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Mr. Dave Ward
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Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission
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INTEGRATED HUMAN FACTORS PLAN - Ne-39-82

Dear Dave:

This is to indicate my feelings relating to the USNRC Integrated Human Factors Plan as presented to the ACRS Subcommittee on Human Factors, September 7, 1982.

1. I was favorably impressed by the general content of the Integrated Plan. It was not possible, however, to evaluate relative areas of emphasis to be placed on the program elements. The necessary information relating to level of effort was not included in the presentation. This consists of two sorts of information:
 - (a) Proposed level of effort.
 - (b) Rationale and justification for the proposed level of effort.

2. I was particularly favorably impressed by the logical planning and thought which have gone into the research program described by Messrs. Norberg, Jenkins, Ryan and others. I share their feeling that NRC has a justified commitment to probabilistic risk assessment and that difficulty in handling the quantitative aspects of human behavior should not lead to seriously reduced research effort in this area. As indicated in the NRC staff presentations, the proposed research effort is a balanced one which also supports actuarial (emperical) probabilistic risk evaluation, as well as the Human Factors Society's position that human factors design should be optimized. As pointed out by Jim Jenkins, quantification of human factors considerations is actually essential to the Society's position in a practical

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sense in order to permit cost-benefit tradeoffs. Real world plant design will never reach the utopian situation where no further improvement can be achieved and (therefore) no quantitative evaluation of present status is necessary.

3. My main concerns with the program as described relate to true integration of all the elements described in the proposal and in the supporting presentations. As indicated explicitly or implicitly in all of the material presented for review, the ultimate product of the integrated human factors program is regulatory media of three sorts:

- (a) "Hard" regulatory material (command literature).
- (b) Guideline material (information and guidance).
- (c) Criteria for NRC review and inspection functions.

As indicated in the attached appendix, the Integrated Human Factors program elements may be broken down into four general areas which must be combined to produce the desired human performance in a cost-effective, risk related way. These elements are:

- (a) Activities which produce and maintain the basic manpower pool.
- (b) Activities relating to establishment and maintenance of plant operability.
- (c) Activities relating to behavioral climate.
- (d) Activities relating to adequate continuing communication and control for personnel functioning in the system.

Control of these activities represents the core of the human factors problem. These elements are not independent. Establishment of "adequate" personnel selection processes, for example, is dependent on the criteria which are set relating to plant operability and on criteria relating to plant communication-control systems.

Establishment of regulatory media for all of the elements must be properly supported by research to establish appropriate inter-related criteria in the form of regulations and guidelines.

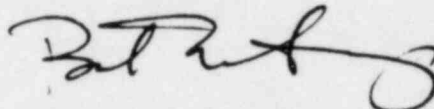
Finally, in the human factors sense, adequacy of the management processes must be judged in terms of controlling the four basic human factors elements in such a way as to establish and maintain acceptable levels of risk.

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While the research plans appear to handle this sort of integration well, I am concerned with lack of models and time sequenced summary material which indicates similar integration of the individual efforts in near term production of regulations, guidelines and other support materials.

In summary, I feel that in order to demonstrate integration and coherence, the proposal needs executive summary material which describes the basic program model and time sequenced means for converting the individual efforts described into an integrated system of regulatory materials and media.

Very truly yours,



Robert J. Nertney, Ph.D.
System Safety Development Center

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Attachment:
As stated

APPENDIX

Human Factors Integrated Program Model

Objective: Achieve desired human behavior in risk related activities in a cost effective manner.

Element A - Provide Manpower Pool

- Selection processes which permit personnel entry into the manpower pool (job related)
- Psychological-physiological maintenance of manpower pool (job related)
- Basic training and drill (job related)
- Basic examination-certification (job related)

Element B - Establish and Maintain Plant Operability

- Man-machine function allocation
- Hardware design and maintenance

Element C - Establish and Maintain Behavioral Climate (Management vigor and example, "morale", "motivation", etc.)

Element D - Provide Personnel Communication-Control System

- Assignments of tasks and decision making authority
- Task related training and drill
- Oral communication-command
- Written communication-command
- Machine input-feedback