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October 18, 1985

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Mr. Hugh L. Thompson, Jr.  
Director, Division of Licensing  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
CRDR Corrective Action Supplemental Information

Gentlemen:

AP&L submitted the Control Room Design Review (CRDR) program plan for Arkansas Nuclear One by letter dated November 25, 1983 (0CAN118310). In accordance with that plan, the ANO-1 CRDR Final Summary Report was submitted to the NRC on August 14, 1985 (1CAN088504). Subsequently, during the week of September 16, 1985, an NRC review team visited ANO to perform an on-site audit of the CRDR program. During the audit, Mr. Robert Lee and Mr. Richard Eckenrode, of the NRC staff, requested additional details related to the implementation schedule for certain corrective actions committed to in the Final Summary Report. Based on subsequent discussions related to that request, AP&L committed to provide a letter within 30 days of September 20, 1985, documenting: 1) specific schedule commitments for resolution of human engineering discrepancies (HEDs) with a significance rating of 1 that will be corrected during the next two refueling outages, and 2) identifying HEDs with a significance rating of 1 and corrective action schedules that may require implementation schedules extending beyond two refueling outages. Additionally, within six months of this letter, AP&L will provide a detailed justification for the exceptions to the two refueling outage schedule stating the basis for the schedule and identifying proposed corrective action.

In accordance with the above commitments, AP&L herein provides the additional details regarding schedules for corrective actions of HEDs with a significance rating of 1. Each HED with a rating of 1 is discussed in the attachment to this letter. In summary, of the 42 HEDs with a significance rating of 1, 15 HEDs or 36% have already been resolved/corrected, 12 HEDs or

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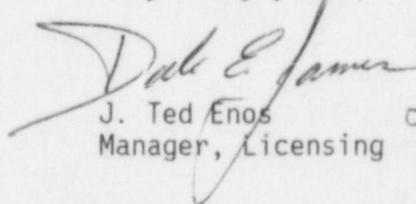
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29% have been scheduled for correction during the seventh refueling outage (1R7), 9 HEDs or 21% have been scheduled for correction during the eighth refueling outage (1R8), and 6 HEDs or 14% may take longer than two refueling outages to correct. Therefore, 86% of all the HEDs with a significance rating of 1, have been corrected or will be corrected during the next two refueling outages at ANO-1. These and other related corrective actions will also address a significant number of HEDs with a rating of 2 and 3. Additional details are contained in the attachment.

As described in the ANO-1 Final Summary Report, a phased approach is planned for resolution of the HEDs that require corrective action. This phase approach is necessary to achieve a consistent, coherent and effective interface between the plant operators and the control room. The approach involves an iterative process of the selection and verification of corrective actions. Since most of the corrective actions interrelate and require a coordinated verification and implementation effort, the corrective actions identified in the attachment for the subject HEDs does not necessarily represent the final solution to the HED. The identified solution does, however, address the operator needs in such a way that subsequent changes (if any) will be primarily enhancements of the identified corrective action. Accordingly, as committed in the ANO-1 Final Summary Report, six-month status reports will be provided to the NRC regarding additional HED resolution status. This is the most practical way to keep the NRC informed of HED resolution status during the iterative corrective action process.

The detailed justification and schedule for the HEDs that are an exception to the two outage schedules, will be provided to the NRC by April 18, 1986, in accordance with the discussions held during the week of September 16, 1985.

Very truly yours,

  
J. Ted Enos  
Manager, Licensing

*See J. Ted Enos*

JTE:DEJ:lw

Attachment

SUPPLEMENTAL INFORMATION REGARDING ANO-1  
HEDS WITH A SIGNIFICANCE RATING OF 1

INTRODUCTION

As described in the ANO-1 CRDR Final Summary Report dated August 14, 1985, human engineering discrepancies (HEDs) that have or could have substantially affected safety systems and/or emergency operations were given a significance rating of 1. A total of 42 HEDs were identified in the Final Summary Report with a significance rating of 1. Discussed below is the corrective action plan for these HEDs with supplemental information regarding schedule details beyond that contained in the Final Summary Report.

HEDS ALREADY RESOLVED/CORRECTED

Of the 42 subject HEDs, 15 HEDs (35%) have already been resolved/corrected. Thirteen of these HEDs were identified as corrected or resolved in the Final Summary Report and will not be discussed further here. These 13 HEDs are:

CK:1-1.012  
CK:5-1.016  
CK:5-1.026  
QS:A3.14-1.002  
QS:B2.1-1.028  
QS:B2.3-1.029  
QS:B7.10-1.030  
QS:A3.13-1.046  
QS:B3.12-1.070  
QS:D4.4-1.079  
VR:1-1.029  
VS:1-1.008  
VL:1-1.006

Two additional HEDs have been corrected as follows:

1. HED No. QS:E2.1-1.083, "SPDS steam generator tube-to-shell delta temperature should be defined on the CRT as far as which temperature minus which temperature."

This HED has been resolved by a software change that presents a better label on the graphic display of the SPDS which clearly identifies the higher and lower temperature components of the graph.

2. HED No. QS:A3.20-1.051, "A chart recorder is needed for reactor building sump level."

This HED has been resolved by the addition of a 24-hour historical file as part of the SPDS such that certain parameters can be selected for trend display of the past 24 hours of data. The reactor building sump is one of the parameters available on this historical file.

## HEDS TO BE CORRECTED BY 1R7

Of the 42 subject HEDs, 12 HEDs (29%) have been scheduled for correction during the next refueling outage, 1R7. Four of these 12 HEDs were identified in the Final Summary Report as being scheduled for correction during 1R7 and will not be discussed further here. These 4 HEDs are:

HR:1-1.002  
QS:A3.2-1.020  
QS:A1.14-1.036  
VR:1-1.028

The other 8 HEDs are as follows:

1. HED No. QS:A3.5-1.042, "A core exit thermocouple indicator (reading in degrees F) is needed in the control room."

This HED will be corrected during 1R7 by the addition of a core exit thermocouple indicator in the control room that is independent of the existing core exit thermocouple display available on the SPDS.

2. HED No. CK:6-1.001, "The control room instrumentation is not clearly labeled to permit rapid and accurate human performance. Many instruments are unlabeled while others are labeled with inadequate information. The labels are inconsistent in letter style and size as well as wording, format, abbreviations, and placement. Readability is also a problem since many of the labels cannot be read from the required viewing distances."

The HED will be corrected during 1R7 as part of the comprehensive control room surface enhancement program. Labels in the control room will be replaced with labels that resolve this HED.

3. HED No. CK:8-1.058, "Related components from panels C18, C16, and C14 are not grouped together. Decay Heat, sodium hydroxide, quench tank and BWST are not grouped. Relationships are not enhanced by spacing, demarcation or color shading."

This HED will be corrected during 1R7 as part of the comprehensive control room surface enhancement program. Spacing, demarcation, mimics and color shading will be used as appropriate to correct this HED.

4. HED No. QS:B3.17-1.071, "Service water instrumentation is not well laid out. Service water pump control is on one panel, pressure and flow indication on another (C16.8/C19). Sluice gates and valves are on C26."

This HED will be corrected during 1R7 as part of the comprehensive control room surface enhancement program. Association enhancement techniques will be used to correct this HED.

5. HED No. QS:1-1.097, "The diesel generator start/stop controls are not clearly associated with the other related controls on panel C10, and there is no distinction between the diesel start/stop controls and the breaker controls."

This HED will be corrected during IR7 by modifying the diesel generator start/stop controls such that they are easily distinguishable from nearby breaker controls. Also, association enhancement techniques will be used to correct this HED.

6. HED No. QS:1-1.103, "The handswitches for all the motor-operated valves are the same type. However, some of the controls are for modulating valves while others are for valves with seal-in circuits. There is no indication on or near the control handswitches to distinguish between types of valves being controlled. This could lead to operator misoperation of certain valves."

This HED will be corrected during IR7 as part of the comprehensive control room surface enhancement program. The modulating controls and seal-in controls will be made easily distinguishable such that each type of control is easily identified by the control room operators.

7. HED NO. VR-1-1.027, "There is a low flow trip on the seal injection valve at 22 gpm. This trip auto resets at about 28 gpm. If the valve travels full open and flow has not reached 28 gpm, the valve trips again. Manual override of the trip function is needed."

This HED will be corrected during IR7 by the modification of the subject valve controls such that manual override of the trip function is available during reestablishment of seal injection flow.

8. HED NO. QS-A5.2-1.065, "The VSF9 fan is noisy and interferes with speech and annunciators."

This HED will be corrected during or before IR7 by making appropriate changes to the ventilation system to reduce the noise from operation of the fan.

#### HEDS TO BE CORRECTED BY IR8

Of the 42 subject HEDs, 9 HEDs (21%) have been scheduled for correction and/or resolution during the second refueling outage after submittal of the Final Summary Report (i.e., IR8). These 9 HEDs are as follows:

1. HED No. CK:3-1.003, "Multipoint alarms require the control room operator to go to a given plant location (or local panel) for specific information."

This HED will be corrected during or before IR8 by separating the more critical multipoint alarms from the less critical multipoint alarms for the specific annunciators identified in the Final Summary Report. The diesel generator multipoint alarm is scheduled for correction during IR7 as part of the overall solution of this HED.

2. HED No. CK:3-1.004, "Print-out capability is not provided for every computer multipoint annunciator alarm."

This HED will be corrected during or before IR8 by separating the more critical multipoint alarms from the less critical multipoint alarms for the specific annunciators identified in the Final Summary Report. The diesel generator multipoint alarm is scheduled for correction during IR7 as part of the overall solution to this HED.

3. HED No. QS:A1.17-1.001, "Atmospheric dump control (CO2) is not separate from condenser dump control, and therefore does not allow individual steam generator header pressure control. Presently both have to be transferred if atmospheric dump or condenser valve is selected in auto mode. They automatically transfer, but turbine bypass valve position is not available. The operators, therefore, cannot identify the current alignment.

All but the turbine bypass valve position indication have been corrected. This HED will be corrected during IR8 by the addition of turbine bypass valve position indication to the control room.

4. HED No. VR:1-1.013, "A meter is needed for that task of determining turbine bypass valve position, but is not available."

This HED will be corrected during IR8 by the addition of turbine bypass valve position indication to the control room.

5. HED No. VR:1-1.006, "During task analysis, the subject matter expert stated a need for a legend light to aid in the task of identifying which makeup/HPI pump is the ES standby pump, but is not available."

This HED will be corrected during IR8 by the addition of valve position indication for the subject system valves needed to establish the status of the makeup/HPI pump.

6. HED No. QS:A1.7-1.018, "A remote control is needed for the DH1A and DH1B decay heat pump suction valves since these valves may be inaccessible due to the accident in which they are needed because of flooding, high radiation, etc."

This HED will be resolved by IR8.

7. HED No. QS:A1.8-1.019, "Remote control, motor operated crossover valves are needed for high pressure injection/low pressure injection line up for piggyback operation."

This HED will be resolved by IR8.

8. HED No. QS:A1.9-1.031, "A makeup tank isolation valve remote control is needed in the control room to prevent gas binding in high pressure injection pumps."

This HED will be resolved by IR8.

9. HED No. VR:1-1.031, "Makeup tank outlet valve (MU-13) must be operated locally by the waste control operator."

This HED will be resolved by 1R8.

#### HEDS TO BE CORRECTED AFTER 1R8

Of the 42 subject HEADs, 6 HEDs (14%) may require schedules for correction/resolution during refueling outages beyond 1R8. Additional information regarding schedule and corrective action and/or resolution details will be provided within six months as agreed to with the NRC during discussions the week of September 16, 1985. These HEDs are as follows:

1. HED No. CK:3-1.008, "There is no logical prioritization system in place for the annunciator windows within each annunciator panel so that the operator can differentiate the most important (or serious) alarms from less important ones."
2. HED No. QS:1-1.100, "The service water pump controls are located very low on panels C16/C18 such that status verification cannot be done from a front panel. Service water pump status is an important item for the operators during an emergency."

The service water pump discharge pressure is conveniently located such that it can be used for rapid verification until the pump controls/status can be evaluated to determine if relocation is practical.

3. HED No. CK:5-1.001, "When panel instruments fail or become inoperable, the failure is not apparent to the operators. Some fail midscale."

Power supply status lights for the most important power supplies are provided in the control room such that evaluation of this HED is limited to additional measures beyond those already completed.

4. HED No. QS:A3.19-1.050, "Diagnostic instrumentation is needed for safety systems."
5. HED No. QS:2-1.084, "Certain parameters that are presently available only on the plant computer or SPDS should be available in the control room with an indicator independent of a computer. (i.e., core exit thermocouples, steam generator tube-to-shell delta temp., and feedwater pump suction pressure)"

The core exit thermocouple portion of this HED is being addressed per HED QS:A3.5-1.042 during 1R7. The feedwater pump suction pressure portion of this HED is being addressed per HED QS:A3.15-1.047 which has a significance rating of 3. The significance rating of 1 applies to the steam generator tube-to-shell delta temperature and the core exit thermocouple displays only.

6. HED No. VR:1-1.007, "An instrument is needed for the task of verifying ES standby HPI pump discharge pressure, but is not available."

This HED is a subset of HED QS:A3.19-1.050 since this instrument is needed for diagnostic purposes.

#### CONCLUSION

As presented above, 86% of all the HEDs with a significance rating of 1 have been corrected or will be corrected during the next two refueling outages at ANO-1. These and other related corrective actions will also address a significant number of HEDs with a significance rating of 2 and 3. Within six months, AP&L will provide a detailed justification for the above identified exceptions to the two refueling outage schedule for HEDs with a significance rating of 1, stating the basis for the schedule and the committed completion outage.