

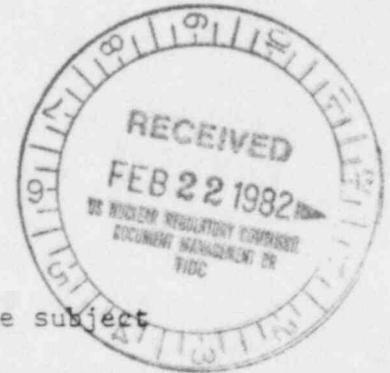

Nebraska Public Power District

 GENERAL OFFICE
 P. O. BOX 499, COLUMBUS, NEBRASKA 68601
 TELEPHONE (402) 564-8561

October 1, 1980

 Mr. Paul F. Collins, Chief
 Operator Licensing Branch
 Division of Project Management
 U.S. Nuclear Regulatory Commission
 Washington, D.C. 20555

Subject: Qualifications of Reactor Operators

 Reference: (1) H. R. Denton letter of March 28, 1980, same subject
 (2) D. G. Eisenhut letter of July 31, 1980, Interim Criteria
 for Shift Manning


Dear Mr. Collins:

This letter is written to outline the changes made in our reactor operator training and requalification programs at NPPD's Cooper Nuclear Station and to request certain exemptions to the requirements outlined in Reference (1). Our revised operator training and requalification program are enclosed as Attachments 1 & 2 to this letter.

The exemptions requested are discussed below and refer to the requirements of various sections of Enclosures 1 and 4 of Reference (1).

Enclosure 1

A.1 Eligibility Requirements to be Administered an Examination

The requirement for four years responsible power plant experience for senior operator license applicants is excessive. This requirement should be no more than three years. We have had cases where those with no previous nuclear experience have become senior reactor operators with three years experience at our station. With the new criteria, it would require six years (2 years to become a RO and 4 years as a RO) experience to be administered a SRO exam. This would discourage us from hiring anyone without previous nuclear experience and would also discourage capable people without nuclear experience from seeking employment with us. We believe the qualifications of people are more important than time requirements. We also believe there may not be a significant number of personnel within the country interested in filling control room operator positions to meet these time requirements at all nuclear plants. We recommend that this requirement be changed to three years in positions at an operating nuclear plant of which one year of experience may be fulfilled with academic or related training.

 M003
 5
 1/1

A.2 Training

- (a) Presently, the required control room manning at Cooper Nuclear Station is one licensed reactor operator (RO) during steady state operation and two reactor operators during periods of control rod manipulation, reactivity changes or transients. It is our normal practice to staff the control room with one SRO (other than the Shift Supervisor) and one RO will be as required in reference (2). The SRO and RO normally rotate the areas of responsibility in the control room (NSSS or Balance of Plant). By doing this, the RO is familiar with giving orders to the auxiliary operators and all facets of control room operation. He also gains much more experience toward being trained as a SRO than he could gain as an extra man on shift for three months. Thus, we will meet this requirement by rotating responsibilities in the control room for at least one year prior to applying for a SRO license.
- (b) The requirement for a RO to have three months training on shift as an extra man in the control room will be fulfilled by the trainee spending: (1) at least 20 hours per week in the control room as an extra man for two months prior to the NRC exam, (2) by one week training at the Simulator, and (3) by spending 4-6 weeks in the control room as an extra man following the administration of the NRC exam prior to receiving the NRC license and using the RO license to meet minimum staffing requirements.

C. Requalification Programs

3. Control manipulations during abnormal or emergency operation will be evaluated or walked through by the shift supervisor. If a Simulator is used to satisfy these requirements, a member of the training staff or the Simulator's training staff will evaluate. The requirement for control manipulation for supervisory personnel maintaining SRO licenses is waived.

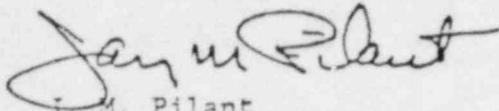
Enclosure 4

Control Manipulations

The control manipulations similar to those listed in enclosure 4 will be performed on a two-year cycle. This is in keeping with the practice of a two-year training cycle of other training and requalification programs at our plant. We believe that a two-year cycle will result in a more deliberate, comprehensive, and useful program than having to do some evaluations yearly and some every two years. This would also allow us to go to a Simulator every two years.

The above exemptions are requested because we feel some of the requirements in the reference letter can best be satisfied by alternate means. We feel that with these exemptions we could meet the additional staffing requirements of reference (2) by December 1981. Without approval of these exemptions, we may not be able to meet the additional staffing requirements by July 1982.

Sincerely,

A handwritten signature in cursive script, appearing to read "J. M. Pilant".

J. M. Pilant
Director of Licensing
and Quality Assurance

JMP:PJB:cg

Attachments

OPERATOR AND SENIOR OPERATOR REQUALIFICATION PROGRAMCOOPER NUCLEAR STATIONI. GENERAL

A continuing requalification program for licensed operators and senior operators shall be established and implemented for Cooper Nuclear Station. The requalification program cycle shall be based on a two-year period with training distributed over that period as required.

Technical personnel who hold a license only to provide backup capability for operating staff shall participate in the requalification program except to the extent that their normal duties preclude the need for retraining in specific areas.

The Cooper Nuclear Station Training Coordinator shall have the general responsibility for establishing and supervising the requalification program.

II. PROGRAM

A. The program may include quizzes, self study, lectures, and training films covering, as a minimum, those areas where annual written examinations indicate the need for additional training in the following subjects.

1. Reactor theory
2. Plant operating characteristics
3. Plant instrumentation and control systems
4. Safety and emergency systems.

5. Heat transfer, fluid flow, and thermodynamics
6. Radiation control and safety
7. Fuel handling and core parameters
8. Normal, abnormal, and emergency operating procedures
9. Administrative procedures, conditions, and limitations.

10. *including core damage prevention*
minimum of

The requalification program will require about 60 hours each year.

B. Each licensed operator shall, over a two-year period, perform *see manual*

the control manipulations similar to those listed in Attachment *see manual*

A. Each senior licensed operator shall, over a two-year period, either perform or direct the activities of others performing the

control manipulations listed in Attachment A. Each individual

shall perform or participate in a combination of, *at least 10 or more* reactivity control

manipulations based on the availability of plant equipment

and systems.

Normal control manipulations must be performed, either on the

plant or on an appropriate simulator. An appropriate simulator *see manual*

may be used to satisfy the requirements for control manipulations. *see manual*

C. Each licensed operator or senior operator shall demonstrate, in the performance of his duties, his satisfactory understanding of the operation of systems and apparatus and his knowledge of operating procedures.

D. Each licensed operator or senior operator shall be kept informed of station design changes, procedure changes, and station license changes. This will be accomplished by prompt distribution of such

changes to each licensed operator or senior operator with periodic review of important changes during the lecture series.

- E. Each licensed operator or senior operator shall review the abnormal and emergency operating procedures annually. This may be accomplished by on-the-job training and/or the use of the lecture series. All licensed operators shall participate in this review.
- F. A licensed operator or senior operator who has been inactive for four or more months shall, before resuming licensed activities, demonstrate his adequate knowledge of current station operations. This shall be accomplished by the observation of station operations for a minimum of 40 hours followed by an oral examination given by the Operations Supervisor with emphasis placed on changes which were made during the period the operator was inactive. An unsatisfactory result on the oral examination shall require the operator to have additional training in areas where he was weak before taking the exam again. To remain on active status, an operator or senior operator shall be required to have, in any four-month period, a minimum of 80 hours active participation in the operation of the station; including 40 hours in the control room. The latter requirement may be waived for supervisory or technical personnel whose daily activities keep them aware of station conditions and operations.
- [Handwritten signature]*

III. EVALUATION

A. Annual written examinations shall be given to all licensed operators and senior operators to determine areas in which requalification training is needed. These examinations may be prepared and evaluated by either Cooper Nuclear Station personnel or an outside agency.

A minimum grade of 80% correct on any section shall exempt an operator from required attendance at requalification lectures pertinent to that section. *70% correct on any section shall exempt an operator from required attendance at requalification lectures pertinent to that section.*

If a licensed individual prepares and grades the annual examination, he or she need not take the examination. *OK*

This exclusion shall apply to only one individual.

B. Written examinations shall be given covering material presented in the requalification program lecture series. These examinations shall specifically cover abnormal and emergency operating procedures and shall be prepared and evaluated by Cooper Nuclear Station personnel. A grade of less than 70% correct on any lecture series examination shall require an operator or senior operator to be rescheduled for lectures on that subject the next time such lectures are scheduled. *70% not required*

C. The performance of licensed operators and senior operators shall be evaluated at least annually by supervisors and/or training staff members. This shall include evaluation of actions taken or to be taken during actual or simulated abnormal and emergency conditions. An appropriate simulator may be used to meet this requirement.

D. A grade of less than 80% correct on an annual written examination, or less than 70% correct on any category, or an unsatisfactory performance evaluation shall require an operator or senior operator to be relieved of all licensed duties so that he may participate in an accelerated requalification program. The operator shall be relieved of his licensed duties by the Station Superintendent when advised of unsatisfactory performance by the Operations Supervisor and/or the Training Coordinator. An operator or senior operator who has been relieved of his licensed duties may return to his licensed duties following completion of requalification training in areas where he was weak including a grade of not less than 70% correct on examinations given over such areas.

Handwritten notes:
with...
see...
file...

IV. RECORDS

Adequate records shall be maintained to document the participation of each licensed operator or senior operator in the requalification program. The records shall contain, as a minimum, copies of written examinations administered including the answers given by the licensee, results of evaluations, and documentation of additional training administered in areas where an operator or senior operator has exhibited deficiencies. Adequate records shall document the distribution of station design changes, procedure changes, and station license changes to each operator or senior operator. The participation of each operator or senior operator in the review of abnormal and emergency procedures shall be documented as shall his participation in various reactivity manipulations. The Cooper Nuclear Station Training Coordinator shall maintain all records pertaining to the requalification program.

Handwritten notes:
... of manipulations - and evaluation of
... II ... III ... page 4

Page 6

Certain requalification records may be destroyed following an audit by the Operator Licensing Branch of the NRC providing other station documents do not require a longer retention period. All requalification training records will be kept a minimum of two years.

CONTROL MANIPULATIONS

- (1) Plant or reactor startups to include a range that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established.
- (2) Plant shutdown.
- (3) Manual control of feedwater during startup or shutdown.
- (4) Any significant (> 10%) power changes by manual rod control or recirculation flow.
- (5) Loss of coolant including:
 1. leaks inside and outside primary containment.
 2. large and small leaks, including leak-rate determination.
- (6) Loss of instrument air.
- (7) Loss of electrical power (and/or degraded power sources).
- (8) Recirc pump trip.
- (9) Loss of condenser vacuum.
- (10) Loss of service water.
- (11) Loss of shutdown cooling.
- (12) Loss of component cooling system or cooling to an individual component.
- (13) Loss of feedwater.
- (14) Loss of reactor protection system channel.
- (15) Mispositioned control rod or rods (or rod drops).
- (16) Inability to drive control rods.
- (17) Conditions requiring use of standby liquid control system.
- (18) Fuel cladding failure or high activity in reactor coolant or offgas.
- (19) Turbine or generator trip.
- (20) Malfunction of automatic control system(s) which affect reactivity.

- (21) Malfunction of reactor coolant pressure/level control system.
- (22) Reactor trip.
- (23) Main steam line break (inside or outside containment).
- (24) Nuclear instrumentation failure(s):

NEBRASKA PUBLIC POWER DISTRICT

9-80

CNS TRAINING PROGRAMTraining for Licensed Operators With No Reactor
Startup Demonstration Required**Hours

A. Mathematics	24
1. Arithmetic Operations	
2. Fractions	
3. Percentage	
4. Positive and negative numbers	
5. Logarithms	
6. Exponents	
7. Constants	
8. Fundamentals of Algebra	
9. Solving Simple Equations	
10. Basic Geometry	
11. Graphical Representation	
12. Differential Formulation	
13. Integration	
B. Physics and Chemistry	40
1. Systems of Units	
2. Physical Measurements	
3. Vectors	
4. Forces	
5. Newton's Laws	
6. Rectilinear Motion	
7. Impulse and Momentum	
8. Moment (Torque)	
9. Angular Motion	
10. Work and Energy	
a. Potential Energy	
b. Kinetic Energy	
11. Power	
12. Hydrostatics	
13. Hydrodynamics	
14. Heat	
15. Temperature	
16. Heat Transfer	
17. Sensible Heat	
18. Change of Phase	
19. Fundamentals of Thermodynamics	
20. Basic Electricity	
21. D.C. Circuits	
22. Electric Fields	
23. Magnetic Fields	
24. A. C. Circuits	
C. Atomic Physics	10
1. Atomic Structure	
2. Bohr Model of the Atom	
3. Periodic Chart	
4. Chemical Reactions	
5. Ionization	
6. Avogadro's Number	

D. Nuclear Physics

- 1. Nuclear Structure
- 2. Chart of the Nuclides
- 3. Mass Defect
- 4. Nuclear Stability
- 5. Radioactivity
- 6. Radioactive Decay Laws
- 7. Interaction of Radiation With Matter
 - a. Charged Particles
 - b. Gamma Rays
 - c. Neutrons
- 8. Fission
- 9. Fusion

E. Radiation Detection

8

- 1. Gas Filled Detectors
- 2. Scintillation Detectors
- 3. Solid-state Detectors
- 4. Neutron Detectors
- 5. TLD Dosimetry
- 6. Detector Outputs
- 7. Typical Detectors
- 8. Power Range Instrumentation
- 9. Portable Radiation Detectors
- 10. Fixed Radiation Detectors

F. Health Physics

12

- 1. Effect of Radiation on Biological Tissue
- 2. Dose
- 3. Dose Rate
- 4. Background Radiation
- 5. External Versus Internal Effects
- 6. Acute and Chronic Exposure Effects
- 7. Somatic Effects
- 8. Genetic Effects
- 9. Ranges of Radiation Effects
- 10. Radiation Exposure History
- 11. Provisions of 10 CFR 20.
- 12. NRC Regulations
- 13. CNS Health Physics Administrative Procedures and Limits

G. Radiation Protection

10

- 1. Basic Principles
- 2. Radiation from Reactors
- 3. Gamma Ray Shielding
- 4. Neutron Shielding
- 5. Contamination
 - a. Fixed
 - b. Smearable
 - c. Airborne
- 6. Geometry
- 7. Personnel Monitoring
- 8. Exposure Limits
- 9. Controlled Areas; Signs and Markers
- 10. Controlled Area Entry and Exit

- 11. Radiation Exposure Controls
 - a. Time
 - b. Distance
 - c. Shielding
- 12. Radiation Detection Instruments
- 13. Protective Clothing and Equipment
- 14. Respiratory Protection Devices
- 15. Internal Contamination; Bioassay Program
- *16. Nuclides Expected in Water and Steam

H. Reactor Physics

75

- 1. Neutron Balance
- 2. Neutron Diffusion
- 3. Diffusion Equation
- 4. Slowing Down of Neutrons
- 5. Multiplication Factor
- 6. Four Factor Formula for K_{∞}
- 7. Non-Leakage Probabilities
- 8. Critical Equations
- 9. Buckling
- 10. Heterogeneous Reactors
- 11. Multiregion Reactors
- 12. Subcritical Multiplication
- 13. Reactivity and Period
- 14. Reserve Reactivity Requirements
- 15. Temperature and Void Effects
- 16. Fission Product Poisoning
- 17. Fuel Depletion
- 18. Fuel Management
- 19. Reactivity Control Methods
 - a. Control Rods
 - b. Recirculation Control
 - c. Burnable Poisons
- 20. Reactor Transient Behavior
- 21. Power Plant Kinetics

I. CNS Systems and Components

215

- 1. Nuclear Boiler
- *2. Nuclear Boiler Instrumentation
- *3. Reactor Recirculation
- 4. Condensate and Feedwater
- 5. Feedwater Control
- 6. Main Steam
- *7. Reactor Water Cleanup
- 8. Control Rod Drives and Hydraulic System
- 9. Residual Heat Removal
- *10. Core Standby Cooling Systems
 - a. High Pressure Coolant Injection
 - b. Automatic Depressurization
 - c. Core Spray
 - d. Low Pressure Core Injection Mode of RHR

11. Reactor Core Isolation Cooling
12. Standby Liquid Control
- *13. Neutron Monitoring Systems
 - a. Source Range Monitors
 - b. Intermediate Range Monitors
 - c. Local Power Range Monitors
 - d. Average Power Range Monitors
 - e. Rod Block Monitors
 - f. Traversing In-core Probes
14. Reactor Manual Control
15. Rod Worth Minimizer
16. Rod Sequence Control System
17. Reactor Protection System
- *18. Primary Containment
- *19. Secondary Containment
- *20. Off Gas
- *21. Standby Gas Treatment
- *22. Leak Detection
- *23. Drywell Inerting
24. Fuel Pool Cooling and Sleanup
25. Demineralized Water and Condensate Storage
26. Reactor Equipment Cooling
27. Turbine Equipment Cooling
- *28. Area Radiation Monitors
- *29. Process Radiation Monitors
30. Solid and Liquid Radwaste
31. Reactor Bldg. and Control Bldg. HVAC
- *32. Nuclear Fuel
- *33. Electrical Distribution
- *34. Emergency Power
35. Switchyard
36. Refueling and Servicing
37. Main Turbine
38. Main Generator
39. Digital Electro-Hydraulic Control
40. Service and Instrument Air
- *41. Service Water
42. Circulating Water
- *43. Process Computer
44. General HVAC

J. Core Thermal-Hydraulics

24

1. Review of Heat Transfer
2. Nucleate Boiling
3. Film Boiling
4. Critical Heat Flux (CHF)
5. Critical Bundle Power
6. Critical Power Ratio (CPR)
7. Minimum Critical Power Ratio (MCPR)
8. Factors Influencing MCPR
9. Fuel and Clad Limits on Heat Generation
 - a. Linear Heat Generation Rate
 - b. Critical Power Ratio (CPR)
 - c. Maximum Average Planar Heat Generation Rate (MAPLHGR)

- 10. CNS Core Thermal Design
 - a. Flux Distributions
 - b. Peaking Factors
 - c. Water Gap Flux Peaking
 - d. Fuel Enrichments
 - e. Channel Orificing
 - f. Core Flow Map
 - 11. Transient Effects on Core MCPR
 - 12. Heat Balance and APRM Calibration
 - 13. Instrumentation
 - 14. Procedures
- K. Documents and Procedures 80
- 1. Station License
 - 2. Final Safety Analysis Report.
 - 3. Technical Specifications
 - 4. Standard Operating Procedures
 - 5. Abnormal Operating Procedures
 - 6. Emergency Procedures
 - 7. Administrative Procedures
 - 8. CNS Emergency Plan
 - 9. CNS Security Plan
 - 10. Operational Quality Assurance
- L. Review and Evaluation of Candidates 40
- M. Reactor Operation (Minimum of Five Significant Reactivity Changes)
- N. G.E. BWRTC Reactor Startup Qualification Program 48
- * These topics or system training include material pertinent to controlling or mitigating an accident in which the core is severely damaged.
- ** Approximate training hours - Includes quizzes and their review.