ADAMS Template: SECY-067

DOCUMENT DATE: 12/01/1999

TITLE: PRM-026-002 - 64FR67202 - BARRY QUIGLEY; RECEIPT OF PETITION FOR RULEMAKING - CLEAR AND ENFORCEABLE WORKING HOURS

CASE REFERENCE: PRM-026-002

64FR67202

KEY WORD: RULEMAKING COMMENTS

Document Sensitivity: Non-sensitive - SUNSI Review Complete

Docket No.: PRM-026-002

11/16/2000

FR Cite: 64FR67202

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
	Quigley Barry		10/07/1999	09/28/1999	Petition for Rulemaking submitted by Barry Quigley requesting that clear and enforceable working hour limits be instituted to mitigate effects of fatigue for nuclear power plant personnel performing safety-related work	
			12/06/1999	12/01/1999	Federal Register Notice - Petition for Rulemaking; Notice of Receipt	
1	Phyllis and Penny Hanna	Self	12/06/1999	12/01/1999		
2	Susan B. Miller, Ph D.	Self	12/06/1999	12/01/1999		
3	John F. Nagle Professor of Physics and Biological Sciences	Self	12/06/1999	12/01/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
4	Nicholas Harmon	Self	12/06/1999	12/01/1999		
5	Clyde Anderson	Self	12/06/1999	12/02/1999		
6	Betty Streett	Self	12/06/1999	12/02/1999		
7	Bonnie L. Wigen	Self	12/06/1999	12/02/1999		
8	Dr Walter Grant	Self	12/06/1999	12/02/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
9	Elizabeth Claire	Self	12/06/1999	12/02/1999		
10	Barbara Curtis	Self	12/06/1999	12/02/1999		
11	Phyllis J. Raynor	Self	12/06/1999	12/02/1999		
12	C. Alexander Cohen	Self	12/06/1999	12/02/1999		
13	Roger Voelker	Citizens Action Coalition of Indiana	12/06/1999	12/03/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
14	Michel A. Lombard	Self	12/06/1999	12/03/1999		
15	Charles Safiran	Self	12/06/1999	12/03/1999		
16	Paula K. Ivey, Ph.D.	Self	12/06/1999	12/03/1999		
17	Margreta von Pein	Self	12/06/1999	12/03/1999		
18	Kris L Christine	Self	12/06/1999	12/04/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
19	Joan W. Witkin, Ph D	Self	12/07/1999	12/01/1999		
20	Peter Wernick	Self	12/07/1999	12/01/1999		
21	Arthur Unger, M D.	Self	12/07/1999	12/01/1999		
22	James E. Giesen	Self	12/07/1999	12/01/1999		
23	Ludell Deutscher	Self	12/07/1999	12/02/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
24	John Bugge, Ph.D.	Self	12/07/1999	12/02/1999		
25	Jane Kelly	Self	12/07/1999	12/02/1999		
26	Peter Robbins	Self	12/07/1999	12/02/1999		
27	Wes Sanders President	Self	12/07/1999	12/02/1999		
28	James L. Ray	Self	12/07/1999	12/02/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
29	Elizabeth Weiss	Self	12/07/1999	12/02/1999		
30	Mark M Giese	Self	12/07/1999	12/03/1999		
31	David H Walworth, M.D	Self	12/07/1999	12/03/1999		
32	Gerald and Ragan Cavanaugh	Self	12/07/1999	12/03/1999		
33	Larry Little	Self	12/07/1999	12/03/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
34	Gary Matthews	Self	12/07/1999	12/04/1999		
35	Wilbur R DeHart	Self	12/07/1999	12/04/1999		
36	Ruth Niswander	Self	12/07/1999	12/04/1999		
37	Peter W. Blickensderfer	Self	12/07/1999	12/04/1999		
107	Patrick Clark	Self	12/07/1999	12/02/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
38	David Illsley	Self	12/08/1999	12/01/1999		
39	Penny Hanna	Self	12/08/1999	12/02/1999		
40	Richard Cone, M.D	Self	12/08/1999	12/02/1999		
41	Louis D. Smullin	Self	12/08/1999	12/02/1999		
42	Donna Mummery	Self	12/08/1999	12/02/1999		

In the Matter of

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
43	Sarah Miller Moore	Self	12/08/1999	12/02/1999		
44	Amanda Brown	Self	12/08/1999	12/03/1999		
45	David F. Gassman	Self	12/08/1999	12/03/1999		
46	Linda Quinet	Self	12/08/1999	12/08/1999		
47	Louis Putterman	Self	12/08/1999	12/04/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
48	Gene Kostruba	Self	12/08/1999	12/04/1999		
49	Jennifer Willis	Self	12/08/1999	12/06/1999		
50	Bart Ziegler, Ph.D.	Self	12/13/1999	12/02/1999		
51	Barbara C. Sorkin	Self	12/13/1999	12/03/1999		
52	G. F Paskusz	Self	12/13/1999	12/04/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
53	Elliott Krackhardt	Self	12/13/1999	12/04/1999		
54	Nancy Hazard	Self	12/13/1999	12/04/1999		
55	Kipp Davies	Self	12/13/1999	12/04/1999		
56	Dave Dolnick	Self	12/13/1999	12/05/1999		
57	Carol Sydney Marshall	Self	12/13/1999	12/06/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
58	Donald McNellis, M.D.	Self	12/13/1999	12/06/1999		
59	Warren and Joyce Holbrook	Self	12/13/1999	12/06/1999		
60	Ralph and Janine Gunderman	Self	12/13/1999	12/06/1999		
61	Carol Kurz	Self	12/13/1999	12/06/1999		
62	David Mel Paul	Self	12/13/1999	12/06/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
63	John T. Morris	Self	12/13/1999	12/07/1999		
64	Wolfgang Benz	Self	12/13/1999	12/07/1999		
65	Jo Sippie-Gora	Self	12/13/1999	12/09/1999		
66	Jon and Beth Davidson	Self	12/13/1999	12/01/1999		
67	Victoria Kalkirtz	Self	12/13/1999	12/06/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
68	Perley Paap-Crabb	Self	12/13/1999	12/06/1999		
69	J. L. Miller	Self	12/13/1999	12/06/1999		
70	N. Bayer, Jr	Self	12/13/1999	12/06/1999		
71	Erin Ferguson Roger Kruse	Self	12/13/1999	12/06/1999		
72	Christopher J. Demeril	Self	12/13/1999	12/06/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
73	Roger Kruse	Self	12/13/1999	12/06/1999		
74	Lynn B. Fulkerson	Self	12/13/1999	12/06/1999		
75	Laura Magzis, Ph.D.	Self	12/13/1999	12/07/1999		
76	Paul J Deutschman	Self	12/13/1999	12/07/1999		
77	William Hinrichs	Self	12/13/1999	12/07/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
78	Alma Medsker	Self	12/13/1999	12/08/1999		
79	Anna Burton, M.D.	Self	12/13/1999	12/08/1999		
80	Margaret A. Eastman	Self	12/14/1999	12/02/1999		
81	Siobhan McCafferty	Self	12/14/1999	12/02/1999		
82	Mark K. Bennett	Self	12/14/1999	12/07/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
83	Jack and Donna Salem	Self	12/14/1999	12/09/1999		
84	Marion P. Morgan	Self	12/14/1999	12/09/1999		
85	Mila and Enrique Cubillo	Self	12/14/1999	12/10/1999		
86	Carmen Cubillo	Self	12/14/1999	12/10/1999		
87	Richard Lance Christie	Self	12/14/1999	12/10/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
88	Gladys Schmitz, et al.	SSND	12/14/1999	12/10/1999		
89	Walter J. Hipple	Self	12/14/1999	12/11/1999		
90	Jesse and Rose Steinman	Self	12/14/1999	12/12/1999		
91	Joanne McKray	Self	12/16/1999	12/06/1999		
92	Susan W. Small	Self	12/16/1999	12/10/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
98	Richard S. Riggs	Self	12/16/1999	12/11/1999		
94	Virginia F. Walters	Self	12/17/1999	12/13/1999		
95	Leonard A. Van Wyk	Self	12/17/1999	12/13/1999		
96	Sherry Wildfeuer	Self	12/17/1999	12/15/1999		
97	Roger W. Perry, Jr	Self	12/20/1999	12/13/1999		

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FR Cite: 64FR67202

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
98	Joseph D. Jackson	Self	12/20/1999	12/14/1999		
102	D. Jay Doubleday	Self	12/20/1999	12/15/1999		
104	Edward C. Brainard II	Self	12/20/1999	12/16/1999		
99	Bill Hogan	Self	12/21/1999	12/15/1999		
100	William F Hassel, Ph.D	Self	12/21/1999	12/15/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
101	Mary Jane Tate	Self	12/21/1999	12/15/1999		
103	K. Bandell	Self	12/21/1999	12/16/1999		
105	Pat Collier	Self	12/21/1999	12/17/1999		
106	Clare T. Pelkey	Self	12/21/1999	12/18/1999		
108	Gerson T. Lesser, M.D.	Self	12/21/1999	12/05/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
109	Charles S. Watson Professor and Director	Self	12/21/1999	12/06/1999		
110	Bruce Pringle	Self	12/21/1999	12/13/1999		
111	Steven Zack	Self	12/21/1999	12/13/1999		
112	Andrea Schorosch	Self	12/21/1999	12/16/1999		
113	Robert L. Blau	Self	12/27/1999	12/18/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
114	Robert B. Dorsett, M.D.	Self	12/27/1999	12/19/1999		
115	Steven Plotnick	Self	12/27/1999	12/19/1999		
116	Dr. Douglas E. Wingeier	Self	12/27/1999	12/20/1999		
117	George Glen	Self	12/29/1999	12/22/1999		
118	Kathi Lindsay	Self	12/29/1999	12/23/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
119	Jeannette Bowman	Self	12/30/1999	12/01/1999		
120	David G. Schowalter, Ph.D.	Self	01/03/2000	12/23/1999		
121	Jan C. Siren	Self	01/03/2000	12/27/1999		
122	David Buchner	Self	01/04/2000	12/30/1999		
123	Alice V. Uyttebrouck	Self	01/04/2000	12/30/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
124	John Stewart	Self	01/04/2000	12/31/1999		
125	Pat and Dick Clemmer	Self	01/07/2000	12/30/1999		
126	Joan O. King	Self	01/07/2000	01/01/2000		
127	Philip A. Marrone	Self	01/07/2000	01/03/2000		
128	Jeanne D. Lindahl	Self	01/10/2000	01/01/2000		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
129	John S. McAnally	Self	01/10/2000	01/04/2000		
130	Mark K Bennett	Self	01/10/2000	01/05/2000		
131	Beth Singer, Ph.D.	Self	01/10/2000	01/06/2000		
132	Nicole Morris	Self	01/10/2000	01/07/2000		
133	Kathy Van Dame	Self	01/10/2000	01/08/2000		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
134	Steven Turrin	Self	01/10/2000	01/10/2000		
135	Frances Lamberts	Self	01/11/2000	01/07/2000		
136	Conni B. Kulas	Self	01/12/2000	12/09/1999		
137	David Shelton	Self	01/12/2000	12/28/1999		
138	Paul and Wendy Manganiello	Self	01/14/2000	01/05/2000		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
139	William J Baumol Professor of Economics, New York University; Professor Emeritus, Princeton University	Self	01/14/2000	01/07/2000		
140	Joseph A. Yarina	Self	01/21/2000	01/09/2000		
141	Jim Mosser	Self	01/21/2000	01/13/2000		
142	Molly Giller	Self	01/21/2000	01/17/2000		
143	Peter Muise	Self	01/24/2000	01/18/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
144	Thomas V. Connor	Self	01/24/2000	01/21/2000		
145	Leonard S. Hubbard	Self	01/28/2000	01/28/2000		
146	David A. Lochbaum	Union of Concerned Scientists	02/02/2000	01/19/2000		
147	R. Adams	Self	02/09/2000	02/07/2000		
148	Elizabeth M. Wien, Ph.D	Self	02/10/2000	02/07/2000		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
149	Craig Smith Licensed Reactor Operator	Self	02/11/2000	02/06/2000		
150	Raymond Gross	Self	02/14/2000	02/06/2000		
151	James Lemke	Self	02/14/2000	02/13/2000		
152	Robert Kline	Self	02/14/2000	02/13/2000		
153	Mike Jacobson President	Professional Reactor Operator Society	02/14/2000	02/11/2000		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
154	Richard S. Barkley	Self	02/15/2000	02/11/2000		
155	Name not provided	Self	02/15/2000	02/14/2000		
156	Deb Katz Executive Director	Citizens Awareness Network	02/15/2000	02/14/2000		
157	Mark J. Wetterhahn Esquire	Commonwealth Edison, Energy Northwest, Niagara Mohawk Power Corporation, other utilities and NUBARG	02/15/2000	02/14/2000		
158	Michael A Krupa Director, Nuclear Safety & Licensing	Entergy Operations, Inc.	02/16/2000	02/10/2000		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
159	Ted C. Feigenbaum Executive Vice President and Chief Nuclear Officer	North Atlantic Energy Service Corporation	02/16/2000	02/11/2000		
160	Gary J Taylor Vice President, Nuclear Operations	South Carolina Electric & Gas Company	02/16/2000	02/11/2000		
161	Ralph E Beedle Sr. Vice President and Chief Nuclear Officer	Nuclear Energy Institute	02/16/2000	02/14/2000		
162	Patricia H. Seffens	Self	02/18/2000	12/08/1999		
163	James H. McCarthy Manager Nuclear Licensing and Operations Support	Virginia Power	02/22/2000	02/08/2000		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
164	Kenneth Putnam Acting Manager Regulatory Performance	Alliant Energy Corporation - Duane Arnold Energy Center	02/22/2000	02/11/2000		
165	James A. Hutton, Jr. Director - Licensing	PECO Energy Company	02/22/2000	02/14/2000		
166	Chris Bakken Site Vice President	Indiana & Michigan Power Company	02/22/2000	02/14/2000		
167	R. John Gianfrancesco, Jr. Manager	Florida Power & Light Company	02/23/2000	02/09/2000		
168	R. M. Krich Vice President - Regulatory Services	Commonwealth Edison Company	02/23/2000	02/14/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
169	S. L. Bernhoft Director, Nuclear Regulatory Affairs	Florida Power Corporation	02/23/2000	02/14/2000		
170	Mark J Burzynski Manager, Nuclear Licensing	Tennessee Valley Authority	02/23/2000	02/14/2000		
171	John T. Conway Vice President - Nuclear Generation	Niagar Mohawk Power Corporation	02/25/2000	02/15/2000		3686877
172	Gabor Salamon Licensing Manager	Public Service Electric and Gas Company	02/28/2000	02/14/2000		
173	Barry Quigley	Self	02/28/2000	02/28/2000		

Docket No.: PRM-026-002 *11/16/2000*

FR Cite: 64FR67202

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
174	James E. Tomkins Manager Nuclear Safety Assessment and Licensing	Pacific Gas and Electric Company	03/15/2000	03/01/2000		
175	Alan C. Passwater Manager, Corporate Nuclear Services	AmerenUE	03/17/2000	03/10/2000		
176	Tony Zigretti	Self	07/05/2000	07/03/2000		3729647
177	Timothy Coleman	Self	7/14/03	7/1/03		ML032060399

(140)

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'00 JAN 21 P2:41

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RU
ADJUD

Joseph A. Yarina
Fairfield Views, Apt. 10B
3103 Fairfield Avenue
Bronx, New York 10463

January 9, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Re: Limits on employee working hours; employee training

Dear NRC:

I am writing to request that you support both proposed rules that govern limits on the amount of hours a nuclear power plant employee can work and also the rule that protects employees who speak out about safety concerns at the plant. The public needs to be assured that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. It is essential to prevent fatigue from impairing nuclear plant worker performance and to prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down. We must prevent fear from causing nuclear plant workers to remain silent about safety problems and to prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions. Please protect the public and the environment from a nuclear power plant accident buy supporting these two proposed rules. I will be awaiting your response to this letter. Thank you very much for your concern and your time.

Sincerely,

Joseph A. Yarina

Joseph A. Yarina

Acknowledged by card FEB 14 2000

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William Baumol
Director
(212) 998-8943

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Co-Director
(212) 998-8944

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(212) 998-8936

Writer's phone #:
(212) 998-____

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'00 JAN 14 P2:41
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January 7, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Mr. Secretary:

I should like to express my strong support for new rules for the prevention of nuclear accidents that have been proposed by the Union of Concerned Scientists. Of course, there can be no rules that are absolutely fool proof in the prevention of accidents. However, it seems to me that there are, under current arrangements, a number of needless dangers. Considering the magnitude of the resulting peril, it seems to me that the proposed rules are moderate, reasonable, and promise to contribute materially to containment of the problem.

Sincerely,

William J. Baumol

William J. Baumol
Professor of Economics, New York University
Professor Emeritus, Princeton University

WJB:jrl

FEB 14 2000
Acknowledged by card

NUCLEAR REGULATORY COMMISSION
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P.O. Box 1001
Norwich, Vt. 05055
January 5, 2000

Secretary of the Nuclear Regulatory Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Mr. Secretary:

We are writing concerning the work conditions of employees at our Nation's nuclear power plants. There are two proposed rules, which will be discussed shortly.

The first establishes limits on the number of hours an employee may work at a nuclear power plant. These workers are the first lines of defense against a nuclear accident. If they are incapacitated do to fatigue, all of our safety may be compromised. We know that human error has contributed to accidents in the past. Present NRC guidelines limiting workers to 16 hrs per or 72 hrs per week, are not mandatory. The Federal government already imposes work limits on pilots and truck drivers; you should do the same for these workers.

The second proposal will protect individuals who conscientiously raise safety issues. Presently supervisors who claim that they were uninformed about the rights of employees can harass these workers. The proposed rule would remove the" ignorance of the law" excuse by requiring mandatory training of managers and supervisors of the rights of their employees

Please support both proposals so as to better assure the safety of our nation's nuclear power plants

Sincerely yours,

Paul and Wendy Manganiello

Paul and Wendy Manganiello

Acknowledged by card FEB 14 2000

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(64FR67202)

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RUL
ADJUD FF

David Shelton
1932 Sterling Rd
Charlotte NC 28209
704 375 0672
smytor@yahoo.com

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir or Ms.,

I am writing to express my support for the two proposals concerned with limiting working hours and protecting 'whistleblowers' from reprisals by management.

As a private citizen, I feel it is bad enough to have this unwanted industry scattered about the landscape that worries quite a number of people (myself included) who are afraid of being in the way of the next nuclear power plant 'event' without the added concern that power plant employees are working too much overtime and are apt to make errors of judgment. Therefore I feel that it is certainly in the best interest of the American people to be as sure as possible that these employees are alert and competent at all times.

Further, I feel that it is imperative that every employee have the right to voice his/her concerns about possible mismanagement of these facilities without the fear of reprisals.

Please approve both proposals.

Sincerely

David Shelton

FEB 14 2000
Acknowledged by card

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'00 JAN 12 A7:29

Conni B. Kulas
840 Watson Road
Deerfield, OH 44411

December 9, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

To Whom It May Concern:

I am a concerned U.S. Citizen requesting your support of Proposed Rules #1 and #2.

As we all know nuclear energy is essential to today's economy. However, if proper safety measures are not in place, "today's economy" will no longer exist.

The though of a fatigued and job-scared employee being responsible for operation and repair of a nuclear power plant is quite frankly, terrifying. It is imperative that nuclear power plant staff be properly trained in safety measures.

Please consider the magnitude of your responsibility when making your decision on these rules.

Thank you for your time.

Very truly yours,

Conni Kulas

Acknowledged by card FEB 14 2000

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(135)

Frances Lamberts, 113 Ridge Lane, Jonesborough, TN 37659-5800
January 7, 2000

'00 JAN 11 P3:29

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Secretary:

I have had concerns about nuclear power-plant safety for a long time, as the enclosed letter in a local newspaper indicates. Believing as I do, that energy generation from renewable sources has many advantages over energy from other sources, I nonetheless realize that nuclear generation does and will play a part in our energy system. Strengthening safety-enhancing measures at nuclear plants is an important public issue which your Agency must continually evaluate and address.

I understand that you are considering issuance of two relevant rules, one pertaining to managerial staff training on employee legal protection if workers raise safety concerns, and one pertaining to enforcement of limitations on line-staff working hours.

I strongly support such regulation and urge its need in light of both past safety failures at plants and of likelihood of economic/competitive pressures on power producers under anticipated deregulation of the electricity industry. As in many industries, these pressures may encourage work force reductions, and demands for longer hours by workers. The public-safety issue from worker fatigue under excessively long work shifts is clear.

I urge that the new regulations assure short enough shifts to prevent worker fatigue, which could impair their performance. The work shift limitation should be effective when plants are operating, as well as when shut down for safety testing and equipment repair. During the latter tasks and times it would seem especially important that worker alertness and physical ability for maximally effective work be safeguarded.

It is of vital importance to the public that any on-line workers who note and report safety issues be fully protected from intimidation or other, untoward pressures or consequences. Requirement of training for managerial staff on the relevant legal issues and responsibilities should be included in the new regulation. Such training should be as commonplace as workforce training on discriminatory practices. In public or industrial work settings, ignorance of the legal foundations in such areas does not protect employees from consequences of illegal acts. Neither should it in the nuclear industry.

Thank you for considering my comments. In hope of strong new regulations to enhance public confidence in nuclear power-plant safety,

Sincerely,

Frances Lamberts

Enclosure

Acknowledged by card FEB 14 2000

Johnson City Press — LETTERS — Greeneville Sun

Writer: 'Nuclear Energy Not Safe, Not The Answer'

Nov 16, 90

Dear Sir:

A recent editorial in an area newspaper suggested that the U.S. should expand its nuclear energy program. From NIH research results which show that persons living near reactors are not at increased cancer risk from radiation, the editorial seemed to conclude that nuclear energy is safe and could be a viable alternative to fossil fuels.

The nuclear industry is beset with many safety-related problems in the operation of current plants, not to speak of the 40-year-old problem of radioactive waste disposal. The Nuclear Regulatory Commission found it necessary, in 1985, to establish a commission to research surfacing "plant aging" problems of unanticipated magnitude. Premature equipment deterioration has repeatedly resulted in accidents such as at the Surry Power plant near Newport News, Va.

There in 1986, a pipe designed for 40 years of use and carrying water heated to 350 degrees had corroded to less than 1/16th of an inch (within 13 years). Its bursting released 30,000 gallons of the water, critically burning eight workers, four of whom died. The costs of the repair and replacement power were close to $40 million.

The NRC grants power plants a standard operating license of 40 years. Yet more than one in 10 of the commercial nuclear power plants had to be closed with 20 years of licensing, and more than half of those closed were in operation less than 10 years.

The pipes, pumps, valves, generators and electric motors in the back-up, safety and emergency failure-monitoring systems are all subject to such deterioration as caused the Surry accident. Add failures of human performance to equipment failures, then Three mile Island near-disasters, and Chernobyl-type catastrophes do not support so sanguine a view of nuclear energy safety.

The enormous human costs of the Chernobyl accident were highlighted in a recent CBS "Sixty Minutes" report. It stated that an area comparable to the state of Iowa is contaminated *forever*. Tens of thousands of persons continue to have to undergo regular medical checks for radiation effects. Nearly 100,000 persons have been evacuated from contaminated areas, and within the next five years, 200,000 more are to be moved. In Byelorussia, more than two million people need to be relocated, leaving behind their homes, farms, factories, and communities.

Economic costs of this disaster are equally staggering. As reported in the November 1990 issue of "World Watch," official Soviet government figures for the cleanup so far are $19 billion. Cleanup costs are to reach $120 billion by the year 2000.

A study by the government's R&D Institute of Power Engineering found that the accident's total costs will reach $358 billion, comparable to 15 percent of the Soviet GNP in 1987. It concluded that "the Soviet economy would be better off if nuclear reactors had never been built."

It is clear that we must search diligently and urgently for energy solutions. But expansion of nuclear energy should not be among the preferred options.

Frances Lamberts
Route 11
Jonesborough

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(134)

January 10, 2000

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USNRC

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

'00 JAN 10 P4:39

Attention: Rulemakings and Adjudications Staff

OFF
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ADJU

Comment Re: Docket PRM-26-2

As a Licensed SRO, I support a more descriptive regulation on working hours for nuclear plant workers. Some utilities have pushed the limits of the current overtime rule to the point where error likely situations are (have been) present. This proposed rule change by Mr. Quigley is not unreasonable and may help the industry better understand the benefits of an attentive and motivated workforce.

I suggest the following changes to the proposed rule change:

1. (1).a.i. – Allow 72 hours per week. This will allow those on 12-hour shifts to cover two extra days, if needed.
2. (1).a.ii. – Allow 132 hours per two-week period. This would allow #1 above, followed by a week where one extra day could be worked.
   Both of these conditions should be available to ensure a "quality of life" environment for such things as vacation, family & personal illness, special and/or exceptional circumstances, etc. Those available to work these hours should equalize the time to the extent possible.
3. (1).b.ii. – Outages are generally becoming shorter duration. Allowing 144 hours per two-week period is acceptable for these times. This equates to a six-day workweek for those on 12-hour shifts. Often, this amount may not be required, but should be available to workers.

   During the scope of outages, a prepared workforce is trained and energized to perform in a certain style that is significantly different to that online. In times of complicated and coordinated projects, mistakes can be introduced by those new (i.e. being "out of the loop" during lengthy time off) to the project as likely as those with a requisite one day off. This is the exception, not the rule, but one that must be considered in a rulemaking change.

4. Do not include references to sleep disorder symptoms (as in (3).a.iii.) as this is a medical condition that should only be diagnosed by a medical professional. I agree to including disclosure on NRC Form 396 for *known* conditions.

Steven Turrin
2620 Parkway
Rosenberg TX 77471

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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From: Carol Gallagher
To: Adria Byrdsong, David Desaulniers
Date: Mon, Jan 10, 2000 2:19 PM
Subject: Comment on PRM-26-2

Attached is another comment on PRM-26-2 that I received via the rulemaking website. It is from:

Steven E. Turrin
2620 Parkway
Rosenberg TX 77471

Carol

(133)

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'00 JAN 10 P2:14

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

From: kathy or david van dame <dvd.kvd@juno.com>
To: TWFN_DO.twf4_po(CAG)
Date: Sat, Jan 8, 2000 7:34 PM
Subject: Comment Re: Docket PRM-26-2

January 8, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Rulemakings and Adjudications Staff

Comment Re: Docket PRM-26-2

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Nuclear power plant accidents have the potential to injure large amounts of people & cause long lasting damage to the environment, therefore it is very important to take strong measures to insure safety. The workers at these plants are on the front lines in preventing an accident. It is the workers who must be able to prevent accidents, & who will be the ones managing the mitigation if an accident occurs.

Like all critical workers, whether health care workers, air transport controllers & pilots, operators of heavy equipment, indeed all humans; nuclear power plant workers suffer deterioration of performance & judgment in a predictable fashion due to fatigue. Limits on hours worked are a critical safety issue.

As electric utility restructuring proceeds, nuclear power plant owners are under pressure to reduce operating costs. As staff is reduced to reduce costs, the remaining staff members must work longer. Human fatigue contributed to the nuclear accidents at Three Mile Island and Chernobyl. It is important for the NRC to make regulations that prevent excessive overtime for all workers that conduct inspections, work in the control room, or do critical maintenance.

Please engage in rule making that requires adherence to reasonable limits on hours worked. This will prevent fatigue from impairing nuclear plant worker performance and prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down. The operations that occur when the plant is closed down can be just as critical to its safe operation as those when it is operation, & worker fatigue is still important & must be prevented. This issue is too important to be left to toothless guidelines.

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. I believe it is necessary to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

Acknowledged by card FEB 14 2000

Peace,
Kathy Van Dame
1148 East 6600 South #7
Salt Lake City, Utah 84121
(801)261-5989 dvd.kvd@juno.com

(132)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED

Nicole Morris
2710 Galisteo Rd. Apt. C
Santa Fe, NM 87505

'00 JAN 10 P3:29

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington D.C. 20555-0001

To Whom it May Concern:

I am writing to you in support of the two proposed rules that are currently before you. The first rule, to establish limits on employee working hours at nuclear power plants, is a must. As you must know, employee fatigue impairs working ability to a greater degree than your own legal limit for blood alcohol content. You have addressed the issues of alcohol and drug abuse on the job, why not extend that to worker fatigue?

I work a month long night shift two months out of the year. Each time I transition into the work I observe marked differences in my ability to perceive and function properly. I hear voices and other sounds that have no source, my reactions are slow, and it can take awhile for me to recognize what I am seeing. Based solely on my own experience with fatigue, I ask you to really regulate what nuclear plant owners demand from their employees. As with many companies during the 80's and 90's, the shift to a reduction in staff and a greater workload for those who remain, has been the key to greater profitability. To leave decisions like these in the hands of the industry by claiming that "sound management practices" will be more effective than regulations, is to revisit Upton Sinclair's expose on Chicago's meat-packing industry at the turn of our last century*.

I am also in favor of the second proposed rule - training on employee protection regulations to supervisors, managers and directors. Please protect "whistleblowers" with an action greater than a slap on the wrist. These people risk their reputations, their friends, their families, their lives, and their jobs to follow a greater integrity than that of the bottom line. Don't allow their efforts to go to waste by allowing the industry to discriminate against them. No industry is "ignorant of the law"; it is only as blind as we allow it to be.

Sincerely,

Nicole Morris

* I refer, of course, to Upton Sinclair's, The Jungle.

Acknowledged by card FEB 14 2000

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(131)

BETH J. SINGER PH.D.
362 PENINSULA BOULEVARD
LYNBROOK, NY 11563-3110

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USNRC

'00 JAN 10 P3:28

OFFICE OF SECRETARY
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January 6, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Mr. Secretary:

I strongly urge passage of the proposed rule limiting the hours employees at nuclear power plants are permitted to work. This is extremely important in order to prevent errors due to fatigue.

I also urge that the proposed rule requiring nuclear plant owners to provide training for supervisors, managers, and directors on employee protection regulations. These regulations must be enforced.

Sincerely yours,

Beth J. Singer
Professor of Philosophy Emerita
Brooklyn College
The City University of New York

Acknowledged by card FEB 14 2000

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'00 JAN 10 P3:29

OFFICE OF SECRETARY
ADJUDICATIONS

January 5, 2000

Dear Secretary of the NRC Commission:

Back in December I sent you a letter urging you to support a couple of proposed rules to ensure the protection of the public and the environment against/from a nuclear power plant accident.

Again, let me reiterate my support for the proposed rule on establishing limits on employee working hours at nuclear power plants.

[redacted] I trust you'll do the right thing.

Peace — Mark K Bennett 513 K Street Davis, CA 95616

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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(64FR67202)

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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKETED
USNRC

'00 JAN 10 P3:28

I write to support the proposed rule changes that will establish limits on working hours for nuclear power plant employees and that will protect those employees from retaliation when safety problems are reported.

Acknowledged by card FEB 14 2000

Individuals engaged in control operations requiring constant attention are subject to fatigue, with its ensuing decline in the ability to make critical judgments and decisions. Truck drivers and airline pilots have mandatory limits on working time. It is at least as important to extend the same protection to persons controlling nuclear power plants.

Those employees should also be protected, in no other way can the public be sheltered from potential danger, when they report safety violations or hazardous conditions. In our automated and profit driven society there have been too many instances of corporate malfeasance hidden from regulators by threats to employees of retaliatory measures.

Please accept a photocopy. I left the original in the copying machine.

John S. McAnally

John S. McAnally

JOHN S. McANALLY
PO BOX 1204
PORT TOWNSEND, WA
98368

U.S. NUCLEAR REGULATORY COMMISSION
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'00 JAN 10 P3:29

(128)

2003 N. Santa Fe
Tulsa, OK 74127
January 1, 2000

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Commission Members,

I write in support of the Union of Concerned Scientists' proposed rules to help ensure that nuclear workers are an effective line of defense against nuclear power plant accidents.

It is essential that employee working hours be limited so as to maintain the alertness required to prevent accidents.

It is also essential that workers that conscientiously raise safety concerns be protected from harassment and intimidation from their superiors. "Ignorance" of the law against harassment, firing, or discriminating against "whistleblowers" would be invalid if training on employee protection regulations was properly conducted.

I urge your implementation of the proposed rules.

Sincerely,
Jeanne D. Lindahl

Acknowledged by card FEB 14 2000

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

20 Hancock St.
Everett, MA 02149

'00 JAN -7 P2:54

January 3, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir,

I would like to voice my support for two new proposed rules. The first proposed rule is one to establish limits on employee working hours at nuclear power plants. The second proposed rule is one to provide training on employee protection regulations to supervisors, managers, and directors at nuclear power plants in order to protect employees who act as "whistleblowers".

Imposing working hour limits is not new for a government agency and is necessary to ensure that economic interests by power plant corporations do not violate safety, which is particularly important when dealing with nuclear power. Likewise, protection for whistleblowers is essential for ensuring that those closest to everyday plant operation voice safety concerns if they arise without fear of repercussion. Educating supervisors of employee rights will eliminate a large loophole that allows whistleblowers to be harassed and/or fired because their supervisors are not aware that this is illegal.

Both new rules are essential for preventing fatigue from impairing nuclear plant worker performance (whether the plant is operating or shutdown), fear from causing plant workers to remain silent regarding safety problems, and supervisors from using "ignorance of the law" as a shield for their illegal actions. Ultimately and most importantly, both proposed rules will also help better protect the public and environment from a nuclear power accident.

Sincerely

Philip A. Marrone

Philip A. Marrone

FEB 14 2000

Acknowledged by card .....

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SNRC

'00 JAN -7 P2:55

January 1, 2000
304 Manor Drive
Sautee, GA 30571

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

To the NRC,

I have followed nuclear issues for a number of years and have a fairly good layman's understanding of both the technical and the political problems involved. I am very concerned about deregulation of the nation's electrical utilities and the possible effect it may have on our nuclear power plants.

I have learned of two new proposed NRC rulings under consideration, one involving workers hours and the other involving whistle-blowers protection. I support both.

We now know falling asleep at the wheel causes at least as many accidents as driving under the influence. We certainly don't want nuclear operators falling asleep on the job.

I have met with nuclear whistle-blowers and heard personally of the hostility they face when they report mismanagement or cover-up at a nuclear plant. This should never happen.

For these personal reasons, I urge the NRC to tighten all controls and standards at the nation's nuclear plants. These are not ordinary commercial businesses that can be allowed to cut corners or hide their mistakes as others sometimes do. It is the NRC's job to see that it doesn't happen.

Sincerely,

Joan O. King

Joan O. King

Acknowledged by card FEB 14 2000

(125)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'00 JAN -7 P2:53

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Protecting Americans from Fatigued Nuclear Workers Afraid to Voice Safety Concerns

We are writing to indicate our support for Proposals #1 and #2, to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. These two rules are essential to:

-prevent fatigue from impairing nuclear plant worker performance
-prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
-prevent fear from causing nuclear plant workers to remain silent about safety problems
-prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
-protect the public and the environment from a nuclear power plant accident

Pat and Dick Clemmer
4413 Claremore Drive
Edina, MN 55435
r.clemmer@gte.net

FEB 14 2000
Acknowledged by card

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKET NUMBER
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USNRC

'00 JAN -4 P3:39

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

I am writing today to express my support for proposed rules intended to protect Americans from fatigued nuclear workers, who through no fault of their own could potentially cause problems in their work environments. I am also writing in support of workers who raise safety concerns.

As you are no doubt aware, a nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident.

The two proposed rules to help encourage a climate of safety at our nuclear plants:

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants. This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC currently has no regulations against excessive overtime.

The Union of Concerned Scientists released a report in March 1999 on the nuclear industry's overtime problems. This report, which is available on the Internet at http://www.tirednukes.org, documented scientific studies which have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%. Regulation implemented by the NRC in the 1980s ban workers with a blood alcohol level greater than 0.04% from nuclear power plants.

The NRC introduced guidelines on working hour limits in 1982. The NRC's guidelines limit workers to 16 hours per day and 72 hours per week. But these guidelines only specifically apply to control room operators and key maintenance personnel. Managers, safety inspectors, engineers, and other plant workers are not explicitly covered by these NRC's guidelines. In addition, the NRC lacks the ability to force plant owners to adhere to these working hour limits – for control room operators and other workers – because they were issued as mere guidelines. It is my belief that it is time for the NRC to update these guidelines to cover all personnel working in a nuclear plant, and to give them the force of law, which would allow the NRC to actually enforce them.

Worse still, the NRC recently opted to consider the guidelines to apply only when a nuclear power plant is running. Thus, plant owners force workers to put in 12 and 16 hour days for weeks on end during refueling outages. The NRC allows fatigued workers during outages because the plants are shut down at the time. The NRC's logic is dumbfounding. ALL of the maintenance on jet airliners is performed when the planes are on the ground. But the FAA would not permit this maintenance to be performed by drunken maintenance crews – which is the state the workers at nuclear power plants find themselves in, according to the study referenced above. The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the government to implement the same rules on those

Acknowledged by card FEB 14 2000

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who work at critical facilities like power plants, for their safety as well as our collective well-being, and these rules should be applied regardless of whether or not a plant is operating.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors. The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. However, I am informed that the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

The NRC's regulations protect nuclear workers from harassment and intimidation. When these regulations are violated, the NRC can take actions against the worker's employer and also against the responsible individual(s). Unfortunately, the NRC is only doing half its job.

After determining who harassed and intimidated a nuclear worker for raising a safety concern, the NRC limits its sanctions to the company. In 1999 alone, the NRC imposed fines of $110,000 on the owners of the Perry and Zion nuclear plants and $80,000 fines on the owners of the Seabrook and Millstone plants. In each of these cases, and in very few of the dozens of similar cases since 1996, the NRC elected not to take sanctions against the individuals doing the illegal actions. By regulation, the NRC can take actions against individuals up to and including banning them from the nuclear industry. By practice, the NRC rarely holds individuals accountable for breaking employee protection regulations – *a serious flaw.*

The NRC maintains that it cannot impose sanctions against the people it determines have broken the employee protection regulations unless it can prove that these individuals knew that their actions were illegal. Thus, "ignorance of the law," which is not a viable defense in *any other US legal proceeding*, is a valid excuse in the NRC's short-sighted eyes.

By claiming to be ignorant of the employee protection regulations, nuclear power plant supervisors and managers can fire workers who raise safety concerns -- and thereby silencing all surviving workers in the future -- with the implicit blessing of the NRC. If caught taking illegal action against a whistleblower, the NRC will -- at worst -- impose a $110,000 fine on the company. Considering that each day that a nuclear power plant is shut down can cost the company $249,000 to $330,000 in lost revenue, a $110,000 fine is hardly an effective deterrent. Today, the risk/reward balance is heavily tilted towards law-breaking managers at the expense of law-abiding workers. That's nonsensical. It is high time for the NRC to force the industry to train all its management employees on employee protection regulations. A single new rule would eliminate once and for all the "ignorance of the law" excuse. In the future, NRC would have no reason to set aside sanctions against individuals breaking the employee protection regulations.

The Union of Concerned Scientsits believes that personal accountability will be far more effective in reducing harassment and intimidation against nuclear workers than the NRC's past practice of the occasional fine against companies.

It is my belief that **both** of the above rules are essential, in order to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

I urget the Commission to adopt both proposed rules at your earliest convenience.

Sincerely,



John Stewart
941 25th Ave.
Seattle, WA 98122

(123)

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'00 JAN -4 P3:40

Dec. 30, 1999.

I am writing today to urge you to implement two proposed rules regarding working conditions at Nuclear Power plants.

Proposed rule #1. Establish limits on employee working hours at nuclear power plants. Worker fatigue can seriously impair good judgment and the ability to perform manual tasks without making grave mistakes. I know from experience driving that even modest levels of fatigue can have dangerous effects on the ability to perform adequately. The transportation department just released a study concluding that there are 1500 driver fatalities each year due to fatigue. Why would we want tired workers handling spent fuel at nuclear power plants during a refueling outage ? Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Why do we continue to take risks by allowing Utility companies to require massive overtime from nuclear plant workers ?

Proposed rule #2. Train plant supervisors, managers, and directors on the existing rules protecting whistle blowers from harassment and intimidation. Rules that allow managers retaliate against whistle blowers by claiming ignorance of the laws is ridiculous. No where else is this nation built on the rule of law is "ignorance of the law" a valid defense. Why should it be so in such a dangerous area of endeavor as the the safe operation of a nuclear power plant ? This is beyond comprehension. It seems that the NRC is entirely beholden to the moneyed interests of the electric power industry.

The implementation of these rules are absolutely necessary to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

I think that the role of the NRC should be to shepherd the United States through this dangerous period, to see to it that our nuclear power plants are managed in the safest manner possible until they are all shut down, decommissioned and entombed. After this the NRC can put it's considerable talent into helping to design and operate the many solar power plants that will be using by then.

Adopting these two proposed rules will help insure this bright future.

Thank You,

Alice V. Clyttebrouck

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Secretary of the Commission
U S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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'00 JAN -4 P3:40

Dec. 30, 1999

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Proposed rule #1. Establish limits on employee working hours at nuclear power plants. Worker fatigue can seriously impair good judgment and the ability to perform manual tasks without making grave mistakes. I know from experience driving that even modest levels of fatigue can have dangerous effects on the ability to perform adequately. The transportation department just released a study concluding that there are 1500 driver fatalities each year due to fatigue. Why would we want tired workers handling spent fuel at nuclear power plants during a refueling outage ? Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Why do we continue to take risks by allowing Utility companies to require massive overtime from nuclear plant workers ?

Proposed rule #2. Train plant supervisors, managers, and directors on the existing rules protecting whistle blowers from harassment and intimidation. Rules that allow managers retaliate against whistle blowers by claiming ignorance of the laws is ridiculous. No where else is this nation built on the rule of law is "ignorance of the law" a valid defense. Why should it be so in such a dangerous area of endeavor as the the safe operation of a nuclear power plant ? This is beyond comprehension. It seems that the NRC is entirely beholden to the moneyed interests of the electric power industry.

The implementation of these rules are absolutely necessary to:

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- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
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- protect the public and the environment from a nuclear power plant accident

I think that the role of the NRC should be to shepherd the United States through this dangerous period, to see to it that our nuclear power plants are managed in the safest manner possible until they are all shut down, decommissioned and entombed. After this the NRC can put it's considerable talent into helping to design and operate the many solar power plants that will be using by then.

Adopting these two proposed rules will help insure this bright future.

Thank You,

David Buchner

David Buchner
110 Mohawk Dr.
Clarendon Hills, IL. 60514

Acknowledged by card FEB 14 2000

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'00 JAN -3 P3:46

OFF
RUL
ADJUD

Jan C. Siren
3280 Fairview Drive
Melbourne, FL 32934

December 27, 1999

Secretary of the Commission
Nuclear Regulatory Commission
Washington, DC 20555-0001

To: Whom It May Concern

I am writing as a private citizen.

The following comment concerns Proposed Rule #1 on employee working hour limits.

Protection of the public from the adverse consequences of nuclear power plant accidents must be the highest priority, not only during the hours of operation of the plants, but also during down-time for refueling, periodic maintenance, and plant modifications and upgrades. Fatigued workers cannot be expected to perform at full efficiency. Therefore, the proposed rule regarding limiting employee working hours is the minimum reasonable action that should be taken to prevent avoidable accidents due to worker fatigue, and thereby protect the safety of the public.

Sincerely,

Jan C. Siren

Jan C. Siren

cc: Union of Concerned Scientists

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKETED

December 23, 1999

'00 JAN -3 P3 29

David G. Schowalter, Ph.D.
378 Walker Rd.
Grantham, NH 03753

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Secretary:

I am writing to you in support of two proposed rules before the commission. The first is a rule to establish limits on employee working hours at nuclear power plants. The second concerns training on employee protection regulations to supervisors, managers, and directors.

Recent scientific studies have shown that being awake for seventeen hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%. Regulations implemented by the NRC ban workers with a blood alcohol level greater than 0.04% from nuclear power plants. Although NRC guidelines enacted in 1982 limit workers to sixteen hours per day and seventy-two hours per week, this applies only to control room operators and key maintenance personnel, not to managers, safety inspectors, engineers, and other plant workers. Even for the control room operators, the NRC has no authority to enforce these limits because they were only enacted as guidelines. Given the potential risks of human error at nuclear power plants, I implore you to impose and enforce working hour limits at nuclear power plants.

Currently, a manager or supervisor illegally firing a worker who raises safety concerns can so so with impunity due to a loophole known as "ignorance of the law." Although a power plant can be fined for such behavior, there is no way to enforce personal accountability. This loophole can be closed by requiring supervisors, managers, and directors in the nuclear industry to be trained on employee protection regulations. I believe it is imperative that this new rule be enacted.

Nuclear power is a very important source of power in this country. It is also one of the most dangerous. The above rules provide relatively simple avenues for ensuring that the industry follows safe practices.

Sincerely,

David G. Schowalter, Ph.D.

Acknowledged by card FEB 14 2000

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USNRC

'99 DEC 30 P3:59

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RULEMAKINGS AND
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

From: "Bowman, Jeannette" <JBowman@idahopower.com>
To: "'nrcweb@nrc.gov'" <nrcweb@nrc.gov>
Date: Wed, Dec 1, 1999 6:44 PM
Subject: Proposed Rules

Dear NRC Secretary:

Adopting safeguards against a nuclear disaster are essential. I support the proposed rules offered by the Union of Concerned Scientists to:

1. Establish limits on employee working hours at nuclear power plants, whether the plants are working or not.

2. Require nuclear plant owners to train supervisors and managers on the employee protection regulations. Fines to companies are only seen as a "price of doing business." Only by making individuals accountable will problems ever have a chance of being solved.

Thank you for your consideration of my remarks.

Jeannette Bowman
Pricing & Regulatory Services
CHQ-9 X-2718

(208) 388-2718 - Phone
(208) 388-6936 - Fax
jbowman@idahopower.com

Acknowledged by E-mail FEB 14 2000

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(118)

Kathi Lindsay

DOCKET NUMBER
PETITION RULE PRM 26-2 (64FR67202)

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USNRC

'99 DEC 29 P5:26

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

To Whom It May Concern:

I am writing regarding two proposed rules the NRC is studying to determine their effect on safety. The first rule establishes limits on employee working hours at nuclear power plants. Studies, as well as common sense, indicate the impairment on judgment which comes when a person is fatigued. It makes sense in the nuclear energy industry, to have rules determining the number of hours a worker can safely perform his or her job. The trucking industry is another industry that has researched and put into effect limits on the hours worked by its employees. In that industry, as should be in the nuclear energy industry, the safety of the workers and the public were tantamount to the decision.

The second proposed rule concerns providing training to supervisors and managers to ensure their awareness of regulations protecting "whistleblowers" from being harassed or intimidated as a result of reporting unsafe conditions. According to my sources, the NRC often excuses those in charge from these regulations based on the rationale that they are unaware of them. As a teacher in the public schools, I cannot fathom such a thing within any system responsible for anything of importance. I cannot imagine my superiors being excused from their actions because they were unaware of the regulations, nor can I imagine a teacher being excused for such a reason. Shouldn't the nuclear industry be at least as responsible to the public and to its workers as the public schools? I would think you would do all you could to encourage workers to step forward with information on conditions that might jeopardize the safety and health of people and the environment.

Please support both the rules discussed above. To do so protects workers, the public and the environment. To neglect to do so is to invite disaster to occur. A proactive stance at this time is much better than a reactive one when a preventable accident occurs.

Thank you for your time and consideration in these matters. Please let me know what decision the NRC makes on these rules.

Sincerely,

Kathi Lindsay

Kathi Lindsay

FEB 14 2000
Acknowledged by card

6700 EAST LINDSEY NORMAN, OKLAHOMA 73071 405 321-1576

U.S. NUCLEAR REGULATORY COMMISSION
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(117)

George Glan
569 Warm Springs Drive
Fairborn OH 45324-5930

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USNRC

DOCKET NUMBER
PETITION RULE PRM26-2
(64FR67202)

'99 DEC 29 A9:12
OF
RUL
ADJU STAFF

December 22, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

Dear Sir:

I wish to make few comments in support of proposed rules which are essential to protect workers employed at the nuclear power plants.

1. Prevent fatigue that would impair the performance of the nuclear plant worker.
2. Prevent fatigued workers from repairing, inspecting and testing safety equipment when nuclear power plants are operating or are shut down.
3. Prevent fear from causing nuclear plant workers to remain silent about safety problems.
4. Prevent supervisors, managers and directors from using "ignorance of the law" as a shield for their illegal actions.
5. Protect the public and the environment from a possible nuclear power plant accident.

The Union of Concerned Scientists petitioned the Nuclear Regulatory Commission to adopt a rule requiring supervisors, managers and directors in the nuclear industry to be trained on employee protection regulations. This new rule would eliminate once and for all the "ignorance of the law" excuse. In the future you would have no reason to set aside sanctions against individuals breaking the employee protection regulations. UCS's proposed new rule was published in the Federal Register on October 27, 1999.

It is time for the Federal Government to impose working hour limits on employees at nuclear power plants. The proposed rule was published in the Federal Register on December 1, 1999.

It is believed that personal accountability will be far more effective in reducing harassment and intimidation against nuclear workers than your past practice of the occasional fine against companies.

Sincerely,

George Glan

12/22/99

Acknowledged by card FEB 14 2000

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'99 DEC 27 A10:57

36 Bust-O-Dawn Drive
Waynesville, NC 28786
20 December 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Friends:

I write to urge you to support two proposed rules--#1, to establish limits on employee working hours at nuclear power plants, and #2 to protect nuclear "whistleblowers," the plant workers who conscientiously raise safety concerns. Thewe rules will help ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination.

I believe that these two rules are essential to:

--prevent fatigue from impairing nuclear plant worker performance;
--prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down;
--prevent fear from causing nuclear plant workers to remain silent about safety problems;
--prevent supervisors, managers, and directors from using "ignorance of the law' as a shield for their illegal actions; and
--protect the public and the environment from a nuclear power plant accident.

I hope you see the wisdom and crucial necessity of these rules, and will enact and enforce them as soon as possible.

Sincerely yours,

Douglas E. Wingeier

Dr. Douglas E. Wingeier

copy: Eric Wesselman, Energy Field Coordinator, Union of Concerned Scientists

Acknowledged by card FEB 14 2000

(115)

DOCKETED
USNRC

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC 27 A10:55

OFF
RU
ADJ

Dec. 19, 1999
THE POSTBOX COLLECTION



Hon. Secretary of the Commission,

Please support ruler to eliminate overtime (fatigue) and discrimination against whistle blowers.

Sincerely,
Steven Plotnick

Secretary of the Commission

U.S. Nuclear Regulatory Commission

Washington D.C. 20555-0001

Steven Plotnick
18 Cramer Rd.
Rhinebeck, NY 12572-1104

CLIFFS AT SUNSET,
GRAND CANYON NATIONAL PARK
Photo © William Neill

FEB 14 2000
Acknowledged by card

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(114)



Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

December 19, 1999

Dear Sir,

I am writing to encourage the Nuclear Regulatory Commission to adopt rules to 1) limit working hours by workers in nuclear facilities and 2) require training of supervisors in nuclear facilities about regulations regarding the rights of whistleblowers. These rules are essential in order to

-- prevent fatigue from impairing nuclear plant worker performance
-- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
-- prevent fear from causing nuclear plant workers to remain silent about safety problems
-- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for illegal firing of whistleblowers

These rules will help to protect the public and the environment from a nuclear power plant accident.

Thank you for your consideration.

Sincerely,

Robert B. Dorsett, MD
Member, Union of Concerned Scientists
127 Park St.
Meeker, CO 81641
rdorsett@amigo.net

Acknowledged by card

(113)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

8100 Parkdale Drive
Austin, TX 78757

December 18, 1999

'99 DEC 27 P5:52

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

I am writing to urge the adoption of two proposed rules before the Nuclear Regulatory Commission (NRC). The first is a proposal to establish limits on employee working hours at nuclear power plants. The second is a proposal to protect whistleblowers by requiring that management personnel at nuclear plants be educated on employee protection regulations.

Limiting employee working hours at a nuclear power plant seems like a real no-brainer to me. I was appalled to learn that such a rule was not already in effect. I feel kind of like a sky diver about to make a jump, having just been informed that my parachute was folded by someone who hadn't slept for 17 hours. Putting a nuclear power plant in the hands of fatigued workers, whether they are handling the plutonium or doing a safety inspection, is just crazy.

As to educating management about employee protection regulations, ... Sorry, but that one's a no-brainer, too. Do we really intend to protect whistleblowers, or are those regulations a cynical sop to public opinion? In an industry as perilous as the nuclear energy industry, can we afford not to protect whistleblowers?

Please adopt these common-sense rules.

Thank you.

Sincerely,

Robert L. Blau

Robert L. Blau

Acknowledged by card FEB 14 2000

(112)

To whom it may concern:

I am writing in support of both proposed rules which would ensure that nuclear power plants are staffed by workers who are free from both fatigue and fear of illegal discrimination.

Andrea Schorosch

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC 21 P4:22

Andrea Schorosch
Box 575221, New South
Georgetown University

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

Steven Zack
1308 Oxmead Road
Burlington, NJ 08016-4208

December 13, 1999 '99 DEC 21 P4:21

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

To the Secretary of the Commission,

To provide for the safety of Americans everywhere, and particularly for those citizens who live in close proximity to nuclear power plants I believe it is imperative that you ensure that the working conditions at a nuclear plant provide the utmost in safety for the public.

Specifically, there should be limits on how many hours an employee can be forced to work, no matter whether the plant is operating or not. Similar rules apply to truck driver, airline pilots, and airplane maintenance employees. Given the fact that a human error at a nuclear power plant could cause injury and death to an even greater number of citizens I find it unconscionable that the same rules do not apply to nuclear plants.

In addition, whistleblowers at nuclear plants should be afforded every possible measure of protection to ensure that they cannot be harassed or intimidated by management when they bring forth safety concerns. "Ignorance of the law" is not an excuse for any other type of illegal behavior and there is no reason this should be acceptable when it comes to nuclear power plants. There have been dozens of cases where employees have alerted the public to serious safety concerns at a plant that would have otherwise been overlooked. I do not believe we should wait for a serious accident such as occurred at Chernobyl before we take measures to prevent this type of situation.

Thank you for your consideration of this matter.

Sincerely,

Steven Zack

Steven Zack

FEB 14 2000
Acknowledged by card

U.S. NUCLEAR REGULATORY COMMISSION
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(64FR67202)

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'99 DEC 21 P4:21

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

Bruce Pringle
17037 12th Place S.W.
Seattle, WA 98166
(206) 241-2452
pringb@compuserve.com

December 13, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Proposed regulations for power plants

Dear Sir or Madam:

An accident at a nuclear power plant could be a terrible disaster. We depend upon alert and effective workers at these plants to watch for danger signs and take preventive action.

It is very important to adopt two proposed regulations: (1) to establish limits on working hours for employees of nuclear power plants, and (2) to require training on employee protection regulations for supervisors, managers, and directors of nuclear power plants—so that it will be clear that regulations protecting whistle blowers must be enforced.

Thank you,

Bruce Pringle

FEB 14 2000
Acknowledged by card .....

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'99 DEC 21 P4:28

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

From: "Chuck Watson" <watson@indiana.edu>
To: "Carol Gallagher" <CAG@nrc.gov>
Date: Mon, Dec 6, 1999 11:58 AM
Subject: RE: Decision on proposed rules

Ms. Gallagher,

Here are the proposed rules to which I was referring. Certainly my concerns are also relevant to any other proposed protections along the same lines, of which I may be unaware. Thanks for getting back to me.
(The descriptions were those circulated by the Union of Concerned Scientists.)

csw

* Proposed Rule #1 - Establish limits on employee
> working hours at nuclear power plants:
> This rule will make the NRC guard against human
> performance degradation from fatigue just as it has
> done for drug and alcohol use since the mid 1980s.
> With the onset of electric utility restructuring,
> nuclear power plant owners face pressure to slash
> operating costs, forcing plant owners to reduce
> staffing levels. The remaining staff members must work
> longer and longer hours. Numerous studies have
> concluded that fatigue impairs human performance.
> Human performance problems contributed to the nuclear
> accidents at Three Mile Island and Chernobyl. Despite
> this evidence, the NRC has no regulations against
> excessive overtime and frequently looks the other way
> when plant owners abuse the agency's overtime
> guidelines.
>
> * Proposed Rule #2 - Training on employee protection
> regulations to supervisors, managers, and directors:
> The second proposed rule will protect nuclear
> "whistleblowers" - the plant workers who
> conscientiously raise safety concerns. The NRC's
> regulations are supposed to protect these workers from
> harassment and intimidation. Unfortunately, the
> agency consistently fails to enforce these regulations
> based on the flimsy rationale that the individuals who
> fire and discriminate against whistleblowers don't
> know that these actions are illegal. The rule removes
> this "ignorance of the law" excuse by requiring
> nuclear plant owners to train supervisors and managers
> on the employee protection regulations.
>

> -----Original Message-----
> From: Carol Gallagher [mailto:CAG@nrc.gov]
> Sent: Friday, December 03, 1999 3:15 PM
> To: watson@indiana.edu
> Subject: Decision on proposed rules

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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>
> Professor Watson,
>
> Your e-mail message to the NRC's Office of Public Affairs
> regarding the subject matter has been forwarded to me for processing.
>
> It appears your comment could apply to one (or more) of several
> petitions for rulemaking that have been published for public
> comment. Please specify which petition (or petitions), by PRM
> number, you are commenting on so that I can have your comment
> docketed properly.
>
> Thank you,
>
> Carol Gallagher
> ca@nrc.gov
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From: "Chuck Watson" <watson@indiana.edu>
To: OWFN_DO.owf1_po(OPA)
Date: Thu, Dec 2, 1999 10:07 AM
Subject: Decision on proposed rules.

PLEASE FORWARD THIS TO THE SECRETARY OF THE NRC, AS I WAS UNABLE TO LOCATE AN EMAIL ADDRESS FOR THE COMMISSION. THANKYOU.

CHARLES S. WATSON
PROFESSOR
INDIANA UNIVERSITY

SIRS,

LIKE MANY OF MY COLLEAGUES I AM VERY CONCERNED ABOUT THE COMMISSION'S CONSIDERATION OF PROPOSED RULES REGARDING NUCLEAR PLANT EMPLOYEES, THEIR WORKING HOURS AND THE TREATMENT OF "WHISTLE BLOWERS". THE SIMPLEST OF VALUE-COST ANALYSES OF THIS PROBLEM CLEARLY FAVORS EXTREME MEASURES TO ASSURE THAT THOSE AT THE CONTROLS NEVER BE OVERLY FATIGUED. LIKEWISE THE SAME ANALYSES RECOMMEND THE UTMOST EFFORT TO PROTECT THOSE WHO REPORT UNSAFE
CONDITIONS AND PRACTICES, AT THE RISK OF THEIR CAREERS.

RESPECTFULLY,

CHARLES S. WATSON,
PROFESSOR AND DIRECTOR,
INSTITUTE FOR THE STUDY OF HUMAN CAPABILITY
INDIANA UNIVERSITY
BLOOMINGTON, INDIANA 47405

(108)

GERSON T. LESSER, M.D.
DEBBIE J. PETERS, J.D.
200 EAST END AVENUE, #7E
NEW YORK, NEW YORK 10128
212-410-5950 (tel)

'99 DEC 21 P4:22

Commission Secretary
US Nuclear Regulatory Committee
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

December 5, 1999

Dear Mr. Secretary:

The aging of nuclear power plants and the cost controls being set by their many new owners set the stage for future accidents.

We urge the NRC to support and act upon: (a) the current proposal to limit plant employee working hours for all employees, including during outages; and (b) the proposed rule for extending training on employee protection regulations. It is essential that "whistle-blowers" be thoroughly protected and that controls regarding supervisors who violate the letter and practice of such protection be enforced and punishments applied.

We look to the NRC to act upon its mandate to protect us and our environment. Three Mile Island and Chernobyl should be, for all of us, daily alarms of future possibilities.

Sincerely,

Gerson T. Lesser, M.D.
Clinical Professor of Medicine
NYU School of Medicine

Debbie J. Peters, J.D.

Acknowledged by card FEB 14 2000

(107)

DOCKETED
USNRC

'99 DEC -7 P3:20

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dec.2,1999

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Mr. Secretary,

I am writing this letter to encourage you to support two proposed rules which are intended to make sure that nuclear workers are fully capable of performing their duties.
Proposed Rule #1 would set limits on employee working hours at nuclear power plants.
Proposed Rule #2 would require nuclear plant owners to train supervisors and managers on employee protection regulations.
These rules will ensure workers capability by eliminating worker fatigue and performance degradation, and by providing freedom to voice their concerns regarding safety of operations without being subjected to harassment and intimidation. These two rules are fundamental to good, safe operation, and are necessary to:
-prevent fatigue from impairing nuclear plant worker performance
-prevent fatigued workers from repairing, inspecting, and testing saftety equipment when nuclear power plants are operating or are shut down
-prevent supervisors, managers, and directors from using " ignorance of the law" as a shield for their illegal actions
-protect the public and the invironment from a nuclear power plant accident

Sincerely,

Patrick Clark
1302 East 95th Ave.
Hutchinson,KS 67502-9017
(316)662-0626
e-mail pdclark@mindspring.com

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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'99 DEC 21 P4:14

OFFICE OF SECRETARY
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330 Alplaus Avenue Apt. D
Alplaus, New York 12008-1012
December 18, 1999

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary,

This is a request that you support both of the following proposed rules:

#1 Training for employees protection regulations – to protect those who conscientiously raise safety concerns;

#2 Establish limits on employee working hours to ensure that the first line of defense is staffed by workers who are free from fatigue and fear of illegal discrimination.

Thank you for considering this request.

Sincerely,

Clare T. Pelkey, CSJ

Clare T. Pelkey, CSJ

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Please make sure that nuclear workers are an effective line of defense against nuclear power plant accidents.

Please establish limits on employee working hours at nuclear power plants that guard against performance degradation from fatigue. Nuclear power plant owners must not be allowed to cut costs by reducing staffing to levels that require remaining staff members to work longer hours.

Please assure that "whistleblowers" - plant workers who conscientiously raise safety concerns, are adequately protected by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations so that "ignorance of the law" cannot excuse harassment and intimidation.

It is essential that you:

- prevent fatigue from impairing nuclear plant worker performance;

- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down;

- prevent fear from causing nuclear plant workers to remain silent about safety problems;

- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions; and

- protect the public and the environment from a nuclear power plant accident.

Please let me know your views on this issue and what action you intend to take.

Thank you.

Sincerely,

Pat Collier

Pat Collier
POB 574
Vashon Island, WA 98070
206 463 3552
pcollier@scn.org

"In our every deliberation, we must consider the impact of our decisions on the next seven generations." From the Great Law of the Iroquois Confederacy

Acknowledged by card FEB 14 2000

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'99 DEC 20 P3:19

Mr. & Mrs. Edward C. Brainard II
23 Roger's Drive
Marion, MA 02738
Tel. & FAX (508)748-0782

Dec. 16, 1999

Secretary Of the Commission
U.S.Nuclear Regulatory Commission
Washington, DC 20555-0001

Subj.: Support of Proposed Rule #1 & 2

Dear Sir;

Please support Proposed Rules #1 &2 which will ensure safer operation of nuclear power plants. The rules will ensure that the first line of defence is staffed by workers who are free from both fatigue and fear of illegal discrimination.

The rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

I thank you in advance for your consideration and support of this very important matter.

Sincerely Yours,

Edward C. Brainard II

Edward C. Brainard II

Acknowledged by card FEB 14 2000

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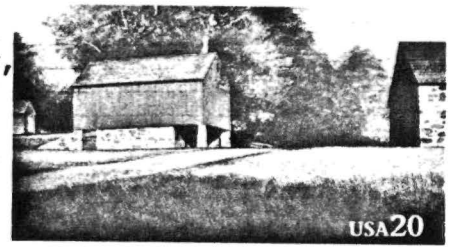
K. Bandell
1065 East Imperial Highway,
Apartment 17
Norwalk, California
90650-2223



Secretary of the Commission
United States Nuclear
Regulatory Commission
Washington, District
of Columbia 20555-0001

December 16, 1999

Dear Sir or Madame:
I type to support proposed changes in rules designed to ensure safe nuclear work places by limiting unrelieved time on front line jobs and designed to abort an ignorance is bliss approach by managers. Rules mandating classes designed to instruct supervisory level personnel on policies, procedures and laws protecting workers from abuse and/or discrimiantion related to good faith efforts to expose safety and other types of problems embody elementary components of standardized orientations.
To wait until an accident secondary to fatigue decimates the health and well being of workers and civilian populations and/or to tolerate the abuse of workers' rights are irresponsible. Please become instrumental in effecting relevant changes. I wish you success in so doing.

Yours truly,
K Bandell
K. Bandell

Acknowledged by card FEB 14 2000

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1559 Indian Creek Loop
Kerrville, TX 78028-1766
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64 FR 67202)

'99 DEC 20 P3:19

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

I am writing to urge the NRC to adopt Proposed Rules #1 and #2 which would establish limits on employee working hours at nuclear power plants and would require training on employee protection regulations for supervisiors, managers and directors.

Rule #1 is needed to:

(1) prevent fatigue from impairing nuclear plant worker performance;
(2) prevent fatigued workers working on safety equipment during operation or shutdown.

Rule #2 is needed to:

(1) encourage nuclear plant workers to freely discuss safety problems;
(2) prevent managers at all levels from using "ignorance of the law" as a shield for illegal activities;
(3) protect the public and the environment from nuclear power plant accidents.

The airwaves are full of talk about accountability. It is time to stop the nonsense where companies are given fines that are not serious penalties and the individuals responsible for violations of policies and rules go scot free on the ground that they are 'ignorant of the law." The training program should absolutely eliminate this weak excuse and the lack of accountability that results.

Thank you for the opportunity to present my views.

Sincerely yours,

D. Jay Doubleday

Acknowledged by card FEB 14 2000

U.S. NUCLEAR REGULATORY COMMISSION
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3381 Oak Knoll Dr.
Paso Robles, CA. 93446

'99 DEC 21 P4:15

Dec. 15, 1999

OFFICE OF SECRETARY
RULEMAKINGS AND
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Secretary of the Commission
U..S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Secretary:

A nuclear power plant accident can cause irreparable damage to the environment and can hurt thousands of people. To help prevent such accidents, I urge you to adopt two proposed rules which will make sure that nuclear workers are an effective line of defense.

First, establish limits on employee working hours at nuclear power plants, thus preventing fatigue from impairing nuclear plant worker performance. Whether the plants are in operation or shut down, nuclear power plant workers need to be alert and vigilant at all times.

Second, give training on employee protection regulations to supervisors and managers and directors. The plant workers who conscientiously raise safety concerns must be protected from harassment and intimidation and those in charge just be made to realize that such treatment is illegal.

Yours truly,

Mary Jane Tate

Mary Jane Tate

Acknowledged by card FEB 14 2000

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PETITION RULE PRM 26-2
(64FR67202)

(100)

William F. Hassel
200 Calle del Norte
Sedona, AZ 86336

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'99 DEC 21 P4:13

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

December 15, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Gentlemen:

I am writing you regarding some proposed rule changes regarding nuclear power plants. One of these addresses limits on employee working hours (Proposed Rule #1). Since the operation of a nuclear plant affects public safety, as a Safety Engineer I am concerned with allowing workers to perform operation, maintenence or repair duties for excessively long hours, allowing deterioration of their attentiveness to their job. Therefore, I urge you to approve the proposed change in working hour limits.

The other item of interest to me is the proposal to provide proper training to the supervisiry staff on employee protection regulations. The public depends for its safety partially on the actions of "whistle-blowers", who report broken equipment and violations of regulations which affect safety when management doesn't listen or respond. Such people should be commended instead of being fired, as often happens. So I urge you also to approve Proposed Rule #2.

Yours sincerely,

William F. Hassel

William F. Hassel, Ph.D., P.E.

Acknowledged by card FEB 14 2000

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2460 E. 72nd Pl.
Chicago, IL 60649
December 15, 1999

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OFFICE OF SECRETARY
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Honorable Secretary:

I am opposed to excessive overtime for Nuclear Power Plant Workers. We in Illinois know of the dangers from the LaSalle & Zion plants. We also know how dangerous the pools of fuel rods are.

We want rad waste contained, not used in the fillings at the dentist office.

I support ending "ignorance of the law" for supervisors & managers. They must be thoroughly trained in employee protection regulations.

Excessive overtime has been promoted to cut costs. This is penny-wise, pound-foolish stuff. Enough is enough!

A concerned consumer
of alternative energies,

Bill Hogan

Acknowledged by card FEB 14 2000

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OFFICE OF SECRETARY
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14 December 1999

Secretary of the Commission
US Nuclear Regulatory Commission (NRC)
Washington DC 20555-0001

RE: Nuclear Plant Safety

Sir;

It has come to my attention that, within the next few months, the NRC will make decisions on two proposed rules. They are intended to ensure that Nuclear plant workers are an effective defense against accidents which have the potential to inflict huge scale and long term damage on our planet and its' inhabitants.

One of the rules would limit employees working hours; to guard against performance degradation caused by fatigue. The NRC already has rules to protect against performance degradation caused by drug and alcohol use. It has also been conclusively demonstrated by scientific study, that fatigue causes the SAME KIND of performance degradation. Human performance problems DID contribute to both of the accidents at the Three Mile Island and Chernobyl Plants. Yet the NRC now takes no action against Plant owners or managers who abuse overtime guidelines. HOLD THEM RESPONSIBLE.

The other rule would mandate training for supervisors, managers, and directors, on employee protection regulations. Both of these NRC rules are essential to creating an effective defense against the causes of accidents, but this second one is CRITICAL. I have good reason to believe that at least two horrendous accidents have ALREADY occurred HERE IN THE UNITED STATES, because those in control failed to heed the voices of technicians with safety concerns. One incident was related to me as having been a Top Secret Military experiment. I have read published accounts of the results of another, which appeared to me to have been "sanitized." There are probably others. The truth about ALL is probably still classified top secret. The worst were apparently not as catastrophic as what happened at Chernobyl, but DID result in immediate deaths and extensive long term health problems for those affected, and in considerable environmental damage as well. I have never had the opportunity to read any official or classified accounts of these military incidents, but I have heard a narrative account of one, from a military individual, who had been in a position to know. That person stated that the information was classified, and demanded that I promise NEVER to identify them as the source. That source sought to obtain protection in THE ONLY WAY AVAILABLE TO THEM. Yet the NRC has allowed just exactly the same situation in the civilian Nuclear Industry since 1974, when Karen Silkwood first spoke out. Only secrecy and irresponsibility are protected. If a worker voices unpopular concerns, they are harassed and/or intimidated, perhaps even clandestinely poisoned, until they are silenced. Current NRC regulations CLAIM to protect them, but do not. Action is taken ONLY against the CORPORATION, leaving the criminal supervisor, manager and/or director to continue the practice. The excuse used to justify this foolishness is that the NRC can not PROVE that the guilty individuals KNEW that their crime was illegal! This is IDIOTIC! If a normal adult drove a car down the street where you live at 80 miles per hour, and killed your child with it, would you conclude that the CAR should be blamed, because the driver had never obtained a driver's license? A corporation is an ARTIFICIAL and FICTITIOUS individual, no more capable of assuming responsibility than that car! MANDATE THIS TRAINING, so that you can HOLD THEM RESPONSIBLE! If you do not, then YOU may one day be indirectly responsible for causing hundreds or thousands of deaths and injuries, resulting from an AVOIDABLE nuclear accident. Some of the victims might even BE you or members of your family. If you do not protect these conscientious workers, then I hope that YOU are held responsible for it, by losing YOUR career, health and peace of mind, as many of them have lost theirs'.

Sincerely,

Joseph D. Jackson
Chemical Corps
US Army Reserve

J.D.J.
1044 WATER ST. PMB 310
PORT TOWNSEND, WA 98368

Acknowledged by card FEB 14 2000

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PETITION RULE PRM 26-2
(64FR67202)

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'99 DEC 20 P3:19

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

13 December 1999

Dear Commissioners;

This letter is written to let you know I support the two proposed rules being considered that are intended to improve safety of nuclear power plants and to help insure that nuclear workers are an effective first line of defense against nuclear accidents.

It is disheartening to think that in an industry as sophisticated, technical and sensitive as nuclear power rules must be promulgated concerning limits of working hours and protection from harassment for employees who conscientiously raise safety concerns. However, having spent 40 years associated with the "medical industry" this does not surprise me.

Everyone knew that fatigued, sleep deprived doctors made more mistakes. Nothing was done. During the 1970's and 1980's numerous studies demonstrated the deterioration of signal recognition, problem solving, short term memory, judgment and motor skills as fatigue and length of sleep deprivation increased. Indeed there developed a significant degree of paranoia in study participants at prolonged periods of fatigue and sleep deprivation, even when they knew it was only a controlled, simulated situation. Nothing was done. Now that the national media has publicized the frequency and cost of medical errors and identified fatigue and lack of sleep as one of the factors maybe something will be done.

The Federal Government has seen fit to impose working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. I believe it is time to impose working hour limits on employees of nuclear power plants that can be enforced whether plants are running or not.

As to "whistleblower protection" I feel that to allow "ignorance of the law" to be an excuse is ridiculous and should not have to be an issue. However since it is, then mandatory training for management should be required. Tell them what you are going to tell them---tell them harassment and intimidation is illegal---tell them what you told them and then make them write it on the blackboard 100 times. Personal accountability will be far more effective than the occasional, inadequate fine against companies.

Living in Maine we feel lucky that concerned workers stepped forward to raise safety concerns that played a role in the premature closing of Maine Yankee. We do not need another Three Mile Island or Chernobyl.

Thank you for your time.

Respectfully,

Roger W. Perry, Jr.

RR 5 Box 1536D
Farmington, ME 04938
207-778-6830

FEB 14 2000
Acknowledged by card

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CAMPHILL VILLAGE KIMBERTON HILLS, INC.
P.O. Box 155, Kimberton, Pennsylvania 19442 / Tel. (610) 935-0300

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PETITION RULE PRM 26-2
(64FR67202)

'99 DEC 17 P3:08

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

Dear Secr. of Commission on Nuclear Regulation

Please support the two proposed rules to

1) Ensure that the first line of defense against nuclear accidents is ~~a~~ workers who are free from fatigue.

2) Ensure that workers who raise consciousness concerning issues of safety are protected from illegal discrimination.

Sincerely,

Sherry Wildfeuer
Po Box 155
Kimberton, PA 19442

FEB 14 2000
Acknowledged by card

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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

Leonard A. VanWyk, Ph.D.
115 Southampton Drive
Harrisonburg, VA 22801
vanwyk@math.jmu.edu
December 13, 1999

Dear Secretary:

I strongly encourage the NRC to establish limits on employee working hours at nuclear power plants *and* to require nuclear plant owners to train supervisors and managers on the NRC's employee protection regulations.

Establishing limits on employee working hours is essential for safety. As a college professor, I can attest to the fact that people (students, in my case) perform far below their potential when fatigued. For college students, the results are simply lower grades; for nuclear power plant employees, the results could be catastrophic.

Educating supervisors, managers, and directors about "whistle-blower" protection laws would protect workers who bring up safety concerns at nuclear power plants from harassment and intimidation. Since such workers are the first line of preventative defense from a nuclear accident, failing to enforce the current protective laws for such employees based on some type of "ignorance of the law" rationale is not a coherent policy.

I trust you will do the logical thing and institute both of these proposed rules.

Sincerely,

Leonard A. VanWyk

Leonard A. VanWyk

FEB 14 2000
Acknowledged by card

U.S. NUCLEAR REGULATORY COMMISSION
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RICHARD and VIRGINIA WALTERS
708 Wake Robin Dr.
Shelburne, VT 05482-7581
(802) 985-9473

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(64FR67202)

OFFICE OF SECRETARY
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December 13, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

We write in support of two new rules regarding nuclear regulations:

1) Establish limits on employee working hours at nuclear power plants.

2) Train supervisors, managers, and directors regarding the employee protection regulation. This rule will protect whistle-blowers who conscientiously raise safety concerns.

These two rules are essential to prevent fatigue from impairing the performance of nuclear plant workers' performance, whether a nuclear power plant is operating or shut down, and will prevent fear from causing nuclear plant workers to remain silent about safety problems.

They will also prevent supervisors, managers, and directors from using "ignorance of the law" to attempt to evade discipline for their illegal actions.

These rules are essential to protect the public and the environment from a nuclear power plant accident.

We urge the Nuclear Regulatory Commission to adopt and enforce these rules.

Sincerely,

Virginia F. Walters

Virginia F. Walters
(Mrs. Richard H. Walters)

Acknowledged by card FEB 14 2000

(93)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'99 DEC 16 A9:44

143 Cedar Grove Rd.
Somerville, NJ 08876
December 11, 1999

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir;

I am writing to encourage the Nuclear Regulatory Commission to support both, Rule 1 which will guard against human performance degradation due to fatigue by limiting workers hours and Rule 2 which will protect nuclear "whistleblowers" who raise safety concerns. These rules are necessary to protect the nuclear plant workers and the American public.

Very truly yours,

Richard S. Riggs

Acknowledged by card JAN 18 2000

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(64FR67202)

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OFFICE OF SECRETARY

Susan W. Small
42 Camino de Caballos
HC 78-9131
Ranchos de Taos, N.M.
87557
(505)737-9681

December 10, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC. 2055-0001

Dear Sir.

I understand that your commission is studying the efficacy of two proposals concerning the safety of the American people against another plant disaster such as Three Mile Island or Chernoble in Russia.

As we know, fatigue does strange things to the mind, so it would be stupid to have employees in the plants, monitoring for safety if their minds are not at top capacity.

I therefore propose that Rule 1 to establish limits on the number of working hours for employees be made regulation for all employees.

For the plant managers and supervisory staff to overlook all safety

JAN 18 2000
Acknowledged by card

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precautions because of a bottom line is truly a criminal act. If the plants can't compete with other forms of energy then they should be shut down. If the owners tell the supervisory staff - ignore the dangers and put the fear of retaliation into anyone who wants to report such a danger, that is an equally criminal act. To use the excuse that the regulations aren't known is pure lie. Of course, they know. Again to punish the "whistleblower" and not the individuals involved is an escape from your rightful duty. Firing a company for 10 minutes of profit is ludicrous. Therefore, I ask that a rule be adopted whereby all managers, supervisors & Directors of the companies be required to know the rules and protect the persons who are trying to do their job for the benefit of all people.

Sincerely yours.

Susan W. Swaze

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(91)

'99 DEC 16 A

601 Ironwood Road
Alameda, CA 94502

December 6, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary:

I am writing concerning two regulations currently being considered by the N.R.C. I urge that both be adopted.

The first one would impose working hour limits on employees at nuclear power plants. This should be enacted because it is even more dangerous to the public to have fatigued power plant workers than fatigued surgeons or airline pilots, in that so many more people are potentially affected.

The second proposed regulation would mandate the training of those in authority regarding employee protection regulations, and then apply sanctions against individuals violating the employee protection regulation. This should be done

Acknowledged by card JAN 18 2000

because brave individuals who speak out in the interests of public safety should be encouraged and protected, not harmed. I am enclosing an article from Sunday's New York Times, concerning attempts to encourage whistle-blowers in the medical field, which I think is pertinent.

It seems obvious to me, and I should think to any reasonable person, that adoption of both these measures is crucial. I urge the commission to do so.

Very truly yours,
Joanne McCray

Editorial and Op-Ed pages, 0-1
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Careers in Education and
Health Care Employment

The New York Times
Week in Review

Sunday, December 5, 1999
Section 4

Do No Harm

Breaking Down Medicine's Culture of Silence

By SHERYL GAY STOLBERG

DR. MICHAEL LEONARD, an anesthesiologist and chief of surgery for Kaiser Permanente in Denver, was operating on a cancer patient a few months ago when he reached into a drawer for medicine. Inside were two vials, side by side. Both had yellow labels. Both had yellow caps. One was a paralyzing agent, which Dr. Leonard had correctly administered to keep the patient still during the operation. The other was the reversal agent, which he needed next. "I grabbed the wrong one," Dr. Leonard recalled. "I used the wrong drug."

It would have been easy for the doctor to keep quiet; the drug wore off and the patient was not harmed. Instead, he talked — to the surgeon and scrub nurses, the patient's wife and the hospital pharmacist, who has since relabeled the paralyzing agents with red stickers and put them in a separate drawer. He also talked to his five partners, whose reaction unnerved him.

"Four of the five of them said, 'You know, I've done the same thing,' " Dr. Leonard said. "One of them said, 'I did the same thing last week.' And I'm thinking, I've been chief of this department for five years. Now I'm chief of surgery. And nobody has ever said to me, 'We have this problem.' A lot of it comes back to this culture of silence."

That culture of silence, and why it needs to be broken, was the unstated theme of a report that shook the medical profession last week. The study, by the independent Institute of Medicine, estimated that in hospitals alone mistakes, from drug mix-ups to surgical errors to misdiagnoses, kill as many as 98,000 people yearly. In addressing basic safety, it said, health care is at least a decade behind other high-risk industries.

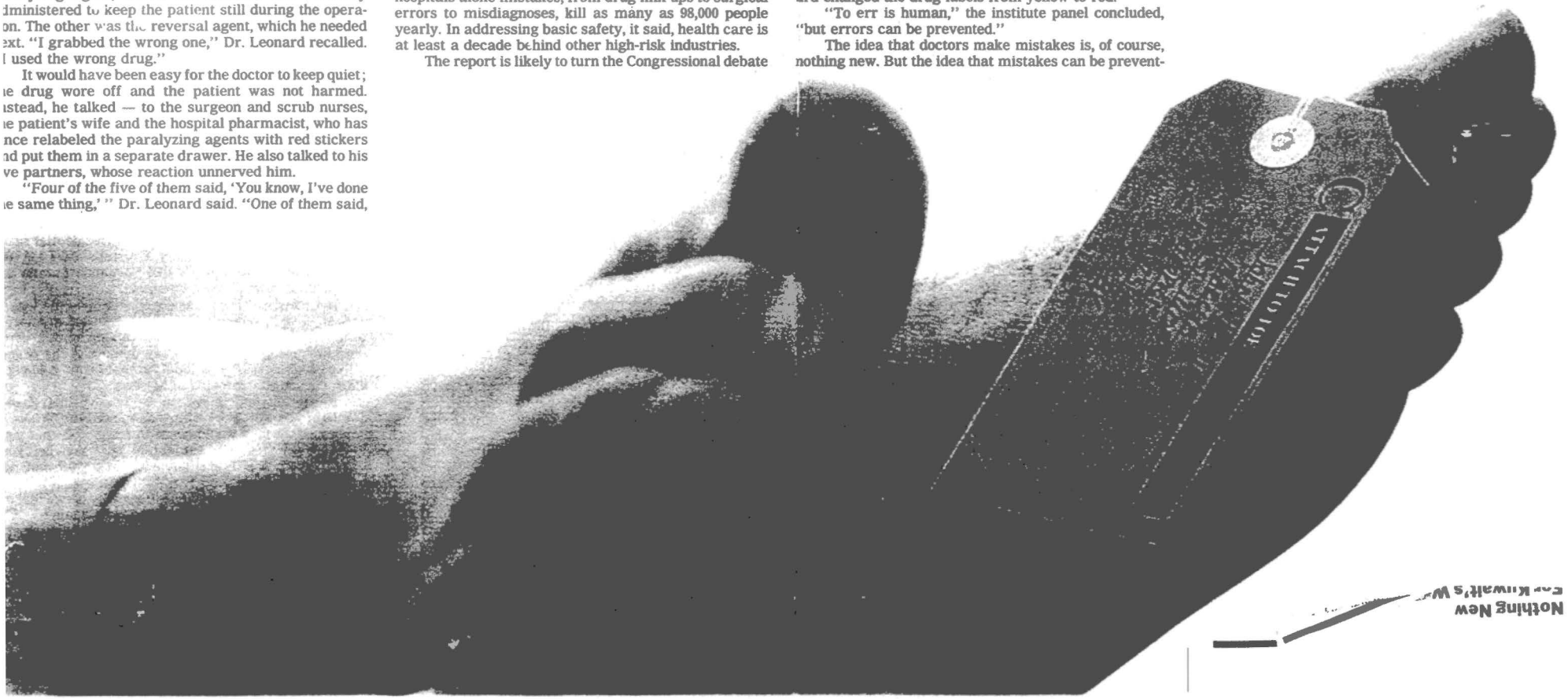
The report is likely to turn the Congressional debate over patients' rights on its head. That discussion revolves around whether patients should be able to sue their health plans; this one revolves around what health care can do to create a climate in which patients are less likely to sue because mistakes are less likely to occur in the first place. The report's authors called on Congress to create a new agency that would collect data on medical errors, analyze their causes, identify trends and recommend changes, in much the same way Dr. Leonard changed the drug labels from yellow to red.

"To err is human," the institute panel concluded, "but errors can be prevented."

The idea that doctors make mistakes is, of course, nothing new. But the idea that mistakes can be prevented by changing systems has been slow to catch on, in part because doctors rarely talk openly about their errors. The pat explanation is that they are afraid of being disciplined, or sued. But it is not the whole truth, says Dr. Lucian Leape, a professor of health policy at Harvard Medical School who studies medical error.

"Physicians are taught that it's your job not to make a mistake," Dr. Leape said. "It's like a sin. The

Continued on Page 18



Breaking Down Medicine's Culture of Silence

Continued From Page 1

whole concept of error as sin, as a moral failing, is deeply ingrained in medicine, and it is very destructive. It means people cannot talk about it, because it is too painful."

There are two ways to think about human error, experts say. Error can be understood as a matter of negligence, a willful disregard for standards. Or it can be understood in the context of normal human frailty. When people hear about medical errors — the surgeon who amputates the wrong leg, the oncologist who delivers a chemotherapy overdose — they assume bad doctors are to blame.

In fact, the opposite is true, says Dr. Donald Berwick, president of the Institute for Healthcare Improvement, a Boston research center. The vast majority of medical mistakes are committed not by bad apples, he says, but by good doctors trying to do the right thing, working under conditions that do not account for the fact that they are human.

Anesthesiologists have already made several equipment changes that have saved thousands of lives and, Dr. Leape said, also cut their malpractice premiums in half.

"You don't get to safe systems that have human beings in them by yelling at them or asking them to try harder," Dr. Berwick said. "You need to engineer the work environment so that normal human limits are respected."

AVIATION has done precisely this over the past two decades. In 1976, the risk of dying in an airplane accident was one in two million; today it is one in eight million. Dr. Robert Helmreich, an expert in human factors analysis at the University of Texas at Austin, said the change came about from pioneering studies that found that the majority of airline accidents are caused not by technical failures but by breakdowns in communications — "exactly the thing that pilots were never taught."

Today, pilots are given intensive training in what Dr. Helmreich calls "the human aspects of flight." Junior pilots — who, like young doctors, may be too intimidated to criticize their superiors — are taught that if they see a mistake, it is their duty to speak up. Simulators teach airline crews teamwork.

For the past several years, Dr. Helmreich has been working to bring these same techniques of "crew resources management" to health care. Dr. Leonard, who is among Dr. Helmreich's disciples, recently visited Southwest Airlines to observe a pilot training session. But just as important as training, the experts say, is a change in culture that makes it permissible to talk about mistakes.

When a plane accident results in death or serious injury, the National Transportation Safety Board investigates. When a hospital patient dies, doctors convene what is known as an "M and M" conference, for morbidity and mortality, to analyze the death and discuss how it might have been prevented. Most doctors find them extremely useful. But there is no way of disseminating these findings nationwide.

That is the role the Institute of Medicine envisions for the new federal agency, which it calls the Center for Patient Safety. Its plan calls for mandatory reports on any mistake that causes death or serious injury, which the agency would collect and make available to the public (including malpractice lawyers).

But the lesson of the airlines is that it is just as important to report mistakes that don't hurt anybody. Aviation has a voluntary system, independent of the Federal Aviation Administration, in which pilots and other crew members submit confidential reports about mistakes. These reports are analyzed and alerts are issued as needed.

"If tomorrow morning, I take off in my airplane and I see a problem in the air traffic system that could lead somebody into the side of a mountain, the whole world of aviation can know about it in the next 24 to 48 hours," said John Nance, an aviation analyst. "'We have been working hard to get rid of the blame culture, which is so imbued in medicine," he added.

But in this litigious society, getting rid of medicine's blame culture may be easier said than done. To foster a better environment for reporting medical mistakes, the institute has recommended that information about errors that were harmless be protected from discovery in a lawsuit, a recommendation that predictably does not sit well with plaintiffs' lawyers.

At the same time, some wonder if it is wise to eliminate the notion of blame completely. "You've got to walk a very delicate line between the responsibility of the individual physician and a recognition that a system can determine behavior and promote error," said Dr. David J. Rothman, professor of social medicine at Columbia University.

THAT line was not lost on me. While preparing this article, I took my 15-month-old to an ear, nose and throat specialist. He prescribed Biaxin, an antibiotic, a half teaspoonful twice a day. Late that night, while I was interviewing Dr. Leape, the specialist left a message on my answering machine saying he had been flipping through his notes to double-check the day's work: the baby's dose was a quarter teaspoon, not half.

My first instinct was anger. How could he make such a mistake? If he had been using a computer to write his prescriptions, I knew, the machine would have checked the dose against my daughter's weight and flagged the error, recognizing the dose as too high. But computers cost money, and in today's managed care environment, most doctors are squeezed for cash. And in any event, as Dr. Leape pointed out, I should have been grateful, not mad. The doctor made a mistake. He caught it. He called me right away. Mistakes happen all the time.

Calculating Costly Mistakes

ALTHOUGH experts believe medical mistakes happen with alarming frequency, there is scant research to document them.

The Institute of Medicine study, which estimated that between 44,000 and 98,000 Americans die each year as a result of medical errors, based those figures on two studies in three states: New York, Utah and Colorado.

The New York study was the most extensive. Dr. Lucian Leape, a professor of health policy at Harvard Medical School, analyzed discharge records of more than 30,000 patients from 51 state hospitals in 1984. He found that 3.7 percent suffered an injury from their treatment that was severe enough to disable them or prolong their hospital stay. Of these injuries, 58 percent were attributed to error; 13.6 percent were fatal.

When extrapolated to the number of people hospitalized in the country in 1997, the institute calculated there were 98,000 deaths.

The Colorado and Utah study, which was conducted in 1992, examined 15,000 records and used similar methodology to reach the lower figure of 44,000.

While there is no way to know if the numbers are going up or down, Dr. Leape said there was "every reason to think they have gone up," because hospital care is more complicated now and patients are sicker. In addition, he said, most medical errors are not reported and many are not recognized, even by the people who make them.

(90)

8207 Calabar Avenue
Playa del Rey, CA 90293

'99 DEC 14 P4:32

12 December 1999

C
AD

Secretary of the Commission
U.S. Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

We strongly support establishing working hour limits throughout the nuclear power industry as is done in other industries critical to peoples safety. It is even more necessary in an industry which has the capability of affecting the lives of tens of thousand people due to worker fatigue. These working hour limits should apply to all times an employee is on the job at the nuclear plant.

We also support the implementation of proposed rule # two. It is quite surprising to us that such a rule does not exist at present. Whistle blowers are an important asset to any company whose misdeeds have the probability of harming a large sector of the population.

As concerned citizens we again urge you to implement these rules.

Thank you
Jesse Steinman
Rose Steinman

Jesse and Rose Steinman

Acknowledged by card JAN 18 2000

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11 December1999
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Colleagues:

I write in support of proposed rule changes which would (1) limit employee working hours at nuclear plants and (2) provide for training of supervisors on employee protection against harassment and intimidation.

1) Fatigue from working excessive hours--or simply from staying awake for excessive hours--has been shown to be as deleterious to performance as blood alcohol levels in excess of accepted guidelines. At present, only a certain few nuclear-plant workers are covered by guidelines limiting their working hours--and that protection is only in the form of guidelines, guidelines which apply only during "up" periods of plant operation.

What is needed--and what the proposed rule change provides--is mandatory limits on working hours for all employees whose performance is pertinent to safe maintenance and operation of nuclear plants, whether the plants are "up" and running or shut down. Human error has been a factor in numerous nuclear accidents and near-accidents, and this safeguard against undue fatigue is one way of minimizing the risk of human error.

2) In the nuclear industry even more than in others, "whistle-blowers" may act as protectors of public safety--and they have in fact done so in numerous cases. There is inadequate protection of the "whistleblowers" themselves, however; the few fines levied against the nuclear companies which have harassed such employees are negligible from the standpoint of those big-budget companies, and the individual personnel responsible for the harassment have not been targeted. Thye can always plead "ignorance of the law."

The proposed rule provides for training of all management personnel to understand the role of "whistleblowers" and the legal protection due to them. Management personnel would thus be individually responsible for their conduct in such matters.

Both of these rule changes seem eminently sensible in providing for increased safety in the nuclear industry, an industry where unsafe practices could have catastrophic consequences. I urge the Nucledar Regulatory Commission to adopt them.

Sincerely,

Walter J. Hipple

(Professor) Walter J. Hipple

328 S Darlington St.
West Chester, PA 19382

2000
JAN 18 1999
Acknowledged by card

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170 Good Counsel Drive
Mankato, MN 56001-3138
December 10, 1999

Secretary of the Commission
Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Commission Secretary,

We have many serious concerns about the safety of nuclear power plants. We are, therefore, writing to urge your support of two proposed rules to protect people from nuclear power plant employees who are fatigued from too long hours and who are afraid to speak out about unsafe conditions.

1.) We ask you to adopt Rule #1 which sets definite limits on the number of hours that a nuclear power plant employee can work inspecting, repairing or testing safety equipment; this should apply whether the plant is operating or shut down. These need to be made mandatory; simply to offer these limits as guidelines is not good enough.

2.) We ask that Rule #2 to protect whistle blowers from being fired, harassed or intimidated in any way be adopted. Power plant owners should be required to train supervisors and managers on the employee protection regulations so that supervisors and managers cannot plead ignorance when breaking employee protection regulations. Simply fining a power plant, especially when the fine is less that the loss of a day's "shut down", will do nothing to deter the company from repeating a breaking of the law if it sees this is to its financial advantage.

We expect the Nuclear Regulatory Commission to act to protect the public. Preventing another Three Mile Island or Chernobyl is necessary not only to protect the American people but also to protect ALL the world's people as well as ALL other forms of life now and for MANY generations to come.

Again, we urge your support of the two proposed rules. Thanks you for your attention to our concerns. We would appreciate a reply.

Sincerely,

Gladys Schmitz, SSND
Denise Coleman SSND
S. Louis Marie SSND
Mary Boylan, S.S.N.D.
Mary T. Bornong, SSND
Harriet F. Zweber SSND
Monica Even SSND
Lucille Matousek
Mary Daniel Leintz
S. M. Lucille SSND
S. Mary Schilling
Miriam Thissen SSND
Marilyn Bambenek SSND
Edna Nosbush SSND

Acknowledged by card JAN 18 ~~1999~~ 2000

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3018 Old City Park Road
Moab, UT 84532
December 10, 1999

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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Gentlemen: RE: Working hours proposed rule published December 1, 1999, in the Federal Register

I support the proposed rule being imposed. The existing NRC guideline limiting control room workers and key maintenance personnel in nuclear power plants to 16 hours work per day and 72 hours per week has no enforcement authority. The guideline does not cover safety inspectors, engineers, and other plant workers; it should. Worse still, the guideline excluded coverage of nuclear power plants during refueling outages, which is when plant workers have most often been obliged to put in 12 to 16-hour days for weeks on end.

With deregulation of the electric utility industry, utility management has strong financial incentives to lower staffing costs if a legal means of doing so is available. A worker who has been at work for 17 hours is as degraded in performance as if he had a blood alcohol level of 0.05%. We do not need impaired, stressed nuclear power workers refueling or operating nuclear power plants. The public welfare and safety is served by having enforceable rules which prevent imposition of undue overtime on nuclear power plant workers whenever they are working with nuclear fueling or operations.

Sincerely yours,

Richard Lance Christie

Richard Lance Christie

Acknowledged by card JAN 10 2000

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USNRC

Dec. 10, 1999

'99 DEC 14 P4:33

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Dear Secretary of the Commission,

Please support the rules establishing limits on employee working hours at the power plants, and the second proposed rule protecting plant workers who raise safety concerns. These are both very important concerns and should be supported by the NRC.

Sincerely,

Carmen Cubillos
4682 Largo Dr.
Cincinnati, OH. 45236

JAN 18 2000

Acknowledged by card

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DATE DOCKETED USNRC

Dec, 10, 199

Dear Secretary of The Commissi~~on~~, DEC 14 P4:33

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

We live very close to 3miles Island & I wish to support the rules establishing limits on employee working hours at the power plants, and the second proposed rule protecting plant workers who raise safety concerns. These are both very important & should be supported by the NRC.

Sincerely, Milagros Cubillo

Mila Cubillo & Enrique Cubillo
725 Aspen lane
Lebanon, PA. 17042

2000
JAN 18 1999
Acknowledged by card

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Marion P. Morgan
717 West 33rd Street, #305
San Pedro, California 90731-6848
e-mail: mpmorgan@SoCa.com

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OFFICE OF SECRETARY
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

December 9, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

I am writing to ask your support for two proposed rules intended to make sure that nuclear workers are an effective line of defense.

Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants: This rule willl make the NRC guard against human pereformance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s.

Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors: This rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns.

These two rules are essential to:

- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Your cooperation in seeing that these two very important rules are adopted will be very much appreciated.

Sincerely,

Marion P. Morgan

Marion P. Morgan

Acknowledged by card JAN 18 2000

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December 9, 1999

'99 DEC 14 P4:33

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Gentlemen:

My family and I are alarmed at the working conditions at our nuclear plants!

We must limit the working hours at these plants; overtime is all well and good but if our workers are fatigued, it can lead to deadly accidents. Carelessness caused by fatigue is not benign when dealing with nuclear power.

Further, we have to protect those individuals who are in the best position to detect flaws in our system, and encourage them to speak up about potential problems. The "whistleblower" is a vital component in plant safety and therefore must be protected from harassment and intimidation.

We urge you to carefully consider and to act upon these important employee protection rules.

Thank you.

Donna K. Salem

Jack and Donna Salem
923 Teakwood Rd.
L.A., CA 90049

Tel: (310) 471-2122
Fax: (310) 472-8368
E-Mail: SalemLA@aol.com

Acknowledged by card JAN 18 2000

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Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

December 7, 1999

'99 DEC 14 P4:33
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RE: Proposed NRC Rules/Employee Working Hour Limits & Employee Protection Training

Dear Secretary:

I'm writing to share with you my views on two proposed rules that are intended to ensure that nuclear workers become a critical line of defense in preventing a disastrous nuclear accident. Every effort should be made to assist and support employees who have so much responsibility. Workers everywhere should not be working when they're fatigued nor be fearful of illegal discrimination, this is doubly important for nuclear power plant workers. They are, as the Union of Concerned Scientists says, our FIRST LINE of defense against accidents.

I urge you to support two proposed rules, 1) establishing limits on working hours for employees at nuclear power plants, and 2) mandating training on employee protection regulations to supervisors, managers, and directors.

It is my understanding that these two rules will go a long way to: * enhancing nuclear plant worker performance by preventing fatigue, * insuring that the repairing, inspecting, and testing of safety equipment (while the plants are operating or shut down) will be done by workers NOT impaired by fatigue, * encouraging nuclear plant workers to come forward about safety problems by diminishing their fear of telling the truth, and finally * preventing supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions against workers who conscientiously and responsibly report their safety concerns. I'm convinced that these two proposed rules, taken together, will further safeguard the public welfare and our environment by reducing the likelihood of nuclear power plant accidents.

My views here are offered as public comment on your upcoming review of the proposed rules. I expect you will be careful and circumspect in your deliberations.

Thanks for listening.

Sincerely,

Mark

Mark K Bennett
513 K Street
Davis, CA 95616
(530) 792-1822
maxmark@sirius.com

2000
JAN 18 1999
Acknowledged by card

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OFFICE OF SECRETARY
ADJUDICATIONS

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir,

I'm writing to let you know that I endorse the two proposed rules currently being considered by the NRC. These rules would essentially:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers and directors from using "ignorance of the law" as a shield for their illegal actions

Please support both rules, thereby protecting the public and the environment from a nuclear power plant accident. Thank you for your consideration.

Sincerely,

Siobhan McCafferty

Siobhan McCafferty
2255 Bronson Hill Dr.
Los Angeles, CA 90068

cc: Eric Wesselman, Energy Field Coordinator
Union of Concerned Scientists

2000
JAN 18 ~~1999~~
Acknowledged by card

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124 South Blair Street
Stillwater, OK 74074
December 2, 1999 '99 DEC 14 P4:33

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ADM

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

I am writing in support of two new rules proposed for nuclear power plants: one to establish limits on employee working hours at nuclear power plants, and the second to require training of supervisors, managers, and directors of plants on regulations protecting employees from harassment and intimidation when they voice safety concerns.

Unsafe operation of nuclear power plants can lead to accidents with loss of life, human health risks, and serious environmental damage. The proposed rules will significantly improve the safety at plants by ensuring that workers are not suffering from fatigue, which would impair their ability to make safe and correct decisions, and are not subject to intimidation when they speak out about safety. The Federal government has set limits on working hours for truck drivers and airline pilots, since their impairment by fatigue could lead to accidents with grave danger to the public. Nuclear power plant workers also control potentially dangerous equipment and should be subject to similar regulations. These limits on hours of work must apply whether the plant is in operation or is shut down, because safety is also important in the performance of maintenance work done during periods when the plant is shut down. Currently supervisors, managers, and directors of plants can use the excuse of ignorance of the law if they harass employees who speak out. This excuse is generally not accepted in any other legal proceeding and creates a climate in which workers may reasonably be afraid of reprisal for speaking out. The second rule eliminates the use of this excuse by ensuring that these people are not ignorant of the law. For these reasons, I urge you to enact the new rules.

Sincerely,

M. A. Eastman

Margaret A. Eastman

JAN 13 2000
Acknowledged by card

U.S. NUCLEAR REGULATORY COMMISSION
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'99 DEC 13 P3:13

OFF
RU
ADJ

Anna Burton, M.D.
163 Engle Street, Bldg. Two
Englewood, N.J. 07631
(201) 567-4633
AnBurtonMD@Compuserve.com

December 8, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

I am writing to urge that your influence is used to support and implement realistic limits on the working hours of employees at nuclear power plants, and the most careful kind of training on employee protection regulations for supervisors, managers, and directors. Plant workers who wish to make suggestions or criticisms of any practice or work situation should be supported, protected, and listened to carefully.

Obviously, the staff at a nuclear power plant is the first and best line of defense against accidents.

Sincerely yours,

Anna Burton, MD

Anna Burton, M.D.

Acknowledged by card JAN 13 2000 ~~1999~~

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For the Public Comment:

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(64FR67202)

78

Secretary of the Commission
US NRC
Washington, D.C. 20555-0001

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'99 DEC 13 P3:13

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OFF

Dear Sir:

Two public comment items:

1) No BRC. For the 5th time in 15 years we, the people, say no. When will bureaucrats understand that no means no? Changing the form and or place of nuclear waste does not stop the deadly emission. No, not then, not now, not ever. No recycling (BRC).

2) I am in support of the 2 rules proposed by Union of Concerned Scientists to establish limits on employee working hours at nuclear power plants, and require owners to train managers & supervisors on the employee protection regulations.

These are essential to worker well-being/job performance which will essentially protect us from a nuclear power accident, when workers see something wrong or something that needs fixed at the plant they should report it, free from harassment, intimidation, or job loss. They are there for our protection.

We had three family members die this year from Cancer. Did someone dump nukes in the Wabash? I support UCS' (above) 2 proposed rules. Thank you for your cooperation in the matter.

Sincerely yours,
Alma Medaker

9769 E. 600th Rd.
Martinsville, IL. 62442
December 8, 1999

2000
JAN 13 1999
Acknowledged by card

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RULEMAKINGS & ADJUDICATIONS ST
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Desaulniers Gallagher
PDR RIDS

Mr. William Hinrichs
99 Johnson Ave.
Meriden, CT 06451-2735

12/7/99

(77)

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'99 DEC 13 P3:14

OFFICE OF THE SECRETARY
RULEMAKINGS AND
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Sir:-

Both the Three Mile Island and the Chernobyl nuclear accidents involved fatigued nuclear workers.

Basic to the Nuclear Regulatory Commission's responsibilities is protecting Americans and America from nuclear hazzards. Basic to that protection is the need to avoid fatigue in those engaged in nuclear plant operation and/or refueling and also in inspection and/or repair. There is further need to protect individuals who conscientiously raise safety concerns, from harassment or discriminatory disciplinary actions.

The Three Mile Island incident fell short of a Chernobyl disaster by the narrowest margin. Our existing plants are aging. Some are already old. A nuclear disaster affects far more than the plant and its immediate environs. Its life-threatening effects may be as much as Continent-wide, affecting millions of people, quite possibly including nationals beyond U.S. boundaries.

I support N.R.C.'s two proposed rulings as they address the two aspects of this problem, and urge that they be adopted with the clearest possible statement that they are iron-clad rules, not "suggestions" or "guide lines" or "ideals".

Electric utility restructuring will inevitably bring terrific pressures to slash operating costs. That translates into reduction of operating personnel. And that translates into longer hours and/or added duties for those on the job. That brings fatigue levels into the picture.

It has been firmly established that fatigue impairs human performance. For instance, being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%.

Proposed Rule #1 could well follow the 1982 N.R.C. guideline limiting workers to 16 hours per day and to 72 hrs per week, but it should extend that rule from control room operators and key maintenance personnel to all plant personnel at all levels from Management and Supervisors, Safety Inspection, Engineering, etc., down to the lowest levels of employment within the plant. NOTE: There needs be provision for strict monitoring of those working time limits for every individual working in the nuclear plant.

I support Proposed Rule #2 if it explicitly requires the plant's owner to train all managers, Supervisors, and Directors on employee protection regulations, specifically and especially

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as they protect conscientious "Whistle Blowers" from harassment and/or discriminatory discipline. That training must include the fact that N.R.C. can and will determine who (or who-all, if more than one) harassed and/or intimidated, and will take action against that individual (or those individuals) up to and including banning from the nuclear industry.

Properly structured and administered, these two rules should:

1) Prevent fatigue from impairing nuclear plant worker performance.
2) Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
3) Prevent fear from causing nuclear plant workers to remain silent about safety problems.
4) Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for illegal actions.
5) Protect the public and the environment from a nuclear power plant accident.

Sincerely and respectfully,

(William) Bill Hinrichs

(76)

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December 7, 1999

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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sirs:

As a member of UCS I am writing to state my support of the critical need for limiting the working hours of maintenance workers and operators in Nuclear Power Plants. In addition rules protecting whistle blowers against harassment are sensible and should be clearly established. Rejecting these rules entails needless risks.

Thank you.

Sincerely,

Paul Deutschman

Paul J. Deutschman
1514 Misty Cloud Place
Santa Rosa, CA 95409

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POB 8774
Penacook, NH 03303
12/7/99

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

I am writing to you about safety in nuclear power plants. As a psychologist, I am keenly aware of the effects on performance of inadequate sleep. There are many good studies which show that human performance deteriorates when individuals have not managed to get enough sleep. Such studies demonstrate, for example, that many auto accidents and fatalities are caused by fatigue. Current regulations to protect the public from nuclear accidents caused by tired and overworked employees are not sufficiently stringent. I therefore urge you to support Proposed Rule #1, which will mandate monitoring of fatigue levels equivalent to monitoring of substance use.

In addition, I urge you to implement Proposed Rule #2, which mandates training on employee protection to "whistle blowers" by plant supervisors, managers and directors. If line staff fear they will lose their jobs or be otherwise punished for mentioning safety problems, then the public is in danger. Please accept this measure.

Thanks for you attention.

Sincerely,

Laura Magzis, Ph.D.

2000
JAN 13 ~~1999~~
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176 Clark Rd.
Litchfield, CT 06759
December 6, 1999

Secretary of the Commission
U.S Nuclear Regulatory Commission
Washington D.C. 20555-0001

Dear Secretary of the Commission:

It has come to my attention that the NRC will reach decisions on two proposed rules intended to make sure that nuclear workers are an effective line of defense against a nuclear accident. This is welcome news since we are all aware of the potential a nuclear power plant has to hurt thousands of people and to cause long lasting damage to the environment.

I urge you to support both rules to ensure that this first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination.

My understanding is that these rules are essential to prevent fatigue from impairing nuclear plant worker performance and to prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.

It is also essential that workers do not fear speaking up about potential safety problems and that supervisors, managers and directors cannot use "ignorance of the law" as a shield for the illegal actions.

The Federal government imposes working hour limits on truck drivers and airline pilot to protect the public from fatigued workers. Isn't it time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

We, the public, depend on you for protection from potentially deadly nuclear accidents.

Thank you for your attention.

Sincerely,

Lynn B. Fulkerson

Acknowledged by card JAN 13 2000 ~~1999~~

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December 6th, 1999

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Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

/Roger Kunz

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December 6th, 1999

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Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

Christopher J. DeMeuse
12-6-99

4238 Stevens Av. S.
Mpls, MN 55409

Acknowledged by card JAN 13 2000

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December 6th, 1999

Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

Erin Ferguson

Roger Kruse

U.S. NUCLEAR REGULATORY COMMISSION
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December 6th, 1999

Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

1817 2nd Ave S.
MPLS, MN 55403

JAN 13 2000

Acknowledged by card

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December 6th, 1999

Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

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December 6th, 1999

Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

Perley Paap-Crabb
4336 Colfax Ave. S
Minneapolis, MN 55409

2000
JAN 13
Acknowledged by card

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December 6th, 1999

Secretary of The Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs/Madam,

I am writing to urge you to support both proposed rules that will ensure nuclear power plant workers are alert and free of fear of illegal discrimination.

These two rules are essential to:

- Prevent fatigue from impairing nuclear plant worker performance.
- Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down.
- Prevent fear from causing nuclear plant workers to remain silent about safety problems.
- Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions.
- Protect the public and the environment from a nuclear power accident.

Again, I am urging you to support the proposed rules for everyone's safety.

Sincerely,

Victoria Kalkirtz
3731 Park Ave. South #4
Minneapolis, MN 55407

Acknowledged by card JAN 13 2000

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Jon & Beth Davidson
P.O. Box 8822
Incline village, Nevada 89452-8822

December 1,1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Gentlemen:

Please protect your fellow Americans ---- by implementing the following two rules: (1)limit the employee working hours at Nuclear Plants and thus guard against worker fatigue and (2) protect workers who conscientiously raise safety concerns from harassment, intimidation and firing.

The Union of Concerned Scientists presents a well reasoned case for these rules and should be heard in this matter. The American public relies on the diligence of your Commission to apply careful precautionary oversight to the nuclear industry.

Sincerely,

Jon & Beth Davidson

cc: Union of Concerned Scientists

Acknowledged by card JAN 13 2000

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OFFICE OF SECRETARY
ADJUDICATIONS

4 Dogwood Trail
Kinnelon, NJ 07405
December 9, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary:

I understand that In the next few months, the Nuclear Regulatory Commission (NRC) will reach decisions on two proposed rules intended to make sure that nuclear workers are an effective line of defense.

These two rules are essential to:
1. Prevent fatigue from impairing nuclear plant worker performance;
2. Prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down;
3. Prevent fear from causing nuclear plant workers to remain silent about safety problems;
4. Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions;
5. Protect the public and the environment from a nuclear power plant accident.

From Karen Silkwood in 1974 to George Galatis in 1996, there is a long history of nuclear workers stepping forward to raise safety concerns. Their efforts forced repairs to broken safety equipment at several nuclear power plants and closings of others.

The NRC's regulations should fully protect nuclear workers, the public and the environment.

Regards,
Jo Sippie Gora
Jo Sippie-Gora

Acknowledged by card JAN 13 2000

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ADJ

Wolfgang Benz
63 Cummings Circle
West Orange, NJ 07052
email: wbenz1632@aol.com

December 7, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Proposed rules on working hours limit and
employee protection training

Dear Secretary:

I would like to urge the Nuclear Regulatory Commission to support both proposed rules.

There are Federal limits on working hours for truck drivers and airline pilots to protect the public from fatigued workers. Several studies have confirmed the common sense expectation that tired people are more likely to make mistakes. The potential for a devastating disaster caused by human error in a nuclear power plant certainly is larger than the damage a truck driver might cause. So it is reasonable to protect the workers, and thereby the public, against excessive overtime. Such a rule must apply to all personnel at all times.

The second rule deals indirectly with the protection of whistleblowers. There are presently Commission rules protecting such employees, but these rules are used in a half-hearted manner. I find it unbelievable that the Commission does not act against individuals breaking these rules because they do not know about them. Where is 'ignorance of the law' a valid defense? No court will accept "I didn't see the posted speed limit". By mandating that all supervisory personnel be trained on employee protection regulation you will ensure that potential whistleblowers feel safe to actually call attention to problems. Past experience is ample proof that such public warnings are needed.

The overall safety record of nuclear power plants is not bad. But the potential harm of an accident is enormous. Therefore stringent safety measures are absolutely necessary. Workers constitute the first line of defense against such mishaps. Therefore, in my opinion, the proposed rules are eminently reasonable.

Sincerely yours,

Wolfgang Benz

Wolfgang Benz

2000
JAN 13 ~~1999~~
Acknowledged by card

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John T. & Charlotte L. Morris
93 Nathan Lane
Plymouth, MA 02360-6835
FAX 508-743-9456 508-743-4684 Email jmorr@capecod.net

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07 December 1999

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ADJ

Secretary of the Commission
Nuclear Regulatory Commission
Washing, DC 20555-0001

Dear Sir:

I retired just two years ago and my wife and I moved to Plymouth, MA. We were made aware of the proximity of the Pilgrim Nuclear Power Plant soon after arriving. Being within the zone which would be affected by any release of radiation from the plant, we are most interested in its continued safe operation.

We have learned about two proposed rules for safer plant operation which the commission is studying: # 1 establishes limits on employee working hours at any plant and # 2 provides for required training of management and supervisory personnel with respect to protecting employees from retribution by such personnel when the employee reports a problem.

Considering the history of nuclear plant accidents, both inside and outside of the United States, it seems to us that these two rules should have been in effect long ago. If they have not, we feel strongly that their adoption is necessary.

We urge the commission to put both rules into effect at the earliest possible moment.

Sincerely yours

John T. Morris

Acknowledged by card JAN 13 2000

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(62)

DAVID MEL PAUL

The best of Sweden...in English

'99 DEC 13 A9:24

4912 "W" Street NW, Washington DC 20007 USA
voice 202/337-2575 fax 202/333-3044
email «davidmelpaul@earthlink.net»

December 6, 1999

Nuclear Regulatory Commission
1555 Rockville Pike
Rockville, MD

In re: Proposed Rules published in Federal Register
October 27, 1999 and December 1, 1999
for Limits on Nuclear Workers Overtime and
for Whistleblower Protection

Dear Sirs:

It was with deep concern that I learned that your rules limiting the overtime of workers at nuclear plants only apply when the plants are running. The fatigue of such workers is a potential cause of mistakes that are an even greater threat to public safety than any mistake that could be made by, for example, the crew who maintain jet aircraft. Several hundred people died in the crash that resulted from the recent Value Jet negligence, but the lives of millions and the desolation of huge areas for a millennium to come are at risk when an over-tired nuclear worker makes a mistake, and such mistakes are as much a threat when, for example, refueling closed nuclear plants as when such a plant is in operation. Therefore I strongly urge you to accept the proposed rule establishing **limits on all** employee working hours, and **specifically forbidding excessive overtime**, with substantial penalties against plant owners for violations.

I was equally concerned to learn that, in distinction from all other legal proceedings, "ignorance of the law" is a sufficient defense against NRC's current regulations meant to protect those nuclear workers who step forward to raise safety concerns from harassment and intimidation. Thus no action can be taken against individuals harassing and intimidating such "whistleblowers" unless the NRC can prove that these individuals knew their actions were illegal. The remedy for this is to make training in employee protection regulations an absolute requirement for all nuclear industry supervisors, managers and directors. It will then be unnecessary to accept ignorance of the regulations as any excuse, and the enforcement of these vital regulations and the vital protection of those brave persons who call attention to deficiencies in nuclear operations will be enforced with vigor. **I urge you to institute a requirement that all these persons be trained in the rights of all employees to blow the whistle on safety threats**.

You know that the penalties for American society are simply too huge for laxity in nuclear plant operation to be tolerated. These newly proposed rules close gaps in the enforcement of nuclear safety, and I hope you will swiftly accept and enforce them..

Sincerely,

David Mel Paul

JAN 13 2000
Acknowledged by card

U.S. NUCLEAR REGULATORY COMMISSION
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2556 Wellington Ct.
Evanston, IL 60201
December 6, 1999

'99 DEC 13 A9:23

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir:

I am writing to encourage the U.S. Nuclear Regulatory Commission to support both the working hour limits and the employee protection training regulations that have been proposed.

These rules are as follows:

*Proposed rule #1- To establish limits on employee working hours at nuclear power plants.

* Proposed rule #2 - To establish limits on employee protection regulations to supervisors, managers, and directors.

The most important reason is to protect the public and the environment from a nuclear power accident. This, obviously, will affect all of us, and therefore we should be working together to avoid such a calamity.

Because so many accidents are a result of human error, preventing employee fatigue is of utmost importance. This pertains to not only the running to the but also to the repairing, inspecting and testing of the plants safety equipment whether nuclear power plants are running or shut down.

Workers should not be put in a situation where they fear speaking up about problems they see occurring at the plant. They have first hand knowledge of of safety problems, and should be given every encouragement to report any problems regarding wear and tear, malfunctions, etc.

Unfortunately, profit motives can cause problems of worker fatigue and safety issues to be overlooked. Environmental concerns should outweigh any profit motive because the consequences of a nuclear power plant accident can be disasterous. There are literally hunderds of these plants. It will take the utmost viligilance to insure that NONE of these plants has a problem. The best way to insure that these plants remain safe is to make sure that EVERYONE works together on safety issues. Supporting these proposed rules are a step in the right direction. And ignorance of the law should be no excuse for safety violations.

Sincerely,

Carol Kurz

Acknowledged by card JAN 13 2000

U.S. NUCLEAR REGULATORY COMMISSION
RULEMAKINGS & ADJUDICATIONS STAFF
OFFICE OF THE SECRETARY
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'99 DEC 13 A9:23

OF
ADD

Ralph Gunderman
138 Millard Ave.
Sleepy Hollow, NY 10591-1413
December 6, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

I am writing to urge adoption of the two new rules being proposed to establish limits on hours worked by nuclear plant workers and to train managers in the rights of employees to report on problems.

The safety record of America's Nuclear Power industry, measured by the number of catastrophic accidents, has been admirable. But we cannot take it for granted.

The two proposed rules would help assure that we avoid dangerous accidents, and make the industry even safer, by lessening the threat of fatigued workers making mistakes and by assuring that workers be supported in their efforts to report any oversight or malfeasance.

We urge the Commission to adopt these rules.

Sincerely,

Ralph Gunderman Janine Gunderman

Acknowledged by card JAN 13 2000

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5625 Aubrey Terrace
Downers Grove, IL 60516

'99 DEC 13 A9:24

December 6, 1999

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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir:

We urge the NRC to support the rules proposed to: #1 - establish limits on employee working hours at nuclear power plants, and #2 - provide training on employee protection regulations to supervisors, managers, and directors.

The above proposed rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident.

Workers must be free from both fatigue and fear of illegal discrimination.

Sincerely,

Warren J. Holbrook

Joyce Holbrook

Joyce Holbrook

2000
JAN 13 ~~1999~~
Acknowledged by card

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OF
RUL

11805 Gregerscroft Rd.
Potomac, Md. 20854
December 6, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary:

I would like to raise my small voice to urge you to support the currently proposed rules to (1) ensure that nuclear plant workers are prevented from working excessively long hours that could lead to worker fatigue, and (2) require training of supervisors and managers in nuclear plants on employee protection regulations relating to reporting safety concerns.

I believe these rules are needed to assure that adequate safeguards against a nuclear accident are in place.

Thank you for considering my view.

Sincerely,

Donald McNellis

Donald McNellis, M.D.

Acknowledged by card JAN 13 2000

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3183 Wayside Plaza #109
Walnut Creek, CA 94596
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

The following are formal comments to the Nuclear Regulatory Commission supporting the proposed rule published in the Federal Register on December 1, 1999 related to working hour limits for employees at nuclear power plants

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

I gather that the NRC introduced guidelines in 1982 limiting some workers at nuclear power plants to 16 hours per day and 72 hours per week, but that this only applies when the plant is actually running. Thus, plant operators can require workers to work 12 and 16 hour days for weeks on end during refueling outages.

It makes little sense to have fatigued workers repairing, inspecting, and testing safety equipment even if the nuclear power plant is shut down. They could so easily make a mistake or overlook some detail that would not be readily apparent, but which could cause a major problem when the plant is operating. The purpose here is to protect the public and the environment from a nuclear power plant accident. The consequences of errors and misjudgments are too awesome to readily comtemplate.

Thank you very much.

Cordially,

Carol S. Marshall

Carol Sydney Marshall

JAN 13 2000
Acknowledged by card

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746 Glen Oaks Rd.
Thousand Oaks, CA. 91360
December 5, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary:

I am writing to ask you to support the two proposed rules regarding establishing limits on employee working hours at nuclear power plants and for training of supervisors, managers, and directors on employee protection regulations.

Safety should be the primary consideration in the operation of a nuclear power plant. It has been demonstrated that fatigued workers are more likely to make mistakes than rested, more alert workers are. Documented studies have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol concentration (BAC) of 0.05%. Current NRC regulations prohibit workers with a BAC greater than 0.04% from nuclear power plants. Current guidelines limiting workers to 16 hours a day and 72 hours a week applies only to a very narrow group of workers (control room operators and key maintenance personnel). These guidelines should also apply to safety inspectors, engineers and other plant workers not covered by these guidelines.

There should be a complete overhaul in the way employees with safety concerns are treated. No employee should feel threatened or be fearful about management retaliation for merely expressing their concerns with respect to safety issues. Current NRC regulations to protect these workers from harassment and intimidation are inadequate. To address this, there needs to be training and re-orientation of all management employees with respect to these issues so that "ignorance of the law" cannot be an excuse. The NRC should impose harsh sanctions on the managers and the companies who have broken the employee protection regulations.

The NRC needs to remember that one of its main objectives is to keep nuclear power plants as safe as possible. A nuclear "accident" is unacceptable with all the industry has learned over the past four decades. Workers who are rested and who do not have fear of illegal discrimination will be able to do their jobs in a careful and safe manner. Passing these two rules will insure an added degree of safety for the public and the environment.

Sincerely,

Dave Dolnick

Dave Dolnick

Acknowledged by card JAN 13 2000

U.S. NUCLEAR REGULATORY COMMISSION
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OFFICE OF SECRETARY
ADJUDICATIONS

Kipp Davies
180 SE 13th Street
Pompano Beach, Fl. 33060

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

4 December 1999

Dear Secretary of the Commission,

I am writing to encourage you to support rules making our nuclear plants safer. These include setting and enforcing guidelines for working hour limits and employee protection training. These two rules are vital in order to:

*prevent fatigue from impairing nuclear plant worker performance

*prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down

*prevent fear from causing nuclear plant workers to remain silent about safety problems

*prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions

*protect the public and the environment from a nuclear plant accident.

Please give the implementation of these rules utmost priority in your immediate agenda.

Thank you for your attention to this matter.
Sincerely,

Kipp Davies

Kipp Davies

Acknowledged by card JAN 13 2000

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December 4, 1999

Safety of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

It has been brought to my attention that the NRC will be reaching a decision on two proposed rulings that are designed to help make workers at nuclear power plants effective as a first line of defense against a nuclear accident.

I strongly urge the Commission to approve the two proposed rulings that will help workers be as free from fatigue as possible, and to avoid fear of being discriminated against in the workplace if they speak out.

As you know nuclear accidents can have far reaching effects to the health and well being of all plants and animals on planet earth. I applaud your efforts to make the nuclear power plants as safe as possible, and I urge you to approve the two proposed rulings which will help minimize human error, and/or the hiding of factual information about the safety of any one nuclear power plant.

Thank you in advance for your consideration of this letter.

Sincerely,

Nancy Hazard

Nancy Hazard
30 Spring Terrace
Greenfield, MA 01301

JAN 13 2000
Acknowledged by card

(53)

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(64FR67202)

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214 Patricia Dr.
North Syracuse, NY 13213
December 4, 1999

'99 DEC 13 A9:23

OFFICE OF SECRETARY
ADJUDICATIONS

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington D. C. 20555-0001

Dear Secretary:

It is my understanding that the Nuclear Regulatory Commission will reach decisions on two proposed rules in the near future. The first rule has to do with employee fatigue due to excessive overtime, which can degrade human performance and contribute to nuclear accidents. The second rule is in regard to training on employee protection regulations for management employees. This proposal would protect nuclear "whistleblowers" against harassment, intimidation or being fired, where ignorance of the regulations is used by management as an excuse.

To prevent worker fatigue, strict regulations on overtime requirements, whether the plant is operating or shut down for maintenance, are necessary to assure safe and proper operation and maintenance of equipment in nuclear plants. Studies have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%, yet NRC regulations ban workers with blood alcohol levels greater than 0.04%. The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. Is not the operation of a nuclear plant even more critical to public safety?

Regarding the protection of "whistleblowers," who call attention to unsafe conditions in nuclear plants, the NRC needs to institute a mandatory policy where all supervisors, managers and directors are trained in the regulations on protection of employees against discrimination. Safety concerns raised by whistleblowers led to the wise but premature closure of the Yankee Rowe and Maine Yankee nuclear power plants.

I respectfully urge you to support both proposed rules to ensure that the first line of defense is staffed by workers who are free from fatigue and fear of illegal discrimination.

Sincerely:

Elliott Krackhardt

Elliott Krackhardt

2000
JAN 13 ~~1999~~
Acknowledged by card

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G. F. Paskusz
850 Kuhlman Rd.
Houston, TX 77024

Gerhard Paskusz

12/4/99

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USNRC

Dear M. Secretary,

'99 DEC 13 A9:25

If Chernobyl has taught anything, it should be that safety in matters nuclear cannot be overdone.

Safety requires, among other factors, alert and awake workers. Although that can never be assumed, it can be helped by limiting the number of hours employees are allowed to work. I therefore favor that proposed rule.

Safety can also be compromised if workers are afraid to point out what appears to them as unsafe situations. The proposed rule to protect "whistle blowers" is therefore equally important.

Cordially,



2000
JAN 13
Acknowledged by card

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103 Gainsborough St., #404
Boston, MA 02115-4239
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Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir or Madam:

This is to urge your support for the currently proposed rules #'s 1 and 2. I feel that these rules are essential to ensure our safety from nuclear accidents.

All nuclear accidents that have occurred to date have been, at least in part, the result of human error. A large body of research shows that fatigue has markedly adverse effects on job performance more marked than the effects of alcohol levels which NRC regulations ban in power plants! Although the guidelines you introduced in 1982 limit worker hours, they only apply specifically to control room operators and key maintenance personnel, and even for this insufficiently inclusive group, the guidelines are not enforceable. Moreover, you recently determined that the guidelines apply only when a nuclear power plant is actually running. Since plants often require 12 to 16-hour workdays for weeks at a time during refueling outages, this means that critical maintenance is being performed by crews suffering from sleep deprivation. Do you really believe that work with large amounts of highly radioactive, fissionable nuclear fuel requires less alertness and capacity for prompt and appropriate response than driving a truck? The Federal government imposes strict working hour limits on truck drivers! I urge your support for similar limits for nuclear power plant employees, and for strict enforcement of these limits during refueling and maintenance, as well as when the plant is running.

Proposed rule #2 is critical to ensure that the nuclear industry does not retaliate against employees who attempt to remedy unsafe practices. Although you imposed fines of $80,000 to $110,000 for harassment or intimidation of workers who raised safety concerns on four nuclear power plants in the past year, no sanctions have been taken against the individuals responsible for breaking the employee protection regulations. The NRC has argued that ignorance of the regulations on the part of the individuals responsible for breaking the regulations makes it impossible to impose sanctions against them. As a shutdown costs the plant considerably more PER DAY than a fine, there is clearly a strong incentive to the industry to discourage whistle blowers. In order to protect the whistle blowers who protect us all from the potentially disastrous effects of corner-cutting by the nuclear industry, this unusual argument for circumventing the regulations must be abrogated. Proposed Rule #2, which requires that supervisors, managers and directors in the nuclear industry be trained to familiarize them with the employee protection regulations would eliminate the "ignorance of the law" argument. I urge you to support this essential new rule.

Sincerely yours,

Barbara C. Sorkin

2000
JAN 13 1999
Acknowledged by card

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December 2, 1999

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: proposed rules for staffing nuclear power plants

To Whom It May Concern:

Please let it be known my support of the proposed rules to ensure that workers will be free from both fatigue and fear of illegal discrimination. The two newly proposed rules are essential in preventing nuclear power plant accidents resulting from fatigued workers with impaired performance due to inadequate rest. Additionally, the proposed new rules allow workers to speak up if concerned about safety problems, without fear of management reprisals, leading to a safer and communicative environment, where all benefit, including the general public.

Thank you for your consideration.

Sincerely,

Bart

Bart Ziegler, PhD, Toxicology
PO 232, Del Mar, CA 92014

Acknowledged by card JAN 12 2000

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(64FR67202)

DOCKETED

December 6, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

'99 DEC -8 P4:17

To the Secretary:

I am writing to express my support for the proposed rules limiting the working hours of nuclear power plant staff, and protecting "whistleblowers" through the proper training of supervisors and management. I am also deeply concerned about recent reports of understaffing and overwork. I think we should have developed safe and clean power sources by now, and we could have if we had decent leadership. The government also could have done something by now to convince American architects to design more responsible structures, and to stop the typical American energy glutton from wasting so much. Had anyone done these things, we would need no nuclear plants whatsoever.

But since we are stuck with the damned things, the least you could do is be extremely strict about anything which impedes safety strive to prevent another disaster until those plants can be decommissioned. The environment is threatened by both the idiocy of nuclear power and the waste it generates, as by the conventional plants which kill our forests and heat up the globe. I'd hate to be in your shoes if there is another disaster.

Sincerely,

Jennifer Willis
10061 Bennington Drive
Cincinnati, OH 45241

Acknowledged by card DEC 21 1999

Al-Islam

Beginner's Introduction

Islam was not born in the 7th century A.D. Rather, it is the same religion that God revealed through His messengers (peace be upon them) to every people. Islam sometimes seems strange to non-Muslims because it is a religion which impacts every part of life, from eating and sleeping to working and playing. It is not only a personal religion, but also a social one.

Muslims seek to live in accordance with God's laws. By doing so, they strive to obtain nearness to God and victory over temporary trials and temptations in this world. All aspects of their practice including prayer, fasting, charity, and pilgrimage are intended to help meet this goal. Although strict by secular standards, Islam is not an ascetic religion. Islam requires its followers to be active participants in their communities.

Muslims believe that God is One, indivisible, and they believe in all the prophets of the Christians and Jews including Adam, Noah, Abraham, Ishmael, Isaac, Jacob, Joseph, Job, Moses, Aaron, David, Solomon, Elias, Jonah, John the Baptist, and Jesus (peace be upon them).

Muslims also recognize another prophet named Muhammad (peace be upon him and his family), who is a direct descendant of Abraham through his first born son, Ishmael. His prophethood may be prophecied in the Bible in several places, including Deut 18:18 and John 14:16.

The Qur'an is the holy book of Muslims. It contains many stories that are familiar to Christians and Jews. It was not created by man but was revealed to the Prophet Muhammad (peace be upon him and his family) through the Angel Gabriel at the command of God. It contains no scientific fallacies or internal contradictions. In fact, it contains much scientific knowledge discovered by scientists only in this century. The Qur'an is an unparalleled Arabic literary masterpiece. Furthermore, it survives in its original revealed form, unlike the Torah and the Gospel.

People living in the West and throughout the world should not allow themselves to be ignorant about Islam and Muslims. For example, there are six million Muslims living in the United States out of 1.2 billion in the world. Only 18% of Muslims live in the Arab world. Demographers say that Islam is the fastest growing religion in the U.S. (and the world) due to high birth rate, immigration, and high conversion rate. By the year 2000, Islam is predicted to be the second largest religion in America if it is not already, surpassing Judaism, Mormonism, Jehovah's Witness, and other religions.

Here are some things you can do with regard to your Muslim neighbors, students, employees, and coworkers that would be appreciated:

- Respect their religious convictions by allowing them to pray, dress, fast, and socially interact according to their beliefs.
- Be sensitive about dietary constraints, particularly when it comes to alcohol and pork.
- Feel free to ask questions!

Contributed by Masooma Beatty.

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Gene Kostruba
180 Elm Court #1304
Sunnyvale, CA 94086

'99 DEC -8 P4:16

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary,

I am writing to support passage of the proposed rules intended to make sure that nuclear workers are effective in maintaining nuclear safety:

- Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants, to prevent employee fatigue.
- Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors, to protect "whistleblowers".

We should be abandoning nuclear power in favor of renewable energy, but as long as we have nuclear plants, they must be 100% safe.

Sincerely,

Gene Kostruba

Acknowledged by card DEC 21 1999

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PDR, RIDS

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'99 DEC -8 P4:17

OFC
ADJ

1128 Old Marlboro Rd.
Concord, MA 01742

December 4, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary:

A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident. I understand that the NRC will be considernig two proposed rules intended to make sure that nuclear workers are an effective line of defense.

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors.

I urge you to support both proposed rules to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. These two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a

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nuclear power plant accident

Yours sincerely,

Louis Putterman

Louis Putterman
Member, Union of Concerned Scientists
Professor of Economics, Brown
University

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(64FR67202)

(46)

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'99

111 River Run
Greenwich, CT 06831
December 4, 1999

'99 DEC -8 P4:18

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ADD

This is to urge you to support proposed rules to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination.

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants:

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors:

These two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Yours truly

Linda Quinet

Linda Quinet

DEC 21 1999
Acknowledged by card

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December 3, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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'99 DEC -8 P4:15

OFFICE OF SECRETARY
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Dear Sir:

The following are formal comments to the Nuclear Regulatory Commission supporting the proposed rule published in the Federal Register on December 1, 1999 related to working hour limits for employees at nuclear power plants

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

I gather that the NRC introduced guidelines in 1982 limiting some workers at nuclear power plants to 16 hours per day and 72 hours per week, but that this only applies when the plant is actually running. Thus, plant operators can require workers to work 12 and 16 hour days for weeks on end during refueling outages.

It makes little sense to have fatigued workers repairing, inspecting, and testing safety equipment even if the nuclear power plant is shut down. They could so easily make a mistake or overlook some detail that would not be readily apparent, but which could cause a major problem when the plant is operating. The purpose here is to protect the public and the environment from a nuclear power plant accident. The consequences of errors and misjudgments is too awesome to readily comtemplate.

Thank you very much.

Sincerely,

David F Gassman

David F. Gassman
389 Belmont #111
Oakland CA 94610

H:510-835-2334
W:415-973-6051 Faxes: 415-973-7215, 6437

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December 3, 1999

(44)

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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'99 DEC -8 A9:20

Dear Sir:

I am writing to ask the NRC to support proposed rules to ensure that the line of defense against a nuclear accident is staffed by workers who are free from both fatigue and fear of illegal discrimination.

Please establish limits on employee working hours at nuclear plants which will guard against human performance degradation from fatigue. The NRC needs to set regulations against excessive overtime.

In addition please require training on employee protection regulations for supervisors, managers and directors. Plant workers who conscientiously raise safety concerns need to be protected from harassment and intimidation. Remove by this rule the excuse of "ignorance of the law."

These 2 rules are necessary to prevent fatigue from impairing nuclear plant worker performance; to prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down; to prevent fear from causing nuclear plant workers to remain silent about safety problems; to prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions; and to protect the public and the

DEC 21 1999
Acknowledged by card .....

U.S. NUCLEAR REGULATORY COMMISSION
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environment from a nuclear power plant accident!

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

In addition, the NRC needs to hold individuals accountable for breaking employee protection regulations - something it has rarely done. "Ignorance of the law" is not a viable defense in any other U.S. legal proceeding - it should not be a valid excuse in these cases. Nor are fines an effective deterrent - the risk/reward balance is heavily tilted towards law-breaking managers at the expense of law-abiding workers. Personal accountability will be far more effective in reducing harassment and intimidation against nuclear workers than the occasional fine against companies.

Please put these two rules in effect - (1) limits on employee working hours at nuclear plants, and (2) training on employee protection regulations to supervisors, managers, and directors.

Sincerely yours,

Amanda Brown 12/3/99

108 Lockwood Rd.
Syracuse, NY 13214

(43)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'99 DEC -8 A9:19

December 2, 1999

Dear Secretary of the Commission,

I am writing to urge you to support the proposed rules on working hour limits and employee protection training. The working hour limits rule is needed to ensure that fatigued, and therefore impaired, workers will not be responsible for repairing, inspecting, or testing safety equipment at nuclear power plants. As seen in both recent and historic examples, worker error can be responsible for accidents at nuclear power plants. Many studies have shown that a person's ability to perform difficult tasks suffers when they are tired. Implementing this rule will help reduce the risk of accidents at nuclear power plants by reducing the likelihood that fatigued workers will be responsible for operations.

In addition, the proposed rule on employee protection training for supervisors, managers, and directors is necessary to protect "whistleblowers" and, by extension, the health and safety of the general public. It is absurd that managers can currently get away with harassing and intimidating whistleblowers on the grounds that they weren't aware that such behavior was illegal. Providing specific mandatory training for management on the employee protection regulations will assure that management is aware of their employees' rights. Additionally, it will remove the "ignorance of the law" excuse.

Once again, I am writing during the public comment period in support of both the proposed rules on working hour limits and employee protection training. I look forward to seeing these proposals become finalized.

Sincerely,

Sarah Moore

Sarah Miller Moore
712 Mulford St
Evanston, IL 60202

DEC 21 1999
Acknowledged by card .....

U.S. NUCLEAR REGULATORY COMMISSION
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(64FR67202)

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USNRC

'99 DEC -8 A10:57

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

67 Village Trail
Honeoye Falls, NY 14472
December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir,

Re: WORKING CONDITIONS AT NUCLEAR GENERATORS

I am concerned about the safety of nuclear generating systems in this country and would urge you to take the following steps:

1. Limit the working hours of staff who are under pressure to compete with other forms of power generators.

2. Prevent fear of reprisal for staff at nuclear generators who see a safety problem.

It is an urgent need for the public safety that these two issues are addressed by the Commission.

Sincerely,

Donna Mummery

Donna Mummery

DEC 21 1999
Acknowledged by card

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(41)

Prof. Louis D. Smullin Dept of Electrical Engineering and Computer Science, MIT
Rm 36-213, Cambridge, MA 02139 12/2/99

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -8 P4:16

OFF
RU
ADJU

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Sir:

I am writing to urge the Commission to adopt the Proposed Rule #1 and the Proposed Rule #2 concerning limits of employee working hours in Nuclear Plants, and training on employee protection regulations to supervisors, managers, and directors.

The limitation of working hours by federal regulation has been used to protect the public in the case of airline employees and of truck drivers. The consequences of fatigue- caused errors in a nuclear power plant can be enormous.

Employees must feel free to report violations to the commission, for the protection of the public. A training course for supervisory personnel should be required to inform them of their duties and personal responsibilities in regard to such reporting and "whistle blowing".

Louis D Smullin

Smullin 36-213
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE
77 Massachusetts Avenue
CAMBRIDGE, MA 02139-4307

Acknowledged by card DEC 21 1999

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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'99 DEC -8 P4:18

BAYLOR COLLEGE OF MEDICINE

Dr. Richard Cone, MD, PhD
Associate Professor
Department of Pathology

Mailing address:
HAM-TMC Library
1133 M.D. Anderson Blvd.
Houston TX 77030-2809
Ph: 1-713-799-7135
Fax: 1-713-790-7052
Email: rcone@bcm.tmc.edu

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dec. 2, 1999

Re: Proposed safety rules

Dear Secretary,

This note expresses my strong support for two proposed safety rules: limits on working hours for nuclear plant employees and training for supervisors at nuclear plants. These rules will undoubtedly improve nuclear safety, and I hope that you will embrace them.

I am grateful for your role in protecting the public from unsafe practices and encourage you to continue your good work.

Sincerely,

Dr. Richard Cone

Acknowledged by card DEC 2 1 1999

U.S. NUCLEAR REGULATORY COMMISSION
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'99 DEC -8 A9:49

OF
ADJ

Wishing You
Every Happiness
this Holiday Season.

DEAR NRC -
Please support Rules #1 + 2 to ensure our nuclear power plants are staffed by workers free from fatigue + fear of illegal discrimination. Thank you Penny Hanra
213 Miranda Dr
APTOS CA 95003

Penny Hanna
213 Miranda Dr
Aptos, CA 95003-5019

Acknowledged by card DEC 21 1999

U.S. NUCLEAR REGULATORY COMMISSION
RULEMAKINGS & ADJUDICATIONS STAFF
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38

Subject: URGENT ACTION ALERT FROM UCS
Date: Wed, 01 Dec 1999 17:21:25 -0500
From: ewesselman@ucsusa.org
To: <UCS_LIST@ucsusa.org>

DOCKETED
USNRC

'99 DEC -8 P4:19

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

***** UNION OF CONCERNED SCIENTISTS ACTION ALERT *****

TELL NRC TO PROTECT AMERICANS FROM FATIGUED NUCLEAR WORKERS AFRAID TO VOICE SAFETY CONCERNS

THE ISSUES:
A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident. In the next few months, the Nuclear Regulatory Commission (NRC) will reach decisions on two proposed rules intended to make sure that nuclear workers are an effective line of defense.

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants:
This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors:
The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

ACTION:

Please write the Nuclear Regulatory Commission and tell them to support both proposed rules to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal

PLEASE SUPPORT THESE TWO PROPOSED RULES

DEC 21 1999
Acknowledged by card

David Illsley
95 Myrtle St
Waltham, MA 02453

U.S. NUCLEAR REGULATORY COMMISSION
RULEMAKINGS & ADJUDICATIONS STAFF
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'99 DEC -7 P3:21

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

1202 West 31st Street
Kearney, NE 68845-3367
Dec 4, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Ladies and Gentlemen:

I am writing you about the proposed rules for workers in nuclear power plants. I am generally a supporter of nuclear power, but only if these plants are operated as safely as possible.

Therefore I strongly urge you to (1) adopt the proposed rule for strictly limiting the hours of work of employees working to operate, maintain or inspect nuclear plants. (2) I also urge you adopt the proposed rule to protect employees who are "whistle blowers". We cannot afford to have anything less than optimum performance of nuclear workers, and these two rules would help insure that.

Thank you for your consideration.

Yours very truly,

Peter W. Blickensderfer

Acknowledged by card DEC 21 1999

(36)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'99 DEC -7 P3:15

OFFICE OF SECRETARY

Ms. M. R. Niswander
622 Barbera Pl.
Davis, CA 95616-0409

Dec. 4, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Dear Secretary:

Please support the two rules that have been proposed to ensure that the first line of defense against a nuclear power plant disaster is a staff of workers free from fatigue and free from fear of illegal discrimination. Proposed Rule #1 is to establish limits on employee working hours at nuclear power plants. The second proposed rule is to give training on employee protection regulations to supervisors, managers, and directors. This second proposal will protect nuclear whistleblowers! Nuclear plant owners must train supervisors and managers on the subject of the employee protection regulations.

These rules are essential to preventing fatigue of plant workers and preventing tired workers from repairing, inspecting and testing safety equipment. These two rules will prevent fear from causing workers to be silent about safety problems. The rules will prevent

(cover)

DEC 21 1999
Acknowledged by card

supervisors, managers, and directors from using "ignorance of the law" as a defense for their illegal actions! These rules will protect the public and the environment from a nuclear plant accident.

We need to act soon! Please study and accept these two rules for safety's sake! Thank you!

Sincerely,

M. Ruth Niswander
622 Barbera
Davis, Ca. 95616

DOCKETED

(35)

December 4, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -7 P3:12

Subject: TO PROTECT AMERICANS FROM FATIGUED NUCLEAR WORKERS AFRAID TO VOICE SAFETY CONCERNS

Sirs:

I have just heard from the Union of Concerned Scientists (UCS) concerning fatigued nuclear workers and workers who are afraid to report safety conditions at nuclear power plants. They are concerned about this and so am I

. In order to eliminate these concerns the UCS has proposed two rules:

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants :This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s.With the onset of electric utility restructuring ,nuclear power plant owners face pressure to slashoperating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despitethis evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtimeguidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors: (my addition: with specific emphasis that harrasing, itimidating, and firing employees who raise concerns is illegal and "ignorance of the law" is not an excuse.)

The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiringnuclear plant owners to train supervisors and managers on the employee protection regulations.

My impression of the NRC is that, in the past, it has consistently put the welfare of the power plant ahead of the welfare of the American public. I would be very pleased if this impression were changed by appropriate actions of the NRC. One such action is the adoption of the two rules proposed by the UCS.

Please note that the UCS is NOT some fly-by-night pressure organization, but is made up of reputable scientists who are rightfully concerned about the welfare of the USA, and the world for that matter. They deserve to be heard with more justification than many other organizations.

Wilbur R. DeHart

Wilbur R. DeHart
6969 Madden Rd.
Dexter, MI 48130

Phone (734) 475-8308
e-mail: lilnwil@juno.com

DEC 21 1999
Acknowledged by card

(34)

Gary Matthews

29 Shadylawn Drive
Madison, NJ 07940-1011
U.S.

Phone 973-966-1924
Fax 973-966-5412

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'99 DEC -7 P3:11

OFF
RUL
ADJ

December 04, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Secretary:,

This letter is to support the two new proposed rules to ensure that the first line of defense against accidents at nuclear plants is staffed by workers who are free from both fatigue and fear of illegal discrimination. These two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Sincerely,

Gary Matthews

Acknowledged by card DEC 21 1999

(33)

Dec. 3, 1999

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USNRC

'99 DEC -7 P2:58

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, D.C. 20555

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Secretary:

Please support the following proposed rules:

(1) Establishment of limits on employee working hours to ease fatigue of workers at nuclear power plants, and

(2) Establisment of whistleblower regulations so that employees are not afraid to voice safety concerns.

Sincerely,
Larry Little
3701 Dial Drive
Stone Mtn., GA 30083

Mr. Larry Little
3701 Dial Dr.
Stone Mountain, GA 30083

Acknowledged by card DEC 21 1999

(32)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

December 3, 1999

'99 DEC -7 A9:27

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

Greetings:

Other than getting rid of that Frankenstein monster called nuclear energy, the single most important job you have is to make sure that the citizens are protected and that the people running the machines are qualified, well-trained, and never fatigued.

I have before me a report issued by the Union of Concerned Scientists concerning proposed work-place safety rules at nuclear power plants. These new and stricter rules concerning employee working hours, improved training, and protection of "whistle-blowers" should be promulgated and implemented immediately.

I urge you to take these necessary steps. There is no higher duty than to insure that our people are protected against any sort of danger from nuclear "incidents."

Sincerely,

Gerald Cavanaugh

Gerald and Ragan Cavanaugh

P. O. Box 247 (560 Oak St.) Ashland, OR 97520; 541-482-6543;

fax: 541-488-8216; email: gjcav@jeffnet.org

cc: UCS

Acknowledged by card DEC 21 1999

(31)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'99 DEC -7 P3:23

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

4648 CHERRYVALE AVENUE
SOQUEL, CA 95073
(831)476-8225

December 3, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir :

I write in affirmation of the proposed Rules Change for workers in nuclear plants.

The first is to provide rules for safeguard against fatigue. I have recently discovered a striking example of the problems with sleep deprivation and fatigue. We have an interchange in Santa Cruz County which is thought to be unusually dangerous. In my review of accidents recorded by the California Highway Patrol at the site, I found that over half of the accidents occurred in the hours from 12 noon to six PM, one-quarter of the day. This could not be accounted for by direction of travel nor by rush hours. We were fortunate that none of these accidents were fatal. The need for bus drivers to rest is legally recognized; the need for workers in nuclear power plants are as crucial as a public health measure. The Exxon Valdez disaster would have been prevented by observance of such restrictions.

The other rule is about "whistle-blowers" which is a problem of long-standing. I have no personal anecdotes but have followed this going back to *Whistle-Blowing at BART*, which had local implications to us in the Bay Area.

Thank you very much .

Sincerely,

David H. Walworth

David H. Walworth, MD emeritus

Acknowledged by card DEC 21 1999

(30)

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USNRC

'99 DEC -7 P3:15

Mark M. Giese
1520 Bryn Mawr Ave.
Racine, WI 53403
USA
m.mk@juno.com

12/03/99

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Commission Secretary:

Please support both proposed rules (below) to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. These two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance

- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down

- prevent fear from causing nuclear plant workers to remain silent about safety problems

- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions

- protect the public and the environment from a nuclear power plant accident.

Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants:
This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors:
The second proposed rule will protect nuclear "whistleblowers" -- the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

Thank you.

Sincerely,

Mark M Giese
MG/mg

Acknowledged by card DEC 2 1 1999

(29)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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USNRC

'99 DEC -7 P3:18

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

Elizabeth Weiss
6022 Dimm Way
Richmond, CA 94805

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary,

I am writing to urge you to adopt the two new rules proposed to help ensure safety at nuclear power plants. I am strongly in favor of both proposals, to limit the length of shifts and to protect employees from retaliatory harassment.

For the safety of nuclear workers and of all Americans, please adopt those rules.

Thank you,

Elizabeth Weiss

Elizabeth Weiss

Acknowledged by card DEC 21 1999

(28)

James L. Ray, Th.D.
1666 Leerkamp Drive
Franklin, IN 46131

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USNRC

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -7 P3:18

OFFICE OF SECRETARY
ADJUDICATIONS

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mr Secretary:

I am writing The Commission to voice my concern about fatigue among the workers at nuclear power plants. I understand that, at times, they are pushed into longer hours than is consistent with safety. Fatigued workers cannot do a good job of insuring the public's safety. A nuclear plant catastrophe would be far more costly to the whole country than the savings in wages justifies. There is no price we can put on the public's safety. This also bears on national security and prestige. In addition to all the deaths and contamination, it would be an embarrassment to the entire United States nation to have a power plant accident. I understand there is consideration at the Commission of enacting regulations that would prevent the long employee hours that cause fatigue and lowered effectiveness that leads to this kind of accident--with all its consequences. So I want to see that regulation approved.

Also, there is a concern about whistleblowers being fired because they blow the whistle on unsafe practices in nuclear plants. The problem seems to be that managers and supervisors can plead ignorance that such firings are illegal. So they can fire with impunity with the "ignorance of the law" excuse at hand. A regulation is coming up for consideration that would remove this excuse by requiring training of managers and supervisors about the law that forbids firing whistleblowers. I am asking the Commission to enact that regulation.

Sincerely yours.

James L Ray

Acknowledged by card DEC 21 1999

(27)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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'99 DEC -7 P3:22

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

2 December 99

Dear Mr. or Ms. Secretary:

I am writing as a citizen very concerned about nuclear safety to as you to support both proposed rules to ensure that the first line of defense at nuclear reactors is staffed by workers who are free from both fatigue and fear of illegal discrimination. The two proposed rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident.

Please use your authority to ensure that these proposed rules become law.

Thank you.

All the Best for the Holiday Season,

Wes Sanders
President
Art/Culture/Nature

Sanders - Young
29 Indian Creek
911 Dorset Street
South Burlington, VT 05403

DEC 2 1 1999
Acknowledged by card .....

(26)

Peter M. Robbins
295 State St.
Brooklyn, NY 11021

DOCKETED
USNRC

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -7 P3:11

OFF
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ADJ

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

I am writing to you to comment on the two proposed new rules which would ensure that the first line of defense at nuclear powerplants is staffed by workers who are free from both fatigue and fear of illegal discrimination. I believe these rules will help:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Requesting that you adopt these proposed rules and thanking you for you attention to this matter, I remain:

Very truly yours,

Peter Robbins

Peter Robbins

Acknowledged by card DEC 2 1 1999

(25)

DOCKETED
USNRC

'99 DEC -7 P3:00

1317 McGee Avenue
Berkeley, CA 94703-1005

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Secretary of the Commission:

I am writing in support of two new proposed rules.

A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident.

Please enter these comments into the record to support:

Proposed Rule #1 - To establish limits on employee working hours at nuclear power plants to prevent fatigue from impairing nuclear plant worker performance.

Proposed Rule #2 - To provide training on employee protection regulations to supervisors, managers, and directors: this will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns.

These rules are necessary in order to:

- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down;

- prevent fear from causing nuclear plant workers to remain silent about safety problems;

DEC 21 1999
Acknowledged by card

- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions;

- protect the public and the environment from a nuclear power plant accident.

Thank you for your consideration of these comments.

Sincerely,

Jane Kelly

Jane Kelly

cc: Senator Barbara Boxer
Senator Dianne Feinstein
The Honorable Barbara Lee

(24)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'99 DEC -7 P3:10

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

1096 Mason Woods Drive
Atlanta, GA 30329
December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir/Madam:

I am writing in support of proposed changes in NRC rules that would affect workers in nuclear power plants.

As I understand it, these rules would set limits on the number of hours persons could work, thereby helping to insure that fatigue does impair their performance; and prevent supervisors from claiming ignorance of the law as a defense when they improperly discipline so-called "whistle-blowers," i.e. workers who conscientiously report safety problems they encounter on the job.

Both proposed rule changes would help protect the public and the environment from a nuclear power-plant accident, which could have devastating effects, as you know. Please enact them.

Thank you.

Sincerely,

John Bugge

John Bugge, Ph.D.

DEC 21 1999
Acknowledged by card .....

(23)

DOCKET NUMBER
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(64FR67202)

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USNRC

'99 DEC -7 P3:03

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

U.S. Nuclear Commission
Washington D.C.

Dear Secretary of the Commission:

I wish to request you to take all steps to prevent workers from repairing, inspecting and testing safety equipment, whether nuclear plants are operating or shut-down.

I wish you to prevent fatigue from impairing workers performance in keeping the plants running.

I request that you provide support and protection to workers in Reporting safety violations.

I make these requests in the interest for the safety of all of us.

Sincerely yours,

Ludell Deutscher
730 West I St.
Benicia, Ca. 94510

Acknowledged by card DEC 2 1 1999

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(64FR67202)

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'99 DEC -7 P3:02

(22)

12/1/99

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Proposed regulations for employees in Nuclear Power Generation

Please consider the safety of the employees and all the citizens of the world and adopt the proposed regulation to limit working hours. This will minimize fatigue and tend to prevent accidents.

Please adopt the training plan that will inform supervisors, managers and directors of their responsibilities regarding whistle blowers. To plead ignorance of their responsibility must be countered. Whistle blowers should be protected, not harassed or intimidated.

These are issues of basic safety for the public and should be implemented as soon as possible.

James E. Giesen
1600 Lori Ct
Dubuque, IA 52001

Acknowledged by card DEC 2 1 1999

(21)

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(64FR67202)

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'99 DEC -7 P3:13

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Arthur D. Unger
2815 La Cresta Drive
Bakersfield, CA 93305-1719
(805) 323-5569
alunger@juno.com

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

December 1, 1999

Dear Secretary:

I am told the NRC guidelines on working hour limits allows 16 hour days and 72 hours per week. I worked even more than that after medical school. I was so happy to work less, most days, when I started practice. You should study reaction times of people over forty who work so long.

Thank you,

Arthur Unger

Arthur Unger, M.D.

Acknowledged by card DEC 21 1999

U.S. NUCLEAR REGULATORY COMMISSION
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(20)

7930 Oxford Rd.
Niwot, CO 80503

'99 DEC -7 P3:01

Dec. 1, 1999

Dear Nuclear Regulator,

I am writing in support of two proposed rule changes in hopes they will promote the safety of nuclear power plants. One rule sets appropriate limits on workers' hours, to guard against stress and fatigue from overwork. The other gives appropriate protection to employee "whistleblowers", who constitute an important line of defense against unsafe practices.

Both of these changes are sensible and should allow for the safest possible operation of these plants. Please support them.

Sincerely,

Peter Wernick

Peter Wernick

Acknowledged by card DEC 2 1 1999

(19)

COLUMBIA UNIVERSITY
COLLEGE OF PHYSICIANS & SURGEONS
DEPARTMENT OF ANATOMY AND CELL BIOLOGY

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USNRC

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'99 DEC -7 P2:59

OF
RU
ADJ

December 1, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

I am writing with reference to NRC's regulations regarding the safety of workers and the safety of the general public and the environment. It is essential that you establish strict limits on employee working hours at nuclear power plants. In addition, stringent training on employee protection should be required for supervisors, managers, and directors. This is as an effort to prevent fatigue from impairing nuclear plant worker performance when repairing, inspecting, and testing safety equipment. This is important both when nuclear power plants are operating and when they are in the process of being shut down.

I am sure that you better aware of the problems associated with the operation of nuclear facilities than I am, but I felt that I should add my encouragement to you in facilitating your handling of these problems. Thank you for your attention.

Sincerely,

Joan W. Witkin

Joan W. Witkin, PhD
Research Scientist

Acknowledged by card DEC 20 1999

630 West 168th Street New York, NY 10032 212-305-3451 Fax 212-305-3970

(18)

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December 4, 1999

'99 DEC -6 P2:50

OFF
RU
ADJU

Commissioners
c/o Commission Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RE: Rule #1 Limiting Working Hours for Nuclear Workers
Rule #2 Ensuring Protection of Nuclear Whistleblowers

Greetings:

It is no more reassuring knowing my children's health could hinge upon the judgment of an exhausted emergency room doctor finishing the final minutes of a 36 hour shift than it is knowing their well-being depends upon fatigued nuclear employees working long shifts considered illegal in other sectors.

Citizens have little peace of mind knowing that nuclear employees routinely work 17 hour shifts and that they may have to make precise, split-second decisions during a crisis arising when they have diminished mental acuity due to fatigue.

Confidence in the nuclear industry is further eroded by the Commission's implicit condoning of whistleblower persecution by supervisors and managers. Would you feel secure if the American Medical Association ignored reports of significant medical misconduct by your family physician for which supervisors intimidated or dismissed the qualified medical staff raising such safety concerns?

Surely you each rely on colleagues in other regulatory agencies to enact rules affording you, as members of the public, the greatest possible margin of safety. It is time you did the same for the public regarding the nuclear industry by ratifying Proposed Rules #1 and #2.

Sincerely,

Kris L. Christine

Kris L. Christine
P.O. Box 12
Alna, ME 04535

Acknowledged by card DEC 14 1999

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December 3, 1999

'99 DEC -6 P3:02

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary;

I urge you to support both NRC proposed rules that ensure the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. This is essential to

Prevent fatigue from impairing nuclear plant worker performance;

Prevent fatigued workers from repairing, inspecting, or testing safety equipment when plants are operating or down;

Prevent fear from causing workers to remain silent about safety problems;

Prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions;

Protect the public and the environment from a nuclear power plant accident.

Keep protecting the Karen Silkwoods and George Galatis of the world. They have been instrumental in protecting the public

Sincerely,

Margreta von Pein

Margreta von Pein
P.O. Box 602
Claverack, New York 12513.

DEC 14 1999
Acknowledged by card

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(16)

Paula K. Ivey, Ph.D.
1706 Bartoncliff Dr.
Austin, TX 78704

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'99 DEC -6 P2:56

OF
AD

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

December 3, 1999

Dear Secretary:

I am writing out of concern for public safety from nuclear power plant mishaps. As a member of the Union of Concerned Scientists and a public health professional, I feel strongly about the lax efforts on the part of the NRC to guard against staff fatigue and protection for employee "whistleblowers". It is in the interest of nuclear power plant staff, the public, and the NRC to choose a risk averse strategy for nuclear safety. Faced with increased competition, nuclear power plant owners continue to stretch worker hours and reduce staff. Overworked employees are presently allowed to repair, inspect and test safety equipment when nuclear power plants are operating or shut down. Numerous studies have found that fatigue impairs human performance, and it is well known that human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. At present, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

In addition to establishing limits on employee working hours at nuclear power plants, the NRC should actively protect plant workers who conscientiously raise safety concerns. At present, the NRC appears more a handmaiden of nuclear industry than a protector of "whistleblowers" who risk their livelihood to suffer fear, harassment and intimidation. Nuclear plant owners should be required to train supervisors and managers on the employee protection regulations, and employers or employees should not be allowed to use "ignorance of the law" as a shield for illegal action. At present, the NRC has done little more than slap the hand of the nuclear power industry for serious violations of safety and employee protection. Individual power plant owners, supervisors and management should be consistently held personally accountable for violations, as occasional fines are little deterrent to industry abuses.

It is in the best interest of the NRC to strongly protect the public and the environment from a nuclear power plant accident. It is critically important to be vigilant against safety risks. The horror of an accident can be avoided by a stronger NRC working in the interests of the public rather than of industry.

Sincerely,

Paula K. Ivey, Ph.D.

Acknowledged by card DEC 14 1999

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OFFICE OF SECRETARY
ADJUDICATIONS STAFF

December 3, 1999

Charles Safiran
200 E. 5th Ave Apt 237
Naperville, IL 60563

Dear Secretary of the Commission:

I recently learned from the Union of Concerned Scientists that two proposed rules, one to limit the number hours worked by nuclear power plant personnel, and a second requiring training for plant supervisors and managers regarding employee protection regulations. I feel strongly in favor of these two rules, and write to urge you to support them.

It is essential to prevent fatigued workers from making dangerous mistakes, and the rule imposing work-hour limits would effectively help to prevent this. Furthermore, nuclear power plant supervisors and managers must not be allowed 'ignorance of the law' regarding ~~employee~~ harassment and ~~intimidation~~ of employees who raise safety concerns. Supervisors and managers should be required to learn about the existing employee protection regulations.

Thank you for your consideration of these important issues.

Sincerely, Charles Safiran

Acknowledged by card DEC 14 1999

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(14)

Michel A Lombard
912 Taft Place
New Orleans, LA 70119-3828
USA

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'99 DEC -6 P3:23

OFF
BR
ADD

December 03, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir,

To Protect Americans from fatigued Nuclear workers afraid to voice safety concerns, I support the two following proposed rules:

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants:
This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors:
The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

Sincerely,

Michel A Lombard

Acknowledged by card DEC 14 1999

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OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS

CITIZENS ACTION COALITION OF INDIANA

2015 Western Ave., Suite 101 South Bend, IN 46629 (219) 232-7905

December 3, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir or Madame:

On behalf of the over 300,00 members of the Citizens Action Coalition of Indiana, I am writing in support of the proposed rules to 1) establish limits on employee working hours at nuclear power plants even if the plant is shut down for maintenance or refueling; and 2) require training of management personnel regarding the rights of employees who point out safety violations and/or express concerns about safety.

In regard to the proposed rule limiting the amount of time worked in a single shift or week:

With the onset of electric utility restructuring, nuclear power plant owners face great pressure to slash operating costs, forcing plant owners to reduce staffing levels. As a result, remaining staff members must work longer and longer hours.

Numerous studies have concluded that fatigue impairs human performance. In fact, some studies have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%. Regulation implemented by the NRC in the 1980s ban workers with a blood alcohol level greater than 0.04% from nuclear power plants.

Allowing fatigued workers to work during outages because the plants are shut down at the time defies common sense. ALL of the

Acknowledged by card DEC 14 1999

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maintenance on jet airliners is performed when the planes are on the ground, yet the FAA would never permit this maintenance to be performed by alcohol-impaired workers. The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. The Citizens Action Coalition of Indiana believes it is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

Regarding the proposed rule requiring training on employee protection regulations for supervisors, managers, and directors:

This rule is needed to protect nuclear plant workers who conscientiously raise safety concerns. Current NRC regulations are supposed to protect these workers from harassment and intimidation. Unfortunately managers who fire and/or discriminate against whistleblowers often escape responsibility for their actions by claiming they didn't know their actions were illegal. The proposed rule would remove this "ignorance of the law" excuse.

In short, these two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Sincerely,

Roger Voelker

Roger Voelker,
Citizens Action Coalition of Indiana

(12)

DOCKETED

35 The Garrison — Rte. 108
Dover, NH 03820
2 December 1999

'99 DEC -6 P3:17

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
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(64FR67202)

To Whom It May Concern:

It is my understanding that we are currently in the public comment period for two proposed rules, which I urge you to support and enforce. While, in the past, the NRC has acted more as the Nuclear Industry Protection Commission, than fulfilling its mandate to regulate the industry and protect workers and consumers from the great dangers posed by nuclear plants that are operated without regard for anything but profit.

Such outrages include allowing owners to demand long overtime shifts of their operators, despite the fact 17 hours of wakefulness has the same effect on the body as a blood alcohol level of .05%. Your own regulations prohibit a blood alcohol level of .04%. It is as if you permit and encourage drunkenness on the job. (Perhaps this should not be surprising, since it is well known here — in Seabrook Station's backyard — that when that plant was being built, workers *were* returning from lunch drunk.) This allowance of excessive overtime must be stopped, for the safety of all. True, you have guidelines that limit workers to 16 hours per day and 72 hours per week. But these guidelines only specifically apply to control room operators and key maintenance personnel. Managers, safety inspectors, engineers, and other plant workers are not explicitly covered by these guidelines. Moreover, you seem to lack the ability to enforce these limits because they are "just guidelines;" and guidelines that apply only when the plant is running. Plant owners force workers to put in 12 to16 hour days for weeks on end during refueling. ALL of the maintenance on jet airliners is performed when the planes are on the ground. But the FAA would not permit this maintenance to be performed by drunken maintenance crews. Federal law places working hour limits on safety related jobs, like truck driver and airline pilot to protect the public from fatigued workers. Employees at nuclear power plants should have the same enforceable limits, whether plants are running or not.

The second rule pertains to whistleblowers; who in the absence of effective oversight from your commission, and from owners whose incentives often run directly counter

over...

Acknowledged by card DEC 14 1999

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to safety concerns; are the best means of determining when a plant is operating outside the bounds of safety. For over twenty years and in many, many instances; these brave souls have alerted the public, and you, to grave danger. On the basis of their reports, actions have been taken which has included the closing of some plants. Yet, they are themselves in danger of retribution from the plant owners and operators who see their profits threatened. While regulations are in place, they are woefully inadequate. You will, perhaps, sanction the company in an amount equal to a third to a half a day's profit -- hardly an incentive at all. Yet those individuals who intimidate and worse are let off scot free. Even those limited sanctions I spoke of may not be imposed if the operator claims not to have known about it — and just how easy is it to lie about such things? especially when there is money at stake? The new rule would remove this ignorance claim, and you should support and enforce it. After all, ignorance of the law is no excuse anywhere else in our system. Personal accountability will go a long way to clean up this mess!

Sincerely,

C. Alexander Cohen

(11)

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DOCKETED

December 2, 1999

'99 DEC -6 P3:17

OFF
ADJ

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Secretary:

Please support both proposed rules to ensure that the first line of defense against a nuclear disaster is staffed by workers who are free from both fatigue and fear of illegal discrimination.

The following two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

These two rules are:

Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants: This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors: The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

Thank you for your time and for helping to ensure that the world we have is free from destruction.

Sincerely,

Phyllis J. Raynor

Phyllis J. Raynor
1207 Lauderdale Drive
Apt. A
Richmond, VA 23233-5046

Acknowledged by card DEC 14 1999

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Barbara Curtis
647-A Nutley Drive
Monroe Twp., NJ 08831

'99 DEC -6 P3:16

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

December 2, 1999

Dear Secretary,

There have been accidents to nuclear power plants in the past that have endangered the public. I urge the Nuclear Regulatory Commission to protect Americans from fatigued workers and those afraid to voice safety concerns. Please enforce these rules:

1. Establish limits on employee working hours at nuclear power plants. Pressure to cut costs must not force plant owners to reduce staffing levels or force workers to increase working hours.
2. Protect "Whistleblowers" from harassment and intimidation from supervisors and managers.

Hopefully these measures will increase safety at nuclear plants in the United States.

Thank you for your consideration.

Yours truly,
Barbara Curtis

Acknowledged by card DEC 14 1999

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'99 DEC -6 P3:21

Elizabeth Claire

302 Nedellec Drive, Saddle Brook, NJ 07663-5135 Tel: (201) 791-5014 Fax: (201) 791-1901
E-mail: Eceardley@aol.com

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Commissioner:

I am urgently concerned about the safety of the millions of Americans who live near nuclear plants. A nuclear power plant accident threatens the environment, the humans and animals, and the genetic make up of all living things near it.

It has come to my attention that nuclear plants in competition with other power sources are cutting costs at the risk of our lives. Staffs have been cut, and remaining wWorkers and managers are working up to, and sometimes more than 72 hours a week, jeopardizing their alertness. I understand that being awake for 17 hours has the same effect as .05% alcohol in the blood. That's not good enough for nuclear workers or the rest of us. There are regulations for airline pilots, truck drivers, and train engineers. We need these regulations for nuclear plant workers too.

I have also learned that supervisors intimidate, harrass and fire workers who try to change their working conditions. This is illegal, but the supervisors plead "ignorant of the law" and the company is merely fined $110,000. This is a cheap price for them to pay, so they continue to do it.

Please protect us all by:

1. Insisting that nuclear plant owners educate their supervisors in the law about employees. Then hold the plant owners responsible for any harrassing, intimidation or illegal firing of nuclear workers who "blow the whistle" on their difficult and dangerous working conditions.

(And, plain and simple, stop the firing of nuclear plant workers who raise safety issues.)

2. Reduce the allowed working hours and conditions to insure that full alertness is available to employees.

Thank you for taking the time to consider my opinion.

Sincerely,

Elizabeth Claire

Elizabeth Claire

DEC 14 1999
Acknowledged by card

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(8)

Dr. Walter Grant

German-English Translations

24 Holton Street, Boston, MA 02134, USA

PHONE: (617) 254-1118 FAX: (617) 254-2112 E-MAIL: wjgrant@concentric.net

'99 DEC -6 P3:21

December 2, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

I am writing concerning proposals soon to be acted on by the NRC, designed to protect Americans from misoperation by fatigued nuclear workers and from the intimidation of such workers to voice safety concerns.

A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident. In the next few months, the Nuclear Regulatory Commission (NRC) will reach decisions on two proposed rules intended to make sure that nuclear workers are an effective line of defense.

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants: This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors: The second proposed rule will protect nuclear "whistle blowers" - the plant workers who conscientiously raise safety concerns. The NRC's

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regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistle blowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and manager son the employee protection regulations.

These two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions

- protect the public and the environment from a nuclear power plant accident

A report released in March 1999 on the nuclear industry's overtime problems. documented that scientific studies have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%. This report is available on the web at http://www.tirednukes.org. Regulations implemented by the NRC in the 1980s ban workers with a blood alcohol level greater than 0.04% from nuclear power plants.

The NRC introduced guidelines on working hour limits in 1982. The NRC's guidelines limit workers to 16 hours per day and 72 hours per week. But these guidelines only specifically apply to control room operators and key maintenance personnel. Managers, safety inspectors, engineers, and other plant workers are not explicitly covered by these NRC's guidelines. In addition, the NRC lacks the ability to force plant owners to adhere to these working hour limits -- for control room operators and other workers -- because they were issued as mere guidelines.

Worse still, the NRC recently opted to consider the guidelines to apply only when a nuclear power plant is running. Thus, plant owners force workers to put in 12 and 16 hour days for weeks on end during refueling outages. The NRC allows fatigued workers during outages because the plants are shut down at the time. The NRC's logic is dumbfounding. ALL of the maintenance on jet airliners is performed when the planes are on the ground. But the FAA would not permit this maintenance to be performed by drunken maintenance crews. Further information on nuclear worker fatigue is available at www.tirednukes.org.

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the federal government to

impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not. The proposed rule was published in the Federal Register on December 1,1999.

WHISTLE BLOWER PROTECTION: From Karen Silkwood in 1974 to George Galatis in 1996, there is a long history of nuclear workers stepping forward to raise safety concerns. Their efforts forced repairs to broken safety equipment at nuclear powerplants such as Millstone, Watts Bar, Vermont Yankee, DC Cook, Nine Mile Point, Vogtle, Palo Verde, WolfCreek, Diablo Canyon, Perry, South Texas Project, and Susquehanna. Safety concerns raised by whistleblowers led to the premature closure of the Yankee Rowe and Maine Yankee nuclear power plants.

The NRC's regulations protect nuclear workers from harassment and intimidation. When these regulations are violated, the NRC can take actions against the worker's employer and also against the responsible individual(s). Unfortunately, the NRC is only doing half its job.

After determining who harassed and intimidated nuclear worker for raising a safety concern, the NRC limits its sanctions to the company. In 1999 alone, the NRC imposed fines of $110,000 on the owners of the Perry and Zion nuclear plants and $80,000 fines on the owners of the Seabrook and Millstone plants. In each of these cases, and in very few of the dozens of similar cases since 1996, the NRC elected not to take sanctions against the individuals doing the illegal actions. By regulation, the NRC can take actions against individuals up to and including banning them from the nuclear industry. By practice, the NRC rarely holds individuals accountable for breaking employee protection regulations.

The NRC maintains that it cannot impose sanctions against the people it determines have broken the employee protection regulations unless it can prove that these individuals knew that their actions were illegal. Thus, "ignorance of the law," which is not a viable defense in any other US legal proceeding, is a valid excuse in the NRC's short-sighted eyes.

By claiming to be ignorant of the employee protection regulations, nuclear power plant supervisors and managers can fire workers who raise safety concerns --and thereby silencing all surviving workers in the future -- with the implicit blessing of the NRC. If caught taking illegal action against a whistleblower, the NRC will -- at worst -- impose a $110,000 fine on the company. Considering that each day that a nuclear power plant is shut down can cost the company $249,000 to $330,000 in lost revenue, a $110,000 fine is hardly an effective deterrent. Today, the risk/reward balance is heavily tilted towards law-breaking managers at the expense of law-abiding workers. That's nonsensical.

The NRC has been petitioned to adopt a rule requiring supervisors, managers, and directors in the nuclear industry to be trained on employee protection regulations. This

new rule would eliminate once and for all the "ignorance of the law" excuse. In the future, the NRC would have no reason to set aside sanctions against individuals breaking the employee protection regulations.The proposed new rule was published in the Federal Register on October 27, 1999.

Personal accountability will be far more effective in reducing harassment and intimidation against nuclear workers than the NRC's past practice of the occasional fine against companies.

Sincerely,

Walter Grant

Walter Grant

(7)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'99 DEC -6 P3:22

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

122 Walhalla Rd.
Columbus, Oh. 43202
December 2, 1999

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir:

I write with regard to the proposed rules for making safer nuclear power in this country by making some basic changes in the work place. Please work for the adoption of the following rules:

Rule #1, limiting the number of hours employees may work in a week. People who have responsibility for operating nuklear plants need to be in an alert condition, so that mistakes are less likely to happen which could endanger our population and our environment.

Rule #2, training on employee protection regulations for supervisors, managers, and directors to prevent fear from "whistle blowing" in the industry.

We believe these to be essential elements of a safe nuclear industry.

Thank you.

Sincerely,

Bonnie L. Wigen

Bonnie L. Wigen

Acknowledged by card DEC 14 1999

U.S. NUCLEAR REGULATORY COMMISSION
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1923 Woodlawn Circle
Clarksdale, MS 38614
work(601)627-7267 home (601)627-4496
email 12step@clarksdale.com
Dec.2, 1999

DOCKETED
USNRC

'99 DEC -6 P3:25

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Mr. Secretary,

This letter is in support of the proposed rules to prevent a nuclear power plant accident. Not to do so would be unconscionable once the question is before us.

Should these rules be disapproved and an accident occur as a result,,the lives of those responsible would be changed for the worse forever. Please do the next right thing.

Best Wishes,

Betty Streett

Betty Streett, LCSW

Acknowledged by card DEC 14 1999

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DOCKET NUMBER
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(64FR67202)

DOCKETED
USNRC
Dec. 2, 1999
'99 DEC -6 P3:25

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Proposed rules for nuclear power plant workers

Dear Sir:

I am writing as a concerned citizen requesting that you support issuance and implementation of the proposed rules that will:

1). Establish limits on employee working hours at nuclear power plants and

2). Require training on employee protection regulations for supervisors, managers, and directors. The second proposed rule will protect nuclear "whistle blowers" - the plant workers who conscientiously raise safety concerns.

I believe both proposed rules are necessary to ensure that the first line of defense from accidents at nuclear power plants is staffed by workers who are free from both fatigue and fear of illegal discrimination. A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident.

Yours truly,

Clyde Anderson

Clyde Anderson
7020 Burt St.
Omaha, NE 68132

Acknowledged by card DEC 14 1999

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Nicholas Harmon
53 Leroy Ave
Darien, CT 06820

DOCKETED
USNRC

'99 DEC -6 P3:22

OFFICE OF SECRETARY
ADJUDICATIONS

December 1, 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Re: two proposed rules intended to make sure that nuclear workers are an effective line of defense

Dear Sir,

I support both proposed rules to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. I believe that these two rules are essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Thank you for your time and consideration.

With light,

Nicholas Harmon

Acknowledged by card DEC 14 1999

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(3)

Carnegie Mellon

Department of Physics
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213-3890
412-268-2740

'99 DEC -6 P3:18

504 Glen Arden Drive
Pittsburgh, PA 15208
1 December 1999

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Commisioners:

For many years I have felt that nuclear power should play some role in our energy balance, especially with the greenhouse implications of fossil fuels. However, I have been unwilling to advocate this position because I have little confidence in the degree of training of nuclear power plant operators. With *laissez-faire* economics, it is just a matter of time until concern for profit will drive the safety factor too low.

I am therefore encouraged to see that there are two proposed rules that will partially alleviate my concern. The rule limiting working hours and the rule protecting whistle-blowers are badly overdue. I urge you to pass them forthwith and to enforce them vigorously.

I would also urge that all nuclear power workers have graduated from accredited degree programs and that they be members of an independent nuclear guild, analogous to the American Medical Association (not a union), but I understand that this issue is not on the table. I do hope you will move favorably on the two proposed rules.

Yours sincerely,

John F. Nagle

John F. Nagle
Professor of Physics
and Biological Sciences
Carnegie Mellon University
Pittsburgh, PA 15213 USA
412-268-2764 (Office)
412-681-0648 (FAX)
nagle@andrew.cmu.edu
http://bilayer.phys.cmu.edu

Acknowledged by card DEC 14 1999

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -6 P3:18

December 1, 1999
317 Maple Ridge
Ann Arbor, MI 48103

To the Secretary of the Commission:

I strongly urge you to support both the working hour limits and the employee protection training rules that have been proposed. Both are needed in order to reduce the possibility of nuclear accidents, a frightening potential of our nuclear facilities.

Yours Sincerely,

Susan B. Miller, PhD.

Susan B. Miller, Ph.D.

DEC 14 1999
Acknowledged by card

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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'99 DEC -6 P3:01

From: ewesselman@ucsusa.org
Date: Wed, 01 Dec 1999 17:20:19 -0500
To: <UCS_LIST@ucsusa.org>
Subject: URGENT ACTION ALERT FROM UCS
Content-Description: "cc:Mail Note Part"

Dear NRC

We support Rules #1 + #2 and hope that you will too!

Thank you

Phyllis + Penny Hanna
213 Mirada Dr
Aptos CA 95003

Slim Heckpern
(same address)

***** UNION OF CONCERNED SCIENTISTS ACTION ALERT *****

TELL NRC TO PROTECT AMERICANS FROM FATIGUED NUCLEAR WORKERS AFRAID TO VOICE SAFETY CONCERNS

THE ISSUES:
A nuclear power plant accident can hurt thousands of people and cause long-lasting harm to the environment. The workers at these plants are the first line of defense against such a disaster. The workers test and inspect safety equipment and follow emergency procedures when equipment malfunctions to lessen the consequences of an accident. In the next few months, the Nuclear Regulatory Commission (NRC) will reach decisions on two proposed rules intended to make sure that nuclear workers are an effective line of defense.

* Proposed Rule #1 - Establish limits on employee working hours at nuclear power plants:
This rule will make the NRC guard against human performance degradation from fatigue just as it has done for drug and alcohol use since the mid 1980s. With the onset of electric utility restructuring, nuclear power plant owners face pressure to slash operating costs, forcing plant owners to reduce staffing levels. The remaining staff members must work longer and longer hours. Numerous studies have concluded that fatigue impairs human performance. Human performance problems contributed to the nuclear accidents at Three Mile Island and Chernobyl. Despite this evidence, the NRC has no regulations against excessive overtime and frequently looks the other way when plant owners abuse the agency's overtime guidelines.

* Proposed Rule #2 - Training on employee protection regulations to supervisors, managers, and directors:
The second proposed rule will protect nuclear "whistleblowers" - the plant workers who conscientiously raise safety concerns. The NRC's regulations are supposed to protect these workers from harassment and intimidation. Unfortunately, the agency consistently fails to enforce these regulations based on the flimsy rationale that the individuals who fire and discriminate against whistleblowers don't know that these actions are illegal. The rule removes this "ignorance of the law" excuse by requiring nuclear plant owners to train supervisors and managers on the employee protection regulations.

ACTION:

Please write the Nuclear Regulatory Commission and tell them to support both proposed rules to ensure that the first line of defense is staffed by workers who are free from both fatigue and fear of illegal discrimination. Tell the NRC that these two rules are

Acknowledged by card DEC 14 1999

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essential to:

- prevent fatigue from impairing nuclear plant worker performance
- prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down
- prevent fear from causing nuclear plant workers to remain silent about safety problems
- prevent supervisors, managers, and directors from using "ignorance of the law" as a shield for their illegal actions
- protect the public and the environment from a nuclear power plant accident

Additional information about these proposed rules is provided at the end of this message.

TIMING:
We need to act soon! The public comment period for the proposed rule on employee protection training ends January 10, 2000.The public comment period for the proposed rule on overtime ends February 14, 2000. Even if you miss these deadlines, please contact the NRC with support for these rules.

HOW TO CONTACT:

UCS encourages you to support both the working hour limits and the employee protection training proposed rules via formal comments to the Nuclear Regulatory Commission. Comments supporting the proposed rules can be mailed to:

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

BACKGROUND:

WORKING HOURS
UCS released a report in March 1999 on the nuclear industry's overtime problems. This report, which is available on the web at http://www.tirednukes.org, documented scientific studies which have shown that being awake for 17 hours has the same adverse effect on human performance as having a blood alcohol level of 0.05%. Regulation implemented by the NRC in the 1980s ban workers with a blood alcohol level greater than 0.04% from nuclear power plants.

The NRC introduced guidelines on working hour limits in 1982. The NRC's guidelines limit workers to 16 hours per day and 72 hours per week. But these guidelines only specifically apply to control room operators and key maintenance personnel. Managers, safety inspectors, engineers, and other plant workers are not explicitly covered by these NRC's guidelines. In addition, the NRC lacks the ability to force plant owners to adhere to these working hour limits -- for control room operators and other workers -- because they were issued as mere guidelines.

Worse still, the NRC recently opted to consider the guidelines to apply only when a nuclear power plant is running. Thus, plant owners force workers to put in 12 and 16 hour days for weeks on end during refueling outages. The NRC allows fatigued workers during outages because the plants are shut down at the time. The NRC's logic is dumbfounding. ALL of the maintenance on jet airliners is performed when the planes are on the ground. But the FAA would not permit this maintenance to be performed by drunken maintenance crews. Further information on nuclear worker fatigue is available at www.tirednukes.org.

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. UCS believes it is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not. The proposed rule was published in the Federal Register on December 1, 1999.

WHISTLEBLOWER PROTECTION

From Karen Silkwood in 1974 to George Galatis in 1996, there is a long history of nuclear workers stepping forward to raise safety concerns. Their efforts forced repairs to broken safety equipment at nuclear power plants such as Millstone, Watts Bar, Vermont Yankee, D C Cook, Nine Mile Point, Vogtle, Palo Verde, Wolf Creek, Diablo Canyon, Perry, South Texas Project, and Susquehanna. Safety concerns raised by whistleblowers led to the premature closure of the Yankee Rowe and Maine Yankee nuclear power plants.

The NRC's regulations protect nuclear workers from harassment and intimidation. When these regulations are violated, the NRC can take actions against the worker's employer and also against the responsible individual(s). Unfortunately, the NRC is only doing half its job.

After determining who harassed and intimidated a nuclear worker for raising a safety concern, the NRC limits its sanctions to the company. In 1999 alone, the NRC imposed fines of $110,000 on the owners of the Perry and Zion nuclear plants and $80,000 fines on the owners of the Seabrook and Millstone plants. In each of these cases, and in very few of the dozens of similar cases since 1996, the NRC elected not to take sanctions against the individuals doing the illegal actions. By regulation, the NRC can take actions against individuals up to and including banning them from the nuclear industry. By practice, the NRC rarely holds individuals accountable for breaking employee protection regulations.

The NRC maintains that it cannot impose sanctions against the people it determines have broken the employee protection regulations unless it can prove that these individuals knew that their actions were illegal. Thus, "ignorance of the law," which is not a viable defense in any other US legal proceeding, is a valid excuse in the NRC's short-sighted eyes.

By claiming to be ignorant of the employee protection regulations, nuclear power plant supervisors and managers can fire workers who raise safety concerns -- and thereby silencing all surviving workers in the future -- with the implicit blessing of the NRC. If caught taking illegal action against a whistleblower, the NRC will -- at worst -- impose a $110,000 fine on the company. Considering that each day that a nuclear power plant is shut down can cost the company $249,000 to $330,000 in lost revenue, a $110,000 fine is hardly an effective deterrent. Today, the risk/reward balance is heavily tilted towards law-breaking managers at the expense of law-abiding workers. That's nonsensical.

UCS petitioned the NRC to adopt a rule requiring supervisors, managers, and directors in the nuclear industry to be trained on employee protection regulations. This new rule would eliminate once and for all the "ignorance of the law" excuse. In the future, the NRC would have no reason to set aside sanctions against individuals breaking the employee protection regulations. UCS's proposed new rule was published in the Federal Register on October 27, 1999.

UCS believes that personal accountability will be far more effective in reducing harassment and intimidation against nuclear workers than the NRC's past practice of the occasional fine against companies.

For more information about nuclear safety, visit the UCS web page at http://www.ucsusa.org or contact Dave Lochbaum at (202) 332-0900 ext. 112, dlochbaum@ucsusa.org.

Please let us know when you contact the NRC. This allows us to monitor how well our action alerts are working. You can send a copy of your comments via mail, fax, or e-mail to our Washington, DC office:

Eric Wesselman
Energy Field Coordinator
Union of Concerned Scientists
1616 P Street NW, Suite 310
Washington, DC 20036
(202) 332-0905 fax
ewesselman@ucsusa.org

Thank you for taking the time to contact the NRC about this important nuclear safety issue

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

[7590-01-P]

DOCKETED
USNRC

'99 NOV 24 P3:47

OFF
BR
ADJUD

NUCLEAR REGULATORY COMMISSION

10 CFR Part 26

[Docket No. PRM-26-2]

Barry Quigley

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; Notice of receipt.

SUMMARY: The Nuclear Regulatory Commission is publishing for public comment a notice of receipt of a petition for rulemaking dated September 28, 1999, that was filed with the Commission by Mr. Barry Quigley. The petition was docketed by the NRC on October 7, 1999, and has been assigned Docket No. PRM-26-2. The petitioner requests that the NRC: (1) add enforceable working hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR Part 55.33 (a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC Form-396 to include self-disclosure of sleeping disorders by licensed operators. The petitioner also requests changes to NRC Inspection Procedure 81502, Fitness for Duty Program. The petitioner believes that clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized.

DATE: Submit comments by February 14, 2000 ~~(75 days after publication in the Federal Register)~~. 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.

Pub. on 12/1/99

ADDRESSES: Submit written comments to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff. Hand deliver comments to: 11555 Rockville Pike, Rockville, Maryland between 7:30 a.m. and 4:15 p.m. Federal workdays.

For a copy of the petition and the two reports submitted with the petition (referenced below), 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 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.

SUPPLEMENTARY INFORMATION:

The Petitioner

The petitioner is licensed by the NRC as a Senior Reactor Operator who is required to comply with all applicable Commission regulations.

Background

The petitioner states that in an increasingly competitive electricity market, the battle cry is 'do more with less.' According to the petitioner, this translates into fewer people who are working more and sometimes many more hours at nuclear power plants. The petitioner believes that personnel mistakes at nuclear power plants can be attributed to fatigue and believes that work-hour limits should be required to minimize personnel fatigue.

The petitioner states that in a letter dated May 18, 1999, to Congressman Edward J. Markey, then-NRC Chairman Shirley Jackson stated that few significant industry events can be attributed to fatigue. While the petitioner agrees that this statement is correct, he asserts that a review of the NRC's Human Factors Information System (HFIS) database suggests that events related to fatigue occur but are not reported, or not properly attributed to fatigue. According to the petitioner, NRC inspection reports listed 87 occurrences of staffing as less than adequate, while the industry using data from the Licensee Events Report only listed 11. For occurrences attributable to excessive overtime/acute fatigue, the petitioner states that NRC reported 59 occurrences, as compared to 3 occurrences reported by the nuclear industry, and for frequent use of overtime/cumulative fatigue, NRC reported 28 cases and the industry reported none.

The petitioner believes that, based on NRC's much higher reporting of fatigue-type events, industry's accounting and reporting process is non-conservative. The petitioner believes that the tendency of the industry to under-report events related to fatigue is all the more significant in light of the NRC's trend, as asserted by the petitioner, of reducing its inspection efforts at nuclear power plants.

The petitioner states that while NRC's HFIS database contains more events related to fatigue than industry's reporting, the NRC also under reports fatigue issues. The petitioner states that among other things, fatigue causes inattention to detail, increased risk-taking, and poor work practices. The petitioner cites the following categories in the HFIS database to support his position:

> Work practices or skill of the craft less than adequate - - If the skill of the craft activities are not performed consistent with management expectations, safety significance of activity or industry standard. 4913 occurrences (NRC and industry combined).
>
> Non-conservative decision making or questioning attitude less than adequate - - If personnel fail to stop work or establish appropriate controls when presented with unfavorable or uncertain work conditions. 1805 combined occurrences.
>
> Self-checking less than adequate - - If a worker fails to self-check adequately before performing task (Stop, Think, Act, Review). 618 combined occurrences.
>
> Awareness or attention less than adequate - - Includes problems that are due to failing to maintain situational awareness, infrequent or ineffective control board monitoring and problems arising from being distracted or interrupted. 2389 combined occurrences.

The petitioner states that the 9725 occurrences included in these four categories account for almost 30% of the total HFIS entries for 1996 through 1998. The petitioner believes

that while there are certainly other causes for these occurrences, such as distractions and interruptions, fatigue most probably played a role in a respectable percentage of them. The petitioner cites a National Transportation Safety Board (NTSB) report, which was attached to the petition, that found that, depending on the transportation mode, 21% to 33% of consequential events were fatigue related, whereas the NRC only attributed 90 occurrences (out of the 9725 included in the HFIS database) directly to fatigue. The petitioner states that it is highly unlikely that less than 1% were caused by fatigue. The petitioner compares the fact that the Department of Transportation (DOT) spent over $30 million on fatigue research in fiscal years 1990 to 1998, while no figures could be found in the NRC budget related to fatigue research. The petitioner compares NTSB and DOT research reports to recent NRC research reports and asserts that the NRC may not be qualified to detect fatigue-related events until they grow to the size of the Peach Bottom occurrence (the NRC ordered two reactors at Peach Bottom nuclear plant to be shut down in March 1987 after NRC inspectors discovered licensed operators asleep in the control room).

The petitioner specifies three other factors that reduce faith in NRC and the industry's reporting on fatigue:

1. Some fatigue errors have latent effects that may not be discovered for quite sometime. The examples the petitioner provided were valve mispositionings and procedures with technical errors caused by an over-worked and fatigued staff. The petitioner asserts that the cause for such errors would be difficult to trace.
2. The HFIS database shows 392 occurrences for which a root cause analysis was determined to be less than adequate. The petitioner questions the quality of the LER's presented by industry to identify all causes of an event.

3. The NRC is not aggressive in looking for fatigue issues. The petitioner notes that NRC indicated that it is very difficult to get overtime issues into Inspection Reports because it is concerned that the licensee may object.

The petitioner states that it appears that the policy of NRC is to wait for something bad to happen and then raise the issue with licensee management.

Petitioner's Conclusion

The petitioner states that the NRC issued a Generic Letter 82-12 on June 15, 1982, to all plant owners that provided guidelines that established controls to prevent situations where fatigue could reduce the ability of personnel to maintain the reactor in a safe condition. According to the petitioner, the issuance of the Generic Letter 17 years ago indicates that NRC is well aware of the threat and undue risk posed by fatigue on workers to safely operate a nuclear power plant, and therefore required plant owners to control working hours. The petitioner notes that with electricity deregulation forcing plant owners to slash staffing levels and work the survivors longer and longer hours, that the NRC has redefined the fatigue risk because few significant events can be precisely attributed to fatigue. However, according to the petitioner, the NRC shut down the Peach Bottom plant without first proving that a single significant event at the facility could be attributed to operator inattentiveness (i.e., napping). The petitioner also states that in the 1980's, although few significant events were attributed to drug or alcohol abuse, the NRC took action to reduce the risk of an accident caused by degraded human performance. Specifically, the NRC implemented a Fitness-for-Duty rule that includes individual and corporate sanctions. The petitioner requests that the NRC take comparable steps to prevent degraded human performances resulting from fatigue.

The Petitioner's Proposed Amendments

The petitioner recommends the following amendments to 10 CFR Part 26.

(1) The following limits apply for personnel performing safety-related work:

(a) During non-outage periods:

(i) 60 hours per week, and

(ii) 108 hours in two weeks.

(b) During outage periods[1]:

(i) 72 hours per week, and

(ii) 132 hours in two weeks.

(c) The maximum annual limits[2] as a percentage over 2080 hours are:

Year ending	Shift Workers		Non-Shiftworkers	Roving Crews
	Licensed	Non-licensed		
Dec 31, 2003[3]	20	20	30	30
Dec 31, 2002	25	20	35	35
Dec 31, 2001	30	25	40	40

(d) No part of a 16-hour shift shall occur between the hours of 11 pm and 7 am, except for turnover.

---

[1]Outage periods are defined as the 48 hours prior to reactor shutdown, the duration of the shutdown and the 48 hours after synchronizing to the grid.

[2]Exclusive of turnover time.

[3]And all subsequent years.

(e) No more than two 16-hour shifts shall occur in a rolling 7-day period. The first 16-hour shift shall be followed by a 16-hour rest period. The second 16-hour shift shall be preceded by a 24-hour rest period. The rest periods may be combined.

(f) No more than 24 hours in a 48 hour period.

(g) The limits apply to an individual regardless of work location or employer.

(h) Turnovers:

(i) A turnover time of 1-hour (1-1/2 hours outage) may be allocated in any manner between an individual's oncoming and offgoing turnovers. Any balance of time remaining from turnover shall not be used for other purposes.

(ii) Exceeding the turnover time limit shall not constitute violation of the working hour limits provided:

(1) The condition is entered into the Licensee's Corrective Action program, and

(2) No more than one occurrence per individual per week.

(iii) The turnover time allowance shall only apply to written turnovers conducted face-to face.

(2) The following exceptions apply to the work hour limits of paragraph (1) provided the licensee takes action to minimize the effects of fatigue on human performance. Such actions may be demonstrated by compliance with paragraph (3) in addition to increased supervisory oversight.

(a) Activation of the Emergency Plan under 10 CFR 50.47,

(b) For those plants which shutdown for severe weather, the limits are suspended from the beginning of the power reduction until the severe weather has passed,

(c) The transition to Daylight Savings time in the Fall. No showing of minimization of fatigue is required for this exemption.

(d) Plant transients, typically large unplanned power changes or initiation of major Engineered Safety Features. Avoidance of Technical Specifications required shutdowns is not a transient covered by this exemption.

(e) For extended shutdown, the biweekly limit increases to 144 hours per week (weekly remains at 72 hours) provided:

(i) Prior to restart or fuel load, a plan is in place to ensure adequate rest for personnel performing critical tasks. Critical tasks are on a higher tier than safety-related work and are physical and administrative tasks directly related to fuel load and startup of the primary and secondary plant. Critical tasks would typically be those related to fuel load, primary and secondary system fill and vents, safety-related system testing, plant heatup and reactor startup (through the reaching of full power).

(ii) The role of fatigue is specifically and promptly evaluated for all[4]

(1) Events classified as Conditions Adverse to Quality under 10 CFR 50, Appendix B, Criterion XVI,

(2) Events classified as Conditions Adverse to Quality under 10 CFR 50, Appendix B, Criterion XVI and attributed to personnel error,

(3) Reportable events of 10 CFR 50 and 10 CFR 20,

(4) OSHA recordable injuries,

(5) Traffic accidents involving employees on their way home from work[5]

(3) Training and monitoring of fatigue.

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[4]This includes events on other units of multi-unit sites if the personnel are under the extended outage provision.

[5]Letter from D. Lochbaum, Union of Concerned Scientists to Chairman Jackson, NRC, March 18, 1999.

(a) Licensees shall provide initial and continuing fatigue mitigation training to personnel performing safety-related work, their supervisors and managers. This training shall be developed in accordance with the systems approach to training of 10 CFR 55.4. At a minimum this training will cover:

(i) Effects of diet, gender, and age on fatigue,

(ii) Importance and ways to maximize rest in off-hours,

(iii) Symptoms of major sleep disorders, and

(iv) Other items as determined during the rule comment period.

(b) Licensees shall provide training to supervisors of personnel performing safety-related work in the monitoring and detection of fatigue.

(4) Section 26.20, "Written Policy and Procedures," should be revised to remove the word "fatigue" from:

"Licensee policy should also address other factors that could affect fitness for duty such as mental stress, fatigue and illness." (The purpose of this change is to eliminate conflicts with the prescriptive working hour limits and inclusion of the word "fatigue" in a statement that is essentially only a recommendation as indicated by the word "should".)

(5) A new definition should be added to 10 CFR Part 26 for the term "Working Hours."

Working Hours - All hours performing safety-related services for the licensee while on property owned or controlled by the licensee. This includes training and meetings. Breaks, paid, or unpaid, are also included in the calculation of working hours for fatigue. This is appropriate since fatigue is related to several factors, including time since awakening.

Proposed Revisions to NRC Form-396 and 10 CFR Part 55

NRC Form -396 and 10 CFR Part 55 should be revised to require self-disclosure and evaluation of known sleep disorders.

(7) Other Changes

A full set of examples ranging from non-cited to Level I violations should be provided in the Enforcement Manual.

Bases for Proposed Changes

Weekly/Biweekly

The petitioner states that the weekly and biweekly limits are to prevent cumulative fatigue over the short-term. A 60-hour limit allows 5 twelve-hour shifts or 7 eight-hour shifts. The biweekly limit would limit one of the weeks to 48 hours. The 108-hour total is based on limiting the total hours worked for twelve hour shifts to a reasonable number and ensuring those working eight-hour shifts have at least one day off every two weeks.

Annual

The petitioner states that the annual limits address longer-term cumulative fatigue and are based on NUREG/CR-4248, "Recommendation for NRC Policy on Shift Scheduling and Overtime at Nuclear Power Plants,"[6] which recommended limiting overtime to 2,260 hours per year. The petitioner specifies that the maximum allowed by this petition exceeded this amount but it is not likely that the limit of 2260 hours could be reached. According to the petitioner, the table includes a workdown curve for each of the categories to ensure that some amount of

[6]Battelle Pacific Northwest Laboratories, Richland WA. July 1985.

immediate relief is provided while allowing a gradual transition period. The shiftworker limits are lower to allow for the impact of rotating shiftwork, constant disruption of circadian rhythms and working during the pre-dawn trough in performance. The licensed operator curve is more gradual to allow more time to increase the number of operators, if the licensee chooses to do so. The roving crew limits are needed to prevent multi-site utilities from almost constantly having people move from site to site using the outage limits on working hours.

16-Hour Shifts

The petitioner states that the 16-hour shift limits address acute fatigue. The petitioner offers that a substantial amount of first- and second-hand experience is available to him that shows that any 16-hour shift involving a midshift is foolhardy. The petitioner offers the following scenario for a 16-hour shift from 3 pm to 7 am.

> Assume the worker arises at 8 am, after a restful sleep, on the day he is to work. A nap prior to 3 pm will be difficult, absent the use of sleeping aids, since sleeping during the day is not natural and the worker should still be rested from the previous night. Near the end of the shift, the worker will have been awake for almost 24 hours.

The petitioner states that Australian researchers[7] show that after 24 hours awake, the performance degradation is equivalent to a Blood Alcohol Content of 0.10%. Additionally, the petitioner states that with the increase in online maintenance, midshifts are no longer the quiet times they were a few years ago and that although the increased workload provides increased stimulation, stimulation is no substitute for rest. The petitioner believes the increased activities provide more opportunities for mishaps.

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[7]Nature, Vol. 388, July 17, 1997 pg 235.

The petitioner offers a similar scenario for a worker who rises at 8 am and works on a shift from 11 pm to 3 pm. The petitioner states that at the end of the shift, the worker will have been up for 31 hours with a 3-hour nap. The petitioner states that although short naps (30 minutes) may have some restorative ability, they must be taken when tired. The petitioner notes that this would qualify as a 'split rest period' under NTSB rules and that NTSB is requesting the DOT to abolish split rest periods due to lack of effectiveness.

Individual Basis

The petitioner believes that limiting hours worked, regardless of employer or location, is necessary to ensure that contractors or others are not excessively fatigued.

Turnover Limits

The petitioner states that turnovers require special consideration. The petitioner believes that orderly transfer of information from one shift to the next is essential for plant safety and that it is as equally important that the work hours are minimized and the turnover allowance is not abused. The petition states there is substantial potential for abuse of the turnover allowance since some may see it as a 'free' extra hour. For example, a maintenance worker or engineer (personnel who typically do not have written turnover) could simply tack on an hour to their workday, absent a specific prohibition. The petitioner also notes that abuses are possible for personnel using written turnovers, i.e., if a turnover is normally completed in 15 minutes, the extra 45 minutes shall not be used for other administrative duties. The petitioner states that this is consistent with the requirement to control working hours to limit the effect of fatigue.

The petitioner further states that there are times when plant events require extended turnovers. The once a week exception is judged adequate based on the petitioner's experience as an on-shift SRO. The petitioner indicated that the requirement to enter the condition into the Licensee's Corrective Action program is required to provide both visibility and tracking, the assumption being that a high number indicates either an excessive administrative burden or an individual performance issue.

Exemption

The list of exemptions is considered reasonable based on the petitioner's experience. It is anticipated to grow slightly during the rulemaking phase as more experience is added. The overriding goal of the exemptions is that they be limited both in circumstance and number. The purpose is to avoid the ambiguity of Generic Letter 82-12.

NRC Form 396 and 10 CFR Part 55

The petitioner believes this revision would allow the NRC to issue conditional licenses with the appropriate compensatory actions. The petitioner states that this approach was adopted by the Coast Guard.

Other Changes

The petitioner believes that a full set of examples in the Enforcement Manual would provide clear guidance to NRC staff on the appropriate level of sanctions required.

Reference Documents

The petitioner states that documents used in support of this petition were readily available on websites of the NRC and the NTSB and in the NRC Public Document Room. The petitioner also attached two documents that in his view summarize the hazards of fatigue. They are Overtime and Staffing Problems in the Commercial Nuclear Power Industry, Union of Concerned Scientists (March 1999), and Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue, NTSB Safety Report NTSB/SR-99/01(May 1999).

Dated at Rockville, Maryland, this 24th date of November, 1999.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.



September 28, 1999

Ms. Annette Vietti-Cook
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

ATTENTION: Rulemakings and Adjudications Staff

Dear Ms. Vietti-Cook:

Pursuant to 10 CFR 2.802(a), the enclosed Petition for Rulemaking seeks to revise 10 CFR Part 26, *Fitness For Duty Programs* and 10 CFR Part 55, *Operators' Licenses*. The petition calls for clear and enforceable working hour limits to mitigate the effects of fatigue for nuclear power plant personnel performing safety-related work. Changes to the NRC Enforcement Manual, NRC Form-396, "Certification of Medical Examination by Facility Licensee" and the NRC Inspection Manual are also requested.

Sincerely,

Barry Quigley

Barry Quigley

3512 Louisiana Rd
Rockford, IL 61108
815-397-2542
QPIF@AOL.COM

Enclosures

cc: William D. Travers, EDO
Karen D. Cyr, OGC
Representative Edward J. Markey
David Lochbaum, Union of Concerned Scientists
Joe Colvin, Nuclear Energy Institute


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PETITION FOR RULEMAKING TO CLEARLY ADDRESS FATIGUE

In an increasingly competitive electricity market, the battle cry is 'do more with less'. This means fewer people working more, sometimes many more, hours. Licensees have little incentive to reduce staff working hours. Overtime pay premiums were meant to penalize employers, instead they are now a cost of business. Overtime costs are a business expense to be reduced, but only until production is impacted. Non-union shops and management sometimes work overtime hours without pay performing safety-related work. What possible business reason exists to curb people working for free? Clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized.

Petitioner requests that the NRC institute a rulemaking to add enforceable working hour limits to 10 CFR 26 and add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders. Petitioner also requests that NRC revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions and revise NRC Form-396 to include self-disclosure of sleeping disorders by licensed operators. Further, changes to NRC Inspection Procedure 81502, Fitness for Duty Program are also requested. The petitioner is licensed by the NRC as a Senior Reactor Operator subject to the provisions of the rules and therefore has standing to request a change.

BACKGROUND

Documents that were readily available to the petitioner were those found on NRC and National Transportation and Safety Board websites as well as some materials from the NRC Public Document Room. Two documents that summarize well the hazards of fatigue are *Overtime and Staffing Problems in the Commercial Nuclear Power Industry*, Union of Concerned Scientists (Attachment A) and *Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue*, NTSB (Attachment B)[1].

NRC has stated[2] that few significant industry events can be attributed to fatigue. Two reasons can explain this: One, NRC is correct. Two, events occur but are either not reported or not properly attributed to fatigue. A review of the NRC's Human Factors Information System (HFIS) database suggests that the second reason is most likely true. NRC Inspection Reports found 87 occurrences of staffing being less than adequate[3], while the industry, via LERs, only found 11. Similarly for excessive overtime/acute fatigue, NRC reported 59 occurrences to the industry's 3. For frequent use of overtime/cumulative fatigue, NRC found 28 cases and the industry reported none.

Based on NRC's much higher reporting of fatigue-type events, it is apparent that the industry's accounting and reporting process is non-conservative. This observation is significant and made even more important by the NRC trend of reducing its inspection effort at nuclear power plants.

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[1] Appendix C by Dr. Rosekind, a fatigue specialist, formerly of the NASA Ames Research Center is particularly useful.

[2] Letter from NRC Chairman Jackson to Congressman Markey, May 18, 1999.

[3] Less than adequate staffing is a driver for high overtime since more hours must be worked by fewer workers.

Further review of the data shows that like the industry, NRC under reports fatigue issues. Fatigue causes, among other things, inattention to detail, increased risk-taking and poor work practices. Categories in the HFIS database related to these are:

- Work practices or skill of the craft less than adequate - If the skill of the craft activities are not performed consistent with management expectations, safety significance of activity or industry standard. 4913 occurrences (combined NRC and industry)

- Non-conservative decision making or questioning attitude less than adequate - If personnel fail to stop work or establish appropriate controls when presented with unfavorable or uncertain work conditions. 1805 combined occurrences.

- Self checking less than adequate - If a worker fails to adequately self-check before performing task (Stop, Think, Act, Review) 618 combined occurrences.

- Awareness or attention less than adequate - Includes problems due to failing to maintain situational awareness, infrequent or ineffective control board monitoring and problems arising from being distracted or interrupted. 2389 combined occurrences.

These 9725 items account for almost 30% of the HFIS entries for 1996 through 1998. Although there are certainly other causes for these such as distractions and interruptions, fatigue most probably played a role in a respectable percentage. Consider an NTSB report[4] which found that, depending on the transportation mode, 21% to 33% of consequential events were fatigue related. However, the NRC only attributed 90 items directly to fatigue. It is highly unlikely that less than 1% were due to fatigue. Consider also that the Department of Transportation spent over $30 million on fatigue research in fiscal years 1990 to 1998. No figures could be found in the NRC budget related to fatigue research. Based on a review of various NTSB and DOT products and comparison to recent NRC products, the NRC may not be qualified to detect fatigue-related events until they grow to the size of Peach Bottom.[5]

Three other factors reduce faith in NRC and industry fatigue reporting:

1. Some fatigue errors are latent. For example, valve mispositionings due to fatigue-driven inattention to detail which have no immediate impact may not be discovered for quite some time. When the mispositioning is found, it is very difficult to trace when it was mispositioned, let alone why. Another example would be procedures with technical errors due to an over-worked and fatigued staff.

2. The HFIS database shows 392 occurrences of root cause analysis being less than adequate. This reduces the faith in the quality of the LERs presented by industry to identify all causes of an event.

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[4] NTSB/SR-99/01 *Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue*, May 1999 National Transportation Safety Board

[5] The NRC ordered the two reactors at the Peach Bottom nuclear plant to be shut down in March 1987 after NRC inspectors discovered licensed operators asleep in the control room.

3. The NRC is not aggressive in looking for fatigue issues. Discussions with NRC staff showed it is very difficult to get overtime issues into Inspection Reports due to concerns that the licensee will object. Consider the NRC Inspection Procedure for labor strikes:

> The inspector should look for fatigue from long hours at work which might affect the continued safe operation of the plant. Recognizing that this area is very subjective, the inspector should find clear evidence of an effect on safety before raising this as an issue with plant management.

It appears that the policy of NRC is to wait for something bad to happen and then raise the issue with licensee management.

The petitioner concludes that the impact of fatigue is under-reported by both the NRC and the industry.

The NRC is well aware of the threat to safe nuclear plant operation represented by worker fatigue. On June 15, 1982, the agency issued Generic Letter 82-12 to all plant owners. The NRC directed plant owners as follows:

> Licensees of operating plants and applicants for operating licenses shall establish controls to prevent situations where fatigue could reduce the ability of operating personnel to keep the reactor in a safe condition. The controls should focus on shift staffing and the use of overtime–key job-related factors that influence fatigue.
>
> The objective of the controls would be to assure that, to the extent practicable, personnel are not assigned to shift duties while in a fatigued condition that could significantly reduce their mental alertness or their decision making capability. The controls shall apply to the plant staff who perform safety-related functions (e.g., senior reactor operators, reactor operators, health physicists, auxiliary operators, and key maintenance personnel).
>
> Enough plant operating personnel should be employed to maintain adequate shift coverage without routine heavy use of overtime. The objective is to have operating personnel work a normal 8-hour day, 40-hour week while the plant is operating.

Thus, 17 years ago the NRC knew that worker fatigue posed an undue risk and required plant owners to control working hours. Now – with electricity deregulation forcing plant owners to slash staffing levels and work the survivors longer and longer hours – the NRC has redefined the fatigue risk because few significant events can be precisely attributed to fatigue. But the NRC shut down the Peach Bottom plant without first proving a single significant event at the facility could be attributed to operator inattentiveness (i.e., napping). In the 1980s, the NRC implemented a Fitness For Duty rule that includes both individual and corporate sanctions even though few significant industry events were attributed to drug or alcohol abuse. The petitioner's point is not that the NRC acted inappropriately in these cases. On the contrary, petitioner views these NRC actions as responsible measures taken to reduce the risk of an accident caused by degraded human performance. Petitioner is merely asking the NRC to take comparable steps to prevent degraded human performance resulting from fatigue.

PROPOSED CHANGES

A. Proposed Revision to 10 CFR 26 to address Working Hour Limits:

1) The following limits apply for personnel performing safety-related work:
   a) During non-outage periods:
      i) 60 hours per week, and
      ii) 108 hours in two weeks.
   b) During outage periods[6]:
      i) 72 hours per week, and
      ii) 132 hours in two weeks.
   c) The maximum annual limits[7] as a percentage over 2080 hours are:

Year ending	Shift Workers		Non-shiftworkers	Roving Crews
	Licensed	Non-licensed		
Dec 31, 2003[8]	20	20	30	30
Dec 31, 2002	25	20	35	35
Dec 31, 2001	30	25	40	40

   d) No part of a 16-hour shift shall occur between the hours of 11pm and 7am, except for turnover.
   e) No more than two 16-hour shifts shall occur in a rolling 7-day period. The first 16-hour shift shall be followed by a 16-hour rest period. The second 16-hour shift shall be preceded by a 24-hour rest period. The rest periods may be combined.
   f) No more than 24 hours in a 48 hour period.
   g) The limits apply to an individual regardless of work location or employer.
   h) Turnovers:
      i) A turnover time of 1-hour (1-1/2 hours outage) may be allocated in any manner between an individual's oncoming and offgoing turnovers. Any balance of time remaining from turnover shall not be used for other purposes.
      ii) Exceeding the turnover time limit shall not constitute violation of the working hour limits provided:
         (1) The condition is entered into the Licensee's Corrective Action program, and
         (2) No more than one occurrence per individual per week.
      iii) The turnover time allowance shall only apply to written turnovers conducted face-to-face.
2) The following exceptions apply to the work hour limits of paragraph 1) provided the licensee takes action to minimize the effects of fatigue on human performance. Such actions may be demonstrated by compliance with paragraph 3) in addition to increased supervisory oversight.
   a) Activation of the Emergency Plan under 10 CFR 50.47,

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[6] Outage periods are defined as the 48 hours prior to reactor shutdown, the duration of the shutdown and the 48 hours after synchronizing to the grid.
[7] Exclusive of turnover time.
[8] And all subsequent years.

b) For those plants which shutdown for severe weather, the limits are suspended from the beginning of the power reduction until the severe weather has passed,
c) The transition to Daylight Savings time in the Fall. No showing of minimization of fatigue is required for this exemption,
d) Plant transients, typically large unplanned power changes or initiation of major Engineered Safety Features. Avoidance of Tech Spec required shutdowns is not a transient covered by this exemption.
e) For extended shutdowns the biweekly limit increases to 144 hours per week (weekly remains at 72 hours) provided:
    i) Prior to restart or fuel load a plan is in place to ensure adequate rest for personnel performing critical tasks. Critical tasks are on a higher tier than safety-related work and are physical and administrative tasks directly related to fuel load and startup of the primary and secondary plant. Critical tasks would typically be those related to fuel load, primary and secondary system fill and vents, safety-related system testing, plant heatup and reactor startup (through the reaching of full power).
    ii) The role of fatigue is specifically and promptly evaluated for all[9]:
        (1) Events classified as Significant Conditions Adverse to Quality under 10 CFR 50, Appendix B Criterion XVI,
        (2) Events classified as Conditions Adverse to Quality under 10 CFR 50, Appendix B Criterion XVI and attributed to personnel error,
        (3) Reportable events of 10 CFR 50 and 10 CFR 20,
        (4) OSHA recordable injuries,
        (5) Traffic accidents involving employees on their way home from work[10].

3) Training and monitoring of fatigue.
    a) Licensees shall provide initial and continuing fatigue mitigation training to personnel performing safety-related work, their supervisors and managers. This training shall be developed in accordance with the systems approach to training of 10 CFR 55.4. At a minimum this training will cover:
        i) Effects of diet, gender and age on fatigue,
        ii) Importance and ways to maximize rest in off-hours,
        iii) Symptoms of major sleep disorders,
        iv) Other items as determined during the rule comment period
    b) Licensees shall provide training to supervisors of personnel performing safety-related work in the monitoring and detection of fatigue.

In addition, 10 CFR 26.20, 'Written policy and Procedures' should be revised to remove the word 'fatigue' from:

> "Licensee policy should also address other factors that could affect fitness for duty such as mental stress, fatigue and illness."

This change is necessary to eliminate conflict from the prescriptive working hour limits and inclusion of the word 'fatigue' in a statement that is essentially only a recommendation as indicated by the word 'should'.

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[9] This includes events on other units of multi-unit sites if the personnel are under the extended outage provision.
[10] Letter from D. Lochbaum, Union of Concerned Scientists to Chairman Jackson, NRC March 18, 1999

A definition should also be added to 10 CFR 26. Working Hours - All hours performing safety-related services for the licensee while on property owned or controlled by the licensee. This includes training and meetings. Breaks, paid or unpaid, are also included in the calculation of working hours for fatigue. This is appropriate since fatigue is related to several factors, including time since awakening.

BASES OF PROPOSED CHANGES

Weekly/Biweekly

The weekly and biweekly limits are to prevent cumulative fatigue over the short-term. A 60-hour limit allows 5 twelve-hour shifts or 7 eight-hour shifts. The biweekly limit would limit one of the weeks to 48 hours. The 108 hour total is based on limiting the total hours worked for twelve hour shifts to a reasonable number and ensuring those working eight hour shifts have a least one day off every two weeks.

Annual

The annual limits address longer term cumulative fatigue and are based on NUREG/CR-4248, *Recommendations for NRC Policy on Shift Scheduling and Overtime at Nuclear Power Plants*[11] which sought to limit overtime to 2260 hours per year. The maximum allowed by this petition exceeds this amount but is not likely that the limit of 2260 hours could be reached. The table includes a workdown curve for each of the categories to ensure that some amount of immediate relief is provided while allowing a gradual transition period. The shiftworker limits are lower to allow for the impact of rotating shiftwork, constant disruption of circadian rhythms and working during the pre-dawn trough in performance. The licensed operator curve is more gradual to allow more time to increase the number of operators, if the licensee chooses to do so. The roving crew limits are needed to prevent multi-site utilities from almost constantly having people move from site to site using the outage limits on working hours.

16 hour shifts

The 16 hour shift limits address acute fatigue. A substantial amount of first and second-hand experience is available to the petitioner which shows that any 16-hour shift involving a midshift is foolhardy. Consider a 16-hour shift from 3 PM to 7 AM. Assume the worker arises at 8 AM, after a restful sleep, on the day he is to work. A nap prior to 3 PM will be difficult, absent the use of sleeping aids, since sleeping during the day is not natural and the worker should still be rested from the previous night. Near the end of the shift the worker will have been awake for almost 24 hours. Australian researchers[12] show that at 24 hours awake, the performance degradation is equivalent to a Blood Alcohol Content of 0.10%. Additionally, with the increase in online maintenance, midshifts are no longer the quiet times they were a few years ago. Although the increased workload provides increased stimulation, stimulation is no substitute for rest. The increased activities provide more opportunities for mishaps.

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[11] Battelle Pacific Northwest Labs, Richland WA. July 1985.
[12] *Nature*, Vol. 388, 17 July, 1997 pg. 235.

Next consider a shift from 11pm to 3 PM. Assume again the worker rises at 8 AM on the workday. It is more likely that the worker will be able to nap before work, but the nap will be limited to a few hours at most. At the end of the shift the worker will have been up for 31 hours with a 3-hour nap. Although short naps (30 minutes) may have some restorative ability they must be taken when tired. Additionally, this would qualify as a 'split rest period' under NTSB rules. NTSB is requesting the DOT to abolish split rest periods due to lack of effectiveness.

Individual Basis

Limiting hours worked, regardless of employer or location, is necessary to ensure that contractors or others are not excessively fatigued.

Turnover limits

Turnovers require special consideration. Orderly transfer of information from one shift to the next is essential for plant safety. Equally important is that the work hours are minimized and the turnover allowance is not abused. There is substantial potential for abuse of the turnover allowance since some may see it as a 'free' extra hour. For example, a maintenance worker or engineer (personnel who typically don't have written turnovers) could simply tack on an hour to their workday, absent a specific prohibition. Abuses are also possible for personnel using written turnovers. If a turnover is normally completed in 15 minutes, the extra 45 minutes shall not be used for other administrative duties. This is consistent with the requirement to control working hours to limit the effects of fatigue.

There are times when plant events require extended turnovers. The once a week exception is judged adequate based on the petitioner's experience as an on-shift SRO. The requirement to enter the condition into the Licensee's Corrective Action program is required to provide both visibility and tracking, the assumption being that a high number indicates either an excessive administrative burden or an individual performance issue.

Exemptions

The list of exemptions is considered reasonable based on the petitioner's experience. It is anticipated to grow slightly during the rulemaking phase as more experience is added. The overriding goal of the exemptions is that they be limited both in circumstance and number. The purpose is to avoid, like the plague, the ambiguity of Generic Letter 82-12.

B. Proposed Revision to 10 CFR 55, and NRC Form-396,

A revision should be made to 10 CFR 55 and NRC Form 396 to require self-disclosure and evaluation of known sleep disorders. This would allow for NRC to issue conditional licenses with the appropriate compensatory actions. This is the approach adopted by the Coast Guard in Navigation and Vessel Inspection Circular No. 2-98, *Physical Evaluation Guidelines for Merchant Marine's Documents and Licenses*, which contains guidelines for physical examinations of mariners and includes sleeping disorders as conditions to be evaluated for original and renewal licenses. This was a NTSB recommendation which was closed out in April 1999.

C. Other Changes

A full set of examples ranging from non-cited to Level I violations should be provided in the Enforcement Manual. This would provide clear guidance to NRC staff on the appropriate level of sanctions required, something sorely lacking with Generic Letter 82-12. This change to the Enforcement Manual would be similar to that made for the last major change to the Fitness for Duty rule. Changes to NRC Inspection Procedure 81502, Fitness for Duty Program, are required to provide resident inspectors with guidance in the area of fatigue.

Overtime and Staffing Problems In the Commercial Nuclear Power Industry

March 1999

My group spends a lot of time in the field, and so does the other groups and we see problems -- working hours, overtime, fatigue. There are three quick examples that we're in between having a standard on how to deal with that and a problem that we know is lurking out there.

NRC Staffer to Advisory Committee on Reactor Safeguards December 5, 1996

UNION OF CONCERNED SCIENTISTS

Washington Office: 1616 P Street NW Suite 310 • Washington DC 20036-1495 • 202-332-0900 • FAX: 202-332-0905
Cambridge Headquarters: Two Brattle Square • Cambridge MA 02238-9105 • 617-547-5552 • FAX: 617-864-9405
California Office: 2397 Shattuck Avenue Suite 203 • Berkeley CA 94704-1567 • 510-843-1872 • FAX: 510-843-3785

After the Three Mile Island accident, the Nuclear Regulatory Commission (NRC) recognized the role that worker fatigue could play in an accident. Unfortunately, that recognition did not lead to the problem's resolution.

An extensive review of NRC documents dealing with fatigue problems found a clear pattern of unenforceable ambiguity. The NRC's concern about worker performance problems caused by fatigue seems to be limited to their meekly encouraging plant owners to handle it. The NRC's inept treatment of this issue is baffling when compared to how successfully the agency dealt with another issue having similar impacts on worker performance – namely, substance abuse. For that issue, the NRC implemented a rule that has virtually eliminated substance abuse problems by nuclear workers.

Anecdotal evidence supports the conclusion of NRC ineffectiveness on the fatigue issue. Three members of the NRC's regional staff indicated that the agency feels that as long as nothing bad happens, it will take no action. That attitude, if reflective of NRC policy, would seem to be designed to – at best – prevent the *second* major reactor accident. It contradicts the NRC's mission, as defined by Congress, of providing adequate protection against the *next* major reactor accident.

The electric utility industry is undergoing restructuring. Nuclear power plant owners are cutting staffing levels in their efforts to generate electricity at competitive prices. As a result, workers at nuclear plants are working more overtime. For example, operators at a Midwest nuclear power plant logged 50,000 overtime hours in just one year's time – 1997. The worker fatigue problems are likely to get worse unless the NRC takes action to deal with the issues.

The full rationale for NRC's failure to meaningfully address overtime and staffing issues is not known, but a major part is simply "that nothing bad has happened yet." Using this unsound logic, the emergency core cooling systems and containment buildings at the nation's 103 nuclear power plants could be permanently removed since few events have required their use. Unlike the purported one in a hundred-thousand year or one in a million year chances of an accident requiring emergency core cooling systems and the containment building, worker fatigue is a minute by minute challenge to safe plant operation.

The NRC must establish clear requirements for working hours that reduce the potential for weary workers making grave mistakes.

How Workers Affect Nuclear Safety

According to information provided to the NRC by nuclear plant owners, 50 to 80 percent of serious safety problems involve worker errors.[1] The NRC's analytical staff reviewed reports submitted by plant owners and NRC inspectors and concluded that the sequence of events leading to a major plant accident would most likely be initiated by a worker mistake.[2] Following its review of plant-specific safety assessments, the NRC staff concluded, "human actions are clearly important contributors to operational safety" and "human error can be a significant contributor to [serious reactor accidents.]"[3] Thus, nuclear plant workers make mistakes and their mistakes can have very serious safety implications.

What causes nuclear plant workers to make mistakes? While there is no single cause for the mistakes, fatigue is responsible for some significant ones. For example, the NRC reported that in October 1990, three workers at Braidwood Unit 1 in Illinois, were sprayed with 180°F water – one individual received second degree burns – from the reactor coolant loop when plastic tubing used for testing burst open. Over 600 gallons of water drained from the reactor coolant system before the leak could be stopped. NRC inspectors concluded that fatigue from excessive overtime was a main contributor to this event.[4]

How Fatigue Affects Workers

Researchers have consistently found what Thomas Jefferson might have considered self-evident – that fatigue causes workers to make more mistakes and to perform less reliably.

The accident at Three Mile Island – the worst commercial nuclear plant accident in US history – occurred in the early morning hours of March 28, 1979. The following year, the NRC reported:

> Studies indicate that with fatigue, especially because of loss of sleep, an individuals detection of visual signals deteriorates markedly, the time it takes for a person to make a decision increases and more errors are made, and reading rates decrease. Other studies show that fatigue results in personnel ignoring some signals because they develop their own subjective standards as to what is important, and as they become more fatigued they ignore more signals.[5]

The last part is particularly disturbing because it suggests that well-founded procedures and layers of emergency equipment can be defeated by weary workers discounting warning signs.

Concern about fatigued workers is not confined to the nuclear industry. Research in the aviation industry found that fatigue:

- slowed individuals' reaction time,
- impaired people's problem-solving ability,
- made people more likely to take short cuts,
- made people more willing to accept higher than normal levels of risk.[6]

Here again, is the disturbing finding that fatigue prompts otherwise responsible people to take shortcuts and high risks.

The aviation study concluded that fatigue made it harder for people to solve problems. In 1992, researchers at Canada's Defence and Civil Institute for Environmental Medicine quantified this negative impact. They reported that after 18 hours awake, people's problem-solving ability declined by 30 percent.[7] Note that this degradation occurs after the time awake not just the time on the job.

Although fatigue was not shown to be a factor in the space shuttle *Challenger* explosion, the Rogers Report did find that worker fatigue had contributed to prior near-misses.[8] One specific example cited was the aborted launch of shuttle mission 61-C on January 6, 1986. Five minutes before the launch, workers misinterpreted a valve indication failure in the automatic fueling sequence. This caused the undetected loss of nine tons of the liquid oxygen fuel. A fortunate side effect of the loss was a drop in temperature to the shuttle main engines, but this degraded condition was noted only 31 seconds before the launch. The launch was aborted. The investigation found two significant points:

- Worker fatigue was one of the major factors of the error. The workers were 11 hours into their third consecutive 12 hour midnight shift when the error was made.
- Had the error not been discovered and the launch aborted in the final seconds of the countdown, it was seriously doubted that the shuttle would have reached orbit.

The Rogers investigation was very critical of the long hours worked by shuttle subcontractors because, in part, they regularly exceeded the recommended limits of an NRC report[9]. The ironic part is that NRC never implemented its own recommendations.

Worker fatigue has even tarnished the golden arches. In 1983, an Oregon jury awarded $400,000 to the driver of a car struck by a McDonalds employee who had worked three shifts within a 24-hour period. The jury determined that McDonalds failure to control working hours "unreasonably created a foreseeable risk of harm."[10]

The effects of fatigue on nuclear safety are best summarised in the NRC's own words:

> The safety of nuclear power plant operations and the assurance of general public health and safety depend on personnel performing their jobs at adequate levels. Research on extended working hours indicates that the performance of individuals will degrade without adequate rest after long periods of work. Fatigue can degrade an operator's ability to rapidly process complex information such as that presented by off normal plant conditions. In addition, fatigue may jeopardize the ability to respond in a timely fashion. Furthermore, performance errors are more likely to occur as a result of lapses in short-term memory. Because individuals performing safety-related duties may be required to respond quickly to a plant emergency, it is important for plant management to carefully exercise control over overtime practices in order to ensure that plant personnel perform adequately.[11]

McDonalds was held accountable because it failed to properly deal with a foreseeable risk of harm. The NRC acknowledges that

worker fatigue represents a risk to nuclear plant safety. What have they done about it?

What NRC Did About Fatigue

The NRC first attempted to deal with the fatigue problem with a policy statement on overtime issued in 1980.[12] The policy contained more restrictive working hour limits than currently exist, but even these 'limits' were diluted because they were presented as recommendations rather than as requirements. The policy also outlined the licensee's responsibility to "provide a sufficient number of trained personnel who are in the proper physical condition to operate and maintain the plant."

In 1982, the NRC sent all nuclear power plant owners information which forms the agency's current overtime policy. The major points of the policy are:

- Plant owners must have written procedures that formalize the working hour guidelines and prevent situations where fatigue could reduce the ability of operating personnel to keep the nuclear plant in a safe condition. The procedural controls should assure that personnel are not in a fatigued condition while at work that could significantly reduce their mental alertness or their decision-making ability.
- A sufficiently large work force should be used to prevent routine heavy use of overtime. The objective is a normal 8-hour day, 40-hour week while the plant is operating. If unforeseen problems require substantial amounts of overtime to be used, or during extended periods of shutdown, the following guidelines shall be followed:
    1. An individual should not work more than 16 hours straight.
    2. An individual should not work more than 16 hours in any 24-hour period, nor more than 24 hours in any 48-hour period, nor more than 72 hours in any seven-day period.
    3. A break of at least 8 hours should be allowed between work periods.
    4. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on shift.
- If very unusual circumstances arise that require deviation from the guidelines, such deviation shall be authorized by the plant manager, his deputy, or higher levels of management.

After the Three Mile Island accident, the NRC required nuclear power plant owners to revise their operating licenses to include administrative controls on staffing levels and working hours. Although the administrative controls language was somewhat ambiguous, its placement in plant operating licenses meant that the NRC focused at least some attention to the matter.

Beginning in 1996, NRC undermined what little rigor remained in overtime regulation by allowing plant owners to re-revise their operating licenses, this time to *remove* the administrative controls on staffing levels and working hours. For example, the NRC issued a Safety Evaluation Report for San Onofre Units 2 and 3 to allow the overtime controls to be removed from Tech Specs. The basis was "that few events at U.S. nuclear plants have been attributed to inadequate control of working hours."[13]

How NRC Handled Substance Abuse

Ten years ago, the NRC issued the Fitness for Duty rule to address substance abuse in the nuclear power industry. The NRC imposed this rule because "scientific evidence is conclusive that significant decrements in cognitive and physical task performance results from drug and alcohol usage."[14]

During 1997, researchers at the University of Southern Australia compared the effects from fatigue to those from alcohol consumption.[15] They used standard eye-hand coordination test methods. After 17 hours awake, the decline in performance was equivalent to a blood alcohol content (BAC) of 0.05 percent (the legal limit set by the NRC for access to nuclear power plants is a BAC of 0.04 percent). At 24 hours awake, performance had decreased to a level corresponding to a BAC of 0.10 percent.

Curiously, although conclusive scientific evidence shows that fatigue causes measurable drops in cognitive and physical task performance and the NRC's own records are replete with examples of safety problems caused by weary workers, the agency views fatigue with in an entirely different light from substance abuse.

During the public comment period for the fitness for duty rulemaking, one person observed that fatigue could impair worker performance. Another commenter noted that workers could be disciplined or fired for errors due to fatigue.

The NRC responded to these comments by acknowledging that fatigue was an important issue but claimed that sound management practices could be expected to be more effective than prescriptive regulations. Because it is more economical to get more work out of existing staff than to hire additional workers, the NRC's logic is wrong. The agency also did not explain why sound management practices would be inadequate to handle substance abuse. The NRC also took credit for the part of the rule that requires plant owners to ensure that workers are not impaired from any cause, arguing that fatigue was covered by this language. Given that this wording is even more nebulous than the NRC's guidance on overtime, the logic is fallacious. The NRC's guidance to inspectors when auditing fitness for duty programs at nuclear power plants makes no – zero – mention of fatigue and focuses solely on substance abuse.[16]

How effective is the fitness for duty rule? With respect to substance abuse at nuclear power plants, it has been very effective. Fewer than one percent of the 296,625 drug and alcohol tests administered to nuclear plant workers during 1996 and 1997 yielded positive results.[17] The rule has been less effective with respect to fatigue at nuclear power plants.

Conclusions

Independent studies and nuclear industry experience both show that fatigue degrades the performance of workers. The NRC reports that worker mistakes can lead to serious nuclear plant accidents. The NRC attempted to limit fatigue among nuclear plant workers through restrictions on overtime and staffing levels, but these efforts have been ineffective.

The NRC's ineffectiveness in handling the fatigue problem is hard to understand given the agency's success in addressing substance

abuse problems. The NRC implemented a fitness for duty rule more than ten years ago that has effectively reduced substance abuse problems among nuclear plant workers. The NRC has been unable, or unwilling, to effectively address the fatigue issue.

The explanation for NRC's failure to address fatigue problems levels is not known. It may simply be that the agency feels "that nothing bad has happened yet" as if its mission were to protect the public from the *second* major reactor accident. Using this logic, the emergency core cooling systems and the containment buildings at nuclear power plants could be permanently removed since few events, *so far*, have required their use.

The restructuring of the electric utility industry makes proper control of worker fatigue more important. Nuclear power plant owners are cutting staff sizes as part of their efforts to generate electricity at competitive prices. As a result, the remaining workers are putting in longer and longer days as they pick up the load from those who have left. Fatigue problems in the nuclear power industry must be resolved soon.

Unlike the purported one in a hundred-thousand year or one in a million year chances of an accident requiring emergency core cooling systems and the containment building, worker fatigue is a minute by minute challenge to safe operation. Actions are said to speak louder than words, but in this case, the NRC's inaction speaks the loudest.

Recommendations

The NRC must take actions to address worker fatigue at nuclear power plants. The NRC could either apply its fitness for duty rule or implement a comparable rule. In any case, the NRC must establish clear requirements for working hours that reduce the potential for weary workers making grave mistakes.

Nuclear power plant owners must develop and consistently implement administrative controls to protect their workers from conditions causing fatigue. The NRC's working hour limits must not be routinely abused.

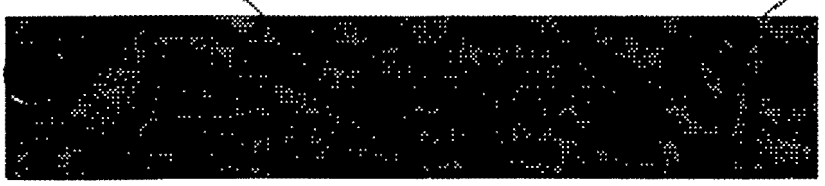
[1] Nuclear Regulatory Commission, Transcript of 452nd Meeting of the Advisory Committee on Reactor Safeguards (ACRS), April 30, 1998.
[2] Nuclear Regulatory Commission, Information Notice No. 92-36, "Intersystem LOCA Outside Containment," May 7, 1992.
[3] Nuclear Regulatory Commission, NUREG-1560 Vol. 1, Part 1, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," October 1996.
[4] Nuclear Regulatory Commission, Information Notice No. 91-36, "Nuclear Plant Staff Working House," June 10, 1991.
[5] Nuclear Regulatory Commission, Circular No. 80-02, "Nuclear Plant Staff Working Hours," February 1, 1980.
[6] Remi, Joly, Transport Canada, "A Study of the Impact of Shiftwork and Overtime on Air Traffic Controllers: Phase I," TP 12257E. October 31, 1994..
[7] Angus, R.G., Pigeau, R.A., and Heselgrave, R., "Human Performance and sleep research: from the field to the laboratory," in C. Stampi (ed) *Why We Nap*. Boston: Birkhauser, 1992, pp 217-241.
[8] "Report of the Presidential Commission on the Space Shuttle *Challenger* Accident, Vol. II, Appendix G, June 1986.
[9] Nuclear Regulatory Commission, "Recommendations for NRC Policy on Shift Scheduling and Overtime at Nuclear Power Plants," NUREG/CR-4285 (PNL-5435), July 1985.
[10] Ed Coburn, "Managing the Costs of Worker Fatigue," *Risk Management News*, July 29, 1996, pp. 3-4.
[11] Nuclear Regulatory Commission, Information Notice No. 91-36, "Nuclear Plant Staff Working Hours," June 10, 1991.
[12] Nuclear Regulatory Commission, Circular No. 80-02, "Nuclear Plant Staff Working Hours," February 1, 1980.
[13] Nuclear Regulatory Commission, Safety Evaluation Report, "Issuance of Amendment for San Onofre Nuclear Generating Station," February 9, 1996.
[14] Title 10 Code of Federal Regulations, Part 26
[15] *Nature*, Vol. 388, 17 July 1997, pg 235
[16] Nuclear Regulatory Commission, Inspection Manual, Inspection Procedure 81502, "Fitness for Duty Program"
[17] Nuclear Regulatory Commission, Information Notice No. 98-39, "Summary Of Fitness-For-Duty Program Performance Reports For Calendar Years 1996 And 1997," October 30, 1998.

Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue



Safety Report
NTSB/SR-99/01

May 1999
PB99-917002
Notation 7155



National Transportation Safety Board
Washington, D.C.

National Transportation Safety Board. 1999. ***Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue.*** **Safety Report NTSB/SR-99/01. Washington, DC.**

During the 1980s, the National Transportation Safety Board investigated several aviation, highway, and marine accidents that involved operator fatigue. Following completion of these investigations, the Safety Board in 1989 issued three recommendations to the U.S. Department of Transportation (DOT) addressing needed research, education, and revisions to hours-of-service regulations. In the 10 years that have passed, the Safety Board has issued more than 70 additional recommendations to the DOT, States, industry, and industry associations to reduce the incidence of fatigue-related accidents. In response to the three 1989 recommendations, the DOT and the modal administrations have, in general, acted and responded positively to those addressing research and education; little action, however, has occurred with respect to revising the hours-of-service regulations. Nevertheless, the Safety Board believes that support has grown in recent years to make substantive changes to these regulations. This report provides an update on the activities and efforts by the DOT and the modal administrations to address operator fatigue and, consequently, the progress that has been made in the past 10 years to implement the actions called for in the three intermodal recommendations and other fatigue-related recommendations. The report also provides some background information on current hours-of-service regulations, fatigue, and the effects of fatigue on transportation safety. As a result of this safety report, the National Transportation Safety Board issued new safety recommendations to the U.S. Department of Transportation, the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, the Research and Special Programs Administration, and the United States Coast Guard. The Safety Board also reiterated two recommendations to the Federal Aviation Administration.

The National Transportation Safety Board is an independent Federal agency dedicated to promoting aviation, railroad, highway, marine, pipeline, and hazardous materials safety. Established in 1967, the agency is mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The Safety Board makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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Safety Report

Evaluation of U.S. Department of Transportation Efforts in the 1990s to Address Operator Fatigue

NTSB/SR-99/01
PB99-917002
Notation 7155
Adopted May 17, 1999

National Transportation Safety Board
490 L'Enfant Plaza, S.W.
Washington, D.C. 20594

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Acronyms Used in the Report

AAA	American Automobile Association
ANPRM	advance notice of proposed rulemaking
ARAC	Aviation Rulemaking Advisory Committee
ASRS	Aviation Safety Reporting System
CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GT	gross ton
NASA	National Aeronautics and Space Administration
NHTSA	National Highway Traffic Safety Administration
NPRM	notice of proposed rulemaking
RSPA	Research and Special Programs Administration
U.S.C.	*United States Code*
USCG	United States Coast Guard

Executive Summary

During the 1980s, the National Transportation Safety Board investigated several aviation, highway, and marine accidents that involved operator fatigue. Following completion of these accident investigations, the Safety Board in 1989 issued three recommendations to the U.S. Department of Transportation (DOT) addressing needed research, education, and revisions to hours-of-service regulations.

Ten years have passed since these safety recommendations were issued. In the interim, the Safety Board has issued more than 70 additional recommendations to the DOT, States, industry, and industry associations to reduce the incidence of fatigue-related accidents. In response to the three 1989 recommendations, the DOT and the modal administrations have, in general, acted and responded positively to the recommendations addressing research and education; little action, however, has occurred with respect to revising the hours-of-service regulations. Nevertheless, the Safety Board believes that support has grown in recent years to make substantive changes to these regulations.

This report provides an update on the activities and efforts by the DOT and the modal administrations to address operator fatigue and, consequently, the progress that has been made in the past 10 years to implement the actions called for in the three intermodal recommendations and other fatigue-related recommendations. The report also provides some background information on current hours-of-service regulations, fatigue, and the effects of fatigue on transportation safety.

As a result of this safety report, the National Transportation Safety Board issued new safety recommendations to the U.S. Department of Transportation, the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, the Research and Special Programs Administration, and the United States Coast Guard. The Safety Board also reiterated two recommendations to the Federal Aviation Administration.

Part 1

Introduction

During the 1980s, the National Transportation Safety Board investigated several accidents that involved operator fatigue.[1] Following completion of these accident investigations, the Safety Board in 1989 issued three recommendations to the U.S. Department of Transportation (DOT):[2]

> Expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety. (I-89-1)
>
> Develop and disseminate educational material for transportation industry personnel and management regarding shift work; work and rest schedules; and proper regimens of health, diet, and rest. (I-89-2)
>
> Review and upgrade regulations governing hours of service for all transportation modes to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues. (I-89-3)

Ten years have passed since these safety recommendations were issued. In the interim, the Safety Board has issued more than 70 additional recommendations to the DOT, States, and industry to reduce the incidence of fatigue-related accidents.[3] The purpose of this report is to provide an update on the activities and efforts by the DOT and the

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[1] (a) National Transportation Safety Board. 1985. *Collision of Tuba City School District Schoolbus and Bell Creek, Inc., Tractor-Semitrailer, U.S. 160 Near Tuba City, Arizona, April 29, 1985.* Highway Accident Report NTSB/HAR-85/06. Washington, DC. (b) National Transportation Safety Board. 1986. *Grounding of the Panamanian-Flag Passenger Carferry M/V* A. Regina, *Mona Island, Puerto Rico, February 15, 1985.* Marine Accident Report NTSB/MAR-86/02. Washington, DC. (c) National Transportation Safety Board. 1986. *China Airlines, Boeing 747-SP, N4522V, 300 Nautical Miles Northwest of San Francisco, California, February 19, 1985.* Aircraft Accident Report NTSB/AAR-86/03. Washington, DC. (d) National Transportation Safety Board. 1987. *Trailways Lines, Inc., Intercity Bus Collision With Rising Fast Trucking Company, Inc., Interstate Highway 40 Near Brinkley, Arkansas, July 14, 1986.* Highway Accident Report NTSB/HAR-87/05. Washington, DC. (e) National Transportation Safety Board. 1988. *Collision Between the* USS Richard L. Page *(FFG-5) and the U.S. Fishing Vessel* Chickadee, *the Atlantic Ocean, April 21, 1987.* Marine Accident Report NTSB/MAR-88/04. Washington, DC. (f) National Transportation Safety Board. 1988. *Collision Between U.S. Passenger/Car Ferries M/V* North Star *and M/V* Cape Henlopen *on Long Island, Orient Point, New York, July 9, 1987.* Marine Accident Report NTSB/MAR-88/06. Washington, DC. (g) National Transportation Safety Board. 1989. *Head-End Collision of Consolidated Rail Corporation Freight Trains UBT-506 and TV-61 Near Thompsontown, Pennsylvania.* Railroad Accident Report NTSB/RAR-89/02. Washington, DC.

[2] The Safety Board's recommendation letter, issued May 12, 1989, is reproduced in appendix A.

[3] See appendix B for the recommendations issued to the DOT and modal administrations.

modal administrations to address operator fatigue and, consequently, the progress that has been made in the past 10 years to implement the actions called for in the three intermodal recommendations and other fatigue-related recommendations. Before addressing the activities and the progress made regarding these recommendations, the report provides some background information on current hours-of-service regulations, fatigue, and the effects of fatigue on transportation safety.

Current Hours-of-Service Regulations

Hours-of-service regulations specify the length of on-duty and off-duty time for operators in transportation. The current hours-of-service regulations vary from mode to mode. The motor carrier hours-of-service regulations were developed in 1937 and have remained essentially unchanged. The Railroad Hours of Service Act was first enacted in 1907; it was substantially revised in 1969, and amended again in 1976 and 1988. Aviation limits were addressed in the Civil Aeronautics Act of 1938 and the Federal Aviation Act of 1958. In 1985, domestic flight limitations and some commuter limitations were updated; flag and supplemental operations were not. The work-hour regulations for marine are specified in Title 46 *United States Code* (U.S.C.) 8104 and date back to the early part of the 20th century. The Oil Pollution Act of 1990 contained work-hour limitations for tank personnel of 15 hours per 24 hours and 36 hours per 72 hours. In 1997, work-hour regulations from the *Standards for Training, Certification, and Watchkeeping* of the International Maritime Organization became effective, requiring a minimum 10-hour rest period during any 24-hour period. The work and rest provisions for operators in the various modes are summarized in table 1–1.

The regulations for aviation, highway, and some marine vessel types impose weekly work and rest limits. Only the aviation mode has monthly and annual limits as well. The maximum number of hours an employee of each mode is permitted to work in the course of a 30-day period is shown in figure 1–1.[4] A commercial pilot may fly up to 100 hours per month; a truckdriver may be on duty up to about 260 hours per month; licensed individuals on an oceangoing vessel or coastwise vessel of not more than 100 gross tons (GT) may operate up to 360 hours per month when at sea; and locomotive engineers may operate a train up to 432 hours per month.

[4] The time for pilots includes only flying time.

Table 1–1. Summary of the current hours-of-service regulations, all transportation modes.

Aviation (14 CFR Part 121; 14 CFR Part 135)

- Pilots flying domestic Part 121 operations may fly up to 30 hours per week, 100 hours per month, and 1,000 hours per year.
- Pilots flying domestic Part 135 operations may fly up to 34 hours per week, 120 hours per month, and 1,200 hours per year.
- If the scheduled flight time is less than 8 hours, the minimum rest period in the 24 hours preceding the scheduled completion of the flight segment is 9 hours. This time may be reduced to 8 hours if the following rest period, to begin no later than 24 hours after the commencement of the reduced rest period, is increased to 10 hours.
- If the scheduled flight time is 8–9 hours, the minimum rest period in the 24 hours preceding the scheduled completion of the flight segment is 10 hours. This time may be reduced to 8 hours if the following rest period, to begin no later than 24 hours after the commencement of the reduced rest period, is increased to 11 hours.
- If the scheduled flight time is equal to or greater than 9 hours, the minimum rest period in the 24 hours preceding the scheduled completion of the flight segment is 11 hours. This time may be reduced to 9 hours if the following rest period, to begin no later than 24 hours after the commencement of the reduced rest period, is increased to 12 hours.

Motor Carrier (49 CFR Part 395)

- Drivers may drive for 10 hours or be on duty for 15 hours.
- Drivers must have 8 consecutive hours off following a 10/15 hour on-duty period.
- If drivers use a sleeper berth, they may split the 8-hour period into two periods as long as neither period is less than 2 hours.
- Drivers may not exceed 70 hours in 8 days, if the carrier operates 7 days a week.
- Drivers may not exceed 60 hours in 7 days if the carrier does not operate every day of the week.

Marine (46 U.S.C. 8104; 46 CFR Parts 15.705, 15.710, and 15.1111)

- Hours-of-service or watch requirements vary depending on type of vessel.
- An officer must be off duty for at least 6 hours within the 12 hours immediately before leaving port before taking charge of the deck watch on a vessel when leaving port.
- On an oceangoing or coastwise vessel of not more than 100 gross tons (GT), a licensed individual may not work more than 9 of 24 hours when in port or more than 12 of 24 hours at sea, except in an emergency.
- On a towing vessel operating on the Great Lakes, harbors of the Great Lakes, and connecting or tributary waters between Gary, Indiana; Duluth, Minnesota; Niagara Falls, New York; and Ogdensburg, New York, a licensed individual or seaman in the deck or engine department may not work more than 8 hours in one day, except in an emergency.
- On a merchant vessel of more than 100 GT, the licensed individual shall be divided into three watches and shall be kept on duty successively to perform ordinary work incident to the operation and management of the vessel.
- On a towing vessel, an offshore supply vessel, or a barge that is engaged on a voyage of less than 600 miles, the licensed individual and crewmembers may be divided, when at sea, into two watches.
- On a fish processing vessel, the licensed individuals and deck crew shall be divided into three watches. However, if the vessel entered into service before January 1, 1988, and is more than 1,600 GT or entered into service after December 31, 1987, and has more than 16 individuals on board primarily employed in the preparation of fish or fish products, then the licensed individuals and deck crew shall be divided into two watches.

Table 1–1. Summary of the current hours-of-service regulations, all transportation modes (continued).

- On a tanker, a licensed individual or seaman may not work more than 15 hours in any 24-hour period or more than 36 hours in any 72-hour period, except in an emergency or a drill.
- On a fish tender vessel of not more than 500 GT engaged in the Aleutian trade, the licensed individuals and crewmembers shall be divided into at least three watches. However, if the vessel operated in that trade before September 8, 1990, or was purchased to be used in that trade before September 8, 1990, and entered into that trade before June 1, 1992, the licensed individuals and crewmembers may be divided into two watches.
- On a vessel used only to respond to a discharge of oil or a hazardous substance, the licensed individuals and crewmembers may be divided into two watches when the vessel is engaged in operation less than 112 hours.
- On a towing vessel operating in the Great Lakes, harbors, or connecting or tributary waters or a merchant marine vessel of more than 100 GT, a seaman may not work alternately in the deck and engine compartments, or be required to work in the engine department if engaged for deck department duty or required to work in the deck department if engaged for engine department duty. A seaman cannot be required to do unnecessary work on Sundays, New Year's Day, July 4, Labor Day, Thanksgiving day, or Christmas day, when the vessel is in safe harbor. When a vessel is in safe harbor, 8 hours is a day's work.
- Offices in charge of a navigational or engineering watch on board any vessel that operates beyond the boundary line shall receive a minimum of 10 hours rest in any 24-hour period. The hours of rest may be divided into no more than two periods, of which one must be at least 6 hours in length. The hours of rest do not need to be maintained in an emergency. The hours of rest may be reduced to 6 hours if no reduction extends beyond 2 days and not less than 70 hours of rest are provided in each 7-day period.

Pipeline

There are no Federal regulations for operators or controllers of pipeline systems.

Rail (49 U.S.C. 211; 49 CFR Part 228)

- Maximum duty limit of 12 hours.
- Must be off-duty for 10 consecutive hours, after working 12 consecutive hours or off 8 consecutive hours if worked less than 12 consecutive hours.
- Time spent in transportation (deadheading) to duty assignment counts toward on-duty time.
- Time deadheading from duty assignment does not count toward on-duty or off-duty time.

CFR = *Code of Federal Regulations*; U.S.C. = *United States Code*.

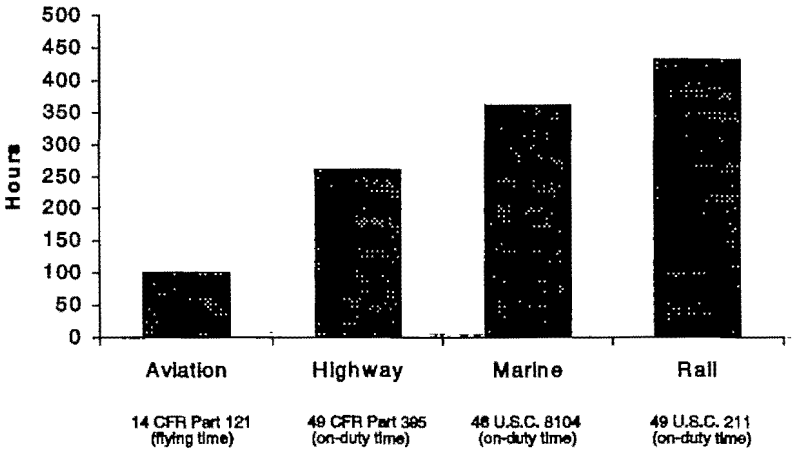

Figure 1–1. Maximum work hours in a 30-day period. For marine, the on-duty and off-duty times are for a licensed individual on an oceangoing vessel or coastwise vessel of not more than 100 gross tons at sea. (CFR = *Code of Federal Regulations;* U.S.C. = *United States Code*)

What is Fatigue?

Traditionally, fatigue was viewed as a simple condition related to the amount of time spent working on a given task.[5] Scientific research, however, has shown that fatigue is related to much more than just the time on a task.[6] Researchers have studied factors that affect fatigue, such as duration and quality of sleep,[7] shiftwork and work schedules,[8] circadian rhythms,[9] and time of day.[10] Others have examined the influence of drugs and alcohol on fatigue and compared performance impaired by alcohol to performance

[5] McDonald, Nicholas. 1984. *Fatigue, Safety and the Truck Driver.* London and Philadelphia: Taylor & Francis. pp. 104-115.

[6] Kryger, M.H.; Roth, T.; Dement; W.C., eds. 1994. *Principles and Practice of Sleep Medicine.* 2nd edition. Philadelphia: W.B. Saunders Company.

[7] (a) Johnson, L.C.; Naitoh, P. 1974. *The Operational Consequences of Sleep Deprivation and Sleep Deficit.* AGARD-AG-193, NATO. London: Technical Editing and Reproduction. (b) Rosekind, M.R.; Gander, P.H.; Connel, L.J.; Co, E.L. 1994. *Crew Factors in Flight Operations. X: Alertness Management in Flight Operations.* NASA/FAA Technical Memorandum DOT/FAA/RD-93/18. Washington, DC: National Aeronautics and Space Administration. (c) National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents.* Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[8] (a) Folkard, S.; Monk, T.H.; Lobban, M.C. 1979. "Towards a Predictive Test of Adjustment to Shiftwork." *Ergonomics* 21: 785-799. (b) Thomas, G.R.; Raslear, T.G.; Kuehn, G.I. 1997. *The Effects of Work Schedules on Train Handling Performance and Sleep of Locomotive Engineers: A Simulator Study.* DOT/FRA/ORD-97-09. Washington, DC: Federal Railroad Administration.

[9] Kryger, M.H.; Roth, T.; Carskadon, M. 1994. "Circadian Rhythms in Humans: An Overview." In: Kryger, M.H.; Roth, T.; Dement, W.C., eds. *Principles and Practice of Sleep Medicine.* 2nd edition. Philadelphia: W.B. Saunders Company. pp. 301-308.

[10] Wylie, C.D.; Shultz, T.; Miller, J.C.; and others. 1996. *Commercial Motor Vehicle Driver Fatigue and Alertness Study: Project Report.* FHWA-MC-97-002. Washington, DC: Federal Highway Administration.

impaired by fatigue.[11] Sleep disorders and the characteristics of sleep patterns at different ages have also been studied.[12] Cumulative sleep loss and circadian disruption can lead to a physiological state characterized by impaired performance and diminished alertness.[13] Fatigue can impair information processing and reaction time, increasing the probability of errors and ultimately leading to transportation accidents.[14] A summary of sleep and circadian rhythms was originally completed for the Safety Board's investigation of the 1993 American International Airways accident in Guantanamo Bay, Cuba.[15] An update of that summary is provided in appendix C.

Scope of the Fatigue Problem

Fatigue has remained a significant factor in transportation accidents since the Safety Board's 1989 recommendations were issued. Although generally accepted as a factor in transportation accidents, the exact number of accidents due to fatigue is difficult to determine and likely to be underestimated. The difficulty in determining the incidence of fatigue-related accidents is due, at least in part, to the difficulty in identifying fatigue as a causal or contributing factor in accidents. There is no comparable chemical test for identifying the presence of fatigue as there is for identifying the presence of drugs or alcohol; hence, it is often difficult to conclude unequivocally that fatigue was a causal or contributing factor in an accident. In most instances, one or more indirect or circumstantial pieces of evidence are used to make the case that fatigue was a factor in the accidents. This evidence includes witness statements, hours worked and slept in the previous few days, the time at which the accident occurred, the regularity or irregularity of the operator's schedule, or the operator's admission that he fell asleep or was impaired by fatigue.[16]

Despite the difficulty in identifying fatigue as a causal factor, estimates of the number of accidents involving fatigue have been made for the different modes of transportation; the estimates vary from very little involvement to as high as about one-third of all accidents.

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[11] (a) Roehrs, T.; Beare, D.; Zorick, F.; Roth, T. 1994. "Sleepiness and Ethanol Effects on Simulated Driving." *Alcoholism: Clinical and Experimental Research* 18(1): 154-158. (b) Dawson, D.; Reid, K. [In preparation]. "Equating the Performance Impairment Associated With Sustained Wakefulness and Alcohol Intoxication." Woodville, South Australia: Centre for Sleep Research.

[12] (a) Aldrich, M.S. 1994. "Cardinal Manifestations of Sleep Disorders." In: Kryger, M.H.; Roth, T.; Dement, W.C., eds. *Principles and Practice of Sleep Medicine.* 2nd edition. Philadelphia: W.B. Saunders Company. pp. 413-425. (b) Bliwise, D.L. 1994. "Normal Aging." In: Kryger, M.H.; Roth, T.; Dement, W.C., eds. *Principles and Practice of Sleep Medicine.* 2nd edition. Philadelphia: W.B. Saunders Company. pp. 26-39.

[13] Rosekind, M.R.; Graeber, R.C.; Dinges D.F.; and others. 1993. *Crew Factors in Flight Operations. IX: Effects of Planned Cockpit Rest on Crew Performance and Alertness in Long-Haul Operations.* NASA Technical Memorandum 108839; DOT/FAA/92/94. Washington, DC: National Aeronautics and Space Administration.

[14] (a) Dinges, D.F. 1989. "The Nature of Sleepiness: Causes, Context, and Consequences." In: Stunkard, A.; Baum, A., eds. *Perspectives in Behavioral Medicine: Eating, Sleeping, and Sex.* Hillsdale, NJ: Lawrence Erlbaum. pp. 147-179. Chapter 9. (b) Dinges, D.F. 1992. "Probing the Limits of Functional Capability: The Effects of Sleep Loss on Short-Duration Tasks." In: Broughton, R.J.; Oglivie, R., eds. *Sleep, Arousal, and Performance.* Boston: Birkhauser-Boston. pp. 176-188. Chapter 12.

Aviation

The Federal Aviation Administration (FAA) reported that 21 percent of the reports in the Aviation Safety Reporting System (ASRS) were related to general issues of fatigue. This includes reports that mentioned fatigue directly or indirectly. When only reports that directly mention fatigue are included, the percentage drops to 3.8 percent.[17]

Highway

The National Highway Traffic Safety Administration (NHTSA) estimates that each year 100,000 crashes, which result in more than 1,500 fatalities and 71,000 injuries, are caused by drowsy drivers.[18] This amounts to about 1.6 percent of all crashes and about 3.6 percent of fatal crashes. In 1998, the Federal Highway Administration (FHWA) derived estimates of the percentages of large truck crashes involving fatigue: all police-reported crashes (0.53 percent to 1.3 percent); all fatal crashes (2.8 percent to 6.5 percent); crashes fatal to the truck occupant only (12 percent to 29 percent); and crashes fatal to nontruck occupants (1.2 percent to 2.8 percent). The FHWA also concluded that more in-depth investigations yield higher percentages of fatigue-related crashes than indicated in comparable samples of police accident reports.[19] The Safety Board's 1990 study of 182 heavy truck accidents that were fatal to the driver showed that 31 percent of the accidents in this sample involved fatigue.[20] This number is frequently cited as an estimate of the incidence of fatigue in truck accidents that were fatal to the truckdriver. The Safety Board's numbers regarding fatigue-involved accidents are more revealing because the Board's in-depth investigations included such surrogate measures as a 72-hour history of rest and duty times, the amount of sleep in the last 24 hours, and the regularity of the work schedule, to name just a few.

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[15] Rosekind, Mark R. [NASA Ames Research Center]; Gregory, Kevin B. [Sterling Software]; Miller, Donna L. [Sterling Software]; and others. 1994. "Analysis of Crew Fatigue Factors in ATA Guantanamo Bay Aviation Accident." In: *Uncontrolled Collision With Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station in Guantanamo Bay, Cuba, August 18, 1993.* Aircraft Accident Report NTSB/AAR-94/04. Washington, DC: National Transportation Safety Board. pp. 133-144.

[16] The Safety Board recognizes that people have a limited ability to predict the onset of sleep and to determine their level of sleepiness. (Itoi, A.; Cilveti, R.; Voth, M.; and others. 1993. *Can Drivers Avoid Falling Asleep at the Wheel? Relationship Between Awareness of Sleepiness and Ability To Predict Sleep Onset.* Washington, DC: AAA Foundation for Traffic Safety. p. 25.)

[17] (a) *Federal Register,* Vol. 60, No. 244, dated December 20, 1995. (b) Batelle Memorial Institute. March 1998. *A Review of Issues Concerning Duty Period Limitations, Flight Time Limitations, and Rest Requirements as Stated in the FAA's Notice of Proposed Rulemaking 95-18.* Washington, DC: Federal Aviation Administration.

[18] Knippling, R.R.; Wang, J.S. October 1995. "Revised Estimates of the U.S. Drowsy Driver Crash Problem Size Based on General Estimates System Case Reviews." In: 39th Annual Proceedings, AAAM; October 16–18, 1995; Chicago, IL. Des Plaines, IL: Association for the Advancement of Automotive Medicine.

[19] Federal Highway Administration, Office of Motor Carriers. September 1998. *Crash Problem Size Assessment: Large Truck Crashes Related Primarily to Driver Fatigue.* Washington, DC.

[20] National Transportation Safety Board. 1990. *Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes.* Safety Study NTSB/SS-90/01 and NTSB/SS-90/02. Washington, DC.

Marine

A 1996 United States Coast Guard (USCG) analysis of 279 incidents showed that fatigue contributed to 16 percent of critical vessel casualties and 33 percent of personal injuries.[21]

Railroad

According to a Safety Board analysis of Federal Railroad Administration (FRA) data from January 1990 to February 1999, only 18 cases were coded "operator fell asleep" as a causal or contributing factor. The Board believes that 18 cases in more than 9 years underestimates the actual number of cases in which fatigue might have been involved. For example, two Safety Board investigations—Sugar Valley, Georgia (August 9, 1990), and Corona, California (November 7, 1990)—in which fatigue was cited by the Safety Board as a causal factor were not coded in the FRA database as fatigue-related but rather as a failure to comply with signals.

In testimony before the Senate Subcommittee on Surface Transportation and Merchant Marine[22] on September 16, 1998, the Administrator of the FRA stated that "about one-third of train accidents and employee injuries and deaths are caused by human factors. We know fatigue underlies many of them."

In summary, although the data are not available to statistically determine the incidence of fatigue, the transportation industry has recognized that fatigue is a major factor in accidents, as was clearly demonstrated at the Safety Board's 1995 symposium on fatigue.[23] Further, the Safety Board's in-depth investigations have clearly demonstrated that fatigue is a major factor in transportation accidents.

[21] McCallum, Marvin C.; Raby, Mireille; Rothblum, Anita M. 1996. *Procedures for Investigating and Reporting Human Factors and Fatigue Contributions to Marine Casualties*. CG-D-09-97. Washington, DC: U.S. Department of Transportation, U.S. Coast Guard, Marine Safety and Environmental Protection.

[22] The subcommittee is an entity of the Senate Committee on Commerce, Science, and Transportation.

[23] The symposium is discussed in further detail in part 2 of this report.

Part 2

Overview of Safety Board Activity Since 1989

Since 1989, the Safety Board has issued more than 70 fatigue-related safety recommendations,[24] which were the result of major accident investigations, special investigations, or safety studies that identified operator fatigue as a factor (see table 2–1). This includes 11 accident reports or studies in aviation regarding air tours and operations conducted under Parts 91, 121, and 135; 7 in highway regarding busdrivers and truckdrivers; 3 in marine regarding passenger vessels and tankships; 4 in railroad regarding freight trains, passenger trains, and rail transit operations; and 1 in pipeline regarding pipeline controllers.

A 1990 safety study that examined the causes of 182 accidents that were fatal to the driver of heavy trucks[25] found that 31 percent of the fatal-to-the-truckdriver accidents in the sample involved fatigue. A 1995 study of 107 accidents (62 of which were fatigue-related) examined the factors that affect fatigue in heavy truck accidents; the Board found that the three most critical factors that predicted a fatigue-related accident were duration of sleep in the last sleep period, the total hours of sleep obtained during the 24 hours prior to the accident, and the presence of split sleep periods.[26]

The Safety Board has also examined operator fatigue in its safety studies on flight crew errors, commuter airlines, and aviation safety in Alaska.[27] In the flight crew study, the Board found that crews comprising captains and first officers whose time since awakening was above the median for their crew position made more errors overall. In the study on commuter airline safety, the Board found that self-reports from commuter airline pilots indicated that most pilots had flown while fatigued. In the study on aviation in Alaska, the Board concluded that the consecutive, long duty days permitted by Title 14 *Code of Federal Regulations* (14 CFR) Part 135.261 for commuter airline and air taxi flight crews in Alaska can contribute to fatigue and are a detriment to safety.

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[24] Thirty-four of these recommendations were issued to the DOT or modal administrations. The remainder of the recommendations were issued to the States, industry, or industry associations.

[25] National Transportation Safety Board. 1990. *Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes.* Safety Study NTSB/SS-90/01 and NTSB/SS-90/02. Washington, DC.

[26] National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents.* Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[27] (a) National Transportation Safety Board. 1994. *A Review of Flightcrew-Involved, Major Accidents of U.S. Air Carriers, 1978 Through 1990.* Safety Study NTSB/SS-94/01. Washington, DC. (b) National Transportation Safety Board. 1994. *Commuter Airline Safety.* Safety Study NTSB/SS-94/02. Washington, DC. (c) National Transportation Safety Board. 1995. *Aviation Safety in Alaska.* Safety Study NTSB/SS-95/03. Washington, DC.

Table 2–1. Fatigue-related investigations and studies conducted by the National Transportation Safety Board since May 1989, by mode.

Location of accident or topic of the study that identified fatigue-related issues[a]	Accident date	NTSB report number
Aviation		
Accident investigation:		
Molokai, Hawaii	10/28/89	AAR-90/05
Brunswick, Georgia	04/05/91	AAR-92/03
Pine Bluff, Arkansas	04/29/93	AAR-94/01/SUM
Guantanamo Bay, Cuba	08/18/93	AAR-94/04
Kansas City, Missouri	02/16/95	AAR-95/06
Cheyenne, Wyoming	04/11/96	AAR-97/02
Everglades, Florida	05/11/96	AAR-97/06
Special investigation:		
Commercial space launch incident, Cape Canaveral, Florida	08/17/93[b]	SIR-93/02
Safety study:		
Flight crew-involved accidents	02/03/94[b]	SS-94/01
Commuter airline safety	11/30/94[b]	SS-94/02
Aviation safety in Alaska	12/01/95[b]	SS-95/03
Highway		
Accident investigation:		
Sutton, West Virginia	07/26/90	HAR-91/01
Donegal, Pennsylvania, and Caroline, New York	06/26/91, 08/03/91	HAR-92/01
Evergreen, Alabama	05/19/93	HAR-94/02
White Plains, New York	07/27/94	HAR-95/02
Special investigation:		
Selective motorcoach issues	02/26/99[b]	SIR-99/01
Safety study:		
Accidents fatal to the truck driver	04/04/90[b]	SS-90/01
Truck driver fatigue	02/07/95[b]	SS-95/01
Marine		
Accident investigation:		
Valdez, Alaska	03/24/89	MAR-90/04
Santa Catalina Island, California	06/14/89	MAR-90/05
Lynn Canal, Alaska	06/23/95	MAR-97/02
Pipeline		
Accident investigation:		
Fork Shoals, South Carolina	06/26/96	PAR-98/01

Table 2–1. Fatigue-related investigations and studies conducted by the National Transportation Safety Board since May 1989, by mode (continued).

Location of accident or topic of the study that identified fatigue-related issues[a]	Accident date	NTSB report number
Railroad		
Accident investigation:		
Corona, California	11/07/90	RAR-91/03
Sugar Valley, Georgia	08/09/90	RAR-91/02
Brooklyn, New York	06/05/95	RAR-96/03
Special investigation:		
Steam locomotives	11/26/96[b]	SIR-96/05

[a] The titles of the published reports are contained in appendix B.

[b] The date the safety recommendations were issued.

Operator fatigue has been on the Safety Board's list of Most Wanted Transportation Safety Improvements since the list's inception in 1990.[28] Had the DOT acted more aggressively on the three intermodal recommendations issued in 1989, the need for the 70-some additional recommendations to the States and industry may have been minimized. (Pertinent recommendations are discussed in more detail in part 3 of this report in connection with the specific issues of Safety Recommendations I-89-1, -2, and -3: research, education, and revisions to hours-of-service regulations, respectively.)

In November 1995, the Safety Board and the National Aeronautics and Space Administration (NASA) cosponsored a symposium to discuss fatigue countermeasures and to demonstrate how they can be applied to prevent accidents in all modes of transportation.[29] The symposium was designed to practically illustrate the intent of one of the Safety Board's 1989 intermodal recommendations (I-89-2): to develop and disseminate educational material. More than 500 people from 16 countries representing all the modes of transportation attended the symposium, which attests to the magnitude and interest in the fatigue problem. As part of the symposium, the participants were divided into modal-specific groups to discuss scheduling, countermeasures, and education. All of the groups indicated that education was needed for the operators as well as for the management of transport companies. While the groups believed there was a need for additional technological countermeasures, they also believed there were some steps that could already be taken or could easily be implemented. For example, both an aviation group and the railroad

[28] In October 1990, the Safety Board adopted a program to identify the "Most Wanted" transportation safety improvements. The purpose of the Board's Most Wanted list, which is drawn up from safety recommendations previously issued, is to bring special emphasis to the transportation safety issues the Board deems most critical.

[29] National Transportation Safety Board; NASA Ames Research Center. 1996. *Fatigue Symposium Proceedings, November 1–2, 1995*. Washington, DC: National Transportation Safety Board.

group discussed the need for quality sleeping areas while away from home, pointing out that many hotels do not have rooms that are adequate for daytime sleeping. There was broad support voiced regarding a need for changes to the hours-of-service regulations. The participants wanted these regulations to be updated and based on scientific research. The summaries of the working groups are provided in appendix D.

Another product from the symposium was the development of the Fatigue Resource Directory, a tool for researchers, industry, and others to use to share information regarding operator fatigue. Following the symposium, the DOT assumed responsibility for maintaining the directory. It is now available on the World Wide Web at <www.hf.faa.gov/dot/fatigue>. The Web site has search capabilities and entries can be edited or new entries can be added.

Part 3

DOT Response to the Safety Board's Intermodal Recommendations

The various Secretaries of the DOT and modal Administrators over the years have expressed their concerns about operator fatigue. In a 1995 summary of the DOT's fatigue safety effort, Federico Peña, then Secretary of the DOT, stated that "fatigue among transportation operators remains a critical safety problem."[30] In a 1999 update, Secretary Rodney Slater stated, "We know that alertness is a key to safe vehicle operation. To reduce crashes and accidents and their personal and financial consequences, we need to ensure that vehicle operators are ready and capable of operating their vehicles or other transportation equipment."[31] Despite the many statements made by the DOT about the importance of addressing fatigue in transportation, only one of the three intermodal recommendations issued to the DOT more than 10 years ago has been fully implemented (I-89-1).

Safety Recommendation I-89-1

Safety Recommendation I-89-1 asked the DOT to expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety. In its August 1989 response, the DOT stated that coordinated research efforts on human factors—including the effects of fatigue, sleepiness, sleep disorders, and circadian factors—on transportation safety was a top priority. The Human Factors Coordinating Committee, formed in 1988 and comprising representatives from each of the DOT administrations, serves as a means to share research information. A subcommittee has been created to focus on fatigue-related issues. In addition, the DOT briefed the Safety Board about the various ongoing fatigue-related projects several times over the years. Safety Recommendation I-89-1 was classified "Closed—Acceptable Action" on July 19, 1996, because the DOT had made Department-wide research efforts on operator fatigue. At the time this recommendation was closed, the FAA, FHWA, NHTSA, FRA, and USCG all had fatigue-related research projects underway.[32] In the Safety Board's 1996 letter closing the recommendation, the Board encouraged the DOT to continue its research efforts, which it generally has done.

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[30] U.S. Department of Transportation. November 1995. *Sharing the Knowledge: Department of Transportation Focus on Fatigue.* Washington, DC.

[31] U.S. Department of Transportation. March 1999. *Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity.* Washington, DC.

[32] U.S. Department of Transportation. November 1995. *Sharing the Knowledge: Department of Transportation Focus on Fatigue.* Washington, DC.

From fiscal years 1990 through 1998, the DOT spent more than $30 million on fatigue research. A wide range of research projects has been initiated, such as developing in-vehicle alerting systems, using high fidelity simulators to determine how different work schedules affect fatigue and performance, studying the effects of loading and unloading, and evaluating technologies that monitor operator performance to indicate fatigue. Table 3–1 identifies major research projects completed by the DOT since 1989.[33]

The Safety Board is disappointed that more research efforts have not been made by the Research and Special Programs Administration (RSPA) in the pipeline mode. In 1998, the Board asked RSPA to assess the potential safety risks associated with rotating pipeline controller shifts and to establish industry guidelines for the development and implementation of pipeline controller work schedules that reduce the likelihood of accidents attributable to controller fatigue (Safety Recommendation P-98-30).[34] The RSPA responded to the recommendation on May 4, 1999.

The Safety Board is aware that industry groups such as the Association of American Railroads and the American Trucking Associations, Inc., have also participated in and conducted research on operator fatigue since the 1989 intermodal recommendations were issued. Additionally, the transportation industry participates in meetings and shares its research findings with other organizations. The FRA has formed the North American Rail Alertness Partnership comprising railroad management, union leadership, and FRA representatives that discuss fatigue and exchange information on countermeasures to reduce fatigue. The FHWA and NHTSA are participants in the National Drowsy Driving Coordinating Committee sponsored by the National Sleep Foundation. This is a forum for sharing research and educational outreach efforts among government, State, industry, and nonprofit groups in the highway mode.

The DOT's efforts to coordinate operator fatigue research have generally been responsive, with the exception of the RSPA regarding pipeline operations. The Safety Board encourages the DOT to continue its research, particularly on technology and in the pipeline mode, and to share information across the modes and with industry.

[33] The Safety Board notes that many of the research projects listed in the DOT's 1999 update were also listed in the DOT's 1995 publication on transportation fatigue.

[34] National Transportation Safety Board. 1998. *Pipeline Rupture and Release of Fuel Oil Into the Reedy River at Fork Shoals, South Carolina, June 26, 1996.* Pipeline Accident Report NTSB/PAR-98/01. Washington, DC.

Table 3–1. Fatigue-related research completed in the U.S. Department of Transportation since 1989.

Federal Aviation Administration:

Effect of Alcohol and Fatigue on an FAA Readiness-To-Perform Test. (DOT/FAA/AM-95/24)

Handbook of Human Performance Measures and Crew Requirements for Flightdeck Research. (DOT/FAA/CT-TN95/49)

Some Effects of 8- vs. 10-Hour Work Schedules on the Test Performance/Alertness of Air Traffic Control Specialists. (DOT/FAA/AM-95/32)

Shift Work, Age, and Performance—Investigation of the 2-2-1 Shift Schedule Used in Air Traffic Control Facilities: 1. The Sleep/Wake Cycle. (DOT/FAA/AM-95/19)

Human Factors in Aviation Maintenance: Phase 3, Volume 1, Progress Report. (DOT/FAA/AM-95/13)

Handbook of Human Performance Measures and Crew Requirements for Flightdeck Research. (DOT/FAA/CT-TN95/49)

Federal Highway Adminstration:

In-Cab Fitness-For-Duty. (FHWA-MC-95-011)

Shipper Involvement in Hours-Of-Service Violations. (FHWA-MC-98-049)

Impact of Local/Short Haul Operations on Driver Fatigue. (DTFH61-C-00105)

Short Haul Trucks and Driver Fatigue. (DTFH61-96-C-00038)

Commercial Motor Vehicle Rest Areas: Making Space for Safety. (PB 97-124705)

Driver Fatigue and Alertness Study. (PB 98-102346)

Local/Short Haul Driver Fatigue Crash Data Analysis. (FHWA-MC-98-016)

Effects of Operating Practices on Driver Alertness. (FHWA-MCRT-99-008)

PERCLOS: A Valid Psychophysiological Measure of Alertness as Assessed by Psychomotor Vigilance. (FHWA-MCRT-98-006)

Electronic On-Board Recorders for Hours-of-Service Compliance. (FHWA-MCRT-99-007)

Conference on Managing Fatigue in Transportation. (cosponsored with NHTSA and the FRA)

Conference on Driver Vigilance Monitoring. (cosponsored with NHTSA)

Federal Railroad Administration:

The Effects of Work Scheduling on Train Handling Performance and Sleep of Locomotive Engineers: A Simulator Study. (DOT/FRA/ORD-97-09)

Enginemen Stress and Fatigue. (Issued February 1993)

Issues in Locomotive Crew Management and Scheduling. (DOT/FRA/RRR-91-01)

National Highway Traffic Safety Administration:

Crashes and Fatalities Related to Driver Drowsiness/Fatigue. (Research Note, Issued November 1994)

Validation of Eye and Other Psychophysiological Monitors. (cosponsored with FHWA) (DOT-HS-808 762)

Research on Vehicle-Based Driver Status/Performance Monitoring: Development, Validation, and Refinement of Algorithms for Detection of Driver Drowsiness. (DOT-HS-808 247)

Research on Vehicle-Based Driver Status/Performance Monitoring: Seventh Semiannual Research Report. (DOT-HS-808 299)

Research on Vehicle-Based Driver Status/Performance Monitoring, Part 1. (DOT-HS-808 838)

Research on Vehicle-Based Driver Status/Performance Monitoring, Part 2. (DOT-HS-808 839)

Research on Vehicle-Based Driver Status/Performance Monitoring, Part 3. (DOT-HS-808 840)

Drowsy Driving and Automoble Crashes. (DOT-HS-808 707)

Table 3–1. Fatigue-related research completed in the U.S. Department of Transportation since 1989 (continued).

United States Coast Guard:

Fatigue and alertness in Merchant Marine Personnel: A Field Study of Work and Sleep Patterns. (USCG-D-06-97)

Procedures for Investigating and Reporting Human Factors and Fatigue Contributions to Marine Casualties. (USCG-D-09-97)

Modeling Techniques for Shipboad Manning: A Review and Plan for Development. (USCG-D-07-93)

Maritime Administration:

Shipboard Crew Fatigue, Safety, and Reduced Manning. (issued November 1994)

Sources: (a) U.S. Department of Transportation, Federal Highway Administration, Office of Motor Carriers. December 16, 1998. *Summary of Driver Fatigue Programs.* Washington, DC. (b) Publications on driver fatigue programs listed on the National Technical Information Service World Wide Web home page, <http://www.ntis.gov>, April 22, 1999.

Safety Recommendation I-89-2

Safety Recommendation I-89-2 asked the DOT to develop and disseminate educational material for transportation industry personnel and management regarding shift work; work and rest schedules; and proper regimens of health, diet, and rest. In its 1989 response, the DOT acknowledged the unique demands placed on transportation workers such as shift-work, long-haul operations, and nighttime duty and that it would review its current policy on developing educational materials. In a more detailed response in 1996, the DOT indicated that it had published its 1995 report *Sharing the Knowledge: Department of Transportation Focus on Fatigue* and produced two videotapes that addressed fatigue: one on human factors and one entitled *Fatigue Busters—How to Survive Fatigue in the '90s*. In addition, the FAA also published a fatigue buster brochure. The Safety Board replied that it was pleased that information had been produced for aviation and highway, but it was concerned that similar information had not been developed for railroad, marine, and mass transit. On May 4, 1999, the DOT provided the Safety Board with an update of FRA education activities. Safety Recommendation I-89-2 is currently classified "Open—Acceptable Response."

Other organizations, agencies, and industry groups—such as the National Sleep Foundation, the AAA Foundation for Traffic Safety, and the American Trucking Associations, Inc.—have also developed educational brochures about fatigue. Two brochures, *Awake at the Wheel* and *Wake Up!*, attempt to educate operators about the need for sleep and to dispel myths such as people can always tell when they are fatigued.[35] Appendix E

[35] The brochure *Wake Up!* was developed jointly by the AAA Foundation for Traffic Safety and the National Sleep Foundation. It was the basis for the brochure *Awake at the Wheel* that was developed for truckdrivers by the FHWA in conjunction with the American Trucking Associations.

contains a list of some educational materials that have been developed since the intermodal recommendations were issued.

In the early 1990s, NASA developed an education and training module entitled "Alertness Management in Flight Operations." It contains information about fatigue with an emphasis on aviation. The module has three primary objectives: to explain (1) the current state of knowledge about the physiological mechanisms that underlie fatigue; (2) misconceptions about fatigue; and (3) fatigue countermeasures. The NASA and the FAA have cosponsored many courses to educate pilots for a large segment of the major U.S. air carriers as well as for corporate management. The FRA, Federal Transit Administration (FTA), and FHWA along with industry organizations have used the NASA countermeasures training module as the basis for training modules in the other modes of transportation.

In addition to Safety Recommendation I-89-2, the Safety Board has issued other recommendations to the individual modal administrations calling for increased educational efforts regarding the effects of fatigue. In 1995, the Safety Board asked the FHWA to develop and disseminate, in consultation with DOT's Human Factors Coordinating Committee, a training and education module to inform truckdrivers of the hazards of driving while fatigued (Safety Recommendation H-95-5).[36] The FHWA and the American Trucking Associations, Inc., adapted the NASA module for use with the commercial driving industry and developed a train-the-trainer course on fatigue and fatigue countermeasures. To date more than 2,000 people have been trained; 16 seminars are being offered in 1999. Safety Recommendation H-95-5 to the FHWA was classified "Closed—Acceptable Action" on July 7, 1998.

In 1996, the Safety Board also asked the FTA, in cooperation with the American Public Transit Association, to develop a fatigue educational awareness program and to distribute it to transit agencies to use in their fitness-for-duty training for supervisors and employees involved in safety-sensitive positions (Safety Recommendation R-96-20).[37] The FTA has developed a seminar, available in four different formats, for a variety of attendees including employees, managers, and persons involved in scheduling. The Safety Board is pleased with this effort of the FTA and is aware that more than 600 persons have attended the seminars. As a result of these efforts, the Safety Board has classified Safety Recommendation R-96-20 "Closed—Acceptable Action."

In aviation, the Safety Board asked the FAA to require U.S. air carriers operating under 14 CFR Part 121 to provide educational programs for pilots (Safety Recommendation A-94-5),[38] to require 14 CFR Part 135 air carriers to provide fatigue countermeasure

[36] National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents.* Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[37] National Transportation Safety Board. *Collision Involving Two New York City Subway Trains on the Williamsburg Bridge in Brooklyn, New York, June 5, 1995.* Railroad Accident Report NTSB/RAR-96/03. Washington, DC.

[38] National Transportation Safety Board. 1994. *A Review of Flightcrew-Involved, Major Accidents of U.S. Air Carriers, 1978 Through 1990.* Safety Study NTSB/SS-94/01. Washington, DC.

information to air crews in initial and recurrent training (A-94-73),[39] and to provide fatigue information to the general aviation community (A-97-20).[40] The FAA revised Advisory Circular 120-51B to include fatigue as one of the topics discussed in crew resource management training. The FAA also developed educational materials to address the hazards of fatigue for use in safety meetings. These three recommendations have been classified "Closed—Acceptable Action."[41]

In 1997, the Safety Board asked the USCG to advise marine pilots about the effects of fatigue on performance and about sleeping disorders such as sleep apnea (Safety Recommendation M-97-41).[42] In a letter dated November 11, 1998, the USCG indicated that it has discussed the effects of fatigue and sleeping disorders with the American Pilots Association and independent pilot associations, requesting that they inform their members of the dangers of sleeping disorders such as sleep apnea through their internal media. Further, Navigation and Vessel Inspection Circular No. 2-98, *Physical Evaluation Guidelines for Merchant Marine's Documents and Licenses*, contains guidelines for use by physicians performing physical examinations of mariners and includes sleeping disorders as conditions to be evaluated for original and renewals of marine pilots' licenses and for the required pilots' physicals. Safety Recommendation M-97-41 was classified "Closed—Acceptable Action" on April 6, 1999.

The Safety Board is aware that the USCG has developed a research and educational program on crew endurance. The Board is also aware that the USCG held a workshop on fatigue on April 6, 1999, aimed at masters and safety management personnel of tugs and barges, passenger vessels, and fishing vessels as well as USCG personnel. The Board encourages the USCG to add more workshops to its agenda. Such programs could be promoted through the USCG's Prevention Through People program. The USCG has not developed any brochures on operator fatigue for the mariner community.

The Safety Board also issued a recommendation to the FHWA asking that educational materials be developed for commercial truckdrivers (H-90-21, classified "Closed—Acceptable Action"). As shown in appendix E, the FHWA has developed and disseminated the brochure *Awake at the Wheel* and fatigue videos; it has also developed courses to educate truckdrivers about the dangers of driving while drowsy. In February 1999, the Board asked the FHWA to ensure that the dangers of inverted sleep periods are discussed in the fatigue video being developed for motorcoaches (Safety Recommendation H-99-4A).

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[39] National Transportation Safety Board. 1994. *In-Flight Loss of Control, Leading to Forced Landing and Runway Overrun, Continental Express, Inc., N24706, Embraer EMB-120 RT, Pine Bluff, Arkansas, April 29, 1993*. Aircraft Accident Report NTSB/AAR-94/02/SUM. Washington, DC.

[40] National Transportation Safety Board. 1997. *In-Flight Loss of Control and Subsequent Collision With Terrain, Cessna 177B, N35207, Cheyenne, Wyoming, April 11, 1996*. Aircraft Accident Report. NTSB/AAR-97/02. Washington, DC.

[41] Safety Recommendations A-94-5 and A-94-73 were classified "Closed—Acceptable Action" on January 16, 1996; Safety Recommendation A-97-20 was classified "Closed—Acceptable Action" on June 11, 1997.

[42] National Transportation Safety Board. 1997. *Grounding of Liberian Passenger Ship* Star Princess *on Poundstone Rock, Lynn Canal, Alaska, June 13, 1995*. Marine Accident Report NTSB/MAR-97/02. Washington, DC.

The Safety Board is pleased to see the increase in educational efforts on fatigue among the DOT modal administrations, particularly the current activities within the FTA. The Safety Board would like to see more efforts in marine and pipeline to develop and disseminate educational materials on fatigue and will continue to monitor these activities. The FAA, FHWA, FRA, and FTA have satisfactorily met the intent of this recommendation; however, the Board urges these modal administrations to continue their efforts in this area. Pending further efforts by the RSPA and the Coast Guard to develop and disseminate educational information on fatigue in marine and pipeline operations, respectively, Safety Recommendation I-89-2 remains classified "Open—Acceptable Response."

Safety Recommendation I-89-3

Safety Recommendation I-89-3 asked the DOT to review and upgrade regulations governing hours of service to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues. In 1989, the DOT stated that it was reviewing the regulations pertaining to hours of service. It had not found research to suggest that the regulations should be consistent across all modes of transportation and that it would continue with research efforts to determine what changes might be made.

The Board has been very disappointed in the DOT's lack of progress in revising the hours-of-service regulations. Subsequently, the Safety Board made specific recommendations to the FAA and FHWA to revise the hours-of-service regulations. In conjunction with its investigation of the crash of American International Airways at Guantanamo Bay, Cuba, in August 1993,[43] the Safety Board recommended that the FAA

> Revise the applicable subpart of 14 CFR Part 121 to require that flight time, accumulated in noncommercial "tail end" ferry flights conducted under 14 CFR Part 91 as a result of 14 CFR Part 121 revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations. (A-94-105, classified "Closed—Acceptable Action/Superseded" by Safety Recommendation A-95-113)
>
> Expedite the review and upgrade of Flight/Duty time limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues. (A-94-106, classified "Closed—Acceptable Action/Superseded" by Safety Recommendation A-95-113)

[43] National Transportation Safety Board. 1994. *Uncontrolled Collision With Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993.* Aircraft Accident Report NTSB/AAR-94/04. Washington, DC.

In its report of the accident involving an Air Transport International DC8-63 at Kansas City International Airport in February 1995,[44] the Safety Board recommended that the FAA

> Finalize the review of current flight and duty time regulations and revise the regulations, as necessary, within 1 year to ensure that flight and duty time limitations take into consideration research findings on fatigue and sleep issues. The new regulations should prohibit air carriers from assigning flight crews to flights conducted under 14 CFR Part 91 unless the flight crews meet the flight and duty time limitation of 14 CFR Part 121 or other appropriate regulations. (A-95-113, currently classified "Open—Acceptable Response")

In its study of aviation safety in Alaska,[45] the Safety Board asked the FAA to

> Develop appropriate limitations on consecutive days on duty, and duty hours per duty period for flight crews engaged in scheduled and nonscheduled commercial flight operations, and apply consistent limitations in Alaska and the remainder of the United States. (A-95-125, currently classified "Open—Acceptable Response")

On June 15, 1992, the FAA announced the establishment of the flight crewmember flight/duty rest requirements working group of its Aviation Rulemaking Advisory Committee (ARAC). In its final report submitted to the FAA on June 30, 1994, the working group indicated that although it had not reached consensus on the specific issues, it did agree on four major areas that should be addressed in FAA rulemaking: absence of a duty time limitation, reserve scheduling, back-side-of-the-clock operations, and scheduled reduced rest.

The FAA issued a notice of proposed rulemaking (NPRM) on December 20, 1995,[46] 6 years after the Board issued Safety Recommendation I-89-3. The proposed flight time and rest requirements are provided in appendix F. Comments on the NPRM were originally due on March 19, 1996; however, the comment period was extended to June 19, 1996. The Board commented on the rulemaking on June 19, 1996, noting several favorable aspects to the NPRM:

- elimination of the ability of carriers to schedule flight crewmember duty during scheduled rest periods, inclusion of standby reserve time, deadheading time, and all duties performed for the airline as duty time in the determination of flight and duty time requirements;

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[44] National Transportation Safety Board. 1995. *Uncontrolled Collision With Terrain, Air Transport International, Douglas DC-8-63, N782AL, Kansas City International Airport, Kansas City, Missouri, February 16, 1995.* Aircraft Accident Report NTSB/AAR-95/05. Washington, DC.

[45] National Transportation Safety Board. 1995. *Aviation Safety in Alaska.* Safety Study NTSB/SS-95/03. Washington, DC.

[46] *Federal Register*, Vol. 60, No. 244, dated December 20, 1995.

- inclusion of ferry, instructional, maintenance, check, and other flights in the determination of flight and duty time requirements, requirements of minimum daily rest periods of at least 10 consecutive hours, and 36 consecutive hours of rest within 7 consecutive calendar days of duty, for flight crewmembers and flight engineers;
- establishment of explicit standards for approving on-board flight crew rest areas;
- permit extensions of daily flight and duty intervals to periods of no more than 2 hours and only for operational reasons beyond the control of the airline; and
- limits of duty periods for crewmembers on reserve assignments depending on the amount of advance notification of reporting time.

In its comments on the rulemaking, however, the Board also expressed concern that the proposed rule did not include effective mechanisms to address flight operation during the circadian night and circadian trough, and it lacked recognition of the fatiguing aspects of multiple takeoffs and landings. There were mixed industry reactions to the NPRM. In general, air carriers and air carrier organizations opposed the NPRM[47] whereas pilot associations supported the proposal with some reservations, primarily a concern with loss of income from reduced flying hours and a desire for a more thorough discussion of back-side-of-the-clock flying time. According to the FAA, it received about 2,000 comments on the NPRM.

With no action since 1996 and the rulemaking effectively abandoned, on July 9, 1998, the ARAC on air carrier operations was assigned to provide a review and analysis of industry practice with regard to reserve duty for flight crewmembers, which is only a small part of the flight and duty time issue. A working group was formed and ultimately delivered recommendations to the FAA on February 9, 1999.[48] The pilots and air carriers on the working group were able to agree on the following:

1. A pilot should be scheduled by the operator to receive a protected time period as an opportunity to sleep for every day of reserve duty. The operator may not contact the pilot during this period.
2. An operator should limit the movement of the pilot's protected time period during consecutive days of reserve duty to ensure circadian stability.
3. A reserve pilot's availability for duty should be limited to prevent pilot fatigue as a result of lengthy periods of time-since-awake.
4. Sufficient advance notice of a flight assignment can provide a reserve pilot with a sleep opportunity.

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[47] Batelle Memorial Institute. March 1998. *A Review of Issues Concerning Duty Period Limitations, Flight Time Limitations, and Rest Requirements as Stated in the FAA's Notice of Proposed Rulemaking 95-18.* Washington, DC: Federal Aviation Administration.

[48] Aviation Rulemaking Advisory Committee, Reserve Rest Working Group. January 8, 1999. *Pilot Members Submission: Proposal of 77,955 Airline Pilots.*

The pilots and the air carriers, however, could not reach agreement about how to meet these goals. The Safety Board understands the difficulty in reaching an agreement on the issue of reserve duty and rest; nevertheless, it remains deeply concerned and disappointed that no further rulemaking action has been taken on the overall issue of hours of service and that duty and rest requirements continue to be different for Part 121 and Part 135 operations. According to the FAA, rather than proceed to a final rule with the NPRM, it will likely issue a supplemental NPRM, which, in the Safety Board's opinion, will only further delay any resolution to this important safety issue.

In its 1995 study on factors that affect fatigue in heavy truck accidents,[49] the Safety Board asked the FHWA to

> Complete rulemaking within 2 years to revise 49 CFR 395.1 to require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours. (H-95-1, currently classified "Open—Unacceptable Response")

> Complete rulemaking within 2 years to eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. (H-95-2, currently classified "Open—Unacceptable Response")

In November of 1996, the FHWA issued an advance notice of proposed rulemaking (ANPRM) that requested additional fatigue research.[50] Rather than proposing any changes to the current hours-of-service regulations, the ANPRM was a general solicitation for comments on hours-of-service regulations. The comment period closed on March 31, 1997. The FHWA received about 1,600 comments to the ANPRM. An expert panel was convened in the summer of 1998 to review and evaluate, based on selected scientific criteria established by the panel, a series of hours-of-service proposals. None of the proposals met the scientific criteria established. The expert panel also developed an additional proposal intended to meet the scientific criteria established. A summary of these proposed hours-of-service regulations is provided in appendix G.

Currently, the FHWA has reported that it is pursuing two different avenues of rulemaking—traditional rulemaking and negotiated rulemaking.[51] In a letter dated November 3, 1998, the FHWA indicated that it intended to publish an NPRM in early 1999, was contracting with the University of Michigan Transportation Research Institute to perform a cost/benefit analysis, and was considering negotiated rulemaking to expedite the process. In a response dated February 25, 1999, to the FHWA, the Safety Board expressed disappointment that it had taken more than 18 months since the ANPRM comment period

[49] National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents.* Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[50] *Federal Register*, Vol. 61, No. 215, dated November 5, 1996.

[51] Basically, a procedure by which representatives of all interests affected by a rulemaking are brought together to discuss fully the issues under conditions conducive to narrowing or eliminating differences and to negotiating a proposed rule acceptable to each interest.

closed to reach the NPRM stage and that the FHWA expected that a 120-day comment period on the NPRM would not be sufficiently long to receive comments, thus prolonging activity to issue a final rule. The Safety Board also indicated that it would support a negotiated rule if it would expedite the process. In testimony at the Safety Board's April 14, 1999, public hearing on truck and bus safety,[52] an FHWA representative indicated that a decision on negotiated rulemaking was expected to be made within 2 weeks. The FHWA representative also indicated that development of an NPRM through the traditional process was taking place simultaneously with the discussions on a negotiated rule to avoid any further loss of time.

In a May 4, 1999, letter to the Safety Board, the DOT indicated that "FRA submitted legislation to Congress last year, and may again this year, to require railroads to submit fatigue management plans designed to reduce fatigue experienced by railroad employees." The letter further stated that "should we be successful in gathering support and passage of such a legislative initiative, we believe fatigue will be greatly reduced in railroad operations."

Although the DOT and the modal administrations have taken positive steps in the area of education and research, they have not acted decisively to revise the antiquated hours-of-service regulations. In fact, as outlined above, little regulatory action has been initiated. The DOT believes that countermeasures to fatigue are preferred over regulation because sleep during a rest period cannot be enforced.[53] The Safety Board points out that hours-of-service rules exist to set limits on allowable scheduling practices, not to prescribe those schedules, and while the Board agrees that sleep cannot be regulated, it also believes that time for adequate sleep must be guaranteed by any Federal regulation related to hours of service.

The Safety Board is aware that the FHWA, and others, are looking at onboard devices to test fitness-for-duty and monitor impairment of operator performance. Although the Safety Board supports pre-duty testing for performance as a result of fatigue, alcohol, drugs, or other condition, it does not believe that operators should be driving up to the point that they fail a valid fitness-for-duty test as a result of fatigue, which could occur in the middle of a trip.

In 1998, DOT Secretary Slater launched the ONEDOT program. This program is to build on collaborative efforts among the various transportation agencies to reduce duplication and save resources. One of the goals of ONEDOT is to develop a common, positive framework relating to work hours, overtime, and incentives. Within the concept of ONEDOT, the DOT Safety Council works toward development of a safety policy for the Department. Fatigue is one of the areas on which the Council intends to act.

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[52] The hearing was held April 14–16, 1999, in Washington, D.C. Discussion panels included representatives from the DOT, highway transportation industry, and public safety groups.

[53] U.S. Department of Transportation. 1999. *Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity.* Washington, DC.

The Safety Board acknowledges this as yet another initiative to address fatigue and revisions to hours-of-service regulations; nevertheless, the Board remains extremely disappointed in the lack of rulemaking by the DOT.

Scientific research has shown that certain sleep factors can affect fatigue and performance: insufficient sleep, irregular and unpredictable schedules, working during low points in the circadian rhythm. The current hours-of-service regulations do not accommodate these concerns. The Safety Board believes these factors should be considered when revising the hours-of-service regulations. Therefore, the Safety Board recommends that the DOT require the modal administrations to modify the appropriate *Codes of Federal Regulations* to establish scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. The Safety Board also recommends that the DOT seek Congressional authority, if necessary, for the modal administrations to establish these regulations. Based on the issuance of this new recommendation, Safety Recommendation I-89-3 is being classified "Closed—Unacceptable Action/Superseded." The Safety Board is also recommending separately that each modal administration—the FAA, FHWA, FRA, USCG, and RSPA—establish, within 2 years, scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. Further, because the FAA's efforts have not resulted in any changes to the flight and duty time regulations, the Safety Board has reclassified Safety Recommendations A-95-113 and A-95-125 "Open—Unacceptable Response." These recommendations are being reiterated in conjunction with this report. For the FHWA, the revised regulations, at a minimum and as recommended by the Safety Board in 1995, should also (a) require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours, and (b) eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. As a result of this new recommendation to the FHWA, Safety Recommendations H-95-1 and -2 are being classified "Closed—Unacceptable Action/Superseded."

Findings

1. Since 1989, the U.S. Department of Transportation has initiated a wide range of research projects to address the issue of operator fatigue in the transportation environment, with the exception of pipeline operations.

2. Since 1989, the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, and the Federal Transit Administration have developed and disseminated various educational materials, including brochures and videotapes, to the industry on the detrimental effects of fatigue in the transportation environment. The Research and Special Programs Administration and the U.S. Coast Guard need to make a more concerted effort to develop and disseminate educational information on fatigue in pipeline and marine operations, respectively.

3. Despite the acknowledgment by the U.S. Department of Transportation that fatigue is a significant factor in transportation accidents, little progress has been made to revise the hours-of-service regulations to incorporate the results of the latest research on fatigue and sleep issues.

Recommendations

As a result of this safety report, the National Transportation Safety Board made the following safety recommendations:

To the U.S. Department of Transportation:

Require the modal administrations to modify the appropriate *Codes of Federal Regulations* to establish scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. Seek Congressional authority, if necessary, for the modal administrations to establish these regulations. (I-99-1) (Supersedes I-89-3)

To the Federal Aviation Administration:

Establish within 2 years scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. (A-99-45)

To the Federal Highway Administration:

Establish within 2 years scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. At a minimum, and as recommended by the National Transportation Safety Board in 1995, the revised regulations should also (a) require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours, and (b) eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. (H-99-19) (Supersedes H-95-1 and H-95-2)

To the Federal Railroad Administration:

Establish within 2 years scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. (R-99-2)

To the Research and Special Programs Administration:

Establish within 2 years scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. (P-99-12)

To the United States Coast Guard:

Establish within 2 years scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. (M-99-1)

Also as a result of this safety report, the National Transportation Safety Board reiterated the following safety recommendations to the Federal Aviation Administration:

Finalize the review of current flight and duty time regulations and revise the regulations, as necessary, within 1 year to ensure that flight and duty time limitations take into consideration research findings on fatigue and sleep issues. The new regulations should prohibit air carriers from assigning flight crews to flights conducted under 14 CFR Part 91 unless the flight crews meet the flight and duty time limitation of 14 CFR Part 121 or other appropriate regulations. (A-95-113)

Develop appropriate limitations on consecutive days on duty, and duty hours per duty period for flight crews engaged in scheduled and nonscheduled commercial flight operations, and apply consistent limitations in Alaska and the remainder of the United States. (A-95-125)

By the National Transportation Safety Board

James E. Hall
Chairman

Robert T. Francis II
Vice Chairman

John A. Hammerschmidt
Member

John Goglia
Member

George W. Black, Jr.
Member

Adopted: May 17, 1999

Appendix A

Intermodal, Fatigue-Related Safety Recommendations Issued May 12, 1989

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date May 12, 1989

In reply refer to: I-89-1 through -3

Honorable Samuel K. Skinner
Secretary
Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

About 7:54 a.m., eastern standard time, on January 14, 1988, westbound Consolidated Rail Corporation (Conrail) "trailer van" freight train TV-61 collided with eastbound Conrail freight train UBT-506 near Control Point Thompson, at Thompsontown, Pennsylvania. The engineers and brakemen on both trains were fatally injured. The conductors on both trains received minor injuries. Damage to the trains was estimated at $6,015,000.

The National Transportation Safety Board determined that the probable cause of this accident was the sleep-deprived condition of the engineer and other crewmembers of train UBT-506, which resulted in their inability to stay awake and alert, and their consequent failure to comply with restrictive signals. Contributing to the failure of the crewmembers were their unpredictable work and rest cycles, their voluntary lack of proper rest before going on duty, and the inadequate alertness and acknowledging devices of the locomotive safety backup systems.

This accident illustrates several aspects of current railroad operations that can adversely affect train crews' performance of their duties and, ultimately, the safety of rail transportation. Specifically, the Safety Board found in this case that the engineer and brakeman of UBT-506 probably were suffering chronic sleep deprivation because their work shifts and off-duty periods at home were unpredictable and irregular. As a result, the crewmembers customarily participated in the normal work and living routines of their families, sleeping during conventional night hours. They did not attempt to get meaningful sleep before anticipated calls to work late in the day or at night, but would try to get by without adequate sleep until their next off-duty period. In this instance, none of the crewmembers of train UBT-506 had more than 2 hours of restful sleep during the 22-24 hours preceding the accident. The Safety Board concluded that the crewmembers' sleep-deprived condition was compounded by the monotonous environment of the locomotive cab and, possibly, by their failure to eat a meal for at least 13 hours before the accident. Finally, the Safety Board found that the UBT-506 engineer was able to prevent the automatic train stop (ATS) device from applying the brakes by simply depressing and releasing the acknowledging pedal in his sleep; the ATS did not incorporate an acknowledging feature that required alertness.

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The Safety Board believes that the work and rest cycles and the behaviors outlined above may have been typical not only of this crew but of other train crews elsewhere on the Conrail system and on other railroads. The changing nature of railroad operations and competitive factors have materially increased the relative number of train crewmembers who must work irregular and unpredictable shifts on a long-term basis. Lacking proper training and education in the physiology of fatigue, many may allow themselves to become chronically deprived of sleep, and develop physiological problems that could adversely affect their performance and the safety of train operations. Other transportation industry operators are exposed to shift work, but the work and rest cycles of railroad extra-board and pool traincrews are often more irregular and unpredictable.

The Safety Board believes that railroad management and unions serving railroad operations have failed to adequately consider the effects of unpredictable work schedules and the relaxation of medical standards and procedures. Moreover, the Safety Board believes cooperative efforts are needed to reduce the element of unpredictability in work scheduling and to train and educate employees and their families about proper regimens of health, diet, and rest. As a result of its investigation of the Thompsontown accident, the Safety Board issued a series of recommendations on these safety issues to Conrail, the Brotherhood of Locomotive Engineers, and the United Transportation Union.

The human performance issues involved in the Thompsontown accident and similar train accidents investigated by the Safety Board in recent years are not unique to the railroad industry. They have frequently appeared in accidents in other transportation modes as well.

Highway

Some of the clearest instances of fatigue-related problems are seen in the Safety Board's investigations of major highway accidents. For example, about 4:15 a.m. on July 14, 1986, an intercity bus operated by Trailways Lines, Inc., collided with a truck operated by Rising Fast Trucking Company on Interstate Highway 40 near Brinkley, Arkansas. The busdriver and 27 bus passengers sustained injuries ranging in severity from minor to serious; the truckdriver and his codriver were not injured. The truckdriver had only a 2-hour nap in the 21 hours before the accident. The Safety Board concluded that the combined effects of fatigue due to sleep deprivation, monotony, and vulnerability to lapses in attention at that hour of day combined to decrease the truckdriver's vigilance, adversely affected his judgment, and contributed to his commission of several errors before the collision.

On April 29, 1985, a tractor-semitrailer collided with the rear end of a schoolbus near Tuba City, Arizona. Of the 32 schoolbus passengers, 2 were fatally injured, 26 sustained serious to minor injuries, and 4 were uninjured. The truckdriver and the schoolbus driver received minor injuries. The Safety Board determined that the probable cause of this accident was the truckdriver's chronic fatigue, which adversely affected his ability to avoid

the collision. His chronic fatigue developed from a loss of sleep due to a combination of excessive duty time and a pattern of prolonged irregular duty time. Contributing to the accident was the failure of the truck company to properly monitor the truckdriver's activities to prevent excessive hours of service.

The truckdriver was found to have kept two sets of logs--one for the company and one for himself--with conflicting entries for the time worked. Fuel receipts conflicted with entries in the driver's logs. The truckdriver said he had slept poorly two nights before the accident due to a cough. The night before the accident he had slept on the floor of a motel room shared with other truckdrivers. After sleeping from around 10 p.m. until 3:30 a.m., he arose, prepared his truck, drove to a ranch, and loaded cattle into the truck trailer. Following breakfast, he left Tonapah, Arizona, destined for Medicine Bow, Wyoming. The accident occurred about 3:15 P.M.

According to the trucking company, the driver had been on duty a total of 88 1/4 hours during the 8 consecutive days before the accident. He was in violation of the Federal rule restricting duty to a maximum of 70 hours in 8 days. He was also in violation of the 10- or 15-hour per day rules, or both, on April 23, 25, 26, 27, and 28. His consumption of a large quantity of sweets several hours before the accident, with the resultant initial elevation in the level of blood sugar, may have led to a rapid depletion of blood sugar and further fatigue.

The Safety Board has issued several safety recommendations related to fatigue, work duty time and its limitations, and record keeping. Recommendations included asking the Office of Motor Carrier Safety (OMCS) to issue "On Guard Notices" warning drivers of the problems of fatigue, and recommending that the OMCS find methods and means to prevent or minimize dozing at the wheel by drivers of carriers in interstate commerce. Based on OMCS's response to this latter recommendation, the Safety Board classified it as "closed, unacceptable action"; but addressee action on the remainder of these recommendations was considered acceptable.

Clearly, the pressure of competition and economics are pervasive factors that tend to complicate and exacerbate the problems of excessive duty time and prolonged irregular duty times in commercial vehicle operations. Therefore, any program of remedial action must address this fundamental reality. It is also apparent to the Safety Board that there are serious deficiencies in the industry's understanding and application of knowledge about sleep, circadian factors, and fatigue as they affect driver performance on the Nation's highways. Additionally, public policy has some serious shortcomings, as reflected in the substance and the lack of enforcement of regulations governing commercial driver duty and rest. The Safety Board believes that these deficiencies in knowledge, policy, and practice warrant an immediate and concerted program of remedial action by the U.S. Department of Transportation (DOT).

Marine

The Safety Board has investigated a number of marine accidents in which crewmember fatigue or sleep deprivation was involved. These accidents, like those cited from other transportation modes, illustrate an inadequate

recognition of the significance and extent of the fatigue problem in the transportation industry.

At 12:20 a.m. on February 16, 1985, a 330-foot Panamanian-Flag passenger/car carrier, the M/V A. REGINA, ran aground on the southeast coast of Mona Island, Puerto Rico. After unsuccessful attempts to refloat the REGINA, the 72 crewmembers and 143 passengers were landed by the vessel's lifeboats and liferafts on Mona Island and subsequently flown back to Mayaguez. One crewmember was injured when leaving the vessel. The stranded vessel, valued at $5 million, was considered a total loss.

The Safety Board determined that the probable cause of the grounding was the failure of the master to monitor the vessel's progress along the charted course line by plotting navigation fixes so as to detect the vessel's set and drift. Contributing to the accident was the master's failure to make a leeway steering allowance for the effects of wind, sea, and current when plotting a course line close to the island, his assuming a watch while on medication and in a fatigued physical condition, and his failure to maintain an adequate lookout.

Evidence indicated that the master was suffering from both chronic and acute fatigue. He had not had a day off during the preceding 12 months. His daily workload varied, depending on whether a trip was made or the vessel remained in port. During the week of the accident, the company had instituted daily roundtrips between Puerto Rico and the Dominican Republic. This schedule allowed the master only about 3 hours to himself each day, in addition to a typical allowance of 7-8 hours for sleep. Insomnia and responsibilities of operation had deprived the master of sleep for a period of about 42 hours when the grounding occurred.

About noon on April 21, 1987, the USS RICHARD L. PAGE collided with the fishing vessel CHICKADEE which was under tow by another fishing vessel. Six feet of the bow of the CHICKADEE was severed and it immediately started taking on water. All three crewmembers on the CHICKADEE abandoned the vessel just before it capsized and sank. Crewmembers were rescued shortly afterward, and no one was injured. The PAGE sustained only minor damage. The CHICKADEE was a total loss. Total damage was estimated at $112,000.

Although visibility was limited at the time of the collision, the captain of the PAGE, a guided-missile frigate, decided to conduct a full power trial to test maximum speed of the frigate. Neither the captain of the PAGE nor of the CHICKADEE sounded fog signals. The officer of the deck (OOD) on the PAGE was advised of intermittent contacts on the radarscope, but because he could not confirm the contact, decided it was not an actual vessel and thus did not report the contact to the captain.

The Safety Board attributed the OOD's behavior the day of the accident partly to his long working hours and disrupted sleep pattern during the several days before the accident. The Board also expressed concern regarding the nature of military operations, which foster almost stoic acceptance on the part of military leaders and their subordinates of an arduous regimen that would be considered unacceptable in most nonmilitary environments.

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At 9:14 A.M. on July 19, 1987, two passenger/car ferries collided near Orient Point, Long Island, New York, during dense fog. The M/V NORTH STAR, a 158-foot ferry, was southbound with 21 passengers on board; the M/V CAPE HENLOPEN, a 308-foot ferry, was northbound with approximately 250 passengers on board. Each ferry was being conned by its master who identified the other vessel on radar and established a meeting agreement by radiotelephone. Both vessels were damaged substantially in the collision but were sufficiently seaworthy to continue on their respective routes. Seventeen passengers and two crewmembers aboard the NORTH STAR were injured; two passengers aboard the CAPE HENLOPEN reported they were injured.

The Safety Board determined that the probable cause of the collision was the failure of the masters of both ferries, while approaching each other in close quarters in reduced visibility, to reduce speed in accordance with the Inland Navigation Rules to a minimum at which courses could be maintained and to specify in their meeting agreement the meeting site and clearance to be maintained.

Investigation disclosed that although the master of the CAPE HENLOPEN, by personal preference, had worked 16 to 17 hours per day during the 4 days before the collision, it could not be established that fatigue played a role in his performance on the morning of the collision. Nevertheless, the Safety Board expressed its concern that current Coast Guard regulations do not specify maximum allowable worktime for crewmembers on ferry vessels. Accordingly, the Board recommended that the Coast Guard establish limitations on watch and duty time for crewmembers on board ferries and other inspected passenger vessels. The Safety Board has classified this recommendation as "open, unacceptable action" pending further response by the Coast Guard.

Aviation

Limitations on flight and duty time for airline pilots generally are more stringent than corresponding limitations for vehicle operators in surface modes of transportation. Fortunately, no recent airline accidents have been attributed to fatigue among flightcrews. Nevertheless, anecdotal and media accounts of pilot complaints about fatigue and sleepiness in the cockpit warrant concern, particularly on extended flights that cross multiple time zones. The Aviation Safety Reporting System of the National Aeronautics and Space Administration continues to receive monthly reports from long-haul flightcrews describing how fatigue and sleep loss have contributed to major operational errors.

On February 19, 1985, China Airlines flight 006, a Boeing 747 en route to Los Angeles, California from Taipei, Taiwan, suffered an inflight upset. The flight from Taipei to 300 nautical miles northwest of San Francisco was uneventful and the airplane was flying at 41,000 feet mean sea level when the No. 4 engine lost power. During the attempt to recover and restore normal power on the engine, the airplane rolled to the right, nosed over, and entered an uncontrolled descent. The captain was unable to restore the airplane to stable flight until it had descended to 9,500 feet and had been subjected to more than 3 G's in the process. After the captain stabilized the airplane, he elected to divert to San Francisco International Airport, where a safe landing was made. The airplane suffered major structural damage during the accident, and two passengers were seriously injured.

The Safety Board determined that the probable cause of this accident was the captain's preoccupation with an inflight malfunction and his failure to properly monitor the airplane's flight instruments, which resulted in his losing control of the airplane. Contributing to the accident was the captain's over-reliance on the autopilot after the loss of thrust on the No. 4 engine.

Flight 006 had departed Taipei at 12:22 A.M. Pacific standard time (4:22 p.m. Taipei local time) and had been airborne 9 hours 46 minutes when the accident occurred. Because of the scheduled duration of the flight (11 hours), an augmented flightcrew was on board, which included an additional fully qualified captain and flight engineer. At the time of the accident, the primary flightcrew members were on duty. They had been on duty during the takeoff, climb, and initial part of the flight, had been afforded a rest period, and had returned to duty about 2 hours before the accident.

Although preoccupation and over-reliance on the autopilot were cited as significant factors in the accident, the Safety Board also noted that the flight had been airborne nearly 10 hours, that it had traversed several time zones, and that the upset occurred about 2:14 a.m. Taiwan local time--about 4-5 hours after the captain had been accustomed to going to sleep. Thus, his ability to obtain, assimilate, and analyze data presented to him could have been impaired by the effects of boredom, monotony, and fatigue. However, the Safety Board was unable to establish conclusively that the captain's performance was impaired by these factors.

On December 12, 1985, Arrow Air Flight MF1285R, a U.S. registered DC-8-63, crashed and burned approximately one-half mile off the departure end of runway 22 at Gander, Newfoundland. All 248 passengers--U.S. military troops--and eight crewmembers sustained fatal injuries. The Canadian Aviation Safety Board (CASB), which investigated the accident, was unable to determine the exact sequence of events that led to the accident. Although the CASB found no basis to indicate that the crew's performance on the accident flight could have been affected by fatigue, its investigation disclosed that if the flight had successfully continued to its Fort Campbell, Kentucky, destination, the crew would have remained on duty to ferry the aircraft to Oakland, California. The CASB estimated that, at the completion of that subsequent flight, the crew would have accumulated about 15 flight hours in the 24 hours that began with their departure from Cologne, West Germany, and the crew's duty day would have approached 20 hours. However, because the ferry flight would have been flown under 14 CFR Part 91 flight rules, which do not include any flight time limitations or minimum crew rest requirements, it could have been accomplished within the provisions of applicable Federal Aviation Regulations.

In its report of this accident, the CASB stated it believes that flight crews of air carrier aircraft "...require the same degree of vigilance, judgement, and ability to react whether they are conducting a revenue-generating or a non-revenue operation." The National Transportation Safety Board agrees with the CASB on this issue and believes this example illustrates

one of the inadequacies of current Federal Aviation Regulations with regard to flight time, duty time, and crew rest provisions. Moreover, the Board believes the example indicates a need to review and upgrade the rules to assure that they incorporate the latest research on fatigue and sleep matters.

The major transportation accidents outlined above raise serious concerns about the far-reaching effects of fatigue, sleepiness, sleep disorders, and circadian factors in transportation system safety. These and other investigative experiences indicate that poor scheduling of work and rest time continues to affect the performance of operating personnel in virtually all modes of transportation. Safety Board experience also indicates that most employees and supervisors in the transportation industry do not receive training on the problems associated with work and rest schedules and the effects such schedules have on safety and performance. Additionally, proper living habits, including attention to exercise, diet, and rest, are important to good health. However, many transportation operating personnel may not adequately appreciate the importance of these habits in relationship to their fitness for duty and their susceptibility to fatigue in the face of their irregular and often unpredictable work/rest patterns. Therefore, the Safety Board believes there is a need to develop and disseminate educational materials that will assist transportation employees in adapting living habits appropriate to their work/rest patterns.

Furthermore, it appears that, with minor exceptions, neither management nor the labor segments of the transportation industry properly considers the adverse effects of irregular and unpredictable cycles of work and rest on its vehicle-operating personnel. Although some private research has been conducted on this safety issue,[1] the Safety Board is unaware of any systematic activity by the DOT to address the safety concerns of inadequate work and rest scheduling in any of the transportation modes.

Since 1972, the Safety Board has issued about 39 safety recommendations to transportation modal administrations, operators, and associations concerning fatigue, duty time, and hours of service. Collectively, these recommendations addressed most aspects of the fatigue and fitness-for-duty issues, but they constitute uncoordinated and piecemeal efforts directed to various government and industry segments of the transportation community. The Safety Board is aware of the March 1989 DOT report entitled "Transportation-Related Sleep Research," which was prepared in response to a request by the U.S. Senate Committee on Appropriations, and which describes current Departmental activities in this field. This report provides an overview of current diverse

1 Moore, Ede, Sulzman and Fuller: The Clocks That Time Us, Harvard University Press, 1982. Akerstedt, Torswell, and Gillberg: "Sleepiness and Shift Work; Field Studies," Sleep 5:S95-S106, New York, Raven Press, 1982. Johnson and Naitoh: "The Operational Consequences of Sleep Deprivation and Sleep Deficit," AGARDOGRAPH No. 193, June 1974. "Biological Clocks and Shift Work Scheduling," Hearings before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, House of Representatives, Ninety-Eighth Congress, March 23, 1983.

activities by various Departmental administrations regarding the role of fatigue, sleep disorders, and sleepiness in their respective modes. However, the Board believes a review of the report also indicates a need for more overall planning, direction, and control of these activities to assure that they are administered as a coordinated, effective program that will provide the best possible safety benefits for the entire transportation community.

Based on its experience in accident investigation, the Safety Board believes it is time for an aggressive Federal program to address the problems of fatigue and sleep issues in transportation safety. Such a program should include a coordinated research effort, an extensive educational effort directed toward all segments of the transportation industry, and a systematic review and improvement of regulations governing hours of service across all transportation modes.

Therefore, the National Transportation Safety Board recommends that the U.S. Department of Transportation:

> Expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety. (Class II, Priority Action) (I-89-1)
>
> Develop and disseminate educational material for transportation industry personnel and management regarding shift work; work and rest schedules; and proper regimens of health, diet, and rest. (Class II, Priority Action) (I-89-2)
>
> Review and upgrade regulations governing hours of service for all transportation modes to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues. (Class III, Longer-Term Action) (I-89-3)

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

By: James L. Kolstad
Acting Chairman

Appendix B

Fatigue-Related Investigations and Studies Conducted Since May 1989

This appendix lists the fatigue-related investigations and studies conducted by the National Transportation Safety Board since May 1989. Only the safety recommendations that were issued to the U.S. Department of Transportation (DOT) and the modal administrations are included.

Safety Board Document:	Aircraft Accident Report
Title:	Aloha IslanderAir, Inc., Flight 1712, De Havilland Twin Otter, DHC-6-300, N707PV, Halawa Point, Molokai, Hawaii, October 28, 1989
Report Number:	NTSB/AAR-90/05
Date Recommendation(s) Issued:	November 21, 1990
Fatigue Cited as a Cause of or Contributing Factor to the Accident:	No

Abstract:

This report explains the crash of Aloha IslandAir flight 1712, a de Havilland Twin Otter DHC-6-300 near Halawa Bay, Molokai, Hawaii, on October 28, 1989.

Fatigue-Related Conclusions:

The captain was probably fatigued because of a full-time training schedule with Aloha Airlines, late night habits, and a part-time flight schedule with Aloha IslandAir.

Fatigue-Related Recommendations Issued to the DOT:

None

Safety Board Document: Aircraft Accident Report

Title: Atlantic Southeast Airlines, Inc., Flight 2311, Uncontrolled Collision With Terrain and Embraer EMB-120, N270AS, Brunswick, Georgia, April 5, 1991

Report Number: NTSB/AAR-92/03

Date Recommendation(s) Issued: May 14, 1992

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

This report explains the loss of control in flight and crash of Atlantic Southeast Airlines, Inc., flight 2311 while the airplane was conducting a landing approach to runway 07 at the Glynco Jetport, Brunswick, Georgia.

Fatigue-Related Conclusions:

Commuter air carriers, including Atlantic Southeast Airlines, use the reduced rest provisions of 14 CFR Part 135 to routinely schedule reduced rest periods in daily operations, contrary to the purpose of the regulation, which is primarily to allow for scheduling flexibility.

Fatigue-Related Recommendations Issued to the DOT:

Issue an Air Carrier Operations Bulletin (ACOB) directing Principal Operations Inspectors to clarify with their operators that the intent of 14 CFR Section 135.265 is not to routinely schedule reduced rest, but to allow for unexpected operational delays, and to require compliance with the intent of the regulation. (A-92-28)

Recipient(s)	Status
Federal Aviation Administration	Open—Acceptable Response

Safety Board Document: Special Investigation Report (Aviation)

Title: Commercial Space Launch Incident: Launch Procedure Anomaly, Orbital Sciences Corporation, Pegasus/SCD-1, 80 Nautical Miles East of Cape Canaveral, Florida, February 9, 1993

Report Number: NTSB/SIR-93/02

Date Recommendation(s) Issued: August 8, 1993

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

This report explains the procedural anomaly that occurred during the launch sequence of an Orbital Sciences Corporation Pegasus expendable launch vehicle, which was subsequently deployed successfully from an NB-52B airplane on February 9, 1993.

Fatigue-Related Conclusions:

There is a high probability that fatigue caused by the disruption of the circadian rhythms and sleep loss adversely affected the performance of some critical personnel during the launch.

Fatigue-Related Recommendations Issued to the DOT:

Require that, as a condition for license for commercial space launches, as a minimum, the company applying for the license include in its license application a provision for mandatory rest periods before the launch for key participants that provide for an adequate and specified time period for uninterrupted sleep. The quantitative criteria for such rest periods should be developed by appropriate human performance experts to ensure applicability to the assigned tasks. (A-93-90)

Recipient(s)	Status
U.S. Department of Transportation	Open—Acceptable Response

Safety Board Document: Safety Study (Aviation)

Title: A Review of Flightcrew-Involved, Major Accidents of U.S. Air Carriers, 1978 Through 1990

Report Number: NTSB/SS-94/01

Date Recommendation(s) Issued: February 3, 1994

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

U.S. air carrier operations are extremely safe, and the accident rate has declined in recent years. However, among the wide array of factors cited by the National Transportation Safety Board as causal or contributing to airplane accidents, actions or inactions by the flightcrew have been cited in the majority of fatal air carrier accidents. Recognizing that deficiencies in various aspects of the aviation system may adversely influence flightcrew performance, the Safety Board conducted this study to learn more about flightcrew performance by evaluating the characteristics of the operating environment, crewmembers, and errors made in major accidents of U.S. air carriers between 1978 and 1990 in which the flightcrew was cited by the Board. Characteristics of the operating environments and flightcrews were identified from information derived from major investigations of 36 accidents and 1 incident. The errors identified were evaluated in light of the contexts in which they occurred.

Fatigue-Related Conclusions:

Half the captains for whom data were available had been awake for more than 12 hours prior to their accidents. Half the first officers had been awake more than 11 hours. Crews comprising captains and first officers whose time since awaking was above the median for their crew position made more errors overall, and significantly more procedural and tactical decision errors.

Fatigue-Related Recommendations Issued to the DOT:

Require U.S. air carriers operating under 14 CFR Part 121 to include, as part of pilot training, a program to educate pilots about the detrimental effects of fatigue, and strategies for avoiding fatigue and countering its effects. (A-94-5)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Action

Safety Board Document:	Aircraft Accident Report
Title:	In-Flight Loss of Control, Leading to Forced Landing and Runway Overrun, Continental Express, Inc., N24706, Embraer EMB-120 RT, Pine Bluff, Arkansas, April 29, 1993
Report Number:	NTSB/AAR-94/02/SUM
Date Recommendation(s) Issued:	March 17, 1994

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the in-flight loss of control of N24706, leading to a forced landing and runway overrun at Pine Bluff, Arkansas, on April 29, 1993.

Fatigue-Related Conclusions:

The crew rest periods scheduled for the trip sequence were within company guidelines and FARs. However, the crew did not take advantage of the rest periods, and the combined effects of cumulatively limited sleep, a demanding day of flying, and a time of day associated with fatigue were factors in the crew's inadequate judgment and performance.

Fatigue-Related Recommendations Issued to the DOT:

Require that 14 CFR Part 135 air carriers provide air crews, as part of their initial and recurrent training, information on fatigue countermeasures relevant to the duty/rest schedules being flown by the company. (A-94-73)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Action

Safety Board Document: Aircraft Accident Report

Title: Uncontrolled Collision With Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993

Report Number: NTSB/AAR-94/04

Date Recommendation(s) Issued: May 18, 1994

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the crash of American International Airways flight 808, a DC-8-61, about 1/4 mile from the approach end of runway 10 at Leeward Point Airfield, U.S. Naval Air Station, Guantanamo Bay, Cuba, on August 18, 1993.

Fatigue-Related Conclusions:

The flightcrew members had experienced a disruption of circadian rhythms and sleep loss, which resulted in fatigue that had adversely affected their performance during a critical phase of flight.

The flightcrew had been on duty about 18 hours and had flown approximately 9 hours at the time of the accident. The company had intended for the crew to ferry the airplane back to Atlanta after the airplane was offloaded in Guantanamo Bay. This would have resulted in a total duty time of 24 hours and 12 hours of flight time, the maximum permitted under 14 CFR Section 121.521, supplemental rules for overseas and international flights.

If the flightcrew had been scheduled to conduct a flight within the United States similar to that of flight 808, the flightcrew would have exceeded the flight and duty time requirements of 14 CFR 121.505.

Fatigue-Related Recommendations Issued to the DOT:

Revise the applicable subpart of 14 CFR Part 121 to require that flight time, accumulated in noncommercial "tail end" ferry flights conducted under 14 CFR Part 91, as a result of 14 CFR Part 121 revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations. (A-94-105)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Action/Superseded

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Expedite the review and upgrade of fight/duty time limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues. (A-94-106)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Action/Superseded

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Safety Board Document:	Safety Study (Aviation)
Title:	Commuter Airline Safety
Report Number:	NTSB/SS-94/02
Date Recommendation(s) Issued:	November 30, 1994

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

The commuter airline industry has grown dramatically and has experienced significant changes in operating characteristics in the past 15 years. In response to safety recommendations issued by the National Transportation Safety Board and through other initiatives taken by government and industry, regulatory revisions and other actions have resulted in an improved safety record for commuter airlines conducting operations under Title 14 *Code of Federal Regulations* Part 135. However, despite efforts to bring about safety improvements, accident rates for commuter airlines continue to be higher than the rates for domestic Part 121 airlines. The higher accident rate, the differences in regulatory standards between Parts 135 and 121, and findings of the Safety Board's investigations of recent accidents prompted the Board to initiate this study of commuter airline safety.

Fatigue-Related Conclusions:

Part 135 regulations on flight time and crew rest allow air carriers to establish schedules that result in reduced rest, and many commuter airlines routinely take advantage of these reduced rest provisions for scheduling flightcrews rather than using the provisions for the intended purpose of accommodating unforeseen circumstances.

Self-reports from the commuter airline pilots surveyed indicate that most have flown while fatigued. The most common reasons given for flying while fatigued were the length of duty days, early shift duty followed by late shift duty, and inadequate rest periods.

The practice of scheduling Part 135 pilots for training, check flights, or other nonrevenue flights at the end of a full day of scheduled revenue flying reduces the value of the training and increases the potential for fatigue-related accidents.

Fatigue-Related Recommendations Issued to the DOT:

Require principal operations inspectors to periodically review air carrier flight operations polices and practices concerning pilot task performed between flights to ensure that carriers provide pilots with adequate resources (such as time and personnel) to accomplish those tasks. (A-94-193)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Alternate Action

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Revise the Federal Aviation Regulations contained in 14 CFR Part 135 to require that pilot flight time accumulated in all company flying conducted after revenue operations—such as training and check flights, ferry flights, and repositioning flights—be included in the crewmember's total flight time accrued during revenue operations. (A-94-194)

Recipient(s)	Status
Federal Aviation Administration	Open—Acceptable Response

Safety Board Document: Aircraft Accident Report

Title: Uncontrolled Collision With Terrain, Air Transport International, Douglas DC-8-63, N782AL, Kansas City International Airport, Kansas City, Missouri, February 16, 1995

Report Number: NTSB/AAR-95/06

Date Recommendation(s) Issued: November 14, 1995

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the accident involving an Air Transport International DC-8-63, which was destroyed by ground impact and fire during an attempted takeoff at Kansas City International Airport, Kansas City, Missouri, on February 16, 1995.

Fatigue-Related Conclusions:

The flightcrew assigned to the ferry had a shortened rest break after performing an international trip. Federal regulations permit companies to eliminate these rest periods after flying a 14 CFR Part 121 operation when the flight will be conducted as a ferry operating under 14 CFR Part 91.

At the time of the accident, the flightcrew was suffering from fatigue as a result of limited opportunities for rest, disruption to their circadian rhythms, and lack of sleep in the days before the accident. However, the Safety Board was unable to determine the extent, if any, to which their fatigue contributed to the accident.

Existing FAR Part 121 flight time limits and rest requirements that pertained to the flights that the flightcrew flew prior to the ferry flights did not apply to the ferry flights flown under FAR Part 91. This permitted a substantially reduced flightcrew rest period when conducting the nonrevenue ferry flights.

Fatigue-Related Recommendations Issued to the DOT:

Finalize the review of current flight and duty time regulations and revise the regulations, as necessary, within 1 year to ensure that flight and duty time limitations take into consideration research findings in fatigue and sleep issues. The new regulations should prohibit air carriers from assigning flightcrews to flights conducted under Title14 *Code of Federal Regulations* Part 91 unless the flightcrew meet the flight and duty time limitations of 14 CFR Part 121 or other appropriate regulations. (A-95-113)

Recipient(s)	Status
Federal Aviation Administration	Open—Unacceptable Response

Safety Board Document: Safety Study (Aviation)

Title: Aviation Safety in Alaska

Report Number: NTSB/SS-95/03

Date Recommendation(s) Issued: December 1, 1995

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

Flight operations in Alaska are diverse, and they are responsive to the State's challenging aviation environment and its unique air transportation requirements. The National Transportation Safety Board conducted this study to examine Alaska's current aviation environment and air transportation activities, to identify the associated risk factors and safety deficiencies, and to recommend practical measures for managing the risks to safe flight operations given the reality of Alaska's aviation environment and the potential of new technologies.

Fatigue-Related Conclusions:

The consecutive, long duty days currently permitted by Part 135.261 for commuter airline and air taxi flightcrews in Alaska can contribute to fatigue and are a detriment to safety.

Fatigue-Related Recommendations Issued to the DOT:

Develop appropriate limitations on consecutive days on duty, and duty hours per duty period for flightcrews engaged in scheduled and nonscheduled commercial flight operations, and apply consistent limitations in Alaska and the remainder of the United States. (A-95-125)

Recipient(s)	Status
Federal Aviation Administration	Open—Unacceptable Response

Safety Board Document: Aircraft Accident Report

Title: In-Flight Loss of Control and Subsequent Collision With Terrain, Cessna 177B, N35207, Cheyenne, Wyoming, April 11, 1996

Report Number: NTSB/AAR-97/02

Date Recommendation(s) Issued: March 21, 1997

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

On April 11, 1996, about 0824 mountain daylight time, privately owned Cessna 177B, registration N35207, collided with terrain after a loss of control following takeoff from runway 30 at the Cheyenne Airport, Cheyenne, Wyoming. The pilot-in-command, pilot trainee, and rear seat passenger (the pilot trainee's father) were fatally injured. Instrument meteorological conditions existed at the time, and a visual flight rules flight plan had been filed. The flight, which was a continuation of a transcontinental flight "record" attempt by the youngest "pilot" to date (the pilot trainee), was operated under the provisions of 14 CFR Part 91.

Fatigue-Related Conclusions:

The pilot-in-command suffered from fatigue on the day before the accident.

Information on fatigue and its effect, and methods to counteract it, might have assisted the pilot-in-command to recognize his own fatigue on the first day of the flight, and possibly enhanced the safety of the trip.

Fatigue-Related Recommendations Issued to the DOT:

Expand the development and increase the dissemination of educational materials on the hazards of fatigue to the general aviation piloting community. (A-97-20)

Recipient(s)	Status
Federal Aviation Administration	Closed—Acceptable Action

Safety Board Document: Aircraft Accident Report

Title: In-Flight Fire and Impact With Terrain, ValuJet Airlines, Flight 592, DC-9-32, N904VJ, Everglades, Near Miami, Florida, May 11, 1996

Report Number: NTSB/AAR-97/06

Date Recommendation(s) Issued: September 9, 1997

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

This report explains the in-flight fire and impact with terrain of ValuJet Airlines flight 592, a DC-9-32, N904VJ, in the Everglades near Miami, Florida, on May 11, 1996.

Fatigue-Related Conclusions:

The maintenance duty time limitations of 14 CFR Part 121.377 may not be consistent with the current state of scientific knowledge about factors contributing to fatigue among personnel working in safety-sensitive transportation jobs.

Fatigue-Related Recommendations Issued to the DOT:

Review the issue of personnel fatigue in aviation maintenance, then establish duty time limitations consistent with the current state of scientific knowledge for personnel who perform maintenance on air carrier aircraft. (A-97-71)

Recipient(s)	Status
Federal Aviation Administration	Open—Response Received

Safety Board Document: Safety Study (Highway)

Title: Fatigue, Alcohol, Other Drugs, and Medical Factors in Fatal-to-the-Driver Heavy Truck Crashes

Report Number: NTSB/SS-90/01 and NTSB/SS-90/02

Date Recommendation(s) Issued: April 4, 1990

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

This report is an analysis of human factors in fatal-to-the-driver, heavy truck accidents in eight States over a 1-year period, October 1, 1987, through September 30, 1988. Data presented are derived from in-depth investigation of 182 accidents that involved 186 heavy trucks and resulted in 207 fatalities. The accident investigations were conducted in California, Colorado, Georgia, Maryland, New Jersey, North Carolina, Tennessee, and Wisconsin. These accidents represent approximately 25 percent of this type of accident nationwide. Volume 1 (NTSB/SS-90/01) of the study includes an analysis of fatigue, alcohol, and other drug prevalence and medical factors in these accidents, presents findings, and makes recommendations to improve heavy truck safety. Volume 2 (NTSB/SS-90/02) contains the 182 case summaries that provided the data discussed in Volume 1.

Fatigue-Related Conclusions:

The most frequently cited accident probable cause or factor in fatal-to-the-driver heavy truck accidents was fatigue (57 cases or 31 percent), followed by alcohol and other drug impairment (53 cases or 29 percent). Of the 57 drivers who were fatigued, 19 were also impaired by alcohol and/or drugs.

Fatigue and fatigue-drug interactions were involved in more fatalities in this study than alcohol and other drugs of abuse.

Fatigue, drugs that are taken to counteract the symptoms of fatigue, drugs that aggravate fatigue, and the interaction of fatigue and drugs appear to be major factors in accident causation.

There is a strong association between violation of the Federal hours-of-service regulations and drug usage. More than half the drivers who had violated Federal hours-of-service regulations tested positive for some drug of abuse. The largest difference among these two groups of drivers appeared to occur with marijuana, which was the most prevalent drug of abuse among the drivers who were in excess of the Federal regulations. Greater use of amphetamines, cocaine, and alcohol by drivers who violated Federal hours-of-service regulations were also indicated.

Drug-free drivers appear more likely to have accidents during certain time periods (when there is increased exposure and at times when people tend to be less alert and in accordance with low periods in circadian rhythm) whereas drug-involved drivers appear to have accidents throughout the day.

Investigators found that logbooks were routinely falsified where they were required by regulation. It was common to find two sets of logbooks (three sets in one case) kept by the accident-involved drivers. In only one case was a vehicle equipped with a tachograph. Five case vehicles were equipped with on-board recorders.

Fatigue-Related Recommendations Issued to the DOT:

Conduct a detailed review of, and report on, trucking industry structure, operations, and conditions, especially shipping, dispatching, and receiving requirements, shipment broker operations, just-in-time shipments, and truckload/less-than-truckload operations which may create incentives for drivers to violate hours-of-service regulations and to use drugs of abuse. (H-90-10)

Recipient(s)	Status
Department of Transportation	Open—Acceptable Response

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Disseminate safety information to national, State, and local police agencies, public service and safety agencies, professional truckdriver groups and individual truckdrivers, regarding the effects of fatigue, alcohol, and other drug use; the interaction of alcohol, drugs, and fatigue; the prevalence of drug and alcohol abuse among professional commercial vehicle operators; and methods of minimizing conditions which lead to commercial vehicle operators driving while fatigued. (H-90-21)

Recipient(s)	Status
Federal Highway Administration	Closed—Acceptable Action

♦♦♦

Require automated/tamper-proof on-board recording devices such as tachographs or computerized logs to identify commercial truckdrivers who exceed hours-of-service regulations. (H-90-28)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action

♦♦♦

As part of the FHWA ongoing study on fatigue and loss of alertness among commercial vehicle operators, investigate the interactions of fatigue and drug usage. (H-90-29)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action

♦♦♦

Revise 49 CFR Parts 391 and 395 to establish driver hours-of-service violations, logbooks irregularities, or the presence of multiple logbooks as a reasonable cause requiring a drug test of the driver. Amend the regulations and provide notice to drivers of these revised regulations. (H-90-30)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action

♦♦♦

Amend 49 CFR Parts 392 and 395 to prohibit employers, shippers, receivers, brokers, or drivers form accepting and scheduling a shipment which would require that the driver exceed the hours-of-service regulations in order to meet the delivery deadline (similar to current regulations regarding schedules which would require the driver to exceed the speed limit [49 CFR 392.6]). In conjunction with the Interstate Commerce Commission, provide for operating certificate and financial penalties appropriate to the offense. (H-90-32)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action/Superseded

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Safety Board Document: Highway Accident Report

Title: Multiple Vehicle Collision and Fire in a Work Zone on Interstate Highway 79 Near Sutton , West Virginia, July 26, 1990.

Report Number: NTSB/HAR-91/01

Date Recommendation(s) Issued: June 20, 1991

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the multiple vehicle collision and fire in a work zone on interstate Highway 79 near Sutton, West Virginia, on July 26, 1990.

Fatigue-Related Conclusions:

The Double B truckdriver drove more than the 10 1/4 hours reported; therefore, it is unlikely that he spent 7 1/2 hours sleeping or resting in the truck's cab the morning before the accident.

Fatigue-induced inattention, exacerbated by an inadequate and unbalanced diet the day of the accident, caused the Double B truckdriver to fail to heed warning signs and to slow the truck in time to avoid the collision.

Fatigue-Related Recommendations Issued to the DOT:

Encourage the use of work zone safety devices and procedures, such as "rumble strips," that alert the various senses. (H-91-28)

Recipient(s)	Status
Federal Highway Administration	Closed—Acceptable Action

Safety Board Document: Highway Accident Report

Title: Greyhound Bus Run-Off-the-Road Accidents: Donegal, Pennsylvania, June 26, 1991; and Caroline, New York, August 3, 1991

Report Number: NTSB/HAR-92/01

Date Recommendation(s) Issued: April 1, 1992

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

On June 26, 1991, about 1:50 p.m., a greyhound bus traveling from Cleveland, Ohio, to Washington, D.C., ran off the right side of the roadway and overturned on the Pennsylvania turnpike near Donegal, Pennsylvania. One passenger was fatally injured, the driver and 14 passengers were injured, and 1 passenger was uninjured. On August 3, 1991, about 6:45 a.m., a greyhound bus traveling from New York City to Buffalo, New York, ran off the right side of the roadway, and overturned on State Route 79 near Caroline, New York. The driver and 33 passengers were injured, and 5 passengers were uninjured.

Fatigue-Related Conclusions:

The limited rest both busdrivers had received prior to the accident trips was one of several physiological factors that may have caused these busdrivers to be inattentive to their driving tasks.

Fatigue-Related Recommendations Issued to the DOT:

None

Safety Board Document: Highway Accident Report

Title: Tractor-Semitrailer Collision With Bridge Columns on Interstate 65, Evergreen, Alabama, May 19, 1993

Report Number: NTSB/HAR-94/02

Date Recommendation(s) Issued: May 4, 1994

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

On May 19, 1993, a tractor with bulk-cement-tank semitrailer was traveling southbound on Interstate 65 near Evergreen, Alabama, and collided with a supporting bridge column of the County Road 22 overpass. Two spans of the overpass collapsed onto the semitrailer and the southbound lanes of the Interstate. An automobile and a tractor-semitrailer then collided with the collapsed bridge spans. The cement-tank truckdriver was seriously injured; the drivers of the other vehicles were killed.

Fatigue-Related Conclusions:

The truckdriver exhibited a reduced alertness that is consistent with falling asleep.

Fatigue-Related Recommendations Issued to the DOT:

None

Safety Board Document: Safety Study (Highway)

Title: Factors That Affect Fatigue in Heavy Truck Accidents

Report Number: NTSB/SS-95/01 and NTSB/SS-95/02

Date Recommendation(s) Issued: February 7, 1995

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

Because of the significant number of heavy truck-related fatalities and the significant role of fatigue in such accidents, the Board initiated this study of single-vehicle heavy truck accidents to examine the role of specific factors, such as drivers' patterns of duty and sleep, in fatigue-related heavy truck accidents and to determine potential remedial actions. The purpose of the Board's study was to examine the factors that affect driver fatigue and not the statistical incidence of fatigue. The study analyzes data from 107 single-vehicle heavy truck accidents in which the driver survived. Volume 1 of the study contains the Board's analysis of the data and its conclusions and recommendations. Volume 2 of the study contains the summaries of the 107 accidents.

Fatigue-Related Conclusions:

The most critical factors in predicting fatigue-related accidents in the Board's sample are the duration of the most recent sleep period, the amount of sleep in the past 24 hours, and split sleep patterns.

Whereas sleep measures were the critical factors in discriminating between a fatigue-related and nonfatigue-related accident, schedule irregularity was the major factor in discriminating between a long-haul and a short-haul operation.

The truckdrivers in fatigue-related accidents in this sample obtained an average of 5.5 hours sleep in the last sleep period prior to the accident. This was 2.5 hours less than the drivers involved in nonfatigue-related accidents (8.0 hours).

The truckdrivers involved in fatigue-related accidents obtained 6.9 hours sleep in the 24 hours prior to the accident (the amount they reported usually needing to feel rested). This was 2.4 hours less sleep than the drivers involved in nonfatigue-related accidents (9.3 hours).

The hours-of-service regulations currently do not provide the opportunity to obtain an adequate amount of sleep (at least 8 continuous hours) because they do not consider time needed for travel, eating, personal hygiene, recreation, or inability to fall asleep immediately at the beginning of the 8-hour off-duty period.

Many of the truckdrivers in the accident sample who were involved in fatigue-related accidents did not recognize that they were in need of sleep and believed that they were rested when they were not. About 80 percent of the drivers involved in fatigue-related accidents rated the quality of their last sleep before the accident as good or excellent.

The data from this study indicate that driving at night with a sleep deficit is far more critical in terms of predicting fatigue-related accidents than simply nighttime driving.

Truckdrivers with split sleep patterns obtained 8 hours sleep in a 24-hour time period; however, they obtained it in small segments, on average of 4 hours at a time. The data and research indicate that sleep accumulated in short time blocks impedes the recovery of performance abilities.

The use of the sleeper berth exemption [now found in 49 CFR 395.1(h)] promotes split sleeping that can result in performance decrements earlier than for drivers who obtain sleep in longer continuous periods.

About 67 percent of the drivers with schedule irregularities were involved in fatigue-related accidents (48 of 73), and about 38 percent of drivers with regular schedules had fatigue-related accidents (13 of 34). Seventeen of the 107 drivers had inverted their duty/sleep periods on the accident trip; that is, the accident occurred at a time when on the previous day the driver had been sleeping. All but one of these drivers (94 percent) had a fatigue-related accident. Irregular and inverted schedules can result in longer hours awake than normal and can prevent drivers from obtaining adequate sleep without careful planning.

Twenty-seven of the 107 drivers exceeded the hours-of-service limits at least once in the 96 hours preceding the accident. Of those drivers who exceeded the limits, about 82 percent (22 of 27) had a fatigue-related accident. The obvious implication for drivers who exceed the hour-of-service limits is the fewer number of hours available to obtain adequate sleep.

Providing education to transportation employees about the factors affecting fatigue is a vitally important component of overall efforts to combat fatigue in transportation.

The results of this study suggest a possible link between the method of driver compensation and fatigue-related accidents—an issue that has not been previously addressed in detail.

Fatigue-Related Recommendations Issued to the DOT:

Complete rulemaking within 2 years to revise 49 CFR 395.1 to require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours. (H-95-1)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action/Superseded by H-99-19

♦♦♦

Complete rulemaking within 2 years to eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. (H-95-2)

Recipient(s)	Status
Federal Highway Administration	Closed—Unacceptable Action/Superseded by H-99-19

♦♦♦

Examine truckdriver pay compensation to determine if there is any effect on hours-of-service violations, accidents, or fatigue. (H-95-3)

Recipient(s)	Status
Federal Highway Administration	Open—Acceptable Response

♦♦♦

Complete rulemaking within 2 years to amend 49 CFR Parts 392 and 395 to prohibit employers, shippers, receivers, brokers, or drivers from accepting and scheduling a shipment which would require that the driver exceed the hours-of-service regulations in order to meet the delivery deadline (similar to current regulations regarding schedules which would require the driver to exceed the speed limit [49 CFR 392.61]. (H-95-4) (Supersedes H-90-32)

Recipient(s)	Status
Federal Highway Administration	Open—Unacceptable Response

♦♦♦

Develop and disseminate, in consultation with the U.S. Department of Transportation Human Factors Coordinating Committee, a training and education module to inform truckdrivers of the hazards of driving while fatigued. It should include information about the need for adequate amount of quality sleep, strategies for avoiding sleep loss such as strategic napping, consideration of the behavioral and physiological consequences of sleepiness, and an awareness that sleep can occur suddenly and without warning to all drivers regardless of their age or experience. (H-95-5)

Recipient(s)	Status
Federal Highway Administration	Closed—Acceptable Action

Safety Board Document:	Highway Accident Report
Title:	Propane Truck Collision with Bridge Column and Fire, White Plains, New York, July 27, 1994
Report Number:	NTSB/HAR-95/02

Date Recommendation(s) Issued: November 27, 1995

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

On July 27, 1994, a tractor cargo-tank semitrailer loaded with 9,200 gallons of propane (a liquefied petroleum gas) and traveling east on Interstate 287 in White Plains, New York, drifted across the left lane onto the left shoulder and struck the guardrail. The tank hit a column of the Grant Avenue overpass. The tractor and the semitrailer separated, and the front head of the tank fractured, releasing the propane, which vaporized into gas and ignited. The tank was propelled northward about 300 feet, landing on a frame house and engulfing it in flames. The driver was killed, 23 people were injured, and an area within a radius of approximately 400 feet was engulfed by fire.

Fatigue-Related Conclusions:

The driver chose to sacrifice his rest in order to complete his deliveries within his normal schedule. At the time of the accident, he had probably fallen asleep because he was suffering from acute fatigue.

The carrier's policy of paying by the load instead of by the hour appeared to encourage drivers to violate hours-of-service regulations.

The driver might have rested before trying to complete his last load had he been trained in understanding the effects of deficit sleep and irregular or inverted rest schedules.

The carrier's oversight of the driver's hours of service was inadequate.

Fatigue-Related Recommendations Issued to the DOT:

Cooperate with the American Association of Motor Vehicle Administrators and the American Trucking Associations to review and augment the commercial drivers license manual and test materials to include information on the role of fatigue in commercial vehicle accidents and methods to identify and address fatigue. (H-95-36)

Recipient(s)	Status
Federal Highway Administration	Open—Acceptable Response

Safety Board Document: Special Investigation Report (Highway)

Title: Selective Motorcoach Issues

Report Number: NTSB/SIR-99/01

Date Recommendation(s) Issued: February 26, 1999

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Not applicable

Abstract:

This report contains the findings of a special investigation conducted as a result of two fatal motorcoach accidents. In the first accident, on October 14, 1995, two passengers sustained fatal injuries, 13 sustained serious injuries, and 26 received minor injuries when a 1989 Eagle motorcoach operated by Hammond Yellow Coach Lines, Inc., overturned upon entering an Interstate 70 exit ramp in Indianapolis, Indiana. In the second accident, on July 29, 1997, 1 passenger sustained minor injuries, the driver and 3 passengers sustained serious injuries, and 28 passengers sustained minor injuries when a 1985 Transportation Manufacturing Corporation (TMC) motorcoach operated by Rite-Way Transportation, Inc., drifted off the side of Interstate 95 near Stoney Creek, Virginia, and down an embankment into the Nottoway River, where it came to rest on its left side, partially submerged in water.

Fatigue-Related Conclusions:

The Rite-Way busdriver fell asleep and ran off the road.

The Rite-Way driver became fatigued because the Pathways to Freedom tour schedule imposed inverted duty-sleep periods and because additional well-rested drivers were not provided for relief.

Although the exact cause of the Hammond driver's failing to respond appropriately cannot be determined, several factors, including fatiguing conditions and the driver's unfamiliarity with the route, may have contributed to his failing to slow down for the exit ramp.

Fatigue-Related Recommendations Issued to the DOT:

Require that the Federal Highway Administration's fatigue video that is being developed for motorcoaches discuss the dangers of inverted duty-sleep periods (H-99-4A)

Recipient(s)	Status
Department of Transportation	Open—Await Response

♦♦♦

In the assessment that is mandated by the Transportation Efficiency Act for the 21st Century, include the inverted work schedules of motorcoach carriers in the study of how the operations of shippers, brokers, freight forwarders, consignees, or others, such as tour or charter operators, encourage the violations of the hours-of-service rules (H-99-5)

Recipient(s)	Status
Department of Transportation	Open—Await Response

Safety Board Document: Marine Accident Report

Title: Grounding of the U.S. Tankship *Exxon Valdez* on Bligh Reef, Prince William Sound Near Valdez, Alaska, March 24, 1989

Report Number: NTSB/MAR-90/04

Date Recommendation(s) Issued: September 18, 1990

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the grounding of the U.S. tankship *Exxon Valdez* near Valdez, Alaska, on March 24, 1989.

Fatigue-Related Conclusions:

The performance of the third mate was deficient, probably because of fatigue, when he assumed supervision of the navigation watch from the master about 2350.

The third mate's failure to turn the vessel at the proper time and with sufficient rudder probably was the result of his excessive workload and fatigued condition, which caused him to lose awareness of the location of Bligh Reef.

There were no rested deck officers on the *Exxon Valdez* available to stand the navigation watch when the vessel departed from the Alyeska Terminal.

Many conditions conducive to producing crew fatigue on the *Exxon Valdez* exist on other Exxon Shipping Company vessels because many are three-mate vessels and because the company has pursued reduced manning procedures.

Exxon Shipping Company manning policies do not adequately consider the increase in workload caused by reduced manning.

The Exxon Shipping Company had incentives and work requirements that could be conducive to fatigue.

The Exxon Shipping Company had manipulated shipboard reporting of crew overtime information that was to be submitted to the U.S. Coast Guard for its assessments of workloads on some tankships.

The Coast Guard was unduly narrow in its perspective when it evaluated reduced manning requests for the *Exxon Valdez*; it based manning reductions primarily on the assumption that shipboard hardware and equipment might reduce the workload at sea but did not consider the heavier workload associated with cargo operations in port and the frequency of such operations.

Fatigue-Related Recommendations Issued to the DOT:

Develop a means for rigorous enforcement of 46 U.S.C. 8104(a) to ensure that officers on watch during departures from ports have had at least 6 hours of off-duty time in the previous 12 hours. (M-90-32)

Recipient(s)	Status
U.S. Coast Guard	Closed—Unacceptable Action

♦♦♦

Increase the manning level at the Marine Safety Office, Valdez, Alaska, to provide the following: enough watchstanders to plot all participating vessels between the pilot station south of Bligh Reef and their berths in Port Valdez; an officer-in-charge of the Vessel Traffic System who will have time to manage and supervise the system effectively; and sufficient additional officers to staff a duty officer watch with officers capable of monitoring and supervising vessel traffic watchstanders outside normal working hours. (M-90-37)

Recipient(s)	Status
U.S. Coast Guard	Closed—Acceptable Action

Safety Board Document:	Marine Accident Report
Title:	Sinking of the U.S. Tug *Barcona* by the U.S. Navy Nuclear Attack Submarine *USS HOUSTON* (SNN713), San Pedro Channel Near Santa Catalina Island, California, June 14, 1989
Report Number:	NTSB/MAR-90/05
Date Recommendation(s) Issued:	October 20, 1990
Fatigue Cited as a Cause of or Contributing Factor to the Accident:	No

Abstract:

This report explains the sinking of the U.S. tug *Barcona* by the U.S. Navy nuclear attack submarine *USS Houston* (SSN 713) in San Pedro Channel near Santa Catalina Island, California, on June 14, 1989.

Fatigue-Related Conclusions:

The *Houston*'s officer of the deck was fatigued when he assumed the navigation watch prior to this accident.

The fatigued condition of the *Houston*'s officer of the deck did not contribute to the failure of the navigation watch to detect the presence of the *Barcona* and its tow before the submarine reached periscope depth.

Current U.S. Navy operational instructions are not adequate to ensure that officers of the deck are sufficiently rested when they assume underway watches.

Fatigue-Related Recommendations Issued to the DOT:

None

Safety Board Document:	Marine Accident Report
Title:	Grounding of Liberian Passenger Ship *Star Princess* on Poundstone Rock, Lynn Canal, Alaska, June 23, 1995
Report Number:	NTSB/MAR-97/02
Date Recommendation(s) Issued:	June 26, 1997
Fatigue Cited as a Cause of or Contributing Factor to the Accident:	Yes

Abstract:

On June 23, 1995 the passenger vessel *Star Princess*, traveling from Skagway to Juneau, Alaska, grounded on Poundstone Rock, Lynn Canal, about 21 miles northwest of Juneau. The vessel's bottom sustained significant damage. No injuries or death resulted from this accident. The total cost resulting from required repairs and delay before the vessel could return to service was estimated at $27.16 million.

Fatigue-Related Conclusions:

The pilot was chronically fatigued as a result of obstructive sleep apnea.

Fatigue may have reduced the pilot's ability to appropriately assess and respond to the developing situation.

Fatigue-Related Recommendations Issued to the DOT:

Advise pilots about the effect of fatigue on performance and about sleeping disorders such as sleep apnea. (M-97-41)

Recipient(s)	Status
U.S. Coast Guard	Closed—Acceptable Action

♦♦♦

Review, in consultation with experts in occupational health, your medical standards, guidelines, and examination forms to ensure that they require the disclosure and appropriate evaluation of the history of presence of any medical conditions, symptoms, or medication use that would affect an individual's fitness to pilot a vessel. (M-97-42)

Recipient(s)	Status
U.S. Coast Guard	Open—Acceptable Response

Safety Board Document: Pipeline Accident Report

Title: Pipeline Rupture and Release of Fuel Oil Into the Reedy River at Fork Shoals, South Carolina, June 26, 1996

Report Number: NTSB/PAR-98/01

Date Recommendation(s) Issued: November 18, 1998

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

About 11:54 p.m. eastern daylight time on June 16, 1996, a 36-inch-diameter Colonial Pipeline Company pipeline ruptured where a corroded section of the pipeline crossed the Reedy River at Fork Shoals, South Carolina. The rupture pipeline released about 957,600 gallons of fuel oil into the Reedy River and surrounding areas. The estimated cost to Colonial for cleanup and settlement with the State of South Carolina was $20.5 million. No one was injured in the accident.

Fatigue-Related Conclusions:

Fatigue resulting from the relief controller's inverted work schedule may have affected his alertness, vigilance, and responsiveness during the accident sequence.

Fatigue-Related Recommendations Issued to the DOT:

Assess the potential safety risks associated with rotating pipeline controller shifts and establish industry guidelines for the development and implementation of pipeline controller work schedules that reduce the likelihood of accidents attributable to controller fatigue. (P-98-30)

Recipient(s)	Status
Research and Special Programs Administration	Open—Await Response

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Safety Board Document: Railroad Accident Report

Title: Atchison, Topeka and Santa Fe Railway Company (ATSF) Freight Trains ATSF 818 and ATSF 891 on the ATSF Railway Corona, California, November 7, 1990

Report Number: NTSB/RAR-91/03

Date Recommendation(s) Issued: August 23, 1991

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the collision between two Atchison, Topeka and Santa Fe Railway freight trains in Corona, California, on November 7, 1990.

Fatigue-Related Conclusions:

The engineer of train 818 failed to stop his train on the Corona siding at the stop signal because he was asleep or in a microsleep brought about by chronic and acute fatigue.

The chronic and acute fatigue of the engineer of train 818 was a result of the irregularity and unpredictability of his work schedule.

Because of fatigue the conductor of train 818 either was asleep or experienced a microsleep as his train approached the stop signal on the west end of the Corona siding.

The brakeman of train 818 failed to take action to stop the train probably because she fell asleep as a result of fatigue.

The Atchison, Topeka and Santa Fe Railway Company did not have a policy or procedure in place to address the issue of an employee notifying the carrier of his or her lack of sufficient sleep.

Fatigue-Related Recommendations Issued to the DOT:

None

Safety Board Document:	Railroad Accident Report
Title:	Collision and Derailment of Norfolk Southern Train 188 With Norfolk Southern Train G-38 at Sugar Valley, Georgia, August 9, 1990
Report Number:	NTSB/RAR-91/02
Date Recommendation(s) Issued:	September 16, 1992
Fatigue Cited as a Cause of or Contributing Factor to the Accident:	Yes

Abstract:

This report explains the 1990 collision of two Norfolk Southern freight trains near Sugar Valley, Georgia.

Fatigue-Related Conclusions:

The engineer of train 188 had changed his work and rest routine just before the accident.

The engineer's failure to bring the train to a stop at the signal probably was caused by a microsleep or inattention due to distraction.

The conductor of train 188 was either distracted or fell asleep sometime after verifying the signal status at CP Davis.

The engineer of train 188 could have canceled the alerter system while he was asleep by a simple reflex action that he performed without conscious thought.

Fatigue-Related Recommendations Issued to the DOT:

In conjunction with the study of fatigue of train crewmembers, explore the parameters of an optimum alerter system for locomotives. (R-91-26)

Recipient(s)	Status
Federal Railroad Administration	Closed—Unacceptable Action

Safety Board Document: Railroad Accident Report

Title: Collision Involving Two New York City Subway Trains on the Williamsburg Bridge in Brooklyn, New York, June 5, 1995

Report Number: NTSB/RAR-96/03

Date Recommendation(s) Issued: September 11, 1996

Fatigue Cited as a Cause of or Contributing Factor to the Accident: Yes

Abstract:

This report explains the collision of two New York City Transit subway trains on the Williamsburg Bridge in Brooklyn, New York, on June 5, 1995. One person was killed and 69 people were treated at area hospitals for minor injuries sustained in this accident. The total estimated damages exceeded $2.3 million.

Fatigue-Related Conclusions:

The J train operator failed to take action to stop his train on the Williamsburg Bridge because he was asleep.

Fatigue-Related Recommendations Issued to the DOT:

In cooperation with the American Public Transit Association, develop a fatigue educational awareness program and distribute it to transit agencies to use in their fitness-for-duty training for supervisors and employees involved in safety-sensitive positions. (R-96-20)

Recipient(s)	Status
Federal Transit Administration	Closed—Acceptable Action

Safety Board Document: Special Investigation Report (Railroad)

Title: Steam Locomotive Firebox Explosion on the Gettysburg Railroad near Gardners, Pennsylvania, June 16, 1995

Report Number: NTSB/SIR-96/05

Date Recommendation(s) Issued: November 26, 1996

Fatigue Cited as a Cause of or Contributing Factor to the Accident: No

Abstract:

On June 16, 1995 the firebox crownsheet of Gettysburg Passenger Services, Inc., steam locomotive 12378 failed while the locomotive was pulling a six-car excursion train about 15 mph near Gardners, Pennsylvania. The failure resulted in an instantaneous release (explosion) of steam through the firebox door and into the locomotive cab, seriously burning the engineer and the two firemen. This accident illustrates the hazards that are always present in the operation of steam locomotives.

Fatigue-Related Conclusions:

Gettysburg Passenger Services, Inc., management was not aware of the Hours of Service Act.

Fatigue-Related Recommendations Issued to the DOT:

In cooperation with the Tourist Railway Association, Inc., promote awareness of and compliance with the Hours of Service Act. (R-96-56)

Recipient(s)	Status
Federal Railroad Administration	Open—Acceptable Response

Appendix C

Summary of Sleep and Circadian Rhythms

The summary in this appendix is an excerpt from information prepared by Dr. Mark Rosekind in April 1999 for the National Transportation Safety Board. The summary was adapted from material included in the Safety Board's report on its investigation of a 1993 aircraft accident. (Rosekind, Mark R. [NASA Ames Research Center]; Gregory, Kevin B. [Sterling Software]; Miller, Donna L. [Sterling Software]; and others. 1994. "Analysis of Crew Fatigue Factors in ATA Guantanamo Bay Aviation Accident." In: *Uncontrolled Collision With Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station in Guantanamo Bay, Cuba, August 18, 1993.* Aircraft Accident Report NTSB/AAR-94/04. Washington, DC: National Transportation Safety Board. pp. 133–144.)

Fatigue in Transportation: Physiological, Performance, and Safety Issues[1]

Mark R. Rosekind
Alertness Solutions
April 1999

Introduction

Maintaining safe transportation operations is a complex task. The undertaking must address a range of issues from the functioning of large systems to the individual human operator. For the foreseeable future, the human operator (pilot, driver, maintenance person, etc.), remains central to safe, efficient, and reliable transportation activities. Therefore, the importance of addressing human-related error, which accounts for at least 70% of transportation accidents, remains critical to maintaining and improving safety (Ref 1).

Fatigue, sleep loss, and circadian disruption created by transportation operations can degrade performance, alertness and safety. An extensive scientific literature exists that provides important physiological information about the human operator, which can be used to guide operations and policy. For example, there are human physiological requirements for sleep, predictable effects of sleep loss on performance and alertness, and patterns for recovery from sleep loss. Additionally, the circadian clock is a powerful modulator of human performance and alertness, and in transportation operations, it can be disrupted by night work, time zone changes, and day/night duty shifts. Scientific examination of these physiological considerations has documented a direct relationship to errors, accidents, and safety. This scientific information can provide important input to policy and regulatory considerations.

Managing fatigue in the complex and diverse transportation environment requires an integrated and multi-component approach. The complexity and diversity of operational requirements preclude a simple solution, and managing fatigue will benefit from addressing education, hours of service, strategies, technology, design, and research. The transportation industry has established a strong safety record by identifying and proactively addressing both substantiated and potential risks. Effectively managing fatigue in transportation operations offers the opportunity to further reduce risks and improve safety.

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[1]Adapted from the following references: (a) Rosekind MR, Gregory KB, Miller DL, Co EL, and Lebacqz JV. "Analysis of crew fatigue factors in AIA Guantanamo Bay Aviation Accident." *Uncontrolled Collision With Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station in Guantanamo Bay, Cuba, August 18, 1993.* Aircraft Accident Report NTSB/AAR-94/04. Washington, DC: National Transportation Safety Board, 1994. (b) Rosekind, MR, Neri, DF, and Dinges, DF. (1997). "From laboratory to flightdeck: Promoting operational alertness." *Fatigue and Duty Time Limitations—An International Review: Proceedings of the Royal Aeronautical Society, London, UK, 16 September 1997.*

This overview provides an introduction to the scientific foundation that exists regarding the physiology of and performance related to fatigue in transportation. It also examines the human physiological requirement for sleep and the functioning of the circadian clock.

The Biological Imperative: Human Sleep Need and the Circadian Clock

Human Sleep Requirements

Sleep is a vital physiological function. Historically, sleep has been viewed as a state when the human organism is turned off. However, scientific findings have clearly established that sleep is a complex, active physiological state that comprises different stages. On average, most people physiologically require about 8 hrs of sleep per night. When provided adequate time to sleep, humans can average about 8.25 to 8.5 hrs of physiological sleep (Refs 2,3). Laboratory studies use physiological measures (i.e., brain, eye, and muscle activity) of sleep quantity and quality and daytime sleepiness to determine the number of hours of sleep that provide an optimal level of waking alertness (Refs 4–6). It is important to distinguish this physiologically determined sleep requirement from both habitual and reported sleep amounts. Some studies have examined the reported amount of habitual sleep over time and other studies have collected one-time surveys inquiring about average sleep amounts. Overall, most adults report an average of about 7–7.5 hrs sleep per night (Ref 7). However, data obtained in controlled laboratory settings challenge whether this "reported" amount of sleep is sufficient for optimal levels of waking alertness. Studies have demonstrated that extending sleep beyond the reported 7–7.5 hrs of "usual" sleep significantly increases daytime alertness (Refs 3,8). The National Sleep Foundation commissioned a Gallop survey examining the report of daytime sleepiness in a random sample of 1,001 individuals. The findings demonstrated that 75% reported daytime sleepiness, with 32% of these reporting severe levels. Thirty-two percent reported that their sleepiness interfered with activities and 82% of the respondents believe that daytime sleepiness has a negative effect on their productivity (Ref 9).

These amounts are averages and there are individuals at both extremes of short and long sleep requirements. These sleep requirements change significantly with age (Ref 10). Younger individuals require more total sleep and this amount decreases to that needed by adults (although it is not the case that older people need less sleep than other adults). Sleep structure also changes with age (e.g., less deep sleep, more awakenings in older adults). In summary, humans physiologically require about 8 hrs of sleep, though they report usual sleep amounts of about 7–7.5 hrs. A majority of the adult population report daytime sleepiness, and when sleep is extended, there is a significant increase in alertness.

Effects of Sleep Loss

Sleep loss is common and can be acute or cumulative. In an acute situation, sleep loss can occur either totally or as a partial loss. Total sleep loss involves a completely missed sleep opportunity and continuous wakefulness for about 24 hrs or longer. Partial sleep loss occurs when sleep is obtained within a 24-hr period but in an amount that is reduced from the physiologically required amount or habitual total. Sleep loss also can

accumulate over time into a "sleep debt." For example, an individual who requires 8 hours of sleep and obtains only 6 hours is essentially sleep deprived by 2 hours. If the individual sleeps only 6 hours over 4 consecutive nights, then the 2-hour-per-night sleep loss would accumulate into an 8 hour sleep debt. Sleep loss, whether total or partial acute or cumulative, results in significantly degraded performance, alertness, and mood (Refs 7, 11–21).

The reduced human performance capability that results from total sleep loss is well documented (Refs 11–18). However, perhaps the most common occurrences in transportation operations are acute partial sleep loss and accumulation of a sleep debt. A review of the relevant scientific literature indicates that as little as two hours of sleep loss on just one occurrence can result in "impairment of performance and levels of alertness" (Ref 7). Therefore, an average individual with a physiological requirement of 8 hours sleep who obtains only 6 hrs of sleep may demonstrate significantly degraded waking performance and alertness. Cumulative sleep debt also significantly reduces alertness and performance (Refs 19–21). Studies have demonstrated that not only does the sleep loss accumulate but that the negative effects on waking performance and alertness also are cumulative and increase over time (Ref 20).

Performance decrements due to sleep loss can occur across diverse functions. For example, studies have demonstrated slowed reaction time, reduced vigilance, cognitive slowing, memory problems, time-on-task decrements, and optimum response decrements (e.g., Refs 13,14,16,18). Performance variability also increases with sleep loss. Therefore, overall performance can be significantly reduced with an increased variability or unevenness in responding (Ref 16). Consider that these findings occur in some of the simplest performance challenges, such as reaction time to a single stimulus or minimal choice memory task. These basic psychomotor and cognitive functions are the foundation for any task requiring complex, higher-order performance.

An important phenomenon, highly relevant to operational environments, is that there is a discrepancy between the subjective report of sleepiness/alertness and physiological measures. In general, individuals will report higher levels of alertness than indicated by physiological measures (Refs 22–24). Data from an international study of flight crews had an example where the highest subjective rating of alertness occurred at a time when physiologically the individual was falling asleep within 6 minutes (an indicator of severe sleepiness) (Ref 22). Likewise, subjective and physiological self-assessment of performance can differ significantly. The operational relevance of this phenomenon is clear. For example, an individual might report a low level of sleepiness or fatigue but could be carrying an accumulated sleep debt with a high level of associated physiological sleepiness. This individual, in an environment stripped of factors that conceal the underlying physiological sleepiness, would be susceptible to the occurrence of spontaneous, uncontrolled sleep episodes and to the performance decrements associated with sleep loss.

Recovery from Sleep Loss

When determining requirements for providing a recovery opportunity from sleep loss, two factors should be considered. First, when does the internal sleep architecture return to usual levels? Second, when do waking performance and alertness levels return to

their baseline? After sleep loss, recovery is not accomplished through an hour-for-hour restitution. Even after extremely prolonged wakefulness, initial recovery sleep may last only 12–15 hrs (Ref 25). Rather, recovery is accomplished through an increase in deep sleep (Non-Rapid-Eye-Movement or NREM slow wave sleep) observed starting on the first night of regular sleep (Refs 26–28). Generally, two nights of recovery sleep (slightly longer than an average night's sleep) are needed to resume a normal baseline sleep pattern (Refs 26,29), though this can be dependent on the duration of the continuous wakefulness. Also, typically, two nights of recovery sleep are needed to return to a normal baseline of waking performance and alertness (Refs 20,30), though this too can be dependent on the length of prior wakefulness (e.g., Ref 3).

The Circadian Clock

Besides sleep, the other major physiologic determinant of waking performance and alertness is the internal circadian clock (Refs 31–33). Circadian (*circa* = around, *dies* = day) rhythms fluctuate on a 24-hr cycle with peaks and troughs occurring in a regular pattern. These patterns are controlled by a circadian pacemaker located in the suprachiasmatic nucleus (SCN) in the brain. The SCN is the circadian timekeeper for a wide range of human functions. One of the most prominent is the 24-hr sleep/wake cycle programmed for a daytime period of consolidated wakefulness and a nighttime period of consolidated sleep. There are circadian patterns for cognitive and psychomotor performance, physiological activity (e.g., digestion, immune function, thermoregulation, DNA synthesis), alertness, and mood (Refs 34–38). Even birth and death have circadian patterns that peak during the night (see Ref 31).

Body temperature is often used as a marker of the internal circadian clock (sometimes referred to as the "hands of the clock"). The trough or low point of the clock is around 3 am to 5 am, with many functions demonstrating reduced levels from 12 am to 6 am. The lowest level of function (e.g., alertness, performance, subjective mood, temperature) occur within the 3 am to 5 am trough. Sleepiness has bimodal distribution (i.e., two peaks and two troughs each day), being most severe at 3 am to 5 am with a less marked but significant expression between roughly 3 pm to 5 pm. This afternoon increase in sleepiness occurs whether or not a meal has been consumed, though the meal may exacerbate the underlying sleepiness (Ref 39).

Zeitgebers ("time givers") are cues that synchronize circadian rhythms to their 24-hr pattern. To date, light has been demonstrated to be among the most powerful zeitgebers to synchronize the circadian pacemaker. Bright light can dramatically shift the phase of the human circadian clock when applied at responsive times in the 24-hr cycle (Refs 40–42). Without cues, the intrinsic rhythm of the clock is longer than 24 hrs. Generally, data have demonstrated a free-running pattern approximating 24.9 hrs, though recent findings suggest this may be closer to 24.2 hrs (Refs 31–33,43). An intrinsic period longer than 24 hrs provides an inherent tendency to support circadian delays (e.g., staying awake longer) and to oppose advances (e.g., trying to go to sleep earlier).

Moving to a new light/dark schedule, such as a shift to nightwork or a time zone change, can create internal and external desynchronization. These involve an internal

desynchrony among circadian rhythms and a discrepancy between internal circadian timing and external/environmental cues, respectively. The internal clock can take from several days to weeks for adjustment or, in some circumstances, not fully resynchronize at all. Scientific studies have demonstrated these findings in the laboratory and in field studies conducted during actual transportation operations (e.g., Refs 31–33, 44–54).

[Additional discussion is not included in this appendix.]

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Appendix D

Summaries of Fatigue Symposium Working Groups, 1995

The working group summaries in this appendix are reprinted from the proceedings of the 1995 multimodal symposium on fatigue in transportation. (National Transportation Safety Board and NASA Ames Research Center. 1996. *Fatigue Symposium Proceedings, November 1–2, 1995*. Washington, DC: National Transportation Safety Board. pp. 91–105.

THE AVIATION WORKING GROUP #1

Moderator Dr. Barry Strauch, National Transportation Safety Board
Analyst Dr. Ben Berman, National Transportation Safety Board

Technical Representatives
Mr. Bob MacIntosh, National Transportation Safety Board
Mr. David Schroeder, Federal Aviation Administration

Hours of Service and Scheduling

The group expressed the view that, because of the criticality of scheduling on human fatigue and alertness, that duty time limits should be upgraded for flightcrew members and established for flight attendants, as well as address issues of circadian rhythms and human performance. All proposed rule changes should be based on the results of scientifically sound sleep research. In addition, it was suggested that rules be promulgated to establish controlled rest during long-haul flight operations.

Nevertheless, concerns were raised that revised flight and duty time rules not be so rigid as to create their own safety hazards. For example, an issue in the Tenerife ground collision between KLM and Pan American Boeing 747s was the inflexible flight and duty time restriction the KLM flightcrew faced at the end of the scheduled flight to Amsterdam. One suggestion was to pattern rules after the advanced qualification program (AQP), which provide airlines considerable flexibility to tailor pilot training to their own needs and circumstances, while maintaining a high degree of FAA oversight. Finally, some attendees expressed concern that proposed rules not place United States aviation interests in the global economy in jeopardy against those of nations that have less restrictive rules and regulations in place.

Personal and Technological Countermeasures

Many innovative proposals were offered during the session. For example, one attendee suggested that airlines and flightcrews work together to obtain "circadian friendly" hotel rooms in which quiet corridors would be maintained, blackout curtains hung in the rooms, and other measures implemented to enhance rest during those periods when most people are active. An additional proposal called for using FOQA (flight operations quality assurance) data to match pilot performance against flight schedule and other data that have been associated with fatigue. Also, expert systems could be used that, with existing data on sleep, help pilots bid schedules, and airlines employ pilot bids, that could minimize the emergence of fatigue during subsequent flight operations. Similarly, a proposal was offered to employ automatic devices in cockpits that would alert crewmembers or require crewmember responses during a flight, to assure that pilots would remain alert during a long flight.

Education and Training

Attendees suggested that education for all personnel was critical to the effectiveness of countermeasures. Further, the group believed that successful countermeasures against fatigue require the active participation of all corporate levels, execute/managerial as well as those directly involved in flight operations. Attendees expressed the view that, following the conclusion of the conferences, the NTSB and NASA inform airline executives directly of the results of the Symposium to help obtain their cooperation in reducing the effects of fatigue at their airline. In addition, basic guidelines should be provided to airlines to assist their management in implementing fatigue countermeasures program at their airline.

Some attendees, representing general aviation interests, also raised the issue of educating general aviation pilots and corporate aviation departments in the need for effective fatigue countermeasures.

SUMMARY VIEWGRAPH

Scheduling

- Upgrade Flight/Duty/Rest (F/D/R) rules
- Regulate, not negotiate, F/D/R rules
- Apply science to F/D/R rules
- Finalize rule on F/D/R
- Avoid rigidity in F/D/R rules
- Level the F/D/R playing field world wide

Countermeasures

- Sleeping quarters at duty site and "circadian-friendly" hotel rooms
- Correlate flight data recorder readouts with crew fatigue factors
- Expert systems to help managers design crew schedules and help pilots bid schedules
- Educate top managers
- Cockpit crew alertness monitoring devices

Education

- Educate personal countermeasures, and educate the family
- Big and small airlines need basic guidelines
- Top-level buy-in is essential
- Integrate personal and company countermeasures
- Don't forget general aviation

THE AVIATION WORKING GROUP #2

Moderator Mr. Jim Danaher, National Transportation Safety Board
Analyst Dr. Malcolm Brenner, National Transportation Safety Board

Technical Representatives
Mr. Bob Benzon, National Transportation Safety Board
Mr. Ronald Simmons, Federal Aviation Administration

Hours of Service and Scheduling

The Aviation Group 2 felt that government regulation of flight and duty time standards was the starting point and foundation for all activities at controlling fatigue in operations. These regulations set the minimum standards for operations beyond which personal and company countermeasures can be applied. The group felt that it was important that the regulations provided core guidelines but also captured important differences in the industry, especially, for example, by providing special provisions applicable to overnight operations. The group felt that "rest" should be defined more operationally than the present definition as the number of hours off-duty. That is, "off duty" time rarely equals "rest" time. It is necessary to allow time for commuting, personal hygiene, and sustenance. Fatigue issues should be addressed more actively in accident and incident reports by the NTSB and the FAA. Fatigue should be assumed to be present until the investigation can rule it out.

Personal and Technological Countermeasures

The group felt that technology was a support, but not a substitute for personal management. Industry and individuals both have responsibilities for minimizing fatigue in operations. Industry can help by developing procedures so pilots can report themselves "too fatigued" to work without punishment, and by providing rest accommodations for quality sleep without noise interruptions. Employees can help by arriving at work rested, arranging their commutes from home and activities during the off-duty time so they are properly rested. When technology is developed, it should not be used to erode other existing or future fatigue countermeasures based on scheduling or personal management.

Education and Training

The group felt that there should be a clearing house to collect and make available successful training materials on fatigue developed by different transportation modes, different disciplines, and different nations. Education is the

most basic countermeasure for fatigue. It should be provided to managers, schedulers, and the general public to change attitudes and recognize the importance of fatigue. Pocket checklists, and checklists integrated into normal operations should address fatigue issues in heightening awareness of the fatigue-producing aspects of duty periods and in judging personal fitness for flight. ASRS reporting forms should enhance their reporting of fatigue, and NTSB/FAA investigations should enhance their monitoring of fatigue issues. Fatigue should be examined on the part of pilots, air traffic controllers, mechanics, and all other personnel in the operational system.

SUMMARY VIEWGRAPH

Scheduling

- Overnight flying - special regulations
- Address fatigue in mishaps
- Government regulation essential
- Define "rest" more operationally

Countermeasures

- Technology supportive of personal management
- Industry support of individual management and decisionmaking - industry support systems and "too fatigued"
- De-link technology and punitive actions
- Balance between industry/individual responsibility - commutes, rest accommodations, and rest periods

Education

- Intermodal, international, interdisciplinary training clearinghouse
- Mangers, schedulers, and the public need education
- Fatigue-related work schedule guidelines
- Enhance ASRS, NTSB, and FAA monitoring of fatigue

THE RAIL WORKING GROUP

Moderator Mr. Bruce A. Magladry, National Transportation Safety Board
Analyst Mr. David Mayer, National Transportation Safety Board
Technical Representatives
Mr. Robert Lauby, National Transportation Safety Board
Mr. Garold Thomas, Federal Railroad Administration

Hours of Service and Scheduling

The lack of schedule predictability and regularity were identified by the group as the number one fatigue producing problems for both train crews and management. For, without timely, accurate schedule information, railroad employees cannot effectively manage their off-duty time to minimize fatigue. The scheduling difficulties that give rise to unpredictability and irregularity are derived from several interrelated, but often conflicting demands that the railroads themselves cannot fully control. Factors that impact scheduling include: equipment breakdowns, emergencies, and power failures, imbalances in the direction of traffic flow, and the demands of customers who have increasing moved to just-in-time pick-up and delivery. Pool dispatch, extra board scheduling, and deadheading of crews also contribute to the problem.

Exacerbating scheduling difficulties is the Hours of Service (HOS) Act developed in 1907. It was not based on science and does not necessarily permit sufficient' continuous sleep periods. nor does it incorporate modem knowledge of circadian rhythms. Historically, it has also promoted an adversarial relationship between labor and management. The group felt it no longer works well. In a spirit of cooperation, government, management and labor should seek innovative and flexible schedule solutions and HOS reforms through pilot projects. However, as a basic tenet of railroad operations, the HOS should not be changed without a firm scientific basis and careful review by all the affected parties.

Personal and Technological Countermeasures

Currently employed fatigue countermeasures are not adequate. Alerters, for example, can be complied with while an employee is severely fatigued. Some existing crew quarters, intended to facilitate rest away from home, are not adequate for daytime sleeping because of noise or lighting or even maid service. Another countermeasure, albeit an unauthorized one, napping, can actually bring on disciplinary action. Nevertheless, there are times when it could be safely and effectively used to reduce fatigue and improve alertness. The group felt appropriate napping should be legitimized.

Group members felt some conditions and procedures seemed to induce fatigue, like poor locomotive cab environments and boring tasks. It was suggested crew input could improve both cab and task design. It was also suggested that various communications equipment and methods should be explored to give employees the

most up to date and valid line-up information so that they plan their sleep accordingly in order to report to work well rested. However, when significant line-up changes occur and an employee is called to duty early without having slept, there should be a mechanism to allow him to mark off without penalty. To do otherwise, may force a fatigued employee to work and create a danger to himself, his railroad and the public.

Fitness for duty testing was also addressed. It was felt that current tests are not yet valid and reliable, and that they miss the point anyway. Efforts should be directed toward developing schedules and working conditions that prevent fatigued employees rather than keeping the current conditions in place and trying to detect fatigued employees. Finally, responsibility for developing and promoting effective countermeasures was believed to belong to all affected parties.

Education and Training

Addressing fatigue through education and training was deemed essential and was considered a win-win proposition for labor and management, improving safety and productivity for each. The group felt that employees should receive training about sleep, sleep disorders, sleep strategies, and fatigue countermeasures. Both labor and management employees should receive the training in order to provide a common understanding of the issue. The training should be based on science with practical solutions, but should not ignore the important components of personal responsibility and behavioral change. Follow-up and feedback were also considered essential to determine efficacy and to reinvigorate individual efforts.

Several railroads already have fatigue education programs in place. The group acknowledged the value of such programs if they do not stand alone. They should be part of a multifaceted approach designed to manage fatigue and promote alertness. Training must accompany other efforts from labor and management to alter operations to facilitate individual employee actions to alleviate fatigue. Thought should also be given for protection of the jobs of employees who come forward after recognizing they have a sleep disorder.

SUMMARY VIEWGRAPH

Scheduling

- Schedule predictability and regularity
- Hours of service flexibility; Minimize deadheading and overnights
- Hours of service provisions based on science and modem demands
- Railroads should conduct hours of service pilot projects
- Enhanced trust to promote innovative thinking

Countermeasures

What is needed:

- Crew quarters suited for sleep
- Crewmembers should be able to mark off when fatigued without penalty
- Tasks that minimize boredom

- Legitimize sensible crew napping
- Fitness for duty testing – not yet valid or reliable and misses the point
- Improved cab design using input from locomotive crews

Education

- Addressing fatigue is a win-win situation
- Education and training is essential - not a stand alone component
- All labor and management should receive training
- Training must be based on science with practical solutions
- Follow-up and feedback are essential
- Job protection for those who seek treatment

THE HIGHWAY WORKING GROUP

Moderator Dr. Vern Ellingstad, National Transportation Safety Board
Analyst Ms. Elaine Weinstein, National Transportation Safety Board

Technical Representatives
Mr. Joe Osterman, National Transportation Safety Board
Mr. Ron Knipling, National Highway Traffic Safety Administration
Ms. Deborah Freund, Federal Highway Administration

Hours of Service and Scheduling

There is more than enough research today to begin to effect changes in the scheduling practices of the trucking industry. The hours-of-service regulations are 50 years old and need to be changed. They do not fit with the circadian clock. The trucking industry is behind other modes in making changes to the hours-of-service regulations and scheduling practices based upon current research knowledge. The industry can initiate changes separately from federal regulation. The changes cannot be done in a vaccuum and need to consider employee, shipper and customer needs. There is also a need to address the problem across the industry and consider the differences between large and small companies. Some of the implications for public policy include the shortage of parking and driver safety at rest stops.

The solutions include regulatory and performanced-based measures.

- Revise the hours-of-service regulations
- Increase the number of driver rest areas
- Consider large versus small companies
- Develop performance-based measures

Personal and Technological Countermeasures

Personal and technological countermeasures should be explored and implemented on parallel tracks. Technology includes fitness-for-duty and alerting methods. Fitness-for-duty technologies are about three years away; alerting method technologies are five-ten years away. Personal countermeasures include napping, education, and medical fitness. They can be implemented immediately.

New technologies must be cost effective, show a safety benefit, and maintain the current level of productiveness. There was some concern expressed that fitness-for-duty detection would give drivers a false sense of security and they would thus be more likely to drive drowsy. Consideration to inter-individual differences needs to be considered along with how the fitness-for-duty testing device would be used. Is it for the driver, the employer, or the regulator? There was agreement that there should be penalties for failing a fitness-for-duty test.

Education and Training

Society needs to undergo major attitudinal changes towards driving when fatigued, similar to that experienced with drunk driving. Some promising efforts have been made in the area of education, such as the Wake UP brochure developed by the AAA Foundation and the American Trucking Associations. There is a need to evaluate the effectiveness of these educational materials to determine if they actually change behavior.

Training for management and drivers is not widespread. ATA Safety Management Council is developing a best practices manual to help educate drivers on how to prepare for work.

- Enforcement training is needed for inspectors and police officers.

SUMMARY VIEWGRAPH

Scheduling

- Revise hours of service regulations
- Increase driver rest areas
- Consider small vs. large companies
- Also performance based measures

Countermeasures

- Technology – there is none – it is five-ten years away
- Personal - napping, medical screening, adequate sleep

Education

- Major cultural change toward fatigue needed – like drunk driving
- Promising efforts toward general education have been made
- Specific training for drivers and management have been less widespread
- Enforcement training is needed

THE MARINE WORKING GROUP

Moderator Dr. Gerald D. Weeks, National Transportation Safety Board
Analyst Dr. Meg Sweeney, National Transportation Safety Board
Technical Representatives
Ms. Marjorie Murtagh, National Transportation Safety Board
Mr. Alexander C. Landsburg, Maritime Administration
Dr. Marc B. Mandler, United States Coast Guard

The working group consisted of more than 80 representatives from various sectors of the maritime industry. Their affiliations reflected the breadth and diversity of the industry. Shoreside managers and shipboard personnel represented many shipping companies in the inland towing, coastwise, and oceangoing trades. Other attendees came from six maritime schools, seven pilots' associations, and a variety of government agencies.

The group's task was to discuss three topics on managing fatigue in the marine industry: Hours of Service & Scheduling, Personal & Technological Countermeasures, and Education & Training. Discussions of each topic addressed three questions concerning implementation: What is currently used, what is needed, and who is responsible? Highlights of the discussions follow.

Hours of Service and Scheduling

Most mariners stand two- or three-section watches when at sea and so they have multiple work periods in a day. The group felt that although the watch system satisfies current hours-of-service regulations, problems of sleep fragmentation and sleep deprivation can arise. The group noted that the potential for long-term fatigue must also be considered--crew members may sign contracts of 10-12 months duration when sailing on foreign flag vessels. Some members of the group observed that an important issue underlying fatigue is workload. In turn, workload is correlated with manning levels. The group felt that there is a need to conduct shipboard workload assessments before regulators consider changes to hours-of-service or to manning regulations. The group concluded that industry should take the lead, in coordination with the regulators, to initiate such workload assessments.

Personal and Technological Countermeasures

Several of the attendees reported that their companies had implemented a variety of fatigue countermeasures. The countermeasures do not have to be "hi tech" to be effective. Even little things like having decaffeinated coffee available near the end of the watch can facilitate sleep during the off-duty period. As another example, some companies had installed acoustic insulation in berthing spaces or relocated those spaces to provide a more restful sleeping environment. Other companies had delegated certain tasks to ratings so as to relieve the workload of the licensed officers. The group

determined that a continued effort was needed to promote both corporate and personal alertness management strategies. They felt that additional interdisciplinary meetings, similar to this Symposium, would be useful for exchanging ideas and experiences with successful fatigue countermeasures. The participants concluded that it is the industry's responsibility to take the initiative in this area.

Education and Training

Currently, there is only a modest amount of education being conducted on fatigue and fatigue countermeasures. The attendees agreed that more education was needed and several of the maritime educators in attendance reported that their institutions were developing courses or course modules on the physiological basis, consequences, and ways of managing fatigue. The group felt that the first and foremost need was to shift the mariners' cultural attitudes concerning fatigue--to dispel the "iron-man" myth that fatigue can be overcome by increased motivation and experience. The group concluded that the greatest likelihood of success for developing and disseminating education was to forge a partnership triangle among management, labor, and government.

SUMMARY VIEWGRAPH

Scheduling

- Duration of the tour
- Review manning
- Industry led initiatives

Countermeasures

- Some countermeasures are being used in the industry
- Continued effort
- Industry initiatives

Education

- Training and education is available
- Shift culture
- Partnership triangle

THE PIPELINE WORKING GROUP

Moderator Mr. Barry Sweedler, National Transportation Safety Board
Analyst Mr. Bill Gossard, National Transportation Safety Board

Technical Representatives
Mr. Bob Chipkevich, National Transportation Safety Board
Ms. Linda Daugherty, Research & Special Projects Administration

Three distinct topical areas were discussed at the Fatigue Symposium addressing fatigue in the pipeline industry: hours of service and scheduling; personal and technological countermeasures; and education. A summary of the pipeline group discussion follows.

Hours of Service and Scheduling

In the area of hours of service and scheduling, it was determined that there currently are neither Federal or State standards nor are there any industry guidelines or recommended practices. Therefore, there are great differences in scheduling from company to company. Some general observations were that many employees in the industry rely on unscheduled overtime; in many companies employees have significant input into the schedules that they work; and that most schedules are rotating with 12 hour shifts. Most employees have little idea of the effects of fatigue and there is very little technical information available specific to the pipeline industry.

It was the group's conclusion that there is a definite need for information and guidance on fatigue/alertness issues. It also was concluded that there is a need for all levels (senior management, supervisors and employees) to learn about fatigue concerns. It was noted that there are industry associations such as the American Gas Association, American Petroleum Institute, the Institute of Gas Technology, and others that could address fatigue concerns and proper interventions in the area of hours of service and scheduling for the industries.

Personal and Technological Countermeasures

Presently, fatigue has not been considered as a problem by much of this industry, therefore, there has been little focus on personal or technological countermeasures. However, the industry does use a number of interventions that have been successful in mitigating some fatigue concerns such as; 2-hour call-ins to remote locations, deadman alarms, video cameras, bright lights and temperature control in control rooms. These interventions were not developed specific to fatigue concerns. The participants agreed that a "napping strategy" could possibly be a useful countermeasure, however, considerable education and understanding by senior management and supervisors of this fatigue countermeasure would be necessary.

There are no fitness for duty countermeasures in this industry with the exception of the liquified natural gas industry where Federal standards require a self-reporting system that the person leaving a shift must state that the person coming on duty is fit to work. The participants concluded that personal countermeasures could be addressed by company employee assistance programs.

Eduation and Training

Education on fatigue issues is scant. There is some abstract concern about fatigue by senior management and supervisors, however, that concern is not necessarily directed to operational concerns. In other words, most concern over fatigue involves emergency response conditions not day-to-day operations and shift work. The participants agreed that educational programs for senior management, supervisors and employees on fatigue/alertness issues could be conducted for employees first through company employee assistance programs and then to families, if employees saw the merit. It also was agreed that if fatigue countermeasures were marketed as a performance enhancement tool, perhaps senior management would support fatigue safety improvements such as scheduling strategies. The participants indicated there is a need for data on the relationship of fatigue and productivity in order to sell this initiative as an opportunity to top management. There was interest in tailoring the NASA/ Ames program on fatigue to make it more specific to the pipeline. industry.

SUMMARY VIEWGRAPH

Scheduling

- Employee reliance on unscheduled overtime
- Employees have significant input into schedules
- All schedules are rotating
- Currently there are no guidelines
- Need information and guidance on fatigue
- Need for more awareness by all

Countermeasures

- Use techniques for monitoring
- Bright lights and temperature control- these techniques are not specific to fatigue
- Napping strategy may work with education
- No fitness for duty countermeasures
- EAP address seminar on fatigue

Education

- Abstract concern about fatigue
- Some knowledge not very detailed

- Need for programs on expectations and fatigue
- Performance enhancement tool - scheduling strategy
- Data relationship fatigue-productivity
- Work smart - Play smart

Appendix E

Sampling of Educational Materials Regarding Operator Fatigue

Table E–1. Sampling of fatigue-related educational material by agency or organization.

Organization	Type of material	Title or topic
	U.S. Department of Transportation	
Aviation:		
Federal Aviation Administration	Brochure	Fatigue Busters
Highway:		
Federal Highway Administration	Brochure (developed for truckdrivers)	Awake at the Wheel[a]
	Radio public service announcements	Awake at the Wheel
	Placemats (in future)	Awake at the Wheel
	Videotape	Training
	Instructional program	Train-the-trainer
	Dissemination of brochures (in future)	Driver Wellness Program
National Highway Traffic Safety Administration	Report	Drowsy Driving and Automobile Crashes
	Report	Educating Youth About Sleep and Drowsy Driving
	Brochure	Safe Driving Tips
	Private Sector Organizations	
AAA Foundation for Traffic Safety	Audio cassette	Wake Up!
	Brochure	Wake Up!
National Center for Sleep Disorders Research	Report	Drowsy Driving and Automobile Crashes
	Report	Educating Youth About Sleep and Drowsy Driving
National Heart, Lung, and Blood Institute	Brochure (emphasis on teenage drivers)	Awake at the Wheel
National Sleep Foundation	Fact sheets	Drowsy Driving
	Videotape	Heads Up at the Wheel: Home Safe
	Videotape	Driver Fatigue: Deadly Slumber
	Videotape	Day/Night Strategies for Shift Workers
	Brochure	Day/Night Strategies for Shift Workers
	Newsletter	President's Circle Update
	Consensus	Use of Continuous Shoulder Rumble Strips
	Report	Report of the National Sleep Foundation
	Audio cassette	Wake Up!
	Brochure	Wake Up!
	Bumper Stickers	I'm Alert. Are You?

[a] This brochure uses the same information as *Wake Up!*, which was developed jointly by the AAA Foundation for Traffic Safety and the National Sleep Foundation.

Appendix F

Flight Time and Rest Requirements Proposed by the FAA

The tables in this appendix were contained in the FAA's notice of proposed rulemaking "Flight Crewmember Duty Period Limitations, Flight Time Limitations and Rest Requirements," Docket No. 28081; Notice No. 95-18, *Federal Register* Vol. 60, No. 244, December 20, 1995.

Table F–1. Proposed pilot duty period, flight time, and rest requirements.

Number of pilots	Duty period hours	Flight time hours	Minimum rest hours	Reduced rest hours[a]	Rest hours following reduced rest (compensatory)	Extended duty period hours[b]
1 (Part 135)	No more than 14.	No more than 8.	10	9, May only be reduced if duty period has not exceeded 14.	11	Up to 16 only if due to operational delays.
2	No more than 14.	No more than 10.	10	9, May only be reduced if duty period has not exceeded 14.	11	Up to 16 only if due to operational delays.
3	No more than 16.	No more than 12.	14	12, May only be reduced if duty period has not exceeded 16.	16	Up to 18 only if due to operational delays.
3 Each pilot must have sleep opportunity, and approved sleeping quarters must be available.	More than 16, but no more than 18.	No more than 16.	18	16, May only be reduced if duty period has not exceeded 18.	20	Up to 20 only if due to operational delays.
4 Each pilot must have sleep opportunity, and approved sleeping quarters must be available.[c]	More than 18 but no more than 24.	No more than 18.	22	20, May only be reduced if duty period has not exceeded 24.	24	Up to 26 only if due to operational delays.

[a] Rest periods may be reduced only when the actual duty period does not exceed the maximum scheduled duty period for that crew composition and if the pilot is provided a compensatory rest period. This compensatory rest period must be scheduled to begin no later than 24 hours after the beginning of the reduced rest period.

[b] The flights to which the pilot is assigned must at block out time be expected to reach their destination within the extended duty period.

[c] Applies only to duty periods with one or more flights that land or take off outside the 48 contiguous States and the District of Columbia.

Table F–2. Proposed flight engineer duty period, flight time, and rest requirements.

Number of flight engineers	Duty period hours	Flight time hours	Minimum rest hours	Reduced rest hours[a]	Rest hours following reduced rest (compensatory)	Extended duty period hours[b]
1	No more than 14.	No more than 10.	10	9, May only be reduced if duty period has not exceeded 14.	11	Up to 16 only if due to operational delays.
2	No more than 16.	No more than 12.	14	12, May only be reduced if duty period has not exceeded 16.	16	Up to 18 only if due to operational delays.
3 Each flight engineer must have sleep opportunity, and approved sleeping quarters must be available.	More than 16, but no more than 20.	No more than 16.	18	16, May only be reduced if duty period has not exceeded 18.	20	Up to 20 only if due to operational delays.
4 Each flight engineer must have sleep opportunity, and approved sleeping quarters must be available.	More than 18 but no more than 24.[c]	No more than 18.	22	20, May only be reduced if duty period has not exceeded 24.	24	Up to 26 only if due to operational delays.

[a] Rest periods may be reduced only when the actual duty period does not exceed the maximum scheduled duty period for that crew composition and if the flight engineer is provided a compensatory rest period. This compensatory rest period must be scheduled to begin no later than 24 hours after the beginning of the reduced rest period.

[b] The flights to which the flight engineer is assigned must at block out time be expected to reach their destination within the extended duty period.

[c] Applies only to duty periods with one or more flights that land or take off outside the 48 contiguous States and the District of Columbia.

Appendix G

Summary of Expert Panel on FHWA Hours-of-Service Proposals for Commercial Drivers, 1998

The information in the table was summarized from the following report:

Transportation Research Institute, University of Michigan. 1998. *Potential Hours-of-Service Regulations for Commercial Drivers.* Contract DTFH61-96-C-00038. Washington, DC: Office of Motor Carriers, Federal Highway Administration, U.S. Department of Transportation.

Table G–1. Summary of the expert panel who reviewed the candidate options for hours-of-service regulations.

Federal Highway Administration candidate option	Evaluation criteria[a]								
	1	2	3	4	5	6	7	8	9
Option A, Current Policy: Current hours-of-service regulations. Drivers may work a 15-hour shift, with a maximum of 10 hours of driving. Must have an 8-hour off-duty period after the first 10 hours of duty.	F	F	F	F	F	F	F	F	F
Option B: Based on a 24-hour cycle. Requires minimum of 9 consecutive hours off duty for sleep (12 hours for home-base drivers) with the recommendation that this 9-hour period begin at the same time each day. Minimum of 1 hour off allowed for any combination of rest, personal and family activity, etc. For regional drivers sleeping at home and split-shift drivers, the 1-hour minimum is extended to 3 hours. A maximum of 14 hours on-duty time is allowed, with a maximum of 12 hours for driving. The maximum on-duty time is 12 hours for regional drivers sleeping at home, split-shift, and home-base drivers. For labor primarily other than driving, the maximum on-duty time is extended to 15 hours, only 6 for driving.	P	F	F	F	F	F	F	F	F
Option C: Similar to option B. It increases the minimum additional hours off duty allowed for long distance drivers and regional drivers away from home, for personal and family activities to 2 hours, and maximum time on one shift is reduced from 14 hours to 13 hours. Drivers away from home may accumulate 78 hours in 7 days but not more than 130 hours in 14 days. Drivers not away from home may accumulate no more than 65 hours in 7 days.	P	F	P	F	F	F	F	P	F

Table G–1. Summary of the expert panel who reviewed the candidate options for hours-of-service regulations (continued).

Federal Highway Administration candidate option	Evaluation criteria[a]								
	1	2	3	4	5	6	7	8	9
Option D: Based on 24-hour cycle. Minimum of 9 consecutive hours off for sleep (12 hours off for home-base drivers and 8 hours for labor primarily other than driving), plus a minimum of 3 hours for long distance, regional, and split shift for rest or personal activities. For labor primarily other than driving, 1 hour is required for these activities. On-duty time is maximum of 12 hours, except for labor primarily other than driving where it is 15 hours. Maximum driving time is 12 hours except for labor primarily other than driving where it is 6 hours. A maximum of 72 hours can be accumulated in a 6-day period, and all hours can be for driving. For home-based drivers, the maximum is 60 hours within a 7-day period.	P	F	P[b]	F	P[b]	F	P[c] F[d]	P	F
Option E: Retains 10-hour driving limit in current system but based on a 24-hour cycle. Allows for up to 2 additional hours for on-duty time.	P	F	P	F	P	F	P[e]	P[e]	F
Option F: All drivers have a maximum of 12 hours on duty, all available for driving, with a 24-hour day. A minimum of 12 hours off, including 9 hours for sleeping. Drivers may not be on duty for more than a total of 18 hours during the interval of midnight and 6:00 a.m. in a 7-day period. Drivers may not be on duty for more than 120 hours in a 14-day period. For drivers who return home each day, on-duty time may not exceed 60 hours in a 7-day period.	This policy attempts to meet all evaluation criteria.								

P = pass (meets criterion); F = fail (does not meet criterion).

[a] The evaluation criteria are defined as follows: (1) 24-hour cycle; (2) nighttime differential; (3) continuous time off duty daily; (4) split-shift drivers; (5) on-duty versus driving time; (6) sleeper berth use; (7) limits on cumulative on-duty time; (8) adequate recovery time, (9) foreknowledge of work schedule.

[b] Except for labor primarily other than driving.

[c] For daytime driving.

[d] For nighttime driving

[e] Depends on amount of nighttime driving.

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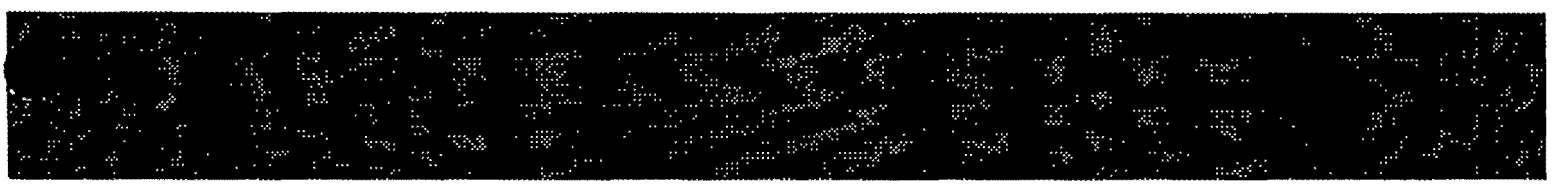

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
94	Virginia F Walters	Self	12/17/1999	12/13/1999		
95	Leonard A Van Wyk	Self	12/17/1999	12/13/1999		
96	Sherry Wildfeuer	Self	12/17/1999	12/15/1999		
97	Roger W Perry, Jr	Self	12/20/1999	12/13/1999		
98	Joseph D Jackson	Self	12/20/1999	12/14/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
99	Bill Hogan	Self	12/21/1999	12/15/1999		
100	William F. Hassel, Ph.D.	Self	12/21/1999	12/15/1999		
101	Mary Jane Tate	Self	12/21/1999	12/15/1999		
102	D. Jay Doubleday	Self	12/20/1999	12/15/1999		
103	K. Bandell	Self	12/21/1999	12/16/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
104	Edward C Brainard II	Self	12/20/1999	12/16/1999		
105	Pat Collier	Self	12/21/1999	12/17/1999		
106	Clare T Pelkey	Self	12/21/1999	12/18/1999		
107	Patrick Clark	Self	12/07/1999	12/02/1999		
108	Gerson T. Lesser, M.D	Self	12/21/1999	12/05/1999		

FR Cite: 64FR67202

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
109	Charles S. Watson Professor and Director	Self	12/21/1999	12/06/1999		
110	Bruce Pringle	Self	12/21/1999	12/13/1999		
111	Steven Zack	Self	12/21/1999	12/13/1999		
112	Andrea Schorosch	Self	12/21/1999	12/16/1999		
113	Robert L Blau	Self	12/27/1999	12/18/1999		

FR Cite: 64FR67202

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
114	Robert B Dorsett, M D	Self	12/27/1999	12/19/1999		
115	Steven Plotnick	Self	12/27/1999	12/19/1999		
116	Dr Douglas E. Wingeier	Self	12/27/1999	12/20/1999		
117	George Glen	Self	12/29/1999	12/22/1999		
118	Kathi Lindsay	Self	12/29/1999	12/23/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
119	Jeannette Bowman	Self	12/30/1999	12/01/1999		
120	David G Schowalter, Ph D	Self	01/03/2000	12/23/1999		
121	Jan C. Siren	Self	01/03/2000	12/27/1999		
122	David Buchner	Self	01/04/2000	12/30/1999		
123	Alice V. Uyttebrouck	Self	01/04/2000	12/30/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
124	John Stewart	Self	01/04/2000	12/31/1999		
125	Pat and Dick Clemmer	Self	01/07/2000	12/30/1999		
126	Joan O King	Self	01/07/2000	01/01/2000		
127	Philip A. Marrone	Self	01/07/2000	01/03/2000		
128	Jeanne D. Lindahl	Self	01/10/2000	01/01/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
129	John S McAnally	Self	01/10/2000	01/04/2000		
130	Mark K Bennett	Self	01/10/2000	01/05/2000		
131	Beth Singer, Ph D	Self	01/10/2000	01/06/2000		
132	Nicole Morris	Self	01/10/2000	01/07/2000		
133	Kathy Van Dame	Self	01/10/2000	01/08/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
134	Steven Turrin	Self	01/10/2000	01/10/2000		
135	Frances Lamberts	Self	01/11/2000	01/07/2000		
136	Conni B Kulas	Self	01/12/2000	12/09/1999		
137	David Shelton	Self	01/12/2000	12/28/1999		
138	Paul and Wendy Manganiello	Self	01/14/2000	01/05/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
139	William J. Baumol Professor of Economics, New York University, Professor Emeritus, Princeton University	Self	01/14/2000	01/07/2000		
140	Joseph A. Yarina	Self	01/21/2000	01/09/2000		
141	Jim Mosser	Self	01/21/2000	01/13/2000		
142	Molly Giller	Self	01/21/2000	01/17/2000		
143	Peter Muise	Self	01/24/2000	01/18/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
144	Thomas V Connor	Self	01/24/2000	01/21/2000		
145	Leonard S Hubbard	Self	01/28/2000	01/28/2000		
146	David A Lochbaum	Union of Concerned Scientists	02/02/2000	01/19/2000		
147	R Adams	Self	02/09/2000	02/07/2000		
148	Elizabeth M. Wien, Ph D	Self	02/10/2000	02/07/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
149	Craig Smith Licensed Reactor Operator	Self	02/11/2000	02/06/2000		
150	Raymond Gross	Self	02/14/2000	02/06/2000		
151	James Lemke	Self	02/14/2000	02/13/2000		
152	Robert Kline	Self	02/14/2000	02/13/2000		
153	Mike Jacobson President	Professional Reactor Operator Society	02/14/2000	02/11/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
154	Richard S Barkley	Self	02/15/2000	02/11/2000		
155	Name not provided	Self	02/15/2000	02/14/2000		
156	Deb Katz Executive Director	Citizens Awareness Network	02/15/2000	02/14/2000		
157	Mark J Wetterhahn Esquire	Commonwealth Edison, Energy Northwest, Niagara Mohawk Power Corporation, other utilities and NUBARG	02/15/2000	02/14/2000		
158	Michael A. Krupa Director, Nuclear Safety & Licensing	Entergy Operations, Inc	02/16/2000	02/10/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
159	Ted C Feigenbaum Executive Vice President and Chief Nuclear Officer	North Atlantic Energy Service Corporation	02/16/2000	02/11/2000		
160	Gary J Taylor Vice President, Nuclear Operations	South Carolina Electric & Gas Company	02/16/2000	02/11/2000		
161	Ralph E Beedle Sr Vice President and Chief Nuclear Officer	Nuclear Energy Institute	02/16/2000	02/14/2000		
162	Patricia H Seffens	Self	02/18/2000	12/08/1999		
163	James H McCarthy Manager Nuclear Licensing and Operations Support	Virginia Power	02/22/2000	02/08/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
164	Kenneth Putnam Acting Manager Regulatory Performance	Alliant Energy Corporation - Duane Arnold Energy Center	02/22/2000	02/11/2000		
165	James A. Hutton, Jr Director - Licensing	PECO Energy Company	02/22/2000	02/14/2000		
166	Chris Bakken Site Vice President	Indiana & Michigan Power Company	02/22/2000	02/14/2000		
167	R John Gianfrancesco, Jr Manager	Florida Power & Light Company	02/23/2000	02/09/2000		
168	R. M. Krich Vice President - Regulatory Services	Commonwealth Edison Company	02/23/2000	02/14/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
169	S L Bernhoft Director, Nuclear Regulatory Affairs	Florida Power Corporation	02/23/2000	02/14/2000		
170	Mark J Burzynski Manager, Nuclear Licensing	Tennessee Valley Authority	02/23/2000	02/14/2000		
171	John T Conway Vice President - Nuclear Generation	Niagar Mohawk Power Corporation	02/25/2000	02/15/2000		3686877
172	Gabor Salamon Licensing Manager	Public Service Electric and Gas Company	02/28/2000	02/14/2000		
173	Barry Quigley	Self	02/28/2000	02/28/2000		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
174	James E. Tomkins Manager Nuclear Safety Assessment and Licensing	Pacific Gas and Electric Company	03/15/2000	03/01/2000		
175	Alan C Passwater Manager, Corporate Nuclear Services	AmerenUE	03/17/2000	03/10/2000		
176	Tony Zigretti	Self	07/05/2000	07/03/2000		3729647
	Quigley Barry		10/07/1999	09/28/1999	Petition for Rulemaking submitted by Barry Quigley requesting that clear and enforceable working hour limits be instituted to mitigate effects of fatigue for nuclear power plant personnel performing safety-related work	
			12/06/1999	12/01/1999	Federal Register Notice - Petition for Rulemaking; Notice of Receipt	

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
1	Phyllis and Penny Hanna	Self	12/06/1999	12/01/1999		
2	Susan B Miller, Ph.D.	Self	12/06/1999	12/01/1999		
3	John F Nagle Professor of Physics and Biological Sciences	Self	12/06/1999	12/01/1999		
4	Nicholas Harmon	Self	12/06/1999	12/01/1999		
5	Clyde Anderson	Self	12/06/1999	12/02/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
6	Betty Streett	Self	12/06/1999	12/02/1999		
7	Bonnie L Wigen	Self	12/06/1999	12/02/1999		
8	Dr. Walter Grant	Self	12/06/1999	12/02/1999		
9	Elizabeth Claire	Self	12/06/1999	12/02/1999		
10	Barbara Curtis	Self	12/06/1999	12/02/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
11	Phyllis J. Raynor	Self	12/06/1999	12/02/1999		
12	C. Alexander Cohen	Self	12/06/1999	12/02/1999		
13	Roger Voelker	Citizens Action Coalition of Indiana	12/06/1999	12/03/1999		
14	Michel A Lombard	Self	12/06/1999	12/03/1999		
15	Charles Safiran	Self	12/06/1999	12/03/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
16	Paula K Ivey, Ph.D.	Self	12/06/1999	12/03/1999		
17	Margreta von Pein	Self	12/06/1999	12/03/1999		
18	Kris L Christine	Self	12/06/1999	12/04/1999		
19	Joan W Witkin, Ph D	Self	12/07/1999	12/01/1999		
20	Peter Wernick	Self	12/07/1999	12/01/1999		

In the Matter of

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
21	Arthur Unger, M D.	Self	12/07/1999	12/01/1999		
22	James E. Giesen	Self	12/07/1999	12/01/1999		
23	Ludell Deutscher	Self	12/07/1999	12/02/1999		
24	John Bugge, Ph D	Self	12/07/1999	12/02/1999		
25	Jane Kelly	Self	12/07/1999	12/02/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
26	Peter Robbins	Self	12/07/1999	12/02/1999		
27	Wes Sanders President	Self	12/07/1999	12/02/1999		
28	James L Ray	Self	12/07/1999	12/02/1999		
29	Elizabeth Weiss	Self	12/07/1999	12/02/1999		
30	Mark M Giese	Self	12/07/1999	12/03/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
31	David H Walworth, M D.	Self	12/07/1999	12/03/1999		
32	Gerald and Ragan Cavanaugh	Self	12/07/1999	12/03/1999		
33	Larry Little	Self	12/07/1999	12/03/1999		
34	Gary Matthews	Self	12/07/1999	12/04/1999		
35	Wilbur R DeHart	Self	12/07/1999	12/04/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
36	Ruth Niswander	Self	12/07/1999	12/04/1999		
37	Peter W Blickensderfer	Self	12/07/1999	12/04/1999		
38	David Illsley	Self	12/08/1999	12/01/1999		
39	Penny Hanna	Self	12/08/1999	12/02/1999		
40	Richard Cone, M.D	Self	12/08/1999	12/02/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
41	Louis D. Smullin	Self	12/08/1999	12/02/1999		
42	Donna Mummery	Self	12/08/1999	12/02/1999		
43	Sarah Miller Moore	Self	12/08/1999	12/02/1999		
44	Amanda Brown	Self	12/08/1999	12/03/1999		
45	David F. Gassman	Self	12/08/1999	12/03/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
46	Linda Quinet	Self	12/08/1999	12/08/1999		
47	Louis Putterman	Self	12/08/1999	12/04/1999		
48	Gene Kostruba	Self	12/08/1999	12/04/1999		
49	Jennifer Willis	Self	12/08/1999	12/06/1999		
50	Bart Ziegler, Ph D	Self	12/13/1999	12/02/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
51	Barbara C Sorkin	Self	12/13/1999	12/03/1999		
52	G F Paskusz	Self	12/13/1999	12/04/1999		
53	Elliott Krackhardt	Self	12/13/1999	12/04/1999		
54	Nancy Hazard	Self	12/13/1999	12/04/1999		
55	Kipp Davies	Self	12/13/1999	12/04/1999		

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Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
56	Dave Dolnick	Self	12/13/1999	12/05/1999		
57	Carol Sydney Marshall	Self	12/13/1999	12/06/1999		
58	Donald McNellis, M.D	Self	12/13/1999	12/06/1999		
59	Warren and Joyce Holbrook	Self	12/13/1999	12/06/1999		
60	Ralph and Janine Gunderman	Self	12/13/1999	12/06/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
61	Carol Kurz	Self	12/13/1999	12/06/1999		
62	David Mel Paul	Self	12/13/1999	12/06/1999		
63	John T Morris	Self	12/13/1999	12/07/1999		
64	Wolfgang Benz	Self	12/13/1999	12/07/1999		
65	Jo Sippie-Gora	Self	12/13/1999	12/09/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
66	Jon and Beth Davidson	Self	12/13/1999	12/01/1999		
67	Victoria Kalkirtz	Self	12/13/1999	12/06/1999		
68	Perley Paap-Crabb	Self	12/13/1999	12/06/1999		
69	J. L Miller	Self	12/13/1999	12/06/1999		
70	N Bayer, Jr.	Self	12/13/1999	12/06/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
71	Erin Ferguson Roger Kruse	Self	12/13/1999	12/06/1999		
72	Christopher J Demeril	Self	12/13/1999	12/06/1999		
73	Roger Kruse	Self	12/13/1999	12/06/1999		
74	Lynn B Fulkerson	Self	12/13/1999	12/06/1999		
75	Laura Magzis, Ph.D	Self	12/13/1999	12/07/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
76	Paul J. Deutschman	Self	12/13/1999	12/07/1999		
77	William Hinrichs	Self	12/13/1999	12/07/1999		
78	Alma Medsker	Self	12/13/1999	12/08/1999		
79	Anna Burton, M.D	Self	12/13/1999	12/08/1999		
80	Margaret A Eastman	Self	12/14/1999	12/02/1999		

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Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
81	Siobhan McCafferty	Self	12/14/1999	12/02/1999		
82	Mark K Bennett	Self	12/14/1999	12/07/1999		
83	Jack and Donna Salem	Self	12/14/1999	12/09/1999		
84	Marion P Morgan	Self	12/14/1999	12/09/1999		
85	Mila and Enrique Cubillo	Self	12/14/1999	12/10/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
86	Carmen Cubillo	Self	12/14/1999	12/10/1999		
87	Richard Lance Christie	Self	12/14/1999	12/10/1999		
88	Gladys Schmitz, et al.	SSND	12/14/1999	12/10/1999		
89	Walter J Hipple	Self	12/14/1999	12/11/1999		
90	Jesse and Rose Steinman	Self	12/14/1999	12/12/1999		

In the Matter of

Barry Quigley; Receipt of Petition for Rulemaking

Comment Number	Comment Submitted by	Representing	Docket Date	Document Date	Miscellaneous Description	Accession Number
91	Joanne McKray	Self	12/16/1999	12/06/1999		
92	Susan W Small	Self	12/16/1999	12/10/1999		
98	Richard S Riggs	Self	12/16/1999	12/11/1999		
			08/27/2002	08/19/2002	Letter from Winston & Strawn, Thomas C Poindexter, & Patricial L. Campbell, Counsels on behalf of NUBARG regarding worker fatigue.	ML022420050

ML032060399

177

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Subject: Worker fatigue rulemaking

I feel compelled to comment on the proposed rulemaking after reading some of the other comments submitted. I have seen a licensed RO who, by his own admission was too tired to continue on duty, spend hours trying to get supervisors to release him. The current rule making draft has no provision for the worker, who is by the way, the only one who knows for sure how he feels, to decide if he will or won't continue to work. Licensed operators have the moral and legal responsibility to remove themselves from duty when they feel unfit, period! A supervisor who is often times concerned with a schedule, or any other person for that matter, should not and cannot honestly determine another persons level of fatigue. It occurs to me that, as I read the other responses, you will have paid little more that lip service to this important issue if you don't give the workers the ability to ask for relief when they deem it necessary. You are allowing many loop holes for companies to get around the proposed limits. Don't forget about the people that have direct control over this country's reactors 24/7/365. Workers that report themselves as unfit for duty due to exhaustion should have the right to do so AND the support and protection of the USNRC when they do it. They should have the same protections afforded "whistle blowers". I know this is past the comment period. However, I was requested by an NRC official to give my comments. Thank You.

Timothy W. Coleman
8277 Canary Dr
Stillman Valley, Il.
61084

DOCKETED
USNRC

July 14, 2003 (11:00AM)

OFFICE OF THE SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Template=SECY-067

SECY-02

From: Carol Gallagher
To: Evangeline Ngbea
Date: Fri, Jul 11, 2003 4:57 PM
Subject: Comment letter on Rulemaking Plan - Fatigue of Workers at Nuclear Power Plants

Attached for docketing is a comment letter on the above noted subject from Timothy W. Coleman that I received via the Rulemaking website on 7/11/03.

Carol

ML022420050

DOCKETED
USNRC

August 27, 2002 (11:30AM)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

WINSTON & STRAWN

1400 L STREET, N.W., WASHINGTON, DC 20005-3502
202-371-5700

35 W. WACKER DRIVE
CHICAGO, IL 60601-9703
312-558-5600

200 PARK AVENUE
NEW YORK, NY 10166-4193
212-294-6700

333 SOUTH GRAND AVE.
LOS ANGELES, CA 90071-1543
213-615-1700

43 RUE DU RHONE
1204 GENEVA, SWITZERLAND
41-22-317-75-75

21 AVENUE VICTOR HUGO
75116 PARIS, FRANCE
33-1-53-64-82-82

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

August 19, 2002

Ms. Annette L. Vietti-Cook
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Attention: Rulemakings and Adjudications Staff

Re: NRC Proposed Rulemaking Concerning Worker Fatigue

Dear Ms. Vietti-Cook:

The following comments concerning the NRC's proposed rulemaking on worker fatigue are submitted on behalf of the Nuclear Utility Backfitting and Reform Group ("NUBARG").[1] These comments supplement previous comments filed by Winston & Strawn on behalf of NUBARG and other licensees concerning a Petition for Rulemaking[2] (letter dated February 14, 2000). NUBARG has followed with interest the NRC's ongoing efforts associated with the proposed rulemaking, and for the reasons discussed below, recommends that all actions associated with the rulemaking be suspended until the NRC performs a backfit analysis to determine whether it can substantiate the proposed rulemaking. It is NUBARG's opinion that the NRC has not yet demonstrated that the proposed rulemaking can satisfy the backfit rule since the majority of the proposed rule's basis is subjective and speculative. NUBARG's requested actions are consistent with specific direction from the Commission issued as part of its approval of the Staff's proposed rulemaking plan. The Commission requested that the Staff consider

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1 NUBARG is a consortium of utilities (representing a number of operating power reactors) which was formed in the early 1980s and actively participated in the development of the NRC's backfitting rule (10 C.F.R. § 50.109) in 1985. NUBARG has subsequently monitored the NRC's implementation of the backfitting rule and regulatory reform efforts.

2 PRM-26-2, 64 Fed. Reg. 67,202 (Dec. 1, 1999).

Template = SECY-067

SECY-02

orig. PM 8/19/02

backfit implications identified by the Office of General Counsel which, heretofore, does not appear to have occurred.

NUBARG believes, based on its participation in Stakeholder meetings and review of supporting information provided by the Staff, that the proposed rulemaking will not provide a substantial increase in public health and safety over the level of protection provided by current requirements and practices. The nuclear industry already enjoys the reputation of being one of the safest industries in which to work. This reputation is due, in no small measure, to the continuing ability of nuclear power plant employees, and, in particular, licensed operators, to support operation of their units. Recognizing that operator effectiveness is of paramount importance and an essential element of the defense in depth of the public health and safety, the nuclear power industry takes appropriate measures to ensure the high performance and alertness of operators, as well as other workers.

The key is adherence to and enforcement of already existing worker fatigue provisions in technical specifications and plant procedures when appropriate. The nuclear industry currently devotes significant resources to the identification, monitoring, and improvement of human performance issues. Moreover, the NRC has required licensees to adopt fitness-for-duty and behavioral observation programs and administrative requirements applicable to a range of employees, including all those having unescorted access to a nuclear power facility. These efforts have been successful in accomplishing their goals for safety in the nuclear power industry.

Background

The proposed rulemaking was initiated in response to a petition for rulemaking. On December 1, 1999, the NRC published for public comment a notice of receipt of a petition for rulemaking dated September 28, 1999, that was filed with the Commission by Mr. Barry Quigley.[3] The petitioner stated that his action was based upon the transition of the electric power industry which translates into fewer people who are working more and sometimes many more hours at nuclear power plants. The petitioner apparently believed that clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized. In particular, the petitioner requested that the NRC (1) add enforceable working hour limits to 10 C.F.R. Part 26, (2) add a criterion to 10 C.F.R. § 55.33(a)(1) to require evaluation of known sleeping disorders, (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC Form-396 to include self-

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[3] 64 Fed. Reg. 67,202 (Dec. 1, 1999).

disclosure of sleeping disorders by licensed operators.[4] The petitioner also requested changes to NRC Inspection Procedure 81502, "Fitness for Duty Program."[5]

Winston & Strawn's comments on the petition (February 14, 2000) addressed the points raised by the petitioner and demonstrated that there is no basis for establishing regulations on working hour limits for the following reasons:

- Licensees of nuclear power plants adequately control overtime and have clear incentives from a business perspective to maintain sufficient staff for routine operations and contingencies.

- In response to Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours" (June 15, 1982), licensees committed to develop administrative procedures governing required shift staffing, and most (if not all) licensees have included requirements in plant technical specifications, thereby providing the NRC with enforcement authority over these requirements.[6]

- Data presented by the petitioner did not demonstrate that staffing being less than "adequate" correlates to "fatigue," nor did the data demonstrate that "fatigue" had contributed in "a respectable percentage" to any major events in the NRC Human Factors Information System database.

- Petitioner's citations to studies of fatigue in the transportation industry are interesting, but have not been demonstrated to be relevant to the manner in which nuclear power plant workers perform safety-related activities, (*e.g.*, quality assurance controls, independent verification, post-maintenance testing).

- Experience in the nuclear power industry does not support Petitioner's assertion that fatigue has been under-reported as a root cause of significant events.

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4 *Id.* at 67,203-04.

5 *Id.* at 67,202.

6 For example, the NRC issued a noncited violation of Technical Specification 6.2.2.g for failure to adhere to overtime restrictions at Arkansas Nuclear One (NRC Inspection Report 50-313; 50-368/2002-03, July 19, 2002).

Staff's Proposed Actions in Response to Petition

In SECY-01-0113, the NRC Staff proposed to the Commission resolution of the petition and requested approval of a rulemaking plan.[7] The Staff identified four options and recommended an option (*i.e.,* Option 2) that would provide an alternative approach to the petition for amending the NRC's fitness-for-duty requirements in 10 C.F.R. Part 26 to establish thresholds for working-hour controls. The approach would specify that hours worked in excess of these thresholds would be controlled through a risk-informed process.[8]

In justifying the proposed rulemaking, the Staff relied largely on subjective criteria which do not demonstrate the need for the proposed action. Though the Staff agreed that there must be a reasonable causative link between fatigue and adverse events, it did not agree that it must demonstrate significant problems due to fatigue in order to justify the new requirements. The Staff took issue with an underlying contention in the public comments on the petition that licensee's existing voluntary practices with respect to working hour limits eliminates the need for the rulemaking and for the NRC to perform a backfit analysis.[9] Notwithstanding the NRC's objections to the applicability of the backfit rule, it agreed that such an analysis would be performed.[10]

Commission Direction to the Staff

Considering the Staff's comments concerning backfit, in the Commission's approval of the proposed rulemaking plan, it directed that, *inter alia*, the Staff "should address and resolve the backfit issues prior to expending significant resources on this rulemaking."[11]

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7 SECY-01-0113, "Fatigue of Workers at Nuclear Power Plants," June 22, 2001.

8 The Commission approved the option recommended by the Staff in "Staff Requirements - SECY-01-0113 - Fatigue of Workers at Nuclear Power Plants," Jan. 10, 2002.

9 NUREG-BR-0058 (Rev. 3), "Regulatory Analysis guidelines of the U.S. Nuclear Regulatory Commission" (July 2000), Section 4.3.1, give guidance on the treatment of industry initiatives in estimating values and impacts for a regulatory/backfit analysis.

10 SECY-01-0113, Att. 2 at 22-23.

11 "Staff Requirements - SECY-01-0113 - Fatigue of Workers at Nuclear Power Plants," Jan. 10, 2002.

The backfitting issues identified by the Office of General Counsel in SECY-01-0113, are summarized below:[12]

- All four options proposed by the Staff would constitute a backfit, and it would be difficult to successfully assert that any of the exceptions set forth in 10 C.F.R. § 50.109(a)(4)(i) through (iii) would apply to the proposed rulemaking options.

- A backfit analysis should be prepared for the proposed rulemaking to determine whether the proposed rule would constitute a substantial increase to protection of public health and safety, and whether the direct and indirect costs of the proposed rule are justified in view of this increased protection.

NUBARG has monitored the Staff's activities and is unaware of any Staff actions aimed at addressing the backfit issues as directed by the Commission. Nevertheless, both the Staff and the industry have expended significant resources as part of the pre-proposed rulemaking stage. NUBARG suggests that from an efficiency perspective, the backfit analysis should demonstrate that the proposed NRC action is viable before more time and licensee resources are spent on an ill-fated rule.

New Overtime Requirements Cannot Satisfy the NRC's Backfit Rule

Any new requirements limiting overtime at nuclear power plants would affect Part 50 licensees and be subject to the NRC's backfit rule. 10 C.F.R. § 50.109(a)(1). Section 50.109(a)(3) of the rule establishes two fundamental criteria that must be met by a new regulation that does not qualify for any of the backfit exceptions in 10 C.F.R. § 50.109(a)(4). As noted above, in SECY-01-0113, the Office of General Counsel stated its position that the proposed rulemaking would have backfit implications and would require a backfit analysis in accordance with 10 C.F.R. § 50.109(a)(4) to determine whether the recommended regulatory changes would result in a substantial increase in protection to public health and safety, and whether the costs of the proposed requirements would be justified.

It is NUBARG's position that neither of these conditions can be met by any additional requirements or limitations on overtime at nuclear power plants. Moreover, none of the exceptions in the backfit rule would apply to such requirements or limitations. Accordingly, the proposed requirements and limitations on overtime at nuclear power plants do not and will not satisfy the backfit rule. NUBARG's position is based on the following points.

- Additional requirements or limitations on overtime would not result in a substantial increase in safety. Current overtime requirements, practices, and procedures have been

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12 SECY-01-0113, Att. 2 at 20.

designed to ensure that all plant personnel are adequately rested and alert while performing their duties. Further reductions in work hours, therefore, would not materially improve the ability of plant personnel to competently perform their assigned duties.[13] Because further reductions in work hours would have no material impacts on safety, such reductions *a fortiori* cannot substantially increase public health and safety.[14]

- The direct and indirect costs of any additional overtime requirements or limitations do not appear to be justified by increased protection. More specifically, because limited, if any, increased protection would result from such additional overtime requirements or limitations, no costs for such overtime requirements or limitations would be justified.[15] Thus, neither of the NRC's backfit criteria could be satisfied by any additional overtime requirements or limitations.

- None of the exceptions in the backfit rule would apply.[16] All facilities currently are in compliance with overtime limitations. 10 C.F.R. § 50.109(a)(4)(i). Additional overtime requirements and limitations are not required to provide adequate protection of the public health and safety because current practices and procedures have been demonstrated to provide such adequate protection. 10 C.F.R. § 50.109(a)(4)(ii). A redefinition of adequate protection as it may apply to overtime is also not justified. 10 C.F.R. § 50.109(a)(4)(iii).

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13 NUREG-BR-0058 (Rev. 3), "Regulatory Analysis guidelines of the U.S. Nuclear Regulatory Commission" (July 2000), Section 4.1, discussing regulatory requirements or guidance already existing, states that the "need for regulatory action must be justified within the context of what would prevail if regulatory action were not taken." Thus, any regulatory/backfitting analysis must credit programs and requirements already in place when evaluating whether a substantial increase in safety would be achieved by the new requirements.

14 Common defense and security are not affected by this request so need not be considered.

15 Even assuming an increase in the level of protection, costs to implement the additional controls and recordkeeping could be substantial because of longer outages and replacement power costs that could result.

16 As noted above, the NRC's Office of General Counsel stated its position that "it would be difficult to successfully assert that any of the exceptions set forth in 10 C.F.R. 50.109(a)(4)(i) through (iii) apply to any of the four rulemaking options for the proposed rulemaking." SECY-01-0113, Att. at 20.

Because none of the backfit exceptions apply and because neither of the backfit criteria can be met, new overtime requirements or limitations cannot satisfy the backfit rule.

Conclusion

For the foregoing reasons, it is NUBARG's position that the proposed rulemaking has not been demonstrated to result in a substantial increase in safety, based on information presently available to the public, and, therefore, no additional requirements could be justified under the backfit rule. In Generic Letter 82-12 and other guidance, the NRC recognized that the issue of employee overtime is significant and deserving of attention. Licensees have taken action accordingly. In addition, worker fatigue is taken into account in fitness-for-duty, training, and behavioral observation programs which are already required by the Commission's regulations. Licensees are sensitive to the fatigue and overtime issues and have incentives to maintain adequate staffing in order to avoid excessive overtime. For these reasons, NUBARG recommends that the Staff perform a backfit analysis for the proposed rulemaking option as directed by the Commission before proceeding further with any actions associated with the proposed rulemaking.

It is NUBARG's position that, absent performance of a backfit analysis, the Staff appears to be unnecessarily expending significant resources on a rulemaking effort that may not constitute a justified backfit. It may be more appropriate to expend the same resources to focus on Staff actions to reinforce existing programs and standards for behavioral observation rather than amend Part 26 to impose specific requirements on the control of working hours.

Sincerely,

Thomas C. Poindexter
Patricia L. Campbell
Counsel for NUBARG

PLC:sdd

ML003729647

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PETITION RULE PRM 26-2
(64FR67202)

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Opinion on proposed rulemaking change on working hours by Barry Quigley.

Although I am aware the public comment period has ended regarding Working Hours At Commercial Nuclear Power Plants, as an I&C technician at a commercial Nuclear Power Plant for over 17 years, I feel compelled to offer my opinion concerning this situation, as well as the misconception by outsiders of how it is being regulated and monitored.

My major points being:

a. The present regulations are unenforceable. Phrases like "routine use of heavy overtime", and "very unusual circumstances" are undefined. Is not 20,000 hours a year overtime in a department of 47 technicians for the past 18 years considered "routine"? Not by the utility's or NRC definition. As I was told by an NRC inspector during an Allegations Meeting, "If we don't have a definition for it, how can we enforce it?" Also, NRC letter 91-36 further defines Information letter 82-12, (which are the guidelines utilities limit their overtime by), by stating that, "plant personel supporting an operating unit shall not be placed on an outage schedule". But this is done throughout the industry. Again, the NRC reply was, "that letter is what we'd like to see, but we cannot enforce it"

b. The present regulations permit 72 hours in a week, and more with an approval by management. There is no cap on the number of weeks that this can go on. The cumulative fatigue effect is ignored. My department has been scheduled 10 hour days, 7 days a week, for 10 weeks to support a refuel outage. And during the 8th week, got extended to 12 hour days. This is totally within the present regulations to do so.

c. It is interesting to note that working past the overtime limits requires approval from management, but not the worker. No one ask's the worker if they are too fatigued to work further hours. How can the utility be monitoring fatigue if the worker is not even questioned? Is your first line supervisor qualified to judge when you're fatigued, when he's also working 70 to 80 hours a week? And his supervisor also? Who is monitoring for this fatigue?

d. One item which I've never heard discussed is the fact that because of deregulation, utilities are not hiring new , younger employees. The average age in my department, as well as the company I work for, is in the mid to late 40's. This aging work force cannot work the long hours as well as we used to. Nothing has been done to address this issue.

e. The current regulations, as well as the proposed new ones, only cover "safety related work". Plants do not have a physical distinction of "safety related systems and components in this area, and not safety related over there". Every worker at a nuclear power plant has the capability of causing a scram or plant transient. A transient is usually the last event in a series of equipment or human failures in the timeline of a catastrophe. Whether it's an operator, or maintenance worker, or a person sweeping the floor, that worker needs a security clearance and monitoring for Fitness for Duty. Federal regulations require that he or she monitored for impairment dues to drugs or alcohol. Why in the world should he or she be exempt from the overtime regulations?

f. The reasoning that the Fitness for Duty program will point out workers in a fatigued condition is almost laughable. As I said before, if your supervisor and his supervisor above him are potentially fatigued, as in during a refuel outage, how can you guarantee that your fatigue will be detected? Further, pulling a worker suffering from cumulative fatigue off his job and sending him home to rest, then expecting him to be back to 100% the next day is not realistic. Currently, the fitness for duty program is associated with disciplinary action. How many times can a worker be caught fatigued under Fitness for Duty before he will be reprimanded?

g. There are many, many more occurances of mistakes and human performance errors than are reported. A typical investigation involves the question, "did you get enough sleep last nite?" Many people will not admit that they are fatigued, due to personal pride, or because many workers do enjoy the heavy overtime (read money), and by admitting they were fatigued, they might lose out on more overtime (read money). That is the reason more workers don't come forward, sometimes overtime (read money) gets addictive. Many people can make more money doing illicit and illegal activities, but does that make it right?

In conclusion

JUL 13 2000
Acknowledged by card

I support the proposed rulemaking petition by Barry Quigley, as they are a step in the right direction, however I feel they need to be refined on the following points:

a. The limits during a plant shutdown should be 60 hrs per week, as when the unit is running. Many Nuclear Plants in the U.S. are dual units. Many work groups are not split between supporting each unit. If there is a problem on the running unit while the other is shutdown, technicians and operators will be working the problem on the running unit, even after working 70+ hours on the shutdown one. There is potential for abuse of this by management, as explained above in paragraph "a". At a minimum, the distinction should be made that when one unit is down, the running unit cannot be ignored, and workers on that unit must follow the regulations for a running unit. This is stated in letter 91-36, however, as I was told by an NRC inspector, it is unenforceable. Further, the work scope during outages is such that the potential for incidents and accidents, such as vessel draindowns and fuel handling accidents is much greater, as compared to more routine work performed while the plant is running. Clearly, increases of limits during refuel outages is done as a bonus to the utilities.

b. The biweekly limit is a good idea, however a cap is needed on how many weeks overtime can go on. Again, the long term cumulative effect is ignored. Yes, outages are generally shorter then they were in the past, but if a problem is encountered, it can drag on for 8-10 weeks.

c. If the utility is serious about monitoring fatigue, the worker should have an input as to whether he is too fatigued to work extended hours.

Sincerely,

Tony Zigretti
26 Kings Rd.
St. Johns, PA 18247

From: Carol Gallagher
To: Adria Byrdsong
Date: Wed, Jul 5, 2000 10:02 AM
Subject: Comment on PRM-26-2

Adria,

Attached is a comment letter on PRM-26-2 that I received via the rulemaking website on July 3, 2000.

The comment is from:

Tony Zigretti
26 Kings Rd.
St. Johns, PA 18247

Carol

Union Electric

One Ameren Plaza
1901 Chouteau Avenue
PO Box 66149
St. Louis, MO 63166-6149
314.621.3222

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March 10, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Attention: Rulemakings and Adjudications Staff

ULNRC-04202

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
COMMENTS ON PETITION
FOR RULEMAKING TO ADDRESS FATIGUE
Reference: 64 Federal Register 230, December 1, 1999

AmerenUE is providing written comments on the above referenced petition for rulemaking to address fatigue. AmerenUE supports the position endorsed by the Nuclear Energy Institute and provides the following comments.

AmerenUE has developed internal procedures and processes to control and limit working hours in accordance with the guidelines specified in Generic Letter 82-12. AmerenUE believes the limitations and guidelines provided in Generic Letter 82-12 are sufficient to ensure no undue risk to operator fatigue. Furthermore, the proposed rule contains limitations which would be resource intensive to monitor and enforce with little or no real benefit. Therefore AmerenUE does not believe further rulemaking to address this issue is warranted or necessary.

Sincerely,

Alan C. Passwater
Manager, Corporate Nuclear Services

DJW/jdg

cc: Mr. David Desaulniers, Project Manager, NRC
Mr. Jim Davis, NEI

Acknowledged by card MAR 30 2000

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Pacific Gas and Electric Company

James E. Tomkins
Manager
Nuclear Safety Assessement
and Licensing

Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

805.545.4052
Fax: 805.545.4234

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PG&E Letter DCL-00-033

Mr. David L. Meyer
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to "Petition for Rulemaking; Request for Comments on Work Hour Limits" (64 Fed. Reg. 67202; December 1, 1999)

Dear Mr. Meyer

The purpose of this letter is to provide comments regarding a petition for rulemaking submitted on September 28, 1999 by Mr. Barry Quigley. The petition requests that the NRC (1) add work hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of work hour violations warranting various NRC sanctions; and (4) revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. The petition also requests changes to the NRC inspection procedure for the fitness for duty program.

PG&E endorses the NEI position on this issue and believes that the NRC should deny the petition. NEI indicates that the petition is unjustified because: (1) the industry has appropriately addressed fatigue related issues; (2) the petitioner's claim that "fatigue most probably played a role in a respectable percentage" cannot be supported; and (3) the implementation of the proposed rule would not satisfy the backfit criteria of 10 CFR 50.109. NEI is providing comments in a separate submittal.

PG&E has developed these comments in cooperation with TXU Electric (Comanche Peak), Wolf Creek Nuclear Operating Corporation (Wolf Creek), and South Texas Project Nuclear Operating Corporation (South Texas Project).

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Sincerely,

James E. Tomkins

cc: Edgar Bailey, DHS
Steven D. Bloom
Tony Harris, WCNOC
Scott Head, STPNOC
Ellis W. Merschoff
David L. Proulx
Roger Walker, TXU Electric
Diablo Distribution

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(64FR67202)

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Ms. Annette L. Vietti-Cook
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Attention: Rulemaking and Adjudications Staff

Re: Comments on Petition for Rulemaking 26-2

Recently I had conversations with different people in different settings regarding my proposed rulemaking on fatigue. I also know that their misconceptions have been provided to the NRC. Please accept this letter as a comment on PRM 26-2. Also note that the public comment period ended on February 14, 2000. It is NRC policy to consider comments received after the closure date if it is practical to do so. I believe in this case since only 2 weeks have elapsed since the closure of the comment period in what is going to be a very long process, consideration of my comments will impose little burden on NRC resources or schedule. Additionally, my comments are more than a simple 'affirmation' or 'opposition' since they provide detail and logic that has a direct bearing on the proposed rulemaking. If this comment will not be considered in the PRM, please let me know.

The reliance and trust being placed on supervisory oversight to detect impairment or fatigue is way out of kilter with the reality of how things work. People in Washington D.C. are far removed for the day to day operation of plants; I'm there. Supervisor training does not always occur; it has been replaced by testing. For example, a recent annual generic exam contained only one question on how to identify abherrent behavior, it asked, "What type of behavior is it when you see someone sitting in the middle of the floor crying?" This in no way, shape or form qualifies a person to identify a fatigued or impaired worker. Reliance on observation may mean waiting for someone to make a mistake to show that he is impaired. This hardly seems to be the proactive approach the industry is always thumping its chest about.

Implicit in observation is that the supervisor is able to monitor the employees; in the control room this is not an issue. Monitoring of field employees is much less rigorous. Supervisors in the field are spread very thin and spend a good deal of their time 'fighting fires'; they go where the problems are. This does not assure observation until it's too late i.e., the impaired employee causes a problem. Some may try to take credit for meetings/briefings held at the beginning of the shift as observation. This is specious for two reasons, first the employee is not being observed in his normal work environment, second, he is being observed at the beginning of his shift when he has had the most rest. It's like taking Diesel Generator performance data at the beginning of a 24-hour surveillance run, instead of at the end. Of course it's a whole lot more likely to pass when you look at the beginning. Finally, some workers don't have supervisors! The new

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2-28-200 12:39PM FROM OFFICE DEPOT #0245 815 226 9860 P.2

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economics of de-regulation have caused some companies to stop paying overtime to supervisors. The supervisors in turn no longer come in on the weekends or backshifts. The end result is that health physics and chemistry technicians have NO supervision for entire shifts.

Are we really willing to risk nuclear safety to the handwaving, smoke and mirrors of training and observation?

An incredibly misleading statement is that few events are attributed to fatigue. This statement must be analyzed closely. Fatigue is a third-tier cause of an event. The first level is 'personnel error', the second level is 'personnel error due inattention to detail' and the third level is 'personnel error due inattention to detail caused by fatigue'. We don't see fatigue as causing an event simply because we don't look that deep. We stop at personnel error or inattention to detail; we never find out the higher tier causes. There are no events because we don't look hard enough. To rely on shallow or missing data to conclude that there is no problem with fatigue borders on irresponsibility.

Some maintain that current guidance on overtime is sufficient to prevent abuse. If this is true then why have the following abuses occurred?

- At least 10 reactors now exempt breaks, lunch, training, cleanup time and meetings from inclusion in the overtime figures. This allows fatigued workers to make bad decisions in meetings or causes them to fail to learn critical information.

- At a Region 2 plant, workers told their supervisors they were not fit for duty due to fatigue; this occurred 6 times in the last quarter of 1999. The operators were forced to work anyway. In at least one case, the person was the licensed operator of record for at least 12 hours.

- Operators who decline to work due to fatigue have had disciplinary letters placed in their personnel files.

- A West Coast plant planned an outage last fall that would require over 20 days straight of 12 hour shifts.

National Transportation Safety Board data should not be discounted; it is very relevant to nuclear power. A direct parallel can be drawn between the control room crews and the flight crews. Field operators, maintenance workers, engineers and technicians often work alone at boring tasks; the parallel for them in the NTSB data is the truck driver or train operator.

Per the backfit rule in 10CFR50, a backfit analysis is not required when the regulatory action involves defining or redefining what level of protection to the public health and safety or common defense and security should be regarded as adequate. Since the current rules for overtime could be the poster child for ambiguity while the proposed rules are a much better definition of protection, no backfit analysis is required.

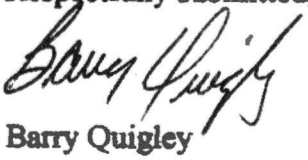
2-28-200 12:40PM FROM OFFICE DEPOT #0245 815 226 9860 P.3

Arguments relating to the potential expenses of implementation of the rule are misleading since they do not include the massive savings that would occur due to reductions in overtime.

Another potential problem that does not stand up to scrutiny is that the rule may cause unnecessary plant shutdowns due to the unavailability of specially trained personnel to repair safety-related systems. I have participated in several forced shutdowns, although demanding, I didn't find them to be unsafe. They are however not cheap. A plant that places themselves in the position where one or two key people are needed to keep a plant online suffers from abysmal resource management and deserves what they get. To prevent the shutdown, the plant could ask for a Notice of Enforcement Discretion.

Attempts to say that the current fitness for duty rule is adequate hinge on the advisory word 'should' in the general performance objectives. In late 1998, the NRC recognized the word 'should' as inadequate in the Maintenance Rule of 10CFR50. Rulemaking was begun to change the 'should' to a 'shall'. Why does the maintenance rule require more than the FFD rule?

Respectfully submitted,



Barry Quigley

3512 Louisiana Rd.
Rockford, IL 61108
QPIF@AOL.COM
815-397-8227

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(64FR67202)

Mr. David L. Meyer
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: Petition for Rulemaking; Request for Comments on Work Hour Limits (64 Fed. Reg. 67202; December 1, 1999)
SALEM AND HOPE CREEK GENERATING STATIONS
DOCKET NOS. 50-272, 50-311 AND 50-354

Dear Mr. Meyer:

On December 1, 1999, the Nuclear Regulatory Commission (NRC) issued a Petition for Rulemaking, for public comment. This letter submits comments from Public Service Electric and Gas (PSE&G) regarding the Petition for Rulemaking. In addition to these specific comments, PSE&G supports the comments submitted by the Nuclear Energy Institute (NEI).

The petition requests that the NRC add work hour limits to 10 CFR Part 26; add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders; revise the Enforcement Policy to include examples of work hour violations warranting various NRC sanctions; and revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. The petition also requests changes to the NRC inspection procedure for the fitness for duty program. PSE&G believes that the petition for rulemaking should be denied.

The industry has appropriately responded to potential fatigue related issues. Each licensee has developed programs to comply with NRC fitness for duty requirements (including the Continuous Behavioral Observation Program), as well as to implement Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours." These programs successfully demonstrate that licensees recognizes that appropriate management of its work force, including oversight of personnel hours worked, is a fundamental aspect of safe plant operation.

In addition, the administrative controls to prevent fatigue-related incidents are already including in Technical Specifications.

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Although the petitioner includes a statement that "fatigue most probably played a role in a respectable percentage" of incidents recorded in the NRC's Human Factors Information System; the petition fails to supply credible data demonstrating an industry-wide problem with nuclear plant personnel fatigue. In fact, data on industry performance demonstrates that industry performance has improved over the past decade and has done so notwithstanding corporate restructuring affecting nuclear power plant licensees.

For these reasons, we strongly encourage the NRC to deny this petition.

Sincerely,

Gabor Salamon
Licensing Manager

C Mr. H. J. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. W. Gleaves, Licensing Project Manager - Salem
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 08B1A
11555 Rockville Pike
Rockville, MD 20852

Mr. R. Ennis, Licensing Project Manager - Hope Creek
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 08B1A
11555 Rockville Pike
Rockville, MD 20852

Mr. S. Morris (X24)
USNRC Senior Resident Inspector - Salem

Mr. J. Schoppy (X24)
USNRC Senior Resident Inspector - Hope Creek

Mr. K. Tosch, Manager IV,
Bureau of Nuclear Engineering
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Trenton, NJ 08625

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ATTN: Rulemakings and Adjudications Staff

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PETITION RULE PRM 26-2
(64FR67202)

RE: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Nine Mile Point Unit 2
Docket No. 50-410
NPF-69

Subject: Comments on the Proposed Rulemaking on 10 CFR Part 26 and 10 CFR 55.33(a)(1) (64 Federal Register 67202, December 1, 1999)

Gentlemen:

The purpose of this letter is to provide Niagara Mohawk Power Corporation's (NMPC's) comments on the September 28, 1999 petition for rulemaking submitted by Mr. Barry Quigley. Specifically, the petitioner requests that the Nuclear Regulatory Commission (NRC): (1) Add enforceable working hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR Part 55.33(a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC Form-396 to include self-disclosure of sleeping disorders by licensed operators. The petitioner also requests changes to the NRC inspection procedure for the fitness for duty program.

After careful consideration of the proposed rulemaking, NMPC has concluded that the petition for rulemaking should be denied. Our basis for this conclusion is consistent with the proposed Nuclear Energy Institute Comments on this Petition which NMPC endorses. In summary, NMPC has appropriately responded to potential fatigue related issues. Niagara Mohawk has developed Nuclear Division directives and procedures to comply with the NRC fitness for duty requirements (including the Continuous Behavioral Observation Program). In addition, the

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Technical Specifications of both units contain requirements regarding working hour limits for operating personnel consistent with the provisions of Generic Letter 82-12, titled "Nuclear Power Plant Staff Working Hours". These directives, procedures and Technical Specifications successfully demonstrate that NMPC recognizes that appropriate management of its workforce, including oversight of personnel hours worked, is a fundamental aspect of safe plant operation.

Sincerely,

John T. Conway
Vice President - Nuclear Generation

xc: Mr. H.J. Miller, NRC Regional Administrator, Region I
Ms. M.K. Gamberoni, Acting Section Chief PD-I, Section 1, NRR
Mr. G.K. Hunegs, NRC Senior Resident Inspector
Mr. P.S. Tam, Senior Project Manager, NRR
Document Control Desk
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(170)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

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Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

February 14, 2000

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RULES & DIR. BRANCH
US NRC

Mr. David L. Meyer, Chief
Rules and Directives Branch
Division of Administrative Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mr. Meyers:

PETITION FOR RULEMAKING; REQUEST FOR COMMENTS ON WORK HOUR LIMITS (64 FED. REG. 67202; DECEMBER 1, 1999)

TVA submits the following comments on the September 28, 1999 petition for rulemaking submitted by Barry Quigley. The petition requests that the NRC (1) add work hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of work hour violations warranting various NRC sanctions; and (4) revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. The petition also requests changes to the NRC inspection procedure for the Fitness for Duty (FFD) program. TVA believes the petition for rulemaking should be denied for four primary reasons.

First, TVA believes that the industry has already addressed potential fatigue-related issues through developed used to comply with NRC FFD requirements and Generic Letter (GL) 82-12, "Nuclear Power Plant Staff Working Hours." These programs demonstrate that licensees recognize that appropriate management of its work force, including oversight of personnel hours worked, is a fundamental aspect of safe plant operation.

Second, TVA notes that the petitioner has not provided evidence to support his contention that "fatigue most probably played a role in a respectable percentage" of incidents recorded in the NRC's Human Factors Information System. Instead, TVA contends that the readily available industry performance data demonstrate that no adverse industry performance trends

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can be attributed to "fatigue" problems. Rather, industry performance has improved significantly over the past decade and has done so notwithstanding corporate restructuring affecting nuclear power plant licensees.

Third, TVA believes NRC has ample authority to enforce compliance with 10 CFR Part 26 and licensee technical specifications (where the administrative controls to prevent fatigue-related incidents identified in GL 82-12 typically reside).

Finally, TVA believes that the backfit test required by 10 CFR 50.109 cannot be met for this petition without showing that fatigue is a root cause or even a substantial contributing factor to the limited number of significant events that have occurred over the past decade. On the other hand, TVA is concerned that implementation of the proposed work hour limits would inappropriately limit its flexibility to effectively manage its plants. TVA believes that, in certain circumstances, it could have an unintended adverse safety effect. For example, it could add additional crew turnovers on critical tasks with a corresponding increase in the potential for communication and hand-off errors. Similarly, it could force plant management to put the plant through a shutdown transient rather than exceeding the overtime limits for one or two key maintenance staff. Experience has shown that plant transient conditions are more risk-significant than steady state operation. Further, given the complexity of the proposal and the burdensome nature of its implementation for licensees and enforcement by the agency, TVA believes that the costs associated with compliance of the proposed rules is another reason it will not meet the backfit test.

In summary, TVA believes NRC has adequately addressed potential fatigue issues as part of its broader FFD rules. Further, licensee programs implementing the guidance contained in GL 82-12 ensure that, under normal operations, licensees limit overtime. As is appropriate, licensees are permitted some flexibility for overtime for unusual circumstances and for relatively short periods with greater worker demands. No evidence has been cited that suggests that any further NRC or licensee actions are necessary. Consequently, TVA believes NRC should deny this petition.

TVA also supports the comments provided by the Nuclear Energy Institute on this petition for rulemaking.

If you have any questions, please contact me at (423) 751-2508.

Sincerely,

Mark J. Burzynski

Mark J. Burzynski
Manager
Nuclear Licensing

cc: U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

(169)

Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'00 FEB 23 P3:47

AD

February 14, 2000
3F0200-13

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Rulemakings and Adjudications Staff

Subject: Comments on Petition for Rulemaking on Work Hour Limits (64FR67202)

Dear Sir:

Florida Power Corporation (FPC) appreciates the opportunity to comment on the petition for rulemaking addressing work hour limits as published in the 64 Federal Register 67202, dated December 1, 1999. FPC endorses the comments on the petition for rulemaking provided by the Nuclear Energy Institute (NEI), by letter dated February 14, 2000, on the industry's behalf.

Please contact me at (352) 563-4566 if you have any questions regarding FPC's comments.

Sincerely,

for S-B

S. L. Bernhoft
Director, Nuclear Regulatory Affairs

SLB/ff

xc: Regional Administrator, Region II
Senior Resident Inspector
NRR Project Manager

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February 14, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Attention: Rulemakings and Adjudications Staff

Subject: Comments on Petition for Rulemaking

References: (1) Nuclear Energy Institute Letter, "Petition for Rulemaking; Request for Comments on Work Hour Limits (64 Fed. Reg. 67202; December 1, 1999)," dated February 14, 2000

(2) Winston & Strawn Letter, "Comments on Petition for Rulemaking dated September 28, 1999 filed by Mr. Barry Quigley, 64 Fed. Reg. 67202 (December 1, 1999), PRM-26-2," dated February 14, 2000

Commonwealth Edison (ComEd) Company is pleased to have the opportunity to comment on the Petition for Rulemaking on 10 CFR 26, "Fitness for Duty Programs," [Docket No. PRM-26-2], (64 FR 67202). We fully endorse the comments of the Nuclear Energy Institute (NEI) and Winston & Strawn, by letters dated February 14, 2000.

We have carefully reviewed the proposals and bases presented in the petition and have concluded that the requested action is unjustified and, therefore, unnecessary. Contrary to the claim of the petition that the lack of a significant event due to fatigue should not be a basis for not pursuing rulemaking, the NRC has already taken appropriate and effective action in the form of Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours," and 10 CFR 26, " Fitness for Duty Programs," both of which establish the guidelines for controlling overtime and detecting fatigue in workers. We consider that these actions have been effective based on a review of root causes associated with significant events at the ComEd nuclear stations. Specifically, a review of Human Performance Event root cause reports and a review of the work history of individuals involved in events has shown that no human performance event, at any one of our nuclear stations, has been attributed to overtime or worker fatigue.

ComEd believes that it is incumbent on Management to effectively, efficiently and safely, manage the workforce. The overtime guidance currently given in Generic Letter 82-12 provides reasonable guidance to prevent situations where fatigue could reduce the ability of operating personnel to keep the reactor in a safe condition.

While well intentioned, the proposed overtime rules are complex and would be extremely difficult to manage with unproven benefit. The current NRC guidelines together with well-structured administrative procedures provide sufficient safeguards against worker fatigue.

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Furthermore, the claim in the petition that a significant fraction of the four categories of human error events in the NRC's Human Factors Information System (HFIS) is due to fatigue is pure speculation. There is no basis presented to support this conclusion. In fact, studies by utilities and independent consultants have shown that one of the predominant causes of human errors is workers not verifying/validating what they think is the right way to perform a particular task.

With regard to the latent effects of fatigue, such as valve mispositioning and procedures with technical errors, the quality assurance programs at nuclear power plants require independent review of manipulations of safety-related equipment and changes to key procedures. More importantly, a review of the causes of equipment mispositioning and procedure problems has not shown fatigue to be a contributor.

For the reasons discussed above, we have concluded that the petition should not be granted. We do suggest, however, that an NRC-industry effort to clarify the overtime guidelines may be beneficial.

If you have any questions, please contact me at (630) 663-7330.

Respectfully,

K. A. Ainger for

R. M. Krich
Vice President – Regulatory Services

(167)

Florida Power & Light Company, P. O. Box 14000, Juno Beach, FL 33408-0420

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L-2000-039

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PETITION RULE PRM 26-2
(64FR67202)

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Ms. Annette Vietti-Cook
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Attn: Rulemakings and Adjudications Staff

Re: Florida Power & Light Company Comments
Petition for Rulemaking – Nuclear Plant Employee Fatigue
Docket PRM-26-2, 64 Fed. Reg. 67202 (Dec. 1, 1999)

Dear Ms. Vietti-Cook:

Florida Power & Light Company (FPL), the owner and operator of the St. Lucie Nuclear Plant, Units 1 and 2, and the Turkey Point Nuclear Plant, Units 3 and 4, hereby submits the following comments on the above-referenced petition for rulemaking. In summary, the petition does not present an adequate factual or legal basis that would justify the proposed rulemaking. Accordingly, the Nuclear Regulatory Commission (NRC) should deny the petition.

The petition requests NRC to adopt specific work hour limits to minimize personnel fatigue. The petition fails to adequately explain why presently existing requirements fail to address this issue. All nuclear power plant licenses contain Technical Specification (TS) requirements that limit the amount of overtime that can be worked by personnel assigned to safety-related duties. NRC has taken enforcement actions against licensees for violations of these overtime requirements. Further, all licensees have established programs consistent with the TS and with Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours." Such requirements were adopted following the Three Mile Island accident to address concerns that fatigue may have been a contributor to the accident.

Above and beyond current overtime restrictions, data maintained by the NRC demonstrates that few significant industry events can be attributed to fatigue. In light of this data, there is no evidence that the additional administrative burden and personnel restrictions that would be required by the proposal would result in any enhancement in the protection of the public health and safety. Other than speculation concerning linkages between worker fatigue and plant safety, the petition provides no evidence in support of further rulemaking in this area. In this connection, FPL questions whether the proposal would survive the cost-benefit scrutiny required by the backfit rule (10 CFR 50.109).

Further, all nuclear plant licensees are subject to the fitness for duty (FFD) requirements of 10 CFR Part 26. As required by Part 26, all supervisors and managers must continuously observe the behavior of the plant workforce for drug or alcohol abuse. The FFD requirements require employees who are not fit for duty to inform their supervisors

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and managers so that appropriate compensatory actions can be taken. Appropriate application of FFD requirements through behavioral observation has been demonstrated to detect degraded performance regardless of cause - fatigue, drugs, and alcohol. The petition provides no evidence to suggest that the Part 26 FFD requirements are inadequate to detect workers that are not fit for duty.

For these reasons, the Commission should deny the above-referenced petition for rulemaking in its entirety. We appreciate the opportunity to comment on this matter.

Sincerely yours,

R. John Gianfrancesco, Jr.
Manager
Administrative Support and Special Programs

Indiana Michigan
Power Company
500 Circle Drive
Buchanan, MI 49107 1395

(166)

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AEP
INDIANA MICHIGAN POWER

February 14, 2000

C0200-15

Docket Nos.: 50-315
50-316

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

U. S. Nuclear Regulatory Commission
ATTN: David L. Meyer
Chief, Rules and Directives Branch
Mail Stop 6 D 59
Rockville, MD 20852-2738

Donald C. Cook Nuclear Plant Units 1 and 2
PETITION FOR RULEMAKING; REQUEST FOR COMMENTS ON WORK HOUR LIMITS, 64 FED. REG. 67202 (DECEMBER 1, 1999).

Indiana & Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant, endorses the comments submitted by the Nuclear Energy Institute (NEI) regarding the September 28, 1999, petition for rulemaking submitted by Mr. Barry Quigley. For the reasons described below, we similarly believe that Mr. Quigley's petition for rulemaking should be denied.

As NEI noted, the industry has already appropriately addressed potential fatigue-related issues through self-regulation consistent with or more conservative than NRC guidelines. The industry has developed work schedule restrictions and training programs for workers performing safety-related tasks that appropriately address potential fatigue-related issues. The Petitioner does not show that these restrictions and programs are not meeting their intended goals. Furthermore, granting the Petitioner's request would result in imposition of an impermissible backfit on licensees in violation of 10 C.F.R. § 50.109.

In addition to the issues raised by NEI justifying denial of this petition, I&M has identified additional concerns regarding Mr. Quigley's request for rulemaking. Specifically, this petition should be denied because it is based upon unsupported claims.

The Petitioner raises several contentions that are unsupported with objective evidence and outside of the Petitioner's expertise (as an operator at a nuclear plant). I&M identifies a few of these unsupported contentions here. As a first example, the Petitioner does not substantiate his contention that "fatigue most probably played a role in a respectable percentage" of incidents recorded in

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the NRC's Human Factors Information System (HFIS). Mr. Quigley does not support this claim with scientific data to demonstrate that the NRC's failure to attribute the incidents to fatigue is faulted. Instead, Mr. Quigley cites the Department of Transportation's (DOT) expenditure of over $30 million on fatigue-related research over a nine-year period – and from this, the Petitioner suggests that the NRC make a comparable research effort. Mr. Quigley offers no evidence resulting from the DOT research that would justify this kind of expenditure or to demonstrate that the NRC, when it has not attributed errors collected in the HFIS to fatigue, is wrong.

As a second example of the Petitioner's unsupported claims, I&M refers the NRC Staff to Mr. Quigley's claim that his proposed 16-hour shift limits are to address "acute fatigue." The Petitioner's claim is based on two scenarios of workers working "swing-shifts" – shifts other than typical daytime hours. Mr. Quigley asserts, without support, that a worker would rise at the 'normal' time of 8 a.m. even if the worker's shift did not begin until 3 p.m. or 11 p.m. Contrary to Mr. Quigley's statement that "sleeping during the day is not natural," experience of workers inside and outside of the nuclear industry shows that workers finishing an overnight shift can, and do, sleep during the day.

Mr. Quigley builds on his unsupported argument by comparing his interpretation of circumstances which would cause sleep deprivation, by working "swing-shifts," with Australian research suggesting that after 24 hours of being awake, an individual's degradation in performance is equal to a blood alcohol content of 0.10%. I&M has no basis for disagreeing with the Australian research; however, Mr. Quigley has not provided any evidence that such sleep deprivation does, or would, occur and Mr. Quigley has not demonstrated that he has any qualifications for making such conclusions.

Finally, the Petitioner does not credit the NRC with staying current with industry deregulation. Specifically, Mr. Quigley suggests that deregulation of the electricity industry will lead to cost cutting, including the reduction of staff, as if this alone will result in a change in the industry's constraints on worker overtime. The Petitioner fails to acknowledge, however, that the NRC is proactively addressing this issue. The NRC has issued a policy statement on deregulation and the NRC is empowered to ensure that licensees have the technical qualifications, including the necessary staff, to safely operate commercial nuclear facilities. The NRC is well aware of the issues, safety-related and otherwise, that are being raised due to deregulation. There are forums to deal with these issues (*e.g.*, license conditions, the new oversight program, and, where appropriate, demands for information), but the case has not been made that licensees are reducing staff in a manner that threatens the safe

operation of facilities. In fact, the nuclear industry's performance has consistently improved over the last decade.

In conclusion, granting this petition would unreasonably constrain licensee flexibility and would unnecessarily compel licensees to increase staff at nuclear facilities to stay within the Petitioner's prescribed overtime limitations. Moreover, the NRC and the industry have already addressed the issues raised by Mr. Quigley, through issuance of NRC guidance and through self-regulation, and the Petitioner raises no compelling argument that warrants re-evaluation of worker fatigue and overtime guidelines. For the reasons stated, I&M therefore requests that the NRC deny this petition.

Sincerely,

Chris Bakken
Site Vice President

\dms

c: Document Control Desk
J. E. Dyer
MDEQ – DW & RPD
NRC Resident Inspector
R. Whale

Station Support Department

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PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

February 14, 2000

Secretary
U.S. Nuclear Regulatory Commission
Attn: Rulemakings and Adjudications Staff
Washington, DC 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Subject: Comments Concerning "Petition for Rulemaking to Address Fatigue."
(64FR67202, dated December 1, 1999)

Dear Sir/Madam:

This letter is being submitted in response to Nuclear Regulatory Commission's request for comments concerning "Petition for Rulemaking to Address Fatigue" that was published in the Federal Register (64FR67202, December 1, 1999). The petition states that as companies downsize, there are fewer people to do the required work, resulting in increased overtime. The petitioner requests that the Nuclear Regulatory Commission (NRC): (1) Add enforceable working hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR Part 55.33 (a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC Form-396 to include self-disclosure of sleeping disorders by licensed operators. The petitioner also requests changes to NRC Inspection Procedure 81502, Fitness for Duty Program. The petitioner believes that clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized.

PECO Energy appreciates the opportunity to comment on the "Petition for Rulemaking to Address Fatigue." PECO Energy supports the comments submitted on behalf of the nuclear energy industry, by the Nuclear Energy Institute.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

James A. Hutton, Jr.
Director - Licensing

Acknowledged by card MAR - 1 2000

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Alliant Tower
200 First Street SE
P.O. Box 351
Cedar Rapids, IA 52406-0351

Office: 319.398.4411
www.alliant-energy.com

February 11, 2000
NG-00-0239

Secretary, U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Rulemakings and Adjudications Staff

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Subject: Duane Arnold Energy Center (DAEC)
Docket No: 50-331
Op. License No: DPR-49
Petition for Rulemaking; Request for Comments on Work Hour Limits
(64 Fed. Reg. 67202; December 1, 1999)

File: A-100

Dear Sir:

Federal Register (FR) Vol. 67, No 202 dated December 1, 1999, published for comment a petition for rulemaking requesting that the NRC add work hour limits to 10 CFR Part 26, add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders, revise the Enforcement Policy to include examples of work hour violations warranting various NRC sanctions, and revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. The petition also requests changes to the NRC inspection procedure for the fitness for duty program. The DAEC fully endorses the comments being forwarded to your staff through the Nuclear Energy Institute and the conclusion that the rulemaking should be denied.

There are no new commitments made in this letter.

If you have any questions regarding this matter, please contact my office at 319-851-7238.

Sincerely,

Kenneth Putnam
Acting Manager, Regulatory Performance

cc: NRC Document Control Desk
DOCU

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VIRGINIA POWER

February 8, 2000 GL99-082

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(64FR67202)

David L. Meyer
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

10 CFR PART 26: PETITION FOR RULEMAKING REGARDING WORKING HOUR LIMITS FILED BY BARRY QUIGLEY

Dear Mr. Meyer:

Virginia Power appreciates the opportunity to comment on the petition for rulemaking regarding working hour limits to minimize employee fatigue that was filed with the Commission by Mr. Barry Quigley. The petition was docketed by the NRC on October 7, 1999, and has been assigned Docket No. PRM-26-2. Notice of the petition was published in the Federal Register (Vol. 64, No. 230) on Wednesday, December 1, 1999, and appeared on pages 67202-67205.

We endorse the comments submitted by the Nuclear Energy Institute (NEI).

If you need further information, please contact:

Gwen Newman Gwen_Newman@vapower.com or (804) 273-4255

Respectfully,

James H. McCarthy, Manager
Nuclear Licensing and Operations Support

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389 Belmont #111
Oakland CA 94610
510-835-2334

December 8, 1999



Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir:

The following are formal comments to the Nuclear Regulatory Commission supporting the proposed rule published in the Federal Register on December 1, 1999 related to working hour limits for employees at nuclear power plants

The Federal government imposes working hour limits on truck drivers and airline pilots to protect the public from fatigued workers. It is time for the Federal government to impose working hour limits on employees at nuclear power plants that can be enforced whether plants are running or not.

I gather that the NRC introduced guidelines in 1982 limiting some workers at nuclear power plants to 16 hours per day and 72 hours per week, but that this only applies when the plant is actually running. Thus, plant operators can require workers to work 12 and 16 hour days for weeks on end during refueling outages.

It makes little sense to have fatigued workers repairing, inspecting, and testing safety equipment even if the nuclear power plant is shut down. They could so easily make a mistake or overlook some detail that would not be readily apparent, but which could cause a major problem when the plant is operating. The purpose here is to protect the public and the environment from a nuclear power plant accident. The consequences of errors and misjudgments is too awesome to readily comtemplate.

Thank you very much.
Sincerely,

Patricia H. Seffens

Patricia H. Seffens

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Ralph E. Beedle
SENIOR VICE PRESIDENT AND
CHIEF NUCLEAR OFFICER,
NUCLEAR GENERATION

February 14, 2000

Mr. David L. Meyer
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

SUBJECT: Petition for Rulemaking; Request for Comments on Working Hour Limits (64 *Fed. Reg.* 67202; December 1, 1999)

Dear Mr. Meyer:

On behalf of the nuclear energy industry, the Nuclear Energy Institute[1] submits the attached comments in response to the *Federal Register* notice published December 1, 1999 (64 *Fed. Reg.* 67202) on a petition for rulemaking on working hour limits. The petition requests that the NRC (1) add working hour limits to 10 CFR Part 26; (2) add a criterion to 10 CFR 55.33(a)(1) to require evaluation of known sleeping disorders; (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. The petition also requests changes to the NRC inspection procedure for the fitness for duty program.[2] The industry believes the petition for rulemaking should be denied for four primary reasons.

First, the industry has appropriately responded to potential fatigue-related issues. Each licensee has developed programs to comply with NRC fitness-for-duty requirements (including the Continuous Behavioral Observation Program), as well as to implement Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours." These programs successfully demonstrate that licensees recognize that appropriate management of their workforces, including oversight of personnel hours worked, is a fundamental aspect of safe plant operation.

[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, nuclear materials licensees, and other organizations and individuals involved in the nuclear energy industry.

[2] 64 Fed. Reg. 67202.

Acknowledged by card MAR - 1 2000

1776 I STREET, NW SUITE 400 WASHINGTON, DC 20006-3708 PHONE 202.739.8088 FAX 202.785.1898

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Second, despite the petitioner's contention that "fatigue most probably played a role in a respectable percentage"[3] of incidents recorded in the NRC's Human Factors Information System, the petition does not, and probably cannot, substantiate that conclusion. Simply stated, the petition fails to supply credible data demonstrating an industrywide problem with nuclear plant personnel fatigue. Indeed, data on industry performance demonstrate exactly the opposite proposition—industry performance has improved over the past decade and has done so notwithstanding corporate restructurings affecting nuclear power plant licensees.

Third, additional regulation is not necessary to provide NRC with authority to take action on fatigue-related issues.

Finally, in promulgating any regulation, the NRC must comply with 10 CFR 50.109. To meet the criteria for a "backfit," a proposed rule must demonstrate that the proposed working hour limitations either (1) are necessary for adequate protection or (2) will achieve a substantial increase in the overall protection of public health and safety, *and* the direct and indirect costs of implementation are justified in view of the increased protection. Without showing that fatigue is a root cause of, or even a substantial contributing factor to, the limited number of significant events that have occurred over the past decade, the adequate protection test of the backfit rule is not met. Further, given the complexity of the proposal and the burdensome nature of its implementation for licensees and enforcement by the agency, we do not believe the proposed rule meets the cost-benefit test of 10 CFR 50.109.

Thus, as stated above, the industry does not believe further agency action is appropriate and we strongly encourage the NRC to deny this petition. Please do not hesitate to contact me or Jim Davis (202-739-8105) if you have questions regarding the industry's position on this rulemaking.

Sincerely,

Ralph E. Beedle

Enclosure

[3] Id. at 67203.

Nuclear Energy Institute Comments on Petition Requesting Amendment of NRC Regulations and Other Action to Address Fatigue of Personnel at Nuclear Power Plants

I. NRC requirements and responsive industry programs sufficiently address potential fatigue-related issues.

Each licensee has developed programs to comply with NRC fitness for duty requirements (contained in 10 CFR Part 26), including implementation of a Continuous Behavioral Observation Program (CBOP). Part 26 very clearly requires that licensees establish and implement written policies and procedures to meet general performance objectives and specific fitness for duty requirements. The general performance objective for 10 CFR Part 26 states that fitness for duty programs must provide reasonable assurance that personnel "will perform their tasks in a reliable and trustworthy manner and are not under the influence of any substance, legal or illegal, *or mentally or physically impaired from any cause,* which in any way adversely affects their ability to safety and competently perform their duties."[1] Further, 26.20 states specifically that the "licensee policy should also address other factors that could affect fitness for duty such as mental stress, *fatigue* and illness."

Thus, licensees are required to have programs to assist supervisors in detecting personnel who are not fit to perform their assigned activities. Licensee managers are given training on behaviors and attributes which indicate various bases for questioning a worker's fitness, including use of alcohol or illegal drugs, and behavior indicating stress or fatigue.[2] It is appropriate to continue to rely on the overall fitness for duty programs currently implemented by licensees to monitor fatigue because these programs have been successful. Fatigue is not simply a function of the number of hours worked. It is also based upon an individual's habits away from work, sleep habits and health condition, to name only a few of the potential variables affecting an individual's level of fatigue. Under fitness for duty programs, supervisors are responsible for constantly determining an individual's overall fitness. The petition does not present a legitimate basis for emphasizing fatigue over any other basis for questioning an individual's mental or physical fitness for duty.[3]

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[1] 10 CFR 26.10(a)

[2] 10 CFR 26.22

[3] The petition requests that the NRC revise Form 396 and 10 CFR Part 55 to require self-disclosure and evaluation of known sleep disorders. Currently, 10 CFR Part 55 requires that a license applicant's medical condition and general health shall not adversely affect the performance of assigned operator duties or cause operational errors endangering the public health and safety. This already encompasses detrimental sleep disorders. If an individual had a sleep disorder that would, in the examining physician's judgment, endanger the public health and safety, information regarding this condition would be provided on NRC Form 396.

- All licensees have instituted procedures/programs to comply with the agency's working hour policy. Generic Letter 82-12 "Nuclear Power Plant Staff Working Hours," states the Commission's policy and that which licensees should use as guidance in developing their programs:

> Licensees of operating plants and applicants for operating licenses shall include in their administrative procedures (required by license conditions) provisions governing required shift staffing and movement of key individuals about the plant. These provisions are required to assure that qualified plant personnel to man the operational shifts are readily available in the event of an abnormal or emergency situation.
>
> ****
>
> These administrative procedures shall also set forth a policy, the objective of which is to prevent situations where fatigue could reduce the ability of operating personnel to keep the reactor in a safe condition. The controls established should assure that, to the extent practicable, personnel are not assigned to shift duties while in a fatigued condition that could significantly reduce their mental alertness or their decision making ability. The controls shall apply to the plant staff who perform safety related functions (e.g., senior reactor operators, reactor operators, auxiliary operators, health physicists, and key maintenance personnel).

Generic Letter 82-12 clearly sets out the agency's working hour *objectives*--under normal operating conditions, licensees are expected to generally maintain an 8-hour a day, 40-hour a week schedule for plant staff who perform safety related functions. The Generic Letter clearly recognizes that there may be situations that require licensees to use substantial amounts of overtime on a temporary basis. These include unforeseen problems, extended periods of shutdown or refueling, major maintenance or major plant modifications.

The intent of GL 82-12 is to provide appropriate flexibility to enable licensees to accommodate both normal and exigent circumstances without affecting public health and safety. The NRC has chosen not to impose requirements creating inflexible working hour standards precisely because there are occasions when management should be permitted to authorize overtime assignments. For example, licensees generally limit work to the normal 8-12 hour day and 40-hour week. Overtime is to be confined to circumstances where essential work must be done on an accelerated basis (e.g., outages, time-limiting "LCO" actions). The basis used to make a need for overtime determination varies from licensee to licensee, but representative criteria used by licensees are:

- completing work on a problem immediately affecting nuclear or industrial safety
- work affecting critical path during a shutdown
- responding to a limiting condition for operation

- completing work where it is safer to complete than to secure.

- unplanned/unexpected personnel shortages

These criteria are both reasonable and protective of the public health and safety.

As an additional safeguard, and consistent with GL 82-12, licensees have implemented systems/procedures to ensure that senior management exercises careful oversight where overtime in excess of procedural limits may be necessary. In fact, licensees generally require their supervisors to obtain senior management approval of overtime decisions. Although the specifics may vary somewhat from licensee to licensee, in the main, licensees require written authorization by a member of senior management (e.g., plant manager or higher) in order to deviate from overtime guidelines or procedures. Consistent with the principles of GL 82-12, licensees also require a senior manager to review monthly overtime to confirm that workers are not assigned excessive hours. The oversight by senior management provides an important internal check on the implementation of the licensee's own program/procedures. The industry believes management's oversight of the use of overtime may well explain why few events are related to fatigue based on excessive working hours.

Although the demonstrated success of the current regulatory approach is sufficient to warrant rejection of the petition's request for additional regulation, we also note that implementing the proposed working hour limits and, thereby, limiting licensee flexibility to exercise its authority to manage its plant, could, in some circumstances, adversely affect safety. For example, the potential for the strictures of the proposed rule to force the licensee to put the plant through a shutdown transient rather than exceeding the overtime limits for one or two key maintenance staff. Also, the proposed rule could result in many more turnovers and disruptions of teams working together, which could, in turn, lead to increases in errors causing events.

In sum, the NRC has adequately addressed potential fatigue issues as part of its broader fitness for duty rules. Further, licensee programs implementing the guidance contained in GL 82-12 ensure that, under normal operations, licensees limit overtime. As is appropriate, licensees are permitted some flexibility for overtime for unusual circumstances and for relatively short periods with greater worker demands. No evidence has been cited that suggests that any further NRC or licensee actions are necessary.

II. The petition fails to supply credible data demonstrating a fatigue problem with nuclear workers.

The petition contends that working hour limits should be imposed to minimize personnel fatigue. In support of this contention, the petition makes the unsubstantiated claim that there is a problem in the area of nuclear plant personnel fatigue but that it is not properly reported. This argument simply does not withstand scrutiny. The lack of data regarding fatigue cases does not establish that the NRC or licensees underreport fatigue as a root cause. Rather, the failure to attribute significant events to fatigue can be

plainly explained. As noted above, the fitness for duty and continuous behavioral observations programs require supervisors to monitor the workforce for fatigue and other fitness related problems. The relatively stringent overtime criteria used by licensees also should be credited in this regard. Thus, potential problems may be *avoided* because regulatory requirements and implementation of GL 82-12 have performed their intended function.

Petitioner also argues that failing to credit fatigue as a root cause of certain events is of increased significance because the NRC will be "reducing its inspection efforts at nuclear plants."[4] This assumption plainly is incorrect. Over the past decade, NRC has performed an average of approximately 2,350 hours of core inspection on two unit sites. Under the new program, projected average baseline inspections are expected to consume approximately 2,300 hours. The actual differential in the pilot program baseline inspection was 47 hours--less than a 2 percent decrease.

The petition also claims additional regulation of working hours is needed because the transition to a competitive electricity market will motivate nuclear licensees to so reduce staffing that excessive amounts of overtime will be required of the remaining workers. While certainly licensees are making efforts to operate more efficiently, they are also well aware of the need to continue to operate at high levels of safety performance and reliably in order to achieve economic gain. In fact, nuclear power plants have responded to competition, in part, by enhancing plant performance. For example, the nuclear industry overall has increased its output (through September 1999) by 9.4 percent over the same period in 1998. The petitioner simply misapprehends the impact on nuclear licensees of moving to a competitive market. Given that licensees can only derive economic benefit from their nuclear plants when they are operated safely and reliably, there is a great incentive to, among other things, maintain staffing at sufficient levels and develop reasonable work schedules. By doing so, licensees promote productivity among their workers and ensure public health and safety.

The petition states that fatigue causes inattention to detail, increased risk-taking and poor work practices.[5] The variables that affect worker performance often make it exceedingly difficult to determine the precise root cause of an inadequately performed task or questionable decision. Yet, the petitioner reaches its conclusion regarding fatigue without mentioning the host of other reasons that may contribute to inattention to detail, increased risk-taking and poor work practices. As a minimum, other reasons could be distractions based on personal issues, interruptions occurring while a job is being performed, and even mild health problems such as a cold or allergies. Interestingly, the petition later admits that there "are certainly other causes" for the occurrences cited by the NRC in its Human Factors information data base, but nevertheless, and without any supporting data, concludes that "fatigue most probably played a role in a respectable percentage" of these occurrences."[6] The imposition of strict limits on working hours

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[4] 64 Fed. Reg. at 67203.

[5] Id.

[6] Id.

would not address the licensee's inability to control an individual's activities outside the work environment, including whether workers obtain sufficient rest/sleep.

Petitioner's only basis for its conclusion is a comparison between reported fatigue related events cited by the National Transportation Safety Board and the NRC. It is not appropriate to assume that the fatigue experienced by truck drivers, who operate in a sedentary, isolated environment, is relevant to nuclear operators, who are stimulated by other operators and various tasks that must be performed throughout the shift. In addition, to the extent petitioner implicitly focuses on the night shift, we note that individual plant data on human performance events indicate that the night shift does not produce a greater number of errors or that the errors that occur are due to fatigue. Plant data indicate that, where errors are made, they tend to be during the day shift because typically there are more activities underway.

Finally, an evaluation of industry performance data refutes the petitioner's argument that this rule is necessary to prevent fatigued personnel from performing safety related functions. In fact, the data on industry performance demonstrate that there have been fewer events in total, and safety and economic performance has improved overall. We note that the results of a recent NRC study based on operating experience indicate that "combined initiating event frequencies for all initiators calculated from the 1987-1995 experience are lower than frequencies used in NUREG 11-50, Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants and IPEs *by a factor of five and four respectively*." The decrease in initiating events, a direct indicator of the appropriateness of operator action, would not have occurred if licensed reactor operators routinely suffered from fatigue or other impairments which would affect their ability to safely perform their duties. Even more telling is the statistic related to the rate at which events directly affected by operator action have been reduced:

> The overall initiating event frequency decreased by a factor of two to three during the nine year span. Most risk-significant initiator frequencies (such as total loss of feedwater flow, loss of instrument or control air, inadvertent closure of all main steam isolation valves (MSIVs) and total loss of condenser heat sink for BWRs) decreased at a faster rate than the overall initiating event frequency.[7]

Thus, the NRC's own data demonstrate that the number of initiating events has been reduced considerably and that events are far less safety significant. Neither statistic could be achieved if operators or other personnel carrying out safety related tasks were routinely in a fatigued or otherwise impaired state. INPO data also support this conclusion.

III. NRC has ample regulatory authority to ensure licensees appropriately handle potential nuclear workforce fatigue.

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[7] NUREG/CR 5750, "Rates of Initiating Events at U.S. Nuclear Power Plants: 1987-1995," February 1999.

The NRC has ample authority to address potential fitness for duty issues including fatigue. Under 10 CFR 26.20(f), "[t]he Commission may at any time review the licensee's written policy and procedures to assure that they meet the performance objectives of this part." Many plants have included their procedures implementing the guidance in GL 82-12 in their technical specifications. The NRC has the authority to take enforcement action to require a licensee to comply with its technical specifications, thereby providing confidence that workers are not impaired from fatigue based on excessive working hours. Where licensees have included overtime guidelines (consistent) with GL 82-12) in their administrative procedures, NRC also retains regulatory authority to address potential fatigue issues it detects.

IV. The proposed rule would not meet the requirements of 10 CFR 50.109, *Backfit.*

In promulgating any regulation, the NRC must comply with 10 CFR 50.109. If the exceptions to the backfit rule[8] are not met, the proposed rulemaking must demonstrate that working hour limitations will achieve a substantial increase in the overall protection of the public health and safety *and* that the direct and indirect costs of implementation are justified in view of the increased protection.

Without a strong showing that fatigue is a root cause or even substantial contributing factor to the limited number of significant events that have occurred over the past decade, the first prong of the backfit test cannot be met. That is, no demonstration has been made to indicate a safety significant problem with the current regulatory scheme. If the current regulatory scheme adequately ensures plant personnel are not being subjected to excessive overtime, it is axiomatic that no substantial increase in public health and safety would be derived from the proposed working hour limits.

Finally, the complexity of the proposal and the burdensome nature of its implementation mean that the rulemaking would not satisfy the second prong of 10 CFR 50.109. Without a substantial increase in public health and safety, no additional costs can be justified.

V. Conclusion

For the aforementioned reasons, the petition for rulemaking should be denied.

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[8] 10 CFR 50.109(a)(4).

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February 11, 2000
RC-00-0034

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Ms. Annette L. Viette-Cook
Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Rulemakings and Adjudications Staff

[redacted] Taylor
[redacted]ent
Nuclear Operations

Dear Ms. Viette-Cook:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
COMMENTS ON PETITION FOR
RULEMAKING DATED SEPTEMBER 28, 1999
FILED BY MR. BARRY QUIGLEY,
(64FR 67202, December 1, 1999)

South Carolina Electric & Gas Co
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, South Carolina
29065
[redacted]344
803.345.5209
www.scana.com

South Carolina Electric & Gas Company (SCE&G) has reviewed the proposed notice of rulemaking and hereby requests that the Nuclear Regulatory Commission deny the request for proposed rulemaking as unnecessary for the continued safe operation of nuclear power plants. SCE&G endorses comments provided by the Nuclear Energy Institute relative to this matter.

Additionally, SCE&G submits the following comments:

It is the best interest of the company to ensure the continued safe and efficient operation of the company's asset in maintaining a nuclear power plant that is competitive through reliable operations. To that end, great effort is taken to maintain a favorable working environment for company employees. Working hours must remain flexible to allow station management various options to control operations and maintenance cost, as well as, fulfill the needs and desires of professional employees.

The suggested requirement to provide initial and continuing fatigue mitigation training for all personnel performing safety related work, their supervisors, and managers is excessive and represents a significant new regulatory burden for a competitive industry to endure. Fatigue related issues have not proven to be a concern at the Virgil C. Summer Nuclear Station.

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The new administrative obligation to track hours worked performing safety related work, as opposed to work that is not safety related, for all employees represents an unjustified and unnecessary regulatory burden.

Refuel outage durations have dropped significantly over the last few years. The industry has seen a resultant decrease in the number of highly skilled and trained contractors who are willing to relocate to the station for short duration outages. The lure for some of this highly skilled labor force is the promise of overtime work hours and the associated overtime pay that comes with working seven day work weeks. The proposal suggests outage work hour limits that will remove an incentive which attracts certain skilled outage laborers. There is a potential impact on the continued ability to meet outage schedules. Extending outage durations could prove to increase risks with regards to shutdown safety.

It is our experience that employees who work night shift rarely take full advantage a day off to rest and relax. Many choose to swap to dayshift hours on a day off to enjoy time with their family. The subsequent move back to nightshift causes increased strain as their bodies adjust to the rapid changes in schedule. This may impact their ability to think clearly and work safely. Permanent plant personnel would generally only be asked to work increased overtime to support outages once (in most cases for about 30 days) in an 18-month cycle.

It is SCE&G's contention that, existing regulations and guidance which are a part of the station's license as Technical Specification 6.2.2.e, are sufficient to limit the working hours of unit staff who perform safety related functions.

If you have any questions please call at your convenience.

Very truly yours,

Gary J. Taylor

RAM/GJT/dr

c: J. L. Skolds
J. J. Galan
R. J. White
K. R. Cotton
NRC Resident Inspector
J. B. Knotts, Jr.
NSRC
RTS (O-L-99-0414-1)
File (811.02, 26.004)
DMS (RC-00-0034)

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North Atlantic

North Atlantic Energy Service Corporation
P.O. Box 300
Seabrook, NH 03874
(603) 474-9521

The Northeast Utilities System

February 11, 2000

NYN-00010

Mr. David L. Meyer
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Seabrook Station
Comments on Petition for Rulemaking; Request for Comments on Work Hour Limits
(64 Fed. Reg. 67202, December 1, 1999)

This letter provides the North Atlantic Energy Service Corporation (North Atlantic) response to the request for comment on the subject Petition for Rulemaking.

North Atlantic has reviewed the comments submitted separately by the Nuclear Energy Institute (NEI) on behalf of the nuclear energy industry and endorses those comments. North Atlantic encourages the NRC to deny this petition. In addition to recognizing that oversight of personnel is a fundamental aspect of safe plant operation, North Atlantic has procedures and programs in place to control personnel working hours within the requirements of Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours", required by the Technical Specifications. North Atlantic believes that the NRC has ample authority to enforce the requirements of the Technical Specification without the need for additional rulemaking.

Thank you for the opportunity to comment on this important issue. If you have any questions regarding these comments, please contact Mr. James M. Peschel, Regulatory Programs Manager, at (603) 773-7194.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.

Ted C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer

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cc: H. J. Miller, Regional Administrator
R. M. Pulsifer, NRC Project Manager, Project Directorate 1-2
R. K. Lorson, NRC Senior Resident Inspector

Entergy

Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213-8298
Tel 601 368 5758

Michael A. Krupa
Director
Nuclear Safety & Licensing

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February 10, 2000

Ms. Annette L. Vietti-Cook, Secretary
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Attn: Rulemaking and Adjudication Staff

Subject: Comments on Petition for Rulemaking Related to 10 CFR Part 26

Reference: *Federal Register* Vol.64, No. 230, Pages 67202 – 67205, dated Dec. 1, 1999

CNRO-2000-00005

Dear Ms. Vietti-Cook,

On December 1, 1999, the NRC published a notice of receipt of a petition for rulemaking regarding working hours. Entergy Operations, Inc. (Entergy) appreciates the opportunity to comment.

Entergy is taking great strides to enter the competitive electricity market. One of the avenues used to become more competitive has been to restructure the workforce. This, in some cases, has lead to reducing the numbers of employees in various support organizations. As the petitioner states, the battle cry is "do more with less". Regardless of that cry, Entergy believes adequate guidance currently exists to ensure the operation of its nuclear power stations is not adversely affected by personnel fatigue. Entergy understands and emphasizes to employees that competitive success can only come with error-free and event-free operation of our nuclear facilities. Additionally, Entergy is committed to assuring the work force is alert at all times. The following points provide Entergy's bases for concluding the rule is not needed:

- Working hours of individuals are controlled by site Administrative controls as required by the Administrative section of each facility's Technical Specifications.

- Entergy is increasing its emphasis on human error reduction. This includes increased supervisory oversight encouraging the use of human performance tools such as self-checking, peer checking, place keeping, and three way communications. Entergy believes the use of these tools provides a greater opportunity to minimize human error than does the proposed rule. Questions related to personnel fatigue are presently included in the human performance tools and traps program. Our experience with crew debriefs following human errors over the past three years show that fatigue is not a significant contributor.

- According to the proposed rule the major cause of fatigue is working hours. However, the activities in which employees participate outside of work also contribute to fatigue. There is no way to enforce an employee's fatigue factor associated with these outside of work activities. Therefore, the rule may not be effective.

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- Behavioral observation, which is included in the Fitness for Duty programs at each site, is already an effective means of recognizing and intervening when an employee is not fit for duty, for whatever reason, including fatigue.

If after reviewing the comments received, the NRC believes this proposed rule is needed, Entergy recommends that the NRC first change its inspection procedure for Fitness for Duty to include a module for fatigue observation. Based on completion of several inspections, including this module, appropriate action should then be taken.

Again thank you for the opportunity to provide our comments.

Sincerely,

Gerry H. Davant

for

MAK/DM/baa

cc: Mr. C. G. Anderson (ANO)
Mr. C. M. Dugger (W-3)
Mr. W. A. Eaton (GGNS)
Mr. R. K. Edington (RBS)
Mr. J. R. McGaha (ECH)

Mr. T. W. Alexion, NRR Project Manager, ANO-2
Mr. R. J. Fretz, NRR Project Manager, RBS
Mr. N. Kalyanum, NRR Project Manager, Waterford-3
Mr. M. C. Nolan, NRR Project Manager, ANO-1
Mr. S. P. Sekerak NRR Project Manager, GGNS

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WINSTON & STRAWN

35 WEST WACKER DRIVE
CHICAGO, ILLINOIS 60601-9703

200 PARK AVENUE
NEW YORK, NY 10166-4193

1400 L STREET, N.W.
WASHINGTON, D.C. 20005-3502

(202) 371-5700

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75116 PARIS, FRANCE

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Ms. Annette L. Vietti-Cook
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Attention: Rulemakings and Adjudications Staff

Re: Comments on Petition for Rulemaking dated September 28, 1999 filed by Mr. Barry Quigley, 64 Fed. Reg. 67202 (December 1, 1999), PRM-26-2

Dear Ms. Vietti-Cook:

The following comments on the petition for rulemaking filed by Mr. Barry Quigley related to overtime are submitted by Winston & Strawn for itself, on behalf of Commonwealth Edison, Energy Northwest, Niagara Mohawk Power Corporation, a number of other utilities and as counsel for NUBARG.[1] Winston & Strawn is a law firm which represents utilities, which are the owners and operators of commercial nuclear power plants and which would be most directly affected by the petition for rulemaking. For the following reasons, we respectfully request that the Nuclear Regulatory Commission deny the request for proposed rulemaking as unnecessary for the safe operation of these nuclear plants.

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[1] NUBARG is a consortium of a dozen utilities (representing 40 power reactors) which was formed in the early 1980s and actively participated in the development of the NRC's backfitting rule (10 C.F.R. § 50.109) in 1985. NUBARG has subsequently monitored the NRC's implementation of the backfitting rule.

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The nuclear industry enjoys the reputation of being one of the safest industries in which to work. This reputation is due, in no small measure, to the continuing ability of nuclear power plant employees, and, in particular, licensed operators, to support the operation of their units. Recognizing that operator effectiveness is of paramount importance and an essential element of the defense in depth of the public health and safety, the nuclear power industry has taken appropriate measures to ensure the high performance and alertness of operators. The nuclear industry has devoted significant resources to the identification, monitoring, and improvement of human performance issues. Moreover, the NRC has required licensees to adopt fitness-for-duty and behavioral observation programs and administrative requirements applicable to a range of employees, including all those having unescorted access to the facility. These efforts have been successful in accomplishing their goals and the petitioner has not demonstrated a need for any additional actions at this time, particularly the prescriptive, complex, and difficult to implement provisions which are advocated in his rulemaking petition.

Background

On December 1, 1999, the Nuclear Regulatory Commission ("NRC" or "Commission") published for public comment a notice of receipt of a petition for rulemaking dated September 28, 1999 that was filed with the Commission by Mr. Barry Quigley (64 Fed. Reg. 67202) ("Notice of Receipt"). Petitioner states that his action is based upon the transition of the electric power industry, including the nuclear power segment of that industry, into the "increasingly competitive electricity market."[2] The petitioner argues that this transition translates into fewer people who are working more and sometimes many more hours at nuclear power plants.[3] The NRC states that the petitioner believes that clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized.[4] In particular, the petitioner requested that the NRC (1) add enforceable working hour limits to 10 C.F.R. Part 26, (2) add a criterion to 10 C.F.R. § 55.33(a)(1) to require evaluation of known sleeping disorders, (3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and (4) revise NRC Form-396 to include self-

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2 Petition of Barry Quigley dated September 28, 1999 (hereinafter "Petition") at 1.

3 Id.

4 64 Fed. Reg. 67202.

disclosure of sleeping disorders by licensed operators.[5] The petitioner also requested changes to NRC Inspection Procedure 81502, "Fitness for Duty Program."[6]

Petitioner fails to support his basic premise by any compelling argument or study. He presents only the briefest anecdotal data. By contrast, the NRC's own review and analysis of the issue of operator staffing does not support the proposition advanced by Mr. Quigley. In a letter dated May 18, 1999 by then Chairman Shirley Ann Jackson to the Hon. Edward J. Markey, the NRC stated the following with regard to operator staffing:

> The NRC does not keep records of staffing levels for all categories of personnel performing safety-related functions at nuclear power plants. However, the NRC maintains records on the number of individuals holding NRC-granted operator licenses. In 1995, there were approximately 4,700 licensed operators working at U.S. commercial nuclear power plants. As of March 1, 1999, there were 4,546 licensed operators. Although the total number of licensed operators has declined, there are currently 5 fewer operating nuclear reactor facilities than there were in 1995. As a result, the average number of licensed operators per operating unit has remained at about 42 during this time period. Dual-unit sites, such as the Byron nuclear plant, generally maintain 70 to 90 licensed operators. As of March 1, 1999, Byron Station had 93 licensed operators.[7]

The petition fails to recognize the simple fact that there exist clear incentives for licensees of nuclear power plants to provide adequate levels of employees necessary to successfully operate their nuclear power plants. In a competitive environment, revenues are generated from a plant only when it is operating, thereby creating incentives to have an adequate number of employees to respond to contingencies as well as to perform routine operating, maintenance and support functions that keep a plant operating well. Avoidance of fatigue and mistakes (which could hinder operation or cause a shutdown) are clearly among the paramount interests of a plant operator. To the extent that staffing levels of nuclear power plants have been

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5 Id. at 67203-04.

6 Id. at 67202.

7 Questions and Answers Attachment, p. 6. Similar letters were sent to Reps. John D. Dingell and Ron Klink on the same date. Mr. Quigley is an operator at the Byron Station, which maintains its number of licensed operators above the norm.

reduced over time, licensees have taken measures to assure that capable employees are retained and have taken measures to increase the efficiency and productivity of those supporting operation of the plants.

The NRC has examined the effect of competition in the electric industry on the safety of nuclear power plants and has taken a number of measures to assure that its regulatory authority and programs are sufficient to protect public health and safety. (See Final Policy Statement on the Restructuring and Economic Deregulation of the Electric Utility Industry, 62 Fed. Reg. 44071, (August 19, 1997).) With respect to safety implications, that Policy Statement reaffirmed that the NRC's primary tool for evaluating and ensuring safe operations at its licensed facilities is through its inspection and enforcement programs. In her May 18, 1999 letter, Chairman Jackson indicated that NRC inspectors have periodically evaluated the use of overtime relative to a plant's technical specifications and the NRC's Policy on Factors Causing Fatigue of Operating Personnel at Nuclear Reactors.[8] The Chairman stated that in the future the Commission would reassess its Policy on Factors Causing Fatigue of Operating Personnel at Nuclear Reactors and continue to follow up on safety significant occurrences to determine root causes, including the potential contribution of personnel fatigue and make any needed adjustments in its regulatory program.[9]

The NRC's present guidance is sufficient to assure that overtime is not abused. Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours," required that licensees develop administrative procedures governing required shift staffing. These administrative procedures were set forth in a policy "the objective of which is to prevent situations where fatigue could reduce the ability of operating personnel to keep the reactor in a safe condition." Overtime control procedures adopted by licensees generally require supervisors to assess and attest to an employee's physical and mental alertness, ability to maintain concentration, and ability to safely complete a task prior to allowing that person to exceed work hour requirements. Such procedures typically require that the fitness-for-duty of the individual be periodically reassessed in order to determine his or her ability to continue the assigned task.

Petitioner's attempt to reinterpret data already collected by the NRC and its licensees to provide further basis for his petition is not rigorous and fails to support his premise. Petitioner argues that NRC inspection reports listed 87 occurrences of staffing as less than adequate while the industry using data from licensee event reports("LERs") only listed 11 for a particular period.[10] First, to draw a correlation between "staffing being less than adequate" and

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[8] Questions and Answers Attachment, p. 4.

[9] S. Jackson letter at 2.

[10] Petition at 1.

fatigue is not supported and is unwarranted. For example, there may have been instances where a particular job may have been determined to have been inadequately staffed in terms of number of individuals or required knowledge or skills. However, at the time the resources may have been available at the facility, but not properly allocated. Second, the disparity in numbers between NRC inspection reports and industry LERs may be explained in a number of ways, most of which are clearly unrelated to fatigue issues as suggested by petitioner.

The petition attempts to equate certain categories in the Human Factors Information System ("HFIS") database (e.g., work practices or skill of the craft less than adequate, non-conservative decisionmaking or questioning attitude less than adequate, self-checking less than adequate, and awareness or attention less than adequate) to fatigue related issues.[11] While undoubtedly fatigue cannot be ruled out as a contributor to the occurrence of any such personnel deficiencies, petitioner has failed to demonstrate that they played "a role in a respectable percentage"[12] or a significant role in any major event. Petitioner attempts to compare these statistics to a National Transportation Safety Board ("NTSB") report related to "consequential events,"[13] and a finding that 21 to 33% were fatigue related. There is no demonstration that the NRC database included only consequential events and therefore a comparison of the percentages is without foundation.

Petitioner's citation of an NTSB report and the comparison of funds allocated for fatigue research by the Department of Transportation versus that of the NRC, do not appear to be relevant to the nuclear industry. Unlike the transportation industry, individuals performing nuclear safety-related activities are rarely alone during the conduct of those activities, and would typically not be subject to the degree of monotony suffered by long distance drivers. In most cases, any inappropriate actions taken by individuals working alone would become readily apparent to other personnel in the plant and timely corrective action taken to mitigate the consequences of those actions. Additionally, the quality assurance program mandated by 10 CFR 50, Appendix B, adherence to those regulatory positions addressed by the Regulatory Guides listed in Section 17.3 of the Standard Review Plan (NUREG-0800), as well as nuclear industry standards, require the independent verification of critical tasks, such as those involving certain design, operating, and maintenance activities (e.g., design verification, quality control inspection activities, post-maintenance testing, and the independent verification of valve positioning), so as to assure the satisfactory completion of those tasks.

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11 Petition at 2.

12 Id.

13 Id.

Petitioner refers to the incident at Peach Bottom in 1987 as fatigue related.[14] As acknowledged by the NRC and licensee in that case, clearly that incident is not related primarily to fatigue but to significant management deficiencies which tolerated unacceptable conduct.[15] The petitioner specifies three other factors that he states would reduce faith in NRC and industry reporting on fatigue.[16] He advances the theory that some fatigue errors are latent and may not be discovered for quite some time."[17] However, if the effect of fatigue were substantial or had fatigue errors contributed to a substantial number of errors, the traceability to fatigue would be obvious or, at least, more direct and subject to confirmation. Second, petitioner states that the HFIS database shows 392 occurrences for which a root cause analysis was determined to be less than adequate, apparently reasoning that a root cause related to fatigue may have been missed.[18] He does not state why such a "fatigue" root cause is more likely to have been missed than any of the myriad of other causes. Third, he argues that LERs substantially understate fatigue as the cause of reportable events. As part of routine inspection activities, the NRC Resident Inspectors of the plant in question examine the quality of LERs and other root cause evaluations. Thus, a significant underreporting of fatigue as a cause of reported events is unlikely. Fourth, petitioner states that the NRC is not aggressive in looking for fatigue issues.[19] Certainly, if fatigue issues played a large role in significant events, they would have been evident and self identifying, and, as a result, thoroughly investigated. In any event, we think the petitioner's conclusions drawn from the guidance given to NRC inspectors regarding labor strikes relied upon by petitioner to support this proposition is inappropriate.[20] The NRC's Inspection Manual states that "recognizing that the area of fatigue is very subjective, the inspectors should find clear evidence

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14 Petition at 3.

15 In the August 10, 1988 letter transmitting the Order and Notice of Violation and Proposed Imposition of Civil Penalty, the NRC found that the failure by site and corporate management to identify, investigate and correct the inattentiveness and willful violation of control room staffing requirements demonstrated a significant lack of management attention to, and control of, operations at Peach Bottom.

16 Petition at 2-3.

17 Id. at 2.

18 Id.

19 Id. at 3.

20 Id.

of an effect on safety before raising this issue with plant management."[21] This appears to be an appropriate caution. However, it should be noted that the quoted section requires the inspector to look for fatigue from long hours at work which might affect the continued safe operation of the plant.

The Petitioner's Proposed Amendments

Petitioner recommends that there be specific limits on personnel performing safety-related work at a facility.[22] Initially, it is difficult if not impossible to identify and keep separate records for people who may be doing at least some "safety related work" during the course of a work week. The case of an individual who may have incidental safety-related tasks as part of his work day is not addressed by petitioner.

The petitioner would add a new definition to 10 C.F.R. Part 26 which would require that it apply to all safety related services "while on property owned or controlled by the licensee."[23] This would be applicable to individuals who may not have unescorted access and thus may not be within the present purview of 10 C.F.R. Part 26. Its scope is arbitrary in that an engineer working at the site would be covered while the same engineer working for a contractor offsite would not. Petitioner has made no showing that any increase in the scope of workers covered by 10 C.F.R. Part 26 is needed. Most importantly, with regard to the impact of the limits on safe operation the petitioner recognizes that "fatigue is related to several factors including time since awakening."[24] While petitioner would put stringent and defined limits on work hours, the rationale for their adoption breaks down inasmuch as the variability among individuals' sleeping habits and daily lifestyle choices may have a more significant impact on fatigue than any uniform limitation on working hours. Thus, the petitioner has not demonstrated that his proposed detailed structure of hour limits is warranted.

Petitioner then describes his suggested prescriptive set of limits on working hours. While mathematically exact, there is no demonstration of the need for either the individual or the collective requirements advanced by petitioner, given the lack of any demonstrated effect of fatigue on significant events or the failure of the presently imposed administrative limit system on overtime and the ability of the present fitness for duty and behavioral observation programs to

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21 NRC Inspection Manual, Inspection Procedure 92711, Section 3.03.

22 Id. at 4.

23 Id. at 6.

24 Id.

assure safe operation of the facilities. For example, petitioner proposed imposing on shift workers annual limits which are less than those for non-shift workers based upon general considerations of circadian rhythms and "working through the pre-dawn trough in performance,"[25] but provides no specific basis for the difference in the maximum annual limit.

Petitioner requests that NRC Form-396 and 10 C.F.R. Part 55 be revised to require self-disclosure and evaluation of known sleep disorders.[26] However, such revision does not appear to be necessary. NRC Form-396 (1-2000) relating to "Certification of Medical Examination by Facility Licensee" requires that as a result of a medical exam, the physician certify that the applicant has been found to meet the "fitness for duty requirements for licensed operators" at the facility. Reference to 10 C.F.R. Part 26 indicates that fatigue is one of the fitness for duty issues required to be addressed therein. Furthermore, the form requires that, based upon the physical examination, "including information furnished by the applicant," the physician determine that the applicant's physical condition and general health are such that the applicant "would not be expected to cause operational errors endangering public health and safety." If necessary, the physician may recommend that an applicant's operator license be conditioned. Clearly, the existing process already allows factors of fatigue and sleep disorder issues to be raised and considered in the medical evaluation of an individual. Further rulemaking is not required.

Section 26.22 currently requires that managers and supervisors receive training to ensure they understand behavior observation techniques for detecting degradation in performance, impairment, or changes in employee behavior, regardless of the cause. Therefore, the proposed revision to 10 C.F.R. Part 26 which would mandate that employees be specifically monitored for signs of fatigue would provide no added value. For the same reason, petitioner's request to modify 10 C.F.R. Part 26 to eliminate the general reference to the issue of fatigue as found in Section 26.20[27] is unsupported and not warranted.

New Overtime Requirements Cannot Satisfy the NRC's Backfit Rule

Any new requirements on limitations on overtime at nuclear power plants would affect Part 50 licensees and, thus, be subject to the NRC's backfit rule. 10 C.F.R. § 50.109(a)(1). Section 50.109(a)(3) of the rule establishes two fundamental criteria that must be met by a new regulation that does not qualify for any of the backfit exceptions in 10 C.F.R. § 109(a)(4).

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25 Id.

26 Id. at 7.

27 Id. at 5.

Backfitting is permissible only if the new requirement results in a substantial increase in the overall protection of the public health and safety or common defense and security and the increased protection justifies the direct and indirect costs of implementing the new requirements. 10 C.F.R. § 50.109(a)(3). Neither of these conditions can be met by any requirements or limitations on overtime at nuclear power plants. Moreover, none of the exceptions in the backfit rule would apply to such requirements or limitations. Accordingly, the proposed requirements and limitations on overtime at nuclear power plants do not satisfy the backfit rule.

First, additional requirements or limitations on overtime would not result in a substantial increase in safety. As has already been discussed, current overtime practices and procedures have been designed to ensure that all plant personnel are adequately rested and alert while performing their duties. Further reductions in work hours, therefore, would not materially improve the ability of plant personnel to competently perform their assigned duties. Because further reductions in work hours would have no material impacts on safety, such reductions (a fortiori) cannot substantially increase public health and safety.[28]

Second, the direct and indirect costs of any additional overtime requirements or limitations are not justified by increased protection. Because no increased protection would result from such additional overtime requirements or limitations, as discussed above, no costs for such overtime requirements or limitations can be justified. Thus, neither of the NRC's backfit criteria could be satisfied by any additional overtime requirements or limitations.

Finally, none of the exceptions in the backfit rule would apply. All facilities currently are in compliance with overtime limitations. 10 C.F.R. § 50.109(a)(4)(i). Additional overtime requirements and limitations are not required to provide adequate protection of the public health and safety because current practices and procedures have been demonstrated, contrary to the assertions by the petitioner, to provide such adequate protection. 10 C.F.R. § 50.109(a)(4)(ii). A redefinition of adequate protection as it may apply to overtime is not justified for the reasons discussed above. 10 C.F.R. § 50.109(a)(4)(ii). Because none of the backfit exceptions apply and because neither of the backfit criteria can be met, new overtime requirements or limitations cannot satisfy the backfit rule.

Conclusion

For the foregoing reasons, the subject petition for rulemaking does not provide a sufficient basis for the relief requested. The NRC clearly has recognized that the issue of employee overtime is a significant one that deserves attention and continuing evaluation. These factors are already taken into account in fitness for duty, training and behavioral observation

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[28] Common defense and security are not affected by this request so need not be considered.

programs which are required by the Commission's regulations, and licensees are sensitive to the fatigue and overtime issues. Moreover, the specific provisions proposed by petitioner were not justified on the basis of reference to studies or experience nor do they take into account individual personal and lifestyle differences among licensee personnel. At the most, the Commission should consider reinforcing existing programs and standards for behavioral observation rather than granting the petition. For these reasons, the petitioner's request to institute a proceeding should be denied.

Sincerely,

Mark J. Wetterhahn

Thomas C. Poindexter
Sheldon L. Trubatch
Counsel for NUBARG

MJW:sdd

MA: Box 83 Shelburne Falls, MA 01370 P/F: 413-339-5781/8768
CT: 54 Old Turnpike Road, Haddam, CT 06438 P/F: 860-345-2157
VT: C/O Box 566 Putney, VT 05346 P/F: 802-387-4050
NH: 9 Evens Road, Madbury, NH 03820 P/F: 603-742-4261
NY: 162 Cambridge St, Syracuse, NY 13203 P/F: 315-472-5478/ 7923

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CITIZENS AWARENESS NETWORK

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

'00 FEB 15 AM 11:51

February 14, 2000

US NRC
Secretary of the Commission
Washington, DC 20555-0001

Re: CAN's comments on two proposed rules: 1) establishing limits on employee working hours at nuclear power reactors and 2) training supervisors, managers and directors on employee protection regulations

To Whom It May Concern:

By this letter, the Citizens Awareness Network (CAN) formally submits comments on the two proposed rules referenced above. CAN is a volunteer, grassroots organization with chapters in reactor communities in MA, CT, VT and NY. We have over 2,000 supporting members.

The Citizens Awareness Network agrees with the Union of Concerned Scientists in that it is time for the Federal government to impose enforceable working hour limits for employees at nuclear power stations. These limits, which are needed to prevent worker fatigue and performance problems, must be applicable whether the nuclear reactor is running, shutdown such as in a refueling or other maintenance outage or decommissioning. We request that your agency act as quickly as reasonable possible to establish employee working hour limits before utilities trim their workforces to dangerous levels in their haste to be competitive in a deregulated electricity market.

The Citizens Awareness Network also supports the Union of Concerned Scientist's proposed rule to mandate the training of supervisors, managers and directors on employee protection regulations. Employee protection regulations training will allow individuals to be held responsible should they break the law by harassing workers. Consider that key managers and supervisors at the Millstone nuclear complex who were responsible for systematically thwarting a safety conscious work environment for years, went unpunished and in some cases, continue to work at the Millstone complex. Regulation that allows the latter to occur defies logic, is ineffective and leaves workers disheartened and silenced. Accountability is the only way to bring an end to chilled workforces.

Nuclear reactor workers are our first lines of defense in the protection of our communities and the environment from nuclear mishaps and accidents. We request that you protect them by implementing both of the proposed rules referenced above.

Sincerely,

Deb Katz (RS)

Deb Katz
Executive Director

TOTAL P.01

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From: <CrypticResources@aol.com>
To: TWFN_DO.twf4_po(CAG)
Date: Mon, Feb 14, 2000 11:59 PM
Subject: PRM 26-2

I would like to submit the following as a response to PRM-26-2. I am sorry but I could not upload it.

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention:Reference: Rulemakings and Adjudication's StaffDocket No. PRM-26-2

To Whom It May Concern:

The rulemaking for overtime restrictions comes at a time when the Nuclear Industry is being driven to add profit to the bottom line. An aggressive utility lobby effort of recent past raised the level of awareness within the NRC that real political pressure can threaten its' very budgetary existence. The utilities are growing larger, more powerful, more political and more intimidating. Not only the utilities, but the NRC must deal with the unions, where a subculture may exist may have a different agenda from the utility and the NRC. The NRC is willing to answer this proposed rule with scientific fact that does exist, and not make a decision based on any political pressure.

The rules appear to be bent more by the utilities, while the NRC searches for some legal teeth to counter a culture shift in the utility management. Some of the utilities are doing more with less. So is the NRC. Years ago the NRC had to deal with a lack of Operations knowledge at the VP level. The NRC needed someone in that position that could prioritize what is needed for the plant. Now the NRC is dealing with the Nuclear Bean Counters, and the lobbying dollars to go with it.

The overtime rules are now interpreted and written in such a cleaver way that they may not count break times, lunch breaks or other non-safeguard activity of an operator. Some utilities are treating the most valuable asset, their employees with impudence. Employees are being reclassified as management, where they do not have to be paid overtime, while doing the same job they have done for years. The workload is increasing; longer hours are required with no compensation. The labor laws that clearly have a set of standards that delineate an exempt and nonexempt worker are being ignored. Worker dissatisfaction is growing along with precursory industrial accident rates. In deregulation, if the company is treating its employees in this regard, how do you think that company will treat you as a customer? Is this rule an indicator of unethical labor law application and practices? I feel sorry for the young operator who is being forced to work year after year hours of overtime and denying him/her of a quality family life. The Nuclear Christmas Carol. This is not the case in all utilities. It is more of the exception than the rule. But it does exist. Therefore, before mergers of utilities take place, I suggest a full review of the application of the labor laws. The labor laws, being compromised requires that action for sanctions be taken for a utility dealing in interstate commerce.

E-mail MAR - 1 2000
Acknowledged by [redacted]

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And so, with a few industry out layers, what is out there to correct the situation. Can INPO include this into the INPO #1 ratings, the amount of overtime worked? If the utilities were truly moving to self-regulation, then I would hope the Commission could ask a few tough questions to the regulars at the Stakeholder meetings.

As far as sleep disorders and reporting them, that shall be a must. The American Sleep Disorders Association can direct the NRC to the latest issue of the International Classification of Sleep Disorders Diagnostic and Coding Manual. Use it in the medical disclosure and license requirements.

Dr. Ehret, who in his studies of Circadian Rhythms found that response time falls off precipitously after 8 hours. Many of the power plants are working 12 hours because it gives the operators additional weeks off a year. But what good is it when that time is spent working more 12 hour shifts. I stated before this is the exception more than the rule.

A machine that measures fatigue may be more of a surprise to the utility than mandating working hours. For those operators that can "get by" with a minimal amount of sleep during the first few nights of back shift, may not be afforded that luxury. The utilities may not be staffed to take care of the operators who say, "I need to be relieved." Then what is the protocol? Have the operator make out a safety related tag out?

The NRC response the Congressmen Markey, Dingell and Klink on this very issue has yet to be answered. I hope that the NRC stops and thinks of its Mission Statement one more time before venturing a ruling on this.

In summary, having worked in the industry for 25 years, as a consultant for many years in operations, working in a quarter of the utilities at one time or another there must be some type of change made. It cannot stay the same. Teeth must be put back into the hour guidelines period. No room for interpretation. Disregard for the intention of the rule is not acceptable. This rule is a plea for a change. If an incident happened a year from now and the root cause found that fatigue was a significant contributing factor, who would be the Esketores?

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(154)

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ADJ

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Rulemakings and Adjudications Staff

February 11, 2000

Dear Ms. Annette Vietti-Cook:

I am submitting a public comment in partial support of Petition for Rulemaking (PRM-26-2) regarding the establishment of enforceable working hour limits for certain employees of NRC licensees. While I am an employee of NRC Region I, I am submitting these comments on my own initiative as I have a strong opinion in this matter. The opinions reflected in this document are solely my own. However, a copy of these comments will be provided to my management for their information.

It is clear to me that the petitioner has experience with working under the NRC's existing guidance in the area of working hour limits (i.e., the guidelines of GL 82-12 as embodied in the Technical Specifications of most, if not all, licensees). He has also done a considerable amount of work in an attempt to make the case that the NRC needs codified working hour limits for key licensee employees as well as changes to the existing Fitness For Duty rule (10 CFR Part 26) to address employee sleep disorders. However, as the petitioner found out, it is very difficult to make a clear connection between employee fatigue due to working an excessive number of hours and performance incidents at NRC licensees. From my 15 years experience reviewing many hundreds of Licensee Event Reports (LERs), internal corrective action requests and employee allegations, I am sure that this task would be very daunting. The NRC's past research efforts in this area have also revealed how difficult it is to make a direct correlation between employee. error rates due to fatigue and the numbers of hours worked. Thus, the NRC has never codified definitive working hour limits, but rather relied on the guidelines of GL 82-12 that are limited in the scope of employees covered, do not address the cumulative effect of excessive working hours over a period greater than one week and can be readily waived by plant management if needed.

Along with the petitioner, I also believe that more incidents in the nuclear industry are, at least in part, attributable to fatigue and excessive working hours than the very few that have been reported to the NRC in the past. I believe this is, in part, because employees often fail to freely admit after an event that they are overly fatigued due to excessive working hours or outside factors over which they have some control (i.e., an excessively long commute, inability to sleep during the daytime, and other outside distractions unrelated to company business). Moreover, errors due to fatigue are also likely not immediately identified (i.e., an equipment failure due to poor engineering or maintenance), in which case it is impossible to attribute the failure to

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employee fatigue months after the fact. As a result, the potential risk significance of employees working excessive working hours is not truly known. Nevertheless, given the great importance of having key plant workers fit for duty, the NRC previously saw fit to publish guidelines on working hour limits as well as ensuring that workers are drug-free.

I too believe it is now time for the NRC to publish clear and enforceable working hour limits for key licensee employees for the following reasons: 1) there has been a steady increase in overtime usage by many licensee employees in recent years due to cost containment pressures, 2) the scope of employees once voluntarily subject to the guidelines of GL 82-12 has been reduced in recent years by some licensees, again for cost related reasons, 3) the deregulated marketplace for electricity will put increasing pressure on key employees (e.g., licensed operators) to work longer hours due to the very high cost of training and developing new employees, and 4) many other federally regulated industries where human performance is critical to safe performance (e.g., aircraft pilots, truck drivers, railroad engineers) have already codified working limits that are more restrictive than the NRC's current guidelines. Therefore, I believe that now is the time to move toward codifying a reasonable set of working hour limits that will help prevent risk significant performance lapses by employees due to fatigue, but at the same time not be unduly burdensome to NRC licensees at a time when they need to become more cost competitive.

Regarding the petitioner's specific points, I would like to comment first on the petitioner's request to add a criterion to 10 CFR Part 55.33 to require evaluation of known sleeping disorders and to revise NRC form 396 to include self-disclosure of sleeping disorders by licensed operators. While I am not familiar with the intricacies of these requirements, the petitioner's request appears reasonable at first glance and should seemingly constitute very little burden for all but a few NRC license applicants. In fact, it is surprising to me that this information has not been required in the past given the range of other health conditions that the NRC and licensee's already evaluate for their potential impact on human performance. I see no reason why sleeping disorders should be treated differently than any other health condition that could impair an operator's fitness for duty.

On the issue of revising the NRC Enforcement Policy to include examples of working hour violations warranting various NRC sanctions, I believe this request is an obvious fallout of any significant change in this area of NRC regulation. While I may not agree with the petitioner's specific examples of such violations, it is logical that the NRC would publish examples of such violations as part of any new regulation in this area.

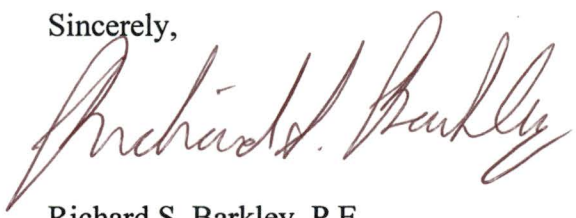
On the issue of the specific working hour limits proposed by the petitioner, I find the petitioner's request realistic overall, but his overly complicated guidelines would require licensees to hire additional time clerks just to keep track of work hours, particularly when workers call in sick or bump up against these multiple guidelines. As an alternate, I would propose a much more streamlined policy with only four logical overtime limits based on my experience with GL 82-12: 1) no more than 28 hours in a 48-hour period; 2) no more than 80 hours in any 7-day period, 3) no more than 280 hours in a 28-day period, and 4) no more than 2,800 hours in any calendar

year. In addition, while I would retain the petitioner's limits on turnover time that is excluded from this hourly count, I would also eliminate virtually all of the additional limits and exemptions permitted by the petitioner as they overly complicate this rule without commensurate benefit. The hourly rules I propose would allow for: 1) working consecutive 12 hour shifts now typical in the industry, but allow an individual to be held over for up to four hours in the event of an unexpected absence, 2) scheduling six 12-hour shifts in a row, but allow for an individual to be held over for up to eight hours in the event of an unexpected absence, 3) working up to 10 hours per day during the 28-30 days of a typical refueling outage (or longer each day, but guaranteeing that a worker would get a few days off to rest) and 4) working up to 35-45% overtime in a calendar year, but place an ultimate cap on the total number of hours which can be worked in order to discourage the development of severe staffing shortages in the future. Overall, I believe these overtime limits are reasonable and would not impose a substantial, additional burden on licensees, with the exception of those few licensees that have critical, long-term staffing shortages that they have not aggressively worked to remedy.

Finally, I agree that the above overtime limits should be imposed on **all licensee employees and supervisors who perform safety-related work**, versus solely just NRC licensed operators. It is important that all workers who perform safety-related work, as well as the individuals who supervise that work, be fit for duty versus just those individuals who are licensed by the NRC to operate plant equipment. Thus NRC licensed operators should not be singled out as the only work group which needs overtime limitations.

In summary, it is important that workers who perform safety-related work in nuclear power plants be fit for duty, which includes being drug-free and not excessively fatigued. As Probabilistic Risk Assessments and Accident Precursor Studies have revealed, the most likely way to have a severe accident at a nuclear power plant is to experience a transient with equipment complications and for operators to make multiple human errors of commission while responding to this event. To minimize the chances of workers who perform safety-related work, particularly operators, making multiple errors of commission, we need to ensure that operators are properly trained and qualified, plant equipment is designed (to the extent practical) with human factors in mind, staffing is adequate to handle events and operators are fit for duty. Ensuring that workers have time to adequately rest, so that they are alert and not overly fatigued, is a key element in ensuring that they are fit for duty.

Sincerely,



Richard S. Barkley, P.E.

cc: Glenn Meyer, Branch Chief, Division of Reactor Projects Branch 3, Region I
Rich Conte, Branch Chief, Operator Licensing, Division of Reactor Safety, Region I

PROFESSIONAL REACTOR OPERATOR SOCIETY

(153)

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

DOCKETED
USNRC

'00 FEB 14 A11 :17

OFFICE OF SECRETARY
RULEMAKINGS AND ADJUDICATIONS STAFF

February 11, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Rulemakings and Adjudication's Staff

Reference: Docket No. PRM-26-2

To Whom It May Concern:

The Professional Reactor Operator Society (PROS) thanks the Commission for the opportunity to comment on the referenced petition for a proposed rule.

While PROS agrees that operator fatigue and attentiveness have safety implications, it is not readily apparent that the referenced battle cry of "do more with less" in the operator community is as prevalent as the petitioner would lead us to believe.

In a recent survey conducted by PROS to determine current issues that our members are concerned about, overtime was identified by 65% of the survey respondents. Our survey did not, however, ask the respondents to qualify their concerns. At this time PROS cannot state definitively that the concern is due to understaffing, desire for more time off, pure dislike of overtime, or any other reason.

In the interest of providing the Commission with the type of data that would be needed for informed rulemaking regarding this issue, PROS is willing to conduct a more detailed survey of the licensed operator community. To better identify the specific concerns the Staff might have PROS is willing to work with the Staff in developing specific survey items to include. PROS is also willing to work with the Staff to complete the survey in a timely manner.

PROS is confident that many of the arguments raised by the petitioner are currently covered by the Fitness for Duty Rule (FFD). When the rule is applied in the broadest sense, an operator must be physically and mentally prepared to assume his or her duties. By virtue of the responsibility that comes with an operator's license, it is PROS belief that each operator is duty bound to follow this premise. PROS is aware of policies at some utilities that have ingrained this into their culture with a great deal of success. Operators that refuse overtime-based on FFD do so without fear of retribution by management. PROS cannot say that this is occurring uniformly across the industry, but it certainly could be substantiated via a comprehensive survey of the affected population.

The proposed limit of hours is a simplistic solution to a very complicated problem. There are a number of other factors that affect attentiveness and fatigue that are not related to hours. Activities prior to coming to work, after work, family obligations, family or work conflict, career goals all affect the licensed operator just as they affect any other worker. To minimize fatigue and attentiveness one would have to be able to predict human response to all of these variables. An attempt to regulate any of these, including hours, would create a regulatory requirement that would be very difficult for each licensed operator to manage.

MAR - 1 2000
Acknowledged by card

P.O. Box 484 Byron, IL 61010-0484 (800) 422-2725 PROS316@aol.com

U.S. NUCLEAR REGULATORY COMMISSION
RULEMAKINGS & ADJUDICATIONS STAFF
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PROFESSIONAL REACTOR OPERATOR SOCIETY

Every new NRC requirement places a new burden on the individual operator to manage. Each 10CFR55 license has individual responsibilities that they are held accountable for. The majority of licensed operators are shift workers that attend requalification training on a set schedule. The intent of this training is to ensure that they have the technical knowledge to operate the plant safely. Each new program that is created by the NRC that requires training actually exacerbates the overtime issue. Many utilities use overtime to train on those topics that are not directly related to the topical areas specified in 10CFR55. Creating another mandatory training program would just mean more overtime training for many operators, the result being counterproductive to the proposed training's goal.

PROS proposes that if the overtime issue is truly a concern of the NRC, then it be tracked or regulated in such a manner that it is unobtrusive to the individual license holder. The recently revised plant inspection program is just such a vehicle. The NRC could track plant performance and include overtime of key safety personnel as one of the pinpoints that feed into overall risk. Although not completely knowledgeable on all of the nuances of the new process, PROS believes that the NRC staff could develop such a program. The Physical Protection Cornerstone has the Fitness-for-Duty (FFD)/Personnel Reliability Program Performance Indicator. 10-CFR Part 26 states, "Licensee policy should also address other factors that could affect fitness for duty such as mental stress, fatigue and illness." The indicator definitions and data reporting elements would be the number of deviations in the overtime rule, number of incidents where operators identify that they are not fit for duty due to fatigue, mental stress or illness while on duty.

In conclusion, PROS would again like to thank the Commission for the opportunity to comment and request that the Staff, if action is taken, seeks ways to minimize the individual burden on the licensed operator community.

Respectfully

Mike Jacobson
President
Professional Reactor Operator Society

P.O. Box 484 Byron, IL 61010-0484 (800) 422-2725 PROS316@aol.com

From: Carol Gallagher
To: Adria Byrdsong, David Desaulniers
Date: Mon, Feb 14, 2000 10:07 AM
Subject: Comment letters on PRM-26-2

Attached are three comment letters on PRM-26-2 that I received via the rulemaking website on February 13, 1999.

They are from:

Mike Jacobson, President
Professional Reactor Operator Society
608 N. Pierce Drive
Santa Maria CA 93454

Jim Lemke
5115 Sedalia Place
Rockford IL 61109

Robert Kline
115 La Colima
Pismo Beach CA 93449-2843

Carol

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)
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USNRC
'00 FEB 14 A11 :17
152

To: Nuclear Regulatory Commission

RE: Docket No. PRM-26-2

I would like to comment on a petition for rulemaking dated September 29, 1999, by Mr. Barry Quigley, assigned Docket No. PRM-26-2.

My name is Robert Kline, I am employed by Pacific Gas and Electric Company (PG&E) as a Control Operator at Diablo Canyon Power Plant, Avila Beach, California. I have been employed by PG&E since 1979. I received a Reactor Operators license in 1983, and a Senior Reactor Operators License (SOP-50225) in 1986. I have been in on-shift operations for more than 20 years.

I am in disagreement with the proposed changes of PRM-26-2, specifically limiting the hours worked by licensed personnel. Mr. Quigley cites National Transportation and Safety Board (NTSB) statistics to support his theories. Comparing the NTSB's statistics to the NRC's statistics is the equivalent of comparing apples to oranges. Airline pilots and long-haul truck drivers are away from home during their work periods. Their sleep and meal patterns are disrupted. Nuclear Power Plant personnel return to their homes following their work periods, and follow their normal sleep and meal patterns.

It is a rarity when any operating personnel are assigned a mandatory overtime shift at Diablo Canyon. Personnel are excused from work 100% of the time if they feel fatigued, or unfit for duty. Management at Diablo Canyon are required to monitor shift operating personnel for fatigue and fitness for duty, and excuse same personnel if fatigue is an issue.

Diablo Canyon Operations went away from working 8 hour shifts, in favor of 12 hour shifts, many years ago. Operations personnel are limited to working 12 hours in a 24 hour period, with a required 12 hour period off work prior to beginning a 12 hour shift. This eliminates the problem of fatigue associated with working a 16 hour shift.

Limiting the working hours of Licensed Operators beyond the currently established limits will have a negative impact on the Licensee during outage periods, as extra personnel are required to perform all of the operations necessary to refuel the plant, and perform the required testing to return the Unit to service. Limiting the number of Licensed Operators available will delay restart of the Unit.

Additional limits on working hours will also cause a loss of income to some licensed personnel, who work additional shifts to cover for vacations, or other absences on-shift.

Please do not hesitate to contact me with any questions. Thank you for your time.

Robert Kline
115 la Colima
Pismo Beach, CA. 93449-2843
805.773.2846
rtk1@pge.com

Acknowledged by card MAR 1 2000

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OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

February 13, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington D.C.
Attention: Rulemaking and Adjudications Staff

Subject: 10 CFR Part 26 (Docket No. PRM-26-2)
NRC Generic Letter 82-12 rulemaking change

Dear Sirs,

As an active RO license holder, I urge you to make the changes as requested by the petitioner concerning overtime hours. Over the past eleven years, I have seen my overtime hours steadily increase. And, although this overtime was still within the limits of GL 82-12, there is so much ambiguity, it does not prevent the misuse of overtime on a day-to-day basis. How do you define "routine" and "heavy use of overtime"?

Even though the objective of a "40 hour week while the plant is operating" is clearly stated in the current 82-12 letter, overtime is quite common and the general feeling is that as long as the specified hours are met, we are in compliance. This mindset then leads to many 72 hour weeks and 16 hour shifts. I personally have had documentation made to my personnel file for refusing to work an eight hour day shift following an eight hour night shift. This is a situation a nuclear plant worker should not even be put in.

In closing, I feel the job we do is too important to not take the risk of fatigue seriously and, that it is imperative to the safety of the industry to update the overtime rules rather than being governed by a generic guideline that is almost twenty years old and outdated.

Sincerely,

James Lemke, Reactor Operator
5115 Sedalia Place
Rockford, IL 61109

Acknowledged by card MAR - 1 2000

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ADJU[illegible]

GROSSLYN FARM

PHONE 766-8785

PLUMSTEADVILLE, PA. 18949

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

2/6/2000

Secretary of the Commission, U.S.
Nuclear Regulatory Commission

Dear Sir.

Please support the new regulations tightening requirements to prevent nuclear workers fatigue; the current lack of enforcement is frightening + could lead to a catastrophy.

I am 74 year old, but I have 5 girls + 19 grandkids. + I fear for them.

Sincerely

Mr. Raymond Gross
P.O. Box 267
Plumsteadville, PA 18949

Raymond C Gross
B267
Plumsteadville, Pa
18949

P.S. I would appreciate information concerning the current status of this matter

MAR - 1 2000

Acknowledged by card

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PETITION RULE PRM 26-2
(64FR67202)

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'00 FEB 11 P3:33

6 February, 2000

Gentleman,

This letter is to provide comments on your petition assigned Docket No. PRM-26-2 regarding nuclear power plant worker overtime and work hours. The current administrative guideline limit of 72 hours per week is adequate to prevent excessive fatigue in individuals working typical 12 hour shifts. This limit insures the individual will receive at least one day off per week.

A 60 hour per week limit for the Transportation industry (i.e. truck drivers, etc.) may be justified for them as they are often traveling on the nation's hi-ways and trying to rest or sleep in road side rest stops or unfamiliar motels, etc. which can often result in non-productive rest. Licensed Operators and nuclear power plant workers on the other hand are able to return home every day after their shift and sleep in a familiar and comfortable environment resulting in a much better productive rest period for them. This allows them to be able to work longer periods of time and not be any more fatigued than probably what a Transportation industry worker may be only working 60 hours a week.

Reducing the hours per week a nuclear industry worker can work will also simply require more **mandatory** overtime to be imposed on workers who traditionally don't want to work over time but will now have to since other workers willing to work the extra overtime will not be allowed to do so. Forcing mandatory overtime on individuals can lead to morale problems which can be of a much greater concern than potential operator fatigue. Perhaps the NRC should be more concerned with the issues of mandatory versus voluntary overtime assignments being made at Licensed facilities.

Sincerely,

Craig Smith

Craig Smith, Licensed Reactor Operator
870 Casitas Ct.
San Luis Obispo, CA 93405

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913 Taughannock Blvd.
Ithaca, NY 14850
February 7, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Dear Sir:

I am writing to comment on two issues related to nuclear power plant safety which I understand are now being considered for rule changes.

First, I support the proposal to establish mandatory limits on employee working hours at nuclear power plants. I understand that the NRC long ago recommended guidelines that limit workers to 16 hours per day and 72 hours per week, but these guidelines did not apply to all personnel and in any case, applied only when the power plant is in operation. In the current competitive climate for energy production, I understand that economics make it tempting for power plant managers to hire as few workers as possible and work them extraordinarily long hours when necessary, especially when the power plant is off line because of maintenance, refueling or repairs. The guidelines should be made mandatory and should apply to all workers all of the time. We cannot afford to have fatigued workers set off another Three Mile Island or Chernobyl. I used minute quantities of gamma-emitting radioisotopes in biological experiments for many years and have a healthy respect for the havoc which could be caused in a nuclear power plant by a fatigued worker in any position. It is, if anything, even more important to have alert workers doing the maintenance, refueling or repairs than when the plant is up and running normally. The system is only as safe and effective as the weakest link – in the present context, the possibility of an error made by a fatigued worker. The power plant operators will tend to cut corners wherever they can within the law, especially in tight economic conditions. It is up to the NRC to establish clear and reasonable regulations to protect the workers from unreasonable work schedules, and to protect the public from a nuclear power plant disaster which could easily have been avoided by mandating reasonable work schedules.

I also support a related rule which I understand is being considered, one which would require nuclear power plant owners to train supervisors and managers in employee protection regulations. This would protect plant workers who conscientiously raise safety concerns from illegal harassment and intimidation by supervisors who can now claim "ignorance of the law." Again, it is important to encourage every worker who responsibly questions a condition or a practice which might adversely affect the safe operation of the plant to bring the issue to the attention of her/his supervisor or whoever is in a position to correct the problem without fear of reprisal.

Sincerely,

Elizabeth Wien

Elizabeth M. Wien, Ph.D.
Retired

Acknowledged by card MAR - 1 2000

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ADJUDICATIONS STAFF

Secretary of U.S. Nuclear
Regulatory Commission
Washington, D.C. 20555-0001

re: Hours of Service, Plant Operations

Sir:

I recently read an article that indicates that there is not an hours of service for plant staff.

As a railroad engineer, I am limited to a 12 hour work shift. This is to help prevents wrecks and injuries to co-workers.

Since I remember the night mare of TMI, I can't believe that there isn't a Federal Rule and accounting program in place to certify hours of service.

Railroad time records are subject to scheduled and surprise inspections. If a Railroad Supervisor falsifies entries and forces the works to go along the worker can contact the FRA without giving name or employee number but where to look. He can call back to help if need be. There is heavy fines or jail time for those involved.

R Adam
450 Swamp Rd.
Doylestown Pa 18901

Acknowledged by card FEB 14 2000

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(64FR67202)

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UNION OF
CONCERNED
SCIENTISTS

January 19, 2000

Ms. Annette Vietti-Cook
Secretary of the Commission
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: RULEMAKINGS AND ADJUDICATIONS STAFF

SUBJECT: COMMENTS ON PROPOSED RULEMAKING ABOUT WORKING HOUR LIMITS (DOCKET NO. PRM-26-2)

Dear Ms. Vietti-Cook:

On behalf of the Union of Concerned Scientists, I am submitting these comments on the petition for rulemaking (docket PRM-26-2) submitted by Mr. Barry Quiqley. This petition seeks to add enforceable working hour limits to 10 CFR Part 26 and associated changes to 10 CFR §55.33, the NRC Enforcement Policy, NRC Form 396, and NRC Inspection Procedure 81502. UCS fully supports the petition for rulemaking and urges the NRC to implement these changes as they have been detailed in the petition with one exception. The petition describes additions to 10 CFR Part 26 which would "apply for personnel performing safety-related work." In theory, this scope would cover contractor person at offsite offices performing safety-related work for a plant owner. In practice, that broad scope would be difficult to enforce by the NRC staff. Therefore, UCS recommends that the scope of the additions to 10 CFR Part 26 be clarified from "personnel performing safety-related work" to "personnel covered by the licensee's Fitness for Duty program" or wording to that effect. Under the existing Fitness for Duty (FFD) rule, plant owners must include all individuals approved for unescorted access to a nuclear plant within their FFD program. Some plant owners expand this scope to also include corporate office staff and onsite support staff. The working hour limits should apply to the persons currently covered by the FFD rule.

The petition for rulemaking is thorough, complete, and supported very well by extensive research. The proposed rulemaking, if enacted, would greatly enhance the ability of the NRC to achieve one of its stated objectives – namely, maintain safety at nuclear power plants.

UCS released a report titled, "Overtime and Staffing Problems in the Commercial Nuclear Power Industry," in March 1999. A copy of that report is enclosed. This report concluded:

> The NRC must establish clear requirements for working hours that reduce the potential for weary workers making grave mistakes.

The proposed rulemaking by Mr. Quiqley will establish the clear requirements that we feel are necessary. As documented in the petition and in our report, the deregulation of the electricity generation makes the need for clear requirements absolutely vital because nuclear plant owners are slashing staff sizes and forcing the survivors to work longer and longer hours. This trend is a clear and present danger that must be addressed now – not deferred until after fatigue contributes to a major nuclear accident.

Acknowledged by card FEB 14 2000

Washington Office: 1616 P Street NW Suite 310 • Washington DC 20036-1495 • 202-332-0900 • FAX: 202-332-0905
Cambridge Headquarters: Two Brattle Square • Cambridge MA 02238-9105 • 617-547-5552 • FAX: 617-864-9405
California Office: 2397 Shattuck Avenue Suite 203 • Berkeley CA 94704-1567 • 510-843-1872 • FAX: 510-843-3785

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On 2/2/00, Rec'd E-mail from
David Desaulniers

The proposed rulemaking would make conditions for nuclear plant workers comparable to those established by federal agencies for workers. For example, the Federal Aviation Administration enforces working hour limits for flight crew members (14 CFR §121.471) and for aircraft dispatchers (14 CFR §121.465) while the US Department of Transportation enforces working hour limits for drivers (49 CFR Part 395) and for railroad workers (49 CFR Part 228). It is incredulous that there are federal regulations limiting the hours worked by a driver of trucks making deliveries to nuclear power plants, but no such regulations limiting the hours worked by the control room operators of those plants. The workers at nuclear power plants may all be very fine men and women, but there is no evidence to suggest that they are immune to human performance problems caused by fatigue. The working hour limits outlined in the petition submitted by Mr. Quiqley must be implemented by the NRC to provide nuclear plant workers and the people living around the plants with protection that the federal government has long provided in other sectors.

Sincerely,

David A. Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists

Enclosure: UCS Report "Overtime and Staffing Problems in the Commercial Nuclear Power Industry," March 1999. [NOTE: This report is not copyrighted and therefore may be distributed without prior permission of UCS.]

Overtime and Staffing Problems In the Commercial Nuclear Power Industry

March 1999

My group spends a lot of time in the field, and so does the other groups and we see problems -- working hours, overtime, fatigue. There are three quick examples that we're in between having a standard on how to deal with that and a problem that we know is lurking out there.

NRC Staffer to Advisory Committee on Reactor Safeguards December 5, 1996

UNION OF CONCERNED SCIENTISTS

Washington Office: 1616 P Street NW Suite 310 • Washington DC 20036-1495 • 202-332-0900 • FAX: 202-332-0905
Cambridge Headquarters: Two Brattle Square • Cambridge MA 02238-9105 • 617-547-5552 • FAX: 617-864-9405
California Office: 2397 Shattuck Avenue Suite 203 • Berkeley CA 94704-1567 • 510-843-1872 • FAX: 510-843-3785

After the Three Mile Island accident, the Nuclear Regulatory Commission (NRC) recognized the role that worker fatigue could play in an accident. Unfortunately, that recognition did not lead to the problem's resolution.

An extensive review of NRC documents dealing with fatigue problems found a clear pattern of unenforceable ambiguity. The NRC's concern about worker performance problems caused by fatigue seems to be limited to their meekly encouraging plant owners to handle it. The NRC's inept treatment of this issue is baffling when compared to how successfully the agency dealt with another issue having similar impacts on worker performance – namely, substance abuse. For that issue, the NRC implemented a rule that has virtually eliminated substance abuse problems by nuclear workers.

Anecdotal evidence supports the conclusion of NRC ineffectiveness on the fatigue issue. Three members of the NRC's regional staff indicated that the agency feels that as long as nothing bad happens, it will take no action. That attitude, if reflective of NRC policy, would seem to be designed to – at best – prevent the *second* major reactor accident. It contradicts the NRC's mission, as defined by Congress, of providing adequate protection against the *next* major reactor accident.

The electric utility industry is undergoing restructuring. Nuclear power plant owners are cutting staffing levels in their efforts to generate electricity at competitive prices. As a result, workers at nuclear plants are working more overtime. For example, operators at a Midwest nuclear power plant logged 50,000 overtime hours in just one year's time – 1997. The worker fatigue problems are likely to get worse unless the NRC takes action to deal with the issues.

The full rationale for NRC's failure to meaningfully address overtime and staffing issues is not known, but a major part is simply "that nothing bad has happened yet." Using this unsound logic, the emergency core cooling systems and containment buildings at the nation's 103 nuclear power plants could be permanently removed since few events have required their use. Unlike the purported one in a hundred-thousand year or one in a million year chances of an accident requiring emergency core cooling systems and the containment building, worker fatigue is a minute by minute challenge to safe plant operation.

The NRC must establish clear requirements for working hours that reduce the potential for weary workers making grave mistakes.

How Workers Affect Nuclear Safety

According to information provided to the NRC by nuclear plant owners, 50 to 80 percent of serious safety problems involve worker errors.[1] The NRC's analytical staff reviewed reports submitted by plant owners and NRC inspectors and concluded that the sequence of events leading to a major plant accident would most likely be initiated by a worker mistake.[2] Following its review of plant-specific safety assessments, the NRC staff concluded, "human actions are clearly important contributors to operational safety" and "human error can be a significant contributor to [serious reactor accidents.]"[3] Thus, nuclear plant workers make mistakes and their mistakes can have very serious safety implications.

What causes nuclear plant workers to make mistakes? While there is no single cause for the mistakes, fatigue is responsible for some significant ones. For example, the NRC reported that in October 1990, three workers at Braidwood Unit 1 in Illinois, were sprayed with 180°F water – one individual received second degree burns – from the reactor coolant loop when plastic tubing used for testing burst open. Over 600 gallons of water drained from the reactor coolant system before the leak could be stopped. NRC inspectors concluded that fatigue from excessive overtime was a main contributor to this event.[4]

How Fatigue Affects Workers

Researchers have consistently found what Thomas Jefferson might have considered self-evident – that fatigue causes workers to make more mistakes and to perform less reliably.

The accident at Three Mile Island – the worst commercial nuclear plant accident in US history – occurred in the early morning hours of March 28, 1979. The following year, the NRC reported:

> Studies indicate that with fatigue, especially because of loss of sleep, an individuals detection of visual signals deteriorates markedly, the time it takes for a person to make a decision increases and more errors are made, and reading rates decrease. Other studies show that fatigue results in personnel ignoring some signals because they develop their own subjective standards as to what is important, and as they become more fatigued they ignore more signals.[5]

The last part is particularly disturbing because it suggests that well-founded procedures and layers of emergency equipment can be defeated by weary workers discounting warning signs.

Concern about fatigued workers is not confined to the nuclear industry. Research in the aviation industry found that fatigue:

- slowed individuals' reaction time,
- impaired people's problem-solving ability,
- made people more likely to take short cuts,
- made people more willing to accept higher than normal levels of risk.[6]

Here again, is the disturbing finding that fatigue prompts otherwise responsible people to take shortcuts and high risks.

The aviation study concluded that fatigue made it harder for people to solve problems. In 1992, researchers at Canada's Defence

and Civil Institute for Environmental Medicine quantified this negative impact. They reported that after 18 hours awake, people's problem-solving ability declined by 30 percent.[7] Note that this degradation occurs after the time awake not just the time on the job.

Although fatigue was not shown to be a factor in the space shuttle *Challenger* explosion, the Rogers Report did find that worker fatigue had contributed to prior near-misses.[8] One specific example cited was the aborted launch of shuttle mission 61-C on January 6, 1986. Five minutes before the launch, workers misinterpreted a valve indication failure in the automatic fueling sequence. This caused the undetected loss of nine tons of the liquid oxygen fuel. A fortunate side effect of the loss was a drop in temperature to the shuttle main engines, but this degraded condition was noted only 31 seconds before the launch. The launch was aborted. The investigation found two significant points:

- Worker fatigue was one of the major factors of the error. The workers were 11 hours into their third consecutive 12 hour midnight shift when the error was made.
- Had the error not been discovered and the launch aborted in the final seconds of the countdown, it was seriously doubted that the shuttle would have reached orbit.

The Rogers investigation was very critical of the long hours worked by shuttle subcontractors because, in part, they regularly exceeded the recommended limits of an NRC report[9]. The ironic part is that NRC never implemented its own recommendations.

Worker fatigue has even tarnished the golden arches. In 1983, an Oregon jury awarded $400,000 to the driver of a car struck by a McDonalds employee who had worked three shifts within a 24-hour period. The jury determined that McDonalds failure to control working hours "unreasonably created a foreseeable risk of harm."[10]

The effects of fatigue on nuclear safety are best summarised in the NRC's own words:

> The safety of nuclear power plant operations and the assurance of general public health and safety depend on personnel performing their jobs at adequate levels. Research on extended working hours indicates that the performance of individuals will degrade without adequate rest after long periods of work. Fatigue can degrade an operator's ability to rapidly process complex information such as that presented by off normal plant conditions. In addition, fatigue may jeopardize the ability to respond in a timely fashion. Furthermore, performance errors are more likely to occur as a result of lapses in short-term memory. Because individuals performing safety-related duties may be required to respond quickly to a plant emergency, it is important for plant management to carefully exercise control over overtime practices in order to ensure that plant personnel perform adequately.[11]

McDonalds was held accountable because it failed to properly deal with a foreseeable risk of harm. The NRC acknowledges that worker fatigue represents a risk to nuclear plant safety. What have they done about it?

What NRC Did About Fatigue

The NRC first attempted to deal with the fatigue problem with a policy statement on overtime issued in 1980.[12] The policy contained more restrictive working hour limits than currently exist, but even these 'limits' were diluted because they were presented as recommendations rather than as requirements. The policy also outlined the licensee's responsibility to "provide a sufficient number of trained personnel who are in the proper physical condition to operate and maintain the plant."

In 1982, the NRC sent all nuclear power plant owners information which forms the agency's current overtime policy. The major points of the policy are:

- Plant owners must have written procedures that formalize the working hour guidelines and prevent situations where fatigue could reduce the ability of operating personnel to keep the nuclear plant in a safe condition. The procedural controls should assure that personnel are not in a fatigued condition while at work that could significantly reduce their mental alertness or their decision-making ability.
- A sufficiently large work force should be used to prevent routine heavy use of overtime. The objective is a normal 8-hour day, 40-hour week while the plant is operating. If unforeseen problems require substantial amounts of overtime to be used, or during extended periods of shutdown, the following guidelines shall be followed:
  1. An individual should not work more than 16 hours straight.
  2. An individual should not work more than 16 hours in any 24-hour period, nor more than 24 hours in any 48-hour period, nor more than 72 hours in any seven-day period.
  3. A break of at least 8 hours should be allowed between work periods.
  4. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on shift.
- If very unusual circumstances arise that require deviation from the guidelines, such deviation shall be authorized by the plant manager, his deputy, or higher levels of management.

After the Three Mile Island accident, the NRC required nuclear power plant owners to revise their operating licenses to include administrative controls on staffing levels and working hours. Although the administrative controls language was somewhat ambiguous, its placement in plant operating licenses meant that the NRC focused at least some attention to the matter.

Beginning in 1996, NRC undermined what little rigor remained in overtime regulation by allowing plant owners to re-revise their operating licenses, this time to *remove* the administrative controls on staffing levels and working hours. For example, the NRC issued a Safety Evaluation Report for San Onofre Units 2 and 3 to allow the overtime controls to be removed from Tech Specs. The basis was "that few events at U.S. nuclear plants have been attributed to inadequate control of working hours."[13]

How NRC Handled Substance Abuse

Ten years ago, the NRC issued the Fitness for Duty rule to address substance abuse in the nuclear power industry. The NRC imposed this rule because "scientific evidence is conclusive that significant decrements in cognitive and physical task

performance results from drug and alcohol usage."[14]

During 1997, researchers at the University of Southern Australia compared the effects from fatigue to those from alcohol consumption.[15] They used standard eye-hand coordination test methods. After 17 hours awake, the decline in performance was equivalent to a blood alcohol content (BAC) of 0.05 percent (the legal limit set by the NRC for access to nuclear power plants is a BAC of 0.04 percent). At 24 hours awake, performance had decreased to a level corresponding to a BAC of 0.10 percent.

Curiously, although conclusive scientific evidence shows that fatigue causes measurable drops in cognitive and physical task performance and the NRC's own records are replete with examples of safety problems caused by weary workers, the agency views fatigue with in an entirely different light from substance abuse.

During the public comment period for the fitness for duty rulemaking, one person observed that fatigue could impair worker performance. Another commenter noted that workers could be disciplined or fired for errors due to fatigue.

The NRC responded to these comments by acknowledging that fatigue was an important issue but claimed that sound management practices could be expected to be more effective than prescriptive regulations. Because it is more economical to get more work out of existing staff than to hire additional workers, the NRC's logic is wrong. The agency also did not explain why sound management practices would be inadequate to handle substance abuse. The NRC also took credit for the part of the rule that requires plant owners to ensure that workers are not impaired from any cause, arguing that fatigue was covered by this language. Given that this wording is even more nebulous than the NRC's guidance on overtime, the logic is fallacious. The NRC's guidance to inspectors when auditing fitness for duty programs at nuclear power plants makes no – zero – mention of fatigue and focuses solely on substance abuse.[16]

How effective is the fitness for duty rule? With respect to substance abuse at nuclear power plants, it has been very effective. Fewer than one percent of the 296,625 drug and alcohol tests administered to nuclear plant workers during 1996 and 1997 yielded positive results.[17] The rule has been less effective with respect to fatigue at nuclear power plants.

Conclusions

Independent studies and nuclear industry experience both show that fatigue degrades the performance of workers. The NRC reports that worker mistakes can lead to serious nuclear plant accidents. The NRC attempted to limit fatigue among nuclear plant workers through restrictions on overtime and staffing levels, but these efforts have been ineffective.

The NRC's ineffectiveness in handling the fatigue problem is hard to understand given the agency's success in addressing substance abuse problems. The NRC implemented a fitness for duty rule more than ten years ago that has effectively reduced substance abuse problems among nuclear plant workers. The NRC has been unable, or unwilling, to effectively address the fatigue issue.

The explanation for NRC's failure to address fatigue problems levels is not known. It may simply be that the agency

feels "that nothing bad has happened yet" as if its mission were to protect the public from the *second* major reactor accident. Using this logic, the emergency core cooling systems and the containment buildings at nuclear power plants could be permanently removed since few events, *so far*, have required their use.

The restructuring of the electric utility industry makes proper control of worker fatigue more important. Nuclear power plant owners are cutting staff sizes as part of their efforts to generate electricity at competitive prices. As a result, the remaining workers are putting in longer and longer days as they pick up the load from those who have left. Fatigue problems in the nuclear power industry must be resolved soon.

Unlike the purported one in a hundred-thousand year or one in a million year chances of an accident requiring emergency core cooling systems and the containment building, worker fatigue is a minute by minute challenge to safe operation. Actions are said to speak louder than words, but in this case, the NRC's inaction speaks the loudest.

Recommendations

The NRC must take actions to address worker fatigue at nuclear power plants. The NRC could either apply its fitness for duty rule or implement a comparable rule. In any case, the NRC must establish clear requirements for working hours that reduce the potential for weary workers making grave mistakes.

Nuclear power plant owners must develop and consistently implement administrative controls to protect their workers from conditions causing fatigue. The NRC's working hour limits must <u>not</u> be routinely abused.

[1] Nuclear Regulatory Commission, Transcript of 452nd Meeting of the Advisory Committee on Reactor Safeguards (ACRS), April 30, 1998.
[2] Nuclear Regulatory Commission, Information Notice No. 92-36, "Intersystem LOCA Outside Containment," May 7, 1992.
[3] Nuclear Regulatory Commission, NUREG-1560 Vol. 1, Part 1, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," October 1996.
[4] Nuclear Regulatory Commission, Information Notice No. 91-36, "Nuclear Plant Staff Working House," June 10, 1991.
[5] Nuclear Regulatory Commission, Circular No. 80-02, "Nuclear Plant Staff Working Hours," February 1, 1980.
[6] Remi, Joly, Transport Canada, "A Study of the Impact of Shiftwork and Overtime on Air Traffic Controllers: Phase I," TP 12257E. October 31, 1994..
[7] Angus, R.G., Pigeau, R.A., and Heselgrave, R., "Human Performance and sleep research: from the field to the laboratory," in C. Stampi (ed) *Why We Nap*. Boston: Birkhauser, 1992, pp 217-241.
[8] "Report of the Presidential Commission on the Space Shuttle *Challenger* Accident, Vol. II, Appendix G, June 1986.
[9] Nuclear Regulatory Commission, "Recommendations for NRC Policy on Shift Scheduling and Overtime at Nuclear Power Plants," NUREG/CR-4285 (PNL-5435), July 1985.
[10] Ed Coburn, "Managing the Costs of Worker Fatigue," *Risk Management News*, July 29, 1996, pp. 3-4.
[11] Nuclear Regulatory Commission, Information Notice No. 91-36, "Nuclear Plant Staff Working Hours," June 10, 1991.
[12] Nuclear Regulatory Commission, Circular No. 80-02, "Nuclear Plant Staff Working Hours," February 1, 1980.
[13] Nuclear Regulatory Commission, Safety Evaluation Report, "Issuance of Amendment for San Onofre Nuclear Generating Station," February 9, 1996.
[14] Title 10 Code of Federal Regulations, Part 26
[15] *Nature*, Vol. 388, 17 July 1997, pg 235
[16] Nuclear Regulatory Commission, Inspection Manual, Inspection Procedure 81502, "Fitness for Duty Program"
[17] Nuclear Regulatory Commission, Information Notice No. 98-39, "Summary Of Fitness-For-Duty Program Performance Reports For Calendar Years 1996 And 1997," October 30, 1998.

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Secretary of the Commission,
U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff

DOCKETED
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'00 JAN 28 P1:16
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DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Leonard S. Hubbard
89 South Road
North Hampton, NH 03862

Dear Sir:

Comments on the proposed rule making: Docket No. PRM-26-2.

The petitioner requests that the NRC:

(1) Add enforceable working hour limits to 10 CFR Part 26;
(2) add a criterion to 10 CFR Part 55.33 (a)(1) to require evaluation of known sleeping disorders;
(3) revise the Enforcement Policy to include examples of working hour violations warranting various NRC sanctions; and
(4) revise NRC Form-396 to include self-disclosure of sleeping disorders by licensed operators.

The petitioner also requests changes to NRC Inspection Procedure 81502, Fitness for Duty Program. The petitioner believes that clear and enforceable working hour limits are required to ensure that the impact of personnel fatigue is minimized.

The parts of this proposed rule that should be adopted are 2 and 4. Certainly it is prudent to require evaluation and disclosure of a known disorder that may affect performance. This is already done, for example in operator license restrictions on the wearing of prescription glasses for licensed operator duties.

It is, however, an unnecessary complication to require enforceable limits as part of 10CFR 26, and unnecessary to revise the enforcement policy for NRC sanctions.

Operators take their responsibilities to protect the health and safety of the public and plant personnel very seriously and are mindful of their limitations for overtime and the possibility of becoming fatigued.

Working hours are already limited by each facility and the NRC has enough enforcement discretion to act on any violations they feel are adverse to safety, either through the facility license or the individual operator license. It is the responsibility of the operators to know when they are not capable of performing their duties and seek the necessary relief. The Fitness for Duty programs already require training on this responsibility and to add more requirements would be redundant with no added value.

Acknowledged by card FEB 14 2000

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Sincerely;

Leonard S. Hubbard
89 South Road
North Hampton, NH 03862-2009

From: Carol Gallagher
To: Adria Byrdsong, David Desaulniers
Date: Fri, Jan 28, 2000 11:54 AM
Subject: Comment letter on PRM-26-2

Attached is a comment letter on PRM-26-2 that I received via the rulemaking website. It was uploaded today by:

Leonard Hubbard
89 South Road
North Hampton, NH 03862-2009

Carol

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

(144)

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'00 JAN 24 P4:31

OFFICE OF SECRETARY
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Secretary of the Commission
US Nuclear Regulatory Commission
Washington,D.C. 20555-0001

Dear Secretary,

I write to you today to encourage you to enact 2 needed Proposed rules.The first being the rule to establish limits on employee working hours at nuclear power plants.I realize I am tardy in making my public comment on this rule and I apologize .This proposed rule is one I support heartily and feel is absolutely vital to the operation of our nation's nuclear power plants.Worker fatigue is dangerous and compromises safety and speed of reaction to emergencies as I have witnessed repetedly in my work as a state Correction Officer of 21 years expierience.

I also wish to support proposed rule 2 which would afford protection to "whistle blowers" who report or raise safety concerns.Safety,where large numbers of people's
well-being and health are concerned should be the foremost concern.It is vital that the jobs of those conscientious employees who alert thier supervisors to safety issues be protected and the supervisors be trained in employees protection requirements.

I THANK YOU for the opportunity of commenting as a private citizen on these matters and pray that you will have the knowledge and wisdom to enact the proper rules and regulations that insure the safe,efficient running of our nation's nuclear power facilities.

Safety First,

Thomas V. Connor

Thomas V. Connor
17 DuBois street
Wallkill,NY 12589-3113-6

Acknowledged by card FEB 14 2000

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'00 JAN 24 P4:28

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Peter Muise
42 Creighton Street
Cambridge, MA 02140

January 18, 2000

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir,

I am writing regarding two new rules the Commission is considering, which would establish limits on employee hours at power plants and provide employee protection training to supervisors. Please support both of these. Neither tired workers or workers afraid to discuss problems at their plants are strong line of defense against potential disasters.

The U.S. has happily been without any nuclear disaster for many years. Please support these rules and ensure that it will continue to be so in the future.

Sincerely,

Peter Muise

Peter Muise

FEB 14 2000
Acknowledged by card

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ADRIAN DOMINICAN SISTERS
1257 East Siena Heights Drive
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January 17, 2000

DOCKET NUMBER
PETITION RULE PRM 26-2
(64FR67202)

Secretary of the Commission
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sir or Madam:

The purpose of this letter is to inform you of my support for the two proposed rules that are before the Nuclear Regulatory Commission (NRC) at this time. The first rule limits the number of working hours for employees at nuclear power plants. As there is scientific research that backs up the direct connection between worker fatigue and the degradation of performance by these employees, all consideration should be given to keeping their working hours at a reasonable and safe limit. The second rule protects the nuclear "whistleblowers" from harassment and intimidation.

Both of these issues require considerable attention to detail to be certain of fairness and logic. I am asking that the NRC support both of these rules to ensure that the first line of defense at our nuclear facilities is staffed by workers who are free from both fatigue and fear of illegal discrimination.

Sincerely,

Molly Giller, op

Molly Giller OP
General Council

MG/ts

Acknowledged by card FEB 14 2000

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ADJUD F

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Secretary,

I'm writing urge you to support both recently proposed rules to ensure that workers are free from both fatigue and fear of illegal discrimination.

These two rules are essential to prevent fatigue from impairing nuclear plant worker performance. They will prevent fatigued workers from repairing, inspecting, and testing safety equipment when nuclear power plants are operating or shut down. The rules would prevent fear from causing nuclear plant workers to remain silent about safety problems. Supervisors, managers, and directors should be prevented from using "ignorance of the law" as a shield for their illegal actions. These rules are needed to protect the public and the environment from a nuclear power plant accident.

Thank you for your attention.

Sincerely,

Jim Mosser
467 SW 191 Terrace
Pembroke Pines, FL 33029

Acknowledged by card FEB 14 2000

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