LUND
Consulting, Inc.

MANAGEMENT CONSULTANTS

1903 EAST MAIN STREET
POST OFFICE BOX 315
MOHEGAN LAKE, NEW YORK 10547
(914) 528-8709

April 8, 1981

Mr. Richard Froelich
Division of Human Factors Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dick,

Enclosed are Lund Consulting's comments on NUREG-0659, "Staff Supplement to the Draft Report on Human Engineering Guide to Control Room Evaluation".

Please feel free to call us at (914) 528-8709 for any further clarifications.

Sincerely,

Linda

Linda O. Lund
President

LOL/mb

cc: S. Weiss
V. Moore

LUND CONSULTING'S COMMENTS ON NUREG-0659

Lund Consulting commented on earlier drafts of the Systems Review which now appear as an appendix in the 0659 document.

On page 2, you define a systems review as identification and analysis of operator tasks. This, in our opinion, is an over-simplification of how an operator interfaces with the equipment in the control room. This is due to the fact that the operator does not act as an individual. Rather, he acts as part of the team or the shift.

Secondly, when looking at the human system, the definition of a systems approach we would suggest is different. Suggestions contained in the following three quotes might be used to come up with a better definition of a systems approach:

> (1) "In a systems approach, human beings and events are studies in terms of their interactions rather than their intrinsic characteristics. The theoretical basis for studying phenomena in this way are in sharp contrast with the mechanistic causal view that has dominated our culture and influenced our mode of thought for centuries."
>
> (2) Further, "the systems approach is necessary to deal with a multi-dimensional behavior of individuals. Human behavior is not the result of the cause and effect relationship. Therefore, to infer that the behavior of an individual causes another's behavior (whether another person or machine) is to apply an over-simplified model that artificially reduces the complexities of reality to linear relations to cause and effect."
>
> This comment has further implications to the operating experience review.
>
> (3) The type of systems analysis stated above "often is criticized for failing to take into consideration past history. Such criticism is superficial, however, and an analysis of significant relations existing upon the componenting parts of a system at a given moment inevitably leads the investigator to correlate the observed data within the systems historic evolution. Moreover, the resulting reconstructions of the systems development provide for more information than would any etiological study."

Within a nuclear power plant control room we have a system comprised of multi-micro systems in reciprocal dynamic interaction. This interaction functions by use of feedback loops between the man, men and machines.

Comment #2

If we look at the detailing of human-error deficiencies as merely a design fix to be sought in the control room reviews, then we must realize that there are other types of problems and potential fixes which we have totally ignored. Other parts of the overall environment, the operational parts including people interactions as well as the machine interactions in the system are being ignored.

Comment #3

An important concept that seems lacking in this draft is a detailed format for the collection of this assessment data. Before we start collecting information on human-error deficiencies, we must first know what we are going to do with the information once it is collected. Therefore, the correct approach is to first determine a presentation format for this data. This presentation format may actually be achieved only by first filling out a more detailed data collection table or format. For example, in reliability calculations, a failure rate is needed. In order to get the failure rate, we may have to collect information on population of equipment, operating time and number of failures. Those three items would be on a data collection format whereas the failure rate number alone may be on the data presentation format.

In this section on systems, we speak of the methodology to be used to collect the information. But, we are not directed to the one final format in which the information will later be presented, compared, and analyzed across the board with all the other plants or with the evaluation criteria (once it exists).

Comment #4

Page 19, walk-through process for the procedures.

Lund would suggest that,rather than having operators explain their actions,walk-throughs be video-taped. After the walk-through, comments can be obtained. This is better than having the operators explain their actions as they go through the procedures.

Constant explaining would interrupt the flow and would decrease their ability to cummunicate among each other during procedural walk-throughs. Video-taping allows for an accurate play back of what happened, allows for discussion, stop-action and return to questionable actions of the operators, and becomes a meaningful evaluation tool for the control room assessors.

Comment #5

Lund Consulting remains concerned that the type of control room review outlined in document 0659 and its earlier predecessor, NUREG-1580, looks in a narrow way at the control room of a nuclear plant. Information is needed on the use of the equipment in the control room rather than just the design of equipment.

Lund would suggest that rather than just hardware changes, changes to training programs or procedure systems be given equal weight in order to correct some of the deficiencies in the control room.

LUND'S COMMENTS ON NUREG-0659

Page 18, 6.3.1.2 -

Frequency, in the sense of number of occurrences of auditory alert signal not specified. If signal is too frequent may overload auditory info processing capacity and annoy operator.

Must determine, by not too elaborate testing, what optimal frequency is.

Page 26, 6.5.5.5-(b) -

Redundancy in presentation of information should be minimized.

Do not eliminate redundancy completely. Some redundancy is good.

Page 41, 6.8.1.3.-6 -

"Words employed in the label should express exactly what is intended". Don't like word "intended". It can mean many things.

Number of words in label should be as small as possible and words in it should directly reflect function of control or equipment.

Page 72, 7.8.1.1. -

Not clear when states "is label near the item to be identified". Near does not mean anything.

Omit this statement completely. Labels should consistently be either above or below (preferably below) item.

Page 73, 7.8.1.3. -

The word "similar" in "Are labels free from words that could be confused with other, similar words?" is not clear since similarily could be in meaning or in physical appearance.

State that "Are labels free from words that could be confused with other words similar in meaning or physical appearance?"