# STATE CERTIFICATION STANDARDS FOR ALASKA'S FACILITY MAINTENANCE TECHNICIANS

**Submitted to:**
**The Denali Commission**

**Prepared by:**
**Three Star Enterprises, LLC**

**August 2013**

# Table of Contents


Acknowledgements ..... 6

1 Executive Summary ..... 7

1.1 Overview ..... 7

1.2 Project Goal ..... 9

1.3 Project Objectives ..... 9

1.4 Findings ..... 10

2 Methodology and Outcomes ..... 11

2.1 Electronic Outreach ..... 11

2.2 Strategic Planning ..... 11

2.3 Curriculum Building ..... 13

2.4 Statewide Public Meetings ..... 14

2.5 Market Assessment ..... 15

2.6 FMT Training Programs in Alaska and the Nation ..... 16

*2.6.1 Program Inventory of Alaska's Facility Maintenance Training Institutions ..... 16*

*2.6.2 National FMT Training Models ..... 19*

3 Conclusions and Recommendations for Alaska's Facility Maintenance Technician Certification Standards ..... 26

3.1 Training Certification Standards ..... 26

*Major Category A: Apply Safe Work Practices ..... 29*

3.2 Training Delivery Model ..... 29

3.3 Levels of Certification ..... 30

*Level 1 Curriculum ..... 31*

*Level 2 Curriculum ..... 32*

*Level 3 Curriculum ..... 32*

4 Action Plan for Codification of Facility Maintenance Technician Certification ..... 33

4.1 Option 1 ..... 33

4.2 Option 2 ..... 35

4.3 Action Plan Recommendation ..... 38

**4.4 Sustainability Plan..... 39**

## List of Appendices

Appendix A: Strategic Planning Meeting Summary

Appendix B: Monthly RAMP-T Meetings Summary

Appendix C: Electronic Outreach

Appendix D: DACUM Report: Skill Identification for Facilities Maintenance Technicians

Appendix E: Public Meeting Summary

Appendix F: Alaska Facility Maintenance Training Providers and Curricula, and National Facility Maintenance Technician Training Programs

## Table of Acronyms

| Acronym | Definition |
|---|---|
| ACPE | Alaska Commission on Postsecondary Education |
| ASME | American Society of Mechanical Engineers |
| AVTEC | Alaska's Institute of Technology |
| AWIB | Alaska Workforce Investment Board |
| BOC® | Building Operator Certification |
| CDQ | Community Development Quota |
| DACUM | Developing a Curriculum |
| DPD | City of Seattle, Department of Planning and Development |
| EPA | United States Environmental Protection Agency |
| ETPL | Eligible Training Providers List |
| FMT | Facility Maintenance Technician |
| HVAC/R | Heating, Ventilation, Air Conditioning and Refrigeration |
| OJT | On-the-Job Training |
| RAMP | Rural Alaska Maintenance Partnership |
| RAMP-T | Rural Alaska Maintenance Partnership Training |
| RSI | Related Supplemental Instruction |

# Acknowledgements

The staff of Three Star Enterprises, LLC would like to thank and acknowledge the assistance of the following members of the RAMP-T Committee:

Steven Angasan, Southwest Alaska Vocational Education Center; Fred Esposito, Alaska's Institute of Technology (AVTEC); Shannon Freitas, Yukon Kuskokwim Health Corporation; Sabrina Hoppas, Denali Commission; Karen Johnson, Denali Commission; Kurt Kuhne, Yuut Elitnaurviat; John Mark, Native Village of Kwinhagak; Joel Neimeyer, Denali Commission; Harold Snowball, North Slope Borough; Mark Spafford, Denali Commission; Mike Tucker, Alaska Works Partnership, Inc.; Bryan Uher, University of Alaska Fairbanks, Interior-Aleutians Campus; Fred Villa, University of Alaska ; Scott Waterman, Alaska Housing Finance Corporation, and Tiffany Zulkosky, United States Department of Agriculture.

We would also like to thank the facilities maintenance technician professionals who volunteered their time to participate in the DACUM: Phillip Downing, Sitka; George Flensberg, Dillingham; Brett Frasier, Bethel; Steven Graham, McGrath; Vernon Kaleak, Barrow; George Makaily, Anchorage, and Timothy McDermott, King Salmon.

Additional thanks go to Dana Jacallen at Lake Washington Technical College and Daryl Walker at Renton Technical College for giving a tour of their facilities and providing valuable information about their facility maintenance technician program.

Special mention goes to Karen Johnson of the Denali Commission. Karen gave many hours and special attention to this project, and her contributions are especially appreciated.

The Denali Commission provided all of the photographs except for the cover photos of the DACUM panel.

# 1 Executive Summary

## 1.1 Overview

In early 2012, the Denali Commission began an initiative to make available trained facility maintenance staff throughout the State of Alaska (State) to help prolong the life and energy efficiency of Federal and State infrastructure investments in rural Alaska. For over 30 years, billions of dollars have been spent to build health facilities, schools, recreation centers, multi-use buildings, housing units, fire halls, power plants and other permanent structures for the health, safety and welfare of rural Alaskans. However, the infrastructure is not being maintained or operated in a manner that protects that investment and in some cases increases operational costs by 30% or more. Prolonging the life of the infrastructure has always been important, but now that federal funding has been drastically curtailed it is more essential than ever.

Maintaining and operating rural facilities is problematic – there is an array of challenges that includes harsh environmental conditions, remote locations and lack of easy access to communities, inadequate telecommunications, and limited funds for school districts, municipalities, health organizations, village corporations, and other entities responsible for the upkeep of the facilities. Inadequate or poorly trained staff is costly in itself. Delayed repairs, faulty maintenance and inability to properly operate high-tech machinery eventually lead to energy inefficiency, facilities breakdown, and the loss of expensive infrastructure.

The new initiative was coined the Rural Alaska Maintenance Partnership (or RAMP). The RAMP is an alliance of Alaska rural facility owners, facility managers and investors who are united in recognizing a need to improve the efficiency and effectiveness of rural infrastructure maintenance. Stakeholders include the Denali Commission, the Alaska Housing Finance Corporation, the Alaska Village Electric Cooperative, Alaska's Institute of Technology (AVTEC), Alaska Works Partnership, Inc., Association of Alaska Housing Authorities, Yukon Kuskokwim Health Corporation, Alaska Native Tribal Health Consortium, Yuut Elitnaurviat, Bristol Bay Housing Authority, Rural Alaska

Community Action Program, Inc., Alaska Energy Authority, the Alaska Department of Labor and Workforce Development, the Alaska Department of Education and Early Development, the Alaska Department of Transportation and Public Facilities, the Alaska Mental Health Trust Authority, and others.

The RAMP's mission is "to create a self-sustaining facility and operations maintenance system that develops the capacity of rural Alaskans to operate and maintain their infrastructure in a manner that protects and enhances the health, safety and sustainability of rural communities and their residents."

The RAMP decided two actions were necessary to achieve its mission:

- Develop a widely accepted industry standard certification for building or facility maintenance technicians (FMTs) by coordinating with participating training centers in Alaska. A sub-committee, the Rural Alaska Maintenance Partnership Training (RAMP-T), was established to lead the training initiative based on current facility maintenance course offerings, industry knowledge, and facility owner/operator needs.
- Create a business model in which regional entities would recruit and hire local maintenance workers to carry out routine maintenance on participating facilities – private and public – and build a sustainable training program for the workers.

Three Star Enterprises, LLC was hired to complete the first step, and was assigned eight tasks, all focused on training:

1. Hold a kick off meeting with Denali Commission staff to develop a clear understanding of the contract's tasks, deliverables, schedule and expectations; and facilitate a strategic planning meeting in Bethel with key personnel, regional employers, and facility owners/operators to help design an Alaska Building Maintenance Certification Standard.
2. Facilitate monthly RAMP-T meetings;
3. Develop and maintain a RAMP-T website;

4. Facilitate the development of a DACUM (Develop a Curriculum) research matrix of occupational needs;
5. Hold public meetings in Juneau, Fairbanks, Kotzebue, Bethel, and Dillingham to expand understanding of Alaska's facility maintenance workforce needs and to validate the draft DACUM occupational analysis;
6. Write an analysis of facility maintenance programs in Alaska and around the nation and compare them for adaptation, modification and potential utilization for the Alaska facility maintenance certification;
7. Draft recommendations for an Alaska Facility Maintenance Technician Certification Standard;
8. Create an action plan for codification of the Facility Maintenance Technician Certification.

## 1.2 Project Goal

The project goal is to facilitate the development of Alaska Facility Maintenance Technician Certification Standards, explore licensing for its Facility Maintenance Training Programs, and build curricula guidelines for each level of certification that could be used by all Alaska training providers.

## 1.3 Project Objectives

The RAMP-T project's objective is to ensure competent and consistent care for the State's rural infrastructure by promulgating State certification standards for facility maintenance technicians.

To achieve the project objectives, Three Star Enterprises, LLC completed the eight tasks listed above. The strategic planning meeting set the direction for the project, the monthly meetings kept the project on track, and an employer marketing assessment determined there is a significant need for a well-trained facility maintenance workforce in rural Alaska and a standard State-certified training program for facility maintenance. The inventory of Alaska's facility maintenance training programs and the examination

of training models in other parts of the nation provided tools for building curricula guidelines and certification standards.

Documentation of Three Star's completion of the assigned tasks is detailed in a series of appendices and two subsections of this document:

- Appendix A: Strategic Planning Meeting Summary;
- Appendix B: Monthly RAMP-T Meetings Summary;
- Appendix C: Electronic Outreach;
- Appendix D: DACUM Report: Skill Identification for Facilities Maintenance Technicians;
- Appendix E: Public Meeting Summary;
- Appendix F: Alaska Facility Maintenance Training Providers and Curricula, and National Facility Maintenance Technician Training Programs;
- Draft recommendations for an Alaska Facility Maintenance Technician Certification Standard are detailed in Section 3;
- An action plan for codification of the Facility Maintenance Technician certification is presented in Section 4.

## 1.4 Findings

The final stage of the RAMP-T project required an analysis of the alternatives for establishing FMT training that lead to State certification and licensure. The findings of this exploration lead to the recommendation that training institutions that want to provide FMT training establish the acceptability of the training with the Alaska Commission on Post-Secondary Education (ACPE), the Alaska Department of Labor and Workforce Development, Division of Business Partnership and the Alaska Workforce Investment Board. This will allow students to obtain student loans, and allow the training institutions to be eligible for program funding. In addition, the goal of having a statewide-recognized FMT certificate could be pursued through a nationally-recognized organization providing construction trade accreditation.

# 2 Methodology and Outcomes

## 2.1 Electronic Outreach

Three Star Enterprises, LLC kicked off the project by setting up a website, www.alaskafacilitymaintenance.org and developing social media, including discussion boards on Facebook and Google+ and an electronic mailing list, to build and maintain contact with stakeholders and other interested parties. Regular electronic newsletters have been distributed during the life of the project. Supporting documentation is presented in **Appendix C**.

**Lessons Learned**
Social media is critical to any project needing public input, and the electronic sites gave consumers a variety of choices for information gathering, participating and contributing to this project. Social media such as Facebook and Google+ were primarily useful in getting word out about upcoming meetings, while the project site was useful for providing project stakeholders real time access to critical project-related documents.

## 2.2 Strategic Planning

A strategic planning summit was convened in Bethel on January 31, 2013 to meet with facility maintenance technicians, training providers, employers, community members and investors and to develop a strategy for the RAMP-T project. The morning session focused on training providers and the afternoon session involved employers and Bethel facility maintenance managers.

The participants provided guidance to the project managers, and consensus was reached on several important issues, including the following:

- The RAMP-T Committee will meet on the fourth Thursday of each month, through July 2013. RAMP-T meeting summaries are presented in **Appendix B**.
- Technician training should recognize several instruction methods, including classroom, hands-on, and apprenticeship.

- Documented time should be an essential part of a certificate program.
- Training should be defined, and skills sets identified and made part of training plan.
- Regional and local training needs would be identified, such as climate and environmental needs, and added to the core group of skills sets.
- Local training facilities would use Memorandums of Agreement or Understanding with other training centers to ensure trainees could get classes not offered locally.
- In order to establish facility maintenance curricula, the DACUM (Developing a Curriculum) process would be employed to develop key competencies and skill sets. As part of that process, the DACUM facilitator required that highly experienced rural maintenance workers be involved.
- Once the DACUM matrix is created, the draft would be reviewed in a series of public meetings throughout the state to verify or validate the results, and make final adjustments based on consensus.
- A list of stakeholders was identified to be included in the development of an FMT training program. They include: Alaska Department of Military and Veterans Affairs, Omni Enterprises, tribal councils and local governments, regional store owners, CDQ groups, utility companies, mines, the Department of Transportation and Public Facilities, and the North Slope Borough.
- The concept of preventative or "reparative" maintenance should be a key concept of any facility maintenance training curriculum.
- Staffing problems are endemic to rural Alaska. Workers are constantly changing jobs but not getting the training they need.
- Low pay, lack of respect, and a lack of administrative understanding of the complexity of facility maintenance results in frequent staff turnover.
- Providing staff training is expensive.
- Maintenance staff needs to understand the complete systems they are servicing.

- When new equipment is added, there should be specialized training for the responsible staff.
- Continuing education credits should be required for staff to keep them current in their field.
- There should be an energy efficiency and sustainability component throughout the training. Even at the beginning level, some understanding about it is important.
- Soft skills training should be a part of any introductory facility maintenance training program.
- Safety should be an integral part of all phases of facility maintenance training.

A summary of the Strategic Planning Meeting is attached as **Appendix A** of this report.

**Lessons Learned**
The Strategic Planning Meeting was valuable and laid the groundwork for the RAMP-T project. There was a good showing of facility maintenance employees, training center educators, and village, city and state employees. The only thing missing was a better representation of business and industry at the table.

## 2.3 Curriculum Building

In March 2013, a DACUM facilitator was hired and a geographically representative group of seven facility maintenance workers volunteered to participate in a two-day skill identification process. Expert FMTs came to Anchorage from across the state, including Sitka, King Salmon, McGrath, Bethel, Barrow, and Anchorage. Their maintenance experience ranged from five to 35 years on the job, and included residential and commercial buildings, water and wastewater operations, regional hospitals and clinics, school districts, remote military sites, roads, and power generation facilities.

Participants identified the major components of an FMT's job and detailed for each task the level of complexity, frequency and required skills and knowledge.

The DACUM report and corresponding Facility Maintenance Technician skills matrix is attached as **Appendix D**.

**Lessons Learned**
The DACUM facilitation was a success–the participants were a good representation of facility maintenance technicians, both in varied years of experience and specialization, and they worked well together over a two-day period. They were able to identify a comprehensive set of skills, sub-skills and knowledge necessary to maintain and repair a wide variety of buildings and facilities.

## 2.4 Statewide Public Meetings

Following the DACUM facilitation, public meetings were held in five communities (Juneau, Fairbanks, Nome, Bethel and Dillingham) and a statewide webinar / teleconference was held to discuss the results of the DACUM process. Common themes arose during the six meetings:

- A certified and standardized training program would give employers confidence when hiring facility maintenance technicians.
- Sharing FMTs would allow organizations to leverage resources.
- There would need to be a certain level of cooperation within regions to share skilled FMTs.
- Regional geographic and economic differences should be taken into consideration when planning the training programs. For instance, subsistence activities could affect when training was offered or maintenance projects undertaken. Weather-related impacts on facilities would make a difference in what courses should be offered. One suggestion was to create regional advisory committees to review the training programs to make sure it made allowances for regional differences.
- Existing workers would benefit from obtaining certification, but concern was expressed about the cost of the training, the need to obtain training away from home village, and the financial impact on smaller organizations.

- Organizations would be more inclined to hire graduates from a certified program.
- Turnover would be reduced if employees were certified.
- It might be difficult to pay certified workers a higher wage.
- It would reduce the need to hire outside workers.
- It would be a tremendous benefit, especially for smaller organizations, to share trained facility maintenance workers with specific expertise.
- Working out cooperative agreements, including financial and liability issues, may be difficult.
- The cost and need for three levels of FMT expertise caused concern for small organizations and communities.
- Some of the training should be offered via webinar or similar technology to make training more affordable.
- Alternative energy systems and energy conservation training should be included in the curriculum.

A summary of the statewide public meetings is attached as **Appendix E**.

**Lessons Learned**
The public meetings provided the RAMP-T with valuable information about local and regional training needs for facility maintenance, and the financial, geographic and environmental problems in each location. However, the meetings weren't always well attended, and a better cross-section of the community would have contributed to a more comprehensive understanding of the region.

## 2.5 Market Assessment

Three Star Enterprises, LLC conducted an independent market assessment among the hundreds of Alaska employers who employ or hire facility maintenance technicians. Thirty-two participants provided input. The responsive employers include village and tribal organizations, regional housing authorities, school districts, health organizations,

vocational/technical training centers, cities and a borough, utilities, a financial organization and a religious institution. Of the 295 FMTs employed by these organizations, 100% agree that most FMTs are trained on the job. At least 75% of all participants agree that if they had adequately trained technicians, it would help protect their investment and increase the operational life of their facilities, reduce turnover, promote greater energy efficiency, and support more local hire. Almost 90% of the participants believe their organizations would support certifying their FMTs.

**Lessons Learned**

The marketing assessment provided good information about the need for facility maintenance personnel with verifiable and consistent training, and the willingness of employers to hire such employees. The participants included a good number of village and tribal organizations, and housing authorities, but the assessment would have benefitted from responses from more cities, boroughs, and industry. Future market assessments should allocate resources towards more telephonic outreach versus electronic outreach.

## 2.6 FMT Training Programs in Alaska and the Nation

### 2.6.1 Program Inventory of Alaska's Facility Maintenance Training Institutions

Alaska has five Facility Maintenance Technician training institutions. It also has four schools with significant pathways that could lead to an FMT degree or certificate.

Alaska Works Partnership, Inc.'s Building Maintenance Repairer (BMR) registered apprenticeship is a two-year or 4,000 hour program offering rural Alaskans the opportunity to train and work in their home region. Recruitment is by region, and participants receive support services such as basic education and life skills training. A step-up program is built in, so students are able to complete the first 2,000 hours of BMR training and then move into a specialized apprenticeship with appropriate credit given for the first year. Energy conservation is an integral part of the curriculum.

The Southwest Alaska Vocational Education Center, or SAVEC, also offers the BMR Certificate. When funding is available, they contract with Alaska Works Partnership to offer the BMR program.

Alaska's Institute of Technology, or AVTEC, A fully rounded certificate. It is a two-semester program with both classroom and hands-on training. They do rough and finished construction. Students get plumbing and electricity, in addition to carpentry. They are adding wastewater. The Construction Trades program is offline for the fall – they are recruiting for a new instructor. Once an instructor is in place, they will crosswalk between the existing curriculum and DACUM and fill any gaps. Once definition is given to the three levels of expertise, they anticipate adding industrial electrical and plumbing to complete level two and three certificates. AVTEC also has two pathways to the FMT: the Refrigeration Technician (which could also be a pathway to HVAC technician) and the Plumbing/Heating Technician (which could also be a pathway to a Plumbing career). A fourth option is the Facility Maintenance Mechanical Trades, which generally leads to careers in either Plumbing or Refrigeration.

The University of Alaska Interior-Aleutian Campus's Facility Maintenance has three levels of FMT training. The 12-credit Occupational Endorsement includes classes in all of the basics of facility maintenance, including interior repairs, flooring and cabinet installation, boiler, HVAC, and appliance repair and troubleshooting, and an introduction to plumbing. Two other Occupational Endorsements, Sustainable Energy and Carpentry, can enhance or lead to Certificates in advanced FMT or advanced Carpentry, respectively. Someone pursuing an Associate of Applied Science degree could use the FMT certificate as a pathway to Residential Construction or Project Management, as could someone who has achieved the Carpentry Certificate.

The focus is residential. Their curriculum is based upon the unique situations in rural Alaska. The program is offered at different times, based on location and need. If a community asks for it, they can deliver the training quickly. They design it around each community's subsistence schedule, and split it between two semesters. It is village-specific. It is a different model in Fairbanks. They partner with Tanana Chiefs Conference, and TCC brings in students from outlying villages. They are now scheduling the classes more regularly because of the partnership.

Yuut Elitnaurviat, or the People's Learning Center, is located in Bethel, and it offers National Center for Construction Education (NCCER) classes and University classes when they line up with the curriculum. Courses may include Boilers, Carpentry, Electrical, Plumbing, Welding, CDL, and Construction Math. If University classes, students get college credits. NCCER certificates are "stackable." Classes are10-20 day intensives, so students can go home, come back and do another one. If the students start in the fall, they are usually done in spring. Yuut has a Memorandum of Agreement with AVTEC to deliver Related Technical Instruction via the Internet. Training is either funded by a grant or driven by employer requested training. Yuut's board is made up of a consortium of employers, and they meet quarterly to discuss current training needs.

Schools with strong pathways to a career as a Facility Maintenance Technician are the University of Alaska Fairbanks Bristol Bay Campus (Dillingham), Alaska Job Corps program (Palmer), Alaska Technical Center (Kotzebue), and Ilisagvik College (Barrow).

The University of Alaska Fairbanks Bristol Bay Campus is currently developing an FMT Occupational Endorsement, and has proposed working with RAMP to design the training to fit with the newly written certification standards. Courses will include welding, plumbing, electrical, wiring, boiler maintenance, construction and safety. It also offers a Sustainable Energy Technician Occupational Endorsement, a strong pathway to FMT. It's a one-semester, 12-credit program with classroom and hands-on training.

Alaska Job Corps has an entry-level maintenance helper pathway. It's a pre-apprenticeship program that includes classroom and hands-on training on job sites. It's a 12-18 month program. All students take a core skills class, and choose one specialty – facilities maintenance, electrical, plumbing, carpentry, or HVAC.

Alaska Technical Center has two pathways to FMT: Millwright Maintenance and Construction Trades Technology. The Millwright program is in response to the Red Dog Mine employment opportunities. It focuses on heavy equipment and processing technologies. The construction trades program is geared toward home construction and maintenance. Additionally, there is short-term training, driven by employers' needs and

public interest. Short-term classes include Toyo stove and water heaters, core driller's class, MSHA/OSHA.

Ilisagvik College's Associated Construction Trades Certificate (four levels) is another pathway to FMT. The curriculum is from NCCER and it's classroom and hands-on training. Courses include Carpentry, Electrical (I, II, III, IV), Pipefitting, Pipeline Insulation, Plumbing (I, II, III, IV), and Scaffolding. Field trips and real construction projects keep interest high. They begin with core skills, and students move through different classes. The college responds to the training demands of regional employers.

A program inventory of Alaska's training institutions that offer Facility Maintenance Technician training or strong pathways toward that occupation were researched and the information cataloged. Detailed information on Alaska training institutions is attached as **Appendix F**.

**Lessons Learned**

It was easy to gather information about FMT training in Alaska, but it is difficult to compare the training methods employed by individual institutions. There may be training in electricity, for instance, but understanding how one school's electrical curriculum compares to another is difficult, other than comparing the number of hours/credits taught and the different levels offered. This problem shines a light on the need for certification standards.

### 2.6.2 National FMT Training Models

After reviewing national training institutions, several stood out as leaders in Facility Maintenance Technician training. **Laney Community College**, in Oakland, California is perhaps the most notable. With grants from the National Science Foundation, Laney and its over-arching Peralta Community Colleges system has been leading the way in cutting-edge research on building science. Their most recent grant, for four million dollars, was awarded in late 2012. It will fund Building Efficiency for a Sustainable Tomorrow to develop curricula for building control technicians and incorporating energy-efficient practices and technologies. The curricula will be made available for the nation's two-year colleges. Laney is partnering with colleges and schools across the

country in this effort, including: UC Berkeley, George Piedmont Community College, and Milwaukee Area Technical College.

Some other notable schools, recognized by Laney College as leaders in the field of facility maintenance technology, are Heartland Community College and Triton Community College in Illinois, Erie Community College in New York, and Community College of Allegheny County in Pennsylvania.

The significance of these schools is their emphasis on energy conservation, green, renewable, and sustainable technologies. The schools differ in their focus—some are industrial, some commercial, and others manufacturing, depending on the economics of the region. The schools are similar in offering what the Pacific Northwest schools do—pathways leading from entry-level technicians to facility management professionals. The schools are also cognizant of the need for continuing education for the existing workforce.

There are also several schools in the Pacific Northwest that are noteworthy for their comprehensive curricula and for their emphasis on energy-efficient building technologies.

**Bates Community College**, in Tacoma, Washington, provides many pathways to the facility maintenance profession, including Certificates of Training (12-18 credits) in Boiler Operations, Building Care and Maintenance I, Maintenance Technician I, Building Care and Maintenance II, and Maintenance Technician II. Additionally, they offer a Certificate of Competency (84-87 credits) and an Associate of Technology Degree (120 credits) as a Facility Maintenance Engineer. Bates Community College also offers the courses as extended learning opportunities for people already in the industry.

Graduates could go on to work in the facility maintenance field, including careers as a boiler operator, building repairman, custodian, or facility maintenance engineer in industrial settings, office buildings, hotels, schools, or government agencies. Courses prepare students for Class V and Class IV boiler operator/fireman certification.

The program also serves as a pre-apprenticeship program for the Western Washington Operating Engineers Facility Custodial Services Apprenticeship Committee and the Western Washington Stationary Engineers Apprenticeship Committee.

The apprenticeship classroom training takes place at the Community College. Apprentices must complete 144 hours of related supplemental instruction (RSI) and 1,000 hours of on-the-job training (OJT) per year. When an apprentice completes 8,000 hours (four years) of OJT and successful completion of all RSI, he/she will receive a nationally-recognized Certificate of Completion from the Washington Department of Labor and Industries.

**Lake Washington Institute of Technology**, in Kirkland, Washington, offers three levels of education for Building Plant Maintenance. The Building Plant Maintenance Associate of Applied Science Degree graduates would be prepared for entry-level Preventative Maintenance Engineering positions targeted toward multi-story commercial office complexes and a wide variety of industrial manufacturing and food service equipment maintenance positions. They would be prepared for the City of Seattle's Department of Planning and Development's (DPD) grade V boiler fireman license exam, and be familiar with the American Society of Mechanical Engineers' (ASME) Boiler and Pressure Vessel Code. Graduates would operate Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R) systems and support equipment as part of preparation to sit for a DPD Refrigeration Operating Engineers License exam. They would also be prepared for the United States Environmental Protection Agency (EPA) Clean Water Act, Section 608 certification (handling refrigerant) and be familiarized with the National Electrical Code standards and recommended practices and guides for commercial and industrial building electrical distribution.

The Building Plant Maintenance Program's Certificate of Proficiency—79 credits or 6 quarters—prepares graduates to work in a variety of entry-level positions in the field of Building Plant Maintenance. The technician would operate, maintain, and repair HVAC systems, be prepared for the DPD grade V boiler fireman license exam, and be familiar with the ASME Boiler and Pressure Vessel Code.

The Certificate of Completion is earned in 47 credits or 2 quarters, and it trains students for a job maintaining and repairing a variety of machines and equipment, including mechanical, electrical, hydraulic, and pneumatic systems. Graduates would also be able to use computer maintenance management systems to plan preventative maintenance and document repairs. It is a pathway to becoming a Building Plant Maintenance Technician.

Lake Washington emphasizes the complex relationship of the building's many systems, including HVAC/R, electricity and wiring, power generation, boilers, and automation and controls, and the relationship between preventative maintenance and sustainable energy practices. The program also recognizes the need for lifelong learning in this occupation, and ensures that their courses are available not only as part of a certificate or degree, but also individually for people already in the trade.

**Renton Technical College**'s Commercial Building Engineering program is recognized as a "School of Technology" by the City of Seattle in their Steam Engineer and Boiler Fireman License Law. Students may choose a Certificate of Completion, an eight-quarter, 128-credit program, or an Associate of Applied Science degree, an eight-quarter, 148-credit program. The curriculum is the same, except the AAS degree includes 20 credit hours of general university requirements. There are also three tracks—Commercial (commercial/business/medical complexes), Industrial (manufacturing plants), and Stationary (boilers and other mechanical equipment).

The curriculum prepares students to operate, repair, maintain, and troubleshoot boilers, boiler systems and refrigeration systems, and also to obtain appropriate operator's licenses. Graduates would also have a basic understanding of pneumatic, electric, electronic, and computerized building control systems and would be able to operate, repair, maintain and troubleshoot them.

Students graduate with a good understanding of electrical fundamentals, components, and diagrams, and would be able to repair, maintain, and troubleshoot electrical controls systems. They would be familiar with the National Electric Code and be very familiar with computer technology, building management control systems, and architectural and mechanical prints for commercial buildings and industrial plants.

Courses in welding, air quality, ventilation systems, building fire and life safety systems, and preventative maintenance systems are also required. Students earn a 40-hour hazardous waste handler's certificate. Graduates would be able to apply mathematical principles to electrical and mechanical problems commonly faced by commercial building and industrial engineers.

The program is designed so students could enroll for morning, afternoon, or evening classes to accommodate work schedules. Practical experience and hands-on training is emphasized. Like Bates Community College, Renton maintains a strong relationship with union apprenticeship. The apprenticeships are employer-driven, so students or graduates must be employed before they are signed as apprentices.

**Portland Community College** offers three levels of training in the facility maintenance field. All courses are contained in the Facility Maintenance Technician (FMT) AAS Degree. Facility Maintenance Technicians work in the semi-conductor industry, health care facilities, heavy industry and commercial facility or for HVAC/R companies.

The first level is a pathway to becoming an FMT, and the graduate receives a HVAC/R Installer Certificate. The 14-credit course, completed in less than a year, includes courses in refrigeration, refrigeration electrical, and HVAC/R installation.

The second level is an entry-level Facility Maintenance Technician program, and the graduate receives an FMT Certificate. The graduate must complete at least 44 credits, and the program can be completed in less than one year. In addition to the courses earned in an HVAC/R program, the graduate will take classes in all facets of facility maintenance.

The third level, the Associate of Applied Science Facility Maintenance Technology degree, is a two-year program. These graduates will have 16 credits of general education, and more advanced courses in facility maintenance.

Of particular note is an elective course in Building Commissioning. It covers the "efficient operation of building systems to ensure that building systems are designed, installed, functionally tested, and maintained according to the owner's operational

needs. Includes verification of specified restoration of existing buildings to high, efficient productivity through renovation, upgrade and the tune-up of existing systems."

Additionally, the Pneumatic Controls course is notable because it trains the HVAC service technician in Honeywell control systems, and it covers thermostat and controllers of Robert Shaw, Johnson, Honeywell, and Barber Coleman.

**Building Operator Certification** (BOC®) is a for-profit organization that offers competency based energy conservation training and certification to facility maintenance technicians. Recognizing the cost-savings inherent in energy efficient practices, the company purports to teach the "big picture" of how building systems can work together to improve energy efficiency. In their view, preventative maintenance and cost-effective strategies for building performance will lead to increasing the lifespan of buildings.

Unlike the other training programs mentioned here, BOC® is for building operators with at least two years of experience. Facility Maintenance Technicians take the classes, but so do building and stationary engineers, maintenance supervisors and workers, HVAC technicians, electricians, operations supervisors and technicians, and others in the field. There are two levels of certification: Building Systems Maintenance, and Troubleshooting and Equipment Maintenance. It has received national accreditation from several organizations, including California State University and the University of Maine. A long list of employers send their employees here for training, including the U.S. Army, U.S. Postal Service, Boeing, Ikea, General Electric, Hewlett-Packard, Providence Health Systems, and Dana Faber Cancer Institute.

An inventory of these and other national programs is presented in **Appendix F**.

**Lessons Learned**

While innovations in facility maintenance technician training are occurring, understanding the scope and context of each training program is a challenge. Schools across the U.S. are similar to those across Alaska—they vary in complexity and focus based on the ability of individual schools to fund the training and the needs of

particular communities and regions. What was learned was the emerging focus on green technologies, energy efficiencies, and whole system training, driven in large part by business and industry recognizing year-to-year cost savings in energy expenditures and the overall sustainability of a building's lifespan. The challenge to this research is the ability to determine the best practices that will be applied to Alaska's system of training.

# 3 Conclusions and Recommendations for Alaska's Facility Maintenance Technician Certification Standards

## 3.1 Training Certification Standards

A Facility Maintenance Technician Training Certification Program should provide a professional certification for staff that operate and maintain public and commercial facilities, and it should involve energy and resource efficient operation of facility systems.

The unique Alaska circumstances of remoteness, numerous unconnected small communities, a small statewide population, and the distance to reach training facilities present difficulties in training Facility Maintenance staff. While recognizing these and other training issues, it was the general consensus from the RAMP-T participants involved in the exploration of this training problem (rural employers, training facility and university staff) that an FMT Certification should be the industry standard for new hires. In addition, the participants agreed that entry into an FMT training program should have basic skill requirements for students (i.e., general knowledge of the world of work, basic computer skills, and reading comprehension and mathematical calculation abilities).

The RAMP-T members requested that the consultant conduct a DACUM exercise to identify the key elements required to develop the FMT curriculum. The DACUM was conducted in April and produced a thorough review of the skills and sub-skills needed to successfully perform FMT work. The following DACUM overview identifies the categories for major skills and sub-skills required for developing the FMT curriculum:

## Facility Maintenance Technician - DACUM Chart

| Skills | Sub-skills | | | | |
|---|---|---|---|---|---|
| A Apply Safe Work Practices | A.1.1 Adhere to OSHA-10 safety standards | A.1.2 Obtain First Aid/CPR certification | A.1.3 Implement standard operating procedures | A.1.4 Use personal protective equipment (PPE) | A.1.5 Maintain clean work area |
| B Maintain Facility Grounds | B.1.1 Maintain facility roadways | B.1.2 Maintain facility walkways | B.1.3 Maintain facility landscaping | B.1.4 Fertilize facility vegetation | B.1.5 Maintain public grounds equipment |
| | B.1.6 Maintain facility signage | B.1.7 Contain wildlife on property | | | |
| C Maintain Facility Structure | C.1.1 Maintain interior and exterior surfaces | C.1.2 Maintain building doors | C.1.3 Maintain building windows | C.1.4 Maintain building roofs | C.1.5 Maintain structural integrity |
| | C.1.6 Maintain levelness of buildings | C.1.7 Apply structural drawing information | C.1.8 Operate fire systems | C.1.9 Maintain building appliances | C.1.10 Maintain building furnishings |
| D Operate HVAC Systems | D.1.1 Operate heating boilers | D.1.2 Operate distributive digital control systems | D.1.3 Maintain heating system valves | D.1.4 Operate heating system pumps | D.1.5 Monitor operation of HVAC system |
| | D.1.6 Maintain cooling / refrigeration systems | D.1.7 Maintain renewable energy systems | | | |
| E Operate Facility Elec-trical Systems | E.1.1 Maintain electrical distribution system | E.1.2 Maintain interior lighting system | E.1.3 Maintain exterior lighting system | E.1.4 Maintain auxiliary electrical system | |

| Skills | Sub-skills | | | | |
|---|---|---|---|---|---|
| F Operate Water Systems | F.1.1 Perform water testing | F.1.2 Maintain water source / treatment system | F.1.3 Identify water system requirements | F.1.4 Perform water treatment | F.1.5 Maintain water storage tanks |
| | F.1.6 Perform leak detection | F.1.7 Repair water distribution leaks | F.1.8 Maintain fire hydrants | F.1.9 Maintain cross-connection control | F.1.10 Maintain water distribution system |
| | F.1.11 Maintain water system valves | F.1.12 Maintain water pumps system | F.1.13 Maintain water system filters | | |
| G Operate Waste Management Systems | G.1.1 Operate lift stations | G.1.2 Maintain wastewater collection system | G.1.3 Maintain wastewater treatment system | G.1.4 Process hazardous materials | G.1.5 Process recyclable materials |
| H Maintain Fleet Machinery | H.1.1 Operate fleet equipment | H.1.2 Perform scheduled maintenance | H.1.3 Change operational lubricants | H.1.4 Repair physical damage | |

The complexity of the range of facility operating systems, the huge array of facility maintenance tasks, and the time requirements for hands-on experience lead the participants to the conclusion that there must be multiple levels of FMT Certification:

Level One—Basic entry-level skills training completion.

Level Two—Higher skills-level training and several years' experience.

Level Three—Complex skills training and additional experience.

The DACUM identified complexity ratings (1 – 4) for all eight major skill categories skills identified in the DACUM (1 being the lowest rating). The ratings were developed to be utilized in developing the curriculum for the three levels of facility maintenance

technician certification. For example, the following identifies the rating levels for the first skill listed under "Apply Work Practices".

**Major Categories, Skills, Sub-skills, Supporting Knowledge, and Abilities**

**Major Category A: Apply Safe Work Practices**

| Skills | Sub-skills | Supporting Knowledge and Abilities |
|---|---|---|
| **A.1.1: Adhere to OSHA-10 safety standards**<br>Importance: 4<br>Frequency: 5<br>Difficulty: 1 | 1.1.1 Attend scheduled safety training<br>1.1.2 Obtain OSHA-10 certification<br>1.1.3 Apply OSHA-10 standards | Knowledge of OSHA Regulations CFR-19.10 |

From the ratings identified for this example, it is obvious that A1.1 Adhere to OSHA-10 safety standards indicated that this skill would be included in FMT Level 1 training.

## 3.2 Training Delivery Model

Currently, the majority of rural Alaska employers that have facility maintenance technician staff use on-the-job training (OJT) as the primary approach to training new facility maintenance staff, and a variety of ad hoc training opportunities to supplement training needs. This approach is chiefly based upon its practicality and the knowledge that most adults learn best through hands-on experience. It was the recommendation of the employers, training institutions, and facility maintenance staff that a mixture of classroom and hands-on experience would be the best approach to preparing new facility maintenance technicians.

The various regional training facilities are limited, for several reasons, in the range of training classes they can offer. The remoteness of Alaska's villages make coming into training facilities costly and limit the number of available students. It is also costly for rural training facilities to offer on-going certificate training programs when the annual number of participants is low or unpredictable, and the expense of developing the

training facilities and keeping staff is prohibitive. Consequently, the most likely scenario for developing successful FMT certification training involves two approaches:

- Larger Institutions—Larger institutions, such as AVTEC and the University of Alaska rural campuses, have the financial basis, facilities and staffing capacity to offer a larger array of training on an annual basis. This approach will appeal to more mobile students and institutions that have the resources to sponsor students.
- Smaller Regional Training Institutions—The close proximity of the regional training institutions to local communities provides a good option for rural residents and employers focusing on local hire for facility maintenance technician staff. Developing cooperative training agreements that take advantage of regional facilities' strengths and the expertise developed by larger centrally located institutions will be a practical solution for rural facility maintenance technician training.

## 3.3 Levels of Certification

As previously noted, the employers and the facility maintenance technicians involved in the DACUM development concur that there should be various levels for the facility maintenance certification training program. The various levels address the employer needs for hiring qualified personnel for entry-level staff and provide a means for determining the qualifications for new hires or advancement of existing staff into higher-level facility maintenance technician responsibilities.

The DACUM identified eight categories of skills with a number of sub-skills. Each of the skills were evaluated and ranked by the DACUM participants on three different criteria:

**Importance:**

**How important is this task to the performance of your current job?**

1. Not important – Performance of this task is not essential to the job

2. Somewhat important – Performance of this task is minimally necessary to the job
3. Important – Performance of this task is essential to the job
4. Extremely Important – Performance of this task is critical; non-performance possesses a risk

**Frequency:**

**How often is the task performed?**

1. Daily
2. Bi-weekly
3. Weekly
4. Monthly
5. Continuously
6. Situationally

**Difficulty:**

**The level of effort, challenge and complication associated with the performance of the task.**

1. Little difficulty
2. Somewhat difficult
3. Difficult
4. Very difficult

It is the recommendation of the DACUM participants and the employers that the FMT certification training has three levels and uniformity by the training institutions across the state. The three levels should utilize the DACUM sub-skill rankings to help determine what training is offered by each of the three levels. Training institutions should consider:

**Level 1 Curriculum**

- New FMT students will enter with essential entry-level skills.

- All essentially important sub-skills will be addressed.
- All sub-set skills that have a difficulty level of 1 and 2 will be included.

**Level 2 Curriculum**

- All entering Level 2 students will have competed one to two years of experience working at a Level 1 skills level (as an FMT or similar occupation) and/or be able to demonstrate the required level of competency (through a skill assessment) to move into the Level 2 training.
- The training will be primarily concerned with DACUM identified Level 3 and some Level 4 areas of difficulty.

**Level 3 Curriculum**

- All Entry-Level 3 students will have one to two years of experience working at a Level 2 skills level (as an FMT or similar occupation) and/or be able to demonstrate the required level of competency (through a skill assessment) to move into the Level 3 training.
- The training will be primarily be concerned with DACUM identified Level 4 areas of difficulty and possibly specific training issues identified by the employer.

# 4 Action Plan for Codification of Facility Maintenance Technician Certification

In Task 8, the Action Plan for Codification of the FMT Certification states: **"The Contractor shall include in their action plan the steps required to attain codification or licensure and the most logical State department to conduct that action; requirements for State of Alaska Department concurrence or approvals; and a potential timeline."**

After reviewing the State statutes and having discussions with the appropriate program personnel, it appears that there are two main options for establishing the State FMT Certification Program:

- Introduce into the Alaska Department of Commerce, Community, and Economic Development, Division of Corporations, Business and Professional Licensing Statutes, the authority to regulate and issue FMT licenses.
- Establishing an FMT license through the Alaska Commission on Postsecondary Education, Department of Labor and Workforce Development and the Alaska Workforce Investment Board.

The following discussion reviews the two options for establishing codification or licensure of the Facility Maintenance Technician program.

## 4.1 Option 1

**Introduce into the Alaska Department of Commerce, Community, and Economic Development, Division of Corporations, Business and Professional Licensing statutes, the authority to regulate and issue facility maintenance technician licenses.**

The Division of Corporations, Business and Professional Licensing is responsible for the licensing and implementation of statutes and regulations for a variety of professions. The current listing of professional licenses covered by the Division does

not specifically include Facility Maintenance Technician.

The closest professional license issued by the Division is for the regulation of Mechanical Administrators (AS 8.48.230). Mechanical Administrators are defined in AS 8.48.00(4) as being responsible for the "fabrication or completion of a product or electrical apparatus exclusive of its completion or installation at a job site" and in AS 8.48.210 the purpose of the Mechanical Operators "is to protect the safety of people and property in the state from the danger of improperly installed or modified mechanical systems by providing a procedure to assure" public safety.

The State Statutes for Mechanical Administrator do not specifically address Facility Maintenance Technicians. However, **AS Sec. 08.40.230 Categories of Licenses,** does state "The department may adopt regulations establishing categories of mechanical administrators, qualifications for those categories, and the content of examinations for applicants for each category."

According to the Division, the licensing of Facility Maintenance Technicians can only be included in the Alaska Statues through legislative action. The Department does not submit legislation for the inclusion of new professional licenses. Consequently, the inclusion of a new statutory professional license would have to be introduced by a legislator and authorized by the legislature. While this is not an impossible task, it could be an involved process with an uncertain outcome.

However, the Alaska statutes and regulations for licensing of Mechanical Administrators (Sec. 08.40.490 – 08.40.490) does state in Sec. 08.40.230 that the department may adopt regulations establishing categories of mechanical administrators, qualifications for those categories and the content of examinations for applicants for each category. This does indicate that the Department could include Facility Maintenance Technicians within the existing regulations.

There are several arguments for not seeking a legislative change to the State Licensing statues or trying to convince the Department that it has the authority to include Facility Maintenance Technicians in the existing Mechanical Administrator regulations. It should be noted that this option does not come with an estimated timetable, as the

variables impacting the process are too unpredictable.

- Required State Licensure would mean all Facility Maintenance Technicians be required to take and pass a qualifying State test. There are provisions in the existing statutes for exempting rural communities with no access to the required training. However, determining this for the regional hub communities and organizations based in those communities (health corporations, housing authorities, etc.) could be problematic.
- The issue of qualifying existing Facility Maintenance Technicians would have to be resolved. There could be an exemption for this group but it might reduce the ability work in other communities and would require the burden of proof to qualify for the exemption.
- The urban areas of the state might not be interested in having this statute occur. It most likely would require involvement in a political process with the State Administration, the legislature, and various industries and employers, with an uncertain or protracted outcome.

## 4.2 Option 2

**Establishing a Facility Maintenance Technicians Certificate that is approved through the Post-Secondary Education Commission, Department of Labor, the Alaska Workforce Investment Board, a national certifying institution and a cooperative agreement between the participating training institutions.**

The Department of Labor and Workforce Development, Division of Business Partnerships and the ACPE requires that training institutions must be on the Eligible Training Providers List (ETPL) before any of the students attending training can receive financial aid. All RAMP-T training and educational institutions are on or exempted (AVTEC and the University of Alaska system) from the ETPL requirement. This would be a concern for any Training Institutions without the ETPL status and wanting to offer FMT training. The process for attaining ETPL status is on the ACPE website (acpe.alaska.gov).

Eligible training providers for the state of Alaska have met certain criteria as defined

under the federal Workforce Investment Act. Training programs approved to receive funds under the Workforce Investment Act (Public Law 105-220) Title I-B Individual Training Accounts and which met performance criteria established by the Alaska Workforce Investment Board are included on an ETPL. Clients seeking training may be sent to programs on this list.

The ETPL provides information on specific performance criteria, a detailed program description, program length, cost, and provider contact information. The ETPL is useful not only for individuals using federal dollars for training, but for all those seeking education and training in Alaska.

Although some programs are exempt from meeting minimum performance criteria, most occupational training programs requiring 80 or more hours of training or that lead to a certificate or degree must meet minimum standards in order for training program clients to be sent to those programs.

If a training/educational institution is going to offer a particular curriculum (i.e., FMT training), the curriculum, number of instructional hours, testing standards, etc. must be submitted to the ACPE for review and approval before students can receive financial aid for participating in this training. This must be done for each training institution offering FMT certification. Consequently, the RAMP-T participant training institutions could not do this as a group. However, this process could be simplified for training institutions if there was an agreement (Memorandum of Agreement or MOA) among all the RAMP-T training entities to utilize the curriculum developed from the DACUM.

It should be noted that the Alaska Workforce Investment Board (AWIB) identifies and approves Priority Occupations to be used in determining how to direct State and Federal workforce development dollars. The AWIB should be approached to include the FMT on the Priority Occupations listing. The FMT job class is currently supported by the Alaska Department of Labor's statistics and would be eligible for consideration for inclusion by the AWIB.

For those institutions that are currently on the ETPL list, the timeline for getting their FMT curriculum approved would be just a few months. For institutions not on the list,

it would be several months longer. Having the AWIB place the FMT training on the Priority Occupations list could take six months to a year, as the AWIB board meets quarterly.

There are several strong arguments to pursuing this option and several liabilities that could be easily addressed.

**Pro Arguments**

- Most of the RAMP-T institutions are on the Eligible Training Providers list and could move quickly to develop the FMT curriculum based on the FMT DACUM.
- One institution, such as AVTEC, could move forward with this effort and create a useable model for the other training institutions to utilize. It is possible that FMT training could be offered this fall and well established before other training institutions were ready to move forward with the effort.

**Con Argument and Possible Solutions**

- This approach requires each institution willing to provide FMT training to go through the agency approval process. In the end, there is no requirement that each institution address all of the DACUM FMT training issues, and there could be a variety of FMT certificates. To address this issue, the training institutions could sign an MOA that:
    - Established agreement to use the FMT DACUM derived curriculum producing three levels of FMT certificates;
    - To work with a national certifying institution (i.e., American Council for Construction Education – acce-hq.org) and; and
    - Work with the AWIB to make this certification a training requirement for funding.

- There is no incentive for employers to use FMT certificated workers. The incentive to develop or continue training FMT certificated workers rests in part on the willingness of the major rural employers (rural education attendance areas, local governments, regional health, housing and social service

organizations, Native regional and village corporations, etc.) to use FMT certified workers. The Village Safe Water Remote Maintenance Worker program might be a good model for how to create an FMT certificate incentive. Funding agencies (i.e. Denali Commission, State Revenue Sharing, Legislative Capitol Projects, etc.) could make the assurance of having qualified FMT staff available for new or continued funding for new or existing facilities. Time-lines to achieve the goal would have to be incorporated into the FMT certificate requirement.

- There is no single test that certifies an FMT is individually qualified and capable of performing the varying levels of FMT work (Level One, Two or Three). As with any training, there is no guarantee that an individual graduated from a training/educational program is competent to do the work. In the suggested MOA between training institutions, there could be an agreement to standardize competency testing and utilize the Post Secondary Education Commission test administration. This approach could be further strengthened if the major rural employers (school districts, regional health, housing and tribal non-profits, etc.) signed off on a MOU that established a requirement that all FMT graduates meet a qualifying test standard.

## 4.3 Action Plan Recommendation

It is the recommendation of this report to pursue the second option:

**Establishing a Facility Maintenance Technicians Certificate that is approved through the Post-Secondary Education Commission, Department of Labor, the Alaska Workforce Investment Board, a national certifying institution and a cooperative agreement between the participating training institutions.**

This option will allow the establishment of FMT training to occur in the near future and has the potential to lead to a statewide recognized FMT certificate. It should be noted that after the extensive exploration of the FMT issue, AVTEC is pursuing the establishment of a FMT program for the 2014 winter session. AVTEC's development

and implementation of an FMT program could serve as a workable model for the expansion of FMT training into other training institutions.

## 4.4 Sustainability Plan

The establishment and utilization of FMT training should be viewed as a long-term commitment to potential employers, job seekers and agencies looking to protect community facilities investments. There are several steps that will help assure the sustainability of the FMT effort.

- The RAMP might consider establishing an additional requirement for the business development component of the facility maintenance technician project. Before training/educational training institutions commit their limited program funds to developing a FMT program, there should be an indication from local employers that they desire and will use FMT certified workers. This might be achieved through the development of a Memorandum of Understanding among the various groupings of rural employers most likely to use FMT graduates (Housing, Health and Tribal non-profit organizations, rural educational attendance areas and borough/city governments, etc.). The commitment from rural employers to us FMT graduates, combined with funding agency expectations that FMT workers will be used for the maintenance and operation of new (and existing) facilities, could offer a very strong incentive to move this effort forward and help assure it's sustainability.

- Identify an organization that will help broadcast the successes and availability of the FMT training effort as it begins to move forward. AVTEC appears to be the most logical institution to carry out this effort, as it is the first training institution to be utilizing the FMT DACUM curriculum.

# Appendix A

**Strategic Planning Meeting Summary**

- Strategic Planning Meeting Minutes
- Strategic Planning Sign In Sheets

# Appendix B

**Monthly RAMP-T Meetings Summary**

- 2.28.13 Monthly Meeting Minutes
- 3.28.13 Monthly Meeting Minutes
- 4.25.13 Monthly Meeting Minutes
- 5.23.13 Monthly Meeting Minutes
- 6.27.13 Monthly Meeting Minutes

# Appendix C

**Electronic Outreach**

- RAMP Project Flyer
- Website front page
- Google+ front page
- Sample Electronic newsletter from March 2013

# Appendix D

**DACUM Report: Skill Identification for Facilities Maintenance Technicians**

# Appendix E

**Public Meeting Summary**

- RAMP-T Public Meetings Summary
- Public Meetings DACUM Presentation
- Fairbanks Public Meeting Agenda
- Fairbanks Sign In Sheet
- Bethel Public Meeting Agenda
- Bethel Sign In Sheet
- Juneau Public Meeting Agenda
- Juneau Sign In Sheet
- Dillingham Public Meeting Agenda
- Dillingham Sign In Sheet
- Nome Public Meeting Agenda
- Nome Sign In Sheet
- Webinar Public Meeting Minutes

# Appendix F

**Alaska Facility Maintenance Training Providers and Curricula, and National Facility Maintenance Technician Training Programs**

- Alaska FMT Training Provider Inventory
- Alaska FMT Schools Curricula
- National FMT Schools