



MONTANA'S  
WEATHERIZATION ASSISTANCE PROGRAM  
QUALITY WORK PLAN  
PY 2016



**Table of Contents**

**Section 1: Work Quality Guidelines and Standards.....3**  
    Technical Guides and Materials ..... 3

**Section 2: Communication of Guidelines and Standards.....5**  
    Sub-grantee Contracts ..... 5

**Section 3: Inspection and Monitoring of Work Using Guidelines and Standards .....6**  
    Quality Control Inspections ..... 6  
    Sub-Grantee Quality Control Inspectors..... 6  
    Grantee QCI Inspectors..... 7  
    Validation of Quality Control Inspection (QCI) Certifications ..... 7  
    Ensure Final Inspections are Performed by BPI-Certified Quality Control Inspectors ..... 7  
    Sub-grantee Final Inspections ..... 7  
    Unit Inspections During Grantee Monitoring of Subgrantee Agencies ..... 8  
    Corrective Actions for Failure to comply with Weatherization Program Requirements ..... 8  
    Communication of Deficiencies and Corrective Action Requirements ..... 9  
    Training and Technical Assistance to Correct Deficiencies ..... 9  
    Quality Improvement Plan ..... 9  
    Corrective Action Sequence ..... 11

**Section 4: Provide Training to Implement and Maintain Guidelines/Standards..... 11**

**Appendix A ..... 13**  
    Quality Control Inspector - Agency Planning Sheet..... 13

**Appendix B ..... 14**  
    Variances from MT SWS..... 14

## Section 1: Work Quality Guidelines and Standards

### Technical Guides and Materials

Montana has adopted the “Deck of Cards” Standard Work Specifications (SWS). Prior to adoption, the Montana Weatherization Technical Committee members comprised of representatives from the state weatherization monitoring staff, the Weatherization Training Center, sub-grantee weatherization program managers, and weatherization workers undertook an extensive review of the SWS for Single Family Homes. The SWS review identified a number of specifications for which Montana’s installation procedures vary. A SWS Variance request has been completed for each of the following specifications:

#### **Variations Approved for Montana:**

1. Evaporative Coolers, since we don’t deal with cooling
2. Ground Moisture Barriers - not needed if moisture is not present
  - Vented Crawl Spaces-Ground Moisture Barrier 2.0403.1b – Coverage
3. Requirement to have a licensed electrical contractor inspect and certify wiring to be safe.
  - 2.0601.1c Isolation and Protection
  - Knob and Tube Wiring 4.1001.2c Isolate or replace
4. Exclude direct vent (Category IV, sealed combustion) appliances from the Worst Case CAZ depressurization testing protocol for single-family homes.
  - 2.0202.2d Baseline pressure will be measured in Combustion Appliance Zone with reference to outdoors where natural draft equipment is present.
  - 2.0201.1e Depressurization test will include exhaust fans, interior door closure, or duct leakage, or a combination thereof, and will not be more negative than -3 Pascal’s accounting for base pressure where natural draft equipment is present.
  - 2.0201.1f a natural draft combustion appliance has spillage that exceeds two minutes during pressure testing, specify measures to mitigate.
  - 2.0201.1i At the conclusion of each work day in which envelope or duct sealing measures have been performed, depressurization and spillage testing will be performed on all natural draft combustion appliances.
5. Remove “non-fibrous” from the specification, Section 4.1402.1a
  - This will allow for a specific installation method for fiberglass where rigid foam or 2-part foam are not available, feasible or appropriate. This installation method is for a cold, dry climate.
  - Use fiberglass insulation blankets in unconditioned crawlspaces to avoid compromising worker safety with two-part spray foam.

6. Use R-10 or better insulation wrap or commercially available water heater wrap kits. The primary reason for this variance is clearance requirements and practicality of installation. The requirement for R-24 insulation is difficult to install and impractical to install efficiently and easily while maintaining required clearances as well as strapping requirements. The second reason is the lack of local availability in Montana for water heater wrap kits rated to R-24; the R-10 kits are readily available and have already been purchased in bulk by many Montana Agencies. These kits are easy to install and provide enough clearance in tight spaces such as a mobile home water heater closet or a small mechanical closet in a stick built home.
7. Exclude the use of the CAZ Depressurization Limits Table (SWS 2.0299.1) and SWS 2.0201.1e in favor of relying on actual spillage test results to determine whether a combustion compliance is operating safely. SWS 2.0299.1 and EWE 2.0201.1e appear to be in conflict with one another. Where 2.0299.1 provides depressurization limit guidance for a range of different heating appliances, section 2.0201.1e has a blanket depressurization limit of -3 Pascal's and does not take into account the differences between appliances, their fuel and burner type, venting configuration or measured test performance. This will provide a concrete test method based on actual test performance for our contractors to ensure the safety of our clients.

Effective with DOE Program Year 2015, the Montana (MT) SWS replaced the Montana Weatherization Field Installation Standards for Single Family Homes. The MT SWS are available via the Department's website at: <http://dphhs.mt.gov/hcsd/energyassistance>.

To ensure workers access to current work specifications, the Montana SWS has been provided to each sub-grantee weatherization agency in electronic format. The Montana Weatherization Program Policy and Procedures have been updated to include the requirements of WPN 15-4. The Montana Weatherization Policy and Procedure Manual is also available at: <http://dphhs.mt.gov/hcsd/energyassistance>.

Scope of Development for the manufactured home (mobile home) version of the SWS:

The Montana Weatherization Training Center is developing the State of Montana Field Guide for Manufactured Housing using that is in compliance with the Department of Energy's Standard Work Specifications.

Currently, the State of Montana Weatherization Program is using the SWS directly from the NREL website to comply with standards related to work in and on manufactured housing stock. This process is aided by trainings held by the Montana Weatherization Training Center staff instructors who thoroughly review the SWS and model field training around those standards and practices.

To make an initial step toward a usable field guide for the State of Montana, the Montana Weatherization Training Center will review and modify the “Deck of Cards” for Manufactured Housing, developed by New Mexico through a cooperative of states. It is our understanding that this Deck of Cards Field Guide for Manufactured Housing has already been submitted to and approved by DOE, so its integration into the Montana program should be seamless. If additional submittal by the State of Montana is required, we can do so within 4 weeks of notification. Montana is already using an approved Deck of Cards Single Family Homes Field Guide for its other program activities. Should questions arise that are not answered by the Deck of Cards based Montana Field Guide, program members will be instructed to follow the SWS as it is presented on the NREL website.

As the State of Montana has been less than impressed with the ease of use provided by the Deck of Cards Field Guide (based on use of the Single Family Homes version), the Montana Weatherization Training Center will use the Deck of Cards for Manufactured Homes Field Guide as a starting point to develop a more user-friendly “Hit-List” field guide, similar to the guide being used by Arizona. This field guide will include the most common measures performed on manufactured housing in the State of Montana as well as photographic guidance supporting those measures. Our goal is to complete this field guide by December 15, 2017 and submit it for approval as a new, updated field guide for the State of Montana. If this process results in a product that is better suited to the Montana Weatherization Workforce, we will create a similar field guide for Single Family Homes and re-submit that to DOE as well.

Montana’s SWS will be updated as updates are received for the “Deck of Cards”. Updates will be reviewed by the Montana Weatherization Technical Committee members to determine the program’s ability to comply with the updated standard. If necessary, a request for variance providing a building science justification for why the MT WAP believes a variance is needed. Variance Requests will be sent to DOE for review/approval prior to implementation.

## **Section 2: Communication of Guidelines and Standards**

### **Sub-grantee Contracts**

Effective with the DOE PY2015 the Montana Weatherization Program sub-grantee contracts (task orders) were modified to require the sub-grantee provide the following assurances:

1. All work funded entirely or in part by the Department of Energy (DOE) will be accomplished utilizing the procedures described in the Montana Standard Work Specifications (MT SWS).
2. All weatherization workers, whether agency employees or subcontractors, have been advised of the requirement to complete weatherization work in accordance with the MT SWS.

3. Any contract/agreement initiated by the sub-grantee agency for the completion of weatherization work must include the requirement that the worker(s) will complete weatherization installations in accordance with the MT SWS.
4. Every home funded entirely or in part by the Department of Energy (labor & materials) will undergo an independent final inspection performed and signed off by a Building Performance Institute (BPI)-certified Quality Control Inspector (QCI). Final inspections will verify the weatherization job has been accomplished in a manner consistent with the Montana Standard Work Specifications (MT SWS) and the Montana Weatherization Policy and Procedures.
5. Acceptance of and signature on the contract providing DOE funding to the sub-grantee agency will serve as proof of receipt of the MT SWS and the updated MT Weatherization Policy and Procedure guidance.

### **Section 3: Inspection and Monitoring of Work Using Guidelines and Standards**

#### **Quality Control Inspections**

Every home reported to DOE as a “completed unit” will receive a final inspection performed by a BPI-certified QCI to ensure that all work meets the specifications outlined in the MT SWS.

The QCI will certify the unit has received a final inspection and that all work meets the MT SWS by signing the final inspection form. The final inspection form must be included in the client file.

The final inspection must include review and assessment of the original audit to confirm the measures performed were those appropriate for the home and were completed in accordance with the MT Energy Audit protocols.

#### **Sub-Grantee Quality Control Inspectors**

Montana subgrantees will utilize a combination of methods to ensure each completed unit funded wholly or in part by DOE receives a final inspection performed by an independent BPI-certified QCI. The larger subgrantee agencies across Montana have one or more individuals who have been certified by BPI as quality control inspectors (QCI).

For the smaller subgrantee agencies whose weatherization program consists of one or two individuals the agency may contract with another subgrantee agency or an independent inspector for the performance of the final inspections. This will allow these agencies to ensure the final inspection has been performed by an independent QCI.

Appendix A contains the Quality Control Inspector Agency Planning Sheet indicating the plan for each agency with regard to the number of BPI-certified inspectors. The table will be updated as additional workers become BPI certified.

### **Grantee QCI Inspectors**

Grantee monitoring of sub-grantee weatherization agencies will include final inspections by a BPI-certified QCI of homes reported to DOE as a “completed units” to ensure that all work meets the specifications outlined in the MT SWS, MT Weatherization Program policy and procedure, and state and federal regulations.

### **Validation of Quality Control Inspection (QCI) Certifications**

QCI competency is demonstrated by BPI certification as a Home Energy Professional Quality Control Inspector.

Quality Control Inspector(s) can be employed by third-party organizations or subgrantees; however, the Grantee is ultimately responsible for ensuring that every unit reported to the US Department of Energy meets quality guidelines required by the Weatherization Assistance Program.

The Grantee’s Energy and Community Services Specialists (State Specialist) will verify Quality Control Inspector(s) credentials before or during the annual monitoring visit.

The QCI Credentials will be validated by:

1. Searching [http://www.bpi.org/individual\\_locator.aspx](http://www.bpi.org/individual_locator.aspx) for certified Home Energy Professionals by name or state.
2. Obtaining a copy of the QCI certificates from the Weatherization Training Center or;
3. Obtaining a copy of the QCI certificates while on-site monitoring.

### **Ensure Final Inspections are Performed by BPI-Certified Quality Control Inspectors**

A Quality Control Inspector is an evaluator who verifies the work performed against the work plan, specifications and standards, performs building diagnostics, records/reports findings and concerns, and specifies corrective actions; by conducting a methodological audit/inspection of the building. The QCI performs safety and diagnostic tests, and observes the retrofit work in order to ensure the completion, appropriateness and quality of the work which provides for the safety, comfort, and energy savings of the building occupants. All certificants must comply with applicable federal, state, and local laws and regulations governing the profession.

### **Sub-grantee Final Inspections**

The Department requires that all weatherization agencies have staff or contractors who are BPI-certified as Quality Control Inspectors to perform all final inspections beginning with the audits completed under the PY2015 DOE contracts.

The following questions will be answered during the on-site monitoring visit to ensure the agency is performing final inspections in an impartial and complete manner.

Describe the individuals performing the final inspections

- Is the individual BPI-certified as a QCI inspector?
- Are they independent?
- Did they audit the home?
- Did they work on the crew?
- Does the agency install all weatherization measures using the Montana Standards Work Specifications?
- Does every DOE client file have a form (completed by a QCI) that certifies that the unit had a final inspection and that all work met the required standards?
- Were the weatherization measures called for in the work order appropriate and in accordance with the CDS Energy Audit?

This ensures that 100% of DOE dwellings are inspected by a BPI-certified Quality Control Inspector.

### Unit Inspections During Grantee Monitoring of Subgrantee Agencies

The minimum number of homes upon which BPI-certified QCI State Specialists will perform final inspections will be either 5 or 10 percent of the homes reported as DOE completions. As described above, the agency's ability to perform independent final inspections using a BPI-certified QCI will vary.

The CDS Energy Audit (EA) system will track the individual who performed the final inspection and whether the inspection was performed by an independent BPI-certified QCI. The Auditor who performed the audit is currently recorded in the Energy Audit (EA) system. Tracking the QCI in the CDS Energy Audit will enable State Specialists to determine whether an independent final inspection was conducted. Having this data available in the EA system will assist also the monitors when planning the monitoring visit.

### Corrective Actions for Failure to comply with Weatherization Program Requirements

Based on routine State monitoring, reviews, or investigations related to specific complaints or allegations, the State Specialist may determine that an agency has failed to comply with the terms of an agreement, the State plan, or to meet a Weatherization Program requirement. **The State Specialist's determination may be based on the agency's failure to provide services, or to meet appropriate standards, goals, and other requirements established by the State, including Quality Control Inspections.** The State Specialist will document the basis for such determination and the specific deficiency or deficiencies that must be corrected.

## Communication of Deficiencies and Corrective Action Requirements

When a State Specialist has determined that an agency has a specific deficiency, the State Specialist must communicate the deficiency to the agency and require the agency to correct the deficiency. To establish compliance with the requirements of the Weatherization Program, records of correspondence or other communications related to a corrective action are maintained.

## Training and Technical Assistance to Correct Deficiencies

The State Specialist will offer training and technical assistance, if appropriate, to help an agency correct identified deficiencies or failures to meet Weatherization Program requirements. Technical assistance may be offered concurrently with the notification of a deficiency or deficiencies and should focus on the specific issues of the agency to the extent possible.

The State Specialist may determine that training and technical assistance are not appropriate. The State Specialist will document reasons that technical assistance is not appropriate. Some examples of situations in which a State Specialist may determine that technical assistance is not appropriate may include, but are not limited, to the following:

1. A deficiency for which the agency has the expertise and skills available within the organization to make corrective actions without assistance;
2. A deficiency for which a State Specialist has previously provided technical assistance and the agency has failed to institute corrective actions;
3. Multiple, widespread, and/or repeated deficiencies that cannot feasibly be addressed through technical assistance;
4. A deficiency that involves evidence of fraudulent reporting or use of funds, or other evidence of criminal wrongdoing.
5. Repeated failure of a Quality Control Inspector to adequately inspect weatherization jobs using the approved DOE field guide.

## Quality Improvement Plan

The State Specialist will consider the seriousness of the deficiency and the time reasonably required to correct the deficiency.

Examples of instances in which a State Specialist may exercise discretion on whether a corrective action plan is appropriate or necessary may include, but are not limited to the following:

- A deficiency for which an agency has previously instituted a corrective action plan and has repeated findings;

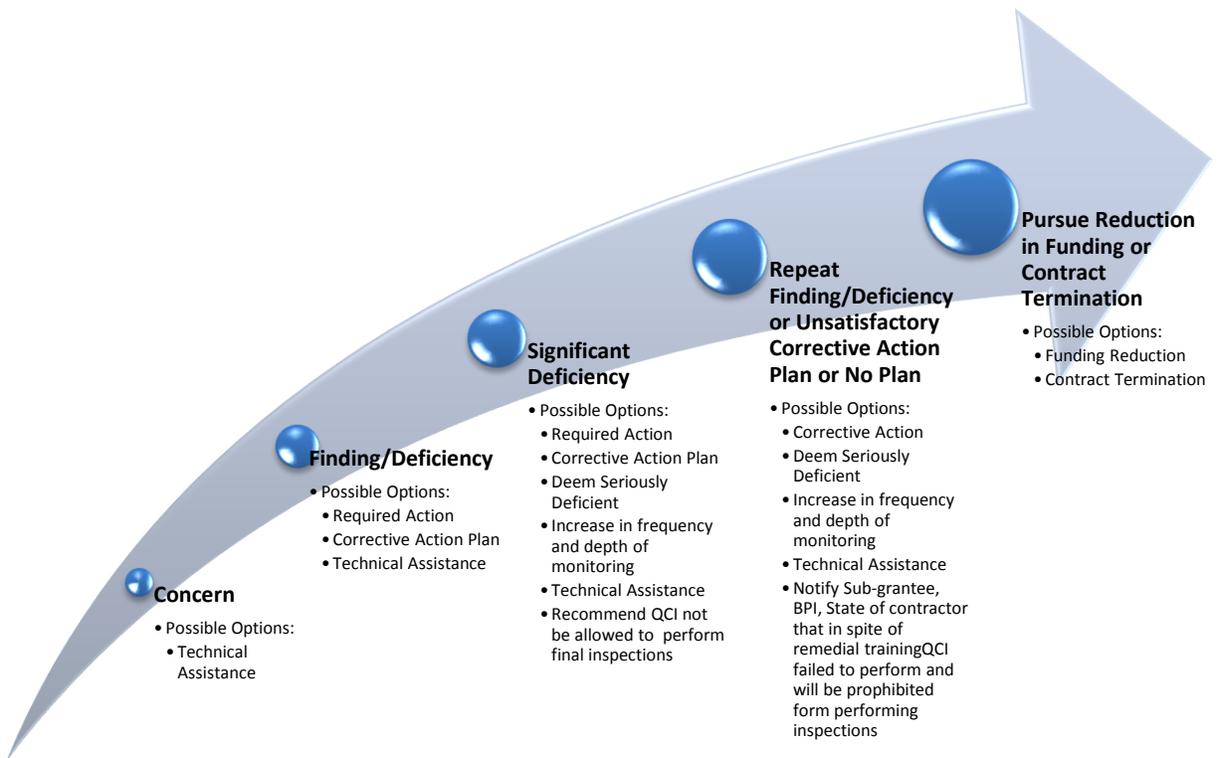
- Failure of a Quality Control Inspector to adequately inspect weatherization jobs using the approved DOE field guide;
- A deficiency that involves evidence of fraudulent reporting or use of funds, or other evidence of criminal wrongdoing and therefore presents a risk requiring immediate action.

If the State Specialist determines that an agency needs to develop and implement a corrective action plan, the State Specialist will allow the agency to develop and implement their plan within 60 days after being informed of a deficiency. The corrective action plan should identify actions that will be taken to correct the deficiency within a reasonable period of time as determined by the State Specialist which may include :

- Notification of probation and immediate retraining.
- De-certification from performing Final Inspections, Remedial training, written reprimand, and on the job training/oversite by a qualified QCI until such time as the disqualified QCI can demonstrate proficiency and be recertified (retake QCI Certification).
- Notification to BPI, employer and/or other impacted parties (Subgrantee, State and/or Contractor) that in spite of remedial training efforts and repeated warnings, QCI has failed to perform and will be prohibited from performing any Final Inspections within the state's current Wx program for the remainder of the grant period or 1 year whichever is less or permanently depending upon circumstances.

The State Specialist will review the corrective action plan and issue a decision on whether the plan is approved as quickly as possible. If the State Specialist does not accept the plan, the State Specialist must specify the reasons why the proposed plan cannot be approved. The State Specialist may exercise discretion based on the specific circumstances. The State Specialist will increase the frequency and depth of monitoring.

## Corrective Action Sequence



## **Section 4: Provide Training to Implement and Maintain Guidelines/Standards**

The Montana WAP contracts with the Montana State University (MSU) Extension Weatherization Training Center (WTC) to provide Tier 1 training (in compliance with the JTAs). Montana State University Extension is IREC accredited for all 4 DOE job designations.

- Home Energy Professional – Crew Leader
- Home Energy Professional – Energy Auditor
- Home Energy Professional – Retrofit Installer
- Home Energy Professional – Quality Control Inspector

To ensure that all employees in the WAP program have been trained to the JTAs required for their job designation, Montana State University Weatherization Training Center (WTC) has been charged with the task of reviewing training records and evaluating students for performance. Sufficient classes are offered to accommodate new employees throughout the year. Tier 2

training is also scheduled throughout the year. Additional Tier 2 training will be offered should continual monitoring of the program necessitate it or, should a sub-grantee agency specifically cite a valid need.

All Tier I and Tier 2 training courses include discussion and/or demonstration of MT SWS appropriate to the topic(s) of the course. Classes specifically focused on review of the MT SWS are also being offered.

**Tier 1 Training:** Comprehensive, occupation-specific training which follows a curriculum aligned with the JTA for that occupation.

Weatherization Fundamentals 101  
Weatherization Fundamentals 102  
Home Energy Professional Skillset Review  
Single Family Energy Auditor  
Quality Control Inspector (QCI) Training  
Mobile Home Weatherization  
Weatherization Crew Leader  
Whole House Assessment for Weatherization Professionals  
Quality Work Plan Implementation

**Tier 2 Training:** Single-issue, short-term, training to address acute deficiencies in the field such as Worst Case CAZ, ASHRAE, and blower door guided air-sealing, etc. Conference trainings are included in this category.

- EPA Lead Renovation, Repair and Painting – Initial
- EPA Lead Renovation, Repair and Painting - Refresher
- Lead Inspector/Risk Assessor
- OSHA 10/30 Hour Workplace Safety Training
- Respiratory Protection/Fit Testing
- Basic Furnace
- Insulation Systems and Applications
- Montana Asbestos Inspector Certification
- Adult First Aid, CPR and AED
- ASHRAE 62.2 (2013) - Residential Ventilation
- Infrared Thermography
- Lead-Safe Weatherization

Additionally, the MT WTC has received Interstate Renewable Energy Council (IREC) accreditation which allows them to be a BPI test center. Review classes and testing dates have been developed to allow for certification of additional individuals as BPI-certified QCI.

# Appendix A

## Quality Control Inspector - Agency Planning Sheet

QUALITY CONTROL INSPECTOR AGENCY PLANNING SHEET					
AGENCY	AUDITOR	AUDITOR/QCI	QCI	AGENCY/Contract	COMMENTS
AEM	2		2	N/A	Separate QCI and Auditor
DISTRICT IV	2			Opp Inc	The agency will be contracting with Opp Inc.
OPP INC.	N/A	2		N/A	Opp Inc has 2 QCI certified.
Opp Inc. Blackfeet	0	2		N/A	Opp Inc has 2 QCI certified.
DISTRICT VI	1			Opp Inc	OK w 5% in short term. 10% may be needed after Cary is QCI. Minimum of 1 year before QCI. Contracting with Opp Inc.
DISTRICT VII	3		1	N/A	HRDC VII has 1 QCI certified.
Dist VII Crow	3		1	DIST. VII	HRDC VII has 1 QCI certified.
CAPNM	1		1	N/A	Separate QCI and Auditor
DISTRICT IX	1	2		NA	Share Auditor and QCI on separate WX jobs
RMDC	1		1	NA	Separate QCI and Auditor
DISTRICT XI	NA	5		N/A	DXI has 5 QCI.
DISTRICT XII	3		2	N/A	OK with independent QCI @ 5%
CHEYENNE	2		2	AEM	Separate QCI and Auditor
FT BELKNAP	2			Opp Inc	The agency will be contracting with Opp Inc.
FT PECK	2		2	AEM	Separate QCI and Auditor
ROCKY BOY	2			Opp Inc	The agency will be contracting with Opp Inc.
SALISH/KOOTENAI	2	0	0	N/A	The agency will be contracting with HESI.
		11	12		Total Current QCI = 9

## Appendix B

### Variances from MT SWS

#### **2.0403.1 Vented Crawl Spaces – Ground Moisture Barrier**

#### **2.0403.2 Closed Crawl Spaces—Ground Moisture Barriers**

##### Variance Request:

When no evidence of moisture is present in vented or closed crawl spaces, no moisture barrier will be installed. According to 2.0403.1c, “Homeowner will be advised that all plastic is biodegradable and will have a life span much shorter than the home (5 years) and it will need replacing to remain effective”. Montana Weatherization Assistance Program prefers to focus on other, longer lasting measures that do not require maintenance or replacement by the homeowner.

#### **5.3003.8 (a-c) Evaporative Cooler Maintenance and Repairs**

##### Variance Request:

Evaporative coolers are uncommon in the Montana Weatherization Assistance Program and will not be assessed or diagnosed per 5.3003.8a. Montana is a cold climate state focused on heating systems more than cooling systems. According to Table 301.3 International Climate Zone Definitions, Montana is considered Zone 6 with between 7200 and 9000 Heating Degree Days. Joseph Lstiburek’s Builder’s Guide to Cold Climates defines a cold climate as “a region with approximately 5,400 heating degree days or greater and less than approximately 9,000 heating degree days. Under either definition, Montana is considered a cold climate state. The Montana Weatherization Assistance Program focuses training and technical assistance funding as well as field work allocations on heating systems and insulation measures, not cooling systems.

#### **2.0601.1c Knob and Tube Wiring**

#### **2.0601.1d Knob and Tube Wiring**

#### **4.1001.2c Knob and Tube Wiring**

##### Variance Request:

Due to the high cost of locating, hiring, and scheduling electrical contractors in the State of Montana currently, the Montana Weatherization Assistance Program will not recommend per 2.0601.1c “A licensed electrical contractor will inspect and certify wiring to be safe and place a warning at all entries to the attic about the presence of knob and tube wiring.” Per 2.0601.1a, “the contractor, assessor, auditor or similar will inspect and assess the house to identify knob and tube wiring” and per 2.0601.1b a “non-contact method will be used to determine if wiring is live”. Additionally per 2.0601.1c “a dam that does not cover the top will be created to separate insulation for the wire path”. The State of Montana Weatherization Assistance Program also will not recommend per 2.0601.1d that “Exposed wiring will be replaced with new appropriate wiring in accordance with NEC and local codes” nor that “Old wiring will be rendered

inoperable by licensed electrician in accordance with NEC and local codes”. Hiring, scheduling, and coordinating electricians in a rural operation area is too expensive and disallows other energy conservation measures to be installed.

#### **2.0201.1d Base Pressure Test**

#### **2.0201.1e Depressurization Test**

#### **2.0201.1f Spillage Test**

#### **2.0201.1i Combustion Safety Testing at Completion of Retrofitting Home**

Variance Request:

Direct vent equipment does not suffer from the depressurization induced spillage that is common with natural draft appliances. Mandating CAZ depressurization testing for direct vent appliances offers little, if any benefit to the safety of the occupants while contributing to the cost of the job and potentially detracting from energy conservation measures. Allowing an exemption for direct vent appliances from CAZ depressurization testing would create continuity between the single-family and manufactured housing sections in the SWS. The CAZ depressurization limit for direct vent appliances is -25 pascals (2.0299.1). It is exceedingly rare for this level of depressurization to be achieved in a CAZ and would therefore offer little benefit to test. This modification would bring the Montana Weatherization Assistance Program Field Guide into alignment with the ANSI accredited BPI 1100 (section 7.7) and BPI 1200 (section 7.9), neither of which include direct vent appliances into the CAZ depressurization testing protocol.

- 2.0202.2d Baseline pressure will be measured in Combustion Appliance Zone with reference to outdoors where natural draft equipment is present.
- 2.0201.1e Depressurization test will include exhaust fans, interior door closure, or duct leakage, or a combination thereof, and will not be more negative than -3 Pascal’s accounting for base pressure where natural draft equipment is present.
- 2.0201.1f a natural draft combustion appliance has spillage that exceeds two minutes during pressure testing, specify measures to mitigate.
- 2.0201.1i At the conclusion of each work day in which envelope or duct sealing measures have been performed, depressurization and spillage testing will be performed on all natural draft combustion appliances.

#### **4.1402.1a Insulation Selection**

Variance Request:

In our rural state, 2-part foam is not readily available in all areas. 2-part foam presents health and safety concerns for the worker and the client which may render it inappropriate for use in some instances. Additionally, much of our older housing stock has field stone foundation and stem walls which make the installation off foam board insulation impossible. Further, it is not always possible to install foam board where the access to the crawl space is not large enough to allow sheet goods into the space. In these instances, we are forced to exclude stem wall insulation.

The installation method proposed will be:

- The ground cover moisture barrier will continue from the crawl space floor and up the stem wall. The moisture barrier will be attached to the sill plate. Ground cover moisture barrier will be installed in compliance with SWS 2.04 03 .2
- R-19 (IECC compliant for Zone 6) un-faced fiberglass will be secured to the sill plate or floor joists to provide a continuous thermal system on the stem wall. Insulation will have a Class I fire rating
- Air sealing will take place between the crawlspace and the outside to prevent wind washing of the fiberglass insulation
- Un-faced fiberglass is specified to allow the stem wall to dry to the exterior and the installation to dry to the interior as needed. We do not feel that foil, Vinyl or perforated Vinyl laminated fiberglass will allow the wall system to dry out adequately if moisture is able to penetrate the system; therefore, un-faced fiberglass is specified

### **7.8103.1c Thermal Efficiency (Water Heater Insulation)**

#### Variance Request

The primary reason for this variance is clearance requirements and practicality of installation. The requirement for R-24 insulation is difficult to install and impractical to install efficiently and easily while maintaining required clearances as well as strapping requirements. The second reason is the lack of local availability in Montana for water heater wrap kits rated to R-24; the R-10 kits are readily available and have already been purchased in bulk by many Montana Agencies. These kits are easy to install and provide enough clearance in tight spaces such as a mobile home water heater closet or a small mechanical closet in a stick built home. To use fiberglass insulation blankets in unconditioned crawlspaces to avoid compromising worker safety with two-part spray foam.

### **2.0299.1 Combustion Appliance Depressurization Limits Table**

#### **2.0201.1e Depressurization Test**

#### Variance Request

SWS 2.0299.1 and EWE 2.0201.1e appear to be in conflict with one another. Where 2.0299.1 provides depressurization limit guidance for a range of different heating appliances, section 2.0201.1e has a blanket depressurization limit of -3 Pascal's and does not take into account the differences between appliances, their fuel and burner type, venting configuration or measured test performance. This will provide a concrete test method based on actual test performance for our contractors to ensure the safety of our clients.