



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

April 10, 1997

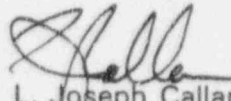
Dr. Robert L. Seale, Chairman  
Advisory Committee on Reactor Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Dr. Seale:

SUBJECT: HUMAN PERFORMANCE PROGRAM PLAN

This responds to your letter dated February 13, 1997, in which you provided comments concerning the Human Performance Program Plan. Your conclusions and recommendations and the staff's responses to each are enclosed.

Sincerely,

  
L. Joseph Callan  
Executive Director  
for Operations

Enclosure: As stated

cc: Chairman Jackson  
Commissioner Rogers  
Commissioner Dicus  
Commissioner Diaz  
Commissioner McGaffigan  
SECY  
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April 10, 1997

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Advisory Committee on Reactor Safeguards  
U.S. Nuclear Regulatory Commission  
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**Original Signed by**  
**L. J. Callan**  
L. Joseph Callan  
Executive Director  
for Operations

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Enclosure

Responses to ACRS' Conclusions and Recommendations

1. The HPPP is not a plan. It is, instead, an inventory of human performance projects within the agency. The HPPP should state explicitly what its goals are, what research efforts will be required to achieve these goals, and when and how it will be known that they have been achieved. The ownership of the present plan is diffuse. The success of such a plan as well as its dynamic nature require that ownership of the entire plan be clearly assigned.

The ACRS is quite correct. As stated in our February 4, 1997, responses to ACRS questions, the HPPP was intended to function as a mechanism to coordinate human factors activities among the Agency's offices. However, we agree that a comprehensive program plan needs to be developed.

Presently, ownership for coordination for the HPPP is in NRR. Since future needed efforts are developmental and are expected to involve confirmatory research, leadership will be shifted to the Office of Nuclear Regulatory Research. An agency-wide program plan for human reliability assessment and human performance evaluation is expected to be developed for review by the end of June.

2. A well-planned research effort in human performance is urgently needed to support both the regulation of plant operations and the transition to risk-informed and performance-based regulation. The overall perspective that can be provided by high-level models of human performance would be helpful in the planning of this research effort. A number of such models are reviewed in NUREG/CR-6350.

We agree that a comprehensive research plan is needed. Consistent with the ACRS's suggestion, the staff is developing a plan for integrating activities in human reliability assessment and human performance evaluation. Beyond providing a mechanism for coordinating current staff activities in these areas, the plan will articulate the conceptual relationships between human reliability analysis activities and those of human performance evaluation. In addition, the "ATHEANA" model, which was developed to improve human reliability analysis, will serve as the framework to guide activities associated with this initiative.

The essential elements of the plan will be a statement of the mission of the human reliability assessment and human performance evaluation initiative in the Agency, a definition of strategies for achieving the mission, and the identification of program areas established to implement the strategies. Within each program area, summaries of ongoing and planned activities will describe their relevance and consistency with the defined mission, strategies, and programs. Such an approach to planning is expected to better highlight any redundancy, gaps, and disproportionate emphasis in current and proposed staff efforts. We will brief the ACRS on the program plan after it is fully developed.

3. The development of indicators of a good safety culture, the design of a meaningful human performance reporting system, and the impact of downsizing and deregulation on human performance should be major elements of the research effort.

We agree that the research effort should include development of indicators of good safety culture, identification of the impact of downsizing and deregulation on human performance, and the design of a meaningful human performance reporting system.

As part of its planned program to develop the technical basis and guidance on management and organizational influences in human performance and plant risk, the influences of management practices and safety culture on human performance and human reliability will be identified. Additionally, the impact of downsizing and deregulation on human performance and human reliability will be investigated. As part of efforts to improve the Senior Management Meeting process, the staff is identifying measures of economic stress that can be used to identify plants for increased safety monitoring.

Licensees are required to report data to the NRC on factors that influence operating events, including factors that contribute to human performance during events. However, the human performance data collected are not always sufficiently detailed to provide the basis for formulating research or regulatory programs. As part of its planned program to conduct operating events analysis to support human performance evaluation and human reliability analysis, the staff expects to recommend reporting requirements to better support HRA and human performance evaluation and to modify the LER coding scheme to include more human performance information.

Dr. Robert L. Seale, Chairman  
Advisory Committee on Reactor Safeguards  
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P.O.  
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Dr. Robert L. Seale, Chairman  
 Advisory Committee on Reactor Safeguards  
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# ACTION

## EDO Principal Correspondence Control

FROM: DUE: 03/13/97 EDO CONTROL: G970104  
4/11/97 DOC DT: 02/13/97  
FINAL REPLY:

R. L. Seale, ACRS

TO:

Chairman Jackson

FOR SIGNATURE OF : \*\* GRN \*\*

CRC NO:

Executive Director

DESC:

ROUTING:

HUMAN PERFORMANCE PROGRAM PLAN (HPPP)

Thompson  
Jordan  
Norry  
Blaha  
Morrison, RES  
Paperiello NMSS  
Ross, AEOD  
Caputo, OI  
Cyr, OGC  
Mitchell, OEDO  
ACRS File

DATE: 2/14/97

ASSIGNED TO: CONTACT:

NRR

Miraglia

SPECIAL INSTRUCTIONS OR REMARKS:

Prepare response to ACRS for EDO signature. Add Commissioners and SECY as cc's (shown on original for reply).

USE SUBJECT LINE IN RESPONSE.

NRR RECEIVED: FEBRUARY 18, 1997  
NRR ACTION: DRCH:BOGER

NRR ROUTING: COLLINS  
MIRAGLIA  
SHERON  
ZIMMERMAN  
TRAVERS  
MARTIN  
BOHRER

ACTION
DUE TO NRR DIRECTOR'S OFFICE
BY <u>March 10, '97</u>

4/8/97



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

February 13, 1997

The Honorable Shirley Ann Jackson  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Chairman Jackson:

SUBJECT: HUMAN PERFORMANCE PROGRAM PLAN

During the 438th meeting of the Advisory Committee on Reactor Safeguards, February 6-8, 1997, we completed our review of the NRC activities identified in the Human Performance Program Plan (HPPP). Our Subcommittee on Human Factors met on September 20 and December 3, 1996, to review these activities. During these reviews, we had the benefit of discussions with representatives of the staff.

In your remarks of December 2, 1996, to all NRC employees, you stated:

As we move to an era of nuclear power industry restructuring and declining NRC and industry resources, it is imperative that we are able to diagnose potentially declining licensee performance as early as possible.

We agree with your assessment. We believe that an appropriate HPPP would contribute significantly to the development of such diagnostic tools.

Conclusions and Recommendations

1. The HPPP is not a plan. It is, instead, an inventory of human performance projects within the agency. The HPPP should state explicitly what its goals are, what research efforts will be required to achieve these goals, and when and how it will be known that they have been achieved. The ownership of the present plan is diffuse. The success of such a plan as well as its dynamic nature require that ownership of the entire plan be clearly assigned.
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performance-based regulation. The overall perspective that can be provided by high-level models of human performance would be helpful in the planning of this research effort. A number of such models are reviewed in NUREG/CR-6350.

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### Discussion

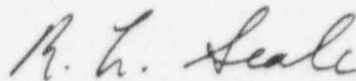
Operational experience has shown that human performance is a major factor in the safe operation of nuclear power plants. Understanding what can go wrong at a plant requires an integrated evaluation of both hardware and human performance; i.e., the plant must be viewed as a sociotechnical system. In particular, the term "human error," which carries the implication that the operators are to be blamed, is inaccurate in many instances and one must investigate and understand the context within which plant personnel function. This context is determined by both the design and the physical conditions of the plant, as well as by the prevailing safety culture.

The development of a plan for research on human factors is certainly not a simple task. This task would be made easier and the recommendations more convincing if the task were guided by a high-level model that identifies the important elements that influence the likelihood of unsafe human acts. Various models and taxonomies have been proposed in the literature and some are beginning to receive wide acceptance. Human performance models and error classifications that could be suitable guides for developing a research plan are being used in other projects in the Office of Nuclear Regulatory Research. The models discussed in NUREG/CR-6350, along with insights from operational experience, could serve to guide the development of an HPPP.

One specific element we would like to see addressed in the HPPP is the impact of situational assessment on compliance with procedures. Investigations of actual incidents and simulator exercises from nuclear and other industries have demonstrated the importance of what Professor James Reason of the University of Manchester calls "intended violations" (circumventions) of procedures by plant personnel. The researchers who collected data from simulator exercises point out that these were not necessarily errors; the operators simply did what they felt was the optimal response to the evolving accident. We believe there is a need to understand the reasons for such deviations and how training, procedures, and the plant safety culture could be modified to eliminate "circumventions" to the extent possible.

The present HPPP contains elements that are worth pursuing. Other elements that should be contained in the HPPP include activities to gain a better understanding of the concept of safety culture and to develop indicators of a good safety culture. The human reliability analysis research project should also be part of the HPPP. We will continue to work with the staff in developing an effective HPPP.

Sincerely,



R. L. Seale  
Chairman

References:

1. Memorandum dated July 31, 1996, from Cecil Thomas, Office of Nuclear Reactor Regulation, to John Larkins, ACRS Executive Director, Subject: Forwarding Human Performance Plan Rev. 1
2. Office for Analysis and Evaluation of Operational Data Report E-95-01, "Operating Events with Inappropriate Bypass or Defeat of Engineered Safety Features," July 1995
3. U. S. Nuclear Regulatory Commission, NUREG/CR-6093, "An Analysis of Operational Experience During LP&S and a Plan for Addressing Human Reliability Issues," June 1994
4. U. S. Nuclear Regulatory Commission, NUREG/CR-6265, "Multidisciplinary Framework for Analyzing Errors of Commission and Dependencies in Human Reliability Analysis," August 1995
5. U. S. Nuclear Regulatory Commission, NUREG/CR-6350, "A Technique for Human Error Analysis (ATHEANA)," May 1996
6. Reason, J.T., Human Error, Cambridge University Press, Cambridge, United Kingdom, 1990
7. R. Montmayeul, F. Mosneron-Dupin, and M. Llory, "The Managerial Dilemma between the Prescribed Task and the Real Activity of Operators: Some Trends for Research on Human Factors," Reliability Engineering and System Safety, 45:67-73, 1994
8. U. S. Nuclear Regulatory Commission, NUREG/CR-6208, "An Empirical Investigation of Operator Performance in Cognitively Demanding Simulated Emergencies," July 1994
9. International Atomic Energy Agency, Vienna, International Nuclear Safety Advisory Group, "Safety Culture," Report 75-INSAG-4, 1991
10. NRC Chairman Shirley Ann Jackson's remarks to all NRC employees, December 2, 1996