

METROPOLITAN EDISON COMPANY

Subsidiary of General Public Utilities Corporation

Subject AUXILIARY OPERATOR TRAINING

Location TMI Nuclear Station
Middletown, Pa.

To

Date April 20, 1979

- Attachments:
1. Job Specification - AO "C" Nuclear
 2. Job Specification - AO "B" Nuclear
 3. Job Specification - AO "A" Nuclear
 4. Guidelines - Auxiliary Operator C Training Program
 - 5.1 Classroom Lesson Topics - AO "C" Initial Training - Unit I
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 - 6.1 Classroom Lesson Topics - AO "B" Training - Unit I
 - 6.2 Classroom Lesson Topics - AO "B" Training - Unit II

1. To be selected for the position of Auxiliary Operator C - Nuclear, an individual must satisfy the prerequisites as stated in Section B of Attachment 1. In part, this requires that an individual be a high school graduate with a background in basic mathematics including algebra.

Once selected and assigned as an Auxiliary Operator C - Nuclear, the individual will begin a two (2) year program of classroom instruction, in-plant training and experience, and written and practical examinations. If completed successfully, this program will result in the individual's being advanced "automatically" to the AO "B" and AO "A" job classifications at one year intervals.

2. The initial formal (classroom) training program will begin soon after an individual is assigned as an Auxiliary Operator C - Nuclear. It will coincide with the ninety (90) day probationary period. The administrative guidelines for program conduct are provided as Attachment 4. A (typical) list of classroom lecture topics for either unit is provided as Attachment 5.1 or 5.2.
3. Upon satisfactory completion of this initial training program, the individual will be assigned to a rotating Operations Department shift and administrative control of the individual will be transferred to the Operations Department. While on shift, the individual will continue in-plant, on-the-job training and qualification under the direction and supervision of Operations Department personnel.
4. Near the end of an individual's first year as an Auxiliary Operator, he/she will be administered both oral and written examinations. These exams will be comprehensive in nature, and will include questions from the following areas:
 - a) Secondary Plant Systems
 - b) Radioactive Waste Disposal Systems
 - c) Fuel Handling
 - d) Plant Safety Practices
 - e) Switching and Tagging

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The oral examination will be administered by an Operations Department Shift Foreman or Shift Supervisor. The written examination will be administered by Training Department personnel. Criteria for satisfactory completion of these exams and the provisions for re-examination shall be the same as for the initial training program final comprehensive examinations (refer to Attachment 4, Section 5 [oral exam] and section 6 [written exam]).

5. In addition to satisfactory completion of the comprehensive oral and written examinations, an individual must meet all other prerequisites (as specified in Attachment 2) before he/she can be advanced to Auxiliary Operator B - Nuclear.

These requirements include completion of a high school level trigonometry course. Completion and appropriate documentation of this requirement is an individual responsibility.

Failure to meet any or all prerequisites for advancement to Auxiliary Operator B - Nuclear within one year from the date first assigned as an Auxiliary Operator C - Nuclear will result in the individual's being returned to the classification held prior to becoming an Auxiliary Operator.

Satisfactory completion of all requirements for advancement will result in the individual's being advanced to Auxiliary Operator B - Nuclear one year from the date first assigned as an Auxiliary Operator.

6. During the year following advancement to Auxiliary Operator B - Nuclear, an individual will receive formal (classroom) training dealing with primary systems and advanced health physics. This formal training will be approximately six (6) weeks in durations. A (typical) list of lecture topics for either unit is provided as Attachment 6.1 or 6.2.

Administrative guidelines for program conduct shall be as specified in Attachment 4, Section 3 - except that weekly examination/re-examination failure will not necessarily result in an individual's being dropped from the program. Such situations will instead be evaluated on a case-by-case basis and appropriate action taken.

7. During the remainder of the year following advancement to AO-B-Nuclear, the individual will remain on shift and continue his/her in-plant training under the supervision of Operations Department personnel.
8. Near the end of an individual's year as an Auxiliary Operator B - Nuclear, comprehensive written and oral examinations will again be administered. Guidelines for these examinations shall be as specified in Section 4 of this memorandum with the addition of 1) Primary Systems and 2) Advanced Health Physics to the list of topics on which the operator is subject to examination.
9. In addition to these examinations, the individual must also satisfy all other requirements for advancement to Auxiliary Operator A - Nuclear as specified in Attachment 3, including completion of a high school level physics course. Again, this shall be considered an individual responsibility.

Failure to satisfy all prerequisites for advancement to Auxiliary Operator A -

Nuclear within two (2) years from the date first assigned as an Auxiliary Operator C - Nuclear will result in the individual's being returned to the classification held prior to becoming an Auxiliary Operator C - Nuclear.

Satisfactory completion of all requirements for advancement will result in the individual's being advanced to Auxiliary Operator A - Nuclear two (2) years from the date first assigned as an Auxiliary Operator C - Nuclear.

10. Continued training for fully qualified Auxiliary Operator A - Nuclear may be accomplished through their attendance in either designated portions of the licensed operator requalification program or other programs developed specifically for Auxiliary Operators.

AUXILIARY OPERATOR-"C" - NUCLEAR POWER STATION

A. Duties:

Under directive supervision or direction and as assigned:

1. Assists Auxiliary Operator-"A" or other designated classifications. In this capacity, inspects and operates non-nuclear auxiliary equipment as directed and reports any unusual performance of this equipment to the designated person(s).
2. Observes, records and interprets designated readings.
3. May be assigned personnel of equal or lesser classification to assist him in the performance of his duties.
4. Is responsible for electrical and mechanical switching as directed.
5. Performs other related or lesser skilled duties for which he is qualified or has received proper instruction or direction.

Under close supervision or direction and as assigned:

6. Learns all the duties of the Auxiliary Operator-"B" and must pass written and practical examinations to qualify for advancement to this higher classification within one year. Will be advanced to Auxiliary Operator-"B" after successful completion of these examinations and one year's experience as an Auxiliary Operator-"C". Failure to learn these duties or pass the examination will result in man's being reassigned to the classification he held prior to being assigned as an Auxiliary Operator.

B. Experience, Education and Special Information Required:

1. Should have at least one year's experience in a steam electric generating station or its equivalent in experience.
2. Must be a high school graduate with a background in basic mathematics including algebra or equivalent education.
3. Must be able to perform routine operations of moderate complexity and variety where standard methods of procedure are available.
4. Must pass the aptitude or comprehension test required for assignment to this classification.
5. Must be thoroughly familiar with the Company's electrical and mechanical tagging rules.
6. Must be thoroughly familiar with the Company's Safety Rules including methods of resuscitation.
7. A valid driver's license may be required.

POOR ORIGINAL

C. Physical Qualifications:

1. Normal health, physique and use of senses including color perception as indicated by passing the physical examination given by a Company physician when required.
2. Strength adequate to perform the duties of this classification.

D. Personal Qualifications:

1. Must be willing to work under unusual or special working conditions and surroundings.
2. Must be willing to work extra and/or irregular hours and/or a shift or scheduled operation.
3. Must be particularly alert in observing hazards and avoiding accidents.
4. Should use tact in dealing with others.

AUXILIARY OPERATOR-"B" - NUCLEAR POWER STATION

A. Duties:

Under directive supervision or direction and as assigned:

1. Assists Auxiliary Operator-"A" or other designated classifications. In this capacity, inspects and operates all non-nuclear equipment in the station as directed and reports any unusual performance of this equipment to the designated person(s).
2. Observes, records and interprets designated readings.
3. Is responsible for electrical and mechanical tagging and switching as directed.
4. May be assigned personnel of equal or lesser classification to assist him in the performance of his duties.
5. Performs other related or lesser skilled duties for which he is qualified or has received proper instruction or direction.

Under close supervision or direction and as assigned:

6. Performs functions involved in the receipt, storage, loading and unloading of fuel, shipment of irradiated materials and disposal of radioactive wastes.
7. Learns the duties of the Auxiliary Operator-"A" and must pass written and practical examinations to qualify for advancement to this higher classification within one year. Will be advanced to Auxiliary Operator-"A" after successful completion of these examinations and one year's experience as an Auxiliary Operator-"B". Failure to learn these duties or pass the examination will result in man's being reassigned to the classification he held prior to being assigned as an Auxiliary Operator.

B. Experience, Education and Special Information Required:

1. Must have one year's experience as an Auxiliary Operator-"C". Must have passed written and practical examinations to qualify for advancement from Auxiliary Operator-"C" to this higher classification.
2. Must be a high school graduate with a strong background in mathematics including algebra and trigonometry or equivalent education.
3. Must be able to perform non-routine operations of moderate complexity and variety exercising judgment where standard methods of procedure are not available.

POOR ORIGINAL

4. Must be thoroughly familiar with the Company's electrical and mechanical tagging rules.
5. Must be thoroughly familiar with the Company's Safety Rules including methods of resuscitation.
6. A valid driver's license may be required.

C. Physical Qualifications:

1. Normal health, physique and use of senses including color perception as indicated by passing the physical examination given by a Company physician when required.
2. Strength adequate to perform the duties of this classification.

D. Personal Qualifications:

1. Must be willing to work under unusual or special working conditions and surroundings.
2. Must be willing to work extra and/or irregular hours and/or a shift or scheduled operation.
3. Must be particularly alert in observing hazards and avoiding accidents.
4. Should use tact in dealing with others.

POOR ORIGINAL

AUXILIARY OPERATOR-"A" - NUCLEAR POWER STATION

A. Duties:

Under general supervision or direction and as assigned:

1. Directs and coordinates the work of others working with or assisting him.
2. Inspects and operates equipment in the power station as directed. Reports any unusual performance of this equipment to the designated person(s).
3. Operates the radioactive waste disposal system and other related equipment within the containment vessel and the auxiliary building in accordance with the Operating License, Technical Specifications, normal and special operating procedures.
4. Performs the functions of radiation protection monitor on his shift and is responsible for notifying the designated persons if any portion of the plant assigned to him exceeds established radiation limits.
5. Observes, records and interprets designated readings.
6. Performs functions involved in the receipt, storage, loading and unloading of fuel, shipment of irradiated materials and disposal of radioactive wastes.
7. Is responsible for electrical and mechanical tagging and switching as directed.
8. Will be expected to show interest in and prepare for the next higher classification, including appropriate AEC licensing.
9. May assist supervisors in training of other personnel in the operation and control of all equipment for which he is responsible.
10. Performs other related or lesser skilled duties for which he is qualified or has received proper instruction or direction.

B. Experience, Education and Special Information Required:

1. Must have one year's experience as an Auxiliary Operator-"B". Must have passed written and practical examinations to qualify for advancement from Auxiliary Operator-"B" to this higher classification.
2. Must be a high school graduate with a strong background in mathematics and the physical sciences including algebra, trigonometry and physics or equivalent education.

POOR ORIGINAL

JOB SPECIFICATION

JOB NO. 107
SHEET NO. 2

3. Must have a thorough knowledge of the layout, construction and operation of the nuclear power station to which he is assigned, including the technical aspects of radiological protection.
4. Must be able to perform non-routine operations of considerable complexity and variety exercising judgment where standard methods of procedure are not available.
5. Must be thoroughly familiar with the Company's electrical and mechanical tagging rules.
6. Must be thoroughly familiar with the Company's Safety Rules including methods of resuscitation.
7. A valid driver's license may be required.

C. Physical Qualifications:

1. Normal health, physique and use of senses including color perception as indicated by passing the physical examination given by a Company physician when required.
2. Strength adequate to perform the duties of this classification.

D. Personal Qualifications:

1. Must be willing to work under unusual or special working conditions and surroundings.
2. Must be willing to work extra and/or irregular hours and/or a shift or scheduled operation.
3. Must be particularly alert in observing hazards and avoiding accidents.
4. Must be capable of making and holding to decisions with fairness.
5. Must be able to receive and transmit orders and instructions in such a manner as to inspire respect and confidence of both superiors and subordinates.
6. Should use tact in dealing with others.
7. Must be capable of assuming responsibility of directing others.
8. Must be able to plan work.

GUIDELINES
AUXILIARY OPERATOR C
TRAINING PROGRAM

1. The initial Auxiliary Operator "C" training program will begin on approximately . The program will be 90 days in duration and will coincide with the 90 day probationary period.
2. The initial Auxiliary Operator "C" Training Program will consist of approximately 9 weeks of systems oriented classroom instruction with the remainder of the 90 day period devoted to on-shift, on-the-job type training and final comprehensive examinations.
3. During the classroom phase of the training program there will be 2 training periods per day. These training periods will run from 0730-1130 and 1200 to 1600. In general, within any given training period there will be one classroom instruction session of approximately 2 hours duration. This classroom instruction session will normally be followed by a plant tour of the system being studied. Such tours will last approximately 1 hour, and students may be divided into smaller groups to facilitate these tours. The remaining hour within each training period will be for self-study.

At the discretion of the instructor or the Supervisor of Training the above schedule may be changed to reflect the most efficient way to handle the respective subject material. However, a conscientious effort will be made to honor a 2:1:1 relationship between classroom instruction, plant tour and self-study respectively. On Friday of each week the entire morning will be provided to the student for study. An instructor will be made available during this period to assist the students as necessary. Students will be expected to use all study periods for studying the appropriate material either in the classroom or the plant. Behavior other than this will be dealt with by using appropriate disciplinary measures.

On Friday afternoon of each week a test will be given. The test will cover the subject matter from the four preceding days. Such weekly tests will be approximately 2 hours in duration. Upon completion, tests will be reviewed in class as time allows.

A grade of 70% will be considered passing on all tests. Should a student fail a weekly test, the failed test will be reviewed with the student's bargaining unit representative. A re-examination on the failed subject matter will be conducted by administering a second written test on the following Friday morning. Failure of the re-examination will result in the student being dropped from the Auxiliary Operator C training program and returned to the classification held prior to becoming an Auxiliary Operator. Failed re-examinations will be reviewed with the appropriate bargaining unit representatives.

4. At 2300 Sunday of the ninth week of the training program the Auxiliary Operators "C" will go on shift and be assigned administratively to the Operations Department. While assigned to the Operations Department they will participate in on-shift evolutions under the direction and supervision of Auxiliary Operators "A". Additionally, they will begin qualification on a checklist of pre-

planned practical assignments in specific areas.

5. During the thirteenth week of the training program all Auxiliary Operators "C" will work Operations Department training shift hours (0700-1500), and will each be given a comprehensive oral examination by a shift supervisor, shift foreman or member of the training department staff. Detailed guidelines and a checklist will be provided to the examiners. The examination will cover material from both the classroom training program and the practical pre-planned assignments accomplished while on shift. The examination will be graded on a pass/fail basis. Failure of this oral examination will result in an oral reexamination being administered later during the thirteenth week of the training program. An Auxiliary Operator "C" may have his/her bargaining unit representative present for an oral re-examination. Failure of an oral re-examination will result in the Auxiliary Operator "C" being returned to the classification he/she held prior to becoming an Auxiliary Operator.
6. During the thirteenth week of the training program all Auxiliary Operators "C" will take a final written comprehensive examination. This examination will cover the same material as the previously described final oral examination and will be approximately 2-3 hours in duration. 70% will be the minimum passing grade. Should an Auxiliary Operator "C" fail the final written examination a written re-examination will be administered later during the thirteenth week of the training program. Should an Auxiliary Operator "C" fail the written re-examination he/she will be returned to the classification held prior to becoming an Auxiliary Operator. As before, all failed examinations or re-examinations will be reviewed with appropriate bargaining unit representatives.
7. Auxiliary Operators "C" who have successfully completed the training program will come off probation 90 days after the commencement of the training program except in such cases where the training program is extended due to time lost during the training program.
8. Vacation may be taken during the training program at the discretion of the employee. However, should an Auxiliary Operator "C" take vacation during the program he/she will be personally responsible for making up all tests or assignments missed upon his/her return.
9. Persons assigned as Auxiliary Operators "C" subsequent to the commencement of the Auxiliary Operator "C" training program but prior to the end of the 90 day training program will participate in the ongoing phase of the Auxiliary Operator "C" training program upon their assignment as an Auxiliary Operator "C". The Auxiliary Operator "C" program will be extended for said individuals in a manner consistent with the above schedule such that said Auxiliary Operators "C" can complete the training program within 90 days.

CLASSROOM LESSON TOPICS
AOC INITIAL TRAINING - UNIT I

1. Mechanical Fundamentals including:
 - a) Pressure and Flow
 - b) Temperature and Heat
 - c) Properties of Water
 - d) Oils and Lubrication
 - e) Valves and Traps
 - f) Pumps
2. Reading Prints and Drawings
3. Interpretation of Graphs
4. Basic Steam Cycle
5. Electrical Fundamentals
6. Balance of Plant Electrical
7. Class 1E Electrical
8. Diesel Generator & Auxiliaries
9. Switching and Tagging
10. Screen House Equipment
11. Secondary Service River Water
12. Mechanical Draft Cooling Tower
13. Nuclear Service River Water
14. Decay Heat River Water
15. Reactor Building Emergency Cooling
16. River Water Chlorination
17. Circulating Water
18. Circ. Water Chlorination and Chemical Feed
19. Amertap (Condenser Tube Cleaning)
20. Fire Protection
21. Cycle Makeup Pretreatment
22. Cycle Makeup Demineralizers
23. Demineralized Water
24. Domestic Water
25. Reclaimed Water
26. Industrial Waste Treatment
27. Condensate
28. Condensate Polishing
29. Condensate Chemical Feed
30. Feedwater
31. Emergency Feedwater
32. Main Steam
33. Extraction Steam
34. Auxiliary Steam
35. Stage Heater Vents and Drains
36. Condenser Air Extraction
37. Auxiliary Boilers
38. Main Turbine - Generator

39. Turbine - Generator Auxiliary Systems including:

- a) Turbine Lube Oil
- b) Hydrogen Seal Oil
- c) Generator Gas & Vents
- d) EHC
- e) Gland Steam
- f) Stator Cooling
- g) Isolated Phase Bus Duct Cooling
- h) Generator Core Monitor

40. Instrument/Control Air

41. Station Service Air

42. Secondary Service Closed Cooling

43. H&V - Control Building

44. Introduction to Nuclear Systems including:

- a) Fuel Handling Equipment
- b) Spent Fuel Cooling
- c) Liquid Waste Disposal
- d) Liquid Waste Evaporators
- e) Solid Waste Disposal
- f) Gaseous Waste Disposal
- g) Reactor Coolant System
- h) Makeup and Purification
- i) Decay Heat Removal
- j) Core Flood
- k) Reactor Building Spray
- l) FSAS
- m) ICS

45. Intermediate Health Physics

46. Multimedia First Aid

47. Fire Brigade Training

CLASSROOM LESSON TOPICS
AOC INITIAL TRAINING - UNIT II

1. Mechanical Fundamentals including:
 - a) Pressure and Flow
 - b) Temperature and Heat
 - c) Properties of Water
 - d) Oils and Lubrication
 - e) Valves and Traps
 - f) Pumps
2. Reading Prints and Drawings
3. Interpretation of Graphs
4. Basic Steam Cycle
5. Electrical Fundamentals
6. Balance of Plant Electrical
7. Class 1E Electrical
8. Diesel Generators & Auxiliaries
9. Switching and Tagging
10. Screen House Equipment
11. Secondary Service River Water
12. Mechanical Draft Cooling Tower
13. Nuclear Service River Water
14. River Water Chlorination
15. Circulating Water
16. Circ Water Chlorination and Chemical Feed
17. Amertap (Condenser Tube Cleaning)
18. Fire Protection
19. Makeup Water Treatment
20. Demineralized Water
21. Domestic Water
22. Industrial Waste Treatment
23. Condensate
24. Condensate Polishing
25. Condensate Chemical Feed
26. Feedwater
27. Emergency Feedwater
28. Main Steam
29. Extraction Steam
30. Auxiliary Steam
31. Heater Drains
32. FW Heater Vents, Reliefs and Misc. Drains
33. Condenser Air Extraction
34. Main Turbine - Generator
35. Turbine - Generator Auxiliary Systems including:
 - a) Turbine Lube Oil (Pumping)
 - b) Turbine Lube Oil Transfer & Purification
 - c) Hydrogen Seal Oil
 - d) EHC
 - e) Gland Steam
 - f) H₂/CO₂ - Secondary
 - g) Isolated Phase Bus Duct Cooling
 - h) Generator Core Monitor

36. Instrument/Control Air
37. Station Service Air
38. Secondary Service Closed Cooling
39. H&V - Control Room
40. H&V - Control Building Area
41. H&V - Cable, Battery & Switchgear Rooms
42. Introduction to Nuclear Systems including:

- a) Fuel Handling Equipment
- b) Spent Fuel Cooling
- c) Liquid Waste Disposal - RC
- d) Liquid Waste Disposal - Misc.
- e) Reactor Coolant Evaporator
- f) Solid Waste Disposal
- g) Gaseous Waste Disposal
- h) Reactor Coolant System
- i) Makeup and Purification
- j) Decay Heat Removal
- k) Core Flood
- l) Reactor Building Spray
- m) SFAS
- n) ICS

43. Intermediate Health Physics
44. Multimedia First Aid
45. Fire Brigade Training

CLASSROOM LESSON TOPICS
AOB TRAINING - UNIT I

1. Reactor Vessel Construction
2. Reactor Coolant System
3. Reactor Coolant Pumps
4. Makeup and Purification
5. Decay Heat Removal
6. Core Flood
7. Reactor Building Spray
8. R.B. Normal Cooling
9. Decay Heat Closed Cooling
10. Intermediate Closed Cooling
11. Nuclear Service Closed Cooling
12. Spent Fuel Cooling
13. Chemical Addition - Nuclear
14. ESAS
15. Liquid Waste Disposal
16. Rad. Waste Evaporators
17. Solid Waste Disposal
18. Gaseous Waste Disposal
19. Fuel Handling
20. Radiation Monitoring System (RMS)
21. Nuclear Instrumentation
22. Non-Nuclear Instrumentation
23. Reactor Protection System (RPS)
24. Control Rod Drive - Mechanical
25. Control Rod Drive - Electrical
26. Integrated Control System (ICS)
27. Mathematics Review including:
 - a) Algebraic Manipulations
 - b) Powers and Roots
 - c) Scientific Notation
 - d) Common and Natural Logarithms
28. Advanced Health Physics

CLASSROOM LESSON TOPICS
AOB TRAINING - UNIT II

1. Reactor Vessel Construction
2. Reactor Coolant System
3. Reactor Coolant Pumps
4. Makeup and Purification
5. Decay Heat Removal
6. Core Flood
7. Reactor Building Spray
8. R.B. Normal/Emergency Cooling
9. Decay Heat Closed Cooling
10. Intermediate Closed Cooling
11. Nuclear Service Closed Cooling
12. Spent Fuel Cooling
13. Chemical Addition - Nuclear
14. SFAS
15. Liquid Waste Disposal - Reactor Coolant
16. Liquid Waste Disposal - Misc.
17. Reactor Coolant Evaporator
18. Solid Waste Disposal
19. Gaseous Waste Disposal
20. Fuel Handling
21. Radiation Monitoring System (RMS)
22. Nuclear Instrumentation
23. Non-Nuclear Instrumentation
24. Reactor Protection System (RPS)
25. Control Rod Drive - Mechanical
26. Control Rod Drive - Electrical
27. Integrated Control System (ICS)
28. Mathematics Review Including:
 - a) Algebraic Manipulations
 - b) Powers and Roots
 - c) Scientific Notation
 - d) Common and Natural Logarithms
29. Advanced Health Physics