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MEMORANDUM FOR: Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

FROM: William T. Russell, Deputy Director
Division of Human Factors Safety

SUBJECT: FINAL SER FOR BEAVER VALLEY POWER STATION, UNIT 2, PLANT PERSONNEL TRAINING

PLANT NAME: Beaver Valley Power Station, Unit 2
DOCKET NO.: 50-412
LICENSING STAGE: OL
RESPONSIBLE BRANCH: Licensing Branch #3
PROJECT MANAGER: Lisamarie Lazo
REVIEW STATUS: Final SER with one open item

Reference: Memorandum from W. Russell to T. Novak, "Draft SER for Beaver Valley Power Station, Unit 2, Plant Personnel Training," dated February 8, 1984

By the above referenced memorandum, we forwarded the LQB draft SER input regarding plant personnel training programs for Beaver Valley Power Station, Unit 2. In our draft SER, we stated that:

(1) With regard to the initial training program, the applicant had not provided: (a) a program in accordance with the guidelines outlined in Enclosure 2 of H. R. Denton's March 28, 1980 letter for instruction in fluid flow, thermodynamics and heat transfer, and (b) the content details of simulator training programs for us to review. Therefore, we were not able to conclude that the applicant's initial training program for reactor operators and senior reactor operators was acceptable.

(2) We found that the applicant's requalification training program for licensed reactor operators and senior reactor operators did not fully satisfy the requirements as specified in Appendix A to 10 CFR Part 55 and in the letter from H. R. Denton to All Power Reactor Applicants and Licensees dated March 28, 1980. Therefore, we were not able to conclude that the applicant's requalification training program was acceptable.

(3) We found that the applicant had not fully committed to the requirements of the TMI Action Plan, Items I.A.2.1 and I.A.2.3.

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(4) The applicant had a cross-training program designed to prepare operators licensed on both BVPS-1 and BVPS-2. However, the applicant had not provided for our review the details of the program. Therefore, we had not been able to conclude that the applicant's BVPS operator cross-training program was acceptable.

(5) We had reviewed the applicant's training program for Shift Technical Advisors (STAs) and found that it was not comparable in scope and depth of training in various subjects to the STA training program as outlined in NUREG-0737, Appendix C.

(6) With regard to the fire protection training program, we found that the applicant had established a fire protection training program to ensure that the capability to fight potential fires was maintained. However, the applicant had not provided the details of the program for us to review.

By letter dated October 1, 1984, the applicant provided responses for the above open issues. We have reviewed the applicant's responses and find that the above open issues, with the exception of the cross-training program designed to prepare operators licensed on both BVPS-1 and BVPS-2 (as noted in the enclosed draft SER, Section 13.2.1.2), have been resolved. Our SER and SALP evaluation are enclosed.

This review has been conducted by D. Shum, Licensee Qualifications Branch, (x24906).

Original signed by
Vassi Moore
for/

William T. Russell, Deputy Director
Division of Human Factors Safety

Enclosures:
As stated

cc: G. Knighton
L. Lazo

DW/DHS/BEAVER VALLEY
BEAVER VALLEY SER
BEAVER VALLEY SALP

OFFICE	LQB/DHFS	LQB/DHFS	LQB/DHFS	DD/DHFS			
URNAME	DShum/br	JPersensky	HBooher	WRussell			
DATE	11/14/84	11/14/84	11/14/84	11/16/84			

FINAL SAFETY EVALUATION REPORT FOR
BEAVER VALLEY POWER STATION, UNIT 2 (BVPS-2)
DOCKET NO.: 50-412
PLANT PERSONNEL TRAINING

13.2 Training

The applicant's training program for licensed reactor operators and non-licensed plant staff were reviewed according to Standard Review Plan (NUREG-0800) Section 13.2. The staff acceptance criteria included: applicable portions of 10 CFR Parts 19, 50 and 55; Regulatory Guides 1.8 and 1.149; as well as the TMI Action Plant (NUREG-0737) and H. R. Denton's letter of March 28, 1980, to All Power Reactor Applicants and Licensees.

13.2.1 Licensed Operator Training Program

A training program for BVPS-2 licensed reactor operators has been implemented to develop and maintain an organization fully qualified to operate the plant and maintain plant safety. The initial and requalification training programs which are designed to meet the requirements of 10 CFR Parts 50 and 55, and TMI Action Plan related requirements, are based on the individual employee's level of education, experience and skills as well as on the level of assigned responsibility and intended position.

13.2.1.1 Initial Training Program

The initial training program for personnel who will be licensed consists of the following discrete segments:

(1) Phase 1 - Academic and Nuclear Fundamental Training

This training course of formal classroom study will be approximately 14 weeks in length and is designed to provide individuals with basic knowledge in science and technology of power plant operations. The major areas to be covered are mathematics, basic

nuclear physics, reactor principles, radiological fundamentals, chemistry, instrumentation and control, electrical theory, safety analysis, fluid flow, thermodynamics and heat transfer.

(2) Phase 2 - Plant Systems

This training course is designed to provide the trainees with an in-depth study of the BVPS-2 systems and equipment. This phase of the training program is 30 weeks in duration. This course consists of formal classroom instruction and a period of time spent in the plant tracing out systems, identifying the equipment associated with the topics covered in the classroom sessions, observation of plant evolutions, and reviewing the station operating and equipment instruction manuals.

(3) Phase 3 - Qualification Standard Checkoffs

This phase of the training program is approximately 49 weeks in duration and will require the trainees to have detailed knowledge of BVPS-2 systems and the ability to perform certain operations using plant control devices. Throughout this period of training, the trainees must demonstrate that they have acquired skill and knowledge to perform the duties to which they will be assigned for operation of the unit. In addition, the trainees will gain additional knowledge of actual plant systems configuration and operation through in-plant hands-on training.

(4) Phase 4 - Simulator Training

This offsite training is one week in duration and will include reactor start-ups and shutdowns to familiarize the operator candidates with reactor operations.

(5) Phase 5 - On-Shift Training

This phase of the training program is approximately 13 weeks in duration and will provide license candidates with hands-on training in the areas of reactivity manipulations. The applicant has indicated that this training will be conducted on either one of the BVPS units, the BVPS simulator, or an offsite simulator and that all candidates being examined for an operating license on BVPS Unit 2 will receive the simulator training that meets the requirements of H. R. Denton's letter of March 28, 1980. The simulator used for training will meet the guidelines of Regulatory Guide 1.149.

(6) Phase 6 - Lectures Review

This is an approximately eight week course designed to sum up the entire program given to prepare the candidate for the licensing exam.

(7) Training Program Evaluation

The performance of each license candidate participating in the training program is monitored and evaluated throughout the program. Frequent examinations and demonstration of proficiency during actual or simulated operations are given to each license candidate in order to determine the effectiveness of the training and knowledge of the trainee.

Based on our review, we find that the applicant's initial training program conforms to the requirements of the applicable positions of 10 CFR Parts 50 and 55, and follows the guidance given in Regulatory Guide 1.8. In addition, the applicant's initial training program conforms to the requirements of H. R. Denton's letter of March 28, 1980. Therefore, we conclude that the initial training program for all reactor operators and senior reactor operators is acceptable.

13.2.1.2 BVPS Operator Cross-Training Program

The applicant has indicated that the BVPS operator cross-training program is designed to prepare operators licensed or licenseable on BVPS-1 for licensing on BVPS-2 to meet the needs of the operating organization. The BVPS operator cross-training program is approximately three to four months in length and includes classroom training in system differences and system checkouts on those systems with significant differences between the units. Technical Specification difference lectures are also included in the program. The applicant has not provided for our review the details of the cross-training program. However, the applicant has indicated that the operator cross-training program is being developed.

We will review the details of the applicant's cross-training program when they are received and report our findings in a supplement to the SER.

13.2.1.3 Requalification Training Program

A requalification training program conducted by the applicant for all licensed reactor operators and senior reactor operators will be implemented following the initial licensing. This program will consist of the following:

(1) Lectures

The applicant has indicated that a total of six preplanned requalification training lectures will be scheduled throughout the year. Lecture subjects and content will be based on the results of the annual examination administered to licensed reactor operators and senior reactor operators. The content of these lectures will cover all the subjects as listed in Appendix A of 10 CFR Part 55 and H. R. Denton's March 28, 1980, letter.

(2) On-The-Job Training

The on-the-job training portion of the requalification program will consist of the following segments:

(a) Control Manipulations

The applicant has indicated that during each two year term of the license, each licensed reactor operator shall perform all of the following listed control manipulations and each licensed senior reactor operator shall perform, direct or evaluate all of the following control manipulations:

*o Plant or reactor start-up to include a range such that reactivity feedback from nuclear heat addition is noticeable and heat-up rate is established

o Plant shutdown

*o Manual control of steam generators and/or feedwater during start-up and shutdown

o Boration and/or dilution during power operation

*o Any significant (10%) power changes in manual rod control

o Any reactor power change of 10% or greater where load change is performed with load limit control

*o Loss-of-coolant including:
  a. Significant PWR steam generator leaks
  b. Inside primary containment
  c. Large and small, including leak-rate determination
  d. Saturated reactor coolant response

o Loss of instrument air

o Loss of electrical power (and/or degraded power sources)

*o Loss of core coolant flow/natural circulation

- o Loss of condenser vacuum
- o Loss of service water if required for safety
- o Loss of residual heat removal (RHR) system
- o Loss of component cooling system or cooling to an individual component
- o Loss of all normal feedwater and feedwater system failure
- *o Loss of all feedwater (normal and emergency)
- o Loss of protective system channel
- o Mispositioned control rod or rods (or rod drops)
- o Inability to drive control rods
- o Conditions requiring use of emergency boration
- o Fuel cladding failure or high activity in reactor coolant or off-gas
- o Turbine or generator trip
- o Malfunction of automatic control system(s) which affect reactivity
- o Malfunction of reactor coolant pressure/volume control system
- o Reactor trip
- o Main steam line break (inside or outside containment)
- o Nuclear instrumentation failure(s)

The starred items shall be performed on an annual basis; all other items shall be performed on a two year cycle. An appropriate simulator, which reproduces the general operating characteristics of and has similar instrument and control arrangement to BVPS-2, may be used to perform these control manipulations.

We find that the above applicant's commitment of control manipulations required for licensed operators does comply with the requirement as specified in Enclosure 4 of H. R. Denton's letter of March 28, 1980, and is, therefore, acceptable.

(b) Knowledge of Facility Design, Procedure, and License Change and Abnormal and Emergency Procedures

In order to ensure a continuing awareness of the action and responses necessary during abnormal and emergency situations, each licensed reactor operator and senior reactor operator will periodically be given reading assignments to review the content of the following subjects:

- o Facility design changes
- o Facility procedure changes
- o Technical Specification changes
- o Emergency Preparedness Plan
- o Radiation control procedures
- o Temporary facility procedures
- o Station industrial security procedures
- o Abnormal and emergency procedures

(3) Simulator Training

The applicant has indicated that all of the licensed operators and senior operators shall participate in simulator training during the term of their licenses. We find that the applicant has committed to the requirement as specified in Enclosure 1 of H. R. Denton's letter of March 28, 1980, which requires all licensed operators to participate in a simulator training program as part of the requalification program.

(4) Evaluation

As described in the Appendix A to the 10 CFR Part 55, the evaluation program for licensed personnel shall include the following:

(a) Annual Written Examination

The applicant has indicated that annual examinations will be given to determine areas in which retraining is needed to upgrade licensed reactor operator and senior operator knowledge.

(b) Systematic Observation and Evaluation

The applicant has indicated that the performance and competence of licensed operators and senior operators are evaluated at least annually by observation or a critique of the manner in which the operators responded in recognizing and managing such events as abnormal occurrences and response to off normal operating conditions, or simulated emergency or abnormal operating conditions. Final evaluation will be accomplished by observation while using the control panel of the BVPS or station simulator control panel.

(5) Accelerated Requalification Program

The applicant has indicated that any licensed operator whose scoring is less than 80% in any section of the comprehensive annual examination shall be required to attend lectures in those sections of the exam. Should the individual fail to attain the established overall average of 80% with a minimum of 70% in each category in the annual examination, the operator shall be removed from shift duties and shall participate in the accelerated requalification programs under the direction of the Director, Nuclear Division Training. The operator will be returned to shift duties after retesting and achieving the established requirements for overall average of each section. Provisions have also been made for licensed operators to participate in an accelerated requalification program when the results of the systematic observation and performance evaluation program clearly indicate the need.

The applicant has provided the criteria for requiring a licensed individual to participate in an accelerated requalification program. We find that the criteria conforms to the requirement as described in Appendix A to 10 CFR Part 55, and in Enclosure 1 of H. R. Denton's March 28, 1980, letter.

Based on our review, we find that the applicant's requalification training program for licensed reactor operators and senior reactor operators conforms to the requirements as specified in the Appendix A to 10 CFR Part 55 and in the letter from H. R. Denton to All Power Reactor Applicants and Licensees dated March 28, 1980. Therefore, we conclude that the applicant's requalification training program is acceptable.

13.2.1.4 TMI Related Requirements for New Operating License

I.A.2.1 Immediate Upgrading of Reactor Operator and Senior Reactor Operator Training and Qualifications

The applicant has established a program to assure that all reactor operator and senior reactor operator license candidates have the prescribed experience, qualification and training.

Each licensed operator candidate will be certified competent to take the NRC license examination by the Vice President of Nuclear Division prior to application for the examination. As an operating license applicant, BVPS-2 is not subject to the one year experience requirement for cold-license SRO candidates. However, after one year of station operation, individuals applying for an SRO license will be required to comply with the one year experience requirement for hot-license SRO applicants, unless previously experienced in an equivalent position at another nuclear plant or at a military propulsion reactor. The experience of license applicants in the latter category will be documented by the applicant on a case-by-case basis in sufficient detail so that the staff can make a finding regarding equivalency. SRO license applicants who possess a degree in engineering or applicable science are considered to meet the one year experience requirement as an RO provided they: (1) satisfy the requirements set forth in Section A.1.a and A.2 of Enclosure 1 to the letter from H. R. Denton to All Power Reactor Applicants and Licensees, dated March 28, 1980, and (2) have participated in a training program equivalent to that of a cold senior reactor operator applicant.

Also, the requirement for three months on-shift experience for control room operators and SRO candidates as an extra person on shift is not required for cold-license candidates and, hence, is not applicable to BVPS-2. However, BVPS-2 will be required to comply with this requirement for hot-license candidates after three months of BVPS-2 operation.

The applicant's training program includes topics in heat transfer, fluid flow, thermodynamics, mitigating core damage and reactor and plant transients. All license candidates will attend simulator training programs as part of the initial training program. Also, the applicant has committed to provide a simulator training program to all licensed operators as part of the requalification program.

Based on our review, we conclude that the applicant of BVPS-2 has satisfied the requirements of this item of the TMI Action Plan.

I.A.2.3 Administration of Training Program

The applicant has indicated that all instructors who teach integrated responses, transients, and simulator courses are SRO certified or licensed. Instructors who teach systems are either SRO certified, licensed, or designated and qualified system experts. SRO licensed or certified instructors are enrolled in appropriate requalification programs.

Based on our review, we find that the applicant of the BVPS-2 has satisfied the requirements of this item of the TMI Action Plan.

II.B.4 Training for Mitigating Core Damage

The applicant has indicated that Shift Technical Advisors and operating personnel from the Superintendent Operations through the operating chain to the licensed operators will be provided training for mitigating core damage. Supervisors and technicians in Radiation Control, Chemistry and Instrumentation and Controls departments will receive mitigating core damage training commensurate with their responsibilities.

Based on our review, we find that the applicant of the BVPS-2 has complied with the requirements of this item of the TMI Action Plan.

13.2.2 Training for Nonlicensed Plant Staff

The applicant has described in the FSAR the details of the training given to nonlicensed plant personnel. The training program for nonlicensed personnel will provide training for maintenance personnel, instrumentation and control personnel, radiation protection personnel, radwaste personnel, nuclear physics personnel and technical personnel.

All permanently employed plant personnel will participate in a general employee training program consisting of, but not limited to, radiological health and safety, quality assurance, industrial safety, plant security, emergency plan, fire protection and other appropriate plant plans and procedures.

The applicant has provided a training program for the Shift Technical Advisors (STA). We have reviewed the program and find that it is comparable in scope and depth of training in various subjects to the STA training program as outlined in NUREG-0737, Appendix C. Therefore, we conclude that the applicant's training for STA is acceptable.

The applicant has established a fire protection training program to ensure that the capability to fight potential fires is maintained. The program includes classroom instruction and training in fire fighting equipment use, strategies, techniques and periodic drills. We conclude that the applicant's fire protection training program conforms with the guidelines as described in the Standard Review Plan, Section 13.2.2 and Branch Technical Position CMEB 9.5-1, and is acceptable.

Based on our review and as indicated in the above, we find that the applicant's training program for nonlicensed plant staff meets the requirements of NUREG-0737 and 10 CFR Parts 19 and 50. Therefore, we conclude that the applicant's training program for nonlicensed plant staff is acceptable.

SALP EVALUATION
FOR BEAVER VALLEY POWER STATION, UNIT 2
DOCKET NO.: 50-412
PLANT PERSONNEL TRAINING

A. FUNCTIONAL AREAS: Plant Personnel Training

1. Management involvement in assuring quality

We had a site visit to audit the applicant's training program for plant personnel and to resolve the open issues as described in the draft SER. The applicant was aware of the importance of our site visit and had taken positive steps to see that the audit and the resolution went well.

Rating: 2

2. Approach to resolution of technical issues from a safety standpoint

Based on our review of the applicant's responses to our request for additional information to resolve our concerns with regard to plant personnel training programs, the applicant exhibits a clear understanding of the technical and licensing procedure issues.

Rating: Category 2

3. Responsive to NRC initiatives

We have no basis to evaluate this item.

Rating: N/A

4. Staffing

We have no basis to evaluate this item. However, the Management Technology Section of LQB will perform the evaluation for this item.

Rating: N/A

5. Reporting and analysis of reportable events

We have no basis to evaluate this item.

Rating: N/A

6. Training and qualification effectiveness

Based on our review of the applicant's training program and our visit to the training facility at the site, we conclude that the applicant's training program will effectively maintain fully

qualified plant personnel to operate the plant and maintain the plant safety.

Rating: Category 2

7. Overall rating for plant personnel training: Category 2

B. Other Functional Areas

N/A