ornl

OAK RIDGE
NATIONAL
LABORATORY

MARTIN MARIETTA

Nuclear Power Plant Personnel
Qualifications and Training:
TSORT — An Automated Technique
to Assign Tasks to Training Strategies

C. C. Jorgensen

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

Engineering Physics and Mathematics Division

NUCLEAR POWER PLANT PERSONNEL QUALIFICATIONS AND TRAINING: TSORT — AN AUTOMATED TECHNIQUE TO ASSIGN TASKS TO TRAINING STRATEGIES

C. C. Jorgensen

NRC Monitor: J. Lowry
Human Factors and Safeguards Branch
Division of Risk Analysis and Operations

Program Manager: P. M. Haas
Oak Ridge National Laboratory

Principal Investigator: C. C. Jorgensen
Oak Ridge National Laboratory

FOREWORD

This report is part of a research program that was initiated in March of 1982 and was designed to provide a technical basis for the implementation of a systems approach to training (SAT) in the nuclear industry. The work previously completed in this program is described in NUREG/CR-3414, entitled "Evaluation of Training Programs and Entry Level Qualifications for Nuclear Power Plant Control Room Personnel Based on the Systems Approach to Training" (P. M. Haas, D. L. Selby, M. J. Hanley, and R. T. Mercer, 1983). Previous work includes a review of taxonomies of human performance and the identification of likely performance shaping factors to be considered in entry level and training requirements for nuclear power plant (NPP) control room personnel. Also, a proposed structure was produced based on the systems approach to training which used guided rating forms to evaluate each element of training system design and a technique developed to rank plant malfunctions for their importance in training.

The current effort was initiated in July 1983. In contrast to the 1982 work, this program was oriented toward the development of a series of tools which could be used to operationalize NRC-directed portions of the SAT structure developed by ORNL. Four research products were originally specified:

1. A methodology for identification of NPP operator characteristics.

2. A general descriptive model for training performance measurement.

3. A methodology to evaluate training effectiveness of NPP control room simulators.

4. A methodology to select tasks for training.

The orientation of the 1983 work was to demonstrate feasibility of the methods. In 1984 the methods were to be refined and tested in realistic field situations. At the later direction of NRC, task 2 (which shared common elements with another NRC effort) was omitted. Task 3 was redirected to focus on the use of simulators as a testing device rather than as a training device. Therefore, three tasks were left for ORNL development as follows:

1. "Development of a methodology for identification of NPP control room operator characteristics." The emphasis of this task was on the generation of a technique to link descriptions of in-plant task behaviors to potential measurement instruments suitable for entry level personnel. This goal was accomplished through the development of an automated task analysis tool called TAPS (the task analysis profiling system) which outputs skills, knowledges, abilities, and attitudes when plant job descriptions are typed in. In addition, TAPS lists potential measurement tests which can be used to measure operator abilities.

2. "Develop a methodology for evaluation of simulation facilities." Developed under subcontract by ORNL to Micro Analysis and Design, the purpose of this task was to assess the acceptability of simulation facilities for use in the simulator-based portion of the licensing examination. This task has been

addressed through the generation of a users handbook for the evaluation of NPP simulators.

3. The final task and subject of the present report was "Develop a methodology for training task selection." The purpose of this task was twofold. The first was to provide NRC with a standardized method to select tasks for use in NRC-sponsored training research. The second was to develop a method to aid NRC in the assessment of whether or not plant training developers were allocating the training of individual tasks to appropriate training methods. These purposes were addressed through the development of a computer-based task sorting program (TSORT) which provides a scientific basis for task-allocation decisions and at the same time reduces NRC manpower work loads.

The NRC training research program covers a wide range of technical areas, including the systems approach to training, qualifications, licensing, simulator evaluation, and operational performance measurement. Each area has implications for supporting research methodologies which must be developed as well as the selection of reasonable problem areas against which a new methodology can be evaluated. TSORT was initially visualized primarily as an NRC methodology to assist in the subjective selection of sample tasks from NRC data bases. It was intended that the tasks would then later be used for research efforts in the above areas. Because the reasons for task selection could be quite varied, it was decided to select a single application problem against which the overall TSORT logic would be demonstrated. The result is the present volume which emphasizes one problem in task allocation that will be encountered by NRC regulatory groups during future evaluation of SAT based NPP training programs.

Development of TSORT occurred in three steps outlined in the contract statement of work:

1. Development of an approach to sort tasks into training strategies

2. Development of a user guide for the approach selected, and

3. Illustration of the feasibility of the concept through a complete example.

The parallel development and application of TAPS is described in Volume 2 of this report "Nuclear Power Plant Personnel Qualifications and Training TAPS — the Task Analysis Profiling System," (C. C. Jorgensen). The method ology for simulator evaluation will be described in a separate report which is expected to be published as an ORNL/TM.

TABLE OF CONTENTS

ABSTRACT

This report discusses TSORT, a technique to assist the Nuclear Regulatory Commission (NRC) in two areas: the first is to provide a standardized method to select tasks for use in NRC-sponsored training research and the second is to evaluate whether training program developers have allocated nuclear power plant tasks to appropriate training strategies. The TSORT structure is presented, including training categories selected, dimensions of task information considered, measurement metrics used, and a guide to application. TSORT is implemented as an automated software tool for an IBM-PC. It uses full color graphics and interactive menu selection to provide NRC with a variety of evaluation options including: rank ordering of training strategies reasonable for each task, rank ordering of tasks within strategies, and a variety of special analyses. The program code is also presented along with a comprehensive example of 20 realistic tasks illustrating each of 17 options available.

LIST OF FIGURES

ACKNOWLEDGEMENTS

1.0 INTRODUCTION

During the implementation of a systems approach to training (SAT), a variety of analyses must be performed which require the subjective expertise of a training developer.[1] One major analysis is the determination of where individual job tasks should be trained and how they should be ranked relative to different instructional aids and approaches.[2] For example, when a course of instruction is produced, a training developer needs to decide whether a task should be trained in an on-the-job setting or in a formal classroom environment. In another situation a trainer may need to identify which tasks should be given extra training if resources permit. A third situation might be the determination of which tasks are logical candidates for mandatory testing or which tasks could be eliminated from training altogether.

Due to a lack of standardized SAT support tools, such decisions are often made in a very subjective manner during the course of training development. Depending upon the skill of training development personnel, the resulting allocation of tasks to training strategies may or may not be properly made. In a SAT the kinds of courseware developed, the media and methods used, and the types of performance evaluations made are directly influenced by decisions based on the general training strategy for tasks. There is thus a "ripple effect" from poor decisions which may have been made early in the process. Because NRC is faced with evaluating many different plant training programs, it becomes important to have an objective basis to determine whether industry selections are reasonable within a SAT framework.

Selection evaluation is a slightly different problem than checklisting whether training processes are used during a SAT development such as that described in Haas, Selby, Hensley, and Mercer (1983). In the present case the process used is not as much the focus as the reasonableness of the product resulting from that process. The distinction is reflected by two dimensions of training evaluation. Haas *et al.* emphasize whether or not a plant training developer has provided a process for each of the required SAT developmental steps. Emphasis is not on whether a particular method used meets SAT content objectives. The present effort stresses the latter aspect, namely, was the *output* of the process reasonable. Because similar end objectives in SAT may be met in more than one way, an independent basis is needed by which NRC could compare the result of task allocation decisions to a standard logic of allocation. If the deviation is extremely large, NRC thus has reasonable grounds to examine the training program further or to require justification from a utility as to why a particular approach was used.

2.0 PROCESS OVERVIEW

To select which training strategy should be applied to a given task, it was necessary to develop a method to relate requirements of tasks to the various potential training approaches. To attain that goal, both the possible training strategies and the dimensions that describe task information had to be specified. Specification of *training strategies* resulted in nine types which might occur during a SAT implementation in the nuclear industry (although the method developed need not be limited by those selections). The strategies used were drawn from DOE and NRC sources, as well as from previous field experience in non-nuclear SAT training developments, including the military.[3,4]

Specification of *task information* resulted in ten dimensions that correspond to decision-making criteria frequently applied by expert training developers when they allocate tasks to different training strategies. In arriving at a decision, not all dimensions are of equal importance for each strategy. Therefore, it was also necessary to develop a weighting scheme which added decision-making importance to dimensions. The result of this process was a ten by nine matrix whose cell values represent rating ranges above or below which a training developer would generally agree that a training dimension should play a significant role in a particular task allocation decision (see Figure 1).

After a matrix of task-sorting decision criteria had been generated (through interviews with an industry trainer), it was then possible to rate plant tasks by the same set of dimension values. By comparing the rated values for a particular task to the criteria values defined for each strategy, it became possible to numerically determine whether a task "fit" better in one category than another (see Figure 2). To make the fitting process mathematically rigorous, it was also necessary to determine what kind of numeric score or "metric" should be produced to describe the fit. A well defined metric was important because a training developer is interested not only in which category to place a task but also how to shift tasks among different categories as resources and time constraints change training priorities.

A numerical analysis of large numbers of tasks implied that manual procedures would be cumbersome and subject to frequent user errors. This has previously been the case with many otherwise worthwhile rating approaches. As a result, it was decided from the onset of the contract to computerize the sort methodology in a form that required the least possible investment of NRC time and effort. The result was a completely automated, menu-driven task sort procedure which is capable of making recommendations for individual task allocations during training and rank ordering sets of tasks within and between allocation categories.

An analyst sometimes requires information that goes deeper than a training strategy selection. Therefore the program was later expanded to include independent rank ordering processes for each task dimension individually. The expansion resulted in ten new menu options over and above the six options previously available. A special eleventh option was also added to demonstrate the feasibility of an automated SAT analysis that includes cost/benefit tradeoffs to assess the utility of training. Due to extremely high costs of safety related nuclear accidents, this capability provides both NRC and industry insight into the cost avoidance benefits of increasing plant safety through better training.

In the remaining sections, each of the above steps is described in detail. Following a technical discussion of the method, a user guide is presented along with a comprehensive example (Appendix 1) which illustrates every feature of the program through a printout of a complete task sorting session using 20 realistic tasks. Appendix 2 provides the scales used to rate tasks. Appendix 3 gives a task data sheet. Finally, Appendix 4 provides a formatted listing of the BASIC code that implements the program on an IBM-PC.

2.1 Training Categories

This section discusses the nine training categories that were chosen to be addressed by the sorting program.

Dimensions*	1 Qualification Training	2 Certification Training	3 Refresher Training	4 Elimination Candidate	5 On-the-Job Training	6 Candidate Less Training	7 Candidate More Training	8 Candidate Simulator Training	9 Candidate Formal Training
1 Skill Acquisition Difficulty	N/A	N/A	>3	<3	<3	<3	>7	>5	>7
2 Skill Performance Difficulty	N/A	N/A	>3	<3	<3	<3	>7	>5	>7
3 Immediate Performance Need	>3	>5	>8	N/A	<3	<3	>7	N/A	>5
4 Safety Consequences	>3	>7	>3	<3	<3	<2	>7	N/A	>7
5 Previous Nuclear Experience	N/A	<2	<3	>7	>7	>5	<5	<3	<5
6 Normal Operation Performance	>3	N/A	<3	N/A	>5	>7	<3	<3	<3
7 Emergency Operation Performance	>5	N/A	>5	<3	<3	<3	>3	>5	>3
8 Plant Delay Tolerance	<2	>7	>7	<3	<3	<3	>7	>5	N/A
9 Regulatory Requirement	>7	>3	>3	<1	N/A	N/A	N/A	>3	N/A
10 Economic Consequences	>5	N/A	N/A	<2	<2	N/A	>7	>5	>3

*N/A means the dimension was rated not relevant by nuclear training personnel based on the scale criteria used. Scale values range from 0 to 9 — < means less than and > means greater than.

Figure 1. Ten Task Dimensions by Nine Training Strategy Categories.

Sample Task Rating		Refresher Training		Formal Training	
Dimension	Actual Task Rating	Ideal Criteria	Deviation	Ideal Criteria	Deviation
1	3	<3	+0 (true)	>7	−4 (false)
2	7	>3	+4 (true)	>7	0 (false)
3	1	>8	−7 (false)	>5	−4 (false)
		Total (Σ)	−3		−8

Result: Category 1 (refresher training) fits the sample task better than Category 2 (formal training) because the total sum of deviations for Category 1 was less negative than for Category 2.

Figure 2. Establishing Whether One Task "Fits" a Category Better Than Another (Two Categories with Three Dimensions Each Taken from the First Three Dimensions of Figure 1).

2.1.1 Certification Training

This category is used to determine tasks whose performance is so crucial to system operation that each operator must be certified as having the ability to perform them prior to being permitted to operate in the NPP environment. Tasks that meet this category should be seriously considered for inclusion in an NRC evaluative examination. The criteria used to select it are shown in Figure 1 in the appropriate column. The same holds true for categories 2.1.2 — 2.1.10.

2.1.2 Qualification Training

This category refers to tasks that contribute to safe plant operation but are not so critical that specific training or testing is required; rather either can be accomplished through representative task samples to assure that the plant training program develops necessary skill levels. These tasks would generally require training to a clearly specified standard of performance before a trainee would be considered as having successfully passed a course module prior to plant operation but could be tested by NRC on a recurring basis or through representative sampling techniques.

2.1.3 Refresher Training

Because some tasks contain skills that tend to degrade quickly, i.e., show poorer performance over time, tasks can require periodic retraining to assure that performance would not be compromised in a plant environment. These tasks can also include qualification or certification tasks that are seldom used but must be capable of immediate performance should emergency needs dictate. Tasks falling in this category are generally included in institutional training as well as requalification testing.

4

2.1.4 Elimination from Training

These are tasks with a high probability that trainees have already been exposed to similar task demands through previous experience in NPP environments or through previous exposure such as Navy experience or academic course-work. As a result, if time or budget pressures require tradeoffs in a plant training program, these tasks would be logical first candidates for omission. They are also tasks which NRC would not normally need to evaluate.

2.1.5 On the Job Training

These tasks require site specific training or can readily be learned after an operator leaves formal training. Often the tasks involve simple skills and can be quickly learned through demonstration or verbal instructions. In some cases they may be difficult tasks that require close monitoring and are not amenable to standard classroom instructional methods. An example is an apprenticeship situation where slowly developed motor skills are involved, such as the case of a journeyman machinist where a "feel" of the equipment is important to achieving close tolerances in machine tool fabrications. These are tasks which NRC may want to evaluate if a plant shows high turnover rates of experienced personnel. NPP personnel could be undertrained if the informal on-the-job apprenticeship is not functioning well.

2.1.6 Candidate Tasks for Less Training

These tasks have a high probability of previous exposure as a result of normal plant operations. They are liable to be both familiar and well practiced. They differ from "Elimination from Training" tasks in that they must still be included in training programs due to their importance to plant operations but can receive less emphasis should an instructor need to reallocate training time to areas that had not originally been planned. NRC should consider these tasks as in a "grey area" where considerable variability from plant to plant is still acceptable.

2.1.7 Candidate Tasks for More Training

These are tasks which are so important that if any extra time is available, an instructor would want the trainee to repeat and reemphasize the task to assure that the subtask steps have been thoroughly practiced. Tasks for certification or qualification are often appropriate for this type of emphasis but are not the only cases that can occur. For example, a manual task with a rapid rate of skill decay can often be improved by "overtraining" to change the forgetting curve. NRC should check the program of instruction to assure the tasks are being considered and be alert to cases where insufficient instruction emphasis may be occurring.

2.1.8 Simula·or Training

Tasks recommended for simulator training comprise a special instance because simulators have some unique advantages over less complex forms of training equipment such as slide projectors or mock-ups. Simulator tasks are best suited for situations that require *dynamic*

5

behavior or real time performance with heavy interactions among plant systems and operators. Simulator tasks are also often tasks where static test score measurements are difficult to generalize to dynamic emergency or accident scenarios. This category is designed to assist an NRC evaluator in differentiating between tasks better suited for performance-based tests in a simulator and tasks reasonable for paper-and-pencil tests such as more traditional platform instruction.

2.1.9 Formal Training

This category can include dynamic tasks but is particularly sensitive to special task requirements including high skill-acquisition difficulties and knowledge acquisition. Formal training tasks can require a large knowledge base which must be drawn upon during plant operation. Math skills are one example. NRC evaluators should be aware that these tasks can be very sensitive to factors such as instructor involvement, morale, or speaking and delivery skills.

2.2 Task Information Extraction

The previous section considered task-training strategies. This section considers the information requirements that lead to these selections. A systematic method is needed to relate a training developer's subjective judgements about task content to the requirements of the nine strategies described in Section 2.1. The method called TSORT accomplishes the linkage by using a table of rating-criteria ranges (Figure 1) within which a rating must fall to be considered acceptable. Ten information dimensions have been given numeric values for all nine strategies. A user of the task sort program is asked to input individual dimension ratings for each task considered when the program is first run. The ten dimensions selected for the TSORT are described below. The complete rating scales are presented in Appendix 2. Appendix 3 shows how 20 tasks were rated for each of the ten dimensions. These tasks are the ones used in the comprehensive example presented in Appendix 1.

2.2.1 Difficulty in Acquiring Skills

The first rating dimension concerns the difficulty a student would have in *acquiring* the basic skills required for performing a task. The skills used by a task may be drawn from either in-plant experience or from SAT analysis procedures, the TAPS methodology discussed in Volume 2 of this contract, or NRC and INPO task analysis data bases. For each dimension a user must rate a task on a scale from 0 to 9 where 0 represents the easiest possible skill acquisition and 9 the most difficult. Or, if the rating is a question of frequency (see, for example, Section 2.2.6), 0 represents never and 9 represents frequently. To assist the user, anchored rating scales were developed (see Figure 3). The type of information required of a rater is stated at the top of the form and three anchoring tasks are listed at the bottom left-hand side that are drawn from plant situations which correspond to low, medium, and high numeric levels of skill acquisition difficulty.

2.2.2 Skill Performance Difficulty

This dimension differs from skill acquisition in that the skills for some tasks may be very easy to acquire but very difficult to *perform*. For example, manual control of the feedwater system during a reactor startup is easily learned but requires skillful manipulation of controls. The operator is told to monitor steam flow, feedwater flow, and reactor water level. The objective is to match feedwater flow with steam flow while maintaining reactor water level in a narrow band. Adjustments to feedwater flow are accomplished by manually adjusting feedwater pump turbine speed. An operator that has not practiced this task would have some difficulty in maintaining a constant reactor water level because of a tendency to "overshoot" in either direction.

2.2.3 Immediate Performance

Although it is not likely that a new operator will face a critical safety-related situation without supervision, it is possible, and special consideration should be given in the training program to such tasks. Such tasks should be evaluated based on the potential need for immediate performance shortly after training. Typically, these are tasks that emphasize safety-related actions in response to plant transients. This dimension can also be useful to NRC in identifying tasks that may have safety implications depending upon manning and crew structures.

2.2.4 Poor Performance Consequences

The task dimension of "Poor Performance Consequences" is closely related to safety. This dimension assesses the potential impact of poor task performance in terms of radiation release to the public. An example is a failure to perform preventive maintenance scheduled for reactor scram signal relays that trigger rod drop into the core (as occurred at the Salem II Power Plant in 1983). In this case severe consequences could have resulted. Scale number 4 in Appendix 2 details the safety criteria utilized.

2.2.5 Previous Experience

The fifth dimension is the amount of previous task experience which an anticipated training population is likely to have. In some cases, such as former nuclear Navy personnel, there may be considerable general experience but with the wrong type of procedures for large commercial reactors. In this case an experience score would be low since retraining would be needed. In other cases, the task may involve the use of common equipment such as pocket dosimeters which would have a high probability of previous utilization and would be rated high. NRC could use this dimension to rank order tasks in a job that may require special training.

2.2.6 Usage in Normal Operations

Some tasks may occur frequently in normal operations and hence are likely to be well practiced by operators even without requalification training. Other tasks may occur seldom or only in emergency operations. This dimension aids in identifying tasks which will

7

be well practiced and hence less subject to "skill decay" discussed in Section 2.1.3. Tasks occurring more frequently would receive higher ratings than those occurring less frequently.

2.2.7 Usage in Emergency Operations

In contrast to "Usage in Normal Operations," some tasks occur frequently in both normal and emergency operations so that in an emergency an operator would probably already be familiar with the tasks. Others occur only in emergency operations (e.g., manual valve opening during operation of ECCS) and are in frequent. Thus, normal and emergency operations need to be rated separately since different emergency task familiarity can be important during training strategy selections.

2.2.8 Response Delay Tolerance

Another dimension is how tolerant a plant is to an operator response delay. Plant sensitivity to some tasks such as repair of systems backed up with redundant circuitry may be very low. Others, however, may require rapid operator decisions. Such a task within a particular plant must be well practiced in order to provide quick operator responses. Thus response speed and other associated variables have plant specific implications for how the task should be practiced in the training program. NRC should be alert to whether operators possess the decision making skills needed by tasks with low plant delay tolerances.

2.2.9 Regulatory Requirement

The ninth dimension is whether or not a task is mandated for training through regulatory requirement. This dimension by itself could require the equivalent of test certification training if its rating level is high enough. The numeric values are determined through the rating scales mentioned earlier and shown in Appendix 2. This dimension may change with NRC policy. Users of the sort program should periodically check the rating scale for validity.

2.2.10 Potential Cost Impacts of Poor Performance

Dollar cost must also be considered in determining training tradeoffs. Although dollar cost will often correlate with safety consequences, the two can diverge dramatically depending upon whether or not poor performance would cause radioactive release from the plant containment. The sort program therefore has a special module to expand cost analysis beyond subjective rating should detailed examination of cost-related training impacts be desired by NRC in the course of assessing whether cost/risk tradeoffs by a plant were reasonable. That expansion will be addressed in Section 2.4.

2.3 Metric Development

Section 2.0 stated that in order to compare how well a given task "fits" in a sort category it was necessary to develop a method to capture task information and relate that information

to the processes involved in selecting a training strategy. Although decision making is still a subjective process in the systems approach to training, it is evident upon close examination that expert training developers actually apply a multivariable logic in their decisions. One technique that has received attention as an appropriate method to capture such judgements is called Multiattribute Utility Theory (MUT).[4] MUT has as an underlying principle, the idea that complex subjective decisions can be considered as an additive series of value judgements which when taken in total comprise an overall measure of the desirability of one course of action over another. Because each element of a decision may have differential importance, some schemes also add weighting values to increase the sensitivity of the process.

In the present method, the ten dimensions described in Section 2.2 correspond to the decision elements with one training category preferred over another based on a total score achieved across all dimensions. Such rating decisions are not usually boolean, i.e., all or none, so a mechanism had to be created to account for the partial applicability of a dimension. For example, a task could have low skill-performance difficulty but still have enough to be potentially important if performance occurs in a situation with severe safety consequences. Therefore it was necessary to expand the ten dimensions along a *scale* of ratings rather than a single value. Nine rating levels were selected to provide adequate range for subjective differences although the choice is arbitrary and could be more or less if warranted by predefined criteria such as maintenance intervals or cost accounting categories.

Raters frequently differ as to a correct subjective value to assign. Psychologists traditionally deal with that problem by providing a series of realistic examples for number ratings (usually top, midpoint, and bottom) called "anchors." TSORT also has developed anchored scales for each of the ten dimensions. These scales and their associated examples are presented in Appendix 2. Figure 3 shows a sample rating sheet for "Skill Performance Difficulty." By using the rating scales it becomes possible to assign ten values to each task, one for each of the ten decision dimensions. Before that information can be applied to choose a particular training category, each task's values must be compared to an appropriate acceptability criteria represented in the matrix that defines the categories (Figure 1). If a dimension falls into the acceptable range (above or below the criteria value) it must be considered in the final training decision; otherwise it should be omitted because its inclusion would bias the final number used to rate all categories against each other. These cases are shown by the letters N/A in Figure 1. If NRC later wishes to change the criteria, what needs to be done is change the cell values. The most recent cell values are listed in Appendix 4 in lines 2130—2200 of the BASIC program code. Each line of code represents a row in Figure 1 starting with sort strategy 1 and ending with number 9. The listed numbers correspond to rating criteria values. If the desired relationship is "not applicable," a—1 is entered. A criteria relationship is actually coded as a pair of numbers. The first number is the value, and the second number the relationship. For example, a 3,1 means a criterion of >3. A 3,0 means <3. To change a criterion, the corresponding numbers in statements 2130—2200 are changed. For example to change the rating criterion for "skill acquisition difficulty" from N/A for "qualification training" to greater than nine, line 2130 would be changed to: 9, 1, -1, 1, 3, 1, 3, 0, 3, 0, 3, 0, 7, 1, 5, 1, 7, 1.

```
┌─────────────────────────────────────────────────────────────────────────┐
│  Skill Performance Difficulty                                             │
│                                                                           │
│  Defined in terms of physical and cognitive effort or degree of precision required │
│                                                                           │
│         VALUE                          CRITERIA                           │
│  ─────────────────────────────────────────────────────────────────────   │
│           0          Easily performed with trivial effort ( > 99% can perform) │
│           1          Easily performed with little precision               │
│           2          Easily performed with some precision                 │
│           3          Some performance difficulty, no decision making      │
│           4          Some performance difficulty, occasional decision making │
│           5          Requires some physical effort or cognitive effort with │
│                      decision making                                      │
│           6          Definite physical effort or cognitive effort with decision │
│                      making                                               │
│           7          Same as #6 with some precision                       │
│           8          Heavy cognitive and/or physical effort with precision │
│           9          Extended physical effort, heavy decision making, and │
│                      stringent performance requirements                   │
│                                                                           │
│  VALUE ANCHORS                         SAMPLE TASK                         │
│  ─────────────────────────────────────────────────────────────────────   │
│           0          Read a digital water level meter out loud            │
│           5          Determine that a reactor scram was caused by a       │
│                      normal turbine trip                                  │
│           9          Align fire system for core cooling following a       │
│                      LOCA and loss of all normal and ECS makeup           │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 3. Sample Rating Sheet for Skill Performance Difficulty.

2.3.1 Metric Types

One general metric to measure the "fit" of a given task to a training strategy might be the sum of all acceptable dimension values divided by the total number of values appropriate for a particular sort category, i.e., a percentage of maximum acceptability. Such a metric however makes a hidden assumption. It is that a training analyst is not interested in how "close" a task came to fitting into a category, only that it had a large enough average value to be acceptable. Initially a very stringent form of this metric was developed, referred to in Jorgensen, Haas, Selby, and Lowry[5] as an *absolute* metric because a task was deemed acceptable for a sort category only if it was in an acceptable range for all dimensions. In practice, such a criterion proved to be much too severe that many tasks ended up never being placed in any category. As a result, this metric was relaxed so that it instead counted how *many* of the criteria were acceptable. This relaxed metric represents a total of how many task ratings fell within an acceptable range (adjusted for inapplicable cases). In the terminology of statistics, the metric is a form of non-parametric score in that it makes no assumption about rating distributions. Such a value is more appropriate when

10

confidence in the stability of the rater scores is too low to assign parametric confidence intervals. A "count metric" is then the first type of metric which can be used in TSORT for producing category recommendations.

A count metric works well when the primary concern is about a training strategy choice for individual tasks. When the topic of interest is rank order between tasks or ranking of possible strategies relative to each other, the all-or-none nature of a count metric can result in a loss of useful numeric information. That is, the metric will not record how far a task was from meeting a criterion. Thus, a task might be a single rating point below cutoff and be missed as a potential category candidate. For that reason, a second metric was developed which keeps track of the positive and negative deviations from the cutoff score for each dimension. The result is a metric whose value is zero if there is a perfect fit, positive if the majority of values exceeded the minimum cutoff criterion for the decision, and negative if the majority of values fell below the criterion. Using this metric it then becomes possible to rank order sets of tasks and categories in descending order from the best choice to the worst. It is the most powerful metric to sort tasks but also makes more parametric assumptions about the nature of the rating data. The choice of which metric to select in a given situation is left up to the analyst and operationally corresponds to selecting an appropriately named menu item on the computer CRT. All internal logic and calculations are handled by the program and are transparent to the user.

2.4 Implementation

NRC required an analysis tool that minimized the time and resource load placed on an evaluator when determining whether or not tasks had been reasonably allocated to training strategies by a plant. At the same time, it was necessary to assure that realistic subtleties associated with the decisions required for training development be taken into account. The numeric ranking method described in the previous section is capable of handling extremely complicated decision processes but does so at the price of computational complexity. For example, the analysis of 50 tasks would require 50 times 9 times 10 or 4500 logical decisions. In addition, desiring to see all the task sort combinations would result in nine sets of 50 ranked tasks (one for each possible task category) and ten other sets of 50 ranked tasks corresponding to each dimension should the user be interested in the relative ranking of all categories (one for each task). Even that formidable work load does not take into account a special econometric analysis that might be required during task tradeoff decisions.

It seemed evident that the most efficient manner to handle the level of effort problem was to computerize the entire process and let a computer handle numeric computations and sorts. Because the purpose of this contract effort was only to develop a sort *methodology*, a full scale mainframe implementation was deemed beyond the contract scope. Consequently, a compromise was chosen for the demonstration which illustrated all features of a full scale version but on an IBM-PC, the primary difference being in execution speed and in the number of tasks which can be evaluated at any given time. The present scaled down version enters tasks one at a time during a session, whereas a full-scale version could draw subjective rating information from larger data bases. Other than speed and number of tasks, this initial product has gone considerably beyond what was originally anticipated and represents a very usable training analysis tool even in its IBM-PC demonstration

11

mode. The smaller version also has some advantages in that it is highly portable, has lower costs, and is extremely easy to use. It takes maximum advantage of the IBM color graphics capabilities to prompt, emphasize information, and summarize results.

2.5 User Guide

The IBM-PC program has been designed so that user interaction is based on a turn-key system. That is, the user has only to place a program disc in the IBM-PC and turn the machine on. From that point on, the user is prompted step by step through data input to the results. (See the complete example in Appendix 1.) For an entire session, or at any point in a session, the user can generate a simultaneous hard copy printout of all questions asked, answers given, and results. This is a valuable feature since typographical errors in entry can be noted and changed. Hard copy also provides a permanent record for NRC files without requiring any additional effort on the analyst's part.

2.5.1 Available Options

All options in the sort program are presented to the user as either questions or menus. In the case of questions, a necessary response is indicated and is entered by typing appropriate text or numbers followed by hitting the RETURN key. For menus, the correct response is to type the number of a desired menu element followed by a RETURN. In the other cases, text such as task sentences is expected. In order to reduce user fatigue and highlight different segments of the program, extensive utilization has been made of color graphics. This feature, of course, requires a color monitor.

2.5.2 Initial Information Input

After an introductory screen is presented, the program will ask how many tasks need to be entered. The user should respond with a numeric value and a RETURN. The program then prompts the user for the first task's name. The name can be up to 256 characters but should normally be abbreviated or recorded as a short task code for reference use. There will follow a prompt line which presents the highlighted name of the task that was typed. The program will then sequentially question the user for a rating on the ten task-descriptive dimensions discussed in Section 2.2. Each rating should be a numeric value between 0 and 9 based on the rating scales in Appendix 2. Figure 4 shows the interactive questions along with some hypothetical numeric scores after the "number of tasks?" question has been answered and the operator is coding the third task in a series of some arbitrary number.

After the user has been prompted for rating values, the program will ask whether a hard copy of the information is desired. A "yes" answer is recommended so that a printed copy is printed for proofreading; this enables the user to detect typographical or rating errors that may have been made. TSORT currently has no retroactive editing option beyond the normal IBM-PC screen editor; therefore, users are cautioned to proof and change typed input before hitting the return key. Once the return has been pressed, the task data is stored in memory and the user must end the current session and reinitialize to input and correct errors.

12

```
WHAT IS THE NAME OF TASK NUMBER 3

? remove primary transformer coil assembly
PROVIDE A NUMERIC RATING FOR EACH QUESTION ABOUT:
TASK NUMBER 3
NAME—remove primary transformer coil assembly
SKILL ACQUISITION DIFFICULTY ? 3
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 3
POOR PERFORMANCE CONSEQUENCES ? 2
PREVIOUS NUCLEAR EXPERIENCE ? 4
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 1
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 2
PLANT PERFORMANCE DELAY TOLERANCE ? 3
REGULATORY REQUIREMENT ? 4
ECONOMIC IMPACT OF POOR PERFORMANCE ? 4
DATA ENTRY FOR TASK 3 IS NOW COMPLETE
```

Figure 4. Data Input Questions for the Task Descriptive Dimension Along with Hypothetical Numerical Scores.

2.5.3 Option Menus

Following the entry of task data, the program will prompt the user with the main menu, which is shown in Figure 5. This menu presents several analysis options. The first two analysis options are ranked categories for each *task* using either the first count metric called *"match values"* or the second stringent metric called *"average values."*

For the purpose of menu selection, "match values" should be used when there is a high degree of rater variability, for instance, insufficient task information (such as a new plant) or ratings from different individuals (e.g., more than one rater may have generated the data coded into the program at entry). Such a case could create high rater variability.

Alternatively, "average values" should be chosen when increased precision is needed. "Average" analysis would let the user know how closely a task fits into a category and whether all rating criteria were met. Figure 6 shows the screen after calculations have been completed for a "match" sort. The numbers in the left-hand column correspond to the desirability of placing the task in a particular category. For example, number one means that for the task "control reactivity level" the first choice for training should be "qualification training." However, if that is not feasible, the next best choice would be "certification training," and so on. In the last column, under *sort value*, a value is presented which shows the relative magnitude of the differences in desirability between

13

```
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

  TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
  TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
  TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
  TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
  TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK USING MATCH VALUES
  TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
  TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 1
```

Figure 5. The Main Sorting Program Menu.

categories; the larger the number, the better the category "fit." On the other hand, if the numbers are identical, the ranking might show a preference. Practically, however, the categories should be considered tied.

Whereas menu items one and two ranked training strategies for each *task*, menu items three and four rank tasks for each *strategy* using match or average values, respectively. Here, all the tasks are ranked ordered relative to each other within a *single* strategy. An example of a sort for three tasks ranked relative to each other is shown in Figure 7. This information is useful in determining which tasks (in order of preference) should be selected, or eliminated from a particular strategy (e.g., which task should be the number one selection, the number two, and so on.) For example, the first task to be *removed* from category 7, "potential for more training" (see block in Figure 7 Continued) would be the last task in the ranked list (control reactivity level) (the one with the rank number 3 in the left-hand margin and a sort value of 0.77).

Menu items five and six correspond to what is anticipated to be the most common situation — one in which an NRC evaluator has no preconceived constraint about which task to place in which category. The evaluator wants the program to do all the work, i.e., make a specific recommendation about where each task should be trained. The result of selecting either of these options (see Figure 8) is a specific statement such as "task one (with its associated name) goes to category four (with its associated name)." Once again, the same logic for selection of either the match or average metrics applies.

Menu item seven in the main menu presents the user with a new menu containing 11 other options. These options are designed to provide special sorts of the task *dimension* information; i.e., only the task dimension values input during the entry process are considered, not the simultaneous criteria required to allocate a task to one of the nine major training strategies. Figure 9 shows the menu for these special options, which are designed to permit a user to quickly determine tasks which have unusual values along dimensions. Selection of a single option such as number one, "rank ordered list of tasks based on skill acquisition difficulty," will output a ranking which permits selection of those tasks most difficult to acquire. Similar rankings could be generated to identify other tasks such as those used

14

```
BEGINNING TASK SELECTION LOGIC
THE RANK ORDERED CATEGORIES FOR:
control reactivity level
ARE:                                              SORT VALUE
     1      QUALIFICATION TRAINING                    .85
     2      CERTIFICATION TRAINING                    .8
     3      REFRESHER TRAINING                        .77
     4      POTENTIAL FOR MORE TRAINING               .77
     5      POTENTIAL SIMULATOR TASK                  .75
     6      POTENTIAL FORMAL TRAINING                 .75
     7      POTENTIAL FOR LESS TRAINING               .37
     8      ON THE JOB CANDIDATE                      .33
     9      ELIMINATION FROM TRAINING                 .25

PRESS ANY KEY TO CONTINUE—THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATEGORIES FOR:
regulate boration
ARE:                                              SORT VALUE
     1      REFRESHER TRAINING                        .88
     2      POTENTIAL FOR MORE TRAINING               .88
     3      POTENTIAL SIMULATOR TASK                  .87
     4      POTENTIAL FORMAL TRAINING                 .87
     5      QUALIFICATION TRAINING                    .85
     6      CERTIFICATION TRAINING                    .8
     7      POTENTIAL FOR LESS TRAINING               .37
     8      ON THE JOB CANDIDATE                      .33
     9      ELIMINATION FROM TRAINING                 .25

PRESS ANY KEY TO CONTINUE—THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATEGORIES FOR:
remove primary transformer coil assembly
ARE:                                              SORT VALUE
     1      POTENTIAL FOR LESS TRAINING               1
     2      POTENTIAL FOR MORE TRAINING               1
     3      POTENTIAL FORMAL TRAINING                 1
     4      ON THE JOB CANDIDATE                      .88
     5      REFRESHER TRAINING                        .88
     6      POTENTIAL SIMULATOR TASK                  .87
     7      QUALIFICATION TRAINING                    .85
     8      CERTIFICATION TRAINING                    .8
     9      ELIMINATION FROM TRAINING                 .75
```

Figure 6. A Sample Task Sort Using the Main Menu, Option Number One.

```
TYPE 1 RANKED CATEGORIES FOR EACH TASK USING ABSOLUTE VALUES
TYPE 2 RANKED CATEGORIES FOR EACH TASK USING RELATIVE VALUES
TYPE 3 RANKED TASKS FOR EACH CATEGORY USING ABSOLUTE VALUES
TYPE 4 RANKED TASKS FOR EACH CATEGORY USING RELATIVE VALUES
TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK USING ABSOLUTE VALUES
TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK USING RELATIVE VALUES
TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 4
NUMERIC CALCULATIONS INITIATED
THE RANK ORDERED TASKS FOR CATEGORY   1   QUALIFICATION TRAINING
   ARE:                                              SORT VALUE
1 TASK 1    control reactivity level                     .85
2 TASK 2    regulate boration                            .85
3 TASK 3    remove primary transformer coil assembly     .85

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   2   CERTIFICATION TRAINING
   ARE:                                              SORT VALUE
1 TASK 1    control reactivity level                     .8
2 TASK 2    regulate boration                            .8
3 TASK 3    remove primary transformer coil assembly     .8

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR REPONSE
THE RANK ORDERED TASKS FOR CATEGORY   3   REFRESHER TRAINING
   ARE:                                              SORT VALUE
1 TASK 2    regulate boration                            .88
2 TASK 3    remove primary transformer coil assembly     .88
3 TASK 1    control reactivity level                     .77

PRESS ANY KEY TO CONTINE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   4   ELIMINATION FROM TRAINING
   ARE:                                              SORT VALUE
1 TASK 3    remove primary transformer coil assembly     .75
2 TASK 2    regulate boration                            .25
3 TASK 1    control reactivity level                     .25
```

Figure 7. A Sort Showing the Ranks of Three Sample Tasks Within Categories (Page 1).

16

```
PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   5   ON THE JOB CANDIDATE
   ARE                                                    SORT VALUE
1 TASK 3    remove primary transformer coil assembly        .88
2 TASK 2    regulate boration                               .33
3 TASK 1    control reactivity level                        .33

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   6   POTENTIAL FOR LESS TRAINING
   ARE:                                                   SORT VALUE
1 TASK 3    remove primary transformer coil assembly        1
2 TASK 2    regulate boration                               .37
3 TASK 1    control reactivity level                        .37

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   7   POTENTIAL FOR MORE TRAINING
   ARE:                                                   SORT VALUE
1 TASK 3    remove primary transformer coil assembly        1
2 TASK 2    regulate boration                               .88
3 TASK 1    control reactivity level                        .77

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   8   POTENTIAL SIMULATOR TASK
   ARE                                                    SORT VALUE
1 TASK 2    regulate boration                               .87
2 TASK 3    remove primary transformer coil assembly        .87
3 TASK 1    control reactivity level                        .75

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATEGORY   9   POTENTIAL FORMAL TRAINING
   ARE:                                                   SORT VALUE
1 TASK 3    remove primary transformer coil assembly        1
2 TASK 2    regulate boration                               .87
3 TASK 1    control reactivity level                        .75
```
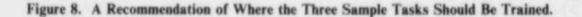
Figure 7. Continued.

```
PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

  TYPE 1 RANKED CATEGORIES FOR EACH TASK USING ABSOLUTE VALUES
  TYPE 2 RANKED CATEGORIES FOR EACH TASK USING RELATIVE VALUES
  TYPE 3 RANKED TASKS FOR EACH CATEGORY USING ABSOLUTE VALUES
  TYPE 4 RANKED TASKS FOR EACH CATEGORY USING RELATIVE VALUES
  TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK USING ABSOLUTE VALUES
  TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK USING RELATIVE VALUES
  TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 6
NUMERIC CALCULATIONS INITIATED
TASK 3 GOES TO: POTENTIAL FOR LESS TRAINING
THE TASK NAME IS: remove primary transformer coil assembly
TASK 2 GOES TO: REFRESHER TRAINING
THE TASK NAME IS: regulate boration
TASK 1 GOES TO: QUALIFICATION TRAINING
THE TASK NAME IS: control reactivity level
```

Figure 8. A Recommendation of Where the Three Sample Tasks Should Be Trained.

```
  TYPE 7 SPECIAL TASK RATING SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 7
SPECIAL OPTIONS ARE:
 1 A RANKED ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
 2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
 3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
 4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
 5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
 6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
 7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
 8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
 9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED ON TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR USE 12 TO QUIT?
```

Figure 9. A Listing of Special Menu Options.

only in "Emergency Operations" and with the highest values along that dimension. Rankings can also be generated to pinpoint tasks with very low plant delay tolerances or tasks with severe economic consequences. In the latter case, the program uses a special analysis for economic consequences. When the user selects Option 11, the "SPECIAL ECONOMIC ANALYSIS" heading appears along with a series of questions regarding plant operating costs. The full set of current questions are shown in Figure 10. One example is the "number of mills profit per kilowatt hour." Although certainly reflecting realistic concerns about costs, it is not intended that the present TSORT cost analysis be more than illustrative of possible factors which could be included. There are many types of "costs" other than dollars that can enter into a task ranking equation. For example the "morale factor" (e.g., requiring increased examination and training loads on experienced operators) is just as real a cost as dollars because poor morale leads to higher job turnover rates. As a first cut, however, "SPECIAL ECONOMIC ANALYSIS" uses two kinds of questions: questions about each task and general questions about the plant environment. Task specific questions are designed to consider information likely to have high variability from task to task, such as potential equipment damage or repair times. General questions concern how global plant conditions may interact with tasks to produce cost impacts. Two examples are the average cost per hour of maintenance personnel or the number of dollars lost in income for every hour the plant is not operating. It is anticipated that TSORT users may later want to add or delete cost equation factors, depending upon the degree of specificity required and which type of "costs" may be the most important. Figure 10, however, presents the result of a simple economic consequence analysis. In this example three tasks are rank ordered based on the dollar impact of a series of questions from the greatest potential impact to the least. What is most interesting about such a ranking is that the true *potential* costs of poor performance become evident when lost profits are taken into account. In a large plant, even a small number of hours of downtime can be extremely expensive. So expensive in fact that the cost of training pales in comparison. The key issue is not whether a specific numeric factor relating hours of training to individual task performance can be created (it would be nice if it were possible). Rather, it is more useful to think of training much like preventative medicine where the intent is *cost avoidance*. Identifying tasks which could have the most severe potential cost impacts forms a natural way to assist the trainer in selecting tasks for additional emphasis.

2.6 Future Directions

In conclusion, this report discusses a tool called TSORT designed to assist an NRC analyst in the complicated job of training program assessment. The emphasis of the methodology has been on determining whether NPP training developers allocated tasks to reasonable training strategies given the general requirements of a system approach to training. TSORT is an automated tool to provide an independent basis for such an assessment. The conceptual ideas used in TSORT are very flexible, however, and the applications of the technique need not be confined to the current examples presented in Appendix 1.

TSORT embodies a highly general method for capturing a subjective judgement process by breaking a decision into a series of dimensions. The dimensions need not only be for training. In the future, NRC may desire to change the dimensions, add new strategies, or

```
ENTER AVERAGE PLANT POWER KILOWATT HOURS/DAY? 500

ENTER AVERAGE DOLLAR PROFIT PER KILOWATT HOUR? 2.30

ENTER AVERAGE PER HOUR COST OF MAINTENANCE? 23.

FOR THIS TASK:
control generator loading rate
MAXIMUM HARDWARE DAMAGE COST INCLUDING REPLACEMENT COST? 900000.
ESTIMATED NUMBER OF DAYS TO REPAIR IF MAX DAMAGE? 180

FOR THIS TASK:
regulate boration
MAXIMUM HARDWARE DAMAGE COSTS INCLUDING REPLACEMENT COST? 87000
ESTIMATED NUMBER OF DAYS TO REPAIR IF MAX DAMAGE? 35

FOR THIS TASK:
remove primary transformer coil assembly
MAXIMUM HARDWARE DAMAGE COSTS INCLUDING REPLACEMENT COST? 1762
ESTIMATED NUMBER OF DAYS TO REPAIR IF MAX DAMAGE? 3
THE TASKS RANKED BY DOLLAR IMPACT ARE:

RANK        TASK NUMBER                          NAME
  1              1                   control generator loading rate
            THE DOLLAR COST OF POOR TRAINING IS $1,275,360
  2              2                        regulate boration
            THE DOLLAR COST OF POOR TRAINING IS $128,055
  3              3              remove primary transformer coil assembly
            THE DOLLAR COST OF POOR TRAINING IS $5,281
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS, R FOR REGULAR SORTS, OR N FOR NO? N
SORT PROGRAM COMPLETED
```

Figure 10. A Sample Special Economic Analysis.

change rating values. The latter was discussed in Section 2.3 and is easily performed with the present code. To reach its full potential, the TSORT code should be made completely flexible. Flexibility could be accomplished by making dimensions, strategies, rating criteria, and rating logic all interactively defined. TSORT could then be customized quickly to a host of new problems. For example, TSORT might be used to rank order training scenarios rather than tasks or applied to subjective estimation of NPP risks by analyzing the dimensions experts use. Regardless of the implementation selected, new TSORT applications should be based upon carefully agreed upon criteria and dimensions. Consequently, the next logical step in expanding the present effort would be to assemble a group of NRC users to formally define and agree upon rating values for the matrix in Figure 1 and to add, subtract, or modify dimensions and categories if appropriate. Each new dimension should include a rating scale such as those developed in the present report. Before undertaking such a task, it is highly recommended that users become familiar with this report's demonstration and concepts. The best way to absorb the concepts is to actually exercise the program by placing a disk in an IBM-PC and following the program prompts. If a computer is not available, Appendix 1 provides a potential user with a complete example, including user responses. The example presents everything a user would actually see on the screen during a realistic application of 20 tasks.

3.0 REFERENCES

1. P. M. Haas, D. L. Selby, M. J. Hanley, and R. T. Mercer, "Evaluation of Training Programs and Entry Level Qualifications for Nuclear Power Plant Control Room Personnel Based on the Systems Approach to Training," NUREG/CR-3414, ORNL/TM-8848, September 1983.

2. E. D. Dawdy and J. K. Hawley, "A Forecasting Method for Training Effectiveness Analysis," *Proceedings of the Human Factors Society 26th Annual Meeting*, Seattle, Washington, October 1982.

3. *Handbook for Designers of Instructional Systems*, (AFP50-58), Vol. I—IV, Department of the Air Force, 1974.

4. J. G. Greeno and F. Restle, *Introduction to Mathematical Psychology*, Addison-Wesley, 1970.

5. C. C. Jorgensen, P. M. Haas, D. L. Selby, J. Lowry, "Nuclear Power Plant Entry Level Qualifications and Training," Presented at the 11th American Water Reactor Safety Meeting, Washington, D. C., October 24-28, 1983.

APPENDIX 1

A COMPLETE EXAMPLE OF TSORT

This appendix presents a complete sample exercise of TSORT. This exercise introduces 20 realistic power plant tasks into the program and follows those tasks through every option and printed output possible in this version of TSORT.

At any time during program execution, a user can obtain a printed copy of everything written on the screen. On the IBM-PC, this is accomplished by holding down the "CTRL" key on the left half of the keyboard and simultaneously pressing the key marked "Pr+Sc" on the right. Nothing will happen immediately, but when the next lines are typed on the CRT, everything that is written on the screen will be echoed to the line printer. When a hard copy is no longer needed, the same sequence of key presses will reverse the process and return to a screen-only mode of operation.

```
BEGINNING DATA ENTRY PROCESS
HOW MANY TASKS HAVE BEEN RATED?? 20
HOW MANY CATAGORIES HAVE BEEN USED?? 10
WHAT IS THE NAME OF TASK NUMBER    1

? REACTOR STARTUP FROM COLD CONDITION
PROVIDE A NUMERIC RATING FOR   EACH QUESTION ABOUT:
TASK NUMBER  1
NAME---REACTOR STARTUP FROM COLD CONDITION
SKILL ACQUISITION DIFFICULTY ? 4
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 5
POOR PERFORMANCE CONSEQUENCES ? 3
PREVIOUS NUCLEAR EXPERIENCE ? 3
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 5
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 5
REGULATORY REQUIREMENT? 8
ECONOMIC IMPACT OF POOR PERFORMANCE? 3
DATA ENTRY FOR TASK  1 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER    2

? SMALL BREAK LOCA
PROVIDE A NUMERIC RATING FOR   EACH QUESTION ABOUT:
TASK NUMBER  2
NAME---SMALL BREAK LOCA
SKILL ACQUISITION DIFFICULTY ? 3
SKILL PERFORMANCE DIFFICULTY ? 4
NEED FOR IMMEDIATE PERFORMANCE ? 1
POOR PERFORMANCE CONSEQUENCES ? 6
PREVIOUS NUCLEAR EXPERIENCE ? 0
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 6
PLANT PERFORMANCE DELAY TOLERANCE ? 6
REGULATORY REQUIREMENT? 8
ECONOMIC IMPACT OF POOR PERFORMANCE? 9
DATA ENTRY FOR TASK  2 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER    3
```

```
? LOSS OF FEEDWATER HEATING
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  3
NAME---LOSS OF FEEDWATER HEATING
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 4
NEED FOR IMMEDIATE PERFORMANCE ? 5
POOR PERFORMANCE CONSEQUENCES ? 4
PREVIOUS NUCLEAR EXPERIENCE ? 3
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 6
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 7
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 5
DATA ENTRY FOR TASK  3 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   4

? LOSS OF CONDENSER VACUUM
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  4
NAME---LOSS OF CONDENSER VACUUM
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 4
NEED FOR IMMEDIATE PERFORMANCE ? 6
POOR PERFORMANCE CONSEQUENCES ? 1
PREVIOUS NUCLEAR EXPERIENCE ? 6
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 6
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 7
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 4
DATA ENTRY FOR TASK  4 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   5

? HIGH EXHAUST HOOD TEMPERATURE
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  5
NAME---HIGH EXHAUST HOOD TEMPERATURE
SKILL ACQUISITION DIFFICULTY ? 1
SKILL PERFORMANCE DIFFICULTY ? 1
NEED FOR IMMEDIATE PERFORMANCE ? 5
POOR PERFORMANCE CONSEQUENCES ? 1
PREVIOUS NUCLEAR EXPERIENCE ? 5
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 4
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 5
REGULATORY REQUIREMENT? 1
ECONOMIC IMPACT OF POOR PERFORMANCE? 3
DATA ENTRY FOR TASK  5 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   6
```

27

```
? HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  6
NAME---HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 4
NEED FOR IMMEDIATE PERFORMANCE ? 2
POOR PERFORMANCE CONSEQUENCES ? 7
PREVIOUS NUCLEAR EXPERIENCE ? 4
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 1
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 5
PLANT PERFORMANCE DELAY TOLERANCE ? 4
REGULATORY REQUIREMENT? 3
ECONOMIC IMPACT OF POOR PERFORMANCE? 7
DATA ENTRY FOR TASK  6 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   7

? ROD WORTH MINIMIZER FAILURE
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  7
NAME---ROD WORTH MINIMIZER FAILURE
SKILL ACQUISITION DIFFICULTY ? 1
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 4
POOR PERFORMANCE CONSEQUENCES ? 2
PREVIOUS NUCLEAR EXPERIENCE ? 6
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 5
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 1
REGULATORY REQUIREMENT? 3
ECONOMIC IMPACT OF POOR PERFORMANCE? 1
DATA ENTRY FOR TASK  7 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   8

? CONTROL ROD DRIVE PUMP FAILURE
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  8
NAME---CONTROL ROD DRIVE PUMP FAILURE
SKILL ACQUISITION DIFFICULTY ? 3
SKILL PERFORMANCE DIFFICULTY ? 1
NEED FOR IMMEDIATE PERFORMANCE ? 3
POOR PERFORMANCE CONSEQUENCES ? 3
PREVIOUS NUCLEAR EXPERIENCE ? 4
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 2
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 4
PLANT PERFORMANCE DELAY TOLERANCE ? 2
REGULATORY REQUIREMENT? 5
ECONOMIC IMPACT OF POOR PERFORMANCE? 2
DATA ENTRY FOR TASK  8 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   9
```

? LOSS OF FEEDWATER
PROVIDE A NUMERIC RATING FOR EACH QUESTION ABOUT:
TASK NUMBER 9
NAME---LOSS OF FEEDWATER
SKILL ACQUISITION DIFFICULTY ? 4
SKILL PERFORMANCE DIFFICULTY ? 6
NEED FOR IMMEDIATE PERFORMANCE ? 2
POOR PERFORMANCE CONSEQUENCES ? 7
PREVIOUS NUCLEAR EXPERIENCE ? 1
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 5
PLANT PERFORMANCE DELAY TOLERANCE ? 6
REGULATORY REQUIREMENT? 7
ECONOMIC IMPACT OF POOR PERFORMANCE? 8
DATA ENTRY FOR TASK 9 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   10

? LOSS OF OFFSITE POWER
PROVIDE A NUMERIC RATING FOR EACH QUESTION ABOUT:
TASK NUMBER 10
NAME---LOSS OF OFFSITE POWER
SKILL ACQUISITION DIFFICULTY ? 5
SKILL PERFORMANCE DIFFICULTY ? 5
NEED FOR IMMEDIATE PERFORMANCE ? 1
POOR PERFORMANCE CONSEQUENCES ? 7
PREVIOUS NUCLEAR EXPERIENCE ? 1
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 5
PLANT PERFORMANCE DELAY TOLERANCE ? 6
REGULATORY REQUIREMENT? 7
ECONOMIC IMPACT OF POOR PERFORMANCE? 9
DATA ENTRY FOR TASK 10 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   11

? MANUAL REACTOR SCRAM
PROVIDE A NUMERIC RATING FOR EACH QUESTION ABOUT:
TASK NUMBER 11
NAME---MANUAL REACTOR SCRAM
SKILL ACQUISITION DIFFICULTY ? 4
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 6
POOR PERFORMANCE CONSEQUENCES ? 8
PREVIOUS NUCLEAR EXPERIENCE ? 6
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 2
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 5
PLANT PERFORMANCE DELAY TOLERANCE ? 6
REGULATORY REQUIREMENT? 9
ECONOMIC IMPACT OF POOR PERFORMANCE? 7
DATA ENTRY FOR TASK 11 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   12

```
? MANUAL LEVEL CONTROL IN STARTUP
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  12
NAME---MANUAL LEVEL CONTROL IN STARTUP
SKILL ACQUISITION DIFFICULTY ? 7
SKILL PERFORMANCE DIFFICULTY ? 6
NEED FOR IMMEDIATE PERFORMANCE ? 5
POOR PERFORMANCE CONSEQUENCES ? 2
PREVIOUS NUCLEAR EXPERIENCE ? 2
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 6
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 3
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 4
DATA ENTRY FOR TASK  12 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   13


? SURVEILLANCE TEST ECCS
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  13
NAME---SURVEILLANCE TEST ECCS
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 7
POOR PERFORMANCE CONSEQUENCES ? 2
PREVIOUS NUCLEAR EXPERIENCE ? 8
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 7
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 1
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 2
DATA ENTRY FOR TASK  13 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   14


? MAIN TURBINE STARTUP
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  14
NAME----MAIN TURBINE STARTUP
SKILL ACQUISITION DIFFICULTY ? 6
SKILL PERFORMANCE DIFFICULTY ? 8
NEED FOR IMMEDIATE PERFORMANCE ? 5
POOR PERFORMANCE CONSEQUENCES ? 5
PREVIOUS NUCLEAR EXPERIENCE ? 3
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 6
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 0
PLANT PERFORMANCE DELAY TOLERANCE ? 5
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 9
DATA ENTRY FOR TASK  14 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   15
```

```
? LARGE LOCA
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  15
NAME---LARGE LOCA
SKILL ACQUISITION DIFFICULTY ? 1
SKILL PERFORMANCE DIFFICULTY ? 1
NEED FOR IMMEDIATE PERFORMANCE ? 1
POOR PERFORMANCE CONSEQUENCES ? 9
PREVIOUS NUCLEAR EXPERIENCE ? 0
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 9
PLANT PERFORMANCE DELAY TOLERANCE ? 1
REGULATORY REQUIREMENT? 8
ECONOMIC IMPACT OF POOR PERFORMANCE? 9
DATA ENTRY FOR TASK  15 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   16

? REACTOR FEED PUMP TRIP
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  16
NAME---REACTOR FEED PUMP TRIP
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 6
POOR PERFORMANCE CONSEQUENCES ? 3
PREVIOUS NUCLEAR EXPERIENCE ? 5
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 4
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 7
PLANT PERFORMANCE DELAY TOLERANCE ? 2
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 6
DATA ENTRY FOR TASK  16 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   17

? REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  17
NAME---REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 4
POOR PERFORMANCE CONSEQUENCES ? 3
PREVIOUS NUCLEAR EXPERIENCE ? 3
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 3
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 1
PLANT PERFORMANCE DELAY TOLERANCE ? 2
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 3
DATA ENTRY FOR TASK  17 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   18
```

```
? MAIN TURBINE GENERATOR TRIP
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  18
NAME---MAIN TURBINE GENERATOR TRIP
SKILL ACQUISITION DIFFICULTY ? 2
SKILL PERFORMANCE DIFFICULTY ? 2
NEED FOR IMMEDIATE PERFORMANCE ? 6
POOR PERFORMANCE CONSEQUENCES ? 5
PREVIOUS NUCLEAR EXPERIENCE ? 6
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 3
PLANT PERFORMANCE DELAY TOLERANCE ? 3
REGULATORY REQUIREMENT? 9
ECONOMIC IMPACT OF POOR PERFORMANCE? 8
DATA ENTRY FOR TASK  18 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   19

? FUEL FAILURE (WITH ISOLATION)
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  19
NAME---FUEL FAILURE (WITH ISOLATION)
SKILL ACQUISITION DIFFICULTY ? 3
SKILL PERFORMANCE DIFFICULTY ? 5
NEED FOR IMMEDIATE PERFORMANCE ? 2
POOR PERFORMANCE CONSEQUENCES ? 8
PREVIOUS NUCLEAR EXPERIENCE ? 1
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 0
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 5
PLANT PERFORMANCE DELAY TOLERANCE ? 3
REGULATORY REQUIREMENT? 9
ECONOMIC IMPACT OF POOR PERFORMANCE? 6
DATA ENTRY FOR TASK  19 IS NOW COMPLETE
WHAT IS THE NAME OF TASK NUMBER   20

? NUCLEAR INSTRUMENT FAILURE
PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:
TASK NUMBER  20
NAME---NUCLEAR INSTRUMENT FAILURE
SKILL ACQUISITION DIFFICULTY ? 1
SKILL PERFORMANCE DIFFICULTY ? 1
NEED FOR IMMEDIATE PERFORMANCE ? 8
POOR PERFORMANCE CONSEQUENCES ? 1
PREVIOUS NUCLEAR EXPERIENCE ? 7
TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ? 6
POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ? 1
PLANT PERFORMANCE DELAY TOLERANCE ? 1
REGULATORY REQUIREMENT? 6
ECONOMIC IMPACT OF POOR PERFORMANCE? 3
DATA ENTRY FOR TASK  20 IS NOW COMPLETE
YOUR DATA HAS NOW BEEN ENTERED, DO YOU WISH A HARD COPY?
IF SO TYPE 'Y' OTHERWISE HIT ANY OTHER KEY? Y
```

Printout of the 20 Input Tasks

```
TASK NUMBER  1
REACTOR STARTUP FROM COLD CONDITION

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 4              2              5              3              3              5
EM OP          DE TL          REG R          ECON
 0              5              8              3


TASK NUMBER  2
SMALL BREAK LOCA

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 3              4              1              6              0              0
EM OP          DE TL          REG R          ECON
 6              6              8              9


TASK NUMBER  3
LOSS OF FEEDWATER HEATING

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 2              4              5              4              3              6
EM OP          DE TL          REG R          ECON
 0              7              6              5


TASK NUMBER  4
LOSS OF CONDENSER VACUUM

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 2              4              6              1              6              6
EM OP          DE TL          REG R          ECON
 0              7              6              4


TASK NUMBER  5
HIGH EXHAUST HOOD TEMPERATURE

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 1              1              5              1              5              4
EM OP          DE TL          REG R          ECON
 0              5              1              3


TASK NUMBER  6
HIGH PRESSURE COOLANT INJECTION TURBINE TRIP

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 2              4              2              7              4              1
EM OP          DE TL          REG R          ECON
 5              4              3              7


TASK NUMBER  7
ROD WORTH MINIMIZER FAILURE

SK AQ          SK PR          IM PR          SAFE          NU EX          NR OP
 1              2              4              2              6              3
EM OP          DE TL          REG R          ECON
 0              1              2              1
```

33

TASK NUMBER 8
CONTROL ROD DRIVE PUMP FAILURE

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
3	1	3	3	4	2
EM OP	DE TL	REG R	ECON		
4	2	5	2		

TASK NUMBER 9
LOSS OF FEEDWATER

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
4	6	2	7	1	0
EM OP	DE TL	REG R	ECON		
5	6	7	8		

TASK NUMBER 10
LOSS OF OFFSITE POWER

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
5	5	1	7	1	0
EM OP	DE TL	REG R	ECON		
5	6	7	9		

TASK NUMBER 11
MANUAL REACTOR SCRAM

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
4	2	6	8	6	2
EM OP	DE TL	REG R	ECON		
5	6	9	7		

TASK NUMBER 12
MANUAL LEVEL CONTROL N STARTUP

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
7	6	5	2	2	6
EM OP	DE TL	REG R	ECON		
0	3	6	4		

TASK NUMBER 13
SURVEILLANCE TEST ECCS

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
2	2	7	2	8	7
EM OP	DE TL	REG R	ECON		
0	1	6	2		

TASK NUMBER 14
MAIN TURBINE STARTUP

SK AO	SK PR	IM PR	SAFE	NU EX	NR OP
6	8	5	5	3	6
EM OP	DE TL	REG R	ECON		
0	5	6	9		

TASK NUMBER 15
LARGE LOCA

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
1	1	1	9	9	0
EM OP	DE TL	REG R	ECON		
9	1	8	9		

TASK NUMBER 16
REACTOR FEED PUMP TRIP

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
2	2	6	3	5	4
EM OP	DE TL	REG R	ECON		
7	2	6	5		

TASK NUMBER 17
REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
2	2	4	3	3	3
EM OP	DE TL	REG R	ECON		
1	2	6	3		

TASK NUMBER 18
MAIN TURBINE GENERATOR TRIP

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
2	2	6	5	6	0
EM OP	DE TL	REG R	ECON		
3	3	9	8		

TASK NUMBER 19
FUEL FAILURE (WITH ISOLATION)

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
3	5	7	8	1	0
EM OP	DE TL	REG R	ECON		
5	3	9	6		

TASK NUMBER 20
NUCLEAR INSTRUMENT FAILURE

SK AQ	SK PR	IM PR	SAFE	NU EX	NR OP
1	1	8	1	7	6
EM OP	DE TL	REG R	ECON		
1	1	6	3		

YOU ARE NOW IN THE ANALYSIS MODE
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

```
TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 1
MATCH CALCULATIONS INITIATED
BEGINNING TASK SELECTION LOGIC
THE RANK ORDERED CATAGORIES FOR:
REACTOR STARTUP FROM COLD CONDITION
ARE:                                                    SORT VALUE
    1            REFRESHER TRAINING                      .8888889
    2            POTENTIAL FOR MORE TRAINING             .8883889
    3            POTENTIAL SIMULATOR TASK                .875
    4            POTENTIAL FORMAL TRAINING               .875
    5            QUALIFICATION TRAINING                  .8571429
    6            CERTIFICATION TRAINING                  .8
    7            ON THE JOB CANDIDATE                    .5555556
    8            POTENTIAL FOR LESS TRAINING             .5
    9            ELIMINATION FROM TRAINING               .5


PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
SMALL BREAK LOCA
ARE:                                                    SORT VALUE
    1            CERTIFICATION TRAINING                  1
    2            REFRESHER TRAINING                      1
    3            POTENTIAL FOR MORE TRAINING             1
    4            POTENTIAL SIMULATOR TASK                1
    5            POTENTIAL FORMAL TRAINING               1
    6            QUALIFICATION TRAINING                  .8571429
    7            POTENTIAL FOR LESS TRAINING             .5
    8            ON THE JOB CANDIDATE                    .4444445
    9            ELIMINATION FROM TRAINING               .25


PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF FEEDWATER HEATING
ARE:                                                    SORT VALUE
    1            REFRESHER TRAINING                      .8888889
    2            POTENTIAL FOR MORE TRAINING             .8888889
    3            POTENTIAL SIMULATOR TASK                .875
    4            POTENTIAL FORMAL TRAINING               .875
    5            QUALIFICATION TRAINING                  .8571429
    6            CERTIFICATION TRAINING                  .8
    7            POTENTIAL FOR LESS TRAINING             .5
    8            ON THE JOB CANDIDATE                    .4444445
    9            ELIMINATION FROM TRAINING               .375
```

36

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF CONDENSER VACUUM
ARE: SORT VALUE
1   QUALIFICATION TRAINING   .8571429
2   CERTIFICATION TRAINING   .8
3   REFRESHER TRAINING   .7777778
4   POTENTIAL FOR MORE TRAINING   .7777778
5   POTENTIAL SIMULATOR TAS.   .75
6   POTENTIAL FORMAL TRAINING   .75
7   POTENTIAL FOR LESS TRAINING   .625
8   ON THE JOB CANDIDATE   .5555556
9   ELIMINATION FROM TRAINING   .5

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
HIGH EXHAUST HOOD TEMPERATURE
ARE: SORT VALUE
1   POTENTIAL FOR MORE TRAINING   .8888889
2   POTENTIAL FORMAL TRAINING   .875
3   QUALIFICATION TRAINING   .8571429
4   CERTIFICATION TRAINING   .8
5   REFRESHER TRAINING   .7777778
6   ELIMINATION FROM TRAINING   .75
7   POTENTIAL SIMULATOR TASK   .75
8   POTENTIAL FOR LESS TRAINING   .75
9   ON THE JOB CANDIDATE   .6666667

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
ARE: SORT VALUE
1   POTENTIAL FOR MORE TRAINING   1
2   POTENTIAL FORMAL TRAINING   1
3   REFRESHER TRAINING   .8888889
4   POTENTIAL SIMULATOR TASK   .875
5   QUALIFICATION TRAINING   .8571429
6   CERTIFICATION TRAINING   .8
7   POTENTIAL FOR LESS TRAINING   .5
8   ON THE JOB CANDIDATE   .4444445
9   ELIMINATION FROM TRAINING   .25

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
ROD WORTH MINIMIZER FAILURE
ARE: SORT VALUE
1   QUALIFICATION TRAINING   1
2   ON THE JOB CANDIDATE   .8888889
3   ELIMINATION FROM TRAINING   .875
4   POTENTIAL FOR LESS TRAINING   .875
5   CERTIFICATION TRAINING   .8
6   REFRESHER TRAINING   .7777778
7   POTENTIAL FOR MORE TRAINING   .7777778
8   POTENTIAL SIMULATOR TASK   .75
9   POTENTIAL FORMAL TRAINING   .75

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
CONTROL ROD DRIVE PUMP FAILURE

ARE:		SORT VALUE
1	QUALIFICATION TRAINING	1
2	POTENTIAL FOR MORE TRAINING	1
3	POTENTIAL FORMAL TRAINING	1
4	REFRESHER TRAINING	.8888889
5	ON THE JOB CANDIDATE	.8888889
6	POTENTIAL SIMULATOR TASK	.875
7	CERTIFICATION TRAINING	.8
8	POTENTIAL FOR LESS TRAINING	.75
9	ELIMINATION FROM TRAINING	.75

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF FEEDWATER

ARE:		SORT VALUE
1	CERTIFICATION TRAINING	1
2	REFRESHER TRAINING	1
3	POTENTIAL FOR MORE TRAINING	1
4	POTENTIAL SIMULATOR TASK	1
5	POTENTIAL FORMAL TRAINING	1
6	QUALIFICATION TRAINING	.8571429
7	POTENTIAL FOR LESS TRAINING	.375
8	ON THE JOB CANDIDATE	.3333334
9	ELIMINATION FROM TRAINING	.125

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF OFFSITE POWER

ARE:		SORT VALUE
1	CERTIFICATION TRAINING	1
2	REFRESHER TRAINING	1
3	POTENTIAL FOR MORE TRAINING	1
4	POTENTIAL SIMULATOR TASK	1
5	POTENTIAL FORMAL TRAINING	1
6	QUALIFICATION TRAINING	.8571429
7	POTENTIAL FOR LESS TRAINING	.375
8	ON THE JOB CANDIDATE	.3333334
9	ELIMINATION FROM TRAINING	.125

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MANUAL REACTOR SCRAM

ARE:		SORT VALUE
1	REFRESHER TRAINING	.8888889
2	POTENTIAL FOR MORE TRAINING	.8888889
3	POTENTIAL SIMULATOR TASK	.875
4	POTENTIAL FORMAL TRAINING	.875
5	QUALIFICATION TRAINING	.8571429
6	CERTIFICATION TRAINING	.8
7	POTENTIAL FOR LESS TRAINING	.375
8	ON THE JOB CANDIDATE	.3333334
9	ELIMINATION FROM TRAINING	.25

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MANUAL LEVEL CONTROL IN STARTUP
ARE: SORT VALUE
    1   CERTIFICATION TRAINING   1
    2   REFRESHER TRAINING   .8888889
    3   POTENTIAL FOR MORE TRAINING   .8888889
    4   POTENTIAL SIMULATOR TASK   .875
    5   POTENTIAL FORMAL TRAINING   .875
    6   QUALIFICATION TRAINING   .8571429
    7   POTENTIAL FOR LESS TRAINING   .625
    8   ON THE JOB CANDIDATE   .5555556
    9   ELIMINATION FROM TRAINING   .5

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
SURVEILLANCE TEST ECCS
ARE: SORT VALUE
    1   QUALIFICATION TRAINING   1
    2   ON THE JOB CANDIDATE   .8888889
    3   ELIMINATION FROM TRAINING   .875
    4   POTENTIAL FOR LESS TRAINING   .875
    5   CERTIFICATION TRAINING   .8
    6   REFRESHER TRAINING   .7777778
    7   POTENTIAL FOR MORE TRAINING   .7777778
    8   POTENTIAL SIMULATOR TASK   .75
    9   POTENTIAL FORMAL TRAINING   .75

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MAIN TURBINE STARTUP
ARE: SORT VALUE
    1   REFRESHER TRAINING   .8888889
    2   POTENTIAL FOR MORE TRAINING   .8888889
    3   POTENTIAL SIMULATOR TASK   .875
    4   POTENTIAL FORMAL TRAINING   .875
    5   QUALIFICATION TRAINING   .8571429
    6   CERTIFICATION TRAINING   .8
    7   POTENTIAL FOR LESS TRAINING   .375
    8   ON THE JOB CANDIDATE   .3333334
    9   ELIMINATION FROM TRAINING   .25

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LARGE LOCA
ARE: SORT VALUE
    1   QUALIFICATION TRAINING   1
    2   CERTIFICATION TRAINING   1
    3   REFRESHER TRAINING   1
    4   POTENTIAL FOR MORE TRAINING   1
    5   POTENTIAL SIMULATOR TASK   1
    6   POTENTIAL FORMAL TRAINING   1
    7   POTENTIAL FOR LESS TRAINING   .75
    8   ON THE JOB CANDIDATE   .6666667
    9   ELIMINATION FROM TRAINING   .5

39

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
REACTOR FEED PUMP TRIP

	ARE:	SORT VALUE
1	QUALIFICATION TRAINING	1
2	POTENTIAL FOR MORE TRAINING	.8888889
3	POTENTIAL FORMAL TRAINING	.875
4	CERTIFICATION TRAINING	.8
5	REFRESHER TRAINING	.7777778
6	POTENTIAL SIMULATOR TASK	.75
7	ON THE JOB CANDIDATE	.6666667
8	POTENTIAL FOR LESS TRAINING	.625
9	ELIMINATION FROM TRAINING	.625

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)

	ARE:	SORT VALUE
1	QUALIFICATION TRAINING	1
2	REFRESHER TRAINING	1
3	POTENTIAL FOR MORE TRAINING	1
4	POTENTIAL SIMULATOR TASK	1
5	POTENTIAL FORMAL TRAINING	1
6	CERTIFICATION TRAINING	.8
7	ON THE JOB CANDIDATE	.7777778
8	POTENTIAL FOR LESS TRAINING	.75
9	ELIMINATION FROM TRAINING	.75

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MAIN TURBINE GENERATOR TRIP

	ARE:	SORT VALUE
1	REFRESHER TRAINING	.8888889
2	POTENTIAL FOR MORE TRAINING	.8888889
3	POTENTIAL SIMULATOR TASK	.875
4	POTENTIAL FORMAL TRAINING	.875
5	QUALIFICATION TRAINING	.8571429
6	CERTIFICATION TRAINING	.8
7	POTENTIAL FOR LESS TRAINING	.75
8	ON THE JOB CANDIDATE	.6666667
9	ELIMINATION FROM TRAINING	.625

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
FUEL FAILURE (WITH ISOLATION)

	ARE:	SORT VALUE
1	CERTIFICATION TRAINING	1
2	REFRESHER TRAINING	1
3	POTENTIAL FOR MORE TRAINING	1
4	POTENTIAL SIMULATOR TASK	1
5	POTENTIAL FORMAL TRAINING	1
6	QUALIFICATION TRAINING	.8571429
7	POTENTIAL FOR LESS TRAINING	.625
8	ON THE JOB CANDIDATE	.5555556
9	ELIMINATION FROM TRAINING	.375

40

```
PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
NUCLEAR INSTRUMENT FAILURE
ARE:                                                         SORT VALUE
    1              QUALIFICATION TRAINING                    1
    2              POTENTIAL FOR LESS TRAINING               .875
    3              CERTIFICATION TRAINING                    .8
    4              ON THE JOB CANDIDATE                      .7777778
    5              REFRESHER TRAINING                        .7777778
    6              POTENTIAL FOR MORE TRAINING               .7777778
    7              ELIMINATION FROM TRAINING                 .75
    8              POTENTIAL SIMULATOR TASK                  .75
    9              POTENTIAL FORMAL TRAINING                 .75


PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

 TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
 TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
 TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
 TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
 TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
 TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
 TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 2
AVERAGE CALCULATIONS INITIATED
BEGINNING TASK SELECTION LOGIC
THE RANK ORDERED CATAGORIES FOR:
REACTOR STARTUP FROM COLD CONDITION
ARE:                                                         SORT VALUE
    1              ON THE JOB CANDIDATE                      -1.111111
    2              POTENTIAL FOR LESS TRAINING               -1.25
    3              CERTIFICATION TRAINING                    -1.4
    4              QUALIFICATION TRAINING                    -1.428572
    5              REFRESHER TRAINING                        -1.444444
    6              POTENTIAL SIMULATOR TASK                  -1.625
    7              ELIMINATION FROM TRAINING                 -1.875
    8              POTENTIAL FORMAL TRAINING                 -2.125
    9              POTENTIAL FOR MORE TRAINING               -2.777778


PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
SMALL BREAK LOCA
ARE:                                                         SORT VALUE
    1              POTENTIAL SIMULATOR TASK                  -.375
    2              REFRESHER TRAINING                        -.8888889
    3              CERTIFICATION TRAINING                    -1.2
    4              QUALIFICATION TRAINING                    -1.285714
    5              POTENTIAL FORMAL TRAINING                 -1.5
    6              POTENTIAL FOR MORE TRAINING               -1.666667
    7              POTENTIAL FOR LESS TRAINING               -2.875
    8              ON THE JOB CANDIDATE                      -3.222222
    9              ELIMINATION FROM TRAINING                 -3.875
```

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF FEEDWATER HEATING
ARE: SORT VALUE
    1   CERTIFICATION TRAINING   -.8
    2   REFRESHER TRAINING   -1.333333
    3   POTENTIAL FOR LESS TRAINING   -1.5
    4   POTENTIAL SIMULATOR TASK   -1.5
    5   QUALIFICATION TRAINING   -1.571429
    6   ON THE JOB CANDIDATE   -1.666667
    7   POTENTIAL FORMAL TRAINING   -2.125
    8   ELIMINATION FROM TRAINING   -2.25
    9   POTENTIAL FOR MORE TRAINING   -2.333333

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF CONDENSER VACUUM
ARE: SORT VALUE
    1   POTENTIAL FOR LESS TRAINING   -1.125
    2   ON THE JOB CANDIDATE   -1.222222
    3   ELIMINATION FROM TRAINING   -1.625
    4   REFRESHER TRAINING   -1.777778
    5   QUALIFICATION TRAINING   -2
    6   CERTIFICATION TRAINING   -2
    7   POTENTIAL SIMULATOR TASK   -2
    8   POTENTIAL FORMAL TRAINING   -2.625
    9   POTENTIAL FOR MORE TRAINING   -2.777778

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
HIGH EXHAUST HOOD TEMPERATURE
ARE: SORT VALUE
    1   ELIMINATION FROM TRAINING   -.625
    2   POTENTIAL FOR LESS TRAINING   -.875
    3   ON THE JOB CANDIDATE   -.8888889
    4   REFRESHER TRAINING   -2.333333
    5   POTENTIAL SIMULATOR TASK   -2.5
    6   QUALIFICATION TRAINING   -2.571429
    7   CERTIFICATION TRAINING   -2.6
    8   POTENTIAL FORMAL TRAINING   -2.75
    9   POTENTIAL FOR MORE TRAINING   -3.333333

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
ARE: SORT VALUE
    1   POTENTIAL SIMULATOR TASK   -.75
    2   REFRESHER TRAINING   -1.222222
    3   QUALIFICATION TRAINING   -1.285714
    4   POTENTIAL FORMAL TRAINING   -1.375
    5   CERTIFICATION TRAINING   -1.6
    6   POTENTIAL FOR MORE TRAINING   -1.777778
    7   POTENTIAL FOR LESS TRAINING   -2
    8   ON THE JOB CANDIDATE   -2.222222
    9   ELIMINATION FROM TRAINING   -2.25

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
ROD WORTH MINIMIZER FAILURE
ARE: SORT VALUE
1   ON THE JOB CANDIDATE   -.2222222
2   ELIMINATION FROM TRAINING   -.375
3   POTENTIAL FOR LESS TRAINING   -.375
4   QUALIFICATION TRAINING   -2
5   REFRESHER TRAINING   -2.666667
6   POTENTIAL SIMULATOR TASK   -3.125
7   POTENTIAL FORMAL TRAINING   -3.125
8   CERTIFICATION TRAINING   -3.2
9   POTENTIAL FOR MORE TRAINING   -4.111111

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
CONTROL ROD DRIVE PUMP FAILURE
ARE: SORT VALUE
1   ON THE JOB CANDIDATE   -.7777778
2   ELIMINATION FROM TRAINING   -1
3   QUALIFICATION TRAINING   -1
4   POTENTIAL FOR LESS TRAINING   -1
5   REFRESHER TRAINING   -1.555556
6   POTENTIAL SIMULATOR TASK   -1.75
7   POTENTIAL FORMAL TRAINING   -2.125
8   CERTIFICATION TRAINING   -2.6
9   POTENTIAL FOR MORE TRAINING   -3.111111

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF FEEDWATER
ARE: SORT VALUE
1   POTENTIAL SIMULATOR TASK   -.125
2   REFRESHER TRAINING   -.7777778
3   CERTIFICATION TRAINING   -.8
4   POTENTIAL FORMAL TRAINING   -.875
5   POTENTIAL FOR MORE TRAINING   -1.111111
6   QUALIFICATION TRAINING   -1.142857
7   POTENTIAL FOR LESS TRAINING   -3.125
8   ON THE JOB CANDIDATE   -3.333333
9   ELIMINATION FROM TRAINING   -3.875

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LOSS OF OFFSITE POWER
ARE: SORT VALUE
1   POTENTIAL SIMULATOR TASK   1.75
2   REFRESHER TRAINING   -.8888889
3   CERTIFICATION TRAINING   -1
4   POTENTIAL FORMAL TRAINING   -1
5   POTENTIAL FOR MORE TRAINING   -1.222222
6   QUALIFICATION TRAINING   -1.285714
7   POTENTIAL FOR LESS TRAINING   -3.125
8   ON THE JOB CANDIDATE   -3.444445
9   ELIMINATION FROM TRAINING   -4

43

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MANUAL REACTOR SCRAM
ARE:

		SORT VALUE
1	QUALIFICATION TRAINING	-.7142858
2	REFRESHER TRAINING	-.7777778
3	POTENTIAL SIMULATOR TASK	-.875
4	CERTIFICATION TRAINING	-1
5	POTENTIAL FORMAL TRAINING	-1.125
6	POTENTIAL FOR MORE TRAINING	-1.222222
7	POTENTIAL FOR LESS TRAINING	-2.5
8	ON THE JOB CANDIDATE	-2.555556
9	ELIMINATION FROM TRAINING	-3.125

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MANUAL LEVEL CONTROL IN STARTUP
ARE:

		SORT VALUE
1	QUALIFICATION TRAINING	-1.285714
2	POTENTIAL SIMULATOR TASK	-1.375
3	POTENTIAL FORMAL TRAINING	-1.5
4	POTENTIAL FOR LESS TRAINING	-1.625
5	ON THE JOB CANDIDATE	-1.777778
6	REFRESHER TRAINING	-1.777778
7	CERTIFICATION TRAINING	-1.8
8	POTENTIAL FOR MORE TRAINING	-2.333333
9	ELIMINATION FROM TRAINING	-2.375

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
SURVEILLANCE TEST ECCS
ARE:

		SORT VALUE
1	ON THE JOB CANDIDATE	-.4444445
2	POTENTIAL FOR LESS TRAINING	-.5
3	ELIMINATION FROM TRAINING	-.625
4	QUALIFICATION TRAINING	-1.428572
5	REFRESHER TRAINING	-2.666667
6	POTENTIAL FORMAL TRAINING	-3.25
7	POTENTIAL SIMULATOR TASK	-3.375
8	CERTIFICATION TRAINING	-3.4
9	POTENTIAL FOR MORE TRAINING	-4

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MAIN TURBINE STARTUP
ARE:

		SORT VALUE
1	CERTIFICATION TRAINING	-1
2	POTENTIAL SIMULATOR TASK	-1
3	POTENTIAL FORMAL TRAINING	-1.125
4	QUALIFICATION TRAINING	-1.285714
5	REFRESHER TRAINING	-1.444444
6	POTENTIAL FOR MORE TRAINING	-1.444444
7	POTENTIAL FOR LESS TRAINING	-2.25
8	ON THE JOB CANDIDATE	-2.777778
9	ELIMINATION FROM TRAINING	-3.5

44

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
LARGE LOCA
ARE:

		SORT VALUE
1	QUALIFICATION TRAINING	-.7142858
2	POTENTIAL SIMULATOR TASK	-1.5
3	REFRESHER TRAINING	-1.888889
4	CERTIFICATION TRAINING	-2
5	POTENTIAL FORMAL TRAINING	-2
6	POTENTIAL FOR MORE TRAINING	-2.666667
7	POTENTIAL FOR LESS TRAINING	-3.125
8	ON THE JOB CANDIDATE	-3.444445
9	ELIMINATION FROM TRAINING	-4.125

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
REACTOR FEED PUMP TRIP
ARE:

		SORT VALUE
1	QUALIFICATION TRAINING	-.1428571
2	REFRESHER TRAINING	-1.333333
3	POTENTIAL FOR LESS TRAINING	-1.375
4	POTENTIAL SIMULATOR TASK	-1.5
5	ON THE JOB CANDIDATE	-1.555556
6	ELIMINATION FROM TRAINING	-1.875
7	POTENTIAL FORMAL TRAINING	-1.875
8	CERTIFICATION TRAINING	-2.4
9	POTENTIAL FOR MORE TRAINING	-2.444445

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
ARE:

		SORT VALUE
1	ON THE JOB CANDIDATE	-.8888889
2	QUALIFICATION TRAINING	-1
3	POTENTIAL FOR LESS TRAINING	-1
4	ELIMINATION FROM TRAINING	-1.25
5	REFRESHER TRAINING	-1.666667
6	POTENTIAL SIMULATOR TASK	-1.875
7	POTENTIAL FORMAL TRAINING	-2.125
8	CERTIFICATION TRAINING	-2.2
9	POTENTIAL FOR MORE TRAINING	-3.111111

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
MAIN TURBINE GENERATOR TRIP
ARE:

		SORT VALUE
1	QUALIFICATION TRAINING	-.8571429
2	REFRESHER TRAINING	-1.444444
3	POTENTIAL FOR LESS TRAINING	-1.625
4	POTENTIAL SIMULATOR TASK	-1.625
5	POTENTIAL FORMAL TRAINING	-1.625
6	ON THE JOB CANDIDATE	-1.888889
7	CERTIFICATION TRAINING	-2
8	POTENTIAL FOR MORE TRAINING	-2
9	ELIMINATION FROM TRAINING	-2.125

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
FUEL FAILURE (WITH ISOLATION)

ARE:		SORT VALUE
1	POTENTIAL SIMULATOR TASK	-.5
2	QUALIFICATION TRAINING	-.7142858
3	REFRESHER TRAINING	-1.111111
4	POTENTIAL FORMAL TRAINING	-1.125
5	CERTIFICATION TRAINING	-1.4
6	POTENTIAL FOR MORE TRAINING	-1.777778
7	POTENTIAL FOR LESS TRAINING	-2.625
8	ON THE JOB CANDIDATE	-2.666667
9	ELIMINATION FROM TRAINING	-3.375

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
THE RANK ORDERED CATAGORIES FOR:
NUCLEAR INSTRUMENT FAILURE

ARE:		SORT VALUE
1	ON THE JOB CANDIDATE	-.6666667
2	ELIMINATION FROM TRAINING	-.75
3	POTENTIAL FOR LESS TRAINING	-.75
4	QUALIFICATION TRAINING	-1.285714
5	REFRESHER TRAINING	-2.555556
6	POTENTIAL SIMULATOR TASK	-3.125
7	POTENTIAL FORMAL TRAINING	-3.125
8	CERTIFICATION TRAINING	-3.4
9	POTENTIAL FOR MORE TRAINING	-3.888889

PRESS ANY KEY TO CONTINUE-THERE WILL BE A SHORT PAUSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

```
TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 3
MATCH CALCULATIONS INITIATED
THE RANK ORDERED TASKS FOR CATAGORY  1    QUALIFICATION TRAINING
ARE:                                                        SORT VALUE
 1 TASK  7     ROD WORTH MINIMIZER FAILURE                  1

 2 TASK  8     CONTROL ROD DRIVE PUMP FAILURE               1

 3 TASK  13    SURVEILLANCE TEST ECCS                       1

 4 TASK  15    LARGE LOCA                                   1
 5 TASK  16    REACTOR FEED PUMP TRIP                       1

 6 TASK  17    REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)  1

 7 TASK  20    NUCLEAR INSTRUMENT FAILURE                   1

 8 TASK  2     SMALL BREAK LOCA                             .8571429

 9 TASK  9     LOSS OF FEEDWATER                            .8571429

10 TASK  10    LOSS OF OFFSITE POWER                        .8571429

11 TASK  11    MANUAL REACTOR SCRAM                         .8571429

12 TASK  12    MANUAL LEVEL CONTROL IN STARTUP              .8571429

13 TASK  3     LOSS OF FEEDWATER HEATING                    .8571429

14 TASK  14    MAIN TURBINE STARTUP                         .8571429

15 TASK  4     LOSS OF CONDENSER VACUUM                     .8571429

16 TASK  5     HIGH EXHAUST HOOD TEMPERATURE                .8571429

17 TASK  6     HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   .8571429

18 TASK  18    MAIN TURBINE GENERATOR TRIP                  .8571429

19 TASK  19    FUEL FAILURE (WITH ISOLATION)                .8571429

20 TASK  1     REACTOR STARTUP FROM COLD CONDITION          .8571429
```

THE RANK ORDERED TASKS FOR CATAGORY 2   CERTIFICATION TRAINING
ARE: SURT VALUE

1 TASK	2	SMALL BREAK LOCA	1
2 TASK	9	LOSS OF FEEDWATER	1
3 TASK	10	LOSS OF OFFSITE POWER	1
4 TASK	12	MANUAL LEVEL CONTROL IN STARTUP	1
5 TASK	15	LARGE LOCA	1
6 TASK	19	FUEL FAILURE (WITH ISOLATION)	1
7 TASK	7	ROD WORTH MINIMIZER FAILURE	.8
8 TASK	8	CONTROL ROD DRIVE PUMP FAILURE	.8
9 TASK	1	REACTOR STARTUP FROM COLD CONDITION	.8
10 TASK	3	LOSS OF FEEDWATER HEATING	.8
11 TASK	11	MANUAL REACTOR SCRAM	.8
12 TASK	4	LOSS OF CONDENSER VACUUM	.8
13 TASK	13	SURVEILLANCE TEST ECCS	.8
14 TASK	14	MAIN TURBINE STARTUP	.8
15 TASK	5	HIGH EXHAUST HOOD TEMPERATURE	.8
16 TASK	16	REACTOR FEED PUMP TRIP	.8
17 TASK	17	REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)	.8
18 TASK	18	MAIN TURBINE GENERATOR TRIP	.8
19 TASK	6	HIGH PRESSURE COOLANT INJECTION TURBINE TRIP	.8
20 TASK	20	NUCLEAR INSTRUMENT FAILURE	.8

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 3   REFRESHER TRAINING
ARE: SORT VALUE
 1 TASK 2   SMALL BREAK LOCA   1

 2 TASK 9   LOSS OF FEEDWATER   1

 3 TASK 10   LOSS OF OFFSITE POWER   1

 4 TASK 15   LARGE LOCA   1
 5 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) 1

 6 TASK 19   FUEL FAILURE (WITH ISOLATION)   1

 7 TASK 3   LOSS OF FEEDWATER HEATING   .8888889

 8 TASK 11   MANUAL REACTOR SCRAM   .8888889

 9 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .8888889

10 TASK 14   MAIN TURBINE STARTUP   .8888889

11 TASK 6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP .8888889

12 TASK 8   CONTROL ROD DRIVE PUMP FAILURE   .8888889

13 TASK 18   MAIN TURBINE GENERATOR TRIP   .8888889

14 TASK 1   REACTOR STARTUP FROM COLD CONDITION   .8888889

15 TASK 5   HIGH EXHAUST HOOD TEMPERATURE   .7777778

16 TASK 16   REACTOR FEED PUMP TRIP   .7777778

17 TASK 4   LOSS OF CONDENSER VACUUM   .7777778

18 TASK 13   SURVEILLANCE TEST ECCS   .7777778

19 TASK 7   ROD WORTH MINIMIZER FAILURE   .7777778

20 TASK 20   NUCLEAR INSTRUMENT FAILURE   .7777778

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY   4   ELIMINATION FROM TRAINING
ARE: SORT VALUE
  1 TASK   7   ROD WORTH MINIMIZER FAILURE   .875

  2 TASK 13   SURVEILLANCE TEST ECCS   .875

  3 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   .75

  4 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   .75

  5 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)   .75

  6 TASK 20   NUCLEAR INSTRUMENT FAILURE   .75

  7 TASK 18   MAIN TURBINE GENERATOR TRIP   .625

  8 TASK 16   REACTOR FEED PUMP TRIP   .625

  9 TASK   1   REACTOR STARTUP FROM COLD CONDITION   .5

 10 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .5

 11 TASK   4   LOSS OF CONDENSER VACUUM   .5

 12 TASK 15   LARGE LOCA   .5
 13 TASK 19   FUEL FAILURE (WITH ISOLATION)   .375

 14 TASK   3   LOSS OF FEEDWATER HEATING   .375

 15 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   .25

 16 TASK 14   MAIN TURBINE STARTUP   .25

 17 TASK 11   MANUAL REACTOR SCRAM   .25

 18 TASK   2   SMALL BREAK LOCA   .25

 19 TASK   9   LOSS OF FEEDWATER   .125

 20 TASK 10   LOSS OF OFFSITE POWER   .125

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 5   ON THE JOB CANDIDATE
ARE: SORT VALUE
  1 TASK   7   ROD WORTH MINIMIZER FAILURE   .8888889

  2 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   .8888889

  3 TASK 13   SURVEILLANCE TEST ECCS   .8888889

  4 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) .7777778

  5 TASK 20   NUCLEAR INSTRUMENT FAILURE   .7777778

  6 TASK 16   REACTOR FEED PUMP TRIP   .6666667

  7 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   .6666667

  8 TASK 18   MAIN TURBINE GENERATOR TRIP   .6666667

  9 TASK 15   LARGE LOCA   .6666667
 10 TASK   4   LOSS OF CONDENSER VACUUM   .5555556

 11 TASK   1   REACTOR STARTUP FROM COLD CONDITION   .5555556

 12 TASK 19   FUEL FAILURE (WITH ISOLATION)   .5555556

 13 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .5555556

 14 TASK   3   LOSS OF FEEDWATER HEATING   .4444445

 15 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP .4444445

 16 TASK   2   SMALL BREAK LOCA   .4444445

 17 TASK 10   LOSS OF OFFSITE POWER   .3333334

 18 TASK 14   MAIN TURBINE STARTUP   .3333334

 19 TASK 11   MANUAL REACTOR SCRAM   .3333334

 20 TASK   9   LOSS OF FEEDWATER   .3333334

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 6   POTENTIAL FOR LESS TRAINING
ARE: SORT VALUE

1 TASK   7   ROD WORTH MINIMIZER FAILURE   .875

2 TASK   13   SURVEILLANCE TEST ECCS   .875

3 TASK   20   NUCLEAR INSTRUMENT FAILURE   .875

4 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   .75

5 TASK   15   LARGE LOCA   .75
6 TASK   17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) .75

7 TASK   18   MAIN TURBINE GENERATOR TRIP   .75

8 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   .75

9 TASK   4   LOSS OF CONDENSER VACUUM   .625

10 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .625

11 TASK 19   FUEL FAILURE (WITH ISOLATION)   .625

12 TASK 16   REACTOR FEED PUMP TRIP   .625

13 TASK 2   SMALL BREAK LOCA   .5

14 TASK 6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   .5

15 TASK 3   LOSS OF FEEDWATER HEATING   .5

16 TASK 1   REACTOR STARTUP FROM COLD CONDITION   .5

17 TASK 10   LOSS OF OFFSITE POWER   .375

18 TASK 14   MAIN TURBINE STARTUP   .375

19 TASK 11   MANUAL REACTOR SCRAM   .375

20 TASK 9   LOSS OF FEEDWATER   .375

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 7   POTENTIAL FOR MORE TRAINING
ARE:

				SORT VALUE
1 TASK	2	SMALL BREAK LOCA		1
2 TASK	6	HIGH PRESSURE COOLANT INJECTION TURBINE TRIP		1
3 TASK	8	CONTROL ROD DRIVE PUMP FAILURE		1
4 TASK	9	LOSS OF FEEDWATER		1
5 TASK	10	LOSS OF OFFSITE POWER		1
6 TASK	15	LARGE LOCA		1
7 TASK	17	REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)	1	
8 TASK	19	FUEL FAILURE (WITH ISOLATION)		1
9 TASK	11	MANUAL REACTOR SCRAM		.8888889
10 TASK	12	MANUAL LEVEL CONTROL IN STARTUP		.8888889
11 TASK	14	MAIN TURBINE STARTUP		.8888889
12 TASK	3	LOSS OF FEEDWATER HEATING		.8888889
13 TASK	16	REACTOR FEED PUMP TRIP		.8888889
14 TASK	5	HIGH EXHAUST HOOD TEMPERATURE		.8888889
15 TASK	18	MAIN TURBINE GENERATOR TRIP		.8888889
16 TASK	1	REACTOR STARTUP FROM COLD CONDITION		.8888889
17 TASK	7	ROD WORTH MINIMIZER FAILURE		.7777778
18 TASK	4	LOSS OF CONDENSER VACUUM		.7777778
19 TASK	13	SURVEILLANCE TEST ECCS		.7777778
20 TASK	20	NUCLEAR INSTRUMENT FAILURE		.7777778

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 8   POTENTIAL SIMULATOR TASK
ARE: SORT VALUE
  1 TASK 2   SMALL BREAK LOCA   1

  2 TASK 9   LOSS OF FEEDWATER   1

  3 TASK 10   LOSS OF OFFSITE POWER   1

  4 TASK 15   LARGE LOCA   1
  5 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) 1

  6 TASK 19   FUEL FAILURE (WITH ISOLATION)   1

  7 TASK 3   LOSS OF FEEDWATER HEATING   .875

  8 TASK 11   MANUAL REACTOR SCRAM   .875

  9 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .875

 10 TASK 14   MAIN TURBINE STARTUP   .875

 11 TASK 6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   .875

 12 TASK 8   CONTROL ROD DRIVE PUMP FAILURE   .875

 13 TASK 18   MAIN TURBINE GENERATOR TRIP   .875

 14 TASK 1   REACTOR STARTUP FROM COLD CONDITION   .875

 15 TASK 5   HIGH EXHAUST HOOD TEMPERATURE   .75

 16 TASK 16   REACTOR FEED PUMP TRIP   .75

 17 TASK 4   LOSS OF CONDENSER VACUUM   .75

 18 TASK 13   SURVEILLANCE TEST ECCS   .75

 19 TASK 7   ROD WORTH MINIMIZER FAILURE   .75

 20 TASK 20   NUCLEAR INSTRUMENT FAILURE   .75

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 9   POTENTIAL FORMAL TRAINING
ARE:
                                                    SORT VALUE
 1 TASK   2   SMALL BREAK LOCA   1

 2 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   1

 3 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   1

 4 TASK   9   LOSS OF FEEDWATER   1

 5 TASK 10   LOSS OF OFFSITE POWER   1

 6 TASK 15   LARGE LOCA   1
 7 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) 1

 8 TASK 19   FUEL FAILURE (WITH ISOLATION)   1

 9 TASK 11   MANUAL REACTOR SCRAM   .875

10 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   .875

11 TASK 14   MAIN TURBINE STARTUP   .875

12 TASK   3   LOSS OF FEEDWATER HEATING   .875

13 TASK 16   REACTOR FEED PUMP TRIP   .875

14 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   .875

15 TASK 18   MAIN TURBINE GENERATOR TRIP   .875

16 TASK   1   REACTOR STARTUP FROM COLD CONDITION   .875

17 TASK   7   ROD WORTH MINIMIZER FAILURE   .75

18 TASK   4   LOSS OF CONDENSER VACUUM   .75

19 TASK 13   SURVEILLANCE TEST ECCS   .75

20 TASK 20   NUCLEAR INSTRUMENT FAILURE   .75

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 4
AVERAGE CALCULATIONS INITIATED
THE RANK ORDERED TASKS FOR CATAGORY 1   QUALIFICATION TRAINING
ARE: SORT VALUE
 1 TASK 16   REACTOR FEED PUMP TRIP   -.1428571

 2 TASK 15   LARGE LOCA   -.7142858
 3 TASK 11   MANUAL REACTOR SCRAM   -.7142858

 4 TASK 19   FUEL FAILURE (WITH ISOLATION)   -.7142858

 5 TASK 18   MAIN TURBINE GENERATOR TRIP   -.8571429

 6 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   -1

 7 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) -1

 8 TASK   9   LOSS OF FEEDWATER   -1.142857

 9 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP   -1.285714

10 TASK 10   LOSS OF OFFSITE POWER   -1.285714

11 TASK   2   SMALL BREAK LOCA   -1.285714

12 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   -1.285714

13 TASK 14   MAIN TURBINE STARTUP   -1.285714

14 TASK 20   NUCLEAR INSTRUMENT FAILURE   -1.285714

15 TASK 13   SURVEILLANCE TEST ECCS   -1.428572

16 TASK   1   REACTOR STARTUP FROM COLD CONDITION   -1.428572

17 TASK   3   LOSS OF FEEDWATER HEATING   -1.571429

18 TASK   7   ROD WORTH MINIMIZER FAILURE   -2

19 TASK   4   LOSS OF CONDENSER VACUUM   -2

20 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   -2.571429

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 2   CERTIFICATION TRAINING
ARE: SORT VALUE
 1 TASK 3   LOSS OF FEEDWATER HEATING   -.8

 2 TASK 9   LOSS OF FEEDWATER   -.8

 3 TASK 10   LOSS OF OFFSITE POWER   -1

 4 TASK 11   MANUAL REACTOR SCRAM   -1

 5 TASK 14   MAIN TURBINE STARTUP   -1

 6 TASK 2   SMALL BREAK LOCA   -1.2

 7 TASK 1   REACTOR STARTUP FROM COLD CONDITION   -1.4

 8 TASK 19   FUEL FAILURE (WITH ISOLATION)   -1.4

 9 TASK 6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP -1.6

10 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   -1.8

11 TASK 15   LARGE LOCA   -2
12 TASK 18   MAIN TURBINE GENERATOR TRIP   -2

13 TASK 4   LOSS OF CONDENSER VACUUM   -2

14 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) -2.2

15 TASK 16   REACTOR FEED PUMP TRIP   -2.4

16 TASK 5   HIGH EXHAUST HOOD TEMPERATURE   -2.6

17 TASK 8   CONTROL ROD DRIVE PUMP FAILURE   -2.6

18 TASK 7   ROD WORTH MINIMIZER FAILURE   -3.2

19 TASK 13   SURVEILLANCE TEST ECCS   -3.4

20 TASK 20   NUCLEAR INSTRUMENT FAILURE   -3.4

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 3   REFRESHER TRAINING
ARE: SORT VALUE

#	Task	Description	Sort Value
1 TASK	9	LOSS OF FEEDWATER	-.7777778
2 TASK	11	MANUAL REACTOR SCRAM	-.7777778
3 TASK	10	LOSS OF OFFSITE POWER	-.8888889
4 TASK	2	SMALL BREAK LOCA	-.8888889
5 TASK	19	FUEL FAILURE (WITH ISOLATION)	-1.111111
6 TASK	6	HIGH PRESSURE COOLANT INJECTION TURBINE TRIP	-1.222222
7 TASK	16	REACTOR FEED PUMP TRIP	-1.333333
8 TASK	3	LOSS OF FEEDWATER HEATING	-1.333333
9 TASK	1	REACTOR STARTUP FROM COLD CONDITION	-1.444444
10 TASK	18	MAIN TURBINE GENERATOR TRIP	-1.444444
11 TASK	14	MAIN TURBINE STARTUP	-1.444444
12 TASK	8	CONTROL ROD DRIVE PUMP FAILURE	-1.555556
13 TASK	17	REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)	-1.666667
14 TASK	12	MANUAL LEVEL CONTROL IN STARTUP	-1.777778
15 TASK	4	LOSS OF CONDENSER VACUUM	-1.777778
16 TASK	15	LARGE LOCA	-1.888889
17 TASK	5	HIGH EXHAUST HOOD TEMPERATURE	-2.333333
18 TASK	20	NUCLEAR INSTRUMENT FAILURE	-2.555556
19 TASK	13	SURVEILLANCE TEST ECCS	-2.666667
20 TASK	7	ROD WORTH MINIMIZER FAILURE	-2.666667

THE RANK ORDERED TASKS FOR CATAGORY 4   ELIMINATION FROM TRAINING
ARE: SORT VALUE

1 TASK	7	ROD WORTH MINIMIZER FAILURE	-.375
2 TASK	5	HIGH EXHAUST HOOD TEMPERATURE	-.625
3 TASK	13	SURVEILLANCE TEST ECCS	-.625
4 TASK	20	NUCLEAR INSTRUMENT FAILURE	-.75
5 TASK	8	CONTROL ROD DRIVE PUMP FAILURE	-1
6 TASK	17	REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)	-1.25
7 TASK	4	LOSS OF CONDENSER VACUUM	-1.625
8 TASK	1	REACTOR STARTUP FROM COLD CONDITION	-1.875
9 TASK	16	REACTOR FEED PUMP TRIP	-1.875
10 TASK	18	MAIN TURBINE GENERATOR TRIP	-2.125
11 TASK	6	HIGH PRESSURE COOLANT INJECTION TURBINE TRIP	-2.25
12 TASK	3	LOSS OF FEEDWATER HEATING	-2.25
13 TASK	12	MANUAL LEVEL CONTROL IN STARTUP	-2.375
14 TASK	11	MANUAL REACTOR SCRAM	-3.125
15 TASK	19	FUEL FAILURE (WITH ISOLATION)	-3.375
16 TASK	14	MAIN TURBINE STARTUP	-3.5
17 TASK	9	LOSS OF FEEDWATER	-3.875
18 TASK	2	SMALL BREAK LOCA	-3.875
19 TASK	10	LOSS OF OFFSITE POWER	-4
20 TASK	15	LARGE LOCA	-4.125

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 5   ON THE JOB CANDIDATE
ARE: SORT VALUE
  1 TASK   7   ROD WORTH MINIMIZER FAILURE   -.2222222

  2 TASK 13   SURVEILLANCE TEST ECCS   -.4444445

  3 .TASK 20   NUCLEAR INSTRUMENT FAILURE   -.6666667

  4 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   -.7777778

  5 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) -.8888889

  6 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   -.8888889

  7 TASK   1   REACTOR STARTUP FROM COLD CONDITION   -1.111111

  8 TASK   4   LOSS OF CONDENSER VACUUM   -1.222222

  9 TASK 16   REACTOR FEED PUMP TRIP   -1.555556

 10 TASK   3   LOSS OF FEEDWATER HEATING   -1.666667

 11 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   -1.777778

 12 TASK 18   MAIN TURBINE GENERATOR TRIP   -1.888889

 13 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP -2.222222

 14 TASK 11   MANUAL REACTOR SCRAM   -2.555556

 15 TASK 19   FUEL FAILURE (WITH ISOLATION)   -2.666667

 16 TASK 14   MAIN TURBINE STARTUP   -2.777778

 17 TASK   2   SMALL BREAK LOCA   -3.222222

 18 TASK   9   LOSS OF FEEDWATER   -3.333333

 19 TASK 15   LARGE LOCA   -3.444445
 20 TASK 10   LOSS OF OFFSITE POWER   -3.444445

60

PRESS ANY KEY TO CONTINUE LISTING—WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 6   POTENTIAL FOR LESS TRAINING
ARE: SORT VALUE

1 TASK	7	ROD WORTH MINIMIZER FAILURE	-.375
2 TASK	13	SURVEILLANCE TEST ECCS	-.5
3 TASK	20	NUCLEAR INSTRUMENT FAILURE	-.75
4 TASK	5	HIGH EXHAUST HOOD TEMPERATURE	-.875
5 TASK	17	REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)	-1
6 TASK	8	CONTROL ROD DRIVE PUMP FAILURE	-1
7 TASK	4	LOSS OF CONDENSER VACUUM	-1.125
8 TASK	1	REACTOR STARTUP FROM COLD CONDITION	-1.25
9 TASK	16	REACTOR FEED PUMP TRIP	-1.375
10 TASK	3	LOSS OF FEEDWATER HEATING	-1.5
11 TASK	18	MAIN TURBINE GENERATOR TRIP	-1.625
12 TASK	12	MANUAL LEVEL CONTROL IN STARTUP	-1.625
13 TASK	6	HIGH PRESSURE COOLANT INJECTION TURBINE TRIP	-2
14 TASK	14	MAIN TURBINE STARTUP	-2.25
15 TASK	11	MANUAL REACTOR SCRAM	-2.5
16 TASK	19	FUEL FAILURE (WITH ISOLATION)	-2.625
17 TASK	2	SMALL BREAK LOCA	-2.875
18 TASK	15	LARGE LOCA	-3.125
19 TASK	9	LOSS OF FEEDWATER	-3.125
20 TASK	10	LOSS OF OFFSITE POWER	-3.125

61

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 7   POTENTIAL FOR MORE TRAINING
ARE: SORT VALUE
 1 TASK 9   LOSS OF FEEDWATER   -1.111111

 2 TASK 10   LOSS OF OFFSITE POWER   -1.222222

 3 TASK 11   MANUAL REACTOR SCRAM   -1.222222

 4 TASK 14   MAIN TURBINE STARTUP   -1.444444

 5 TASK 2   SMALL BREAK LOCA   -1.666667

 6 TASK 6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP -1.777778

 7 TASK 19   FUEL FAILURE (WITH ISOLATION)   -1.777778

 8 TASK 18   MAIN TURBINE GENERATOR TRIP   -2

 9 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   -2.333333

10 TASK 3   LOSS OF FEEDWATER HEATING   -2.333333

11 TASK 16   REACTOR FEED PUMP TRIP   -2.444445

12 TASK 15   LARGE LOCA   -2.666667
13 TASK 1   REACTOR STARTUP FROM COLD CONDITION   -2.777778

14 TASK 4   LOSS OF CONDENSER VACUUM   -2.777778

15 TASK 8   CONTROL ROD DRIVE PUMP FAILURE   -3.111111

16 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) -3.111111

17 TASK 5   HIGH EXHAUST HOOD TEMPERATURE   -3.333333

18 TASK 20   NUCLEAR INSTRUMENT FAILURE   -3.888889

19 TASK 13   SURVEILLANCE TEST ECCS   -4

20 TASK 7   ROD WORTH MINIMIZER FAILURE   -4.111111

62

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY 8   POTENTIAL SIMULATOR TASK
ARE: SORT VALUE
 1 TASK 10   LOSS OF OFFSITE POWER   1.75

 2 TASK   9   LOSS OF FEEDWATER   -.125

 3 TASK   2   SMALL BREAK LOCA   -.375

 4 TASK 19   FUEL FAILURE (WITH ISOLATION)   -.5

 5 TASK   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP -.75

 6 TASK 11   MANUAL REACTOR SCRAM   -.875

 7 TASK 14   MAIN TURBINE STARTUP   -1

 8 TASK 12   MANUAL LEVEL CONTROL IN STARTUP   -1.375

 9 TASK 15   LARGE LOCA   -1.5
10 TASK 16   REACTOR FEED PUMP TRIP   -1.5

11 TASK   3   LOSS OF FEEDWATER HEATING   -1.5

12 TASK 18   MAIN TURBINE GENERATOR TRIP   -1.625

13 TASK   1   REACTOR STARTUP FROM COLD CONDITION   -1.625

14 TASK   8   CONTROL ROD DRIVE PUMP FAILURE   -1.75

15 TASK 17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP) -1.875

16 TASK   4   LOSS OF CONDENSER VACUUM   -2

17 TASK   5   HIGH EXHAUST HOOD TEMPERATURE   -2.5

18 TASK   7   ROD WORTH MINIMIZER FAILURE   -3.125

19 TASK 20   NUCLEAR INSTRUMENT FAILURE   -3.125

20 TASK 13   SURVEILLANCE TEST ECCS   -3.375

```
PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
THE RANK ORDERED TASKS FOR CATAGORY  9     POTENTIAL FORMAL TRAINING
ARE:                                                      SORT VALUE
  1 TASK   9     LOSS OF FEEDWATER
                                                            -.875

  2 TASK   10    LOSS OF OFFSITE POWER
                                                            -1

  3 TASK   11    MANUAL REACTOR SCRAM
                                                            -1.125

  4 TASK   14    MAIN TURBINE STARTUP
                                                            -1.125

  5 TASK   19    FUEL FAILURE (WITH ISOLATION)
                                                            -1.125

  6 TASK   6     HIGH PRESSURE COOLANT INJECTION TURBINE TRIP  -1.375

  7 TASK   2     SMALL BREAK LOCA
                                                            -1.5

  8 TASK   12    MANUAL LEVEL CONTROL IN STARTUP
                                                            -1.5

  9 TASK   18    MAIN TURBINE GENERATOR TRIP
                                                            -1.625

 10 TASK   16    REACTOR FEED PUMP TRIP
                                                            -1.875

 11 TASK   15    LARGE LOCA                                  -2
 12 TASK   3     LOSS OF FEEDWATER HEATING
                                                            -2.125

 13 TASK   17    REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)  -2.125

 14 TASK   1     REACTOR STARTUP FROM COLD CONDITION
                                                            -2.125

 15 TASK   8     CONTROL ROD DRIVE PUMP FAILURE
                                                            -2.125

 16 TASK   4     LOSS OF CONDENSER VACUUM
                                                            -2.625

 17 TASK   5     HIGH EXHAUST HOOD TEMPERATURE
                                                            -2.75

 18 TASK   7     ROD WORTH MINIMIZER FAILURE
                                                            -3.125

 19 TASK   20    NUCLEAR INSTRUMENT FAILURE
                                                            -3.125

 20 TASK   13    SURVEILLANCE TEST ECCS
                                                            -3.25
```

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

 TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
 TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
 TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
 TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
 TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
 TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
 TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 5
MATCH CALCULATIONS INITIATED
TASK   2   GOES TO :CERTIFICATION TRAINING
THE TASK NAME IS:SMALL BREAK LOCA
TASK   6   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
TASK   8   GOES TO :POTENTIAL FORMAL TRAINING
THE TASK NAME IS:CONTROL ROD DRIVE PUMP FAILURE
TASK   9   GOES TO :POTENTIAL FORMAL TRAINING
THE TASK NAME IS:LOSS OF FEEDWATER
TASK   7   GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:ROD WORTH MINIMIZER FAILURE
TASK 10   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:LOSS OF OFFSITE POWER
TASK 15   GOES TO :POTENTIAL FORMAL TRAINING
THE TASK NAME IS:LARGE LOCA
TASK 17   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
TASK 19   GOES TO :POTENTIAL FORMAL TRAINING
THE TASK NAME IS:FUEL FAILURE (WITH ISOLATION)
TASK 12   GOES TO :CERTIFICATION TRAINING
THE TASK NAME IS:MANUAL LEVEL CONTROL IN STARTUP
TASK 14   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:MAIN TURBINE STARTUP
TASK   3   GOES TO :REFRESHER TRAINING
THE TASK NAME IS:LOSS OF FEEDWATER HEATING
TASK 11   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:MANUAL REACTOR SCRAM
TASK   1   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:REACTOR STARTUP FROM COLD CONDITION
TASK 13   GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:SURVEILLANCE TEST ECCS
TASK 16   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:REACTOR FEED PUMP TRIP
TASK 18   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:MAIN TURBINE GENERATOR TRIP
TASK   5   GOES TO :POTENTIAL FOR MORE TRAINING
THE TASK NAME IS:HIGH EXHAUST HOOD TEMPERATURE
TASK 20   GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:NUCLEAR INSTRUMENT FAILURE
TASK   4   GOES TO :CERTIFICATION TRAINING
THE TASK NAME IS:LOSS OF CONDENSER VACUUM

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

  TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
  TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
  TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
  TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
  TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
  TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
  TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 6
AVERAGE CALCULATIONS INITIATED
TASK 10 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:LOSS OF OFFSITE POWER
TASK 9 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:LOSS OF FEEDWATER
TASK 7 GOES TO :ON THE JOB CANDIDATE
THE TASK NAME IS:ROD WORTH MINIMIZER FAILURE
TASK 2 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:SMALL BREAK LOCA
TASK 19 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:FUEL FAILURE (WITH ISOLATION)
TASK 5 GOES TO :ELIMINATION FROM TRAINING
THE TASK NAME IS:HIGH EXHAUST HOOD TEMPERATURE
TASK 16 GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:REACTOR FEED PUMP TRIP
TASK 13 GOES TO :POTENTIAL FOR LESS TRAINING
THE TASK NAME IS:SURVEILLANCE TEST ECCS
TASK 20 GOES TO :ON THE JOB CANDIDATE
THE TASK NAME IS:NUCLEAR INSTRUMENT FAILURE
TASK 11 GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:MANUAL REACTOR SCRAM
TASK 1 GOES TO :ON THE JOB CANDIDATE
THE TASK NAME IS:REACTOR STARTUP FROM COLD CONDITION
TASK 6 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
TASK 3 GOES TO :CERTIFICATION TRAINING
THE TASK NAME IS:LOSS OF FEEDWATER HEATING
TASK 14 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:MAIN TURBINE STARTUP
TASK 8 GOES TO :POTENTIAL FOR LESS TRAINING
THE TASK NAME IS:CONTROL ROD DRIVE PUMP FAILURE
TASK 15 GOES TO :QUALIFICATION TRAINING
THE TASK NAME IS:LARGE LOCA
TASK 17 GOES TO :ON THE JOB CANDIDATE
THE TASK NAME IS:REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
TASK 4 GOES TO :ON THE JOB CANDIDATE
THE TASK NAME IS:LOSS OF CONDENSER VACUUM
TASK 12 GOES TO :POTENTIAL SIMULATOR TASK
THE TASK NAME IS:MANUAL LEVEL CONTROL IN STARTUP
TASK 18 GOES TO :POTENTIAL FORMAL TRAINING
THE TASK NAME IS:MAIN TURBINE GENERATOR TRIP

PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE
WOULD YOU LIKE ADDITIONAL ANALYSIS?
IF YES TYPE 'Y' IF 'NO' HIT RETURN? Y
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

 TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
 TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
 TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
 TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
 TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
 TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
 TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 7
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 1
THE TASKS RANKED IN DESCENDING ORDER FOR
SKILL ACQUISITION DIFICULTY ARE:

```
RANK    1    12   MANUAL LEVEL CONTROL IN STARTUP
                  ITS VALUE IS:   7
RANK    2    14   MAIN TURBINE STARTUP
                  ITS VALUE IS:   6
RANK    3    10   LOSS OF OFFSITE POWER
                  ITS VALUE IS:   5
RANK    4    11   MANUAL REACTOR SCRAM
                  ITS VALUE IS:   4
RANK    5    9    LOSS OF FEEDWATER
                  ITS VALUE IS:   4
RANK    6    1    REACTOR STARTUP FROM COLD CONDITION
                  ITS VALUE IS:   4
RANK    7    8    CONTROL ROD DRIVE PUMP FAILURE
                  ITS VALUE IS:   3
RANK    8    2    SMALL BREAK LOCA
                  ITS VALUE IS:   3
RANK    9    19   FUEL FAILURE (WITH ISOLATION)
                  ITS VALUE IS:   3
RANK    10   4    LOSS OF CONDENSER VACUUM
                  ITS VALUE IS:   2
RANK    11   13                 SURVEILLANCE TEST ECCS
                  ITS VALUE IS:   2
RANK    12   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                  ITS VALUE IS:   2
RANK    13   16                 REACTOR FEED PUMP TRIP
                  ITS VALUE IS:   2
RANK    14   17                 REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                  ITS VALUE IS:   2
RANK    15   18                 MAIN TURBINE GENERATOR TRIP
                  ITS VALUE IS:   2
RANK    16   3    LOSS OF FEEDWATER HEATING
                  ITS VALUE IS:   2
RANK    17   5    HIGH EXHAUST HOOD TEMPERATURE
                  ITS VALUE IS:   1
RANK    18   15                 LARGE LOCA
                  ITS VALUE IS:   1
RANK    19   7    ROD WORTH MINIMIZER FAILURE
                  ITS VALUE IS:   1
RANK    20   20                 NUCLEAR INSTRUMENT FAILURE
                  ITS VALUE IS:   1
```

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 2
THE TASKS RANKED IN DESCENDING ORDER FOR
SKILL PERFORMANCE DIFICULTY ARE:

RANK  1    14  MAIN TURBINE STARTUP
                ITS VALUE IS:  8
RANK  2    12  MANUAL LEVEL CONTROL IN STARTUP
                ITS VALUE IS:  6
RANK  3    9   LOSS OF FEEDWATER
                ITS VALUE IS:  6
RANK  4    10  LOSS OF OFFSITE POWER
                ITS VALUE IS:  5
RANK  5    19  FUEL FAILURE (WITH ISOLATION)
                ITS VALUE IS:  5
RANK  6    3   LOSS OF FEEDWATER HEATING
                ITS VALUE IS:  4
RANK  7    4   LOSS OF CONDENSER VACUUM
                ITS VALUE IS:  4
RA  (  8   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                ITS VALUE IS:  4
RANK  9    2   SMALL BREAK LOCA
                ITS VALUE IS:  4
RANK  10   1   REACTOR STARTUP FROM COLD CONDITION
                ITS VALUE IS:  2
RANK  11   13               SURVEILLANCE TEST ECCS
                ITS VALUE IS:  2
RANK  12   7   ROD WORTH MINIMIZER FAILURE
                ITS VALUE IS:  2
RANK  13   16               REACTOR FEED PUMP TRIP
                ITS VALUE IS:  2
RANK  14   17               REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                ITS VALUE IS:  2
RANK  15   18               MAIN TURBINE GENERATOR TRIP
                ITS VALUE IS:  2
RANK  16   11               MANUAL REACTOR SCRAM
                ITS VALUE IS:  2
RANK  17   8   CONTROL ROD DRIVE PUMP FAILURE
                ITS VALUE IS:  1
RANK  18   15               LARGE LOCA
                ITS VALUE IS:  1
RANK  19   5   HIGH EXHAUST HOOD TEMPERATURE
                ITS VALUE IS:  1
RANK  20   20               NUCLEAR INSTRUMENT FAILURE
                ITS VALUE IS:  1
```

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 3
THE TASKS RANKED IN DESCENDING ORDER FOR
IMMEDIATE PERFORMANCE NEED ARE:

RANK  1    20   NUCLEAR INSTRUMENT FAILURE
                ITS VALUE IS:  8
RANK  2    13   SURVEILLANCE TEST ECCS
                ITS VALUE IS:  7
RANK  3    4    LOSS OF CONDENSER VACUUM
                ITS VALUE IS:  6
RANK  4    16   REACTOR FEED PUMP TRIP
                ITS VALUE IS:  6
RANK  5    18   MAIN TURBINE GENERATOR TRIP
                ITS VALUE IS:  6
RANK  6    11   MANUAL REACTOR SCRAM
                ITS VALUE IS:  6
RANK  7    1    REACTOR STARTUP FROM COLD CONDITION
                ITS VALUE IS:  5
RANK  8    14   MAIN TURBINE STARTUP
                ITS VALUE IS:  5
RANK  9    5    HIGH EXHAUST HOOD TEMPERATURE
                ITS VALUE IS:  5
RANK  10   3    LOSS OF FEEDWATER HEATING
                ITS VALUE IS:  5
RANK  11   12                   MANUAL LEVEL CONTROL IN STARTUP
                ITS VALUE IS:  5
RANK  12   7    ROD WORTH MINIMIZER FAILURE
                ITS VALUE IS:  4
RANK  13   17                   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                ITS VALUE IS:  4
RANK  14   8    CONTROL ROD DRIVE PUMP FAILURE
                ITS VALUE IS:  3
RANK  15   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                ITS VALUE IS:  2
RANK  16   19                   FUEL FAILURE (WITH ISOLATION)
                ITS VALUE IS:  2
RANK  17   9    LOSS OF FEEDWATER
                ITS VALUE IS:  2
RANK  18   15                   LARGE LOCA
                ITS VALUE IS:  1
RANK  19   2    SMALL BREAK LOCA
                ITS VALUE IS:  1
RANK  20   10                   LOSS OF OFFSITE POWER
                ITS VALUE IS:  1
```

DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 4
THE TASKS RANKED IN DESCENDING ORDER FOR
PUBLIC SAFETY RISK ARE:

RANK   1   15   LARGE LOCA
                 ITS VALUE IS: 9
RANK   2   11   MANUAL REACTOR SCRAM
                 ITS VALUE IS: 8
RANK   3   19   FUEL FAILURE (WITH ISOLATION)
                 ITS VALUE IS: 8
RANK   4   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                 ITS VALUE IS: 7
RANK   5   9   LOSS OF FEEDWATER
                 ITS VALUE IS: 7
RANK   6   10   LOSS OF OFFSITE POWER
                 ITS VALUE IS: 7
RANK   7   2   SMALL BREAK LOCA
                 ITS VALUE IS: 6
RANK   8   18   MAIN TURBINE GENERATOR TRIP
                 ITS VALUE IS: 5
RANK   9   14   MAIN TURBINE STARTUP
                 ITS VALUE IS: 5
RANK   10   3   LOSS OF FEEDWATER HEATING
                 ITS VALUE IS: 4
RANK   11   16   REACTOR FEED PUMP TRIP
                 ITS VALUE IS: 3
RANK   12   17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                 ITS VALUE IS: 3
RANK   13   8   CONTROL ROD DRIVE PUMP FAILURE
                 ITS VALUE IS: 3
RANK   14   1   REACTOR STARTUP FROM COLD CONDITION
                 ITS VALUE IS: 3
RANK   15   7   ROD WORTH MINIMIZER FAILURE
                 ITS VALUE IS: 2
RANK   16   12   MANUAL LEVEL CONTROL IN STARTUP
                 ITS VALUE IS: 2
RANK   17   13   SURVEILLANCE TEST ECCS
                 ITS VALUE IS: 2
RANK   18   4   LOSS OF CONDENSER VACUUM
                 ITS VALUE IS: 1
RANK   19   5   HIGH EXHAUST HOOD TEMPERATURE
                 ITS VALUE IS: 1
RANK   20   20   NUCLEAR INSTRUMENT FAILURE
                 ITS VALUE IS: 1

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 5
THE TASKS RANKED IN DESCENDING ORDER FOR
PREVIOUS EXPERIENCE LIKLIHOOD ARE

RANK   1    13   SURVEILLANCE TEST ECCS
                 ITS VALUE IS:  8
RANK   2    20   NUCLEAR INSTRUMENT FAILURE
                 ITS VALUE IS:  7
RANK   3    11   MANUAL REACTOR SCRAM
                 ITS VALUE IS:  6
RANK   4    4    LOSS OF CONDENSER VACUUM
                 ITS VALUE IS:  6
RANK   5    18   MAIN TURBINE GENERATOR TRIP
                 ITS VALUE IS:  6
RANK   6    7    ROD WORTH MINIMIZER FAILURE
                 ITS VALUE IS:  6
RANK   7    5    HIGH EXHAUST HOOD TEMPERATURE
                 ITS VALUE IS:  5
RANK   8    16   REACTOR FEED PUMP TRIP
                 ITS VALUE IS:  5
RANK   9    8    CONTROL ROD DRIVE PUMP FAILURE
                 ITS VALUE IS:  4
RANK   10   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                 ITS VALUE IS:  4
RANK   11   3    LOSS OF FEEDWATER HEATING
                 ITS VALUE IS:  3
RANK   12   17                   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                 ITS VALUE IS:  3
RANK   13   1    REACTOR STARTUP FROM COLD CONDITION
                 ITS VALUE IS:  3
RANK   14   14                   MAIN TURBINE STARTUP
                 ITS VALUE IS:  3
RANK   15   12                   MANUAL LEVEL CONTROL IN STARTUP
                 ITS VALUE IS:  2
RANK   16   9    LOSS OF FEEDWATER
                 ITS VALUE IS:  1
RANK   17   19                   FUEL FAILURE (WITH ISOLATION)
                 ITS VALUE IS:  1
RANK   18   10                   LOSS OF OFFSITE POWER
                 ITS VALUE IS:  1
RANK   19   15                   LARGE LOCA
                 ITS VALUE IS:  0
RANK   20   2    SMALL BREAK LOCA
                 ITS VALUE IS:  0
```

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 6
THE TASKS RANKED IN DESCENDING ORDER FOR
NORMAL OPERATION PERFORMANCE ARE

RANK  1    13   SURVEILLANCE TEST ECCS
                ITS VALUE IS:  7
RANK  2    4    LOSS OF CONDENSER VACUUM
                ITS VALUE IS:  6
RANK  3    12   MANUAL LEVEL CONTROL IN STARTUP
                ITS VALUE IS:  6
RANK  4    3    LOSS OF FEED WATER HEATING
                ITS VALUE IS:  6
RANK  5    14   MAIN TURBINE STARTUP
                ITS VALUE IS:  6
RANK  6    20   NUCLEAR INSTRUMENT FAILURE
                ITS VALUE IS:  6
RANK  7    1    REACTOR STARTUP FROM COLD CONDITION
                ITS VALUE IS:  5
RANK  8    7    ROD WORTH MINIMIZER FAILURE
                ITS VALUE IS:  5
RANK  9    16   REACTOR FEED PUMP TRIP
                ITS VALUE IS:  4
RANK  10   5    HIGH EXHAUST HOOD TEMPERATURE
                ITS VALUE IS:  4
RANK  11   17                 REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                ITS VALUE IS:  3
RANK  12   8    CONTROL ROD DRIVE PUMP FAILURE
                ITS VALUE IS:  2
RANK  13   11                 MANUAL REACTOR SCRAM
                ITS VALUE IS:  2
RANK  14   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                ITS VALUE IS:  1
RANK  15   15                 LARGE LOCA
                ITS VALUE IS:  0
RANK  16   9    LOSS OF FEEDWATER
                ITS VALUE IS:  0
RANK  17   10                 LOSS OF OFFSITE POWER
                ITS VALUE IS:  0
RANK  18   18                 MAIN TURBINE GENERATOR TRIP
                ITS VALUE IS:  0
RANK  19   19                 FUEL FAILURE (WITH ISOLATION)
                ITS VALUE IS:  0
RANK  20   2    SMALL BREAK LOCA
                ITS VALUE IS:  0
```

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 7
THE TASKS RANKED IN DESCENDING ORDER FOR
EMERGENCY OPERATIONS ARE

RANK   1    15   LARGE LOCA
                 ITS VALUE IS:  9
RANK   2    16   REACTOR FEED PUMP TRIP
                 ITS VALUE IS:  7
RANK   3    2    SMALL BREAK LOCA
                 ITS VALUE IS:  6
RANK   4    10   LOSS OF OFFSITE POWER
                 ITS VALUE IS:  5
RANK   5    11   MANUAL REACTOR SCRAM
                 ITS VALUE IS:  5
RANK   6    6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                 ITS VALUE IS:  5
RANK   7    9    LOSS OF FEEDWATER
                 ITS VALUE IS:  5
RANK   8    19   FUEL FAILURE (WITH ISOLATION)
                 ITS VALUE IS:  5
RANK   9    8    CONTROL ROD DRIVE PUMP FAILURE
                 ITS VALUE IS:  4
RANK   10   18                   MAIN TURBINE GENERATOR TRIP
                 ITS VALUE IS:  3
RANK   11   17                   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                 ITS VALUE IS:  1
RANK   12   20                   NUCLEAR INSTRUMENT FAILURE
                 ITS VALUE IS:  1
RANK   13   13                   SURVEILLANCE TEST ECCS
                 ITS VALUE IS:  0
RANK   14   14                   MAIN TURBINE STARTUP
                 ITS VALUE IS:  0
RANK   15   7    ROD WORTH MINIMIZER FAILURE
                 ITS VALUE IS:  0
RANK   16   3    LOSS OF FEEDWATER HEATING
                 ITS VALUE IS:  0
RANK   17   4    LOSS OF CONDENSER VACUUM
                 ITS VALUE IS:  0
RANK   18   5    HIGH EXHAUST HOOD TEMPERATURE
                 ITS VALUE IS:  0
RANK   19   1    REACTOR STARTUP FROM COLD CONDITION
                 ITS VALUE IS:  0
RANK   20   12                   MANUAL LEVEL CONTROL IN STARTUP
                 ITS VALUE IS:  0
```

```
DU YUU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 8
THE TASKS RANKED IN DESCENDING ORDER FOR
PLANT DELAY TOLERANCE ARE

RANK  1    3    LOSS OF FEEDWATER HEATING
                ITS VALUE IS:  7
RANK  2    4    LOSS OF CONDENSER VACUUM
                ITS VALUE IS:  7
RANK  3    2    SMALL BREAK LOCA
                ITS VALUE IS:  6
RANK  4    9    LOSS OF FEEDWATER
                ITS VALUE IS:  6
RANK  5    10   LOSS OF OFFSITE POWER
                ITS VALUE IS:  6
RANK  6    11   MANUAL REACTOR SCRAM
                ITS VALUE IS:  6
RANK  7    5    HIGH EXHAUST HOOD TEMPERATURE
                ITS VALUE IS:  5
RANK  8    1    REACTOR STARTUP FROM COLD CONDITION
                ITS VALUE IS:  5
RANK  9    14   MAIN TURBINE STARTUP
                ITS VALUE IS:  5
RANK  10   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                ITS VALUE IS:  4
RANK  11   12            MANUAL LEVEL CONTROL IN STARTUP
                ITS VALUE IS:  3
RANK  12   18            MAIN TURBINE GENERATOR TRIP
                ITS VALUE IS:  3
RANK  13   19            FUEL FAILURE (WITH ISOLATION)
                ITS VALUE IS:  3
RANK  14   17            REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                ITS VALUE IS:  2
RANK  15   8    CONTROL ROD DRIVE PUMP FAILURE
                ITS VALUE IS:  2
RANK  16   16            REACTOR FEED PUMP TRIP
                ITS VALUE IS:  2
RANK  17   7    ROD WORTH MINIMIZER FAILURE
                ITS VALUE IS:  1
RANK  18   15            LARGE LOCA
                ITS VALUE IS:  1
RANK  19   13            SURVEILLANCE TEST ECCS
                ITS VALUE IS:  1
RANK  20   20            NUCLEAR INSTRUMENT FAILURE
                ITS VALUE IS:  1
```

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 9
THE TASKS RANKED IN DESCENDING ORDER FOR
REGULATORY REQUIREMENTS ARE

RANK   1    11   MANUAL REACTOR SCRAM
                 ITS VALUE IS:  9
RANK   2    18   MAIN TURBINE GENERATOR TRIP
                 ITS VALUE IS:  9
RANK   3    19   FUEL FAILURE (WITH ISOLATION)
                 ITS VALUE IS:  9
RANK   4    15   LARGE LOCA
                 ITS VALUE IS:  8
RANK   5    2    SMALL BREAK LOCA
                 ITS VALUE IS:  8
RANK   6    1    REACTOR STARTUP FROM COLD CONDITION
                 ITS VALUE IS:  8
RANK   7    9    LOSS OF FEEDWATER
                 ITS VALUE IS:  7
RANK   8    10   LOSS OF OFFSITE POWER
                 ITS VALUE IS:  7
RANK   9    13   SURVEILLANCE TEST ECCS
                 ITS VALUE IS:  6
RANK   10   14                 MAIN TURBINE STARTUP
                 ITS VALUE IS:  6
RANK   11   4    LOSS OF CONDENSER VACUUM
                 ITS VALUE IS:  6
RANK   12   16                 REACTOR FEED PUMP TRIP
                 ITS VALUE IS:  6
RANK   13   17                 REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                 ITS VALUE IS:  6
RANK   14   3    LOSS OF FEEDWATER HEATING
                 ITS VALUE IS:  6
RANK   15   12                 MANUAL LEVEL CONTROL IN STARTUP
                 ITS VALUE IS:  6
RANK   16   20                 NUCLEAR INSTRUMENT FAILURE
                 ITS VALUE IS:  6
RANK   17   8    CONTROL ROD DRIVE PUMP FAILURE
                 ITS VALUE IS:  5
RANK   18   7    ROD WORTH MINIMIZER FAILURE
                 ITS VALUE IS:  3
RANK   19   6    HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                 ITS VALUE IS:  3
RANK   20   5    HIGH EXHAUST HOOD TEMPERATURE
                 ITS VALUE IS:  1
```

DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? S
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 10
THE TASKS RANKED IN DESCENDING ORDER FOR
 ECONOMIC CONSEQUENCES ARE

RANK   1   2   SMALL BREAK LOCA
                 ITS VALUE IS: 9
RANK   2   10   LOSS OF OFFSITE POWER
                 ITS VALUE IS: 9
RANK   3   14   MAIN TURBINE STARTUP
                 ITS VALUE IS: 9
RANK   4   15   LARGE LOCA
                 ITS VALUE IS: 9
RANK   5   9   LOSS OF FEEDWATER
                 ITS VALUE IS: 8
RANK   6   18   MAIN TURBINE GENERATOR TRIP
                 ITS VALUE IS: 8
RANK   7   11   MANUAL REACTOR SCRAM
                 ITS VALUE IS: 7
RANK   8   6   HIGH PRESSURE COOLANT INJECTION TURBINE TRIP
                 ITS VALUE IS: 7
RANK   9   16   REACTOR FEED PUMP TRIP
                 ITS VALUE IS: 6
RANK   10   19   FUEL FAILURE (WITH ISOLATION)
                 ITS VALUE IS: 6
RANK   11   3   LOSS OF FEEDWATER HEATING
                 ITS VALUE IS: 5
RANK   12   12   MANUAL LEVEL CONTROL IN STARTUP
                 ITS VALUE IS: 4
RANK   13   4   LOSS OF CONDENSER VACUUM
                 ITS VALUE IS: 4
RANK   14   17   REACTOR RECIRCULATION TRIP (RECIRCULATION PUMP)
                 ITS VALUE IS: 3
RANK   15   1   REACTOR STARTUP FROM COLD CONDITION
                 ITS VALUE IS: 3
RANK   16   5   HIGH EXHAUST HOOD TEMPERATURE
                 ITS VALUE IS: 3
RANK   17   20   NUCLEAR INSTRUMENT FAILURE
                 ITS VALUE IS: 3
RANK   18   13   SURVEILLANCE TEST ECCS
                 ITS VALUE IS: 2
RANK   19   8   CONTROL ROD DRIVE PUMP FAILURE
                 ITS VALUE IS: 2
RANK   20   7   ROD WORTH MINIMIZER FAILURE
                 ITS VALUE IS: 1

```
DO YOU WISH ANOTHER ANALYSIS?
TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO? R
YOU ARE NOW IN THE ANALYSIS MODE
WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?

 TYPE 1 RANKED CATEGORIES FOR EACH TASK USING MATCH VALUES
 TYPE 2 RANKED CATEGORIES FOR EACH TASK USING AVERAGE VALUES
 TYPE 3 RANKED TASKS FOR EACH CATEGORY USING MATCH VALUES
 TYPE 4 RANKED TASKS FOR EACH CATEGORY USING AVERAGE VALUES
 TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES
 TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES
 TYPE 7 SPECIAL INPUT DATA SORTS
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? QUIT
?Redo from start
PLEASE SELECT A NUMBER FROM THE ABOVE LIST? 7
SPECIAL OPTIONS ARE:
1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS
2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY
3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE
4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK
5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD
6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS
7 A SIMILAR LIST FOR EMERGENCY OPERATIONS
8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE
9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS
10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES
11 SPECIAL COST BENEFIT ANALYSIS MODULE
PLEASE CHOOSE A NUMBER OR 12 TO QUIT? 12
SORT PROGRAM COMPLETED
0
```

APPENDIX 2

TASK RATING SCALES

1. Skill Acquisition Difficulty

Defined in terms of the number of practice repetitions required

VALUE	CRITERIA
0	No practice steps
1	Can be self taught
2	Can be learned by demonstration (observation)
3	Requires hands-on practice
4	May require supervision and hands-on practice
5	Requires closely supervised practice
6	May require previous knowledge and supervised practice
7	Requires previous knowledge and hands-on practice
8	Requires extensive previous knowledge and supervised dynamic practice
9	Extensive practice over long period, may require innate abilities

VALUE ANCHORS	SAMPLE TASKS
0	Depress a push button
5	Provide manual control of reactor water level during start up in a BWR
9	Balance a turbine rotor

2. Skill Performance Difficulty

Defined in terms of physical and cognitive effort or degree of precision required

VALUE	CRITERIA
0	Easily performed with trivial effort (> 99% can perform)
1	Easily performed with little precision
2	Easily performed with some precision
3	Some performance difficulty, no decision making
4	Some performance difficulty, occasional decision making
5	Requires some physical effort or cognitive effort with decision making
6	Definite physical effort or cognitive effort with decision making
7	Same as #6 with some precision
8	Heavy cognitive and/or physical effort with precision
9	Extended physical effort, heavy decision making, and stringent performance requirements

VALUE ANCHORS	SAMPLE TASK
0	Read a digital water level meter out loud
5	Determine that a reactor scram was caused by a normal turbine trip
9	Align fire system for core cooling following a LOCA and loss of all normal and ECCS makeup

82

3. Need for Immediate Performance

Based on frequency of observed occurrences of events or recorded plant histories

VALUE	CRITERIA
0	Probably will not perform the task during life of the plant
1	May be required to perform task once during life of the plant
2	2 years to 5 years
3	1 year to 2 years
4	6 months to 1 year
5	1 month to 6 months
6	2 weeks to 1 month
7	1 week to 2 weeks
8	1 day to 1 week
9	May need to perform task within 1 day after training

VALUE ANCHORS	SAMPLE TASK
0	Replace the reactor vessel
5	Tag out a failed component
9	Record a power level

4. Poor Performance Consequences

Scales are based on RAD release and level of physical injury

VALUE	CRITERIA
0	No danger to public or plant personnel
1	Potential for unplanned exposure to plant personnel
2	Unplanned exposure of plant personnel below 10CFR20 standards
3	Same as 2 but possible physical injury from mechanical causes
4	Same as 3 but probable physical injury
5	Plant personnel exposure > 10CFR20 limits
6	Same as 5 plus some small exposure off-site
7	Dangerous exposure to plant personnel plus off-site > 5 mR/hr
8	Off-site exposure at 10CFR100 limits, possibly life threatening to plant personnel
9	Off-site exposures greater than 10CFR100 times for off-site exposure, life threatening situation for plant personnel

VALUE ANCHORS	SAMPLE TASKS
0	Failure of Drywell temperature monitor
5	Improper use of protective clothing when handling low low waste
9	Inability to control a fuel failure

5. Previous Nuclear Experience

Based upon likelihood of previous exposure to task elements

VALUE	CRITERIA
0	Task only performed by highly experienced nuclear personnel
1	Task performed only after supervised on-the-job nuclear training
2	Task performed by most people with both classroom and control room nuclear experience
3	Task performed by most people with specific classroom nuclear training
4	Task only performed by nuclear personnel with more than one year general experience
5	Task sometimes performed by nuclear personnel with more than one year experience
6	Task only performed in nuclear related industrial job contexts
7	Task occasionally performed in non-nuclear work
8	Task often performed after experience industrial of any kind
9	Task often performed by average high school graduate

VALUE ANCHORS	SAMPLE TASKS
0	Measure core performance
5	Check system valve line ups
9	Read a temperature indicator

6. Task Performance in Normal Operations

Based on frequency of performance

VALUE	CRITERIA
0	Never performed during normal operation
1	Once per year
2	Once per calendar quarter
3	Once per month
4	Once per week
5	Once per day
6	Once per shift
7	Twice per shift
8	Once per hour
9	Always performed on a scheduled basis

VALUE ANCHORS	SAMPLE TASKS
0	Inject water using an ECCS
5	Sample primary coolant
9	Monitor Power Level

7. Potential for Performance in Emergency Operation

Scale defined in terms of probable frequence of performance

VALUE	CRITERIA
0	Task never applies in emergency operation
1	Task infrequenctly performed in an emergency
2	Task may be applied in only one accident
3	Task is applied in only one accident scenario
4	Task could be applied in more than one accident scenario
5	Task is definitely applied in more than one accident scenario
6	Task is performed in a large number of accidents
7	Task may be applied repeatedly within an accident and in more than one accident type
8	Task is always applied repeatedly in more than one accident
9	Task always occurs in all emergency operations more than once

VALUE ANCHORS	SAMPLE TASKS
0	Withdraw control rods
5	Start High Pressure Coolant injection
9	Monitor reactor water level

8. Delay Tolerance

Scales based upon allowable reaction time

VALUE	CRITERIA
0	> 24 hours
1	6 hours to 24 hours
2	3 hours to 6 hours
3	2 hours to 3 hours
4	1 hour to 2 hours
5	30 minutes to one hour
6	5 minutes to 30 minutes
7	30 seconds to 5 minutes
8	10 seconds to 30 seconds
9	≤ 10 seconds

VALUE ANCHORS	SAMPLE SITUATION
0	Loss of a pump in potable water system
5	Increased conductivity on stator cooling water
9	Failure of reactor protection system to trip on valid scram signal

9. Regulatory Requirement

Defined in terms of NRC required frequency of testing

VALUE	CRITERIA
0	No requirement defined by NRC
1	N/A
2	N/A
3	Tested during initial training only
4	N/A
5	N/A
6	Exercise required bi-annually
7	N/A
8	N/A
9	Exercise required annually

VALUE ANCHORS	SAMPLE TASKS
0	Fill out log book
3	Startup Reactor Water Clean Up System
6	Compensate for inadvertant turbine trip transient
9	Execute safety shutdown for loss of all feedwater transient

10. Economic Impact of NPP Failures

Based on the economic impact of a single equipment failure that can be attributed to one or more of the following factors:

A. Cost of replacement power due to lost generating capacity. The higher cost of the replacement power can result from higher fuel cost by using alternate sources within the system, or purchasing power from other utilities at a higher rate.

B. Cost of replacement equipment for items that are damaged beyond repair.

C. Cost of repair is related to the base labor rate and the man-hours necessary to accomplish the repairs. Also included in the cost of repairs are tools and materials necessary to complete the repair task.

D. Regulatory fines for violating technical specifications or procedures that lead to the failure.

RATING SCALE	AGGREGATE COST
0	< $1,000
1	$1,000 to $5,000
2	$5,000 to $10,000
3	$10,000 to $50,000
4	$50,000 to $100,000
5	$100,000 to $500,000
6	$500,000 to $1,000,000
7	$1,000,000 to $5,000,000
8	$5,000,000 to $10,000,000
9	> $10,000,000

VALUE ANCHOR	SAMPLE INSTANCE
0	Work valve stem packing failure in non-nuclear system not required to support power opeation
1	Failure of a circuit board in the process computer
2	Replacement of a stator cooling water pump
3	Trip of one reactor feedwater pump due to control failure
4	Replacement of a reactor recirculation pump seal
5	Failure of the main transformer
6	Replacement of one main steam isolation valve (MSIV)
7	Replacement of reactor recirculation pump motor
8	Fuel failure severe enough to cause an unplanned outage
9	Gross turbine blading failure

APPENDIX 3

**SAMPLE TASK DATA SHEET USED TO SCORE EXAMPLE
FOR 20 TASKS IN APPENDIX 1**

Sample Data Collection Sheet for Rater Scores

Dimension / TASK	1	2	3	4	5	6	7	8	9	10
CRD** Pump Failure	3	1	3	3	4	2	4	2	5	2
Fuel Failure (w/Isolation)	3	5	2	8	1	0	5	3	9	4
High Exhaust Hood Temp	1	1	5	1	5	4	0	5	1	3
HPCI* Turbine Trip	2	4	2	7	4	1	5	4	3	7
Large LOCA	1	1	1	9	0	0	9	1	8	9
Loss of Condensor Vacuum	2	4	6	1	6	6	0	7	6	4
Los of Feedwater	4	6	2	7	1	0	5	6	7	8
Loss of Feedwater Heating	2	4	5	4	3	6	0	7	6	5
Loss of Off-Site Power	5	5	1	7	1	0	5	6	7	8
Main Turbine/ Gen. Trip	2	2	6	5	6	0	3	3	9	8
Main Turbine S/U	6	8	5	5	3	6	0	5	6	9
Man. Level Control	7	6	5	2	2	6	0	3	6	4
Man. Rx Scram	4	2	6	8	6	2	5	6	5	8
Nuc. Instrument Failure	1	1	8	1	7	6	1	1	6	3
RFP Trip	2	2	6	3	5	4	7	2	6	6
Rod Worth Minimizer Failure	1	2	4	2	6	5	0	1	3	1
Rx Recirc. Trip (Recirculation Pump)	2	2	4	3	3	3	1	2	6	3
Rx S/U from Cold Condition	4	2	5	3	3	5	0	5	8	3
Small break LOCA	3	4	1	6	0	0	6	6	8	9
Surv. Test EOS	2	2	7	2	8	7	0	1	6	2

+ Analyzed Transient
++ Analyzed Accident
* HPCI - High Pressure Coolant Injection
** CRD - Control Rod Drive

93

APPENDIX 4

FORMATTED CODE LISTING

```
   5  GOSUB 2000
  10  KEY OFF
  20  SCREEN 1
  25  COLOR 9,0
  30  FOR D=0 TO 360 STEP 10
  35  :  DRAW "ta=d;nu35"
  40  NEXT D
  45  LOCATE 21,10
  50  PRINT "ORNL TASK SORTING PROGRAM"
  55  PRINT
  60  LOCATE 23,12
  65  PRINT "C.C. Jorgensen--1983"
  70  FOR I=1 TO 2000:
      NEXT I
  85  SCREEN 1
  95  WIDTH 80
  96  SCREEN 0
 100  LOCATE 6,22
 105  PRINT "BEGINNING DATA ENTRY PROCESS":
      BEEP
 106  COLOR 4,0,1
 110  LOCATE 10

 115  REM INPUT PROGRAM FOR TASK RANKING DATA

 120  INPUT "HOW MANY TASKS HAVE BEEN RATED?";FT
 125  INPUT "HOW MANY CATAGORIES HAVE BEEN USED?";FC
 129  DIM
         CT$(10),
         TC(FT)
 130  DIM
         ORG(FT,10,2),
         DIF(FT,10,2),
         TASK$(FT),
         SUM(FT,10),
         DAT(FT,10,3),
         TASC(FT)
 131  CT$(1)="QUALIFICATION TRAINING":
      CT$(2)="CERTIFICATION TRAINING"
 132  CT$(3)="REFRESHER TRAINING":
      CT$(4)="ELIMINATION FROM TRAINING"
 133  CT$(5)="ON THE JOB CANDIDATE":
      CT$(6)="POTENTIAL FOR LESS TRAINING"
 134  CT$(7)="POTENTIAL FOR MORE TRAINING":
      CT$(8)="POTENTIAL SIMULATOR TASK"
 135  FOR J=1 TO FT
 140  :  COLOR 4,0,1
 145  :  CLS
 150  :  LOCATE 8
 155  :  PRINT
      :      "WHAT IS THE NAME OF TASK NUMBER  ";J;
      :          "
 160  :  INPUT TASK$(J)
 161  :  CLS
```

97

```
162  :  LOCATE 10
165  :  PRINT "PROVIDE A NUMERIC RATING FOR  EACH QUESTION ABOUT:"
170  :  PRINT "TASK NUMBER ";J
175  :  COLOR 7,4,1
180  :  PRINT "NAME---";TASK$(J)
185  :  COLOR 1,3,1
190  :  INPUT "SKILL ACQUISITION DIFFICULTY ";ORG(J,1,1)
195  :  INPUT "SKILL PERFORMANCE DIFFICULTY ";ORG(J,2,1)
200  :  INPUT "NEED FOR IMMEDIATE PERFORMANCE ";ORG(J,3,1)
205  :  INPUT "POOR PERFORMANCE CONSEQUENCES ";ORG(J,4,1)
210  :  INPUT "PREVIOUS NUCLEAR EXPERIENCE ";ORG(J,5,1)
215  :  INPUT "TASK PERFORMANCE FREQUENCY IN NORMAL OPERATIONS ";ORG(J,6,1)
220  :  INPUT "POTENTIAL FOR PERFORMANCE IN EMERGENCY OPERATIONS ";ORG(J,7,1)
225  :  INPUT "PLANT PERFORMANCE DELAY TOLERANCE ";ORG(J,8,1)
226  :  INPUT "REGULATORY REQUIREMENT";ORG(J,9,1)
227  :  INPUT "ECONOMIC IMPACT OF POOR PERFORMANCE";ORG(J,10,1)
230  :  CLS
235  :  LOCATE 15,15
240  :  PRINT "DATA ENTRY FOR TASK ";J; "IS NOW COMPLETE "
245  :  FOR H=1 TO 2000:
     :  NEXT
246  :  CT$(9)="POTENTIAL FORMAL TRAINING"
250  :  SCREEN 0
255  NEXT J
320  CLS
321  LOCATE 10
325  COLOR 7,4,1
330  PRINT "YOUR DATA HAS NOW BEEN ENTERED, DO YOU WISH A HARD COPY?"
335  INPUT "IF SO TYPE 'Y' OTHERWISE HIT ANY OTHER KEY'";H$
340  IF
         H$="Y" OR H$="y"
             THEN
                 ( GOTO ) 345
             ELSE
                 ( GOTO ) 400
345  FOR I=1 TO FT
350  :  LPRINT A$
355  :  LPRINT "TASK NUMBER ";I
360  :  LPRINT TASK$(I)
365  :  LPRINT " "
370  :  LPRINT "SK AQ","SK PR","IM PR","SAFE ","NU EX","NR OP"
375  :  LPRINT
     :      ORG(I,1,1),ORG(I,2,1),ORG(I,3,1),ORG(I,4,1),ORG(I,5,1),ORG(I,6,1)
     :
377  :  COLOR 2,0
380  :  LPRINT "EM OP","DE TL","REG R","ECON "
385  :  LPRINT ORG(I,7,1),ORG(I,8,1),ORG(I,9,1),ORG(I,10,1)
390  NEXT I
400  COLOR 4,0,1
405  CLS
410  LOCATE 10
415  PRINT "YOU ARE NOW IN THE ANALYSIS MODE"
420  PRINT "WHAT KIND OF ANALYSIS DO YOU WISH TO PERFORM?"
425  PRINT
```

```
430   PRINT " TYPE 1 RANKED CATEGORIES FOR EACH TASK USING ABSOLUTE VALUES"
435   PRINT " TYPE 2 RANKED CATEGORIES FOR EACH TASK USING RELATIVE VALUES"
440   PRINT " TYPE 3 RANKED TASKS FOR EACH CATEGORY USING ABSOLUTE VALUES'
445   PRINT " TYPE 4 RANKED TASKS FOR EACH CATEGORY USING RELATIVE VALUES"
450   PRINT
          " TYPE 5 RECOMMENDED CATEGORIES FOR EACH TASK-USING ABSOLUTE VALUES"
455   PRINT
          " TYPE 6 RECOMMENDED CATEGORIES FOR EACH TASK-USING RELATIVE VALUES"
456   PRINT " TYPE 7 SPECIAL INPUT DATA SORTS"
465   INPUT "PLEASE SELECT A NUMBER FROM THE ABOVE LIST";BCODE
466   IF
          BCODE = 7
              THEN
                  GOSUB 3300
                  GOTO 3000


470   REM ABSOLUTE CRITERIA SORT CHECKS FOR TASKS


475   REM PUTS VALUES IN DIFFERENCE (DIF) READS FROM ORGDAT (ORG)


480   REM ORG IS ORIGINAL TASK RATINGS


485   REM DIF IS THE DIFFERENCE BETWEEN MINIMUM ACCEPTABLE RATING AND ACTUAL
          SCORE


490   REM SUM IS A CONVENIENT WAY OF GETTING MINIMUM ACCETABLE RATING AS ONE
          VALUE

491   CLS:
      LOCATE 20,20:
      PRINT "NUMERIC CALCULATIONS INITIATED"
492   NT=FT
493   CATSUM=0:
      LG = 0
495   FOR T=1 TO NT
497   :  FOR JX=1 TO 9:
      :  :  FOR KX=1 TO 10:

      :  :  :  REM JX=SORT CATEGORIES KX=DIMENSIONS

499   :  :  :  IF
      :  :  :      REL(KX,JX,1) = -1
      :  :  :          THEN
      :  :  :              LG=LG + 1
500   :  :  :  IF
      :  :  :      REL(KX,JX,2) = 1
      :  :  :          THEN
      :  :  :              ( GOTO ) 510
      :  :  :          ELSE
      :  :  :              ( GOTO ) 520
```

```
510  :  :  :  IF
     :  :  :      ORG(T,KX ,1) >= REL(KX,JX,1)
     :  :  :          THEN
     :  :  :              CATSUM=CATSUM + 1
511  :  :  :  IF
     :  :  :      ORG(T,KX,1) = RFL(KX,JX,1)
     :  :  :          THEN
     :  :  :              GOTO 525
520  :  :  :  IF
     :  :  :      ORG(T,KX,1) <= REL(KX,JX,1)
     :  :  :          THEN
     :  :  :              CATSUM = CATSUM +1
525  :  :  NEXT KX
527  :  :  IF
     :  :      CATSUM <> 0
     :  :          THEN
     :  :              DIF(T,JX,1) =(CATSUM-LG)/(10-LG):
     :  :              CATSUM = 0:
     :  :              LG=0
530  :  NEXT JX
600  NEXT T

601  REM AJ IS A MATRIX OF ADJUSTMENT WEIGHTS FOR SUBJECTIVE  VARIATIONS


605  REM RELATIVE SORT MODULE

610  FOR L=1 TO NT:
     :  FOR M=1 TO 9:
     :  :  DIF(L,M,2) = 0:
     :  NEXT M:
     NEXT L

615  REM ZERO OUT THE DIF MATRIX FOR NEW DATA WHERE -99 IS A DUMMY LOW VALUE

621  NT=FT
624  CATSUM=0:
     LG = 0
626  FOR T=1 TO NT
628  :  FOR JX=1 TO 9:
     :  :  FOR KX=1 TO 10:

     :  :  :  REM JX=SORT CATAGORIES KX=DIMENSIONS

630  :  :  :  IF
     :  :  :      REL(KX,JX,1) = -1
     :  :  :          THEN
     :  :  :              LG=LG + 1:
     :  :  :              GOTO 638
632  :  :  :  IF
     :  :  :      REL(KX,JX,2) = 1
     :  :  :          THEN
     :  :  :              ( GOTO ) 634
     :  :  :          ELSE
```

100

```
                          ( GOTO ) 636
634  :   :   :   CATSUM=CATSUM + (ORG(T,KX,1)-REL(KX,JX,1)):
     :   :   :   GOTO 638
636  :   :   :   CATSUM = CATSUM + (REL(KX,JX,1) - ORG(T,KX,1))
638  :   :   NEXT KX
640  :   :   IF
     :   :       CATSUM <> 0
     :   :           THEN
     :   :               DIF(T,JX,2) =(CATSUM)/(10-LG):
     :   :               CATSUM = 0:
     :   :               LG=0
642  :   NEXT JX
644  NEXT T
675  GOTO 780
680  COLOR 1,3,1:

     REM set the border and screen dark blue and set screen light blue


685  REM VALUES FOR TASK NUMBER (ST,FT) OR CATAGORY NUMBER (SC,FC)


690  REM DAT (X,X,1) IS THE SORT VALUE, DAT (X,X,2) IS THE ORIGINAL TASK
         POSITION


695  REM sc is the start number of catagories fc is the finishing number


700  REM st is the start number of tasks        ft is the finishing number

705  FOR T=1 TO FT:
     :   FOR S=1 TO 9:
     :   :   DAT(T,S,1)=DIF(T,S,1):
     :   :   DAT(T,S,2)=T:
     :   :   DAT(T,S,3)=S

710  :   :   REM THE X IN 705 IS EITHER 1 FOR ABSOLUTE VALUES OR 2 FOR
                 RELATIVE VALUES

715  :   NEXT S:
     NEXT T

720  REM FILL DAT WITH EITHER SORT VALUES IN POS 1 AND TASK NUMBERS IN POS 2

725  FOR I=A TO FT:
     :   FOR J=B TO FC:
     :   :   FOR K=I TO FT:
     :   :   :   FOR L=J TO FC
730  :   :   :   :   IF
     :   :   :   :       DAT(I,J,1) >= DAT(K,L,1)
     :   :   :   :           THEN
     :   :   :   :               ( GOTO ) 750
735  :   :   :   :   SWAP DAT(K,L,1),DAT(I,J,1):
```

101

```
740  :  :  :  :    SWAP DAT(K,L,2),DAT(I,J,2)
     :  :  :  :    SWAP DAT(K,L,3),DAT(I,J,3)

745  :  :  !  :    REM SWAP CAT VALUES AND ORIGNAL POSITION RECORD

750  :  :  :  NEXT L:
     :  :  NEXT K:
     :  NEXT J:
     NEXT I
755  RETURN

760  REM TO MAKE THIS ROUNTINE SORT IN EITHER ROW OR COLUMN CHANGE START AND
         STOP

765  REM VALUES FOR TASK NUMBER (ST,FT) OR CATAGORY NUMBER (SC,FC)

770  REM DAT (X,X,1) IS THE SORT VALUE, DAT (X,X,2) IS THE ORIGINAL TASK
         POSITION

780  IF
         BCODE=1 OR BCODE=3 OR BCODE=5
             THEN
                 X=1
             ELSE
                 X=2

785  REM X INDICATES WHETHER DATA FOR SORT USES ABSOLUTE OR RELATIVE
         INFORMATION

795  IF
         BCODE=1 OR BCODE=2
             THEN
                 MESKEY=1
800  IF
         BCODE=3 OR BCODE=4
             THEN
                 MESKEY=2
805  IF
         BCODE=5 OR BCODE=6
             THEN
                 MESKEY=3

810  REM MESKEY SELECTS TASKS BY CATAGORY SORTS,CATAGORY BY TASK SORTS

815  REM OR RECOMMENDED TASKS BY CATAGORY SORTS

820  IF
         MESKEY=1
             THEN
                 ( GOTO ) 824
             ELSE
```

102

```
                        ( GOTO ) 830
824   CLS:
      LOCATE 20,20:
      PRINT "BEGINNING TASK SELECTION LOGIC"
825   FOR INC=1 TO FT:
      |   A=INC:
      |   FT=INC:
      |   B=1:
      |   FC=9:
      |   GOSUB 705:
      |   GOSUB 890:
      |   FT=NT:
      NEXT
830   IF
          MESKEY=2
              THEN
                    ( GOTO ) 835
              ELSE
                    ( GOTO ) 840
835   FOR IND=1 TO 9:
      |   A=1:
      |   FT=NT:
      |   B=IND:
      |   FC=IND:
      |   GOSUB 705:
      |   GOSUB 890:
      |   FT=NT:
      |   FC=9:
      NEXT
836   IF
          MESKEY=2
              THEN
                    GOSUB 1050
840   IF
          MESKEY=3
              THEN
                    A=1:
                    B=1:
                    FC=0:
                    GOSUB 705
841   FOR SS=1 TO NT:
      |   TASC(SS)=0:
      NEXT:
      GOSUB 890:
      GOSUB 1050

845   REM SET UP THE LOOP COUNTS FOR SORT AND PRINT ROUTINES


850   REM THIS IS THE GENERAL OUTPUT ROUTINE


855   REM IT IS CALLED ONCE FOR EACH INTERATION OF A LOOP
```

103

```
860    REM MESKEY 1 IS FOR A CATAGORY SORT FOR EACH TASK


365    REM MESKEY 2 IS FOR A SORT BY TASKS


870    REM MESKEY 3 IS FOR AN OPTIMUM ALLOCATION OF TASKS TO CATAGORIES

875    SCREEN 1:
       SCREEN 0:
       WIDTH 80
876    LOCATE 15,25
880    COLOR 14,0,3
885    PRINT "SORT PROGRAM COMPLETED":
       BEEP:
       END
890    CLS
895    SCREEN 0
900    WIDTH 80
905    COLOR 3,0,1
915    TASK=A
920    CATA=B
925    IF
           MESKEY=1
               THEN
                   ( GOTO ) 926
               ELSE
                   IF
                       MESKEY=2
                           THEN
                               ( GOTO ) 970
                           ELSE
                               ( GOTO ) 1000
926    IF
           INC > FT
               THEN
                   INC=FT:
                   GOSUB 1050
930    PRINT "THE RANK ORDERED CATAGORIES FOR:"
931    PRINT TASK$(INC)
932    COLOR 20,0,1:
       PRINT "ARE:",,,,"SORT VALUE" :
       COLOR 4,0,1
935    FOR DD=1 TO 9
940    :  PRINT DD,CT$(DAT(INC,DD,3)),"              ";DAT(INC,DD,1)
950    NEXT DD
951    PRINT:
       PRINT:
       PRINT "PRESS ANY KEY TO CONTINUE--THERE WILL BE A SHORT PAUSE"
952    XY$=INKEY$:
       IF
           XY$=""
               THEN
                   ( GOTO ) 952
```

104

```
965  IF
         MESKEY=1
             THEN
                 ( GOTO ) 1030
966  LOCATE 10
970  PRINT "THE RANK ORDERED TASKS FOR CATAGORY ";IND,CT$(IND)
971  COLOR 20,0,1:
     PRINT "ARE:",,,,"SORT VALUE":
     COLOR 4,0,1
972  FOR EE=1 TO FT
974  :  PRINT
     :      EE;"TASK ";DAT(EE,IND,2);"    ";TASK$(DAT(EE,IND,2)),,,DAT(EE,IND,
     :          1)
976  NEXT EE
977  PRINT:
     PRINT:
     PRINT "PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE"
978  XY$=INKEY$:
     IF
         XY$=""
             THEN
                 ( GOTO ) 978
1000 IF
         MESKEY=2
             THEN
                 ( GOTO ) 1030
1005 FOR TASK=A TO NT:
     :  FOR CATA=B TO 9
1010 :  :  IF
     :  :      TASC(DAT(TASK,CATA,2))=0
     :  :          THEN
     :  :              ( GOTO ) 1015
     :  :          ELSE
     :  :              ( GOTO ) 1020
1015 :  :  PRINT "TASK ";DAT(TASK,CATA,2);" GOES TO :"; CT$(DAT(TASK,CATA,3))
1016 :  :  PRINT"THE TASK NAME IS:" TASK$(DAT(TASK,CATA,2))
1020 :  :  TASC(DAT(TASK,CATA,2))=1
1025 :  NEXT CATA:
     NEXT TASK
1026 PRINT:
     PRINT:
     PRINT "PRESS ANY KEY TO CONTINUE LISTING-WAIT FOR RESPONSE"
1027 XY$=INKEY$:
     IF
         XY$=""
             THEN
                 ( GOTO ) 1027
1030 RETURN
1035 FOR XX=1 TO 1500:
     NEXT:
     RETURN
1050 LOCATE 10
1052 COLOR 7,4,1
1054 PRINT "WOULD YOU LIKE ADDITIONAL ANALYSIS?"
```

```
1056   INPUT "IF YES TYPE 'Y' IF 'NO' HIT RETURN";B$
1058   IF
          B$="Y" OR B$="y"
              THEN
                  GOTO 420
              ELSE
                  GOTO 875
2000   DIM
          REL(10,9,2)
2010   FOR A=1 TO 10:
       :  FOR B=1 TO 9:
       :  :  READ REL(A,B,1),REL(A,B,2):
       :  NEXT B:
       NEXT A
2021   RETURN
2130   DATA
          -1,
           1,
          -1,
           1,
           3,
           1,
           3,
           0,
           3,
           0,
           3,
           0,
           7,
           1,
           5,
           1,
           7,
           1
2140   DATA
          -1,
           1,
          -1,
           1,
           3,
           1,
           3,
           0,
           3,
           0,
           3,
           0,
           7,
           1,
           5,
           1,
           7,
           1
2150   DATA
```

```
               3,
               1,
               5,
               1,
               8,
               1,
              -1,
               1,
               3,
               0,
               3,
               0,
               7,
               1,
              -1,
               1,
               5,
               1
2160  DATA
               3,
               1,
               7,
               1,
               3,
               1,
               3,
               0,
               3,
               0,
               2,
               0,
               7,
               1,
              -1,
               1,
               7,
               1
2170  DATA
              -1,
               1,
               2,
               0,
               3,
               0,
               7,
               1,
               7,
               1,
               5,
               1,
               5,
               0,
               3,
               0,
```

107

```
             5,
             0
2180  DATA
             3,
             1,
            -1,
             1,
             3,
             0,
            -1,
             1,
             5,
             1,
             7,
             1,
             3,
             0,
             3,
             0,
             3,
             0
2190  DATA
             5,
             1,
            -1,
             1,
             5,
             1,
             3,
             0,
             3,
             0,
             3,
             0,
             3,
             1,
             5,
             1,
             3,
             1
2200  DATA
             2,
             0,
             7,
             1,
             7,
             1,
             3,
             0,
             3,
             0,
             3,
             0,
             7,
```

108

```
            1,
            5,
            1,
           -1,
            1
2210  DATA
            7,
            1,
            3,
            1,
            3,
            1,
            1,
            0,
           -1,
            1,
           -1,
            1,
           -1,
            1,
            3,
            1,
           -1,
            1
2220  DATA
            5,
            1,
           -1,
            1,
           -1,
            1,
            2,
            0,
            2,
            0,
           -1,
            1,
            7,
            1,
            5,
            1,
            3,
            1
3000  CLS
3002  LOCATE 5,20:
      PRINT "SPECIAL OPTIONS ARE:"
3005  LOCATE 10
3010  PRINT "1 A RANK ORDERED LIST OF SKILL ACQUISITION DIFFICULTY ON TASKS"
3015  PRINT "2 A SIMILAR LIST OF SKILL PERFORMANCE DIFFICULTY"
3020  PRINT "3 A RANK ORDERED LIST BASED ON IMMEDIATE PERFORMANCE"
3025  PRINT "4 A SIMILAR LIST BASED ON PUBLIC SAFETY RISK"
3030  PRINT "5 A RANK ORDER OF TASKS BASED ON PREVIOUS EXPERIENCE LIKELIHOOD"
3035  PRINT "6 A RANKED LIST OF TASK PROBABILITY IN NORMAL OPERATIONS"
3040  PRINT "7 A SIMILAR LIST FOR EMERGENCY OPERATIONS"
```

```
3045   PRINT "8 A RANKED LIST OF TASKS BASED ON PLANT DELAY TOLERANCE"
3050   PRINT "9 TASKS RANKED IN TERMS OF REGULATORY REQUIREMENT CONSTRAINTS"
3055   PRINT "10 TASKS RANKED IN TERMS OF POTENTIAL ECONOMIC CONSEQUENCES"
3060   PRINT "11 SPECIAL COST BENEFIT ANALYSIS MODULE"
3065   LOCATE 24,20:
       INPUT "PLEASE CHOOSE A NUMBER OR 12 TO QUIT";OPN
3070   ON
           OPN
             GOTO 3081,3091,3101,3111,3121,3131,3141,3151,3161,3171,3181,875
3081   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3082   PRINT "SKILL ACQUISITION DIFICULTY ARE:":
       CD=1:
       CB=1:
       GOSUB 3300 :
       COLOR 4,0,1
3083   PRINT:
       FOR TZ=1 TO FT:
       :  PRINT "RANK ";TZ;" ";DAT(TZ,1,2),TASK$(DAT(TZ,1,2))
3084   :  PRINT " ", "ITS VALUE IS: ";DAT(TZ,1,1):
       NEXT TZ:
       GOTO 3200
3091   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3092   PRINT "SKILL PERFORMANCE DIFICULTY ARE:":
       CB=2:
       CD=2:
       GOSUB 3300 :
       COLOR 4,0,1
3093   PRINT:
       FOR TZ=1 TO FT:
       :  PRINT "RANK ";TZ;" ";DAT(TZ,2,2),TASK$(DAT(TZ,2,2))
3094   :  PRINT " ", "ITS VALUE IS: ";DAT(TZ,2,1):
       NEXT TZ:
       GOTO 3200
3101   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3102   PRINT "IMMEDIATE PERFORMANCE NEED ARE:":
       CB=3:
       CD=3:
       GOSUB 3300 :
       COLOR 4,0,1
3103   PRINT:
       FOR TZ=1 TO FT:
       :  PRINT "RANK ";TZ;" ";DAT(TZ,3,2),TASK$(DAT(TZ,3,2))
3104   :  PRINT " ", "ITS VALUE IS: ";DAT(TZ,3,1):
       NEXT TZ:
       GOTO 3200
```

110

```
3111  CLS:
      LOCATE 10:
      PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
      COLOR 2,0,1
3112  PRINT "PUBLIC SAFETY RISK ARE:":
      CB=4:
      CD=4:
      GOSUB 3300 :
      COLOR 4,0,1
3113  PRINT:
      FOR TZ=1 TO FT:
      :   PRINT "RANK ";TZ;" ";DAT(TZ,4,2),TASK$(DAT(TZ,4,2))
3114  :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,4,1):
      NEXT TZ:
      GOTO 3200
3121  CLS:
      LOCATE 10:
      PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
      COLOR 2,0,1
3122  PRINT "PREVIOUS EXPERIENCE LIKLIHOOD ARE":
      CB=5:
      CD=5:
      GOSUB 3300:
      COLOR 4,0,1
3123  PRINT:
      FOR TZ=1 TO FT:
      :   PRINT "RANK ";TZ;" ";DAT(TZ,5,2),TASK$(DAT(TZ,5,2))
3124  :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,5,1):
      NEXT TZ:
      GOTO 3200
3131  CLS:
      LOCATE 10:
      PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
      COLOR 2,0,1
3132  PRINT "NORMAL OPERATION PERFORMANCE ARE":
      CB=6:
      CD=6:
      GOSUB 3300:
      COLOR 4,0,1
3133  PRINT:
      FOR TZ=1 TO FT:
      :   PRINT "RANK ";TZ;" ";DAT(TZ,6,2),TASK$(DAT(TZ,6,2))
3134  :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,6,1):
      NEXT TZ:
      GOTO 3200
3141  CLS:
      LOCATE 10:
      PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
      COLOR 2,0,1
3142  PRINT "EMERGENCY OPERATIONS ARE":
      CB=7:
      CD=7:
      GOSUB 3300:
      COLOR 4,0,1
```

111

```
3143   PRINT:
       FOR TZ=1 TO FT:
       :   PRINT "RANK ";TZ;" ";DAT(TZ,7,2),TASK$(DAT(TZ,7,2))
3144   :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,7,1):
       NEXT TZ:
       GOTO 3200
3151   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3152   PRINT "PLANT DELAY TOLERANCE ARE":
       CB=8:
       CD=8:
       GOSUB 3300:
       COLOR 4,0,1
3153   PRINT:
       FOR TZ=1 TO FT:
       :   PRINT "RANK ";TZ;" ";DAT(TZ,8,2),TASK$(DAT(TZ,8,2))
3154   :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,8,1):
       NEXT TZ:
       GOTO 3200
3161   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3162   PRINT "REGULATORY REQUIREMENTS ARE":
       CB=9:
       CD=9:
       GOSUB 3300:
       COLOR 4,0,1
3163   PRINT:
       FOR TZ=1 TO FT:
       :   PRINT "RANK ";TZ;" ";DAT(TZ,9,2),TASK$(DAT(TZ,9,2))
3164   :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,9,1):
       NEXT TZ:
       GOTO 3200
3171   CLS:
       LOCATE 10:
       PRINT "THE TASKS RANKED IN DESCENDING ORDER FOR":
       COLOR 2,0,1
3172   PRINT " ECONOMIC CONSEQUENCES ARE":
       CB=10:
       CD=10:
       GOSUB 3300:
       COLOR 4,0,1
3173   PRINT:
       FOR TZ=1 TO FT:
       :   PRINT "RANK ";TZ;" ";DAT(TZ,10,2),TASK$(DAT(TZ,10,2))
3174   :   PRINT " ", "ITS VALUE IS: ";DAT(TZ,10,1):
       NEXT TZ:
       GOTO 3200
3181   CLS:
       LOCATE 10,20:
       COLOR 4,0,1:
```

```
           PRINT "$$$$ SPECIAL ECONOMIC ANALYSIS $$$$"
3182   COLOR 4,0,1:
           PRINT:
           INPUT "ENTER AVERAGE PLANT POWER KILOWATT HOURS/DAY";E
3183   PRINT:
           INPUT "ENTER AVERAGE DOLLAR PROFIT PER KILOWATT HOUR";P
3184   PRINT:
           INPUT "ENTER AVERAGE PER HOUR COST OF MAINTAINANCE";M
3186   FOR AB=1 TO FT
3187   :   PRINT "FOR TASK:":
       :   COLOR 14,0,1:
       :   PRINT TASK$(AB):
       :   COLOR 2,0,1
3188   :   INPUT "MAXIMUM HARDWARE DAMAGE COSTS INCLUDING REPLACEMENT COST";MD
3189   :   INPUT "ESTIMATED NUMBER OF DAYS TO REPAIR IF MAX DAMAGE";RD
3190   :   TC(AB)=(E*RD*P) + (M*RD) + MD
3191   NEXT AB
3193   CLS:
           LOCATE 10:
           COLOR 15,0,1:
           PRINT "THE RANKED TASKS BY DOLLAR IMPACT ARE: "
3194   COLOR 4,0,2:
           GOSUB 3500:
           PRINT:
           PRINT "RANK     TASK NUMBER ---NAME"
3195   FOR V=1 TO FT:
       :   PRINT V,DAT(V,1,2),TASK$(DAT(V,1,2)):
       :   COLOR 2,0,2
3196   :   PRINT "     THE DOLLAR COST OF POOR TRAINING IS ";DAT(V,1,1):
       :   COLOR 4,0,2
3197   NEXT V
3200   GOSUB 1035:
           LOCATE 24,20:
           PRINT "DO YOU WISH ANOTHER ANALYSIS?"
3201   INPUT "TYPE S FOR SPECIAL SORTS,R FOR REGULAR SORTS,OR N FOR NO";Q$
3202   IF
           Q$="S"
               THEN
                   ( GOTO ) 3000
               ELSE
                   IF
                       Q$="R"
                           THEN
                               ( GOTO ) 400
                           ELSE
                               ( GOTO ) 875

3300   REM sc is the start number of catagories fc is the finishing number

3302   REM st is the start number of tasks      ft is the finishing number

3304   FOR T=1 TO FT:
       :   FOR S=CB TO CD:
```

113

```
        :   :   DAT(T,S,1)=ORG(T,S,1):
        :   :   DAT(T,S,2)=T
3308    :   :   DAT(T,S,3)=S:
        :   NEXT S:
        NEXT T

3310    REM SWAP CAT VALUES AND ORIGNAL POSITION RECORD

3312    FOR I=1 TO FT:
        :   FOR J=CB TO CD:
        :   :   FOR K=I TO FT:
        :   :   :   FOR L=J TO CD
3314    :   :   :   :   IF
        :   :   :   :       DAT(I,J,1)  >= DAT(K,L,1)
        :   :   :   :           THEN
        :   :   :   :               ( GOTO ) 3322
3316    :   :   :   :   SWAP DAT(K,L,1),DAT(I,J,1):
        :   :   :   :   SWAP DAT(K,L,2),DAT(I,J,2)
3318    :   :   :   :   SWAP DAT(K,L,3),DAT(I,J,3)

3320    :   :   :   :   REM SWAP CAT VALUES AND ORIGNAL POSITION RECORD

3322    :   :   :   NEXT L:
        :   :   NEXT K:
        :   NEXT J:
        NEXT I
3321    RETURN
3500    FOR T=1 TO FT:
        :   FOR S=1 TO 1:
        :   :   DAT(T,S,1)=TC(T):
        :   :   DAT(T,S,2)=T
3502    :   :   DAT(T,S,3)=S:
        :   NEXT S:
        NEXT T

3503    REM SWAP CAT VALUES AND ORIGNAL POSITION RECORD

3506    FOR I=1 TO FT:
        :   FOR J=1 TO 1:
        :   :   FOR K=I TO FT:
        :   :   :   FOR L=J TO 1
3508    :   :   :   :   IF
        :   :   :   :       DAT(I,J,1)  >= DAT(K,L,1)
        :   :   :   :           THEN
        :   :   :   :               ( GOTO ) 3516
3510    :   :   :   :   SWAP DAT(K,L,1),DAT(I,J,1):
        :   :   :   :   SWAP DAT(K,L,2),DAT(I,J,2)
3512    :   :   :   :   SWAP DAT(K,L,3),DAT(I,J,3)

3514    :   :   :   :   REM SWAP CAT VALUES AND ORIGNAL POSITION RECORD

3516    :   :   :   NEXT L:
        :   :   NEXT K:
        :   ..EXT J:
```

```
          NEXT I
3518   RETURN




   Summary
   Input line count      -    321
   Statement count       -    591
```

INTERNAL DISTRIBUTION

1. L. S. Abbott
2. C. R. Bovell (Consultant)
3. R. J. Carter
4. G. F. Flanagan
5. L. H. Gray
6-9. P. M. Haas
10-14. C. C. Jorgensen
15. H. E. Knee
16. P. A. Krois
17. F. C. Maienschein
18. A. P. Malinauskas

19. J. J. Manning
20. F. R. Mynatt
21. A. Zucker
22. P. W. Dickson, Jr. (Consultant)
23. G. H. Golub (Consultant)
24. D. Steiner (Consultant)
25. Central Research Library
26. Y-12 Document Ref. Section
27. Laboratory Records ORNL, RC
28. ORNL Patent Office

EXTERNAL DISTRIBUTION

29. Director, Division of Reactor Research and Technology, DOE, Washington, D.C. 20545.
30. Office of the Assistant Manager for Energy Research and Development, DOE-ORO, Oak Ridge, TN 37830.
31. H. L. Parris, Electric Power Research Institute, 3412 Hillview Ave., P.O. Box 10412, Palo Alto, CA 94303
32. J. O'Brien, Electric Power Research Institute, 3412 Hillview Ave., P.O. Box 10412, Palo Alto, CA 94303
33. Z. T. Pate, President, Institute of Nuclear Power Operations, 1820 Water Place, Atlanta, GA 30339
34. K. Strahm, Institute of Nuclear Power Operations, 1820 Water Place, Atlanta, GA 30339
35. D. Stubbs, Martin Marietta, ATC, 475 School St., Washington, D.C. 20024
36. M. A. Larue, Jr., Martin Marietta Aerospace, P.O. Box 179, Denver, CO 80201

U.S. Nuclear Regulatory Commission, Washington, D.C. 20555:
Division of Risk Analysis and Operations:

37-41. J. C. Lowry
42. J. P. Jenkins
43. J. A. Norberg
44. C. M. Overbey
45. Thomas G. Ryan
46. M. L. Au

Division of Human Factors Safety:

47. D. H. Beckham
48. H. R. Booher
49. D. Jones
50. J. J. Persensky

51–52. Technical Information Center

53–452. Given distribution as shown in NRC Category RX, Human Factors Safety (NTIS — 10).

2. TITLE AND SUBTITLE	3. LEAVE BLANK	
Nuclear Power Plant Personnel Qualifications and Training: TSORT — An Automated Technique to Assign Tasks to Training Strategies		
	4. DATE REPORT COMPLETED	
	MONTH	YEAR
	7	84

5. AUTHOR(S)	6. DATE REPORT ISSUED	
Charles C. Jorgensen	MONTH	YEAR
	9	84

7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)	8. PROJECT/TASK/WORK UNIT NUMBER
Oak Ridge National Laboratory Reliability & Human Factors Group Bldg. 6025 Oak Ridge, TN 37831	9. FIN OR GRANT NUMBER
	B0466

10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)	11a. TYPE OF REPORT
Nuclear Regulatory Commission Human Factors and Safeguards Branch Division of Risk Analysis and Operations Office of Nuclear Regulatory Research, U.S. NRC Washington, D.C. 20555	Final
	b. PERIOD COVERED (Inclusive dates)
	6/83 -- 7/84

12. SUPPLEMENTARY NOTES

13. ABSTRACT (200 words or less)

This report discusses TSORT, a technique to assist the Nuclear Regulatory Commission (NRC) in evaluating whether training program developers have allocated nuclear power plant tasks to appropriate training strategies. The TSORT structure is presented including training categories selected, dimensions of task information considered, measurement metrics used, and a guide to application. TSORT is implemented as an automated software tool for an IBM-PC. It uses full color graphics and interactive menu selection to provide NRC with a variety of evaluation options including: rank ordering of training strategies reasonable for each task, rank ordering of tasks within strategies, and a variety of special analyses. The program code is also presented along with a comprehensive example of 20 realistic tasks illustrating each of 17 options available.

14. DOCUMENT ANALYSIS — a. KEYWORDS/DESCRIPTORS	15. AVAILABILITY STATEMENT
Systems approach to training, ISD, Task analysis, SAT, Training development, Analysis	
	16. SECURITY CLASSIFICATION
	(This page)
	Un
b. IDENTIFIERS/OPEN-ENDED TERMS	(This report)
Cost effectiveness analysis, Task allocation	Un
	17. NUMBER OF PAGES
	18. PRICE