COMMENTS ON THE DETAILED CONTROL ROOM DESIGN REVIEW PROGRAM PLAN FOR VIRGINIA ELECTRIC AND POWER COMPANY SURRY POWER STATION UNITS NO. 1 AND 2 NORTH ANNA POWER STATION UNITS NO. 1 AND 2

LAWRENCE LIVERMORE NATIONAL LABORATORY

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BACKGROUND

Licensees and applicants for operating licenses shall conduct a Detailed Control Room Design Review (DCRDR). The objective is to "improve the ability of nuclear power plant control room operators to prevent accidents or cope with accidents if they occur by improving the information provided to them" (NUREG-0660, Item I.D.). The need to conduct a DCRDR was confirmed in NUREG-0737 and Supplement 1 to NUREG-0737. DCRDR requirements in Supplement 1 to NUREG-0737 replaced those in earlier documents. Supplement 1 to NUREG-0737 requires each applicant or licensee to conduct a DCRDR on a schedule negotiated with the Nuclear Regulatory Commission (NRC).

NUREG-0700 describes four phases of the DCRDR and provides applicants and licensees with guidelines for its conduct.

The phases are:

1. Planning
2. Review
3. Assessment and Implementation
4. Reporting.

Criteria for evaluating each phase are contained in draft NUREG-0801.

A Program Plan is to be submitted within two months of the start of the DCRDR. Consistent with the requirements of Supplement 1 to NUREG-0737, the

Program Plan shall describe how the following elements of the DCRDR will be accomplished:

1. Establishment of a qualified multidisciplinary review team

2. Function and task analyses to identify control room operator tasks and information and control requirements during emergency operations

3. A comparison of display and control requirements with a control room inventory

4. A control room survey to identify deviations from accepted human factors principles

5. Assessment of human engineering discrepancies (HEDs) to determine which HEDs are significant and should be corrected

6. Selection of design improvements

7. Verification that selected design improvements will provide the necessary correction

8. Verification that improvements will not introduce new HEDs

9. Coordination of control room improvements with changes from other programs such as SPDS, operator training, Reg. Guide 1.97 instrumentation, and upgraded emergency operating procedures.

A Summary Report is to be submitted at the end of the DCRDR. As a minimum it shall:

1. Outline proposed control room changes

2. Outline proposed schedules for implementation

3. Provide summary justification for HEDs with safety significance to be left uncorrected or partially corrected.

The NRC will evaluate the organization, process and results of the DCRDR. Evaluation will include review of required documentation (Program Plan and Summary Report), and may also include reviews of additional documentation, briefings, discussions, and on-site audits. In-progress audits may be conducted after submission of the Program Plan, but prior to submission of the Summary Report. Evaluation will be in accordance with the requirements of Supplement 1 to NUREG-0737. Additional guidance for the evaluation is provided by NUREG-0700 and draft NUREG-0801. Results of the NRC evaluation of a DCRDR will be documented in a Safety Evaluation Report (SER) or SER Supplement.

Significant HEDs should be corrected. Improvements which can be accomplished with an enhancement program should be done promptly. Other control room improvements should be done on a schedule acceptable to the NRC.

Discussion

The Virginia Electric and Power Company (VEPCO) submitted a Detailed Control Room Design Review (DCRDR) Program Plan for its Surry and North Anna Power Stations to the Nuclear Regulatory Commission on March 1, 1984. We have reviewed the plan against the requirements of Supplement 1 to NUREG-0737.

The Program Plan states, on page 1-3, that it is intended that the plan be a baseline for any audit of VEPCO's CRDR. The licensee should be advised that the NRC will use the requirements of Supplement 1 to NUREG-0737 and the guidelines of NUREG-0700 and NUREG-0801 in their audit.

A human factors evaluation of the design of the remote shutdown capability provided to meet 10 CFR Part 50, Appendix A GDC-19, and 10 CFR Part 50, Appendix R is not specifically identified as a requirement in Supplement 1 to NUREG-0737. NRC staff review of this issue is not complete. In the interim, we recommend that the scope of the DCRDR include a human factors evaluation of the design of the remote shutdown capability. To the extent practicable, without delaying completion of the DCRDR, it should also address any control room modificatons and additions (such as controls and displays for inadequate

core cooling and reactor system vents) made or planned as a result of other post-TMI actions and the lessons learned from operating reactor events such as Salem ATWS events. Generic implications of the Salem ATWS events are discussed in NUREG-1000 and required actions are described in Secton 1.2, "Post-Trip Review - Data and Information Capability," of the enclosure to Generic Letter 83-28.

The following comments apply to specific elements of the Surry/North Anna DCRDR Program Plan.

Qualifications and Structure of the DCRDR Team

Supplement 1 to NUREG-0737 requires that the licensee establish a qualified multidisciplinary review team. The VEPCO DCRDR team will consist of a 10-member core review team, which will be supplemented by up to 17 additional supporting members on an as-required basis. The availability of these members has been assured by a VEPCO management directive and has been pre-planned to the degree possible. The disciplines available in the support group are Nuclear, Mechanical, Electrical, Industrial, Operations, Training, Human Factors, and an Architect and Engineer representative. Six individuals within the core team will be members of the Human Engineering Discrepancy Assessment Team (HEDAT). The HEDAT will review and assess all HED reports, develop recommended resolutions, and establish preliminary schedules for all backfit activities.

Figure 2.2 of the licensee's Program Plan shows that the primary management structure of the team is comprised of the HEDAT members, and that human factors project management and expertise is provided by a consultant, the Essex Corporation.

The VEPCO Lead Discipline Engineer (LDE) has overall responsibility for following the planned schedule, reviewing progress, resolving problems, chairing project meetings, and reporting project status to his management. He will also act as HEDAT team leader and ensure strict adherence to HEDAT review procedures.

Liaison with corporate management will be provided by the Nuclear Operations Department (NOD) Corporate Project Coordinator, who will also act with other coordinators in staff capacity to the LDE.

The Station Coordinators for Surry and North Anna are responsible for determining station facility, personnel availability and activity coordination as appropriate, and for providing operational expertise.

The two lead Essex human factors (HF) specialists are responsible to the LDE for, and will ensure the technical quality of, human factors work and the availability of other appropriate HF specialists as appropriate throughout the project. They will coordinate all HF activities and will contribute to the HEDAT functions. The HF specialists are committed to collect, reduce, and analyze data, and to locate, analyze, and resolve HEDs. The major DCRDR planned activities and approval cycles are illustrated in Figure 2.4 of the plan. Figure 2.3 of the plan describes in matrix format the 15 DCRDR task assigments of the support staff personnel and each category of team member, with coded identification of primary responsibility, support responsibility, and approval authority.

Appendix A of the Program Plan contains the resumes of HED assessment team members.

We conclude that the VEPCO management and staffing effort has been adequately planned, and that the DCRDR team will have access to a suitable diversity of expertise. To enhance the qualifications and structure of the DCRDR team, we recommend that a formal program of HF orientation and training for non-HF specialists be instituted and executed to provide a common basis of understanding for review team members.

Based on our review of the qualifications, organization, and management structure of the Surry/North Anna review team, it is expected that the licensee will satisfy the requirement of Supplement 1 to NUREG-0737 to establish a qualified multidisciplinary review team to conduct a DCRDR.

While not required by Supplement 1 to NUREG-0737, the following two comments are intended to provide the NRC with a more complete description of the tasks included in the Plan.

Documentation and Document Control

The VEPCO DCRDR plan states that the project team includes an individual experienced in document and office management, who will control all project documentation and reports. The system will be compatible with current VEPCO corporate and station document control systems and will ensure the accessibility and auditability of review project data and files. It is recommended that the DCRDR Summary Report describe the document system in sufficient detail to allow the NRC to fully understand and review it, especially the audit capability.

Operating Experience Review

The Operating Experience Review (OER) recommended by NUREG-0700 is described in Section 4.2 of the plan, and consists of two tasks:

1) Review of plant and industry documents
2) Survey of plant operations personnel.

These tasks will identify CR design attributes and procedural activities which may affect operator performance. Problems identified in both tasks will be documented in HED reports for analysis and assessment by the HEDAT.

Seven sources of documents will be reviewed by HF specialists, who will identify human errors, equipment failures, procedure problems, and other sources of potential human performance problems. Document sources to be reviewed are:

1) Licensee Event Reports (LERs)
2) Significant Operating Experience Reports (SOERs)

3) Engineering Work Requests (EWRs)
4) INPO Significant Event Reports (SERs)
5) INPO Operations and Maintenance Remainders (O&MRs)
6) Westinghouse Data Letters (WDLs)
7) Westinghouse Technical Bulletins (WTBs).

Appendix B of the VEPCO plan illustrates an Historical Report Summary (HRS) form to be used to collect the data for review by the Lead Human Factors Specialist (LHFS). The HRS will be attached to its related HED report.

The operations personnel survey will consist of these subtasks:

1) Use of self-administered questionnaires
2) Conduct of structured interviews
3) Analysis of all questionnaire and interview responses.

The questionnaires will be issued to all licensed SROs and ROs, STAs and training staff, and to selected administrative personnel to solicit information in the following areas:

1) Availability and usability of CR information
2) Design and location of controls and displays
3) Annunciator warning system effectiveness
4) Adequacy of workspace layout and anthropometry
5) Operation of process computer
6) Adequacy of panel labeling
7) CR communications
8) CR environment
9) Maintenance in the CR
10) Units 1 and 2 operator interfaces
11) Personnel Human Error
12) Respondent biographical data.

Structured interviews will be conducted with a minimum of 50% of the licensed ROs and SROs, and will address 14 areas identified from Chapter 6 of NUREG-0700. Operators will be encouraged to provide any other comments or concerns they may have regarding CR design or operation.

Response analyses and tabulations will be aided by checklists constructed from Chapter 6 of NUREG-0700.

We conclude that the OER, as planned, is complete and well-structured, and will meet the intent of the guidelines described in NUREG-0700.

Function and Task Analysis

Supplement 1 to NUREG-0737 requires the licensee to perform systems function and task analyses to identify control room operator tasks and information and control requirements during emergency operations. Furthermore, Supplement 1 to NUREG-0737 recommends the use of function and task analyses that had been used as the basis for developing emergency operating procedures technical guidelines and plant-specific emergency operating procedures to define these requirements.

The licensee's program plan (Section 1.3.3.3) states that the System Functions and Task Analysis (SFTA) will be done in 4 steps:

1. Identification of systems and subsystems by review of plant documentation and the Westinghouse Owner's Group Emergency Response Guidelines and Task Analysis.

2. Identification of normal and emergency operating procedures to undergo task analysis.

3. Identification of system/subsystem functions through document review and operator interviews.

4. Identification and analysis of CR operational tasks.

It is requested that the licensee explain more fully and differentiate the tasks to be performed in accomplishing steps 1 and 3 above.

The two basic products of this analysis will be: (a) a tabular listing of major operating systems and subsystems, and (b) tables and/or functional-flow block diagrams showing the specific operator functions required to complete the procedures selected for analysis.

Item (b), above, will record the actual task analyses of the required operator functions in terms of operator input-output and decision requirements. This record will establish the information and control requirements and the performance criteria for the tasks to be performed by the operators under emergency conditions.

The SFTA method described in the plan (4.4.2) states that emergency event sequences which challenge safety-related functions will be considered from the following list of scenarios:

- Small loss of coolant accident
- Inadequate core cooling
- Anticipated transient without reactor trip following a loss of off-site power
- Multiple failure of tubes in a steam generator and tube ruptures in more than one steam generator.

Other scenarios may be considered as may be necessary.

Functions, such as the following, are stated to be challenged by the event sequences chosen:

- Subcriticality
- Containment integrity
- Heat sink
- Reactor coolant system inventory

- o Core cooling
- o Reactor coolant system integrity.

It is assumed that all scenarios and functions listed above will undergo SFTA by the licensee and will be reported in the DCRDR summary report. If, in fact, not all of the above will be analyzed, any omissions should be justified. Additional scenarios and functions which may be analyzed should be described. It is recommended that a large break LOCA be considered.

The selection of event scenarios and system functions will form the basis for the selection of appropriate ERGs. The WOG generic task analysis data will provide the initial input for the development of unit-specific task analysis information.

The above process will develop an inventory of tasks, and, for each task, will identify the following:

- o the operating event
- o the title of the task
- o the task objective
- o the cue or signal that initiates the task
- o the number of the task
- o the behavioral or subtask elements that identify which operator performs the element, where it is performed, the action that is taken, and other data necessary to describe components, parameters, and parameter states.

It is stated that the unit-specific task analysis information will identify the required instruments and controls for each task, but a description of how this identification will be accomplished is not included. It is not stated either how or in what format the instrument and control characteristics will be determined (e.g., control type and characteristics, instrument range, accuracy, scale details, tolerances, rate of data change, etc.). It is requested that these items be explained in the summary report.

The NRC memorandum of April 5, 1984, from H. Brent Clayton to Dennis L. Ziemann, "Meeting Summary--Task Analysis Requirements of Supplement 1 to NUREG-0737, March 29, 1984 meeting with Westinghouse Owner's Group (WOG) Procedures Subcommittee and Other Interested Persons" states that it appears that Revision 1 of the ERG and background documents do provide an adequate basis for generically identifying information and control needs.

The licensee should describe specifically how it is intended to accomplish Items 2, 3, and 4 of the April 5, 1984 Memorandum, which is reproduced in Appendix A to this report.

Examples of the pre-printed forms that VEPCO will use to record the data are illustrated in the plan in Fig. 1, Task Sequence Chart, and Fig. 2, Task Data Form. Terminology to be used on the forms will be selected from the Standard Data Base Entries of Fig. 3, and Standardized Behavior Verbs in hierarchical order, Fig. 4. The forms appear to be functional and well designed for easy recording and subsequent use. The format provides easy computer entry.

The licensee should be aware that operator information and control needs should be determined from the system function and task requirements such as those specified in the generic and plant-specific ERGs. It is important to recognize that information and control requirements should be derived from the analysis of system function and task requirements; not from existing instruments and controls that are installed in the control room.

It is not clear from the VEPCO Program Plan what process will be used to identify the operator information and control needs that are associated with each task. An objective, independent determination of the operator information and control needs for each operator task should be done before instrument and control specifications are developed. Review of the sample forms provided in the Program Plan does not indicate that an objective identification of operator informaton and control needs will be accomplished or adequately documented.

The licensee should closely review the task analysis methodology to ensure that operator information and control requirements to perform operator tasks are determined and documented to support the specification of instruments and controls. The Program Plan does not as yet describe this process in sufficient detail to determine that the VEPCO DCRDRs for Surry and North Anna will meet the requirement of NUREG-0737, Supplement 1, to perform function and task analyses to identify operator tasks and information and control requirements during emergency operations.

Control Room Inventory

Supplement 1 to NUREG-0737 requires the applicant to make a control room inventory and to compare the operator information and control needs determined from the task analyses with the control room inventory to determine missing controls and displays.

Section 4.5 of the DCRDR describes a very complete and systematically organized plan to develop a comprehensive listing of instruments, controls and equipment contained in the Surry and North Anna CRs. Data collected will be placed in the VEPCO data base management system in five files:

- System instrumentation
- System manual controls
- System automatic controls
- Annunciator system
- Miscellaneous CR instrumentation and controls and operator equipment.

In each category, a complete collection of equipment locations, types, parameters, and other characteristics are described and planned to be filed for later retrieval. Where appropriate, the following will also be included:

- Component photograph or drawing, if available
- Photomosaic location code
- Surveys and checklists applied to component
- Identification of HEDs written for component, if any.

The inventory will be made plant-specific through photomosaics and visits to the CR and/or simulators. The licensee should be made aware that simulators, if used for inventory purposes, must be exact duplicates of the CRs, and this should be confirmed in the Summary Report.

The licensee should ensure that the DCRDR objectively compares information and control needs throughout the control room with a control room inventory to identify missing controls and displays. An objective comparison is needed to fulfill the requirement of Supplement 1 to NUREG-0737 for comparison of operator information and control needs with the control room inventory.

When conducted and documented as described, we conclude that the licensee will meet the requirement in Supplement 1 of NUREG-0737 to compare acceptably determined operator information and control needs with a CR inventory.

Control Room Survey

Supplement 1 to NUREG-0737 requires that a control room survey be conducted to identify deviations from accepted human factors principles. NUREG-0700 provides guidelines and criteria for conducting a control room survey. The objective of the control room survey is to identify for assessment and possible correction, the characteristics of displays, controls, equipment, panel layout, annunciators and alarms, control room layout, and control room ambient conditions that do not conform to good human engineering practices.

Section 4.3 of the DCRDR plan states that NUREG-0700 will provide the specific and detailed criteria to which all survey data will be compared.

The licensee CR survey plan will be executed using 14 individual specific task plans. Each task plan covers an individual area which parallels the structure of Ch. 6 of NUREG-0700. Each task plan uses an appropriate mix of one or more of four types of basic data collection procedures: a) measurements, b) observations, c) questionnaires/interviews, and d) document reviews. The data types are determined by the NUREG-0700 criteria and are described in

the plan, Section 4.3.2.f. The texts of the task plans are not included in the DCRDR plan, but are stated to follow the following format:

1.0 - Objectives
2.0 - Review Team
3.0 - Criteria Summary
4.0 - Procedures
5.0 - Equipment/Facility Requirements
6.0 - Inputs and Data Forms Listing
7.0 - Required Outputs/Expected Results
8.0 - Figures and Tables (if required)
9.0 - Procedure Exceptions (if any)
Appendix A - Detailed Criteria
Appendix B - Data Collection and Analysis Forms
Appendix C - Criteria-to-Procedure Matrix
Appendix D - Task Plan Critique

Sections 1.0 through 8.0 above are summaries of the task requirements for the task conductor . For each task plan:

- Appendix A contains detailed criteria and procedural information, referenced to NUREG-0700, Chapter 6,

- Appendix B contain subappendices which describe the data collection and analysis procedures, each of which is complete for each task plan.

- Section 9.0 and Appendix D are completed by the task conductor, if necessary, and submitted to the VEPCO technical reviewer for comment and feedback.

- Appendix C is not described. It is recommended that the applicant be requested to include a description and sample matrix in the Summary Report for NRC review.

Examples of a two page HED report form, a 3 page HED Potential Significance form; and a HED Cost Estimate form are included in Appendix B of the DCRDR Program Plan (which is different from Appendix B of the task plan described above). The forms appear to be well designed and to contain adequate information for efficient review and analysis. Copies of all completed task plans will be filed in the Review Data File.

Section 4.1.2.2 of the Program Plan states that "any deviation from the guidelines will be noted." In addition, the licensee should justify such deviations.

Based on our review we conclude that the licensee has submitted an excellent DCRDR CR Survey Plan. It is expected that the licensee will meet the intent of NUREG-0700 and satisfy the requirement of Supplement 1 to NUREG-0737 to conduct a CR survey to identify deviations from accepted HF principles.

Assessment of HEDs

Supplement 1 to NUREG-0737 requires that HEDs be assessed to determine which HEDs are significant and should be corrected.

The basic procedure to be employed in selecting HED corrective actions described by the plan is based on Exhibit 4-2 of NUREG-0700 and NUREG-0801, draft of October 1981. The process is as follows:

- Assess extent of deviation from NUREG-0700 guidelines
- Estimate increase in human error for the discrepancy
- Determine if discrepant component is safety function related
- Determine if errors in using discrepant component(s) could lead to violation of tech specs or unsafe operation
- Assign category and priority, based on the above.

HEDs identified during the review period will be assessed by the HEDAT. They will separate those HEDs that are unlikely to degrade performance from those that may degrade performance. The assessment factors used will be estimations of: a) the potential for operator error, b) the consequences of the errors and c) the probability of error recovery.

The estimates of the potential for error will be based on the expert judgment of the lead HF specialist, and will consider

- Component design factors (e.g., extent of deviation from guideline, conformance to plant design conventions),
- Task factors (e.g., difficulty, frequency, time demands), and
- Human factors (physical performance; sensory and perceptual performance; cognitive performance).

Error consequences will be estimated by the HEDAT. Figure 5-1 of the plan provides nine classes of HEDs to aid the HEDAT in analyzing HEDS and selecting appropriate corrective actions. Documented errors or HEDs that are identified as being safety related or which increase the probability of an error that could result in unsafe operation or violation of a technical specification will receive the highest rating.

HEDs will be selected to be corrected by enhancements, operator training, procedural revisions, and/or design improvement alternatives. Cost benefit analyses will be made to limit the number of changes which must be made. The licensee should objectively explain and justify the rationale used to leave safety significant HEDs partially corrected or uncorrected.

We expect that an acceptably executed and documented assessment plan will enable the licensee to demonstrate that this requirement of Supplement 1 to NUREG-0737 to assess HEDs to determine which are significant and should be corrected has been met.

Selection of Design Improvements

Supplement 1 to NUREG-0737 requires selection of control room design improvements that will correct significant HEDs. It also states that improvements that can be accomplished with an enhancement program should be done promptly. An unacceptable schedule of implementation is defined in the Glossary on page 1-17 of the Plan, where it is stated: "Near term corrective actions . . . will be completed by the end of the second refueling outage after submittal of the final Summary Report and after NRC acceptance."

The plan states that the selection of HED corrective actions involves the following:

- Analysis for correction by enhancements
- Analysis for correction by design alternatives
- Assessment of the extent of correction.

It is planned that the HEDAT will identify potential corrective actions for all HEDs, regardless of their priority.

Those HEDs selected for correction by enhancement will be reassessed for effects on operator performance and, if appropriate, will be re-evaluated via checklisting and task analysis to verify HF suitability. If not suitable for correction by enhancement, HEDs will be corrected by design alternative.

Factors used to identify HED design alternatives will include reference to task analysis data, constraints due to equipment availability, scheduling, coordination requirements, cost, impact on operator training, plant maintenance and documentation. Alternatives will be verified by functional and task analyses and reapplication of NUREG-0700 guidelines.

It is recommended that the licensee use cost with objective restraint and discretion in the determination of corrective actions so as to ensure that HEDs will not be inadequately corrected.

The extent to which HEDs will be corrected will be reviewed by the HEDAT. It is stated that, ideally, all discrepancies should be fully corrected, but any that are not fully corrected will be identified, documented, and justified.

The corrective action implementation schedule will consider the following:

- Prioritization and categorization guidelines of Paragraph 5.2 of the Plan
- Safety consequences of operator errors that could be caused by the discrepancy
- Integration with other NUREG-0737 Supplement 1 programs
- Plant operation constraints
- Operator training/retraining requirements
- Outage schedules
- Equipment procurement schedules.

We conclude that when the plan is executed and reported as described the licensee will meet the requirement of Supplement 1 to NUREG-0737 to select design improvements that will correct significant HEDs. However, the implementation will not be acceptable unless all corrective actions are completed on a schedule acceptable to the NRC.

Verification that Design Improvements Provide Necessary Correction and Do Not Introduce New HEDs

Supplement 1 to NUREG-0737 requires that the licensee verify that selected design improvements will provide the necessary correction and will not introduce new HEDs.

The Program Plan does not specifically address these issues as separate elements. However, certain sections of the plan include statements relative to satifying these requirements. Some examples follow:

Pg. 5-8 5.3.5 "Where appropriate, the control room simulator will be utilized to test corrections required on various panels," and "this...effort affords an opportunity to look for possible violation of other HF criteria resulting from the original correction."

Pg. 1-14 1.3.4.3 "The acceptability of design alternatives will be verified by reapplication of 0700 guidelines and task analysis."

Pg. 1-14 1.3.4.4 "In addition the correction will be reviewed to ensure that no new HEDs are introduced into the control room as a result of the change."

Pg. 1-15 1.3.5 "...all HED resolutions will be evaluated to ensure that each resolution is complete and adequate."

We conclude that the execution of the licensee's plan as described will meet this requirement. We recommend that the licensee be requested to provide sufficient detail in his Summary Report to describe the steps taken to satisfy these requirements of Supplement 1 to NUREG-0737.

Coordination of Control Room Improvements With Other Programs

Supplement 1 to NUREG-0737 requires that control room improvements be coordinated with changes from other programs; e.g, Safety Parameter Display System (SPDS), operator training, Regulatory Guide 1.97 (R. G. 1.97), and Emergency Operating Procedures (EOPs).

The plan states in section 1.2.1 that VEPCO recognizes interfaces between the CRDR and other related activities (e.g. SPDS, EOP, operation training, and PAM instrumentation) and that the plan is organized to consider CRDR coordination with these related efforts. VEPCO further states that it has used all relevant NRC NUREGs and Reg. Guides in developing the Program Plan and has dedicated the necessary resources to ensure the success of the CRDR project. However, except for a few brief nonspecific statements in other parts of the plan, there is no description of how the coordination effort will proceed, and who is responsible for executing and recording it.

Because the specific methods and procedures planned to be used for the coordination effort are not discussed, we recommend that the licensee be requested to provide descriptions which will ensure that design improvements introduced as the result of other control room improvements are reviewed to meet the same standards of good human factors engineering as improvements that result from the DCRDR. The licensee will need to provide evidence of these coordination efforts and details of their accomplishment in their Summary Report to verify that the design improvement coordination requirement of Supplement 1 to NUREG-0737 is met.

Conclusions

Based on our review of the VEPCO Surry/North Anna DCRDR Program Plan, we conclude that VEPCO plans to conduct a DCRDR that generally meets the intent of Supplement 1 to NUREG-0737. However, there are several areas in the plan which should be described in more detail in the Summary Report. They are:

- A detailed description of how the detailed information and control needs will be determined is needed because it is not clear that objective and independent processes will be used to identify and document the information and control needs that are associated with each task. If operator information and control needs are not objectively identified during the task analysis, a key ingredient of the DCRDR will be missing, and the comparison of these needs with the inventory will not be valid.

- A detailed description of the steps that will be taken to verify that the HED design improvements will provide the necessary correction without introducing new HEDs.

- A detailed description of how the coordination effort will be accomplished.

- An acceptable schedule for implementation of all corrective actions should be submitted to the NRC.

References

1. "Requirements for Emergency Capability," NUREG-0737, Supplement 1, USNRC, Washington, DC, December 1982, transmitted to reactor licensees via Generic Letter 82-33, December 17, 1982.

2. Letter to Dennis L. Ziemann, NRC, from H. Brent Clayton, NRC, Meeting Summary--Task Analysis Requirements of Supplement 1 to NUREG-0737, March 29, 1984 Meeting with Westinghouse Owners' Group (WOG) Procedures Subcommittee and other interested persons, April 5, 1984.

3. Letter from W. L. Stewart, Virginia Electric and Power Company, to Harold R. Denton, NRC, forwarding Control Room Design Review Program Plan, March 1, 1984.

4. Control Room Design Review Program Plan for North Anna and Surry Power Stations, Virginia Electric and Power Company, (Attachment to Reference 2).

5. NUREG-0700, "Guidelines for Control Room Design Reviews," September 1981, USNRC.

6. NUREG-0801, "Evaluation Criteria for Detailed Control Room Design Reviews," Draft, April 1983, USNRC.

7. NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident," May 1980, Revision 1, August 1980.

8. NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant," April 1983.

9. Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," July 8, 1983.

Appendix A

Text of Memorandum of April 5, 1984

MEMORANDUM FOR: Dennis L. Ziemann, Chief
Procedures and Systems Review Branch
Division of Human Factors Safety

FROM: H. Brent Clayton, Section Leader
Section A - Procedures
Procedures and Systems Review Branch
Division of Human Factors Safety

SUBJECT: MEETING SUMMARY - TASK ANALYSIS REQUIREMENTS OF SUPPLEMENT 1 TO NUREG-0737
MARCH 29, 1984 MEETING WITH WESTINGHOUSE OWNERS GROUP (WOG) PROCEDURES SUBCOMMITTEE AND OTHER INTERESTED PERSONS

Staff representatives met with representatives of the WOG Procedures Subcommittee and others on March 29, 1984, to discuss the task analysis requirements of Supplement 1 to NUREG-0737 (Generic Letter 82-33). The purposes of the meeting were (1) for the Subcommittee to discuss how operator information and control needs have been addressed by the Emergency Response Guideline (ERG) development effort, and (2) for the staff to identify any additional analysis or documentation needed for review.

Mr. Doug McKinney, Subcommittee Chairman, made a brief presentation on the background of the ERG development program as it relates to the issue of task analysis. His presentation included a description of the ERG background documents, development of Revision 1 to the ERG, interactions with NRC, Supplement 1 to NUREG-0737 requirements, and an overview of how the WOG had responded to the requirements. A copy of Mr. McKinney's transparencies is enclosed (Enclosure 1).

Mr. Ralph Surman of Westinghouse made a presentation which described in some detail the development of the ERG and the accompanying background documentation for both the Basic version and Revision 1. He emphasized that one of the main objectives of the ERG is to identify the operator tasks necessary to perform functions which are identified in the background documentation. A copy of Mr. Surman's transparencies is enclosed as Enclosure 2.

After a caucus, the staff made the following comments to the meeting attendees:

(1) Based on the presentations by Mr. McKinney and Mr. Surman, it appears that Revision 1 of the ERG and background documents do provide an adequate basis for generically identifying information and control needs.

(2) Each licensee and applicant, on a plant-specific basis, must describe the process for using the generic guidelines and background documentation to identify the characteristics of needed instrumentation and controls. For the information of this type that is not available from the ERG and backround documentation, licensees and applicants must describe the process to be used to generate this informaton (e.g., from transient and accident analyses) to derive instrumentation and control characteristics. This process can be described in either the PGP or DCRDR Program Plan with appropriate cross-referencing.

(3) For potentially safety-significant plant-specific deviations from the ERG instrumentation and controls, each licensee and applicant must provide in the PGP a list of the deviations and their justification. These should be submitted in the plant-specific technical guideline portion of the PGP, along with other technical deviations.

(4) For each instrument and control used to implement the emergency operating procedures, there should be an auditable record of how the needed characteristics of the instruments and controls were determined. These needed characteristics should be derived from the information and control needs identified in the background documentation of Revision 1 of the ERG or from plant-specific information.

(5) It appears that the Basic version of the ERG and background documentation provide an adequate basis for generically deriving information and control needs. However, because of the differences in the organization of the material in the background documents between Basic and Revision 1, it is apparent that it would be easier to extract the needed information from the Revision 1 background documents.

At the conclusion of the meeting, there was general agreement with the staff's comments among the owners' representatives present.

Enclosure 3 is a list of attendees.

Original signed by

H. Brent Clayton, Section Leader
Section A - Procedures
Procedures and Systems Review Branch
Division of Human Factors Safety

NOTE: The enclosures mentioned in the text above are not included in this appendix.

cc: Mr. Michael W. Maupin
Hunton and Williams
Post Office Box 1535
Richmond, Virginia 23213

Mr. J. L. Wilson, Manager
Post Office Box 315
Surry, Virginia 23883

Donald J. Burke, Resident Inspector
Surry Power Station
U.S. Nuclear Regulatory Commission
Post Office Box 166, Route 1
Surry, Virginia 23883

Mr. Sherlock Holmes, Chairman
Board of Supervisors of Surry County
Surry County Courthouse
Surry, Virginia 23683

W. T. Lough
Virginia Corporation Commission
Division of Energy Regulation
Post Office Box 1197
Richmond, Virginia 23209

Regional Radiation Representative
EPA Region III
Curtis Building - 6th Floor
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Mr. J. H. Ferguson
Executive Vice President - Power
Virginia Electric and Power Company
Post Office Box 26666
Richmond, Virginia 23261

James P. O'Reilly
Regional Administrator - Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Virginia Electric and Power Company

cc:
Richard M. Foster, Esquire
Musick, Williamson, Schwartz,
Leavenworth & Cope, P.C.
P. O. Box 4579
Boulder, Colorado 80306

Michael W. Maupin, Esquire
Hunton, Williams, Gay and Gibson
P. O. Box 1535
Richmond, Virginia 23212

Mr. Paul W. Purdom
Environmental Studies Institute
Drexel University
32nd and Chestnut Streets
Philadelphia, Pennsylvania 19104

Atomic Safety and Licensing Appeal
Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Ellyn R. Weiss, Esquire
Sheldon, Harman, Roisman and Weiss
1725 I Street, N.W., Suite 506
Washington, DC 20006

Mr. E. W. Harrell
P. O. Box 402
Mineral, Virginia 23117

Mr. Anthony Gambardella
Office of the Attorney General
11 South 12th Street - Room 308
Richmond, Virginia 23219

Resident Inspector/North Anna
c/o U.S. NRC
Senior Resident Inspector
Route 2, Box 78
Mineral, Virginia 23117

Mr. J. H. Ferguson
Executive Vice President - Power
Virginia Electric and Power Co.
Post Office Box 26666
Richmond, Virginia 23261

Mrs. Margaret Dietrich
Route 2, Box 568
Gordonsville, Virginia 22042

Mr. W. T. Lough
Virginia Corporation Commission
Division of Energy Regulation
P. O. Box 1197
Richmond, Virginia 23209

U.S. Environmental Protection Agency
Region III Office
ATTN: Regional Radiation
Representative
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Regional Administrator
Nuclear Regulatory Commission
Region II
Office of Executive Director
for Operations
101 Marietta Street N.W., Suite 2900
Atlanta, Georgia 30323

Old Dominion Electric Cooperative
c/o Executive Vice President
Innsbrook Corporate Center
4222 Cox Road, Suite 102
Glen Allen, Virginia 23060

Mr. Richard C. Klepper
Board of Supervisors
Louisa County Courthouse
P. O. Box 27
Louisa, Virginia 23093