

Facility Representative

Qualification Equivalencies Based On Previous Experience

The following information was distributed by Thomas W. Evans (HR 1.5) in a memorandum dated December 12, 1995. The memorandum is on file in DOE-ID Training and if needed can be referenced as "DOE Memorandum, Course Catalog and Competency to Course Matching", dated December 12, 1995.

DOE Technical Qualification Program Standards specify competencies that technical DOE employees must possess to accomplish their assigned tasks and activities. These competencies can be gained in a number of ways including through training, education, or prior military or job experience. This material contains lists of the military or job experience and the competencies that were gained as a result of that experience. This information was developed by three subject matter experts who held positions of increasing authority in the military or the job category. Each subject matter expert independently analyzed each qualification standard competency. Then, the three met as a group to develop a consensus on each competency. If there was disagreement, the most conservative choice was used.

The header lists the general field of experience, Commercial Nuclear Power or Navy Nuclear Power Program, with all other categories under these two areas. The subheader lists the position title of the military or job category within that industry. The next level lists the qualification standard subject with the competencies associated with it listed below.

To locate the equivalencies that you may claim, locate the position title of your prior military or job category, then find the qualification standards and listed competencies that apply to your current position. The competencies listed below the qualification standards are those you would have gained through your experience in the job listed in that subheader in commercial or navy nuclear programs. The index of the data including the industry and qualifying position, is as follows:

A. Commercial Nuclear Power

1. Auxiliary Operator
2. Operations/Maintenance Manager
3. Reactor Operator
4. Senior Reactor Operator/Shift Technical Advisor

B. Navy Nuclear Power Program

1. Commanding Officer
2. Division Officer/Chief - Engineering Division (E)
3. Division Officer/Chief - Machinery Division (M)
4. Division Officer/Chief - Reactor Controls (R)
5. Division Officer/Chief - Radiological Laboratory Technician (RL)
6. Served Engineer
7. Engineer Qualified
8. Leading Petty Officer/Engineer Watch Supervisor (LPO/EWS) - Engineering Division (E)
9. Leading Petty Officer/Engineer Watch Supervisor (LPO/EWS) - Machinery Division (M)
10. Leading Petty Officer/Engineer Watch Supervisor (LPO/EWS) - Reactor Controls (R)
11. Leading Petty Officer/Engineer Watch Supervisor (LPO/EWS) - Radiological Laboratory Technician (RL)
12. Nuclear Power School (NPS)/Nuclear Power Training Unit (NPTU)

A. Commercial Nuclear

1. Auxiliary Operator

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.7 Personnel shall demonstrate familiarity level knowledge of basic heating, ventilation, and air conditioning system construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.11 Personnel shall demonstrate working level knowledge of basic electrical fundamentals in the area of electrical distribution systems.
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.
- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.17 Personnel shall demonstrate working level knowledge of chemistry fundamentals in the area of safety.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.
- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.

2. Ops/Main Manager

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.

- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.7 Personnel shall demonstrate familiarity level knowledge of basic heating, ventilation, and air conditioning system construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
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- 1.17 Personnel shall demonstrate working level knowledge of chemistry fundamentals in the area of safety.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.
- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.
- 1.24 Personnel shall demonstrate a working level knowledge of engineering fabrication, construction, and architectural drawings.
- 3.1 A Facility Representative shall demonstrate a working level knowledge of the Department of Energy/facility contract provisions necessary to provide oversight of the operating contractor operations.
- 3.2 A Facility Representative shall demonstrate a familiarity level knowledge of the training and qualification requirements for nuclear facility operations personnel.
- 4.1 A Facility Representative shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of the problems, and identify corrective action(s).
- 4.2 A Facility Representative shall demonstrate a working knowledge of assessment techniques such as the planning and use of observations, interviews, and document reviews to assess facility performance, report results of assessments, and follow up on actions taken as the result of assessments.
- 4.3 A Facility Representative shall demonstrate a working level knowledge of the Department of Energy emergency management system and response practices.
- 4.4 A Facility Representative shall demonstrate a familiarity level knowledge of applicable DOE Orders sufficient to conduct independent assessment of contractor and/or Federal employee work activities.
- 4.5 A Facility Representative shall demonstrate a working level knowledge of Conduct of Maintenance principles and Department of Energy requirements to ensure maintenance is performed in a safe and efficient manner.
- 4.6 A Facility Representative shall demonstrate a working level knowledge of the Occurrence Reporting and Processing System necessary to ensure that occurrences are properly reported and processed in accordance with DOE Order 5000.3B "Occurrence Reporting and Processing of Operations Information".

3. Reactor Operator

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.7 Personnel shall demonstrate familiarity level knowledge of basic heating, ventilation, and air conditioning system construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.11 Personnel shall demonstrate working level knowledge of basic electrical fundamentals in the area of electrical distribution systems.
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.
- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.17 Personnel shall demonstrate working level knowledge of chemistry fundamentals in the area of safety.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.
- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.
- 3.1 A Facility Representative shall demonstrate a working level knowledge of the Department of Energy/facility contract provisions necessary to provide oversight of the operating contractor operations.
- 3.2 A Facility Representative shall demonstrate a familiarity level knowledge of the training and qualification requirements for nuclear facility operations personnel.

4. SRO/STA

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
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- 3.1 A Facility Representative shall demonstrate a working level knowledge of the Department of Energy/facility contract provisions necessary to provide oversight of the operating contractor operations.
- 3.2 A Facility Representative shall demonstrate a familiarity level knowledge of the training and qualification requirements for nuclear facility operations personnel.
- 4.3 A Facility Representative shall demonstrate a working level knowledge of the Department of Energy emergency management system and response practices.
- 4.5 A Facility Representative shall demonstrate a working level knowledge of Conduct of Maintenance principles and Department of Energy requirements to ensure maintenance is performed in a safe and efficient manner.

B. Navy Nuclear

1. CO

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
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- 4.1 A Facility Representative shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of the problems, and identify corrective action(s).
- 4.2 A Facility Representative shall demonstrate a working knowledge of assessment techniques such as the planning and use of observations, interviews, and document reviews to assess facility performance, report results of assessments, and follow up on actions taken as the result of assessments.

2. Div Off/Chief-E

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
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- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
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- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
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- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.
- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.

3. Div Off/Chief-M

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
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- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
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- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.

- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.

4. Div Off/Chief-RC

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
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- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.
- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.

5. Div Off/Chief-RL

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.

- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
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- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.

6. ENG Billet

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
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- 4.1 A Facility Representative shall demonstrate a working level knowledge of problem analysis principles and techniques necessary to identify problems, determine potential causes of the problems, and identify corrective action(s).
- 4.2 A Facility Representative shall demonstrate a working knowledge of assessment techniques such as the planning and use of observations, interviews, and document reviews to assess facility performance, report results of assessments, and follow up on actions taken as the result of assessments.

7. ENG Qual

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
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8. LPO/EWS-E

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
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9. LPO/EWS-M

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- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.

- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.
- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.

10. LPO/EWS-RC

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.
- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.
- 1.22 Personnel shall demonstrate a working level knowledge of electrical prints, diagrams and schematics.

- 1.23 Personnel shall demonstrate a working level knowledge of electronic/logic block diagrams, prints, and schematics.

11. LPO/EWS-RL

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.2 Personnel shall demonstrate familiarity level knowledge of basic pneumatic and hydraulic systems in the areas of components, operations, and theory.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.6 Personnel shall demonstrate familiarity level knowledge of basic air compressor, strainer, and filter construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.13 Personnel shall demonstrate familiarity level knowledge of control system principles of operation and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.
- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.
- 1.21 Personnel shall demonstrate a working level knowledge of engineering prints and drawings.

12. NPS/NPTU

- 1.1 A Facility Representative shall demonstrate a familiarity level knowledge of principles of steam system operation including theory, components, startup, normal and off-normal operation, and shutdown.
- 1.3 Personnel shall demonstrate familiarity level knowledge of heat exchanger construction, operations, and theory.
- 1.4 Personnel shall demonstrate familiarity level knowledge of pump construction, operations, and theory.
- 1.5 Personnel shall demonstrate familiarity level knowledge of valve construction, operations, and theory.
- 1.8 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the areas of terminology and theory.
- 1.9 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of direct current (DC).
- 1.10 Personnel shall demonstrate familiarity level knowledge of basic electrical fundamentals in the area of alternating current (AC).
- 1.12 Personnel shall demonstrate familiarity level knowledge of process instrumentation principles of operation, purpose and uses.
- 1.14 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of theory and the periodic table.

- 1.15 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of chemical bonding and chemical reactions.
- 1.16 Personnel shall demonstrate familiarity level knowledge of chemistry fundamentals in the areas of corrosion and water treatment.
- 1.18 Personnel shall demonstrate familiarity level knowledge of basic thermodynamics concepts and theories.
- 1.19 Personnel shall demonstrate familiarity level knowledge of basic heat transfer and fluid flow concepts and theories.
- 1.20 Personnel shall demonstrate familiarity level knowledge of basic material science in the areas of concepts, theories, and principles.