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TRAINING AND QUALIFICATION PROGRAM FOR NUCLEAR CRITICALITY SAFETY TECHNICAL STAFF

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INTRODUCTION

A training and qualification program for nuclear criticality safety technical staff personnel has been developed and implemented. The program is compliant with requirements and provides evidence that a systematic approach has been taken to indoctrinate new technical staff. Development involved task analysis to determine activities where training was necessary and the standard which must be attained to qualify. Structured mentoring is used where experienced personnel interact with candidates using checksheets to guide candidates through various steps and to provide evidence that steps have been accomplished. Credit can be taken for the previous experience of personnel by means of evaluation boards which can credit or modify checksheet steps. Considering just the wealth of business practice and site specific information a new person at a facility needs to assimilate, the program has been effective in indoctrinating new technical staff personnel and integrating them into a productive role. The program includes continuing training.

TASKS

The task analysis for the program identified 13 tasks which a nuclear criticality safety technical staff person may be called upon to perform. These tasks are listed and briefly described in table 1. In addition to these tasks, there are initial qualification, general, duty area access requirements, and continuing training which must be met and maintained.

STRUCTURE

There is an initial qualification step that all new personnel must go through. It involves demonstration that job entry requirements are met and that compliance required training; e.g., General Employee Training and security briefing; has been completed. It also includes some mentored self-study of basic nuclear criticality safety theory and practice, and required reading of a number of business and basic nuclear criticality safety practice documents. Following completion of the items noted, a candidate is considered to be an Engineer-in-Training and will embark on one of two qualification paths. Most candidates pursue the path which leads to qualification as Nuclear Criticality Safety Engineer and then to Nuclear Criticality Safety Specialist. The other path leads to qualification as Technical Specialist. Qualification as Nuclear Criticality Safety Engineer requires qualification in the first four tasks of table 1, experience, and completion of an oral board. Qualification as Nuclear Criticality Safety Specialist requires attainment of qualification as Nuclear Criticality Safety Engineer, qualification in tasks 5 and 6 (both of which require an oral board) plus any two of tasks 7 through 9, additional experience, and an oral board. The Technical Specialist path is for those highly specialized personnel whose expertise is activities such as computations or emergency response and qualification as a Technical Specialist requires qualification in any three of the tasks 1 through 9. Tasks 10 through 13 are appointed or position dependent tasks.

There are several notable features of the program. It includes required familiarization tours of various plant areas as part of qualification and permits a technical staff member to independently perform tasks in which they are qualified. A list of qualified personnel is maintained and used to guide personnel assignments to ensure that technical staff members are qualified by plant area, computer code, and by task to independently perform.

IMPLEMENTATION

One of the basic problems with implementing a qualification program is deciding and justifying who is initially qualified. This was accomplished by convening a board of the three most senior members of the nuclear criticality safety function. The collective experience of the board was nearly 75 years in nuclear

criticality safety with over 50 years within the plant. The board deliberated, task by task and person by person, the experience of technical staff members based upon the board's knowledge of the kinds of work which had been performed by incumbent technical staff prior to September, 1994. When the board unanimously agreed that a particular technical staff member was qualified in a task, then that person was considered to be so qualified. When the qualification of a board member was being deliberated, that member was not permitted to participate or vote in the consideration. After the qualification of technical staff incumbents was decided by board action, documentation required by procedures was executed to except them from training required for qualification. Subsequent to the board evaluation of incumbents, all task and program qualification of full time technical staff, on loan personnel, and subcontractor personnel required that a person either successfully complete training or provide evidence of applicable prior experience which demonstrates that they are qualified to perform the task.

EXPERIENCE

The training and qualification program was implemented in 1995 and was accompanied by startup problems and agonies as would be expected for something new and different. Some of the modifications made as a result of experience with the training program included:

1. better definition of some of the expectations for checksheet steps and development of explicit criteria for successful completion of steps;

2. moving the two review tasks 4 and 5 from their original position in the Nuclear Criticality Safety Engineer program to the Nuclear Criticality Safety Specialist program; and

3. changes in the composition of oral boards for task and program qualification.

Appropriate use has been made of Experienced Personnel Evaluation boards to speed qualification of newly hired experienced personnel. The protocol which has evolved is to step through checksheet items and accumulate evidence that the experienced person being evaluated has successfully performed similar work. In general, it has been found that no exceptions can be made for familiarization tours of plant areas or for required readings of various documents, primarily because plant areas and many of the documents are site specific and are simply unavailable elsewhere. Conversely, computation skills tend to be very transferrable and experience with external monitoring and evaluations tends to be moderately so.

The human responses are also interesting and, in retrospect, somewhat predictable. Entrants with little (<2 years) or no experience in nuclear criticality safety tend to embrace the program and find it to be the most and most focused training they have experienced. Although not universally the case, practitioners with extensive experience seem to view it more as a chore and may be somewhat offended by the idea that they need to qualify.

CONCLUSIONS

A program to train and qualify nuclear criticality safety technical staff has been developed and implemented. It has been demonstrated to be compliant with requirements and effective in producing personnel qualified to conduct business. It has features such as Experienced Personnel Evaluation and task qualification which permit new technical staff personnel to quickly become productive in limited task and plant areas.

Table 1 - Nuclear Criticality Safety Tasks

1. External Monitoring	Perform a comparison of operating area conditions and activities with nuclear criticality safety limits, conditions, and requirements in accordance with approved procedures
2. Nuclear Criticality Safety Evaluation	Perform nuclear criticality safety evaluation to demonstrate satisfaction of the double contingency principle in accordance with approved procedures
3. Operating Procedure Approval	Ensure that nuclear criticality safety limits, conditions, and requirements are correctly stated in operating procedures in accordance with approved procedures
4. Nuclear Criticality Safety Computations	Perform nuclear criticality safety computer calculations in accordance with approved procedures
5. Nuclear Criticality Safety Computation Review	Perform independent assessments of the adequacy of nuclear criticality safety computations produced by others in accordance with approved procedures
6. Nuclear Criticality Safety Evaluation Review	Perform independent assessments of the adequacy of nuclear criticality safety evaluations produced by others in accordance with approved procedures
7. Emergency Response Planning	Advise emergency preparedness function in matters concerning nuclear criticality accident emergency preparedness planning in accordance with approved procedures
8. Criticality Accident Alarm System (CAAS) Support	Perform as subject matter expert in setting standards for CAAS siting and testing and serve on CAAS Configuration Control Board
9. Order Compliance and Nuclear Criticality Safety Procedures	Evaluate DOE Orders and guidelines, national standards, and corporate and plant procedures for nuclear criticality safety programmatic impact
10. Independent Technical Review Board (ITRB)	Independent review of nuclear criticality safety evaluations and computations
11. Final Nuclear Criticality Safety Technical Documentation Approval	Provide final approval of nuclear criticality safety technical documentation
12. Nuclear Criticality Safety Program Oversight	Recommend modifications of nuclear criticality safety program and procedures
13. Emergency Operations Center (EOC) Support	Advise plant management of nuclear criticality safety considerations during real or simulated emergencies in accordance with approved procedures

Distribution:

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