PROOF OF CONCEPT REPORT:

ALIGNMENT BETWEEN THREE ENERGY OCCUPATIONS AND MILITARY OCCUPATIONS

A REPORT IN SUPPORT OF NATIONAL INSTITUTE OF BUILDING SCIENCES EFFORT ON THE DEPARTMENT OF ENERGY'S BETTER BUILDINGS WORKFORCE GUIDELINES "BUILDING OPERATIONS PROFESSIONAL, BUILDING ENERGY AUDITOR, AND BUILDING COMMISSIONING PROFESSIONAL JOB TITLES

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EXECUTIVE SUMMARY

The Department of Energy's (DOE) Better Building Workforce Guidelines (BBWG) initiative is developing certification schemes for several new job titles in Energy Management and Building Operations occupational areas. One of DOE's key areas of interest is to identify potential methods to consider and incorporate the rich talents and experiences of United States military Service members and Veterans into this workforce development effort. Proactively considering the skills attained through military training in the development of the certification schemes can enhance the ability of the certification providers to ensure that Service members and Veterans receive appropriate credit for skills attained through this less traditional form of workforce preparation. This is consistent with the Veterans Skills to Jobs Act (Public Law 112-147), which requires federal agencies that develop occupational credentialing requirements to consider relevant training received by individuals while servicing as members of the armed forces.

This report focuses on establishing a proof of concept process to identify and provide a high-level assessment of the linkages between the Job Task Analyses (JTA) and certification eligibility requirements for three occupational titles, Building Operations Professional, Building Energy Auditor, and Building Commissioning (Cx) Professional identified for the Better Buildings Workforce Guidelines and how those might be related military occupational codes (MOCs). The JTAs for these job titles were completed in July 2014 and validated by their Scheme Committees during their meetings in August and September 2014 in Denver, Colorado.

The National Institute of Building Sciences, working for the U.S. Department of Energy, contracted with SOLID to review the JTA and Scheme Committee guidance and develop a proof of concept military crosswalk. This report identifies a baseline strategy, methodology, and essential elements of how future military crosswalks could be performed. The report also highlights examples of military occupational codes (MOCs) related to the three respective job titles, and it serves to identify additional validation requirements as well as potential future areas of investigation.

The Department of Defense (DoD) has hundreds of occupational areas with tens of thousands of military job titles within them. To narrow the field of possibilities while completing this initial crosswalk, analysts reviewed a number of key data sources, including the Department of Labor's Occupational Information Network (O*NET) database, the Army, Navy, Air Force, and Marine Corps Credentialing Opportunities On Line (COOL) databases, and data from the Department of Defense's Defense Manpower Data Center (DMDC).

From that review, seven proof of concept candidate MOCs were selected for deeper investigation and were profiled as sample MOC candidates for additional review and focus for the potential development of bridge training programs. The MOCs are described in sections two through four of the report. The seven candidate MOCs include samples from each of the military Services in order to provide a broader spectrum of possibilities across the Department of Defense.

Each of the candidate MOCs was evaluated to determine if there is evidence of training and experience of personnel in the MOC related to the respective JTAs of each job title and if so to what degree. The key comparison elements for conducting the crosswalk included publicly available information on training and career field development for each military occupation as compared to the Scheme Committee Exam Blueprints for each of the three BBWG job titles.

Another key element of the analysis was a specific focus on enlisted MOCs as they are the group of personnel the Department of Energy and Department of Defense agree are most in need of attention and emphasis during this workforce development project. The enlisted force is highly-skilled and highly-trained, but minimally credentialed for civilian occupations. Civilian employers often find it difficult to assess the equivalency of Veterans' military training and, as a result, transitioning enlisted Service members and Veterans may have difficulty attaining civilian jobs for which they are qualified.

The purpose of this proof of concept study was to develop the tools and processes by which additional analysis can be conducted, and to gain insight into the general nature of the training and experience of military personnel as it relates to the certification criteria for each of these three BBWG job titles. In general, it does not appear that many enlisted MOCs will directly relate to this job title and certification requirements; however, there is evidence that Service members in numerous military occupational areas have embedded skill sets that with further training and development could bridge the experience gaps and complement their significant managerial, planning, and leadership experiences making them good candidates for earning the certification requirements for each of these career fields.

1. INTRODUCTION

PURPOSE

The Department of Energy's (DOE) Better Building Workforce Guidelines (BBWG) initiative is developing certification schemes for several new job titles in Energy Management and Building Operations occupational areas. One of DOE's key areas of interest is to identify potential methods to consider and incorporate the rich talents and experiences of United States military Service members and Veterans into this workforce development effort. Proactively considering the skills attained through military training in the development of the certification schemes can enhance the ability of the certification providers to ensure that Service members and Veterans receive appropriate credit for skills attained through this less traditional form of workforce preparation. This is consistent with the Veterans Skills to Jobs Act (Public Law 112-147), which requires federal agencies that develop occupational credentialing requirements to consider relevant training received by individuals while serving as members of the armed forces.

This report focuses on establishing a proof of concept process to identify and provide a high-level assessment of the linkages between three military occupations and separate job task analyses for three specific energy-oriented positions:

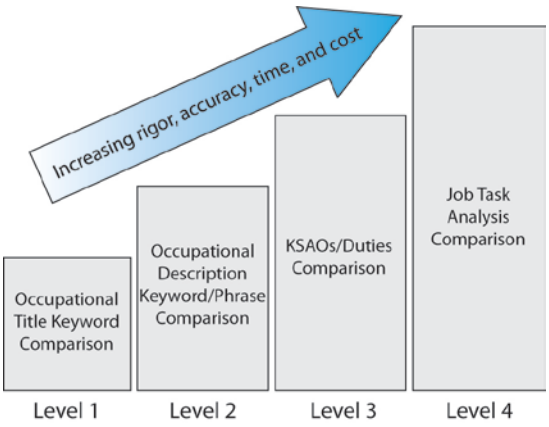
- Building Operations Professional,
- Building Energy Auditor, and
- Building Commissioning Professional.

The JTA for these three positions was completed during 2014 and validated by DOE-convened Scheme Committees for each of the three positions.

The National Institute of Building Sciences (NIBS) contracted with SOLID to review the JTA and Scheme Committee guidance and develop a proof of concept military crosswalk for each of the three positions. This report identifies a baseline strategy, methodology, and essential elements of how future military crosswalks could be performed. The report also highlights examples of military occupational codes (MOCs) related to the three job titles, and it serves to identify additional validation requirements as well as potential future areas of investigation.

METHODOLOGY

The Department of Defense (DoD) has hundreds of occupational areas with thousands of military job titles within them. To understand the methodology employed to isolate the military occupations related to the three Building positions, it is useful to understand the varying methodologies that can be employed to make military to civilian job matches. Exhibit 1 shows the four levels of analysis that might be used to develop military to civilian crosswalks. The degree of accuracy of a crosswalk will be dependent on the level of rigor employed in its development. The methodologies depicted in Exhibit 1 and described in Table 1, are divided into four levels of analysis with Level 1 requiring the least rigorous analysis and producing the least accurate results and Level 4 being the most rigorous and most accurate:



- Level 1 – Occupational Title Keyword Comparison
- Level 2 – Occupational Description Keyword/Phrase Comparison
- Level 3 – KSAOS/Duties Comparison
- Level 4 – Job Task Analysis Comparison

Clearly, the ideal methodology would be the most rigorous; however, as the level of rigor and accuracy increase, so does the amount of time required to conduct the analysis and the cost of the analysis. Level 3 and 4 analyses produce the most accurate results, but because they require a significant level of effort and interaction with subject-matter experts and/or the use of Industrial/Organizational Psychologists, they can be costly and time consuming.

For purposes of this initial proof of concept test, SOLID used a two-step process that resulted in an approach that might be considered a hybrid of Level 2 and Level 3 analysis. Specifically, the Level 2 analysis process was used to identify the pool of military occupations that might be related to the three positions and this was then followed up with more detailed analysis of a subset of these MOCs. This second step partially meets the Level 3 Analysis comparison – that is, it involved a comparison of job duties, but did not include subject matter expert validation, which was beyond the scope of resources available for this proof of concept. More detailed information on the two-step process is provided below.

Table 1: Levels of Data Analysis for Military to Civilian Crosswalks

Level	Type of Data Analyzed		Description
	Military Occupation	Civilian Occupation	
1	MOC Title	O*NET Title	Occupational Title Keyword Matching – Matching key words in military and civilian occupational titles.
2	MOC Description	O*NET Description	Occupational Description Keyword/Phrase Comparison – Comparison of key words and phrases in military and civilian job descriptions.
3	Military KSAOs/Duties	KSAOS/Duties Defined in O*NET	KSAOs/Duties Comparison – Comparison of Knowledge Skills, Abilities, and Other (KSAOs) and/or job duties for military and civilian jobs combined with Subject Matter Expert (SME) input.
4	Military JTA or Training Materials	Civilian JTA	Job Task Analysis Comparison – SME and Industrial/ Organizational Psychologist (I/O) Panel conduct Job Task Analyses (JTAs) involving observation, incumbent surveys, interviews, and validation studies. [Note: Military JTA is often not available and training materials may be substituted.]

INITIAL IDENTIFICATION OF MOCS POTENTIALLY RELATED TO THE NEW BBWG OCCUPATIONAL TITLES

In support of the Services' COOL programs, SOLID does an in-depth analysis comparing the Service MOCs to civilian jobs based on the Department of Labor O*NET classification scheme. SOLID identifies those civilian jobs that are related to the majority of MOC duties as well as those that are related to an underlying skill set for the MOC or a critical task performed by Service members in that MOC. The O*NET database categorizes and describes the Energy Auditor occupation, but not the Building Operations Professional or Building Commissioning Professional. Accordingly, the first step in the analysis was to compile an umbrella list of related civilian occupations from the O*NET database that have skill sets or training related to these two additional job titles (see Table 2 below). That list was then used to compile a list of potentially related military occupation code candidates based on SOLID's previous cross-walk investigations.

Table 2. Career Titles from O*NET Identified as Potentially Related to the Three NIBS Positions

Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	Architectural and Engineering Managers	Construction Managers
Heating and Air Conditioning Mechanics and Installers	Electrical Engineering Technologists	Electrical Power-Line Installers and Repairers
Insulation Workers, Mechanical	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	Helpers–Pipelayers, Plumbers, Pipefitters, and Steamfitters
Plumbers, Pipefitters, and Steamfitters	Operating Engineers and Other Construction Equipment Operators	Pipe Fitters and Steamfitters
Stationary Engineers and Boiler Operators	Refrigeration Mechanics and Installers	Energy Auditor

To develop the MOC candidate list, the existing crosswalks developed by SOLID in the Army, Navy, Air Force, and Marine Corps Credentialing Opportunities On-Line (COOL) databases were queried. From the query of the COOL databases as compared to the existing O*NET titles, a total of 114 potentially related military occupations were identified. To view the complete table of potentially related military occupations see Appendix H – O*NET-Military Career Field Crosswalk.

An important qualifier of this data source is that the Air Force and Marine Corps COOL databases were in initial development stages at the time this study was conducted. Neither the Air Force nor the Marine Corps had existing COOL programs at the time, and the initial launch of their respective sites did not go live until October 2014. Accordingly, SOLID's review of related MOCs for the Marine Corps and Air Force were not as comprehensive as for the Army and Navy, but the initial crosswalks were available and relevant to this initial proof of concept investigation.

It is also important to note that in deducing potentially related career fields the focus was on the Department of Defense's (DoD) employment objectives for transitioning enlisted Service members as a priority over transitioning officers. This stipulation was advanced by DoD and approved by the Department of Energy's BBWG oversight authorities and the respective Scheme Committees. The reason for this focus on enlisted personnel is that officers often have existing education credentials and eligibility for professional certifications that closely relate to civilian occupations whereas enlisted Service members often lack closely related civilian employment experience, and developing employment pipeline opportunities for these highly-skilled and highly-trained enlisted personnel is of critical importance to the Department of Energy as well as the Department of Defense. That being the case, the MOCs selected for demonstration in this proof of concept report are enlisted career fields although it is understood that many officer

career fields would likely be more related to the key task found in the JTA/DACUM lists of these job titles.

LEVEL 2 ANALYSIS OF POTENTIALLY RELATED MOCS TO NARROW SCOPE FOR PROOF OF CONCEPT

Once the potentially related military occupations were identified for each of the three positions, the second step was to limit that field of 114 MOCs to a smaller number that was in line with the resources available for the proof of concept study. The goal was to identify and target those MOCs most likely to align with the eligibility requirements confirmed by the Scheme Committees for each of the three positions.

To identify these occupations a Level 2 analysis was conducted of the 114 MOCs. Specifically, analysts performed a key word search against the descriptions of those 114 MOCs using the Defense Manpower and Data Center (DMDC) Occupational Database (ODB). This database contains a comprehensive listing of the over 10,000 military job titles and job descriptions, including not only primary career fields but special duty or collateral duty job titles for which there are not always career development or training tracks within the military. Key words related from the list of "Skills and Abilities" on the DACUM charts associated with each of the three positions were input, and any job titles or job descriptions that contained those key words were compiled on a list of potential candidate career fields for further investigation.

While the Building Operations Professional, Energy Auditor, and Commissioning Professional positions have distinct duties, there were no MOCs that aligned directly with each of the three building positions. Using the Scheme Committee eligibility criteria and cross-referencing both the DMDC and COOL databases, the list of 114 potential military career fields was paired down to seven distinct MOCs for additional review and analysis as part of this proof of concept study. These seven MOCs were identified as sharing some of the job duties for each of the three building positions. It is important to note that some of these seven MOCs shared job duties for more than one of the three building positions and were therefore analyzed against the credentialing exam criteria for more than one of the three job titles.

FINAL ANALYSIS OF SEVEN PROOF OF CONCEPT MOCS

The next step in the analysis process was to conduct the initial phase of the Level 3 analysis – that is, a comparison of the job duties of the related MOCs to the Exam Blueprints, which were also confirmed by the Scheme Committees. The results of the analysis of each of the MOCs are detailed in the remaining chapters of this report.

Each of the MOCs are identified individually in the Exam Blueprint comparison chartsin the chapters that follow. The Exam Blueprint relationship chart for each MOC provides a visual representation of the likelihood of personnel in the career field having attained the training and experience necessary to successfully challenge the certification exam. The chart interpretation key is as follows:

- ● Fully colored circle –military job duties are closely related to this job title
- ◖ Half colored circle – military job duties are partially related to this job title
- ○ Empty circle – military job duties are not related to this job title

Exhibit 2. Primary Data Sources Used for Proof of Concept

The initial step in the crosswalk review process was to identify the key eligibility requirements and job tasks for each of the three job titles for comparison to the military occupations. Two primary sources of information were used as foundational documents in that review:

1. Scheme Committee requirements review. These are the eligibility requirements as defined during the August and September 2014 Scheme Committee meetings (Appendices A – C, Professional Testing Scheme Committee Meeting Summaries).
2. Final Examination Blueprints. This information can be found in the DACUM chart of duties and tasks included in Job Task Analysis document completed by Professional Testing and submitted to the Scheme Committee for review during their August-September 2014 meetings (Appendices D-F – JTA/DACUM extracts).

SOLID analysts then used three primary sources of data for comparison to identify prospective military career fields:

1. Department of Labor's O*NET database of occupations
2. Department of Defense, Defense Manpower Data Center (DMDC) military occupation descriptions.
3. Army, Navy, Air Force, and Marine Corps Credentialing Opportunities On-Line (COOL) databases. (Appendix C – list of reference links)

REPORT ORGANIZATION

The remainder of this report presents the results of the analysis of the three positions under consideration by NIBS along with conclusions and considerations for next steps:

- Chapter 2 – Building Operations Professional
- Chapter 3 – Building Energy Auditor
- Chapter 4 – Building Commissioning Professional
- Chapter 5 – Conclusions and Considerations for Next Steps
- Appendices – Included as a separate document

2. BUILDING OPERATIONS PROFESSIONAL

OVERVIEW OF BUILDING OPERATIONS PROFESSIONAL

Building Operations Professionals manage the maintenance and operation of building systems and installed equipment, and perform general maintenance to maintain the building's operability, optimize building performance, and ensure the comfort, productivity and safety of the building occupants.

Building Operations Professional 5-Key Task Area Domains (Reference Appendix D - Building Operations Professional JTA/DACUM)

A	Managing Human Resources
B	Conduct Planning Activities
C	Operating Buildings
D	Optimizing the Facility
E	Conducting Budgeting Activities

During their meeting in Denver, CO between 21-22 August, the Building Operations Professional Scheme Committee reviewed the DACUM charts task by task, and identified the tasks and associated KSAs that could be tested, and those that could be verified through experience or other requirements. The Scheme Committee agreed to the following eligibility requirements for individuals to quality to take the Building Operations Professional certification examination (Appendix A):

> Participation in facility energy assessment OR 30 contact hours of specific relevant training in energy assessments, system optimization, measurement verification and energy analysis; plus participation in capital planning process, OR 10 contact hours of specific relevant training in capital budget, equipment, lifecycle analysis (LCA).
>
> Participation in a minimum of three projects related to facility operations, improvements, or repairs spanning submittal approval, construction planning, completion verification, and commissioning as appropriate to the project. Over the three projects, the applicant must have performed the following activities at least once: conduct equipment inventories; identify equipment specifications; identify O&M requirements; rank equipment in terms of priority; determine level of service to be performed on equipment based on criticality of system; identify tasks to be outsourced; identify skill level of staff; identify required tools; identify opportunities for predictive maintenance.
>
> Over the course of a minimum of three engagements with third-party or external resources, the applicant must have done each of the following activities at least once: create the RFP and SOW; determine requirements for outside services; determine type of contract; interview service providers; review proposals or RFP responses; develop or use existing contractor/service provider handbook; conduct orientation for service providers;

determine criteria for selection of service providers; secure the services of outside service providers.

AND one of the following options:

1. Bachelor's Degree or higher or attainment of E6 in any branch of the military with 6 years' experience in building operations with a minimum of 3 years in supervisory role.

2. Bachelor's Degree or higher related to Building Operations or attainment of E6 in a related specialty in a branch of the military with 5 years' experience in building operations with a minimum of 3 years in supervisory role. Building Operations related degrees include courses, for example, but not limited to: HVAC, energy management, mechanical engineering, electrical engineering, boilers, fans and pumps, building automation technology, fire-life safety, lighting, sustainability, green technology, etc.

3. High School Diploma or GED with 10 years' experience in building operations* with a minimum of 3 years in supervisory role**.

4. Associate Degree or Vocational degree related to Building Operations with 7 years' experience in building operations with a minimum of 3 years in supervisory role. Building Operations related degrees include courses, for example, but not limited to: HVAC, energy management, mechanical engineering, electrical engineering, boilers, fans and pumps, building automation technology, fire-life safety, lighting, sustainability, green technology, etc.

5. Associate/Technical/Vocational 2 year degree, or equivalent military training, with 8 years' experience in building operations with a minimum of 3 years in supervisory role.

*Experience in building operations is defined as performing general maintenance to maintain the building's operability, optimize building performance, and ensure the comfort, productivity and safety of the building occupants.

**Supervisory experience is defined as directing, planning and evaluating individuals responsible for performing general maintenance to maintain the building's operability, optimize building performance, and ensure the comfort, productivity and safety of the building occupants.

From that operational definition of Building Operations Professional and from those eligibility criteria, the following military occupations were evaluated as candidate MOCs for the proof of concept study.

ARMY 91X MAINTENANCE SUPERVISOR

Military Occupational Description:

The Maintenance Supervisor directs and performs field and sustainment maintenance on tracked and wheeled vehicles, construction equipment, and special purpose equipment maintenance

activities. Examples of equipment managed by Maintenance Supervisors include that used for earthmoving, grading and compaction; lifting and loading; quarrying and rock crushing; asphalt and concrete mixing and surfacing; water pumping; air compression and pneumatic tools; powered bridging and their associated trailers and material handling equipment (MHE).

Areas of maintenance supervisor expertise include: (1) Power Generation Equipment; (2) Air Conditioning/Refrigeration Systems; and (3) Quartermaster and Chemical Equipment. Supervisory expectations are to perform as support maintenance machine ship supervisor or metalworking supervisor. Supervise recovery operations on track vehicles, wheel vehicles and related activities including electrical wiring harness system repair/maintenance.

Job training for a Maintenance Supervisors requires 10 weeks of Basic Combat Training and 12 weeks of Advanced Individual Training with on-the-job instructions. Part of this time is spent in the classroom and part in the field. Typically Maintenance Supervisors receive Training with Industry skill development; this opportunity exposes the Soldier to best practices in industry and management training, plus additional benefits.

Relationship to Building Operations Professional:

Although the Maintenance Supervisors serve in a different operational context outside of building systems management, their power generation and HVAC systems management training, skills, and experience would likely translate well into building operations. Their experience and training expose these Soldiers to communications, planning, and data collection elements all of which are imperative to success as a Building Operations Professional. Specific building systems training would likely be necessary for a candidate to successfully challenge all the elements of the Blueprint Exam.

Army 91X Maintenance Supervisor Enlisted
Energy Building Operations Professional Blueprint

A		**Managing Human Resources (8%)**	●
	1	Develop workload analyses	◖
	2	Analyze staffing productivity	●
	3	Supervise building staff	●
	4	Secure outside service providers	◖
B		**Conduct Planning Activities (15%)**	◖
	1	Update procedures (SOPs, BOPs, operating plans, emergency plans, etc.)	●
	2	Develop equipment operations plans	◖
	3	Develop planned maintenance schedules	◖
	4	Contribute to construction standards and guidelines	◖
	5	Contribute to capital renewal plans	◖
	6	Conduct Data Management Activities	○

C	**Operating Buildings (50%)**	●
1	Perform workplace hazard assessments	●
2	Participate in emergency drills	●
3	Manage the PPE program	●
4	Manage third party inspections	◖
5	Respond to building emergencies	●
6	Managing building securities	●
7	Coordinate/conduct occupant training	●
8	Conduct risk management activities	●
9	Manage responses to inclement weather conditions/issues	●
10	Respond to tenant requests/issues	●
11	Conduct equipment checks	●
12	Conduct daily rounds	●
13	Coordinate facility operations (normal)	●
14	Coordinate facility operations (other than normal)	●
15	Manage the work order process	●
16	Investigate indoor environmental quality	●
17	Conduct tenant relations activities	○
18	Manage consumables	○
19	Manage outside facility contractors/service providers	◖
20	Manage environmental requirements (permits, etc.)	○
21	Implement an energy management program	◖
22	Maintain the facility and systems	●
23	Conduct facility repair activities	●
D	**Optimizing the Facility (20%)**	◖
1	Conduct measurement and verification activities	●
2	Analyze system performance	●
3	Identify cost saving measures	◖
4	Respond to changing energy costs	◖
5	Optimize system performance	◖
6	Identify sustainability opportunities	◖
E	**Conducting Budgeting Activities (7%)**	○
1	Contribute to long term facility budget plan (5 years)	○
2	Contribute to facility operations budget	●
3	Contribute to capital improvement budget(s)	○

NAVY UT MASTER CHIEF UTILITIESMAN

Military Occupational Description:

Master Chief Utilitiesmen plan, supervise and perform tasks involved in installation, maintenance and repair of plumbing, heating, steam, compressed air, fuel storage and distribution systems, water treatment and distribution systems, air conditioning and refrigeration equipment and septic systems as prescribed by drawings and specifications. Additional responsibilities include preparing progress reports, time records, construction schedules and material, labor, tool and equipment estimates for construction projects.

Master Chief Utilitiesmen act as a project supervisors and trainers. In these roles they solve problems, plan, estimate, schedule, control costs and manage personnel. As a project manager they are responsible for the planning, staffing, directing and control of multiple construction projects. They ensure compliance with specifications, code, plans and contracts. Chiefs also maintain individual combat readiness and perform tasks required in combat and disaster preparedness or recovery operations.

Relationship to Building Operations Professional:

The Naval Master Chief Utilitiesman MOC shows significant evidence that training and experience are likely to have been attained related to this job title and they would be good candidates for the Building Operations Professional certification. Helpful in their background is experience in communications, planning, data collection, and reporting. Opportunities for skill enhancement include budget preparation, and optimization evaluation processes.

Navy UT Master Chief Utilitiesmen Enlisted
Energy Building Operations Professional Blueprint

A		**Managing Human Resources (8%)**	●
	1	Develop workload analyses	◖
	2	Analyze staffing productivity	●
	3	Supervise building staff	◖
	4	Secure outside service providers	●
B		**Conduct Planning Activities (15%)**	●
	1	Update procedures (SOPs, BOPs, operating plans, emergency plans, etc.)	●
	2	Develop equipment operations plans	●
	3	Develop planned maintenance schedules	●
	4	Contribute to construction standards and guidelines	●
	5	Contribute to capital renewal plans	◖
	6	Conduct Data Management Activities	◖
C		**Operating Buildings (50%)**	●

1	Perform workplace hazard assessments	●
2	Participate in emergency drills	●
3	Manage the PPE program	●
4	Manage third party inspections	●
5	Respond to building emergencies	●
6	Managing building securities	●
7	Coordinate/conduct occupant training	●
8	Conduct risk management activities	●
9	Manage responses to inclement weather conditions/issues	●
10	Respond to tenant requests/issues	●
11	Conduct equipment checks	●
12	Conduct daily rounds	●
13	Coordinate facility operations (normal)	●
14	Coordinate facility operations (other than normal)	●
15	Manage the work order process	●
16	Investigate indoor environmental quality	●
17	Conduct tenant relations activities	◖
18	Manage consumables	◖
19	Manage outside facility contractors/service providers	◖
20	Manage environmental requirements (permits, etc.)	●
21	Implement an energy management program	◖
22	Maintain the facility and systems	●
23	Conduct facility repair activities	●
D	**Optimizing the Facility (20%)**	◖
1	Conduct measurement and verification activities	●
2	Analyze system performance	●
3	Identify cost saving measures	◖
4	Respond to changing energy costs	◖
5	Optimize system performance	◖
6	Identify sustainability opportunities	◖
E	**Conducting Budgeting Activities (7%)**	◖
1	Contribute to long term facility budget plan (5 years)	◖
2	Contribute to facility operations budget	●
3	Contribute to capital improvement budget(s)	◖

AIR FORCE 3E090 FACILITY SYSTEMS SUPERINTENDENT ENLISTED

Military Occupational Description:

The Air Force Facility Systems Superintendent manages resources and directs activities devoted to installation removal, operation, maintenance, and repair of all electrical power distribution systems, electrical power generating and control systems, fire alarms, lightning protection, cathodic protection systems, airfield lighting systems, and aircraft arresting systems.

The Air Force Facility Systems Superintendent is a Senior NCO level military occupation, and there are areas of training and experience throughout the MOC that indicate where "Superintendents" would have developed many of the technical and managerial skill sets and experience that with some degree of bridge training would allow them to challenge this certification exam. The subordinate, or "feeder" occupations at the apprentice and journeyman level to this superintendent level position would not likely have the experience and managerial skills necessary to compete well for the certification, but they would be developing technical experience that would be related to the job.

The Superintendent also:

- Performs planning activities and conducts facility surveys;
- Surveys proposed work to determine resource requirements;
- Obtains certifications, special tools, and equipment for assigned personnel; and
- Ensures compliance with all safety and environmental regulations.

Relationship to Building Operations Professional:

While Air Force Facility Systems superintendents serve in a different operational context outside of building systems management, their experiences and training with critical flight line safety management would likely translate well into building operations. Their experience and training expose these senior non-commissioned officers to communications, planning, and data collection elements all of which are imperative to success as a Building Operations Professional. Specific building systems training would likely be necessary for a candidate to successfully challenge all the elements of the Blueprint Exam.

Air Force 3E090 Facility Systems Superintendent Enlisted
Energy Building Operations Professional Blueprint

A		**Managing Human Resources (8%)**	◖
	1	Develop workload analyses	◖
	2	Analyze staffing productivity	◖
	3	Supervise building staff	●
	4	Secure outside service providers	◖

B		**Conduct Planning Activities (15%)**	◖
	1	Update procedures (SOPs, BOPs, operating plans, emergency plans, etc.)	◖
	2	Develop equipment operations plans	◖
	3	Develop planned maintenance schedules	◖
	4	Contribute to construction standards and guidelines	◖
	5	Contribute to capital renewal plans	◖
	6	Conduct Data Management Activities	○
C		**Operating Buildings (50%)**	◖
	1	Perform workplace hazard assessments	●
	2	Participate in emergency drills	◖
	3	Manage the PPE program	◖
	4	Manage third party inspections	◖
	5	Respond to building emergencies	●
	6	Managing building securities	●
	7	Coordinate/conduct occupant training	●
	8	Conduct risk management activities	●
	9	Manage responses to inclement weather conditions/issues	●
	10	Respond to tenant requests/issues	◖
	11	Conduct equipment checks	●
	12	Conduct daily rounds	●
	13	Coordinate facility operations (normal)	●
	14	Coordinate facility operations (other than normal)	●
	15	Manage the work order process	●
	16	Investigate indoor environmental quality	◖
	17	Conduct tenant relations activities	◖
	18	Manage consumables	◖
	19	Manage outside facility contractors/service providers	◖
	20	Manage environmental requirements (permits, etc.)	○
	21	Implement an energy management program	○
	22	Maintain the facility and systems	●
	23	Conduct facility repair activities	●
D		**Optimizing the Facility (20%)**	◖
	1	Conduct measurement and verification activities	●
	2	Analyze system performance	●
	3	Identify cost saving measures	○
	4	Respond to changing energy costs	◖

	5	Optimize system performance	◖
	6	Identify sustainability opportunities	◖
E		**Conducting Budgeting Activities (7%)**	○
	1	Contribute to long term facility budget plan (5 years)	◖
	2	Contribute to facility operations budget	◖
	3	Contribute to capital improvement budget(s)	○

MARINE CORPS 1169 UTILITIES CHIEF ENLISTED

Military Occupational Description:

Marine Corps Utilities Chiefs analyze, translate, and execute commanders' operational requirements into a utilities support reality that enhances mission accomplishment. They plan and supervise the establishment, operation, and maintenance of water filtration/purification, storage, and distribution sites; electric power generating sites along with the inherent underground, above ground, and overhead electric power distribution systems; and shower and laundry services. They coordinate and supervise the installation, maintenance and repair of heating, air conditioning, this also includes automotive, and refrigeration equipment; and the maintenance and repair of the electrical systems on engineer and general supply equipment. Water quality assurance, field sanitation, sewage, and waste disposal are also planned, coordinated, and supervised by utilities chiefs. Additional responsibilities expected of Utilities Chiefs include planning and coordinating the installation and repair of plumbing and indoor electrical wiring.

This MOS is technical in nature and requires years of experience to become proficient. Due to the diversity of commands throughout the Marine Corps, some of the duties and tasks performed by the Utilities Chief may overlap with those of the Engineer Equipment Chief, Motor Transport Maintenance Chief, and Motor Transport Operations Chief. Additional duties may include: formal schools faculty, safety management, new equipment/systems research and development, and new systems acquisition.

Relationship to Building Operations Professional:

The Marine Utilities Chief MOC shows evidence that typical training and experience development tracks are likely to relate to this job title and they would be good candidates for the Building Operations Professional certification. Helpful in their background is experience in communications, planning, data collection, and reporting. Opportunities for skill enhancement include budget preparation and optimization evaluation processes.

Marine Corps 1169 Utilities Chief Enlisted
Energy Building Operations Professional Blueprint

A		**Managing Human Resources (8%)**	◖
	1	Develop workload analyses	◖
	2	Analyze staffing productivity	◖
	3	Supervise building staff	●
	4	Secure outside service providers	◖
B		**Conduct Planning Activities (15%)**	◖
	1	Update procedures (SOPs, BOPs, operating plans, emergency plans, etc.)	◖
	2	Develop equipment operations plans	◖
	3	Develop planned maintenance schedules	◖
	4	Contribute to construction standards and guidelines	◖
	5	Contribute to capital renewal plans	◖
	6	Conduct Data Management Activities	○
C		**Operating Buildings (50%)**	◖
	1	Perform workplace hazard assessments	●
	2	Participate in emergency drills	●
	3	Manage the PPE program	●
	4	Manage third party inspections	●
	5	Respond to building emergencies	●
	6	Managing building securities	●
	7	Coordinate/conduct occupant training	●
	8	Conduct risk management activities	●
	9	Manage responses to inclement weather conditions/issues	●
	10	Respond to tenant requests/issues	●
	11	Conduct equipment checks	●
	12	Conduct daily rounds	●
	13	Coordinate facility operations (normal)	●
	14	Coordinate facility operations (other than normal)	●
	15	Manage the work order process	●
	16	Investigate indoor environmental quality	●
	17	Conduct tenant relations activities	◖
	18	Manage consumables	◖
	19	Manage outside facility contractors/service providers	◖
	20	Manage environmental requirements (permits, etc.)	○
	21	Implement an energy management program	◖

22	Maintain the facility and systems	●
23	Conduct facility repair activities	●
D	**Optimizing the Facility (20%)**	◖
1	Conduct measurement and verification activities	●
2	Analyze system performance	●
3	Identify cost saving measures	○
4	Respond to changing energy costs	◖
5	Optimize system performance	◖
6	Identify sustainability opportunities	◖
E	**Conducting Budgeting Activities (7%)**	○
1	Contribute to long term facility budget plan (5 years)	○
2	Contribute to facility operations budget	○
3	Contribute to capital improvement budget(s)	○

SUMMARY OF FINDINGS

Using the proof of concept process described in the Methodology section above, four representative military occupational codes (MOCs) across all four Services were selected for the Building Operations Professional military crosswalk.

Table 3. Number of Assigned Military Personnel in Candidate MOCs for the Building Operations Professional Certification Criteria (DMDC data as of 9/30/2014)

Service	MOC	Title	Enlisted /Officer	Strength		
				Active Personnel	Guard/ Reserve Personnel	Total Personnel
Army	91X	Maintenance Supervisor	Enlisted	2,052	3,551	**5,603**
Navy	UT	Master Chief Utilitiesman	Enlisted	811	584	**1,395**
Air Force	3E090	Facility Systems Superintendent	Enlisted	125	201	**326**
Marine Corps	1169	Utilities Chief	Enlisted	157	23	**180**
					Total	**7,504**

The MOCs identified in Table 3 do not portray a comprehensive list of all the potential candidate MOCs that might be related to the Building Operations Professional certification criteria. They do, however, inform the proof of concept study and demonstrate a foundational process by which additional MOC reviews can be conducted.

In general, as evidenced in the proof of concept demonstration MOCs reviewed, it does not appear that the military Services will have many directly linked enlisted career fields to the Building Operations Professional job title although they do have many career fields with differing levels of related skill sets. With the use of bridge training programs targeted towards the training and experience gaps, Service members may be able to attain this certification.

There are several apparent reasons for the dearth of directly related and transferrable experience and skills to the Building Operations Professional job title. First, much of the support work in this functional area appears to be conducted by DoD civilians or contractors rather than military personnel. Military personnel do not appear to get as deeply involved with the day-to-day operations and oversight of building management systems and activities until they are more senior in grade and supervise related civilian personnel and building operations systems. Therefore the numbers of potential candidates prepared to challenge the Exam Blueprint as it currently stands will likely be minimal. A second reason for the limited number of potential candidates is the level of higher education and experience requirements established for this certification. With roughly 50% of the key domain tasks and sub-tasks requiring higher level managerial experience, few personnel in the junior to mid-grade enlisted MOCs will have earned the breadth of experience outlined in this JTA, and even fewer will have attained the higher education requirements. Although there are numerous MOCs that have at least partial fulfillment of the required skills and experience identified on the Exam Blueprint, the vast majority of personnel in enlisted MOCs will require bridge training to cover the gaps in experience or training.

3. BUILDING ENERGY AUDITOR

OVERVIEW OF BUILDING ENERGY AUDITOR

The Commercial Building Energy Auditor is an energy solutions professional who assesses building systems and site conditions; analyzes and evaluates equipment and energy usage; and recommends strategies to optimize building resource utilization.

Energy Auditor 7-Key Task Area Domains
(Reference Appendix E - Building Energy Auditor JTA/DACUM)

A	Communication with Stakeholders
B	Developing the Action Plan
C	Conducting Pre-Site Visit Data Collection Activities
D	Collecting Data On-Site
E	Analyzing Building Performance Data
F	Identifying Opportunities for Improving Building Performance
G	Producing the Deliverable

The following requirements to be eligible to take the Energy Auditor certification exam were agreed upon by the Energy Auditor Scheme Committee during their meeting in Denver, CO 19-20 Aug 2014 (Reference Appendix B):

- Completion of five commercial (non-residential) audits, with a minimum of two building use types, completed within three years of applying for the exam. Verification of completion of audit will need to be included on the application for certification.
- Two (2) hours of CE in safety training. Safety courses taken to maintain licensing requirements, certification requirements in a related field, employer sponsored/required, or to meet state requirements will be accepted.

AND

1. Licensed engineer or architect plus a minimum of two years' experience in energy auditing.*

OR

2. Degree in engineering or five or six year architecture degree and a minimum of three years' experience in energy auditing.

OR

3. Four year science, technology, math degree or four year architecture degree with four years' experience in energy auditing.

OR

4. Two year technical degree or vocational training certificate in mechanical/electrical engineering technology and a minimum of four years' experience in energy auditing. Enlisted *military members might qualify under this option.*

OR

5. Four year non-STEM degree and a minimum of five years' experience in energy auditing.

OR

6. Completion of high school diploma or GED and a minimum of seven years' experience in energy auditing.

* Energy auditing experience is defined as successfully completing or participating in activities, at a minimum:

a. Visit job sites to collect data for energy conservation analyses.
b. Evaluate construction design information like drawings, design calculations, system layouts, and sketches.
c. Evaluate energy systems including heating, ventilation, and air conditioning (HVAC), lighting and other building/industrial mechanical systems.
d. Monitor and analyze energy consumption patterns and provide benchmarking analysis.
e. Identify potential energy saving measures along with constructability requirements.
f. Perform energy modeling or other energy calculation.
g. Verify energy bills and meter readings.
h. Prepare a report of the findings.

From that operational definition of Energy Auditor and from those eligibility criteria, the following military occupations were evaluated as candidate MOCs for the proof of concept study.

NAVY UT - MASTER CHIEF UTILITIESMAN

Military Occupational Description:

Master Chief Utilitiesmen plan, supervise and perform tasks involved in installation, maintenance and repair of plumbing, heating, steam, compressed air, fuel storage and distribution systems, water treatment and distribution systems, air conditioning and refrigeration equipment and septic systems as prescribed by drawings and specifications. Additional responsibilities include preparing progress reports, time records, construction schedules and material, labor, tool and equipment estimates for construction projects.

Master Chief Utilitiesmen act as a project supervisors and trainers. In these roles they solve problems, plan, estimate, schedule, control costs and manage personnel. As a project manager they are responsible for the planning, staffing, directing and control of multiple construction projects. They ensure compliance with specifications, code, plans and contracts. Chiefs also maintain individual combat readiness and perform tasks required in combat and disaster preparedness or recovery operations.

Relationship to Energy Auditor:

The Naval Master Chief Utilitiesman MOC shows significant evidence that training and experience are likely to have been attained related to this job title and they would be especially good candidates for the Energy Auditor certification. Helpful in their background is the extensive training and experience these sailors have in planning, data collection, communications, reporting. Opportunities for skill enhancement and training include analysis, forecasting and assessment of energy systems specifically related to commercial buildings.

Navy UT Master Chief Utilitiesman

A		**Communicating with Stakeholders (5%)**	●
	1	Identify the owner's project team	●
	2	Review the scope and process with the client	●
B		**Developing the Action Plan (7%)**	●
	1	Conduct pre-audit activities	●
	2	Generate preliminary list of systems and assemblies to be audited	●
	3	Determine audit tools and forms	●
	4	Determine project schedule	●
	5	Identify safety and access requirements of the facility	●
C		**Conducting Pre-site Visit Data Collection Activities (4%)**	●
	1	Obtain utility information	●
	2	Obtain facility data from point of contact	●
	3	Gather historical weather data	●
D		**Collecting Data On-site (21%)**	●
	1	Obtain information from facility staff	●
	2	Obtain information from facility occupants	◖
	3	Assess the building envelope	●
	4	Assess building systems and components	●
E		**Analyzing Building Performance Data (25%)**	○
	1	Establish energy and cost baseline	◖
	2	Establish benchmarks	●
	3	Disaggregate the energy end use breakdown	●
F		**Identifying Opportunities for Improving Building Performance (30%)**	◖
	1	Identify deviations from best practices	◖
	2	Determine energy impact of each measure	◖
	3	Estimate implementation cost	◖
	4	Conduct an economic analysis	◖
G		**Producing the Deliverable (8%)**	●
	1	Write a summary audit report	●

AIR FORCE 4B0X1 - BIOENVIRONMENTAL ENGINEER

Military Occupational Description:

Bioenvironmental Engineers perform and manage occupational and environmental health site assessments to support peacetime and wartime contingency operations. Their work includes anticipating, recognizing, evaluating, and controlling exposures to chemical, biological, radiological and nuclear hazards while performing industrial hygiene, radiological safety, environmental health and medical readiness assessments.

Duties and Responsibilities of Bioenvironmental Engineers are:

- Conducting preventative medicine studies in support of base vulnerability assessments.
- Coordinating with other base agencies to identify critical infrastructure and components, and using existing sources of intelligence to identify potential threats.
- Assessing overall vulnerability.
- Providing recommendations to commanders to reduce health risk to personnel and mission.
- Identifying and approving potable and non-potable water sources.
- Analyzing surface, ground and local sources to determine drinking water quality and address health risks associated with non-potable water.
- Communicating effective solutions to address health concerns.
- Executing Occupational and Environmental Health Site Assessment.
- Collecting site-specific data to identify exposure pathways to chemical, physical or radiological contaminants at home station or deployed.
- Responding to terrorist attacks, natural disasters or accidents that may result in exposure to health threats.
- Performing on-site health risk assessments within potential exposure zone.
- Documenting information regarding exposure from incidents.
- Identifying health hazards.
- Anticipating and recognizing actual or potential chemical, biological, radiological, nuclear and physical health threats.
- Working with Emergency Management personnel, Explosive Ordnance Disposal, Fire and Emergency Services and other base personnel to identify hazards.
- Analyzing and evaluate actual or potential health threats using state of the art equipment.
- Collecting, preserving, packaging, and shipping samples associated with crisis responses at home station or deployed locations.
- Conducting post exposure investigations.
- Using analytical exposure data to reduce risks in future operations and other similar and concurrent operations through recommendations to commanders.
- Documenting known operational impacts.
- Controlling health hazards.
- Providing control recommendations to eliminate or mitigate actual or potential chemical, biological, radiological, nuclear and physical health threat.

- Applying the hazard control hierarchy, using engineering, administrative and personal protective equipment.
- Determining protective measures in chemical, biological, radiological, and nuclear operating environments.
- Providing relevant threat control recommendations to the commander with respect to real-time and future operations.
- Assisting with shelter management by determining adequacy of collective protection for controlling health threats and performing health risk assessment to determine when to release personnel from collectively protected facilities.
- Associating exposure with affected personnel.
- Evaluating potential health threats.
- Recommending appropriate hazard controls.
- Documenting actual exposures of affected individuals using appropriate occupational health management information system.
- Participating in risk management/communication.
- Advising senior leadership and affected communities on health risks associated with operations and missions.
- Effectively communicating on health effects, outcomes, and control measures.

Specialty Qualifications for Bioenvironmental Engineers include basic and applied mathematics, basic chemistry, physics and computer usage, industrial hygiene, community drinking water surveillance, occupational health, radiological health, environmental protection, medical administration, and bioenvironmental engineering aspects of medical readiness. For entry into the Bioenvironmental engineering specialty, completion of an algebra I, chemistry, biology, and English composition in high school is mandatory. Completion of high school courses in algebra II and physics are desirable.

Airmen serving as Bioenvironmental Engineers complete a basic bioenvironmental engineering apprentice course and have experience performing and supervising industrial hygiene, occupational and environmental health, medical readiness and radiological health surveys to include the preparation of all related correspondence, reports, and charts. Additional mandatory experience includes managing industrial hygiene, community environmental surveillance, and radiological health programs.

Relationship to Energy Auditor:

The Air Force Bioenvironmental Engineer career field would not be a conspicuous candidate for Energy Auditor certification at first glance as it does not operate in an occupational area that is directly related to the specific technical areas of a Commercial Buildings Energy Auditor; however, it was selected as a candidate MOC to highlight the potential of other MOCs that have skill sets that might lend well to cross-training into this new occupational area. Air Force Bioenvironmental Engineers are highly skilled and trained in planning, data collection, analysis, reporting, and communication. Opportunities for skill enhancement and bridge training will exist in the technical aspects of understanding building performance systems and data collection.

Air Force 4B0X1 Bioenvironmental Engineer			
A		**Communicating with Stakeholders (5%)**	●
	1	Identify the owner's project team	●
	2	Review the scope and process with the client	◖
B		**Developing the Action Plan (7%)**	●
	1	Conduct pre-audit activities	◖
	2	Generate preliminary list of systems and assemblies to be audited	●
	3	Determine audit tools and forms	●
	4	Determine project schedule	●
	5	Identify safety and access requirements of the facility	●
C		**Conducting Pre-site Visit Data Collection Activities (4%)**	●
	1	Obtain utility information	●
	2	Obtain facility data from point of contact	●
	3	Gather historical weather data	●
D		**Collecting Data On-site (21%)**	◖
	1	Obtain information from facility staff	●
	2	Obtain information from facility occupants	◖
	3	Assess the building envelope	◖
	4	Assess building systems and components	●
E		**Analyzing Building Performance Dat**a 25%	◖
	1	Establish energy and cost baseline	◖
	2	Establish benchmarks	●
	3	Disaggregate the energy end use breakdown	●
F		**Identifying Opportunities for Improving Building Performance 30%**	◖
	1	Identify deviations from best practices	◖
	2	Determine energy impact of each measure	◖
	3	Estimate implementation cost	◖
	4	Conduct an economic analysis	◖
G		**Producing the Deliverable 8%**	◖
	1	Write a summary audit report	◖

MARINE CORPS 1169 UTILITIES CHIEF ENLISTED

Military Occupational Description:

Utilities Chiefs are technical advisers to the commander at all levels of all elements of the various Marine Corps units on the employment of utilities support. These Staff Noncommissioned Officers analyze, translate, and execute commanders' operational requirements into a utilities support reality that enhances mission accomplishment. They plan and supervise the establishment, operation, and maintenance of water purification, storage, and distribution sites; electric power generating sites along with the inherent underground, above ground, overhead and tactical electric power distribution systems; and shower and laundry services.

They coordinate and supervise the installation, maintenance and repair of heating, air conditioning (to include automotive), and refrigeration equipment; and the maintenance and repair of the electrical systems on engineer and general supply equipment. Water quality assurance, field sanitation, sewage, and waste disposal is also planned, coordinated, and supervised. When deployed in support of Humanitarian Assistance and Civil Military Operations, Utilities Chiefs also plan and coordinate the installation and repair of plumbing and indoor electrical wiring. The occupation is technical in nature and requires years of experience to become proficient. Due to the diversity of commands throughout the Marine Corps, some of the duties and tasks performed by the Utilities Chief may overlap with those of the Engineer Equipment Chief, Motor Transport Maintenance Chief, and Motor Transport Operations Chief. Additional duties may include: formal schools faculty, staff planning, new equipment/ systems research and development, and new systems acquisition. To become a Utilities Chief, the Marine must graduate from the resident Utilities Chief Course.

Relationship to Energy Auditor:

Marine Corps Utilities Chiefs are good candidates for the Energy Auditor certification due to their extensive training and experience with communications, planning, data collection, and analysis. To best prepare Utilities Chiefs for the credential, additional technical awareness training in “Identifying Opportunities for Improving Building Performance,” and developing and delivering reports is recommended.

Marine Corps 1169 Utilities Chief

A		**Communicating with Stakeholders 5%**	◖
	1	Identify the owner's project team	●
	2	Review the scope and process with the client	◖
B		**Developing the Action Plan 7%**	◖
	1	Conduct pre-audit activities	●

	2	Generate preliminary list of systems and assemblies to be audited	●
	3	Determine audit tools and forms	●
	4	Determine project schedule	●
	5	Identify safety and access requirements of the facility	●
C		**Conducting Pre-site Visit Data Collection Activities 4%**	●
	1	Obtain utility information	●
	2	Obtain facility data from point of contact	●
	3	Gather historical weather data	●
D		**Collecting Data On-site 21%**	●
	1	Obtain information from facility staff	●
	2	Obtain information from facility occupants	◖
	3	Assess the building envelope	◖
	4	Assess building systems and components	●
E		**Analyzing Building Performance Data 25%**	◖
	1	Establish energy and cost baseline	◖
	2	Establish benchmarks	●
	3	Disaggregate the energy end use breakdown	●
F		**Identifying Opportunities for Improving Building Performance 30%**	◖
	1	Identify deviations from best practices	◖
	2	Determine energy impact of each measure	◖
	3	Estimate implementation cost	◖
	4	Conduct an economic analysis	◖
G		**Producing the Deliverable 8%**	◖
	1	Write a summary audit report	◖

SUMMARY OF FINDINGS

Using the proof of concept process described in the Methodology section above, three representative military occupational codes (MOCs) from various branches of the military Services were selected for the Energy Auditor military crosswalk.

Table 4. Number of Assigned Military Personnel in Candidate MOCs for the Energy Auditor Certification Criteria (DMDC data as of 9/30/2014)

Service	MOC	Title	Enlisted /Officer	Strength		
				Active Personnel	Guard/ Reserve Personnel	Total Personnel
Navy	UT	Master Chief Utilitiesman	Enlisted	811	584	**1,395**
Air Force	4B0X1	Bioenvironmental Engineer	Enlisted	929	391	**1,320**
Marine Corps	1169	Utilities Chief	Enlisted	157	23	**180**
					Total	**2,895**

The MOCs identified in Table 4 do not attempt to portray a comprehensive list of all the potential candidate MOCs that might be related to the Energy Auditor certification criteria. They do, however, inform the proof of concept study and demonstrate a foundational process by which additional MOC reviews can be conducted.

In general, as evidenced in the proof of concept demonstration MOCs reviewed, it does not appear that the military Services will have many directly linked enlisted career fields to the Energy Auditor job title although they do have many career fields with differing levels of related skill sets. With the use of bridge training programs targeted towards the gaps, Service members may be able to attain this certification.

There are several apparent reasons for the dearth of directly related and transferrable experience and skills to the Energy Auditor job title. First, much of the support work in this functional area appears to be conducted by DoD civilians or contractors rather than military personnel. Military personnel do not appear to get as deeply involved with the day-to-day operations and oversight of building management systems and activities until they are more senior in grade and supervise related civilian personnel and building operations systems. Therefore the numbers of potential candidates prepared to challenge the Exam Blueprint as it currently stands will likely be minimal.

A second reason for the limited number of potential candidates is the level of higher education and experience requirements established for this certification. With the large percentage of the key domain tasks and sub-tasks that require higher level managerial experience, few personnel in

the junior to mid-grade enlisted MOCs will have earned the breadth of experience outlined in this JTA, and even fewer will have attained the higher education requirements. Although there are numerous MOCs that have at least partial fulfillment of the required skills and experience identified on the Exam Blueprint, the vast majority of personnel in enlisted MOCs will require bridge training to cover the gaps in experience or training.

It does bear mentioning again, however, that just as is identified in the Air Force 4B0X1, Bioenvironmental Engineer MOC reviewed above, there are other military occupational areas that might not be conspicuous choices for candidacy for this Energy Auditor certification due to their technical skill set being outside of building energy systems, but they are worthy of consideration for development of specific bridge training programs because their leadership, managerial, and analytical skills, training, and experience would like comport well with the requirements of the Energy Auditor occupation.

Another example of a military occupation not specifically analyzed in this report is Air Force Contracting (6C0X1) where training and experience specifically includes auditing. The MOC further includes management, performance, and administration of contracting functions for commodities, services, and construction using acquisition procedures, negotiation, and other approved methods. Air Force contracting noncommissioned officers use automated contracting systems to prepare, process, and analyze transactions and products, and act as business advisors, buyers, negotiators, administrators, and contracting officers, all responsibilities which would likely align well with Energy Auditor requirements.

4. BUILDING COMMISSIONING PROFESSIONAL

OVERVIEW OF BUILDING COMMISSIONING PROFESSIONAL

The Building Commissioning (Cx) Professional is an individual who leads, plans, coordinates and manages a commissioning team to implement commissioning processes in new and existing buildings. The JTA/DACUM review identified seven primary domains in which the Building Commissioning Professionals operate; they are:

Building Commissioning Professional 7-Key Task Area Domain (Reference JTA/DACUM – Appendix F)

A	Managing Commissioning Projects
B	Preparing Commissioning Documentation
C	Conducting Commissioning Activities
D	Managing Training Activities
E	Completing Warranty Phase Activities
F	Conducting Existing Building Commissioning
G	Conducting On-going Commissioning

During their August 25-26, 2014 meeting, the Scheme Committee reviewed the Building Commissioning (Cx) DACUM charts task by task, and identified the tasks and associated KSAs that could be tested, and those that could be verified through experience or other requirements. The following eligibility requirements to take the Building Commissioning Certification examination were agreed upon by the committee (Appendix C):

Participate in a minimum of three commissioning projects. The projects may not include one and -two family residential buildings. Over the projects, the applicant must have participated in the following activities:

- development of an OPR/CFR
- develop commissioning plan
- review of a design
- perform field verification
- oversee performance testing
- correction of deficiencies
- training
- prepare commissioning report

AND one of the following options:

1. Licensed Architect or Professional Engineer with three years' commissioning experience.
2. Bachelor's degree in building sciences* or equivalent military training/experience, with five years' experience in building commissioning.

3. Associate/Technical/Vocational 2 year degree, non-building sciences bachelor's degree, or equivalent military training/experience, with eight years' building industry experience**, with five of those years in building commissioning.
4. High school diploma or GED with 10 years' experience in building industry experience**, with five of those years in building commissioning.

*Building science education is defined as mechanical engineering, electrical engineering, construction science, construction management, architecture and other majors/fields of study designed to train people for careers in the building industry.

**Building industry experience is defined as design, construction, testing and commissioning, code enforcement and operations.

From that operational definition of Building Commissioning (Cx) Professional and from those eligibility criteria, the following military occupations were evaluated as candidate MOCs for the proof of concept study.

ARMY ENLISTED 91Z SENIOR MAINTENANCE SUPERVISOR

Military Occupational Description:

The Senior Maintenance Supervisors supervise, plan, coordinate, and direct the field and sustainment maintenance of all wheeled, tracked, armament, power generation, and utility equipment. (1) Serving as principal maintenance or operations NCO in maintenance battalion or higher-level organization. (2) Supervising personnel performing the duties of Maintenance Supervisor.

Senior Maintenance Supervisors have expertise in: (1) Power Generation Equipment; (2) Air Conditioning/Refrigeration Systems; and (3) Quartermaster and Chemical Equipment. Supervisory expectations are to perform as support maintenance machine ship supervisor or metalworking supervisor. Supervise recovery operations on track vehicles, wheel vehicles and related activities including electrical wiring harness system repair/maintenance.

Job training for Senior Maintenance Supervisors includes extensive system specific training, in addition to any basic Army requirements such as Basic Combat Training and 12 weeks of Advanced Individual Training with on-the-job instructions. Part of this time is spent in the classroom and part in the field. Often Senior Maintenance Supervisors receive Training with Industry skill development; this opportunity exposes the soldier to best practices in industry and management training, plus additional benefits. Given the Soldier's military experience requirements alone, the exposure to practical skill sets and continuous training prepares Senior Maintenance Supervisors for a variety of supervisory and management demands.

Relationship to Building Commissioning Professional:

Senior Maintenance Supervisors are potential candidates for the Building Commissioning Professional credential because of their experience and training in managing personnel, planning,

budgeting and forecasting for maintenance operations and optimization. Opportunities for training to more closely satisfy the blueprint for the Building Operations Professional include learning specific elements of commercial buildings data management and commercial buildings systems.

Army 91Z Senior Maintenance Supervisor Enlisted
Building Commissioning Professional

A	**Managing Commissioning Projects (18%)**	◖
1	Identify the scope of the project	●
2	Develop a commissioning team	◖
3	Manage a commissioning budget	●
4	Identify commissioning deliverables	◖
5	Participate in VE activities	◖
6	Review project documents	●
7	Monitor the construction/project schedule	◖
8	Participate in project meetings	●
9	Conduct commissioning meetings	◖
10	Track deficiencies (issues log)	●
11	Facilitate risk assessment as it relates to commissioning activities	◖
12	Assess pass/fail criteria for functional test results	●
13	Identify tasks for completion of commissioning processes	◖
B	**Preparing Commissioning Documentation (19%)**	◖
1	Assist in developing the OPR/CFR	◖
2	Create system/equipment list	●
3	Create commissioning process tracking matrices	◖
4	Develop the commissioning plan	◖
5	Develop commissioning schedules	●
6	Develop communications plans	●
7	Create commissioning specifications	◖
8	Write system verification checklists	●
9	Create FPTs	●
10	Determine site visit protocols (logistics)	●
11	Develop issues logs	●
12	Document commissioning meetings	●
13	Write commissioning reports	◖
14	Create systems manuals	◖
15	Develop end of warranty review processes	◖

C	**Conducting Commissioning Activities (24%)**	◖
1	Plan commissioning construction activities	◖
2	Monitor commissioning construction activities	●
3	Facilitate the completion of construction checklists	◖
4	Facilitate the acceptance phase	◖
D	**Managing Training Activities (4%)**	◖
1	Develop training plan	◖
2	Facilitate training coordination meeting	◖
3	Facilitate training activities	●
4	Conduct training follow-up activities	◖
E	**Completing Warranty Phase Activities (5%)**	◖
1	Facilitate off-season testing	◖
2	Troubleshoot facility issues	●
3	Measure energy performance	◖
4	Facilitate end of warranty meeting	◖
F	**Conducting Existing Building Commissioning (23%)**	◖
1	Determine Scope of Project	◖
2	Conduct a building performance assessment	◖
3	Prepare a CFR	○
4	Conduct a systems assessment	●
5	Conduct a site investigation	◖
6	Recommend corrections and improvements	●
7	Oversee implementation of corrective measures	●
8	Conduct performance verifications	●
G	**Conducting On-going Commissioning (7%)**	◖
1	Measure IEQ performance	○
2	Evaluate building systems performance	●
3	Review building operating plan	●
4	Review maintenance activities	●
5	Accommodate space/function changes	◖
6	Implement corrective actions	●
7	Publish measurement and performance results to stakeholders	◖

NAVY UT MASTER CHIEF UTILITIESMEN

Military Occupational Description:

Master Chief Utilitiesmen plan, supervise and perform tasks involved in installation, maintenance and repair of plumbing, heating, steam, compressed air, fuel storage and distribution systems, water treatment and distribution systems, air conditioning and refrigeration equipment and septic systems as prescribed by drawings and specifications. Additional responsibilities include preparing progress reports, time records, construction schedules and material, labor, tool and equipment estimates for construction projects.

Master Chief Utilitiesmen act as project supervisors and trainers. In these roles they solve problems, plan, estimate, schedule, control costs and manage personnel. As a project manager they are responsible for the planning, staffing, directing and control of multiple construction projects. They ensure compliance with specifications, code, plans and contracts. Chiefs also maintain individual combat readiness and perform tasks required in combat and disaster preparedness or recovery operations.

Relationship to Building Commissioning Professional:

Master Chief Utilitiesmen are good potential candidates for the Building Commissioning Professional credential; areas of strength are in project management and building operations. Opportunities for training to more closely satisfy the blueprint for the Building Operations Professional include specific elements of commercial buildings data management, and commercial buildings systems technical training.

Navy UT Master Chief Utilitiesmen Enlisted
Building Commissioning Professional

A	**Managing Commissioning Projects (18%)**	●
1	Identify the scope of the project	●
2	Develop a commissioning team	●
3	Manage a commissioning budget	●
4	Identify commissioning deliverables	◖
5	Participate in VE activities	◖
6	Review project documents	●
7	Monitor the construction/project schedule	●
8	Participate in project meetings	●
9	Conduct commissioning meetings	●
10	Track deficiencies (issues log)	●
11	Facilitate risk assessment as it relates to commissioning activities	●
12	Assess pass/fail criteria for functional test results	●

13	Identify tasks for completion of commissioning processes	●
B	**Preparing Commissioning Documentation (19%)**	◖
1	Assist in developing the OPR/CFR	◖
2	Create system/equipment list	●
3	Create commissioning process tracking matrices	◖
4	Develop the commissioning plan	●
5	Develop commissioning schedules	●
6	Develop communications plans	◖
7	Create commissioning specifications	◖
8	Write system verification checklists	●
9	Create FPTs	●
10	Determine site visit protocols (logistics)	●
11	Develop issues logs	●
12	Document commissioning meetings	●
13	Write commissioning reports	◖
14	Create systems manuals	◖
15	Develop end of warranty review processes	◖
C	**Conducting Commissioning Activities (24%)**	◖
1	Plan commissioning construction activities	◖
2	Monitor commissioning construction activities	◖
3	Facilitate the completion of construction checklists	●
4	Facilitate the acceptance phase	●
D	**Managing Training Activities 4%**	●
1	Develop training plan	◖
2	Facilitate training coordination meeting	●
3	Facilitate training activities	●
4	Conduct training follow-up activities	●
E	**Completing Warranty Phase Activities 5%**	◖
1	Facilitate off-season testing	●
2	Troubleshoot facility issues	●
3	Measure energy performance	●
4	Facilitate end of warranty meeting	◖
F	**Conducting Existing Building Commissioning 23%**	●
1	Determine Scope of Project	●
2	Conduct a building performance assessment	◖
3	Prepare a CFR	◖

4	Conduct a systems assessment	●
5	Conduct a site investigation	◖
6	Recommend corrections and improvements	●
7	Oversee implementation of corrective measures	●
8	Conduct performance verifications	●
G	**Conducting On-going Commissioning 7%**	●
1	Measure IEQ performance	◖
2	Evaluate building systems performance	●
3	Review building operating plan	●
4	Review maintenance activities	●
5	Accommodate space/function changes	●
6	Implement corrective actions	●
7	Publish measurement and performance results to stakeholders	●

AIR FORCE 3E090 FACILITY SYSTEMS SUPERINTENDENT ENLISTED

Military Occupational Description:

Manages resources and directs activities devoted to installation removal, operation, maintenance, and repair of all electrical power distribution systems, electrical power generating and control systems, fire alarms, lightning protection, cathodic protection systems, airfield lighting systems, and aircraft arresting systems.

The Air Force Facility Systems Superintendent is a Senior NCO level military occupation, and there are areas of training and experience throughout the MOC that indicate where "Superintendents" would have developed many of the technical and managerial skill sets and experience that with some degree of bridge training would allow them to challenge this certification exam. The subordinate, or "feeder" occupations at the apprentice and journeyman level to this superintendent level position would not likely have the experience and managerial skills necessary to compete well for the certification, but they would be developing technical experience that would be related to the job.

The Superintendent also:

- Performs planning activities and conducts facility surveys;
- Surveys proposed work to determine resource requirements;
- Obtains certifications, special tools, and equipment for assigned personnel; and
- Ensures compliance with all safety and environmental regulations.

Relationship to Building Commissioning Professional:

The Air Force Facility Systems Superintendent is a reasonable candidate for the Building Commissioning Professional certification because of the extensive training and experience required for this occupation. Areas of strength include general management, training management, and facility management. Opportunities for skill enhancement to best prepare the Service member for the Building Commissioning Professional certification include commissioning preparation, and commissioning activities for buildings as well aslearning specific elements of commercial buildings data management and technical design components of commercial buildings systems.

Air Force 3E090 Facility Systems Superintendent Enlisted
Building Commissioning Professional

A	**Managing Commissioning Projects (18%)**	◖
1	Identify the scope of the project	◖
2	Develop a commissioning team	◖
3	Manage a commissioning budget	◖
4	Identify commissioning deliverables	◖
5	Participate in VE activities	○
6	Review project documents	●
7	Monitor the construction/project schedule	●
8	Participate in project meetings	●
9	Conduct commissioning meetings	◖
10	Track deficiencies (issues log)	●
11	Facilitate risk assessment as it relates to commissioning activities	○
12	Assess pass/fail criteria for functional test results	◖
13	Identify tasks for completion of commissioning processes	○
B	**Preparing Commissioning Documentation (19%)**	◖
1	Assist in developing the OPR/CFR	○
2	Create system/equipment list	●
3	Create commissioning process tracking matrices	◖
4	Develop the commissioning plan	◖
5	Develop commissioning schedules	◖
6	Develop communications plans	◖
7	Create commissioning specifications	◖
8	Write system verification checklists	●
9	Create FPTs	◖
10	Determine site visit protocols (logistics)	●
11	Develop issues logs	●

12	Document commissioning meetings	○
13	Write commissioning reports	◖
14	Create systems manuals	◖
15	Develop end of warranty review processes	◖
C	**Conducting Commissioning Activities 24%**	◖
1	Plan commissioning construction activities	◖
2	Monitor commissioning construction activities	◖
3	Facilitate the completion of construction checklists	◖
4	Facilitate the acceptance phase	◖
D	**Managing Training Activities 4%**	◖
1	Develop training plan	◖
2	Facilitate training coordination meeting	◖
3	Facilitate training activities	●
4	Conduct training follow-up activities	●
E	**Completing Warranty Phase Activities 5%**	●
1	Facilitate off-season testing	●
2	Troubleshoot facility issues	●
3	Measure energy performance	●
4	Facilitate end of warranty meeting	●
F	**Conducting Existing Building Commissioning 23%**	◖
1	Determine Scope of Project	◖
2	Conduct a building performance assessment	●
3	Prepare a CFR	○
4	Conduct a systems assessment	●
5	Conduct a site investigation	●
6	Recommend corrections and improvements	●
7	Oversee implementation of corrective measures	●
8	Conduct performance verifications	●
G	**Conducting On-going Commissioning 7%**	●
1	Measure IEQ performance	◖
2	Evaluate building systems performance	●
3	Review building operating plan	●
4	Review maintenance activities	●
5	Accommodate space/function changes	●
6	Implement corrective actions	●
7	Publish measurement and performance results to stakeholders	◖

ARMY – 12H – CONSTRUCTION ENGINEERING SUPERVISOR

Military Occupational Description:

The Construction Engineering Supervisor oversees the construction, repair and utilities of buildings, warehouses, fixed bridges, port facilities and petroleum pipelines, tanks and related equipment. Duties performed by Soldiers in this MOS include:

- Reads and interprets construction drawings
- Estimates material, time, equipment, and labor requirements
- Supervises the construction and repair of wood frame, concrete, masonry or prefabricated structures
- Supervises the installation and repair of utility systems
- Inspects structures and facilities to ensure compliance with specifications
- Directs operator maintenance on assigned vehicles and equipment
- Directs combat engineering missions
- Devises network flow diagrams such as the critical path method and coordinates work activities of supporting units
- Provides supervision over all structural and utility construction projects
- Inspects subordinate elements to ensure compliance with directives, construction drawings, and specifications
- Plans and organizes for combat engineering missions

Relationship to Building Commissioning Professional:

The Army Construction Engineering Supervisor is a good candidate for the Building Commissioning Professional certification because of the extensive training and managerial experience required for attaining this MOC. Areas of strength include general management, training management, and construction and utility systems management. Opportunities for skill enhancement to best prepare the service member for the Building Commissioning Professional certification include commissioning preparation, and commissioning activities specific to commercial buildings.

Army MOS 12H Construction Engineering Supervisor Enlisted
Building Commissioning Professional

A	**Managing Commissioning Projects (18%)**	◖
1	Identify the scope of the project	◖
2	Develop a commissioning team	◖
3	Manage a commissioning budget	◖
4	Identify commissioning deliverables	◖
5	Participate in VE activities	○
6	Review project documents	●

7	Monitor the construction/project schedule	●
8	Participate in project meetings	●
9	Conduct commissioning meetings	◖
10	Track deficiencies (issues log)	◖
11	Facilitate risk assessment as it relates to commissioning activities	○
12	Assess pass/fail criteria for functional test results	◖
13	Identify tasks for completion of commissioning processes	○
B	**Preparing Commissioning Documentation (19%)**	◖
1	Assist in developing the OPR/CFR	○
2	Create system/equipment list	◖
3	Create commissioning process tracking matrices	◖
4	Develop the commissioning plan	○
5	Develop commissioning schedules	◖
6	Develop communications plans	◖
7	Create commissioning specifications	○
8	Write system verification checklists	◖
9	Create FPTs	◖
10	Determine site visit protocols (logistics)	●
11	Develop issues logs	●
12	Document commissioning meetings	◖
13	Write commissioning reports	◖
14	Create systems manuals	◖
15	Develop end of warranty review processes	◖
C	**Conducting Commissioning Activities (24%)**	◖
1	Plan commissioning construction activities	◖
2	Monitor commissioning construction activities	◖
3	Facilitate the completion of construction checklists	◖
4	Facilitate the acceptance phase	◖
D	**Managing Training Activities (4%)**	●
1	Develop training plan	◖
2	Facilitate training coordination meeting	●
3	Facilitate training activities	●
4	Conduct training follow-up activities	●
E	**Completing Warranty Phase Activities (5%)**	●
1	Facilitate off-season testing	●
2	Troubleshoot facility issues	●

3	Measure energy performance	●
4	Facilitate end of warranty meeting	●
F	**Conducting Existing Building Commissioning (23%)**	◖
1	Determine Scope of Project	◖
2	Conduct a building performance assessment	◖
3	Prepare a CFR	○
4	Conduct a systems assessment	●
5	Conduct a site investigation	◖
6	Recommend corrections and improvements	◖
7	Oversee implementation of corrective measures	●
8	Conduct performance verifications	◖
G	**Conducting On-going Commissioning (7%)**	◖
1	Measure IEQ performance	◖
2	Evaluate building systems performance	◖
3	Review building operating plan	●
4	Review maintenance activities	●
5	Accommodate space/function changes	◖
6	Implement corrective actions	◖
7	Publish measurement and performance results to stakeholders	●

SUMMARY OF FINDINGS

Using the proof of concept process described in the Methodology section above, four representative military occupational codes (MOCs) from the Air Force, Army, and Navy were selected for the Building Commissioning (Cx) Professional military crosswalk.

Table 5. Number of Military Personnel in Candidate MOCs for the Building Operations Professional Certification Criteria (DMDC data as of 9/30/2014)

				Strength		
Service	**MOC**	**Title**	**Enlisted /Officer**	**Active Personnel**	**Guard/ Reserve Personnel**	**Total Personnel**
Army	91Z	Senior Maintenance Supervisor	Enlisted	796	1,406	**2,202**
Navy	UT	Master Chief Utilitiesman	Enlisted	811	584	**1,395**
Air Force	3E090	Facility Systems Superintendent	Enlisted	125	201	**326**
Army	12H	Construction Engineering Supervisor	Enlisted	497	1,702	**2,199**
					Total	**6,122**

The MOCs identified in Table 5 do not portray a comprehensive list of all the potential candidate MOCs that might be related to the Building Commissioning Professional certification criteria. They do, however, inform the proof of concept study and demonstrate a foundational process by which additional MOC reviews can be conducted.

In general, as evidenced in the proof of concept demonstration MOCs reviewed, it does not appear that the military Services will have many directly linked enlisted career fields to the Building Commissioning Professional job title although they do have many career fields with differing levels of related skill sets. With the use of bridge training programs targeted towards the gaps, Service members may be able to attain this certification.

There are several apparent reasons for the dearth of directly related and transferrable experience and skills to the Building Commissioning Professional job title. First, much of the support work in this functional area appears to be conducted by DoD civilians or contractors rather than military personnel. Military personnel do not appear to get as deeply involved with the day-to-day operations and oversight of building management systems and activities until they are more senior in grade and supervise related civilian personnel and building operations systems. Therefore the numbers of potential candidates prepared to challenge the Exam Blueprint as it

currently stands will likely be minimal. A second reason for the limited number of potential candidates is the level of higher education and experience requirements established for this certification. With roughly 50% of the key domain tasks and sub-tasks requiring higher-level managerial experience, few personnel in the junior to mid-grade enlisted MOCs will have earned the breadth of experience outlined in this JTA, and even fewer will have attained the higher education requirements. Although there are numerous MOCs that have at least partial fulfillment of the required skills and experience identified on the Exam Blueprint, the vast majority of personnel in enlisted MOCs will require bridge training to cover the gaps in experience or training.

An example of where larger populations of potential candidates for this job title can be found is by looking at "feeder" MOCs to the higher-level superintendent or supervisory MOCs. For instance, the Air Force 3E3X1, Structural Civil Engineer, occupational specialty, which has a total population of nearly 2,500 active and reserve personnel is a feeder MOC to the 3E090, Facility Systems Superintendent, MOC that is profiled above. Airmen in this specialty are trained and develop significant experience in managing, constructing, repairing, and modifying structural systems. They learn to fabricate and repair components of buildings, utility systems, and real property equipment as well as ensuring compliance with environmental regulations. Similarly, Airmen holding the 3E1x1, HVAC/Refrigeration, occupational specialty, which has a total population of nearly 2,900 active and reserve personnel are a feeder MOC to the 3E090 Facility Systems Superintendent, MOC. They are trained and develop significant experience managing, installing, operating, and maintaining heating, ventilation, air conditioning, and refrigeration systems as well as combustion and other industrial equipment.

Individuals in these MOCs are indicative of many in all of the Services who have numerous technical skill sets that are applicable to the Building Commissioning Professional occupational area, but until they attain the senior NCO ranks will not likely have the level of broad managerial experience and formal education and training necessary to successfully challenge the certification exam, but could likely do so with a specific bridge training program.

5. CONCLUSIONS AND CONSIDERATIONS FOR NEXT STEPS

The purpose of this study was to make an initial determination of the extent to which military occupations may be related to three new BBWG job titles being developed by the Department of Energy: Building Operations Professional, Building Energy Auditor, and Building Commissioning Professionals. This proof of concept report identifies a methodological approach for a more all-encompassing analysis, and to determine the feasibility and advisability of doing so. This was conducted with the intent of evaluating whether unique military eligibility requirements might be developed for certification in the respective new job titles and whether there is potential value in developing bridge training opportunities to fill the gaps between military training and the certification knowledge domains identified in the certification exam blueprints.

While the level of analysis conducted for this proof of concept was not the most rigorous possible as it was an initial, high-level analysis, we believe it is sufficient to draw the conclusion that the degree of relatedness between any one enlisted MOC and these new BBWG job titles is not direct in most instances and individuals in these MOCs will require a degree of bridge training. For the reasons stated in the summary of findings sections above for each of the MOCs reviewed, there are likely to be significant gaps between the enlisted military job duties and related training and the qualifications and duties described in the JTAs of these new job titles. Thus, it does not appear likely that specific eligibility criteria unique to enlisted military occupations can be adopted for purposes of certification in these newly defined job titles. It may be possible, however, to further study the potential development of bridge training programs to fill the gaps between military training and the knowledge requirements for the certification requirements.

To determine whether bridge training programs might be developed, it would be necessary to identify the specific knowledge gaps for the MOCs most related to each of the job titles. This would need to be undertaken by taking the following steps:

1. Conduct initial Level 3 Analysis of remaining 114 MOCs identified as potentially related to these BBWG positions (Appendix H). This would entail doing the same level of analysis that was done for the MOCs included in this proof of concept report.
2. Conduct a complete Level 3 Analysis on all 114 MOCs – that is, attain SME validation of initial Level 3 analysis – a step not taken for the proof of concept.
3. Use complete Level 3 Analysis to identify the most related MOCs.
4. Conduct Level 4 analysis on the most related MOCs (identified in step 3 above) to identify training gaps. A key factor not pursued during this study was a careful examination of the training materials and learning objectives of each of the programs of instruction for the identified MOCs. Military subject matter experts well-versed in the development and administration of such programs of instruction will ensure a more robust and thorough understanding of exactly what individuals in potentially

related MOCs formally study as well as the skills they may attain through on the job training.

5. Determine whether the gaps identified in step 4 are unique to the military or if they are similar to the gaps that would be faced by civilians performing in occupations that are somewhat related, but not directly related to the three new BBWG occupational titles.
    a. If gaps are similar to those of civilian occupations, unique to the military bridge training may not be warranted.
    b. If gaps are unique to military personnel, specific military-focused bridge training may be warranted. It is highly unlikely that the Department of Defense, given its current budget constraints will be able to expand training to anything other than operational requirements for its military personnel for the foreseeable future. That being the case, close partnership with industry, academic institutions, and trade unions would be necessary to develop an affordable and efficient delivery model for bridge training programs.