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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
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MEMORANDUM FOR: D. Ward, Chairman, ACRS Subcommittee on Human Factors
FROM: W. Keyserling, ACRS Consultant *D.C. Fisher for*
SUBJECT: SUBCOMMITTEE REPORT ON THE SEPT. 7, 1982 HUMAN FACTORS SUBCOMMITTEE MEETING

The meeting of the ACRS Subcommittee on Human Factors was helpful in developing a better understanding of the NRC's Integrated Human Factors Program Plan. Unfortunately it was impossible to merely evaluate the plan at the time of the meeting because of the poor editorial quality of the draft document. In addition, there are several problems with the plan itself which should be corrected prior to implementation.

My first criticism of the Plan is directed toward its editorial quality. The current draft is particularly difficult to read and comprehend. Instead of defining major project goals and delineating specific tasks required to achieve these goals, the Plan virtually stops at the identification of six different program areas. The many pages of prose merely redefine the problem areas presented in the introduction section. A better format would be to present the six major areas and then outline major tasks and subtasks which must be performed in the next few years. The subtasks must be defined more precisely than they are now, and an appendix should be added which describes the subtasks in reasonable detail. Prior to discussing more substantive issues I would like to commend the work of ACRS Fellow J. Preston who prepared the document titled "Synopsis of the NRC Integrated Human Factors Program Plan for FY 82-85." This synopsis is considerably easier to read and a better description of the current plan than the draft plan that was presented in mid-August.

Involving the more substantive issues, I have two major complaints with the current plan. The first complaint is that while the document is supposedly describing an integrated human factors plan for the NRC there is virtually no integration in the plan itself. Six program areas are defined, and projects specific to these programs are mentioned; unfortunately, there appears to be no mechanism for integrating the activities of the six program areas to assure that they are directed toward common goals. A mechanism must be created since the knowledge that is obtained in the man-machine interface project is made available to the training branch and the procedures developed in the training project are brought to the attention of persons involved in the licensing examinations project. Without such a mechanism for overseeing and coordinating the entire program it is doubtful that quality results will ever be achieved.

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My second criticism is directed toward the emphasis of the current plan. Human factors people often classify control problems into two categories, the first being engineering controls and the second being administrative controls. Engineering controls refer to problems where the workplace is changed to match the capabilities of the worker, while administrative controls refer to programs where the worker is selected or trained to overcome deficiencies in the workplace. Three of the six problem areas, namely, Staffing and Qualifications, Training, and License Examinations, would probably be classified as administrative controls. I strongly support all efforts to find and develop highly skilled operators for our nuclear power plants, but I must draw the line, however, when training programs are substituted for good human factors design. Instead of encouraging the nation's utilities to spend large sums of money to teach operators how to work in poorly designed control rooms, it makes more sense for the NRC to encourage, and in some instances, regulate changes in efficient control room designs. Such a change in emphasis would certainly result in future control rooms which are inherently safer than present control rooms, and would probably result in lower training and accident costs in the long run. To summarize this point in a single statement, I think that the only true engineering control aspect of the current NRC Plan, namely, the man-machine interface program, should receive considerably more emphasis than is given in the current draft of the Plan.

On a more positive note, I was very pleased to learn that members of the NRC Staff are continuing to investigate and evaluate several different systems for anonymously reporting human errors in the nuclear power industry. As I have stated in earlier meetings of the ACRS Subcommittee on Human Factors, I think that this type of system is essential in order to identify and eliminate human errors. The implementation of such a system would have the following benefits:

1. It would provide the NRC and the nuclear power industry with a sensitive method for recording human errors. Information collected with the system could be fed into a central data base. After a period of time, this data base could be queried to identify the types and root causes of human error. This information could be used in developing and directing the appropriate corrective actions such as improved operator training and improved control room design in order to prevent future human errors.
2. The implementation of a reporting system would be very helpful in evaluating the effectiveness of various human factors programs which will be undertaken in the near future by the NRC and by the power industry. Trends in human error rates can be studied to evaluate the effectiveness of different control approaches.
3. The implementation of anonymous systems may allow the NRC and the industry to identify previously undiscovered sources of potential human error in the nuclear power industry. Information of this type would prove to be useful in developing the appropriate control problems before serious human errors

occur. I hope that the NRC will pursue this program in a most vigorous manner, and that prototype incident reporting systems will be in place within three years.

My final comment concerns Dr. Thomas Ryan's presentation on the organization and management research program. In general, it appears that considerable work has been done in developing this program and that the plan will yield many successes. I think that Dr. Ryan and his staff deserve high praises for their efforts in this area.

I am curious, however, why this plan falls into the area of human factors, since it appears to be dealing primarily with management issues. Although I can not speak for the other consultants of the Human Factors Subcommittee, I personally do not feel qualified to evaluate the details of this program. If this program remains under the oversight of the Human Factors Subcommittee I would encourage the ACRS to obtain additional consultants to get considerable expertise in the areas of organization and management.