FY2015 – 2016 Weatherization Program Manual
Track Changes Version

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Chapter 1 – Program Introduction and General Management

1.1 Introduction

The federal Weatherization Assistance Program (WAP) was created in 1976 to assist low-income families who lacked resources to invest in energy efficiency. The Weatherization Assistance Program is operated in all 50 states, the District of Columbia, Native American tribes, and U.S. territories. Funds are used to improve the energy efficiency of homes occupied by low-income households, using the most advanced technologies and testing protocols available in the housing industry. The energy conservation resulting from the efforts of state and local agencies helps our country reduce its dependence on foreign oil and decrease the cost of energy for families in need while improving the health and safety of their homes.

The Weatherization Assistance Program is governed by federal regulations designed to help manage and account for the resources provided by the U.S. Department of Energy (DOE). Weatherization Assistance Program funding is derived from annual appropriations from Congress. Each year the Senate and House Interior Appropriations committees decide the level of funding allocated to the program.

Wisconsin's Weatherization Assistance Program is funded with a combination of funds including DOE, Low Income Home Energy Assistance Program (LIHEAP), and state Public Benefits funding. Public Benefit funding may only be used on buildings served by a participating electric utility.

The mission of the Wisconsin Weatherization Assistance Program is to reduce energy costs for eligible low-income households by improving the energy efficiency of their homes while ensuring their health and safety. Achieving the primary goal of energy efficiency is dependent on effective program management that strives to maximize energy savings, minimize production costs, improve program management and quality of work, and reduce the potential for waste, fraud, abuse and mismanagement.

1.1.1 Weatherization Program Resources and Grantee Responsibilities

Home Energy Plus (HE+) includes the Wisconsin Home Energy Assistance Program (WHEAP) and the Weatherization Assistance Program (WAP), and is administered by the Wisconsin Department of Administration (DOA), Division of Energy Services (DES or 'the Division'), through a network of county agencies, tribal governments, community-based organizations, and housing authorities. The Home Energy Plus website provides information for the general public, and weatherization and energy assistance program grantees. Grantees may find current documents, field forms, program information, manuals, and technical reports at this site. It is a Grantee's responsibility to ensure the forms and documents they are using meet current weatherization program requirements.

The purpose of this Weatherization Manual is to identify Wisconsin Weatherization Assistance Program requirements for Grantees and financial auditors. It is considered part of the annual contract/grant agreement by reference. In terms of contract compliance, the order of precedence is the weatherization contract followed by the weatherization manual.

Other guidance regarding implementation of program requirements may be found in the Wisconsin Weatherization Field Guide and in official DES guidance.

The Division of Energy Services reserves the right to have the final authority in any cases of dispute.

1.2 General Management Policy

A Grantee shall make all reasonable efforts to deliver comprehensive weatherization services to low-income people in the most cost effective, efficient, and timely way possible. In doing so, Grantees will maximize the use of available funding in delivering weatherization services.

1.2.1 Lobbying

Weatherization program funds shall not be used for lobbying activities. ~~Grantee staff members that perform any lobbying activities shall comply with the instructions included with the . This form is available at: http://dwd.wisconsin.gov/dwd/forms/dws/pdf/DWSD-14772-E.pdf~~

1.2.2 Conflict of Interest Policy

Each Grantee shall develop, maintain, and keep on file a plan for dealing with potential conflicts of interest. Conflicts of interest covered by the plan shall include all situations, actual or perceived, when the Grantee, members and relatives of the Grantee's board of directors, Grantee staff, and relatives of Grantee staff have an interest in a business (or organization) providing services or materials, or property proposed to receive weatherization services. At a minimum the plan shall set forth the procedures and steps the Grantee will follow to deal with conflicts of interest in:

1) Purchase of materials and services;
2) Taking of applications;
3) Prioritizing and scheduling of services;
4) Determining services (auditing) for buildings;
5) Installing measures in buildings;
6) Conducting final inspections; and
7) Obtaining owner sign-off.

Any potential conflict of interest shall be disclosed in writing to the Division via the Help Desk as soon as possible after the conflict is identified.

When a Grantee has partial or complete ownership of a property that is eligible for weatherization, the following process shall be followed:

1. The Grantee shall review its Conflict of Interest Policy as it applies to the potential project.

2. The Grantee sends a message through the Help Desk indicating that the property is eligible, and proposes who would conduct the energy audit (Grantee or third party).
3. The Division reviews the request and must approve of auditor proposal.
4. The energy audit is conducted.
5. The Grantee submits the following to the Division for review, at a minimum (additional information may be requested):
    a. Computerized audit file,
    b. Field data collection form(s),
    c. Audit photos including, but not limited to, building exterior, existing conditions, and mechanicals, and
    d. List of measures to be performed and by whom (e.g., contractor, Grantee crew).
6. The Division approves or denies the request.
7. The Grantee notifies the Division when the building is reported as complete.
8. The Division schedules the property for Quality Assurance inspection.

1.2.3 Confidentiality

Grantees shall not use confidential information for any purpose other than the limited purpose of their contract, and shall not disclose such confidential information to any persons other than those who have a business-related need to have access to such information. Grantees shall require all ~~such persons~~Grantee employees with access to confidential information to read and sign ~~a~~ the HE+ Confidential/Sensitive Information Non-Disclosure Agreement ~~non-disclosure statement,~~ and shall be responsible for the breach of any confidentiality (see also Appendix G.2 Non-disclosure Agreement). The agreement is available on the HE+ Program Information page under the HE+ Program Agreements/Forms heading.

The Grantee shall institute and maintain reasonable security procedures to maintain confidential information while in its possession or control, including transportation, whether physically or electronically. Confidential information ~~is defined as~~means all tangible and intangible information and materials, including all proprietary and personally identifiable information (PII). ~~Personally identifiable information means an individual's first and last name, social security number, driver's license number, or other identification number, including financial account numbers, or other personal identification criteria.~~ For more specific information regarding confidentiality and PII see the contract, 2 CFR 200.79 and Appendix G – Policy for Handling Sensitive Data~~Appendix G – Policy for Handling Sensitive Data~~.

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1.2.4 Limited English Proficiency Customers

Grantees are obligated to ensure that persons with limited English proficiency (LEP) have meaningful and equal access to benefits and services. This assistance goes beyond provision of brochures in Spanish, Hmong, or another language. As some individuals may not read English, or any other language, the agency shall have a mechanism to communicate orally with people with limited English proficiency.

1.2.5 Quality Control System

Grantees shall develop and maintain a documented Quality Control System (QCS). A QCS includes procedures that are designed to provide a detailed review of the weatherization program ~~functions~~ process including an on-site dwelling unit check and measurement of client satisfaction. ~~Final inspections shall be completed on every unit by individuals who did not install the weatherization measures on the inspected unit. However, completing final inspections is only one element of a QCS.~~ The following areas shall be covered under a QCS:

1) Energy Audit accuracy and appropriateness;
2) Work Order/Work Agreement accuracy and appropriateness;
3) Completeness of work performed (final inspections);
4) Quality of work performed (for example, in-progress quality control inspections);
5) Compliance with applicable health and safety requirements;
6) Client satisfaction with work performed;
7) Contractor and/or agency crew performance and management;
8) A feedback loop to discuss work performance that is below required standards with those performing the work (contractors and/or agency staff).
9) Verifying heating system replacements identified by contractors that were not recommended by the computerized energy audit. This may include: using multiple contractors but not having replacements performed by the same contractor who identified the failure; obtaining a percentage of failed heating system units and verifying failures with destructive tests; or using other methods to ensure that reported heating system failures are accurate.
10) Documenting all serious complaints, including those having potential legal consequences, relating to severe structural damage or impacting client health.
11) Reporting all serious complaints to DES within five days of being received by the agency. An optional Weatherization Complaint Report form is available on the HE+ Grantee Information page under the Field Forms heading.

1.2.6 Final Inspections

Final inspections shall be completed on every unit. Whenever feasible, final inspections shall be completed by individuals who did not audit the building. In all cases the final inspection shall not be completed by an individual involved in the installation of the weatherization measures on the inspected unit. Where it is necessary for individuals who audit units to also perform final inspections of those same units, the agency must receive prior approval by submitting a quality control plan (see 1.2.5 above) to the Division detailing the process by which the agency will assure the quality and integrity of the audit as well as the final inspection.

All final inspections of DOE units reported on or after July 1, 2015 shall be performed by a certified Quality Control Inspector (QCI) or by a staff person in the process of obtaining QCI certification. *Exception for DOE units in FY 2015-2016: A Grantee may have the same staff person perform the audit and final inspection on a building if that staff person is QCI certified or in the process of obtaining QCI certification (is a BPI registered candidate). These*

Grantees will receive Quality Assurance inspections on a minimum of 10 percent of completed DOE units during FY 2015-2016.

1.2.7 Basic Energy Auditor Certification

All persons auditing homes with the Wisconsin Weatherization Assistance Program shall obtain a Wisconsin Weatherization Basic Energy Auditor Certification within 12 months of beginning to audit homes for the Weatherization Program. Staff working toward a Basic Energy Auditor Certification will be considered an Energy Auditor Trainee and shall have their audits reviewed and signed-off on by a certified Energy Auditor. Completion of the Basic Energy Auditor Certification requirement advances the energy auditor beyond the trainee status.

Three requirements shall be completed to become a certified Basic Energy Auditor:

1. Meet the DOE Weatherization Assistance Program Core Competencies pre-requisite for Basic Energy Audit Competencies, which are:
   - Ability to read and write legibly;
   - Basic verbal and written communication skills;
   - Basic construction knowledge;
   - Basic math skills; and
   - Basic computer skills.
2. Complete and pass the Basic Energy Auditor Course.
3. Complete and pass a Basic Weatherization Assistant course.

Further details can be found in Core Competencies for the Weatherization Assistance Program~~.~~ and the Energy Auditor Job Task Analysis.

1.2.8 Reworks

Any weatherization work performed on a unit after the unit has been reported as completed within the WisWAP system is considered a rework. Rework expenses require prior Division approval to be allowable. Since federal and state requirements prohibit returning to units that have been previously weatherized, extenuating circumstances are required for the Division to authorize any rework activities.

Weatherization work that was omitted or does not meet the program requirements is the responsibility of the Grantee. If, in the opinion of the Division, there is a legitimate claim that the Grantee misinterpreted program requirements, the Division may authorize the unit to be reworked using Weatherization Program funds. Prior authorization is required for such rework activities. The Division encourages Grantees to contact the Division regarding any policy interpretation issues prior to completing the unit.

Grantees are encouraged to utilize insurance to cover expenses related to employee or contractor negligence, warranty issues, or other expenses related to completed units weatherized.

1.2.9 Customer Education

The Customer Bill of Rights is required to be provided to all weatherization program customers, regardless of funding source. The Customer Bill of Rights provides information concerning rights to safety, the right to be informed, warranty information and the steps a customer may take in the event a warranty issue is not resolved. Grantees shall distribute the Customer Bill of Rights as early in the weatherization process as possible. The customer's signature on the Work Agreement shall signify receipt. The Customer Bill of Rights is available on the HE+ WisWAP Grantee Information page under the Weatherization Program Information heading.

The Weatherization Guidebook is required for single-family buildings including site built, manufactured housing and single condominiums. A Grantee shall complete and distribute the Guidebook to single family homeowners and tenants within 60 days of reporting a building as complete. The Guidebook contains information about installed materials, appliances and mechanicals including warranty information and installer contact information, and is available on the HE+ Training and Technical Assistance website.

1.2.10 Training and Technical Assistance

The Division of Energy Services allocates Training and Technical Assistance (T&TA) funds to each Grantee. A Grantee is required to develop and submit a plan for T&TA expenditures per annual direction from DES. Grantees shall comply with all mandatory training requirements as directed by the Division (See also 5.8 Training and Technical Assistance (T&TA)~~5.8 Training and Technical Assistance (T&TA)~~.

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1.2.11 Emergency Furnace Repair and Replacement

The Grantee, as a condition of their Weatherization contract, agrees to provide emergency furnace repair and replacement services for the WHEAP agencies within their service territory as directed. This service is billed through the HE+ System.

1.2.12 Local Coordination ~~Plan~~

Grantees shall coordinate efforts with local agencies providing energy assistance and other organizations serving low-income households. This includes working with the vendors that do not participate in Public Benefits funding. ~~The Coordination Plan shall include a directory of local agencies and their services, the coordination activities performed, and the roles and responsibilities of the agencies directly involved in writing the plan. This information is outlined in the WHEAP Coordination Plan Template. Grantees shall make the Plan available to the Division upon request.~~

1.2.13 Home Energy Plus Logo

The Division requires the use of the official Home Energy Plus logo when a Grantee creates weatherization documents such as brochures and program marketing materials. A final draft of documents shall be submitted to the Help Desk for review and approval by the Division before printing and distribution to the public.

The official logo can be obtained on the Home Energy Plus Training and Technical Assistance website. The logo and guidelines for use are located under the Technical Assistance drop down menu.

1.3 Government to Government

Wisconsin Executive Order #39, issued in February 2004, affirms the government-to-government relationship between the State of Wisconsin and American Indian Tribal governments located within the State of Wisconsin. Government-to-government relations involve respectful and cooperative communication and dealings that are designed to achieve a consensus, to the extent possible, before a decision is made or an action is taken, and to implement programs in a collaborative manner.

The Wisconsin Department of Administration (DOA) is committed to such government-to-government relations with the federally recognized Tribal governments of Wisconsin (Tribes). The State will employ its best efforts to achieve positive outcomes from its consultation and collaboration with the Tribes. The intent of this policy is to improve the planning and delivery of State services to Tribal governments, Tribal communities, and Tribal members by developing principles and a process for consultation on these service policies in Wisconsin. It is for this purpose that this policy has been developed.

Both State and Tribal governments share the goal of providing services to their citizens in the most cost-effective manner practicable. The DOA possesses a tremendous amount of experience in streamlining and economizing the provision of state government services. The DOA believes that there is great value to both the State of Wisconsin and Tribal governments in sharing this expertise to the greatest extent possible. As residents of the State of Wisconsin, Tribal members are equally entitled to those services afforded to all residents of the State. As members of a sovereign Tribal nation, Tribal members are entitled to those services afforded to all members of that Tribal nation. Whether the services are provided through Tribal agencies or directly through the DOA or county agencies, it is critical that the Department of Administration administrators, Tribal leadership, and their representatives consult with one another to ensure that needed services are provided and received in a manner that is both efficient and effective.

1.3.1 Guiding Principles

The DOA is committed to improving and maintaining effective government-to-government relations with the Tribes. The development of mutual understanding, with cultural awareness and sensitivity, is necessary to effective consultation on policy and collaboration on program operations. Toward achieving this goal, the DOA shall utilize the following principles in consulting on policy and on program issues with Tribal governments. Integration of these principles into DOA planning and management activities will help produce positive and desired outcomes for Tribal community members. It is important to recognize the uniqueness of each Tribe's culture, governmental structure and processes, demographics and geography (i.e., where Tribal members are located), and other factors. Consultation involves respectful and timely communication with Tribal governments in a cooperative process that strives to achieve a consensus before a decision is made or an action is taken.

Working directly with American Indian Tribes in a government-to-government manner will result in an effective, efficient, and sustainable consultation process.

1.3.2 Purpose and Methods

The State of Wisconsin, represented for purposes of this policy by its Department of Administration, with the concurrence of the Tribes as sovereign nations, will diligently seek to maintain an ongoing and meaningful process for communicating general concerns, program and funding priorities, respective roles in the provision of services to Tribal community members, and other high-level matters of mutual concern. The Wisconsin Department of Administration, together with the Wisconsin federally recognized Tribal governments, establishes this policy requiring consultation by and between these governments on DOA policies and activities.

1.3.3 Working Cooperatively with Tribal Governments

With respect to the intent of DOA and Tribal governments working to ensure eligible tribal members receive services in a cost effective and timely manner, it is the responsibility of weatherization program Grantees to collaborate with local Tribal governments to ensure potential customers are aware of the program and the process of application and completion of weatherization of eligible homes.

1.3.4 Prioritization of Tribal Households

Grantees shall prioritize tribal applicants to ensure work is completed in a timely manner.

Chapter 2 – Eligibility, Deferral and Denial

2.1 Applicant Eligibility

A household shall meet specific financial and non-financial eligibility requirements before weatherization services can be provided. Household eligibility is first established by the Wisconsin Home Energy Assistance Program (WHEAP) provider in the county where the applicant resides. For information regarding WHEAP eligibility guidelines, see the WHEAP Program and Operations Manual, Chapters 3 and 4.

Once initial household eligibility is established by the WHEAP agency, the weatherization agency determines dwelling eligibility (see 2.8 Dwelling Eligibility).

Eligibility of rental property is addressed in Chapter 3 – Weatherization of Rental Units~~Chapter 3 – Weatherization of Rental Units~~.

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2.2 Eligibility Periods

There are two eligibility stages, and both are contingent upon the household remaining at the address for which the initial eligibility was established.

Stage 1: The household is eligible for weatherization services for one year from the WHEAP application date, contingent upon dwelling eligibility. During this one-year time period, an energy audit shall be completed or the eligibility of the household for weatherization will need to be re-established by re-applying for WHEAP.

Stage 2: The completed energy audit date is the start of the Stage 2 time period and the dwelling shall be reported as completed within one year of this date.

Deferrals do not extend the time period.

2.2.1 Exceeding Eligibility Periods

When either time period is exceeded, the following applies:

- Household eligibility shall be re-established by the WHEAP agency, and
- A new priority for service is established.

2.3 Priority of Service

Grantees shall give priority of service to households based on the Priority ID number found in the WHEAP Referrals Report. Referrals with the lowest Priority ID numbers shall receive the highest priority. A Grantee's goal shall be to have 80 percent of completions from high priority referrals. Tribal households shall be included in the Grantees targeted high priority of service group regardless of the Priority ID number on the WHEAP referral. Grantees shall develop an internal prioritization plan for providing service to priority groups.

Priority shall be determined based on the Priority ID number on the date of contact. The Priority ID number is generated based on factors including the household energy burden,

and whether any members are elderly, disabled, or children under six years old. Although determined initially by information contained on the WHEAP application, prioritization is tied to the dwelling unit, not the applicant. If the eligible household moves, they will not establish a new priority ranking until they apply for WHEAP at their new residence.

2.4 Denial of Weatherization Services

It is the policy of the Division to provide comprehensive weatherization services to eligible dwellings occupied by eligible low-income persons.

Weatherization services shall be denied when any of the following are true:

- The dwelling is not eligible.
- There are no energy conservation measures to complete.
- There are changes in household eligibility status.

Upon denial of weatherization program services, the applicant shall be given a copy of the Grantee's appeal procedure (see 2.6 Applicant Appeal Process~~2.6 Applicant Appeal Process~~).

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Units that are denied while in progress cannot be reported to DES as a completed unit for reimbursement of costs.

2.5 Deferral of Weatherization Services

Grantees shall strive to work with applicants to resolve conditions where a deferral of service has been issued.

The decision to defer work in a dwelling is difficult but necessary in some cases. This does not mean that weatherization assistance will never be available, but that work shall be postponed until the problems can be resolved and/or alternative resources are found. Grantees are expected to pursue reasonable options on behalf of the dwelling owner, and to use good judgment in dealing with difficult situations. Grantees shall not simply defer service without pursuing other options and identifying other resources to address the identified hazard(s). Whenever appropriate, educational information on how to address the hazard shall be shared with the occupant. An example of educational materials is EPA booklet 402-K-98-002, "Indoor Air Hazards".

Grantees are required to create a Building in the WisWAP reporting system, document the deferral status, and select the reason(s) for deferral.

Weatherization services shall be deferred when:

- The customer refuses work items that cause the proposed Weatherization Assistant Recommended Measures report to drop below a cumulative SIR of 1.0. Grantees shall then defer all services to the customer. (Refusal of measures that are optional to the customer is not cause for deferral.)

- A repair or health and safety measure causes the proposed Weatherization Assistant Recommended Measures report to drop below a cumulative SIR of 1.0. Grantees shall then defer all services to the customer until the repair or health and safety issue is addressed with other funds.
- The dwelling or household presents a serious crew safety concern.

Examples of reasons for deferral include the following:

- Standing water, mold, friable asbestos, deteriorated lead-based paint surfaces or other hazardous materials that cannot be addressed by the weatherization work.
- Evidence of infestations of rodents, insects, and/or other vermin.
- Un-vented space heater(s) that may have a harmful effect on the air quality of the home.
- Unsecured pets that may prevent workers from safely completing their work.
- The presence of sewage or animal feces in or around the home.
- Improperly stored chemicals, combustible materials, or other fire hazards that present a danger to the occupants or the workers.
- Maintenance or housekeeping practices that limit the access of workers to the dwelling or create an unhealthy work environment.
- Major remodeling is in progress, which limits the proper completion of major weatherization measures.
- The home receives HUD funding and at the time of completion, the unit will not meet applicable HUD Lead-Based Paint standards.
- Electrical or plumbing hazards or structural failures that cannot be addressed as a part of weatherization services.
- Threat(s) of violence or abusive behavior toward worker(s) or household member(s) during the weatherization process.
- The illegal presence or use of any controlled substance in the home during the weatherization process.
- Occupant has known health conditions that prohibit the installation of insulation or other weatherization materials.

2.5.1 Deferral Notification Requirements

Upon the decision to defer weatherization program services, the customer shall be notified in writing within five working days. The notification shall be sent by ~~certified~~ mail~~,~~ or hand delivered~~, for customer signature of receipt~~. Grantees ~~that opt to hand deliver deferral notifications shall include the procedure in their deferral policy, and~~ shall continue to make appropriate referrals to any programs available to assist customers in resolving the deferral issue(s).

Notifications shall include:

- A copy of the Grantee's appeal procedure.

- The Deferral of Service Notification form available on the HE+ WisWAP Grantee Information page under the Field Forms heading

The notice shall include the reason for the deferral, and the means by which the applicant can rectify the situation so the weatherization measures can be performed. The requirements for rectifying the deferral shall be reasonable and appropriate to the severity of the situation being addressed. The Grantee shall provide the customer a reasonable timeframe to correct the identified issue.

Any eligible applicant that complies fully with these requirements shall be reinstated in the Grantee's work system so weatherization work can progress as soon as reasonably possible. There is no time extension for the eligibility period due to a deferral. If the dwelling cannot be reported as complete within the eligibility period, the customer must reapply for WHEAP and they do not retain their priority.

On a deferred unit, pictures documenting the reason for deferral (mold or other problems) are required and shall be part of the customer file record.

2.6 Applicant Appeal Process

Grantees shall have an internal applicant appeal process. Upon the deferral or denial of weatherization program services, the applicant shall be given a copy of the Grantee's appeal procedure. The appeal process may be the same when an applicant is denied service or when service is deferred. If, after following the appeal process, a customer wishes to contact the Division of Energy Services, they shall be provided with the Home Energy Plus Hotline number: 1-866-HEAT-WIS (432-8947).

2.7 Limited Weatherization

Limited Weatherization (Wx) Services is a program available for 1 – 24 unit dwellings that provides lighting, refrigerator and freezer measures. Eligible households could include units with a deferral status and units denied to an SIR less than 1.0. Receipt of Limited Wx Services does not prevent an eligible unit from receiving full weatherization services in the future. For more information see the Limited Weatherization (Wx) Services heading on the HE+ WisWAP Grantee Information page.

2.8 Dwelling Eligibility

To be considered for weatherization, a dwelling must be a structure, including a stationary mobile home, apartment, group of rooms, or a single room occupied as separate living quarters (including historic properties), and qualified shelters or other group facilities. Government institutions, halfway houses, nursing homes, recreational vehicles (RVs), cars, trucks or tents are not eligible dwellings and are not eligible for weatherization services. Properties having only a commercial use are not eligible for weatherization.

A qualified dwelling is eligible for weatherization service if it:

- Is occupied by an eligible household, or will become an eligible dwelling unit within 180 days under a Federal, State, or local government program for rehabilitating the building or making similar improvements to the building; and
- Has not been previously weatherized, or
- Was weatherized prior to October 1, 1994, or
- Was weatherized prior to October 15, 2000, and the residence is served by a Public Benefits participating electric utility.

Dwelling units served by a Public Benefits participating utility and weatherized between October 1, 1994 and October 14, 2000 may be reweatherized using state Public Benefits (PB) funds only. Dwelling units originally weatherized with DOE funds prior to October 1, 1994 may be reweatherized using federal Department of Energy (DOE) and federal Low Income Home Energy Assistance (LIHEAP) funds, and PB funds if the residence is served by a participating electric utility.

When homeownership needs to be verified, the Weatherization Program is responsible for obtaining the verification documentation and retaining the documentation in the customer file (see 8.2 Client Files~~8.2 Client Files~~). For guidance on verifying homeownership, see Section 3.3 of the Home Energy Plus Furnace Program Manual.

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For multi-family and rental unit eligibility, see Chapter 3 Weatherization of Rental Units.

2.8.1 Manufactured Home Proof of Ownership

Mobile or manufactured homes on private property are not required to be titled according to State of Wisconsin law. If a client resides in a mobile or manufactured home that is on private property and does not have a Certificate of Title, a Bill of Sale, or a copy of the Homeowner's Insurance, the client must provide documentation that identifies the owner of the property where the address listed on the HE+ Application is located, such as property tax records, deed, or other verification of ownership of the land on which the manufactured home sits.

If a client resides in a mobile or manufactured home that is located in a mobile home park or community (not on private property) and does not have a Certificate of Title, the Grantee is encouraged to work with the client to obtain a title by mailing the completed application and necessary payment to the Department of Safety and Professional Services. If the client is unable to provide a title or acquire a title, the following documents may provide sufficient proof of ownership:

- a Bill of Sale;
- a copy of the Homeowner's Insurance where the document provided identifies the household member's name as the dwelling owner and describes the dwelling (e.g. serial number, make and year);
- property tax records that name a household member or home owner as responsible for the taxes at the address listed on the HE+ Application.

Use the Department of Safety and Professional Services (DSPS) website to search for current manufactured home ownership if the client has a title but cannot provide a copy of the title. Titles issued by the Department of Transportation (prior to 2001) are not on the DSPS website. If the correct unit is located in the database and a household member or home owner is shown as the owner, highlight the entry and print a copy to put in the file. If the unit is not in this database, call (608) 264-9596 and request assistance from DSPS staff.

2.8.2 Limitations and Exceptions to Dwelling Eligibility

A dwelling is not eligible for weatherization, even if occupied by an eligible household, if the dwelling was previously weatherized with Weatherization Program funds, unless:

- The dwelling was damaged by fire, flood or natural disaster, and repair of the damage to weatherization materials is not covered by insurance; or
- The dwelling is eligible for reweatherization as described in Section 2.8 above.

If the occupancy of the dwelling unit changes to another low-income family, the dwelling unit does not become eligible for additional weatherization. A dwelling is not eligible for weatherization, even if occupied by an eligible household, if a federal, state or local program has designated the dwelling for acquisition or clearance within 12 months from the date weatherization would be scheduled to be completed.

2.8.3 Group Homes

Grantees may weatherize eligible private, non-profit, or publicly owned long-term group homes. If a group home is owned by a religious organization, the Grantee shall use PB funds if PB eligible~~,~~ and EAP funds if not PB eligible.

Group homes are eligible when they meet the applicant and dwelling unit tests in 2.1 Applicant Eligibility~~2.1 Applicant Eligibility~~ and 2.8 Dwelling Eligibility. The Grantee shall establish the number of dwelling units in the building using the Separate Living Quarters definition in Appendix A – Definitions and Acronyms~~Appendix A – Definitions and Acronyms~~. For example:

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- Single Dwelling Units – If the group home is a single dwelling unit, treat it as such when providing services. If residents share a kitchen, the building may only be qualified as a single dwelling unit, with all residents counted as one household for application purposes.
- Multiple Dwelling Units – If the group home is composed of more than one dwelling unit, determine eligibility for each unit and treat it as the building type it most closely resembles (e.g., 2-4 unit, 5+).

The owner or operator of a group home is required to pay at least 15 percent of the total cost of weatherization if the owner or operator provides the heat.

2.8.4 Temporary Shelters

A temporary shelter is any dwelling unit or units whose principal purpose is to house, on a short-term basis, individuals who may or may not be related to one another. Examples of

temporary shelters are transitional housing for homeless persons and domestic abuse shelters. Nursing homes, prisons, or similar institutional care facilities are not eligible temporary shelters.

Grantees may weatherize temporary shelters without an income eligibility test or entry of an application in WisWAP. However, only properties owned by non-profit entities or units of government and their subsidiaries, such as housing authorities, are eligible. If a temporary shelter is owned by a religious organization, the Grantee shall use PB funds if PB eligible, and EAP funds if not PB eligible.

The owner or operator of a temporary shelter is required to pay at least 15 percent of the total cost of weatherization if the owner or operator provides the heat.

For the purpose of determining how many dwelling units exist in a shelter, a Grantee shall count each 800 square feet of the shelter living area as a dwelling unit ***or*** count each floor of the shelter that has living area as a dwelling unit.

2.9 WHEAP Applications for Multifamily Buildings in Weatherization

Weatherization agencies that identify multi-family buildings for weatherization shall refer application needs to the local WHEAP agency to take applications from any tenants in the building who have not yet applied for energy assistance/weatherization. The local WHEAP agency shall prioritize the application intake process, key in the Home Energy Plus application into the WHEAP database within 30 days if received from the Weatherization agency, and discuss the eligibility results with the local weatherization operator within the 30 days.

If the building does not have the minimum number of eligible dwelling units needed to proceed with weatherization after the local WHEAP agency has completed application efforts, the two agencies shall discuss what further steps may be necessary to qualify additional households, or decide to delay weatherization of the building.

Additional efforts the local WHEAP agency shall consider include mailings to the tenants in the building, putting up informational posters, conducting outreach on-site at the property, and any other methods that are likely to encourage residents of the building to complete a Home Energy Plus application. Local weatherization operators are expected to manage their contracts and use the flexibility of the LIHEAP/PB tenant threshold when necessary and as funding allows.

Chapter 3 – Weatherization of Rental Units

3.1 General

Within the constraints of the program, a Grantee shall provide services to buildings that have rental dwelling units occupied by eligible program participants, or units that are expected to be occupied by eligible program participants within 180 days of completion of the weatherization work (with prior approval from the Division). A Grantee shall weatherize the entire multi-unit building when the building is eligible.

Since a significant portion of Wisconsin's low-income population lives in rental units, Grantees are required to make a substantial effort to weatherize a number of rental units that is proportional to renters in the low-income population.

3.2 Energy Audits

Rental buildings shall be treated the same as owner-occupied buildings in determining appropriate measures to be performed. See Chapter 10 – Energy Audits, Diagnostic Tests and Air Sealing~~Chapter 10 – Energy Audits, Diagnostic Tests and Air Sealing~~ for protocol on auditing rental units.

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3.3 Multi-Unit Building Eligibility Requirements

Eligibility requirements are as follows:

When the Grantee uses only Public Benefits or EAP funds:

1) 50 percent or more of the units are occupied by eligible applicants; or

2) 50 percent or more of the dwelling units will be occupied by eligible households within 180 days under a federal, state or local government program for rehabilitating or making similar improvements to the building. Note: Contact DES to request permission to utilize this qualification process.

When the Grantee uses ***any*** DOE funds:

1) 66 percent or more (50 percent or more for duplexes and 4 unit buildings) of the dwelling units in the building are occupied by eligible applicants; or

2) 66 percent or more of the dwelling units will be occupied by eligible households within 180 days under a federal, state, or local government program for rehabilitating the building or making similar improvements to the building. Note: Contact DES to request permission to utilize this qualification process.

If the multi-unit building is not eligible for weatherization as described above, service to the entire building shall be denied. As noted in 2.2 Eligibility Periods~~2.2 Eligibility Periods~~, a dwelling unit is eligible for weatherization services for one year from the WHEAP application date. All units required to meet the percentage amounts above shall be eligible before the

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energy audit is completed or the eligibility of the household will need to be re-established by re-applying for WHEAP.

3.3.1 Owner Occupied Multi-Unit Buildings – Condominiums

If each dwelling unit in a multi-unit building is separately owned and occupied by the owner, then each eligible dwelling unit shall be created as a separate single family building in WisWAP. Work on common area measures is allowed only when all dwelling units in such a building are occupied by eligible households.

3.3.2 Rental Units Containing Commercial Property

If a building contains 1 or more dwelling units ***and*** is also used for commercial purposes, only the part of the building that is residential (contains dwelling units) may be weatherized. The eligibility of buildings that have commercial property and multi-unit residential units will be determined based on multi-unit eligibility rules described in Section 3.3 above. Grantees may not weatherize commercial property. Multi-unit eligibility as described in Section 3.3 applies to rental units containing commercial property, but the commercial property cannot be counted as a unit when determining the number of units in the building. Rooms or other areas used only for commercial/business purposes are not considered eligible space for weatherization services.

Where a measure will need to be installed on both the eligible dwelling unit and commercial area to be effective (e.g. insulating sidewalls) the Grantee shall charge the portion associated with the eligible unit to the program and charge the portion associated with the commercial area to the property owner. The amount charged to the property owner may not be counted toward the owner contribution if an owner contribution is required under Section 3.4.2 or 3.4.3 below. If the property owner declines the measure or declines to pay for the portion associated with the commercial area, the dwelling unit shall be denied.

3.4 Policies and Procedures

3.4.1 Rental Work Agreement

Grantees shall receive written permission from the owner (or authorized representative) to weatherize the building. Grantees are required to use the Wisconsin Weatherization Assistance Program Rental Work Agreement for each rental weatherization project. The Rental Work Agreement is available on the HE+ WisWAP Grantee Information page under the Field Forms heading.

3.4.2 Owner Contribution – One to Four Unit Buildings

In rental dwelling units where owners are responsible for paying heating costs, or multi-unit buildings that are master-metered, owners are required to make a contribution amounting to a minimum of 15 percent of the total cost of the weatherization work. Organizations that are non-profit and are owners or managers of eligible rental property are not exempt from the 15 percent cost of weatherization work. An exception is made for owners who are themselves eligible for weatherization services because they are eligible for the Wisconsin Home Energy Assistance Program (WHEAP). These owners are not required to make contributions.

An owner may meet the owner contribution requirement in any of the following ways:

1) Cash contribution;
2) Rebate or rent reduction (the rebate period cannot exceed one year);
3) Weatherization materials installed by the owner to the dwelling unit to facilitate weatherization services, except that labor performed by the property owner may not count toward the contribution.

3.4.3 Owner Contribution – 5+ Unit Buildings

Building owner contributions in 5+ unit buildings may be used to cover the cost (or portion of the cost) of any weatherization measure allowed by the State of Wisconsin that does not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building, under the following conditions:

1) The owner's contribution shall be equal to or exceed the buy-down amount needed to generate an SIR greater than or equal to 1.0.
2) The owner's contribution shall be at least 15 percent of the total cost of measures performed when the heat is master-metered.
3) The buy-down of measures shall not result in other cost-effective measures being dropped from the improvement package. All measures that were cost-effective after the initial energy audit is conducted would remain a part of the list of measures to be completed on the unit.
4) The cumulative SIR of the building's measures package shall be greater than or equal to 1.0.
5) There shall be documentation in the building/customer file of the energy audit, including measures that will be completed which have an initial SIR of less than or equal to 1.0.
6) A summary of all costs associated with the weatherization of the building, including non-federal resources, shall be retained in the building/customer file.

3.4.4 Complaint Process

By signing the Rental Work Agreement (see 3.4.1 Rental Work Agreement~~3.4.1 Rental Work Agreement~~), the owner agrees not to raise rent(s) for a period of one year, beginning on the date of the satisfactory final inspection, because of the increased value of the dwelling unit(s) when the value is increased solely because of the weatherization work. Grantees shall inform tenants of this rent provision and of owner contributions that result in rebates or rent reductions. If a complaint arises due to an alleged violation of the Rental Work Agreement and the complaint is not resolved at the Grantee level, the tenant may submit a written request for investigation to:

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Department of Administration
Division of Energy Services
Quality Assurance Section
PO Box 7868
Madison, WI 53707-7868

Chapter 4 – Financial Standards

4.1 General

Grantees shall establish and maintain fiscal control and accounting procedures as set forth in Wisconsin Statutes 46.036(4) and 2 CFR 200. These procedures shall be in writing and consistently applied, and shall include procedures for determining the reasonableness, allocability and allowability of costs in accordance with the provisions of the applicable Federal cost principles and the terms and conditions of the award. Grantees shall maintain account books on a double entry basis. Accounting will be on a modified accrual basis at a minimum. Full accrual basis accounting is encouraged.

Grantees shall maintain separate accounting for each grant (contract). For grants funded through multiple sources, the grantee shall maintain records that separately track and account for those funds. There shall be a system for allocating common expenses among funding sources.

If work is performed by the Grantee's staff, charges to the weatherization program will be made on an actual cost basis. Grantees are required to notify the Division of any potential financial conditions that could adversely impact program operations. Examples of these conditions include: pending legal activity by a vendor, client or employee; organizational cash flow shortages; allegations or investigations of fraud or embezzlement. Failure to notify the Division of potentially adverse financial conditions is grounds for immediate termination of the contract.

4.2 Source Documentation

Grantees shall maintain at least the following documentation of funding sources:

1) Approval to secure funds,
2) Applications and requests for modifications,
3) Signed contract and modification approvals,
4) Board minutes, and
5) Proof of receipt/deposit slip, including date, amount, source of funds, and identification of receipt of funds in cash ledger.

4.3 Expenditure Documentation

Grantees shall maintain at least the following documentation of expenditures:

1) Written prior authorization where required,
2) Budget approval,
3) Budget amendment approval,
4) Extension of vendor contracts,
5) Internal prior authorization,
6) Purchase order,

7) Travel authorization,
8) Employee contract or time records signed by employee and supervisor,
9) Proof that goods or services were received,
10) Bill of lading and receipt or invoice marked “received” with initials or name of person accepting delivery, and
11) Proof of payment using check stubs or copies of checks/vouchers including:
    - Source of funds,
    - Date paid,
    - Amount paid,
    - Authorization of payment, and
    - Identification of application in disbursement ledger.

4.4 Cash

Grantees shall make intact deposits (no cash back).

The Division does not allow cash payments except from petty cash.

It is not necessary to keep funds from separate grants (contracts) in separate bank accounts; however, Grantees shall maintain separate financial records for each grant.

Grantees shall perform monthly bank reconciliation.

Advances may only be used for allowable weatherization costs that occur during the grant period.

Grant funds may only be used for allowable weatherization program expenses. Any use of weatherization program funds for expenditures other than those allowed by the weatherization program, even on a temporary basis, may result in immediate termination of the contract.

4.5 Record Retention

Grantees shall retain all records associated with the Grant as detailed below for three years after the final Federal Financial Report (FFR) has been submitted by the state, per federal regulations (~~10 CFR 600.153 for non-profits and 10 CFR 600.242 for State and local governments.)~~2 CFR 200.333).

a. Grantees shall retain all financial records, supporting documentation, statistical records (including procurement records).
b. Grantees shall store their agency cost files and label or name each file according to the time period involved.
c. All records maintained in accordance with the operation of the weatherization program shall be available to the Division on request for inspection, examination, excerpting, transcription or financial audit.

d. Grantees shall maintain a permanent record of all units weatherized which, at a minimum shall include; street number, street name, unique unit identifier, city, zip code, county and date of completion.
e. For all records created during a Grant Period the following record disposal schedule shall be applied.

Grant Period	Disposal Date
07/01/2004 – 06/30/2009	After 9/30/2012
07/01/2009 – 06/30/2013	After 9/30/2016
07/01/2013 – 06/30/2016	After 9/30/2019

See Chapter 8 – Documentation and Record Keeping~~Chapter 8 – Documentation and Record Keeping~~ for additional information pertaining to client file retention.

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4.6 Financial Audits

Grantees shall ensure that financial audits are:

1) Conducted annually;
2) Conducted by an independent auditor;
3) Timely; and
4) Submitted to the Division as soon as available. Grantees shall submit one copy of the audit and one copy of the audit firm's most recent quality/peer review report, including any accompanying letters of findings. Send the electronic, unsecured PDF file to the DOAS single Audit Coordinator at DOADOASSingleAuditCoordinator@wisconsin.gov. If electronic submissions are not possible, audit reports may be sent to the following address:

   Department of Administration
   Bureau of Financial Management
   Single Audit Coordinator
   101 East Wilson, 9th Floor
   PO Box 7869
   Madison, WI 53707-7869

5) Conducted in accordance with federal laws and regulations, Title 2 of the Code of Federal Regulations, ~~OMB Circular A-133~~ and the State Single Audit Guidelines (SSAG) issued by the Wisconsin Department of Administration.

4.6.1 Single Audit Reports

The audit reporting package shall include the following. See the State Single Audit Guidelines (SSAG) ***and*** Supplemental Schedules for complete information.

1) Audited financial statements of the overall agency
2) Schedule of expenditures of Federal & State Award
3) Additional Supplemental Schedule(s) required by the granting agency
4) Schedule of Prior Audit Findings

5) Corrective Action Plan
6) Opinion on General-Purpose Financial Statements and Supplementary Schedule of Expenditures of Federal and State Awards
7) Report on Compliance and on Internal Control Over Financial Reporting Based on an Audit of Financial Statements Performed in Accordance With Government Auditing Standards
8) Report on Compliance With Requirements Applicable to Each Major Program and on Internal Control Over Compliance in Accordance with OMB Circular A-133 and the SSAG
9) Schedule of Findings and Questioned Costs
10) Management letter

4.6.2 Compliance Requirements and Audit Procedures

1) Determine the effectiveness of management controls and the fiscal integrity of the financial system.
2) Determine whether the Grantee is in compliance with the terms and program requirements as set forth in the weatherization contract and the DOA Weatherization Manual.
3) Determine whether reports issued to DOA are accurate and complete, including financial and production data.
4) Determine whether expenditures are properly classified in accordance with the weatherization contract and that they are allowable costs as set forth in the weatherization manual and federal regulations.
5) Determine that administration expenses were limited to the appropriate percentage of expended dollars as stated in the contract.
6) Determine whether inventories are properly maintained and safeguarded.
7) Determine whether materials inventory and materials installed were properly valued.
8) Audit requirements and procedures published in 2 CFR 200 Subpart F – Audit Requirements. ~~OMB's Compliance Supplement for Audits of State and Local Governments or OMB's Compliance Supplement for Audits of Institutions of Higher Learning and other Non-Profit Institutions.~~

The selection of the audit firm shall comply with procurement requirements (see Chapter 6), except that 1) a Request for Proposal (RFP) shall be used instead of Weatherization Request for Bid (RFB) template, and 2) an RFP is required, regardless of cost.

Grantees shall have a method for resolving questioned costs.

4.7 Interest Income

Interest income is income earned on advances of program funds. Grantees shall maintain unspent advance balances in interest bearing accounts. The accounts shall be liquid and carry no penalty for early withdrawal. During the contract year, advances are reallocated among program funding sources (DOE, LIHEAP and Public Benefits) as funds are depleted, in order to fully pay invoiced expenses and maintain the original advance amount.

Interest shall be allocated to the appropriate Weatherization funding source based on the advance funding at the time the interest was earned, as shown on WisWAP Interest Income Allocation Report.- -Grantees shall report interest earned monthly on the invoice in WisWAP. To the extent possible, interest earned after June 30, but associated with that year's contract shall be included in the closeout report. Any necessary amendments to the interest reported in the closeout may be conveyed to the Division of Energy Services by e-mail.

Interest earned on federal funds (DOE and LIHEAP) funds **over $250500** shall be returned to the State quarterly (Federal Regulation 10CFR600C). Checks shall be made out to the U.S. Department of Energy and submitted to the Division of Energy Services. Interest earned on LIHEAP and, Public Benefits-, and DOE ($500 or less) may be retained by the Grantee and shall be used for weatherization program purposes. Interest earnings are not Job Cost Reduction funds.

4.8 Purchase Orders

The Division does not permit blanket purchase orders. There shall be a purchase order for each purchase including:

- Quantity
- Unit price
- Maximum amount
- Authorizing signature
- Date

There shall be a purchase order log, a record of all obligations and a way to identify unpaid obligations. Approval by an authorized person shall be in place before the purchase is made.

Invoices presented for payment shall be submitted in accordance with instructions contained on the purchase order including reference to purchase order number and submitted to the correct address for processing.

Chapter 5 – Allowable Costs

5.1 General

This chapter provides a description of allowable costs, including allowable costs by budget line. The following general principles apply.:

A Grantee shall expend funds provided under contract in conformance with the approved Monthly Contract Plan worksheet in the Contract Planning Workbook and the following limitations:

1) Administrative expenditures shall not exceed the budgeted amount per funding source and total administrative expenditures shall not exceed the percent specified in a Grantee's contract of total actual allowable expenditures.
2) DOE Health and Safety budget shall not be overspent.
3) T&TA budget shall not be exceeded, and under expenditures of DOE T&TA funds shall not be ~~moved to another~~used to cover over expenditures of other budget lines.
4) Public Benefit funds may be used only in territories being served by a retail electric utility that is collecting fees and participating in the state Public Benefits Program under Wisconsin Statutes. s.16.957.
5) Funds cannot be transferred between funding sources.
6) Expenditures shall meet reasonableness, allocability and allowability requirements.
7) Any bonus or incentive plan shall be submitted to the Division via the Help Desk. The Division retains a copy of the plan for recordkeeping purposes and prior approval is ***not*** required. If changes are made to a plan on file, a Grantee shall submit an updated bonus or incentive plan via the Help Desk within 30 days of the plan effective date.

Except as stated in 1 to 5 above, positive balances in one line item may be shifted to cover cost overruns in other line items. Costs shall be in accordance with pertinent state and federal regulations.

8) All costs expensed to a contract shall fall within the contract period. The only exceptions are the fiscal and compliance audits, which, even though the expense relates to a prior contract period, shall be expensed to the current contract.
9) Expenditures incurred for the installation of allowable measures on a completed dwelling unit shall be reimbursed under the contract year the unit is reported completed. Costs for the installation of allowable measures may be accrued prior to the contract year in which a completed unit will be reported, and reimbursed when the unit is reported as completed (Advance funds shall not be used to cover these costs). To avoid disallowed costs, a Grantee shall ensure that all measures are active and allowable under the subsequent contract.

5.1.1 Disallowed Costs

Disallowed costs are expenses, as determined by the Division that are not reimbursable using grant funds. If the Division cannot determine if expenditure is allowable, because of

inadequate records or documentation, the questioned cost will be disallowed. Grantees shall reimburse the Division for the amount of any disallowed costs.

5.1.2 Interest Expense

Interest charges are ***not*** an allowable expense with DOE funds. Interest is an allowable cost using LIHEAP and Public Benefits funds.

5.1.3 Rework Expense

Rework expenses are disallowed costs except when specifically authorized by the Division.

5.1.4 Purchase of Vehicles and Equipment

All equipment and vehicles shall be purchased entirely with PB funds, or funds resulting from an approved disposition, or an approved disposition applied as a trade-in. Grantees shall request Division approval for all such purchases with an original purchase value of $5,000 or more. Note that "original purchase value" means the purchase price plus any trade-in.

5.2 Administration

Total Grantee administrative expenses shall not exceed the contracted percent of total actual allowable expenditures.

Under administration, a Grantee may charge salaries, wages and fringe benefits for weatherization-related personnel. For agency-wide administrative and clerical positions, Grantees may charge only the portion of salaries, wages and fringe benefits that can be directly allocated to the Weatherization Program. Agency-wide administrative and clerical costs that are directly allocated **cannot** also be recovered as indirect costs. For more information on direct charging of these costs see 2 CFR 200.413.

The Division allows as administrative expenses, such items as:

- Space
- Supplies (paper, pencils, etc.)
- Furniture
- Operational equipment (fax machines, photocopy machines, etc.)
- Computer systems and supplies
- Telephone
- Postage
- Copying
- Utilities (Weatherization Program share)
- Training (including state-sponsored or Grantee-developed training)
- Professional membership dues in business, technical and professional organizations and subscriptions to trade business, technical and professional ~~magazines~~periodicals

- Indirect costs, pursuant to a federally-approved indirect cost rate, but only up to the amount allowable in a Grantee's administration budget lines, regardless of the federally approved rate
- Out-of-State travel (with prior Division approval) when directly related to operation/administration of the Weatherization Program and allowed by contract.

5.3 Operations

Operations expenses result from installing energy conservation measures (ECMs) and repair measures. Measure costs may be comprised of direct labor, materials, delivery, and contractor costs.

5.3.1 Direct Labor

The Grantee shall include the following when calculating an agency direct labor rate:

- Direct labor costs, including taxes, vacation/holiday time, anticipated training time, and job prep/transportation time;
- Supervisory costs;
- Inventory control personnel;
- Warehousing (program share of space, utilities, etc.); and
- That portion of wages and fringe benefits for the program manager and other program staff that directly relate to crew and/or ~~sub-~~contractor field operation.

Grantees are required to use the Direct Labor Rate Calculation worksheet in the Contract Planning Workbook, posted on the Home Energy Plus website, to calculate their direct labor rate. This calculation shall be performed, at a minimum, prior to the start of the annual contracting cycle for planning purposes, any time there are significant personnel or cost changes, and/or as directed by the Division.

The Direct Labor Rate (DLR) worksheet in the Contract Planning Workbook is designed based on the assumption that the Grantee will not use funds from the Training & Technical Assistance (T&TA) budget line for the wage costs of crew members or any staff splitting their time between Operations and Support (DLR-supported staff) involved in training activities. When these costs are known or can be anticipated, they should be recovered using the Operations and Health & Safety budget lines. Accordingly, enter anticipated training time for DLR-supported staff into the template when this method is followed.

On a monthly basis, the Grantee shall compute the variance between actual and recoverable direct labor expenses. Recoverable direct labor expenses are determined by multiplying measure hours completed by the direct labor rate. Grantees are required to maintain a record of measure hours completed. The use of the Direct Labor Rate Monthly Variance Tracking Spreadsheet, found in the Contract Planning Workbook and also posted on the Home Energy Plus website, to perform the monthly reconciliation is strongly recommended.

“Measure hours completed” shall be calculated in one of two ways:

1. All measure hours worked on completed and uncompleted jobs during the month, whether the job has been reported in WisWAP or not. Use this method if the agency's policy is to expense direct labor costs when incurred, rather than to inventory unbilled labor costs.
2. All measure hours on jobs that have been completed and reported in WisWAP during the month. Use this method if the agency's policy is to inventory unbilled labor costs, rather than expensing these costs when incurred.

The hourly rate shall be adjusted only if it has been determined that variances are unlikely to reverse, or self-correct prior to the end of the contract. Monthly reconciliation records shall be retained, and may be reviewed for any continuing pattern of excessively high variances between actual and recoverable direct labor expenses.

5.3.2 Materials Installed

The cost of materials installed that meet standards stated in Chapter 11 – Weatherization Materials and Specifications~~Chapter 11 – Weatherization Materials and Specifications~~. If materials in stock no longer meet Chapter 11 standards, a Grantee may continue to install materials that met standards when purchased, until the materials are used up, unless the Division directs otherwise.

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5.3.3 Delivery

The cost of having a third party transport weatherization materials to the program warehouse or directly from the seller to the job site is an allowable cost.

5.3.4 Contractor Costs

The reasonable cost of the installation of weatherization measures by a private contractor.

5.3.5 Repair Costs

The cost of incidental repairs, if such repairs are necessary to make the installation of weatherization materials effective, are allowable costs when NEAT/MHEA auditing requirements have been followed as required.

5.3.6 Unusable, Damaged or Lost Grantee Materials

Total charges for unusable, damaged or lost materials shall not exceed 0.25 percent of the total contract year Operations expenses. Any amount exceeding 0.25 percent is not an allowable cost. These costs shall not be charged to a weatherization job. These costs shall not include damage to installed materials or mechanicals. A Grantee may only charge unusable materials to the contract if approved, in writing, by the Division. Prior approval is ***not*** required for damaged or lost materials.

5.3.7 Job Cost Reduction

Job cost reduction funds are defined as the gross income earned during the contract year by a Grantee from grant supported activities and contributions from outside sources (such as

local utilities or landlords) in support of a Grantee's Weatherization Program. Weatherization resources cannot be used to earn income from activities not permitted by program rules. Job cost reduction funds shall be spent on allowable Weatherization Program activities. These activities are subject to the same regulations and conditions as other Weatherization Program funds.

Job cost reduction funds shall be:

- Used in the contract year earned;
- Spent on the same measure that generated the fund and;
- Reported in WisWAP when work is completed. This includes measures paid for entirely with job cost reduction funds.

A Grantee shall maintain financial records by contract year of job cost reduction funds earned and spent, including the source and amount.

Note: Records of the expenditure of job cost reduction funds shall follow the same general guidelines as contract funds.

5.4 Program Support

Program support costs are allowable costs when incurred in the provision of weatherization services as described in this section.

5.4.1 Support Labor

Support labor includes costs for staff performing program management, energy audits, final inspections, training time not included in the Direct Labor Rate calculation, outreach and intake, and other support related staff costs not directly tied to the installation of weatherization measures.

5.4.2 Transportation

This is the cost of transportation of weatherization materials, tools, equipment, work crews, supervisory personnel and energy auditors. Vehicle usage expenses may include mileage reimbursement for non-agency owned vehicles and may also include expenses for agency-owned or leased vehicles used for weatherization, such as:

- Gas and oil
- License and taxes
- Tires and vehicle repairs
- Vehicle insurance (collision and liability)
- Vehicle purchase using PB funds
- Vehicle lease
- Vehicle lease termination
- Vehicle storage costs

5.4.3 Tools and Equipment

The Division allows the purchase and/or lease of tools and equipment necessary to install weatherization materials effectively. Tools and equipment shall include non-consumable items such as tape measures, insulation blowers, ladders and also consumable equipment (e.g., saber saw blades, replacement filters for dust masks, blades for utility knives, etc.). See Chapter 7 – Equipment and Materials Management~~Chapter 7 – Equipment and Materials Management~~ for further definitions of, and requirements for agency property.

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Repair and maintenance costs for tools and equipment are also allowable costs.

5.4.4 Other Support

Other Support includes the following costs that occur as a result of staff performing weatherization tasks:

- Telephones
- Office supplies
- Postage
- Copying
- Space
- Computer supplies and service contracts
- Computer equipment for production based activities
- Equipment lease or purchase (other than computers)
- Building permits when required by law, and
- Reimbursement of travel to attend meetings of the Weatherization Operators of Wisconsin (WOW)
- Staff uniforms (includes work boots)

5.5 Health and Safety

A Grantee shall expense treatment of Health and Safety hazards in accordance with Chapter 12 – Health and Safety~~Chapter 12 – Health and Safety~~. Health and Safety expenses are limited to $1,000 per dwelling unit unless a cumulative SIR≥1 is verified by a Weatherization Assistant audit. DOE Health and Safety expenses shall not exceed the DOE Health and Safety budget.

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5.6 Liability Insurance

The Grantee shall charge the cost of insurance for the following to this cost category:

- Personal injury
- Property damage
- Operations

- Product liability
- Pollution Occurrence Insurance (POI) – (also see 5.6.1 Pollution Occurrence Insurance (POI)~~5.6.1 Pollution Occurrence Insurance (POI)~~)

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Payment of reasonable deductible amounts shall be allowable if a claim has been submitted to the policy issuer and with prior approval of the Division.

The Division strongly recommends that a competitive ~~procurement~~ process is followed for an agency-wide purchase of a liability insurance policy; for example, receiving at least three quotes from an insurance broker. ~~The Grantee does not have to purchase this independently and follow the procurement requirements identified in Chapter 6 unless greater than 60 percent of the Grantee's operation budget is for the Weatherization and Home Energy Plus Furnace programs.~~

The cost of mold and mildew coverage is ***not*** an allowable cost.

The cost of liability insurance for vehicles is ***not*** allowed in this budget line item. It is a transportation cost.

Self-insurance is ***not*** allowed.

5.6.1 Pollution Occurrence Insurance (POI)

DOE and DES strongly recommend Grantees, Contractors and lower-tier subcontractors be covered by a POI policy. POI coverage is not allowed for vendors providing commodities only (including refrigerator/freezer delivery), or for contracts that provide services such as energy audits or final inspections. Recommended minimum limits are $500,000 per occurrence, $500,000 aggregate for the policy term, and a maximum $2,500 deductible per occurrence.

A Grantee shall decide whether to cover its contractors under its POI insurance as "additional named insured" or pass the liability to such contractors. If a Grantee chooses not to have POI, or has POI but chooses not to cover its contractors, it shall inform contractors, and require a signed waiver that indemnifies the agency and the state. The language suggested is as follows:

> *The Contractor shall indemnify and hold harmless the weatherization agency, the State of Wisconsin, and all of their officers, agents and employees from all suits, actions or claims of any character brought for or on account of any injuries or damages received by any persons or property resulting from the operations of the Contractor, or of any of its agents or subcontractors, in performing work under this Agreement.*

Allowable costs are for a POI policy that covers WAP related work being performed under an agreement with a funding source to perform such work on their behalf. The cost for non-weatherization program work covered under a POI policy performed by crews or contractors

is not an allowable weatherization cost and shall be paid for from sources other than the weatherization contract.

If a Grantee does not obtain POI or require Contractors to have POI, the cost to do remediation, clean up, relocation, medical expenses, the cost of any litigation/settlement or any other resulting cost is not an allowable weatherization expense and must be covered by another funding source.

For more information on POI see the WAPTAC FAQs – Pollution Occurrence Insurance.

5.7 Financial Audit

The Weatherization Program is classified as a major program as defined in Title 2 of the Code of Federal Regulations Subpart F – Audit Requirements. ~~federal OMB Circular A-133, Audits of States, Local Governments and Non-Profit Organizations.~~

A Grantee shall charge the cost of the required financial and compliance audit of the Weatherization Program to the Financial Audit budget line. Do not include the cost of a financial audit in the agency's indirect cost rate. Separate funding is available for audit costs, and the costs shall ***not*** be paid with administrative funds.

The cost of a financial audit shall be ***either*** the cost of a separate audit of the Weatherization Program ***or*** the Weatherization portion of an agency-wide audit.

See additional information in Chapter 4 – Financial Standards~~Chapter 4 – Financial Standards~~.

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5.8 Training and Technical Assistance (T&TA)

A Grantee shall not exceed the budgeted amount for Training and Technical Assistance.

Training and Technical Assistance activities are intended to maintain or increase the efficiency, quality and effectiveness of the Weatherization Program at all levels. Such activities shall be designed to maximize energy savings, minimize production costs, improve program management, crew and contractor quality of work, and reduce the potential for waste, fraud, abuse and mismanagement.

A Grantee shall use T&TA Funds for:

- The cost of training programs and training materials;
- In-state travel costs and registration fees for training weatherization staff;
- The cost of subscriptions to weatherization program-related periodicals;
- Program evaluation costs, including labor costs, in accordance with the program budget;
- Costs associated with out-of-state training when allowed;

- The cost of training certifications that are required by the Division or DOE, including but not limited to, Energy Auditor, Lead -Safe Renovator, Asbestos Supervisor, and Asbestos Inspector.
- The cost of travel to Technical Development Work Group (TDWG) for designated employees;
- State-directed Grantee meetings;
- All or part of the cost of training contractors (see 5.8.2 Contractor Training~~5.8.2 Contractor Training~~); and
- Education for customers on energy conservation practices, including the information that is relevant to conditions noted in the home and the identification of the measures completed on their home and how to maintain those measures over their lifetime. The Wisconsin Weatherization Customer Guidebook is designed to incorporate that information for the program's customers.

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5.8.1 Labor Costs

Labor costs paid with T&TA funds are limited to:

- Labor that is directly linked to a specific training activity not included in the Direct Labor Rate calculation;
- Labor used to provide customer education; and
- Labor required as a part of program evaluation.

There shall be complete documentation of any labor costs associated with a Grantee's internal training, including the training activity/topic, the hours involved in the training, and names and positions of those trained, the development and distribution of the individualized Weatherization Customer Guidebook, and the hours charged for the participation in and support of program evaluation (e.g., state or national evaluation).

5.8.2 Contractor Training

Any costs associated with training contractors shall be preceded with a retention agreement in exchange for the training. Reimbursement of labor, mileage, meals and lodging costs for contractors attending trainings is not allowable.

Whenever possible, the term of a retention agreement shall coincide with the one-year contract (between the Agency and the Contractor) or one-year renewal period. Otherwise, the retention agreement shall be for the duration of the contract from the time the training is provided, not to exceed one year. Training, but not certification as a Lead or Asbestos Company or maintenance of any certifications, may be provided to contractors meeting retention requirements. Note that the retention agreement requirement does not apply to Grantee or State contractor orientation sessions or when grantees provide instruction to contractors on improving technique as needed.

Grantees shall consider whether the term of the retention agreement aligns with the cost of training provided. Contact the Division for additional guidance regarding this, if needed. The required Wisconsin WAP Retention Agreement Template can be found on the HE+ Procurement Information page under the Resources heading.

5.8.3 Out-of-State Travel

Out-of-state travel for conferences or other training shall be approved on a case by case basis, unless a blanket approval is extended by the Division for a specific event. Submit requests to the Home Energy Plus Help Desk at heat@wisconsin.gov. Requests for out-of-state travel shall include:

- The name and position of the persons attending the event;
- The costs associated with their attendance at the event;
- An indication of how grantee participation will minimize production costs, and/or improve program management, and/or improve the quality of work; and
- The grantees' current level of unit and expenditure production (e. g., 110 percent).

5.8.4 Costs Not Allowed

The Division ***does not*** allow the use of Training and Technical Assistance funds for:

- Wages and fringe benefits (except as noted above);
- Costs related to attending meetings (except as noted above); or
- Equipment purchases over the life of a contract that total more than $5,000, without prior written approval from the Division.

5.9 Public Benefits (PB) and Energy Assistance Program (EAP) Measures

The following measures are funded ***only*** by PB and EAP. In some areas where the utility does not participate in PB, EAP may be the only available funding source.

- Water Heater Conversion – Indirect Fired Water Heater
- Freezer – Replacement
- Freezer – Remove Additional Unit
- Health and Safety Air Quality – Other Remediation

Verify your agency has PB or EAP funding available for planned expenditures toward these measures.

5.10 Average Unit Cost

The Department of Energy (DOE) sets a limit on the average amount of DOE funds that can be spent per unit. For Program Year ~~2014~~ 2015 to ~~2015~~2016, the Average Unit Cost (ACU) limit is $~~6,987~~7,105 for DOE funds. Grantees shall manage job costing so as to adhere to this limit for DOE funds spent on all units completed in a contract year. DOE fund line items included in determining the ACU are Program Support and Operations.

Chapter 6 – Procurement

6.1 Procurement Requirements

A Grantee shall comply with procurement requirements as stated in the Weatherization Manual. Such requirements include a combination of State of Wisconsin and federal requirements (Office of Management and Budget Circulars, as applicable; Code of Federal Regulations (CFR) 10 CFR 440, 10 CFR 600; Weatherization Program Notices; and all other applicable federal requirements).

Requirements apply, regardless of their inclusion in the Weatherization Manual. (Note that 600.xxx indicates a specific reference to 10 CFR 600).

6.1.1 Code of Conduct

A code, or standard of conduct that will govern the performance of its officers, employees or agents engaged in the awarding and operation of contracts, shall be maintained. No employee, officer or agent of the Grantee shall participate in selection, or in the award or administration of a contract supported by Federal or State funds if a conflict of interest, real or apparent, would be involved. Accepting gratuities, favors or anything of monetary value from contractors or potential contractors, or having a financial interest in a firm selected for award would create a real or apparent conflict of interest. See 10 CFR 600.236(b)(3) for more information (See also 1.2.2 Conflict of Interest Policy~~1.2.2 Conflict of Interest Policy~~).

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6.1.2 Competition

All procurement transactions shall be conducted in a manner to provide, to the maximum extent practical, open and free competition. Be alert to organizational conflicts of interest as well as non-competitive practices among contractors that may restrict or eliminate competition or otherwise restrain trade. In order to ensure objective contractor performance and eliminate unfair competitive advantage, contractors that develop or draft specifications, requirements, statements of work, invitations for bids, and/or requests for proposals shall be excluded from competing for such procurements (600.143).

6.1.3 Cost and Price Analysis

Some form of cost or price analysis shall be made and documented in the procurement files in connection with every procurement action (600.236). When a Grantee is considering a shift from using primarily Grantee staff to subcontracting for a service instead (or the reverse), the Grantee shall perform a cost analysis and inform the Division prior to implementing the change.

Procedures shall provide for a review of proposed procurements to avoid purchase of unnecessary or duplicative items. Consideration shall be given to consolidating or breaking out procurements to obtain a more economical purchase. Where appropriate, an analysis shall be made of lease versus purchase alternatives, and any other appropriate analysis to determine the most economical approach (600.236).

6.1.4 Annual Procurement Planning

~~Annually an agency shall identify the commodities and services to be acquired, the timing, and the method of procurement based on transaction cost.~~ An optional planning template is available on the HE+ Procurement Information page under the Resources heading to assist with annual procurement planning, including identifying commodities and services to be acquired and the timing and method of procurement based on transaction cost.

6.1.5 Contract Management and Contractor Performance Management

A system for contract administration shall be maintained to ensure contractor conformance with the terms, conditions, and specifications of the contract and to ensure adequate and timely follow up of all purchases. Grantees shall evaluate contractor performance and document, as appropriate, whether contractors have met the terms, conditions and specifications of the contract (600.147).

a) Contractors/vendors shall be provided with the **right to cure** except if the contractor/vendor:
   - Breaches or defaults an obligation under their Contract as follows:
     Fails to perform any material obligation required under the Contract such as
     - Files a petition in bankruptcy, becomes insolvent, or otherwise takes action to dissolve as a legal entity;
     - Allows any final judgment not to be satisfied or a lien not to be disputed after a legally-imposed, 30-day notice; or
     - Makes an assignment for the benefit of creditors;
   - Fails to follow the sales and use tax certification requirements of Wis. Stats. 77.66;
   - Incurs a delinquent Wisconsin tax liability;
   - Fails to submit a nondiscrimination or affirmative action plan as required;
   - Fails to follow the nondiscrimination or affirmative action requirements of Wis. Stats. 111 Subchapter II (Wisconsin's Fair Employment Law);
   - Becomes a federally debarred Contractor;
   - Is excluded from federal procurement and non-procurement contracts;
   - Fails to maintain and keep in force all required insurance, permits, and licenses as provided in the Contract;
   - Fails to maintain the confidentiality of the State's information that is considered to be Confidential Information, proprietary, or containing Personally Identifiable Information; or
   - Contractor performance threatens the health or safety of a State or Grantee employee, or Grantee's customer.

b) A Grantee shall document their contractor performance management process as part of the requirement for a documented Quality Control System (see 1.2.5 Quality Control System~~1.2.5 Quality Control System~~).

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6.2 General

A Grantee is subject to the following general requirements:

a) A Grantee shall maintain records sufficient to detail the significant history of a procurement action and retain documentation to demonstrate compliance with

procurement-related requirements. These records shall include, but are not necessarily limited to the following: a rationale for the method of procurement, selection of contract type, contractor selection or rejections, and the basis for the contract price (600.236). An optional Procurement Records Checklist is available on the HE+ Procurement Information page under the Resources heading.

b) Effort is made to utilize small businesses, minority-owned businesses, and women-owned businesses (see 6.7 Affirmative Steps~~6.7 Affirmative Steps~~).

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c) Follow open records requirements after a bid process is complete and contracts are executed with selected vendors. There may be exceptions to this availability sequence; all open records requests are determined on a case-by-case basis.

   Note: Though there is no formal protest process for *commodities* procurement, Grantees shall be responsive to inquiries or requests for information from bidders following a commodities contract award.

d) Award contracts to the lowest responsive and responsible bidder(s) after following applicable procurement requirements.

e) Award contract only to responsible contractors who possess the ability to perform successfully under the terms and conditions of a procurement action (600.236(b)(8)).

f) Note: Affirmative Action/Contract Compliance (Section 6.4) applies as specified.

6.2.1 Specifications

a) Define the specifications for goods or services to be acquired, and provide specifications for simplified and sealed bids. To meet this requirement, a Grantee shall identify the applicable Wisconsin Weatherization Field Guide requirements and Weatherization Manual standards/specifications in every procurement action. Grantees shall comply with the following requirements for specifications:

   i. Specifications presented to potential bidders shall define both the product or end result of the contract, and the time in which performance is to take place.

   ii. Specifications shall be prepared so as to preclude restrictive provisions and encourage competition.

   iii. Develop specifications so as to permit the lowest responsible bid to be the principal basis of award.

   iv. Use performance criteria that will not restrict competition or limit the number of sources bidding.

   v. Use generic specifications with no trade or brand names.

   vi. The procurement specifications shall not exceed materials and installation standards and service requirements as stated in the Weatherization Manual and Field Guide without prior written approval.

   vii. Properly identify scope of work (items to be included in the bid) and material/ equipment specifications to achieve equitable cost comparison and expected building outcomes. When the complexity of the project requires design, include the design parameters.

b) Require materials and installation standards for weatherization materials that meet the standards set forth in the Weatherization Manual, annual contract requirements, or 10 CFR Part 440, Appendix A, whichever is more restrictive. Grantees shall ensure that bidders have easy access to these standards by providing standards as part of the sealed bid package, and for simplified bidding. (Note that a bidder's products and services may exceed standards.)

6.2.2 Procurement Method and Transaction Cost

Applicable requirements shall be followed based on the planned and estimated transaction cost.

a) Planned and estimated transaction cost shall be based on a determination of whether commodities or services could reasonably be expected to be acquired from a single procurement action. When a Grantee chooses to purchase like items in separate purchases, the rationale for this decision shall be documented as part of cost and price analysis (e.g., HE+ Furnace Program Emergency Furnace and Weatherization HVAC services were purchased separately due to the unique requirements for Emergency Furnace service).

b) Serial contracting, which is the practice of issuing a series of smaller purchase orders to one or more vendors for the same commodity or service in order to avoid the sealed bid process, is prohibited.

c) Grantees shall plan procurement actions to ensure that serial purchasing does not occur. Commodities and/or services that can logically be grouped together (e.g., refrigerators and freezers; weatherization materials; equipment replacement; etc.) shall be procured following the method required for the anticipated aggregate dollar threshold. This aggregate total is for the term of the fiscal year beginning July 1.

d) When a building requires specialized equipment and/or services, including specialized expertise, not covered under a prior procurement action, a separate procurement action is required. The critical elements in this action include providing bidders with the opportunity to acquire detailed information related to bidding that allows accurate pricing for the complete scope of work. Examples include large or complex mechanicals and/or asbestos abatement in which the needs of the building are not standard. A typical specialized project could be HVAC for a larger multi-unit building or complex of like buildings. Even if necessary equipment and/or services are covered under a prior procurement action, Grantees have the option to perform a separate procurement for specialized or unique situations, and are encouraged to do so if it is believed likely to result in reduced costs or to meet the needs of the situation.

6.2.3 Contract Cost and Price

Applicable requirements from 10 CFR 600 shall be followed, including:

a) The cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used (600.236).

b) Grantees shall not use time and material type contracts unless prior written approval has been obtained and only:
   (i) After a determination that no other contract is suitable (see below), and
   (ii) If the contract includes a ceiling price that the contractor exceeds at its own risk (600.236).

   The determination shall document why it is not possible to estimate the extent of work, the duration of work, or the anticipated costs.

6.3 Cost Sheet Requirements

When a procurement action includes a labor rate (time) and/or material mark-up percentage, these items shall be incorporated into the cost sheet and calculation of Grand Total Cost as identified below. To the maximum extent possible, the Grantee shall define the items to be procured as fixed price items, including time (e.g., installation of measures). There may be exceptions in which the Grand Total Cost requirement does not apply; contact the Help Desk for guidance.

The following chart is provided as an example to clarify this requirement:

Measures - cost of materials & installation	**Est. Quantity**	**Dollar Amount**	**Total item cost**
measure a	12	$1,056	$12,672
measure b	80	$2,030	$162,400
measure c	44	$456	$20,064
Category 1			$195,136
measure x	10	$55	$550
measure y	17	$343	$5,831
measure z	11	$17	$187
Category 2			$6,568
Additional labor hours	1000	$40	$40,000
	bidder provide %	value	
Misc. materials mark-up	15%	$1,000	$150
		GRAND TOTAL	$241,854

6.4 Affirmative Action/Contract Compliance

Affirmative Action/Contract Compliance (AA/CC) requirements identified in s. 16.765, Wis. Stats., and Department of Administration, Administrative Code, Chapter 50 apply to Grantee procurement actions as follows:

(a) When a purchase for *services* for which the Grantee is under contract with the Division to provide are subcontracted and the resulting contract is estimated to be over $50,000, the Grantee shall ensure that AA/CC requirements are met as described in this section. Services include, but are not limited to, auditing, inspection, etc., and installation of materials and commodities~~, including refrigerators/freezers~~.

(b) Procurement of commodities (e.g., materials, equipment, ~~appliances~~ or major mechanicals) for installation by Grantee staff to fulfill the weatherization contract is not subject to the AA/CC requirement.

(c) Procurement of refrigerators/freezers, including installation/removal by the vendor, is considered to be a commodity and is not subject to the AA/CC requirement.

~~(c)~~(d) AA/CC provisions shall be included as part of the Official Sealed RFB and RFP processes. Note that AA/CC does not apply as a result of cumulative expenditures~~-~~ awarded through contracts for separate procurement actions.

~~(d)~~(e) The Grantee shall review and approve plans. Plans or exemptions shall be processed within fifteen (15) working days of receipt of plan or exemption request.

~~(e)~~(f) Contractors with fewer than 50 employees are exempt from having an AA/CC Plan, but must submit an exemption request.

~~(f)~~(g) Once a plan is approved, the Grantee shall provide the contractor with the required notice (Compliance Law Poster) that sets forth the provisions of the State of Wisconsin nondiscrimination clause.

~~(g)~~(h) The AA/CC requirements do not apply to a contractor's lower-tier subcontractors (these requirements are only transferred down one tier from the Grantee).

A Grantee shall document the implementation of this requirement for each purchase of Grantee subcontracting for *services* estimated to result in a contract exceeding $50,000, as defined above.

File documentation shall include, at a minimum:

1) Approved Affirmative Action Plan or Exemption Request for each services contractor.
2) Information related to approval or denial of plan or exemption request.
3) Other items as directed by the Division.

6.5 Simplified Bidding for Purchases up to $50,000

Note that the requirement to identify the applicable Wisconsin Weatherization Field Guide requirements and Weatherization Program Manual standards/specifications applies to both forms of simplified bidding (See 6.2.1 Specifications).

6.5.1 Best Judgment (Simplified Bidding) Purchases of $5,000 or Less

When the estimated cost of a transaction is $5,000 or less, a Grantee shall select the vendor judged to be best able to supply the goods or services. Consider the following when selecting a vendor:

a) Location of delivery point
b) Quality of goods/service to be supplied
c) Price
d) Conformity with specifications and standards
e) Purpose for which the goods/services are required
f) Date of delivery

6.5.2 Simplified Bidding for Purchases over $5,000 through $50,000

When the estimated cost of a transaction, or multiple like transactions, is over $5,000 through $50,000, a Grantee shall demonstrate a good faith effort to obtain bid prices from three or more qualified bidders and make a selection based on lowest price. To increase the likelihood of a pool of qualified bidders, building a solicitation list is strongly recommended (retain this documentation as part of the procurement record). These bids may be:

a) Price quotes;
b) Quotes on file (e.g., catalog, etc.);
c) Telephone or other oral quotes:
   (i) These shall include the name of the firm and individual, date, price quote, delivery information and other pertinent information.
   (ii) When an oral quote is accepted, the bidder must confirm the bid in writing.
d) Written bids.

When procuring services with a simplified bid, bidders shall be provided with a written document that includes: A Method of Award, cost sheet, and specifications, in addition to applicable terms and conditions. An optional Simplified Bid template is available on the HE+ Procurement Information page under the Simplified Bids heading.

Document all bids on a written quotation bid summary form. The form may be any format designed by the Grantee; however it shall contain information showing the basis for the selection (e.g., low cost, delivery terms, etc.). An exception to this requirement applies to vehicle purchases over $5,000 through $50,000 (see 6.5.3 below).

The contract renewal terms identified in Section 6.6.2 may be incorporated into a simplified bid process with the same conditions.

6.5.3 Modified Simplified Bidding for Vehicle Purchases (New or Used) over $5,000 through $50,000

The Division of Energy Services will allow purchase of new or used vehicles through a modified simplified bid process. Prior to beginning procurement, the grantee shall ensure equal comparison between vehicles and provide vendors with specifications that are specific enough to meet the Grantee's needs yet encourage competition. Do not include features that may preclude the ability of a vendor to bid (must have a "Hemi" engine, specific color, etc.). This process is particularly important when considering used vehicles. See 7.3.1 Vehicles Leased/Purchased From Sources Other Than the Grantee~~7.3.1 Vehicles Leased/Purchased From Sources Other Than the Grantee~~ for additional requirements on vehicle purchases.

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Note that:

1) All vehicles shall be purchased only with PB funds, funds resulting from an approved disposition, or an approved disposition applied as trade-in.

2) The Official Sealed Bid process is required when a total of more than $50,000 of vehicles will be purchased, regardless of the number of vendors or vehicle types.

Simplified bid process for vehicles with total cost not to exceed $50,000:

1) A minimum of 3 bids shall be obtained from qualified vendors.
2) Notice shall be provided to an appropriate list of potential bidders and give specific information to all bidders (e.g., location of delivery point with the dealer to pay for delivery, specifications and standards, date of delivery, and quality).
3) In choosing a vendor, the following shall be considered: quality of vehicle to be supplied, price of vehicle including delivery, conformity with specifications, purpose for which the vehicle is required, and date of delivery.

6.6 Official Sealed Bid Process for Purchases over $50,000

The Official Sealed Bid Process is the procedure used for soliciting bids from at least three bidders (when available) when the procurement is expected to cost over $50,000. See requirements for procurement of vehicles over $50,000 in Chapter 7.3. An RFP process for the financial audit is required regardless of cost.

For the procurement of services, except for financial audit, and commodities, the Grantee shall use the required templates and attachments available at: Weatherization RFBs Grantees are limited to modifying RFB templates as directed by notes within each RFB and through other direction provided by the Division. When other requirements are added to a template in sections 5, 6, and 8, such additions shall follow the last section number.

For the procurement of financial audit services, a Request for Proposal (RFP) shall be utilized and the following process applies:

a) Requests for proposals will be publicized and identify all evaluation factors and their relative importance. An optional audit firm solicitation list is available to meet the

publicizing requirement. Contact the Help Desk to request the solicitation list. Any response to publicized requests for proposals shall be honored to the maximum extent practical;

b) Proposals will be solicited from an adequate number of qualified sources;

c) There shall be a method for conducting technical evaluations of the proposals received and for selecting the awardee; and

d) Awards will be made to the responsible firm whose proposal is most advantageous to the program, with price and other factors considered (600.236).

e) Also see Vendornet PRO-C-12 for guidance on RFP procedures and requirements.

6.6.1 Bid Procedures

The following requirements apply to RFB procurement actions; documentation of compliance shall be retained:

a) Use of a solicitation list to announce the procurement action (including potential vendors/contractors). The Grantee shall ensure that lists of persons, firms, or products which are used in acquiring goods and services are current and include enough qualified sources to ensure maximum open and free competition.

b) Publishing a public Notice of Intent to request bids in a local/regional newspaper that reaches potential vendors for the service territory. Trade, civic, or social publications may provide additional means of attracting small, veteran-owned, minority, or handicapped business bidders.

c) See VendorNet PRO-C-5, IX. Public opening and reading of bids.

d) Facsimile and email bids are not allowed. A Grantee may propose a system for accepting e-mail bids, but written Division approval is required prior to implementation.

e) Grantees may award contracts to multiple vendors, based on the bid specifications, when needed to ensure adequate capacity for timely completion of contracts. The use of multiple contractors is strongly recommended and shall be clearly stated in the Method of Award.

f) Follow the Minor Omissions Policy for Weatherization Agency Procurement Actions available on the HE+ Procurement Information page under the Resources heading.

g) Other requirements applicable to the RFB process, including those identified in Section 6.6.

6.6.2 Contract Renewal

A contract resulting from a HE+ Weatherization and/or Furnace Program RFB or simplified bid process may be renewed for two (2), one (1) year periods for a total of three (3) years, if:

- Notice was given in the original bid specifications, and
- Agreement is by mutual consent.

This time period is at the discretion of the Grantee and may be modified by the Grantee to provide no renewals, or a one-year renewal.

6.6.3 Prices Fixed/Price Increases

Price increases to a contract, including renewals, are limited to fully documented cost increases to the contractor which are demonstrated to be industry wide. This applies to contracts resulting from simplified and sealed bid procurement actions. Note that a price increase applies only to materials and not to unit installation price.

6.7 Affirmative Steps

In outreach and design of the bid package, a Grantee shall follow the Affirmative Steps requirements identified in 10 CFR 600, Subpart C, 600.236(e)(2)(i) to ensure that "small and minority firms, and women's business enterprises" have the opportunity to bid. The steps shall include:

1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists.
2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential resources.
3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises.
4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses and women's business enterprises.
5) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the U.S. Department of Commerce.
6) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs 1) through 5), above.

Affirmative Steps Definitions:

1) "Small business" means a business which has had less than $1.5 million in gross annual sales in the most recent calendar or fiscal year. (Wis. Stats. 16.75(4)(c)).
2) Women's business enterprises: "Female owned business" means a business that is at least 51 percent owned and controlled and actively managed by a woman or women. (Wis. Adm. Code ILHR 830.02(14)).

3) Minority firms/businesses/enterprises: “Minority business enterprise” (MBE) is a business certified by the Department of Commerce under Wis. Stats 560.036(2). “Minority group member” means any of the following: Black American, Hispanic American, American Indian, Eskimo, Aleut, native Hawaiian, American Asian-Indian, and an American of Asian-Pacific origin. (Wis. Stats. 16.287(2)).

6.7.1 Documentation of Affirmative Steps

Documentation shall show that the Grantee followed the Affirmative Steps for each Official Sealed Bid Process. At a minimum, such documentation shall include a copy of the solicitation list developed/used for each procurement activity and a printout of the search results for certified MBE businesses from the DOA Wisconsin ~~Minority Price~~ Supplier Diversity Program, Business Search. The search shall be based on ‘products/services’ and/or 'county'.

6.7.2 Bid/Performance Bonds

The use of bid or performance bonds is not allowed unless an agency has provided written justification in advance, and receives written Division approval for such an exception prior to releasing ~~-~~the bid.

6.7.3 ~~Minority Price~~Supplier Diversity Preference

Qualified bids from certified Minority Business Enterprises (MBE) or Disabled Veteran-owned Business Enterprises (DVB) may be provided up to a five percent (5%) bid preference in accordance with Wis. Stats. 16.75(3m).

1) To apply, take the lowest bid and add 5% to it; if an MBE- or DVB~~-~~certified bidder’s price is within that amount, the MBE/DVB gets the bid. For example, low bid = $1,000; take $1,000 x 1.05 = $1,050. If the MBE/DVB firm has a bid of $1,050 or less, they get the bid. For more information ~~on this topic,~~ see VendorNet PRO-D-1 and the DOA Supplier Diversity Program.~~the Web site, Policy number PRO-D-1. http://vendornet.state.wi.us/vendornet/procman/index.asp~~

6.8 Warranty Requirements

A Grantee shall warranty workmanship and products for at least one year, in addition to the manufacturer’s standard warranties on all items. This one-year warranty shall commence on the date of the final inspection. Subcontracted work procured through a bid process requires a one-year warranty which commences on the date of satisfactory completion of work. This warranty period is separate from the one-year warranty required of grantees on **all work**, commencing on the date of final inspection.

To avoid excess costs associated with replacing failed light bulbs, light bulbs that fail within the warranty period shall be exchanged in a cost-effective manner, such as having customers bring failed bulbs into the Grantee office for exchange.

6.9 Grantee Responsibilities for Property Improvements through Contractors

A Grantee contracting under weatherization for any improvement for a property in which the address for the improvement is identified to the contractor shall inform the contractor of the following:

1) The only recourse for payment is the weatherization agency; and by agreeing to perform weatherization work the contractor agrees to the following terms, and agrees to pass along the following requirements to their suppliers and any subcontractors:
    a. The contractor agrees they will not, under any circumstances, seek payment from the owner or occupant of the premises improved.
    b. The contractor shall not file, suffer, or permit any lien or other encumbrance of record as a claim against any site of a weatherization project in recognition that the only recourse for payment is from the weatherization agency.
    c. ~~A signed lien waiver for each individual work location/property is required (when the property to receive the improvement is identified) from all parties providing any labor and materials, including the contractor. The contractor agrees to inform any party supplying labor and/or material to an identified property, prior to engaging such parties in providing weatherization services, that a lien waiver is required in order for the contractor to invoice the weatherization agency for the job.~~
    d. An optional form is available under the Resources heading on the HE+ Procurement Information page for informing subcontractors and material suppliers of the lien waiver policies related to weatherization services.
    e. Any lien notice action by a contractor, and/or any of its subcontractors and/or material suppliers, against a property owner ~~shall~~ may be considered non-performance by the terms and conditions of their contract, and such a contractor ~~shall~~ may be removed from the statewide weatherization agency bidder's list for a period of 2-5 years, as ~~shall~~ may any subcontractors and/or suppliers that take such action.
2) By engaging in a contract with the weatherization agency, the contractor agrees that if they do not pay for materials and labor completed through their weatherization contract, the weatherization agency has the option to use payments owed to the contractor to pay such subcontractors and suppliers.

6.10 Vendor Payments

Grantees shall make timely payments to vendors as follows:

1) The Agency shall normally pay properly submitted vendor invoices within thirty (30) days of receipt provided that goods and/or services have been delivered, installed (if required), and accepted as specified. A good faith dispute or an improper invoice creates an exception to prompt payment only when the vendor is notified in writing of the reason for the dispute or improper invoice.
2) After a dispute is settled, or improper invoice is resolved, the agency shall have 30 days to pay the invoice.

Chapter 7 – Equipment and Materials Management

7.1 Grantee Information Technology (IT) Requirements

Grantees are responsible for all costs of hardware, software, and internet access required for Weatherization Program delivery. A Grantee shall have all IT hardware (equipment that allows a user to create, store, or transmit data), software (computer application/program or data) and service subscriptions, including but not limited to email hosting, and desktop support, necessary to meet general requirements for program management and financial reporting. Computers, laptops, tablets, and desktop PCs, shall use a version of Microsoft (MS) Windows® operating system. Productivity software loaded on the computers shall be a version of MS Office® compatible with DES software. Transmittal of MS Office files to DES shall be in MS Word, MS Excel, MS PowerPoint, .wdz (Wx Assistant), or PDF file format. Other file formats may be transmitted at the request of the Division. All data handling will be in compliance with Appendix G – Policy for Handling Sensitive Data.

A Grantee shall have reliable access to the Internet at a sufficient connection speed to meet business requirements. Internet browsers used to access the WisWAP system shall be MS Internet Explorer.

A Grantee shall make their own hardware and software purchases. A Grantee shall track and maintain all IT hardware, software, and services that are purchased with Wisconsin Home Energy Plus program funds. A Grantee shall procure all IT hardware, software and services in accordance with all applicable federal and state guidelines and laws.

A Grantee shall make full specifications and disclosure of IT hardware, software, and services available to the Division upon request

Grantees shall appoint at least one WisWAP System Contact Administrator who is responsible for:

a. Submittal of a completed and signed WisWAP System Contact Administrator form identifying the appointed Contractor Administrator(s); and
b. Notification to the Division system administrator(s) (using the same form), of any changes to these appointments.

The WisWAP System Contact Administrator is responsible for creation of new, and maintenance of current WisWAP System user logins/permissions/user profile information within their agency, including signed security agreements for each system user within the agency.

To safeguard the integrity and security of data maintained in WisWAP, Grantees shall limit contracted energy auditors' access to the database. Such contractors are allowed only to add, edit or delete measures. The correct permissions setting for these functions is "JobMeasureModifyOwnGrantee."

7.1.1 Wisconsin Diagnostic Workbook

Weatherization crews shall electronically document building test results and site conditions on the Wisconsin Diagnostic Workbook available on the Home Energy Plus Training and Technical Assistance Website. This workbook was developed for the State of Wisconsin and shall not be shared outside of the Weatherization Program and its specific contractors. The workbook shall not be modified except as authorized by the State of Wisconsin or its contractors. Grantees shall maintain and stay current with workbook updates.

7.2 Program Leasing of Grantee Owned Property

The Division will allow the leasing of Grantee owned property (such as vehicles, agency operations space or equipment) to the Weatherization Program if:

- Property was purchased with non-federal funds; and
- Total cost does not exceed the cost of comparable property or available alternatives.

Grantees may calculate charges for the property lease using one of the following methods:

1) Allowance Method: Charge an allowance not to exceed 2 percent of acquisition cost for building and improvements, including land improvements. When the allowance method is used for buildings, the entire building shall be treated as a single asset; the building's components (e.g. plumbing system, HVAC, etc.) cannot be segregated from the building shell. A Grantee may compute equipment charges (for items that are merely attached or fastened to the building but not permanently fixed to it) charges at a rate not to exceed 6⅔ percent of the acquisition cost; or
2) Depreciation method: Establish the period of useful service for each asset, taking into consideration the type of construction, nature of equipment and other factors influencing the asset's useful life. The method of depreciation used to assign the cost of an asset to an accounting period shall reflect the pattern of consumption during its useful life. If there is no clear pattern of consumption, use the straight line method. Support charges for use, allowance or depreciation by adequate property records, including depreciation records, for each period, if the depreciation method is used.

In addition to the allowance and depreciation methods, the Grantee may calculate maintenance, taxes, insurance and interest into the lease charges.

7.3 Vehicle Lease/Purchase

Vehicle lease or purchases shall be based on a demonstrated Grantee need.

7.3.1 Vehicles Leased/Purchased From Sources Other Than the Grantee

Only Public Benefit funds may be used to purchase vehicles (or funds resulting from an approved disposition, or an approved disposition applied as a trade-in). PB, DOE, or LIHEAP funds may be used to lease vehicles. Grantees shall use a modified simplified bid process (see Chapter 6.5.3) for purchase of vehicles totaling $5,000 to $50,000. Grantees shall use a sealed bid process for purchases of vehicles totaling more than $50,000. See procurement guidelines for purchases in excess of $50,000 and obtain a minimum of three

(3) bids. The Grantee shall have possession of the purchased vehicles and the invoice for the vehicles during the term of the contract when the purchase was made.

Vehicle Leases/Purchases

Vehicle lease agreements and purchases shall provide for the following:

1) Vehicle Specifications:

- Age of vehicle (if other than new)
- Mileage (if other than new)
- Vehicle type
- Body style
- Size (½ ton, 1 ton, etc.)
- Engine size
- Description of vehicle's general condition (if other than new)
- Early lease termination clause
- Accessories/options
- Lease/purchase conditions

2) A minimum of three sealed bids from other sources for lease of similar types of vehicles for the same time period is required.

   Note: Leases with maintenance clauses may not be compared to those without them.

7.3.2 Vehicles Leased or Purchased from the Grantee

The Grantee may lease vehicles it owns to its weatherization operation. The Division allows rental costs to the extent that the costs are reasonable according to:

- Rental costs of comparable vehicles, if any;
- Market conditions in the area; and
- Type, life expectancy, condition and value of the leased vehicle.

The Division allows rental costs under sale and lease-back arrangements only up to the amount that would be allowed had the Grantee continued to own the vehicle. Rental costs under leases that create a material equity in the leased property are allowable only up to the amount allowed had the Grantee purchased the vehicle on the date the lease agreement was executed.

If the Grantee leases a vehicle to the Weatherization Program, charges to the Weatherization Program may not exceed the actual costs to the Grantee. Grantee costs may include purchase price, interest, lease administration charges, maintenance, etc.

If the vehicle was purchased with other federal funds, the Grantee may not charge lease costs of the vehicle to the Weatherization Program. It may be used by the Weatherization

Program but *not* paid for a second time with federal funds. If the vehicle was purchased with non-federal and/or non-state funds, the Grantee may lease it to the Weatherization Program.

To document the rationale for leased vehicles, keep the following information on file and available for inspection:

1) Vehicle Specifications

   - Age of vehicle
   - Mileage
   - Vehicle Type
   - Body style
   - Size (1/2 ton, etc.)
   - Engine size
   - Description of vehicle's general condition
   - Original purchase price
   - Previous use of vehicle
   - Termination conditions

2) An explanation of how the lease amount was computed, the methodology used and the amount of lease termination costs.
3) Competitive bids from other sources for lease of similar types of vehicles for the same time period.

   Note: Leases with maintenance clauses may not be compared to those without them.
4) Justification, including detail of total lease costs compared to purchase costs.

7.4 Property

Property includes non-consumable equipment, tools, and vehicles, and also consumable materials and inventory. The Division and federal granting agency hold a reversionary interest in property purchased with program funds. Title to property is also vested with the Grantee. A Grantee shall maintain asset accounts for all consumable and non-consumable property. Grantees shall have a system to control losses, damages and theft of Grantee property. (See Section 7.7 for disposal requirements)

All equipment and vehicles shall be purchased entirely with PB funds, or funds resulting from an approved disposition, or an approved disposition applied as a trade-in. Grantees shall request Division approval for all purchases with an original purchase value of $5,000 or more per unit. Note that “original purchase value” means the purchase price plus any trade-in.

7.5 Property Record Keeping

7.5.1 Vehicles, Equipment and Tools Records

The Grantee shall take a physical count of vehicles and non-consumable equipment and tools) at least annually, which shall be reconciled to the written records. The Grantee shall document shortages in writing at the point of reconciliation. The Division requires the following records be kept for vehicles and non-consumable equipment and tools with an original purchase value of $5,000 or more per unit:

- Description including model, year, serial or vehicle identification number, etc.;
- Date of purchase;
- Original purchase value, including any trade-in applied;
- Source of funds used for purchase (DOE,~~.~~ LIHEAP, PB);
- Location, use and condition of property;
- Individual to whom property is assigned;
- Records of maintenance completed; and
- Disposition date, method, and amount received.

All equipment requiring calibration shall be maintained and calibrated according to manufacturer's recommendations.

7.5.2 Inventory Asset Accounts

The Grantee shall take a physical count of materials and supplies inventory each month. A Grantee shall maintain asset accounts for all consumable materials. There shall be a costing system, a system for storage, handling and protection against damages and theft, and ~~. There shall be~~ a monthly reconciliation of the physical inventory to the perpetual records and inventory asset account. ~~There shall be a written perpetual inventory system if materials are stored or stocked.~~ The Division recommends a "first in, first out" system, so the Grantee shall rotate stock and use older materials first. ~~The Grantee shall have a system for storage, handling and protection against damages and theft~~.

A Grantee shall maintain an ~~master~~ inventory record. ~~for all storage facilities.~~ This record shall include:

1) ~~Summary information from each inventory log~~Location of inventory (if multiple storage locations);
2) Quantity of materials received and disbursed ~~during the period~~;
3) Description of materials; ~~and~~
4) Unit prices of materials;~~.~~
5) Job number;
6) Date of disbursement, return and receipt;
7) Crew person signing materials in or out;
~~4)~~8) Purchase Order number for all receipts.

~~A Grantee shall also maintain an inventory log/ledger by warehouse. This log/ledger shall include:~~

~~1) Job number;~~
~~2) Date of disbursement, return and receipt;~~
~~3) Crew person signing materials in or out;~~
~~4) Quantity of materials;~~
~~5) Description of materials; and~~
~~6) Purchase Order number for all receipts.~~

7.6 Consumable Materials Cost Allocation

Consumable materials are materials that are difficult to measure on a per-unit basis and for which the unit purchase quantity may be used in more than one home. Examples of consumables meeting this description are roofing nails, turpentine, push points, and other similar materials.

A Grantee may use a cost allocation system for consumable materials. A Grantee shall develop a consistent procedure to handle such consumable materials. When tools are assigned to a crew, a Grantee does not need to inventory consumable tools that are usable for only one or two jobs.

7.7 Disposition of Property

Disposition of property shall be in accordance with the rules of the funding source. The Division reserves the right to transfer equipment from one Grantee to another if the equipment is found to be surplus. See the following sections for details on proper disposition of property by type.

7.7.1 Inventory Disposal

Any charge to be made against the contract to cover losses incurred in liquidating inventory shall be approved in writing by the Division.

The Grantee shall contact the original vendor to request return of the items. If the items cannot be returned, the Grantee may dispose of the inventory. The Grantee shall notify all other Grantees that the inventory is available for use in the Weatherization Program. If a Grantee expresses interest, the inventory may be transferred to that Grantee for the purpose of use in the Weatherization Program.

If no Grantee expresses an interest, then the inventory may be disposed of using a system ensuring free and open competition. The Grantee shall submit a written request to sell inventory including:

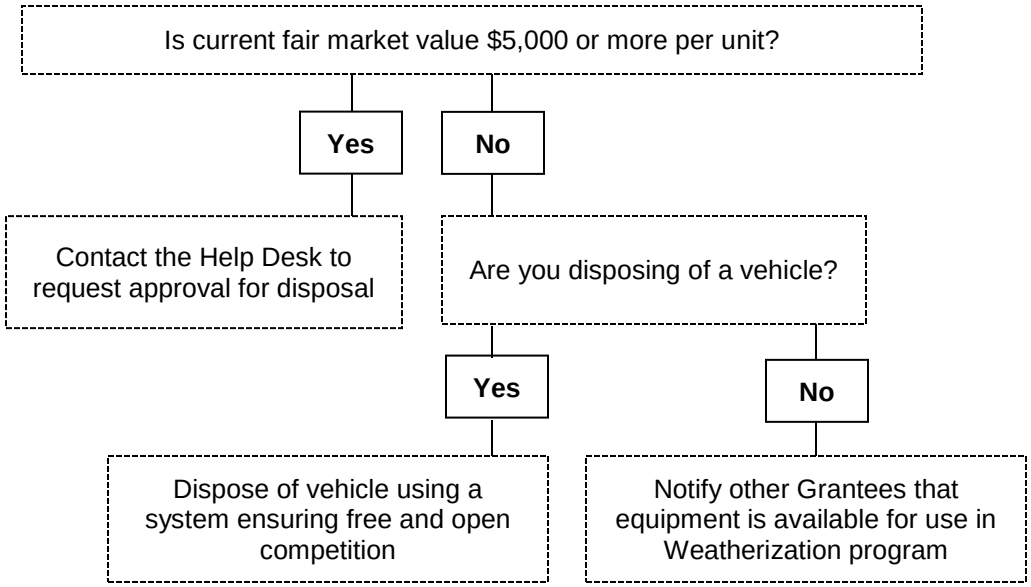
1) Description of items to be sold, including:
    a. Unit price;
    b. Quantity of items;
    c. Original vendor; and

d. Funding source used to purchase items.

2) Disposal methods to be used (e.g., auction, public notice, or sealed bids). It is essential that the method chosen allows for open and free competition and that the general public has a chance to purchase the items;
3) Cost of selling the items, not to exceed 10 percent of the value of items being liquidated; and
4) Plans for the use of any funds recovered (e.g., to be returned to the funding source, to be used to purchase other weatherization materials).

7.7.2 Vehicle, Equipment and Tool Disposal

The figure below provides guidance for determining what method to use when disposing of vehicles and non-consumable tools and equipment. Acceptable methods for determining current fair market value include but are not limited to: using an existing Grantee depreciation policy; blue book value or used retail value; obtaining a dealer or vendor quote.



For disposal of non-consumable tools and equipment with current fair market value of less than $5,000 per unit -the Grantee shall notify other Grantees that the equipment is available for use in the Weatherization Program. If the equipment is defective, it does not need to be offered to other Grantees.

If a Grantee expresses interest, the equipment may be transferred to that Grantee for the purpose of use in the Weatherization Program. If no Grantee expresses an interest, then the equipment may be disposed of using a system ensuring free and open competition. Vehicles with current fair market value of less than $5,000 may be disposed of using a system ensuring free and open competition without prior notification to other Grantees. Proceeds shall be used to purchase other weatherization materials or equipment.

The Grantee shall request permission from the Division to dispose of vehicles and non-consumable tools and equipment with current fair market value of $5,000 or more. Written disposal requests shall include the following:

1) Explanation of why the equipment can no longer be used in the Weatherization Program;
2) Description of the equipment including model, year, serial or identification number, mileage, etc.;
3) Date of purchase;
4) Contract number when purchased;
5) Purchase value, including any trade-in applied;
6) Source of funds used for purchase (DOE, LIHEAP, EXXON, ARRA, or PB) and percentages, if multiple funding sources were used;
7) Estimated current fair market value;
8) Condition and age of equipment. If equipment is defective, in unsafe operating condition, or inoperable, supply an estimate of repair costs required to return the equipment to operating condition; and
9) Copy of purchase approval letter, if applicable.

A Vehicle and Equipment Disposal template is available on the HE+ Procurement Information page under the Resources heading. Use of this template is optional.

Proceeds from such disposals shall be handled based on the requirements of the funding source. The Division will provide guidance regarding allowable usage of the proceeds.

Chapter 8 – Documentation and Record Keeping

8.1 Client Records

A Grantee shall maintain a permanent list of weatherized units. At a minimum the list shall include: Street number, street name, unique unit identifier, City, zip code, County and date of completion. A Grantee shall comply with the applicable federal and state laws, and Division regulations concerning the confidentiality of client records.

Grantees shall retain all records associated with weatherization jobs as detailed below for three years after the final Federal Financial Report (FFR) has been submitted by the state, per federal regulations (10 CFR 600.153 for non-profits and 10 CFR 600.242 for State and local governments.)

a. Grantees shall store and label or name each file according to the time period involved.
b. All records maintained in accordance with the operation of the weatherization program shall be available to the Division on request for inspection, examination, excerpting, transcription or financial audit.
c. For all client records created during a Grant Period the following record disposal schedule may be applied.

Grant Period	Disposal Date
07/01/2004 – 06/30/2009	After 9/30/2012
07/01/2009 – 06/30/2013	After 9/30/2016
07/01/2013 – 06/30/2016	After 9/30/2019

A Grantee shall consider Social Services Department staff working with WHEAP or with Income Maintenance Programs such as W-2/TANF and Food Stamps (Food Share) as employees of the Division for purposes of confidentiality. Therefore, a Grantee shall permit these staff access to necessary information concerning clients.

8.2 Client Files

The following information is required to be included in client files:

1) Verification of eligibility using a printed -or an electronic (PDF) copy of the WHEAP Referral Details screen.
2) Verification of ownership.
3) Deferral or denial notification page provided to the household, if applicable.
4) Work Agreement signed by property owner or agent prior to the installation of weatherization materials and measures.
5) Completion Certificate signed by the final inspector and property owner or agent following completion of all weatherization work.
6) Electronic files or reference(s) to the location(s) of:
   a) Weatherization Assistant or TREAT audit for the building.

b) Completed ~~Wisconsin House or Mobile Home~~ electronic Diagnostic~~s~~ Workbook., including the following tabs ~~:~~

- Summary
- Building Information
- Auditor
- Modeling
- Air Sealing
- Crew
- Garage ZPD, if attached garage present
- ~~Blower Door Data form~~
- ~~House or Mobile Home Diagnostics Pages 1 and 2~~
- ~~Attached Garage ZPD form~~

c) Furnace Useful Life Calculator, if completed.

d) Electric Fuel Switch Calculator Worksheet, if completed.

~~d)~~e) Freezer Replacement Calculator, if completed.

7) Work order, including:
   a) Total measures costs, with final job costing sheet;
   b) Documentation of any call-back corrections;
   c) Quality control record, if performed;
   d) Justification for any Recommended Measures not completed;~~; and~~
   e) Job detail report documenting any non-DOE/LIHEAP/Public Benefits weatherization work on the unit; and~~.~~
   f) Instructions for crew when asbestos containing materials will be disturbed.
8) For multi-family dwelling units, references to all weatherized units in the building.
9) Health and Safety Inspection Checklist ~~available under the Field Forms heading at http://homeenergyplus.wi.gov/category.asp?linkcatid=494&linkid=122&locid=25~~.
10) Documentation that the EPA Booklets “A Brief Guide to Mold, Moisture and Your Home,” "The Lead-Safe Certified Guide to Renovate Right," “A Citizen’s Guide to Radon,” and the DES “Customer Bill of Rights” were received by each household.
11) Documentation regarding ventilation, if applicable, including Ventilation and Your Home, Refusal of Ventilation, and Release of Liability, Indemnification and Waiver of Claims.
12) Heating System Checklist available under the Field Forms heading at: http://homeenergyplus.wi.gov/category.asp?linkcatid=494&linkid=122&locid=25
13) Documentation of the sizing calculation for replacement heating systems. Acceptable sizing calculations are REScheck™, ACCA Manual J, or an equivalent industry accepted sizing formula.
14) Results of any tests for asbestos or lead.
15) Lead Safe Weatherization Form.
16) Renovation Recordkeeping Checklist(s), if applicable.
17) For rental units: rental work agreement, documentation of unit’s monthly rent, and documentation of contribution calculation.

18) Documentation of any waivers or approvals pertaining to the job or building.
19) Photographs, or references to the location of photos, including at a minimum:
    a) The frontal view of the unit's exterior;
    b) Each appliance, window, and door before replacement;
    c) Leaky water heater before replacement;
    d) Any condition adversely affecting the installation of weatherization measures;
    e) Photo documentation of lead safe work practices. If photos are lost, damaged or otherwise not available, then other documentation showing lead safe work practices were implemented;
    f) Photo documentation of asbestos containment and safety practices. If photos are lost, damaged or otherwise not available, then other documentation showing asbestos containment and safety practices were implemented; ~~-~~and
    g) On deferred units, pictures documenting the reason(s) for deferral (e.g., mold or other problems).
20) Documentation of historical review submission and response.

~~21) Lien waivers, a requirement of the procurement procedures, which may be kept in the client file or the financial records.~~

~~22)~~21) Building Permit(s), if required by local building codes. If a permit is not issued by the local jurisdiction, then a copy of the receipt for payment is acceptable documentation.

~~23)~~22) Accrual of Benefits form for multi-unit (2 or more unit) buildings when tenants do not pay a heating fuel or electric bill, found at (along with a sample completed form): http://homeenergyplus.wi.gov/category.asp?linkcatid=494&linkid=122&locid=25

23) Quality Assurance Inspection Certificate, when applicable.

8.3 Open Records/Public Records

A Grantee is subject to State Public Records laws, (Wis. Stats - Chapter 19, subchapter II, sections 19.21 through 19.39). These laws relate to record retention by the Grantee and its contractors/vendors and to the provision of information (known as "complete public access"). Division policy is to:

1) Forward a written copy of all records requests to DOA, Division of Energy Services or directly to DOA, Office of the Secretary, Legal Office, PO Box 7864, Madison, WI 53707-7864.
2) Provide records to requestors, as required; or
3) Request that DOA coordinate the response to the records request.

8.4 Work Agreements

A work agreement shall be signed by the owner/agent of an eligible dwelling unit prior to the commencement of weatherization work. The Grantee shall use the Wisconsin

Weatherization Assistance Program Work Agreement documents available on the HE+ WisWAP Grantee Information page under the Field Forms heading.

The work agreement shall detail the type and amount of weatherization work to be done on the building and other conditions both parties shall agree to, including the right for representatives from the Grantee as well as State and Federal government, or their designee, to verify the delivery of weatherization services and the quality of those services.

The work agreement includes an owner sign-off for the completed work at the property. After all work is complete and a final inspection is conducted, a signature is required to verify the proposed work in the work agreement was completed and was acceptable.

8.5 Historic Review

Homes to be weatherized that are 50 years old or older may require measures that are subject to review by the Wisconsin Historical Society (WHS). Measures that will change the appearance of the exterior of a home 50 years old or older are subject to review. Measures that will change the appearance of historically significant elements of the interior of a home 50 years old or older are subject to review. Examples of items that require review include replacement of exterior windows or doors, removal of original/ornamental lighting fixtures, or significant structural alterations to walls or roofs.

Some Weatherization Assistance Program measures are exempt from review as long as those measures do not alter the appearance of the home or adversely affect the property. For more information, see the document titled “Historic Review - List of Exempt Activities” available on the HE+ WisWAP Grantee Information page under the Historic Review heading.

While other weatherization work may proceed, measures subject to Historic Review are not to be completed without written permission from DES. Requests shall be sent to the Energy Help Desk with an email subject line stating “Historic Review Request”. Once a measure is submitted to WHS, the Society has up to 30 days to review the planned work. When received, the DES permission should be printed and placed in the client file.

If a home 50 years old or older is to receive a measure requiring WHS review, the grantee shall send a Historic Review request to the Division which includes:

- County the home is located in;
- Complete street address;
- WisWAP Building ID Number;
- Year built (or estimate);
- A list of non-exempt items planned for replacement;
- Photos of the items planned for replacement;
- A photo of the exterior of the home from several views (front, back, and unique exterior features);
- Notes about improvements completed since the home was built (such as construction of additions, covering or replacement of original siding or replacement of original windows)and
- If the home is in a rural area, the Township, Range and Section Numbers as found on the property tax bill.

An optional Historic Review Request Template is available on the HE+ WisWAP Grantee Information page under the Historic Review heading.

WHS may require additional review and request further documentation on a case-by-case basis. Additional requests may include detailed photos, building history or material specification for proposed replacement items.

Chapter 9 – Reporting Requirements

9.1 General

The Grantee shall submit reports to the Division on a monthly and contract basis. The Grantee shall also submit special reports as requested by the Division.

An authorized agency representative shall review all reports and sign financial reports before submission. The Division reserves the right not to accept as timely, reports that are incomplete or inaccurate.

When submitting electronic financial reports, clicking the "Approve" button in WisWAP has the same implications as a signature, and shall only be performed by an authorized Grantee representative.

9.2 Monthly Financial Reports

Monthly reports shall be submitted through the WisWAP electronic system by the fifteenth (15th) day following each contract month. Completed unit information to be included on the monthly invoice can be entered any time before the invoice is created.

Electronic reports received by the 5th of the month will be reimbursed first and a second reimbursement for those received by the 15th. If the 5th or the 15th of the month fall on a weekend or holiday, the deadline is extended to the next following business day.

Monthly financial reports are subject to a four-stage approval process before reimbursement:

1) Initial Grantee approval;
2) Grantee authorized representative approval;
3) Division of Energy Services (DES) representative approval; and
4) Division of Administrative Services (DOAS) representative approval.

The expenditure reports shall present an accurate statement of allowable costs incurred for the month.

The Grantee shall submit separate Weatherization Expenditure Reports each month for each grant funding source.

9.3 Unit Reporting

All measures identified in a work order shall be invoiced in the contract year the unit is reported as complete. If a measure is completed and invoiced, the unit shall be completed in that contract year. If the unit is not completed by the end of the contract year, any invoiced measure costs will be disallowed and shall be backed out and reentered for the new contract year. Costs for the installation of allowable measures may be accrued prior to the contract year in which the completed unit will be reported, and then reimbursed when the

unit is reported as complete. To avoid disallowed costs, care shall be taken to ensure that all measures are active and allowable under the subsequent contract.

9.4 Timely WisWAP Data Entry

All WisWAP data entry shall be performed within five (5) days of the completion of the activity. The procedure shall be to:

- Update WHEAP referrals status within five days of outreach or intake activities being performed.
- Enter building and customer information within five working days of receiving a verification of interest in weatherization services from the applicant.
- Enter audit information within five working days from the completion of the audit.
- Enter actual materials and labor information as soon as possible following receipt of invoices and/or cost information.
- Enter completions within five working days of the final inspection that verifies all measures have passed the final inspection.

9.5 Final Program Review (Close-Out Report)

The Grantee shall submit the Final Program Review Close-Out Report (Close-Out Report) to the Division no later than 60 calendar days after the termination of a contract. No production charges are allowed unless approved by the Division.

The Close-Out Report contains multiple parts. The Division does not consider the Close-Out Report finalized until each of the multiple parts is submitted and complete.

The Close-Out Report consists of the following:

1. Electronic submittal using the Division Close-Out Report Excel Spreadsheet which includes:
   a. Return of Unspent Advance Funds, by funding source, if applicable;
   b. Return of Overspent Admin Amount, if applicable;
   c. Total Number of Completed Units;
   d. Job Cost Reduction Reconciliation;
   e. Tool and Equipment Purchase of items with an acquisition cost of $5,000 or more when DOE or LIHEAP funds were used for the purchase;
   f. Vehicles Purchased and Leased when DOE or LIHEAP funds were used for the purchase;
   g. Program Support Expended to Planned;
   h. Interest Income Earned from Advances, by Fund Source; and
   i. Admin Expended as a % of Total Actual Allowable Expenses.

2. Checks for the return of unspent advance funds and/or overspent administration, if applicable, are to be made payable to the Department of Administration.

The Close-Out Report shall be submitted via e-mail to: Heat@Wisconsin.gov (use 'Close-Out Report' in the subject line).

9.5.1 Final Month 13 Close-Out Invoice

A Grantee shall submit, electronically through WisWAP, a final month 13 invoice for each fund.

9.5.2 Units Completed

A Grantee shall report the total number of units completed during the contract period on the Close-Out Report. The total number of units shall reconcile to the Average Invoice Cost per Unit WisWAP report which can be found in Reports/Invoice Costs/Average Invoice Costs per Unit.

9.5.3 Job Cost Reduction (JCR) Reconciliation

A Grantee shall report the following JCR information on the Close-Out Report:

1. Enter the Total Cost Reductions amount earned in the contract year; and
2. Enter the total Amount Expended in WisWAP in the contract year.

The Total Cost Reductions amount and the total Amount Expended in WisWAP shall reconcile to the Average Cost per Measure WisWAP report found in Reports/Job Costs/Average Cost per Measure.

9.5.4 Tool and Equipment Purchased

If a Grantee used federal funds (DOE or LIHEAP) to purchase tools or equipment with an individual purchase price of $5,000 or more, the Grantee shall provide a list and include the item description, purchase price, funding source(s) and, if applicable, the percent of funding split if purchased with more than one fund source. Include a total dollar amount for the equipment expenditures listed.

9.5.5 Vehicles Purchased/Leased

If a Grantee used federal funds (DOE or LIHEAP) to purchase and/or lease a vehicle with a purchase price of $5,000 or more, the Grantee shall provide a list of vehicles purchased and/or leased and shall include the vehicle year and model, purchase price, funding source(s) and, if applicable, the percent of funding split if purchased with more than one fund source. Include a total dollar amount for all vehicle purchase(s)/lease(s) listed.

9.5.6 Interest Income Earned from Advances

A Grantee shall identify, by fund source, per contract year, the amount of interest earned from each funding source and the amount of DOE interest returned to the Division. Close-Out Reports will not be finalized until any interest owed to DOE has been returned and the Close-Out invoice reflects the amount returned. See also 4.7 Interest Income.

9.5.7 Weatherization Interest Income Allocation Report

The Interest Income Allocation Report is available on WisWAP to assist grantees with properly reporting all interest income earned on advance funds to the proper fund source (EAP, PB, and DOE). Advances are made from one or more contract funds at the beginning of the contract year and grantees are required to maintain advance amounts received in an interest bearing bank account. As individual contract funds are depleted through the course of the contract period it is necessary for advance amounts to be reallocated to contract funds with sufficient available balances. The Interest Income Allocation report provides grantees with the correct percent allocation breakdown by fund for the month they are reporting expenses. Grantees are required to use this report when reporting interest income amounts earned on the monthly invoice. The invoice will have the total amount of interest reported by date, broken out by funding source.

The Interest Income Allocation report is found in WisWAP under Reports/Invoice Costs/Interest Income Allocation. The report parameters will default to the current contract year and your Grantee ID/Name (based on user login credentials). Select the contract month for which expenses are being reported and click Create Report. The report results will display the percentage by fund to which a Grantee shall allocate and report any interest income earned on that month's invoice

9.5.8 Admin Expended

A Grantee shall calculate the amount of allowable admin that can be reimbursed based on the total funds expended through closeout, including Job Cost Reduction, multiplied by the final approved Weatherization Monthly Contract Plan Administration Rate.

9.6 Special Reports

Special reports may be requested from the Grantee by the Division regarding program operations, client services and energy savings, or other as defined by the Division. Special reports shall be submitted as indicated on the request.

Chapter 10 – Energy Audits, Diagnostic Tests and Air Sealing

10.1 General

The State of Wisconsin uses the Weatherization Assistant energy audit software for one to four unit dwellings (NEAT) and mobile homes (MHEA). For 5-24 unit multifamily buildings NEAT is used and for buildings with 25 or more units TREAT is used. Further details on the use of the energy audits, as well as installation guidelines are provided elsewhere in this Manual as follows:

- Appendix B – 1-4 Unit Building Measures, Specifications, and NEAT Modeling Requirements addresses the measures required for 1-4 unit buildings. Appendix B also covers the minimum energy audit modeling requirements.
- Appendix C – Mobile Home Measures, Specifications, and MHEA Modeling Requirements addresses the measures required to be modeled for mobile homes. Appendix C also covers the minimum energy audit modeling requirements.
- Appendix D - the Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications addresses the measures required to be modeled for all buildings that have more than 4 dwelling units. All 5-24 unit buildings will be modeled using NEAT. All 25+ unit buildings will be modeled using the TREAT audit. Appendix D also covers the general energy audit modeling requirements.

The Division has developed protocols, enabled measures and default set-up libraries by Grantee for use of Weatherization Assistant energy audit software for 1-4 unit buildings and mobile homes. Those default database values are reviewed semi-annually and adjusted at least annually. Grantees shall use the audit software and database version designated annually by the Division and posted on the Home Energy Plus website.

It is the Grantee's responsibility to establish a local supply library for water heaters and refrigerators. The supply libraries shall be customized to reflect the grantee's current replacement equipment models and costs. It is recommended that grantees also customize their supply libraries to include other sub-contracted weatherization services.

Grantees shall maintain the final electronic version of each completed energy audit. The electronic copy of the energy audit shall, at a minimum, be maintained within the database it was created in. Energy audits shall be readily available to the Division upon request.

10.1.1 Modeling Buildings Using Fuel Consumption

Collect and use actual fuel consumption data as it increases the energy audit modeling accuracy. (Fuel consumption data for most applicants served by a Class A utility will be a component of the WHEAP Referral.) Use a minimum of a full year of actual fuel consumption except as indicated:

- When customers are attempting to reduce energy expenses by any of the following:
  - Closing off rooms in an attempt to only heat part of the building.
  - Maintaining their home at a temperature below normal during the heating season.

- When fuel records cannot be obtained for the heating season of the previous year.

For 1-4 unit buildings and mobile homes use the Therm Calculator. The Therm Calculator will normalize the consumption for average heating degree days, since Weatherization Assistant will not. It will also assist energy auditors in estimating the heating fuel consumption when multiple fuels are used or one to two months are missing. The calculator is available on the T&TA site at http://homeenergyplus.weccusa.org/ under the Technical Assistance tab.

When the exceptions above are met, the energy audit's default consumption may be used. The circumstances requiring the use of the default shall be documented in the customers file. Note that the completed Home Energy Plus application provides a release for fuel vendors to supply a customer's energy use information for weatherization purposes. All vendors participating in the Wisconsin Home Energy Assistance Program have agreed to provide billing information.

Master-metered 5-24 unit buildings shall have the fuel consumption records for the preceding 12 months submitted by the building owner as a part of the certification process. Master-metered 25+ buildings shall have actual master meter consumption records for both heating and electrical for the preceding 18 to 24 months submitted by the building owner as a part of the certification process. Buildings with individual mechanical systems in each unit shall have the actual consumption records for each unit for the preceding 18 to 24 months. Tenants not certified as Home Energy Plus eligible (free riders) will need to provide fuel consumption records to the building owner or the grantee. If fuel records are unavailable, free riders will need to sign a release to allow access to their utility records.

Use the Therm Calculator worksheet in the 5-24 Unit Workbook. This calculator will project the total building fuel consumption using a median consumption projection for units without actual data, based on heating costs or partial consumption data.

10.1.2 Itemized Costs and Special Data Entry Procedures

Not all of Wisconsin's weatherization measures are modeled with the Weatherization Assistant audits to establish a Savings to Investment Ratio (SIR). In order to generate a Recommended Measures report that is reflective of all the measures and costs, additional measures shall be selected from the user defined options in the Itemized Cost tab. Some measures shall be included in the building's SIR; other measures shall *not* be included in the SIR. Check the summary lists at the end of Appendix B for 1-4 unit and Appendix C for mobile home "include in SIR" requirements.

General rules for data entry into the Weatherization Assistant audits include the following:

1) Identify all planned measures in the audit.
2) Use the Itemized Cost tab to identify those measures that are currently not modeled by the audit:
   - Programmable thermostats
   - Lighting efficiency improvements
   - Domestic water heater measures (not water heater replacement)

- Refrigerator and freezer removal incentives
- Sealing and insulating duct work
- Miscellaneous heating system work
- Heating system clean and tunes
- Exhaust ventilation

3) Model repairs first with the related energy conservation measure(s). Enter the cost in the measure tab under "Additional Cost." Make a note in the comment section that the repair is included in the measure's cost. If a measure including the repair costs has an SIR of less than 1.0, then enter the repair in the Itemized Cost tab instead and include it in the SIR.
   - Some repairs are always entered in the Itemized Cost tab, including dryer venting, window/door replacements, and standard thermostats.
   - The cumulative building SIR shall be ≥1.0 in order to complete the planned repairs. Buildings that cannot be weatherized without the repairs shall be deferred.
   - Note: Repair cost shall be separated from shell measure costs when reporting the completed measure in WisWAP.
4) Health and safety measures shall be identified in the Itemized Cost tab, except water heater replacements and asbestos work (See Appendix F.3.6 – Modeling to Determine if Asbestos Work is Cost Effective). When estimated health and safety costs total more than $1,000, all health and safety measures shall be included in the SIR.
   - Health and Safety measures which are excluded from the $1,000 and the SIR include ventilation, worst-case depressurization safety testing, and gas leak repair.
   - The cumulative building SIR shall be ≥1.0 in order to complete the planned Health and Safety measures. Buildings that cannot be weatherized without the Health and Safety measures shall be deferred.
   - If Health and Safety costs end up exceeding $1,000 due to issues that arise during the course of weatherization, there shall be documentation in the customer file of the conditions which caused the additional costs, and the reason they were not previously identified. For water heaters and heating systems, also see the Chapter 10 section, Requirement to Update Weatherization Assistant on In-Progress Jobs.
5) Heating system modifications (repair, distribution replacement or additions) shall be modeled as follows:
   - When modifications to a heating system are required for the proper *installation* of a replacement heating system, include those costs with the cost of the replacement heating system modeled in the Heating System tab. Report the repair costs separately in WisWAP.
   - When modifications to the heating system are required for the proper *operation* of the existing or replacement heating system, identify the measure and cost in the Itemized Cost tab. The cost shall be included in the SIR.
6) When the estimated cost of a measure, based on a contractor's bid or the Grantee's labor and materials, exceeds the Grantee's default cost by 20 percent, the additional cost shall be included in the Additional Cost field in the measure's tab.
   - When the estimated cost of a measure is less than the Grantee's default cost by 20 percent, adjust the cost by a negative number in the Additional Cost field in the measure's tab. Direct questions about how to make a negative cost adjustment to the Help Desk.

10.1.3 End-State Planning and Informational Modeling

The primary goal of the Weatherization Assistance Program is energy efficiency, and the inclusion of health and safety improvements to the units occupied by low-income persons served must be limited to such improvements that are "energy-related." This guiding premise is implemented through the audit process and these important activities:

- Planning for end-state conditions
- Informational modeling

1) End-state planning is required for all weatherization jobs and shall be conducted prior to proceeding with weatherization work. End-state planning, as taught through the Division training contract, involves conducting tests and analyzing the characteristics unique to each dwelling in order to:
    a. Select and implement the appropriate measures and accurately estimate costs;
    b. Determine the worst case depressurization (draft);
    c. Calculate the Depressurization Tightness Limit prior to installing any exhaust ventilation;
    d. Identify potential draft problems at the end of the job;
    e. Identify maximum building tightness and allowable exhaust ventilation;
    f. Make critical decisions regarding deferral, or prevention or resolution of predicted draft problems; and
    g. Provide information to plan and manage the job to avoid unexpected delays.

    <u>Natural draft water heaters</u>: Perform Informational Modeling when a natural draft water heater will remain at the end of the job and end-state planning indicates the potential for draft problems (e.g., spillage, lack of sufficient draft). The purpose of informational modeling is to show whether the job can support a potential water heater replacement. If the job does not have an SIR of 1.0 or greater when modeled as a Health and Safety replacement, the auditor shall determine if the job can be managed to avoid the draft problem. If a feasible plan to avoid or manage the problem cannot be developed, consider deferral.

2) Informational Modeling will inform the auditor whether the job SIR will support the cost of a mechanical system replacement. The results of Informational Modeling are used in two ways: (a) decision-making for heating system replacement at audit and (b) determining if the job can support the cost of a water heater or heating system replacement, should it occur when the job is in-progress.

    Informational Modeling is required when a mechanical system does not have a measure SIR of 1.0 or greater, to determine if the job would support the additional cost. Informational modeling is the step of modeling the replacement in the Itemized Cost tab as a Health and Safety measure.

    If the cumulative SIR for the job is less than 1.0, the auditor shall determine if the job may proceed without the mechanical system replacement and make decisions as follows:
    a. Water heater: Continue with the job <u>and</u> prevent or manage draft problems - or defer the job.
    b. Heating system: See also Appendices B and C. Perform a clean and tune only:
        - When required by policy; or

- When diagnostic tests indicate that efficiency can be improved; or
- To address questionable heating systems that cannot already be addressed under current protocols.

Where a mechanical system replacement is not an allowable weatherization program expense, alternative resources shall be pursued to cover the cost. If alternative resources cannot be found, contact the Help Desk or consider deferral.

10.1.4 Requirement to Update Weatherization Assistant on In-Progress Jobs

When a job is in-progress and a water heater or heating system needs replacement after work has begun, the audit shall be updated with the equipment replacement(s) modeled, and re-run. If the job has an SIR of 1.0 or greater, the work may proceed. If the SIR is less than 1.0, work may proceed and required documentation shall be submitted to the Help Desk by the Weatherization Program Manager within 10 working days of identifying the need for a replacement. Required documentation includes:

- WisWAP Building ID number (and Job ID, if a multi-unit)
- Auditor name
- Diagnostic Workbook (when replacement is due to insufficient draft)
- Energy audit (.wdz file)
- All photographs related to the original equipment
- Field data collection information for the appliance(s) to be replaced
- Useful Life Calculator
- An explanation of:
  1) Why the replacement is needed; and
  2) Why the need for replacement was not determined prior to starting the job.

When the audit is re-run with the replacement(s) and the job does not have an SIR of 1.0 or greater, DOE funds shall not be used for the replacement measures.

10.2 Modeling Air Sealing with NEAT

While the amount of air sealing that is completed on the building is driven by Wisconsin's Air Sealing Protocols and the Wisconsin Cost-Effective Guidelines, the estimated air sealing cfm50 reduction and cost are important to the modeling of the building. This information provides a baseline SIR for the job. Other shell measures, such as sidewall insulation, depend on this information to calculate an SIR. NEAT will recommend energy conservation measures based on the final estimated CFM50 entered. For example the savings for heating replacement are not as high in tighter homes.

In the "Air and Duct Leakage" tab, enter the pre-CFM50 blower door reading and estimated post-CFM50 reading. The Grantee's average costs per cfm50 reduction will be entered in the cost box when you 'tab' through the empty box. Multiply the estimated cfm50 reduction by this amount and enter it into the cost box. If the cost entered differs from this amount there shall be documentation in the comments box as to why a different cost was entered for this job. Variances from the average cost shall be based on an actual "Before Weatherization" blower door test. One example of conditions where the cost of air sealing may be lower than the average costs is a balloon framed building where addressing sidewall

insulation and key junctures may achieve significant reductions in air leakage at a much lower cost.

10.3 Auditing Mobile Homes with MHEA

The MHEA audit is visually similar to the NEAT audit, but there are differences in how data is entered and how the audit models measures. Special areas of concern are identified in Section 10.3.1. Mobile homes that have multiple additions and\or a basement may still be classified as a mobile home as long as the HVAC system is set up as a standard mobile home installation. When a combustion appliance zone is located in the basement, it may be more appropriate to treat the mobile home as a site built structure. The determination should be made at the energy audit. The proposed measures may assist in the decision of which software should be used. Use the following table to help guide that decision.

	What software to use?	
	MHEA	NEAT
Building Characteristics to consider when deciding which software is appropriate for the building	Heating system and water heater located on main floor	Heating system and water heater are or will be located in basement or crawlspace
		Ducts and / or plumbing in basement or crawlspace
	Unconditioned basement or crawlspace	Intentionally (or unintentionally) conditioned basement
	Multiple additions that are similar and could be accurately modeled as one	Multiple additions with different wall characteristics
	When belly insulation will be maintained as the thermal barrier	When sill box or foundation insulation is an option

10.3.1 Air and Duct Sealing in Mobile Homes

Do not model duct sealing for mobile home distribution systems. In the “Ducts/Infiltration, Air and Duct Leakage" tab, *do not* check "Evaluate duct sealing." Duct sealing is completed based on the individual performance measurement of each duct. This provides an indication of the leakiness of each duct. A protocol on how to seal ducts is found in the Field Guide.

As with site built units, the air sealing in mobile homes is driven by Wisconsin’s Air Sealing Protocols and the Wisconsin Cost-Effective Guidelines. In the "Whole House Infiltration Reduction with Blower Door" tab, enter the blower door cfm50 reading or estimate in "Pre-Infiltration Reduction." In the "Post-Infiltration Reduction" tab, enter the post cfm50 estimate. The estimated air sealing cfm50 reduction and cost are important to the modeling of the mobile home. The grantee’s average costs per cfm50 reduction will automatically show up in the cost box. Multiply the estimated cfm50 reduction by this amount. If the energy auditor

enters a different cost there shall be documentation in the comments box as to why a different cost was entered for this job.

10.4 Computerized Energy Audits in 5+ Unit Buildings

Grantees shall use an electronic energy audit to determine the weatherization measures for buildings with 5 or more units. The specific measures to be modeled, the protocols that guide those installations and the standards for those installations are outlined in Appendix D – Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications. As indicated above, the NEAT audit will be used for 5-24 unit buildings and the TREAT audit will be used for buildings with 25 or more units. Grantees shall maintain the electronic version of the completed NEAT audit or all of electronic and hard copy documents relating to the TREAT audit. All electronic or hard copy of the documents shall be readily available to the Division upon request.

A minimum inspection sample of 8 units or 25 percent, whichever is larger, is required for all buildings with 5 or more units. The inspection sample shall include units from each floor and each building exterior wall orientation (i.e. direction), and shall be representative of each type of unit in the building. All common areas shall be inspected and addressed in the energy audit.

10.4.1 NEAT Audit for 5 to 24 Unit Buildings

The Division has developed a separate NEAT database for 5-24 unit buildings. As with the single family Weatherization Assistant audits, this database includes enabled measures and default set-up libraries. The default database values are reviewed bi-annually and adjusted at least annually. Grantees shall use the audit software and database version designated annually by the Division and posted on the Home Energy Plus website. Grantees may opt to customize their own set-up libraries to reflect local costs. Customized set-libraries shall:

- Use the same default fuel costs and preferences set by the Division annually.
- Enable only measures enabled by the Division.
- Conform to the review and update schedule determined by the Division.
- Be reviewed and approved by the Division prior to use.

NEAT data entry protocols may vary slightly based on the configuration of the building. All eligible measures, including repairs and health and safety measures are included in either the set-up library or User Defined Measures (Itemized Costs). It is a Grantee responsibility to establish the local supply libraries for all sub-contracted weatherization services, including mechanical and baseload measures.

Model all repair costs with the energy conservation measure (ECM) that is being evaluated. If that is not possible, model the repair in the Itemized Cost tab and check “Include in SIR.” The repair measure and cost shall be reported separately on the appropriate WisWAP line item.

Model all health and safety costs with the ECM that is being evaluated. If that is not possible, model the health and safety measure in the Itemized Cost tab and check “Include

in SIR." Health and safety measures exempt from the SIR test include the worst case depressurization test, ventilation, and gas leak detection and repair. The health and safety measure and cost shall be reported separately on the appropriate WisWAP line item.

The building owner, as a part of their contribution, may contribute to the repair and health and safety measures that are required to complete an ECM. See Appendix D, General Policy and Specification, Item 9) for information on calculating owner contributions.

10.4.2 TREAT Audit for Buildings of 25 or More Units

NOTE: THIS SECTION IS SUSPENDED UNTIL FURTHER GUIDANCE IS ISSUED (Unless a Grantee receives approval from the Division to proceed).

The Division will supply TREAT audits for eligible buildings. Certified eligible buildings with 25 or more units will require a pre-audit assessment by the Grantee. The pre-audit information needed will include:

1) Basic building information provided in a pre-audit form (available on the Home Energy Plus website or by contacting the Help Desk).
2) Fuel records for every unit covering an 18 month to 2 year period.
3) A Health and Safety inspection (may be performed in conjunction with the on-site inspection for the TREAT audit) (see Chapter 12.1).

This information shall be submitted electronically to the Division via the Help Desk (heat@wisconsin.gov), with the subject line, "TREAT Audit Request." Following a review of that information, the Division will order a TREAT audit of the building.

The TREAT audit also has default values that are established by the Division. The Division will supply TREAT audits for eligible buildings. The TREAT audit will include the following:

1) Fuel records to "true-up" the audit to the building's actual energy use.
2) A completed audit package with all of the proposed measures.

Include the cost of necessary repair and health and safety in the improvement package. Repair measures shall be linked to specific energy conservation measure (ECM). For instance, roof replacement would not be an allowable cost unless it is linked to an ECM that is being evaluated, such as attic insulation. The entire improvement package, including the required repair and health and safety measures, shall have an SIR of ≥1.0. Measures which are exempt from the SIR test include the worst case depressurization test, ventilation, and gas leak detection and repair. The repair and health and safety measures and costs shall be reported separately on the appropriate WisWAP line item.

The building owner, as a part of their contribution, may contribute to the repair and health and safety measures that are required to complete an ECM.

The Division will review the potential measures package, and provide the Grantee with a list of allowable measures and the estimated contribution required from the building owner. See

Chapter 2 Rental Weatherization concerning the requirements regarding the building owner's contribution.

The Grantee is expected to supply estimated costs for crew measures, or actual contractor bids for all work to be completed. The Division will "true-up" the TREAT audit results when bids are received, and send the completed Package of Improvements to the Grantee with approval to proceed.

10.4.3 Multifamily Resources Online

Several items relating to multifamily weatherization are posted on the HE+ WisWAP Grantee Information page under the Multifamily Resources (5+ Unit) heading.

The following items are available there:

- 5-24 Unit Building Workbook
- NEAT Modeling Options for 5-24 Units
- Multifamily Buildings – Air Sealing Measures, Materials, Techniques, and Tools

10.5 Diagnostic Tests

The following diagnostic tests shall be performed on every building and mobile home unless the site conditions limit the effectiveness of the test:

- Blower door air leakage tests
- Depressurization tightness limit
- Ventilation calculations
- Worst case depressurization and combustion safety

For mobile homes, perform room to room pressure testing and distribution register testing. Document the cause of all variances from this requirement.

For 5+ unit buildings, perform blower door tests if feasible. If blower testing is not feasible, follow the guidance in Appendix D - Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications in guiding air sealing and ventilation calculations. Complete the worst case depressurization and combustion safety tests as is appropriate for the building configuration.

For 1-4 unit buildings and mobile homes calculate the results of these tests using the Wisconsin Diagnostic Workbook. Weatherization crews shall use computers on-site to electronically document test results and site conditions in the electronic Diagnostic Workbook. The following worksheets shall be completed in the workbook: Blower Door Data form, House or Mobile Home Diagnostics Pages 1 and 2, and the Attached Garage ZPD form. The Diagnostic Workbook was developed for the State of Wisconsin and has proprietary formulas. The workbook's use is limited to Grantee staff and ~~sub~~contractors. The software is available through the Wisconsin Energy Conservation Corporation. Grantees shall maintain the electronic version of the completed Diagnostic Workbook. The workbook shall be readily available to the Division upon request.

10.5.1 Maximum Depressurization Guideline, Worst Case Depressurization, Worst Case Draft Testing, and the Depressurization Tightness Limit Calculation in 1-4 Unit Buildings and Mobile Homes

Maximum Depressurization Guideline: The Division uses a Maximum Depressurization Guideline (MDG) as a predictor of when a dwelling's combustion appliances may fail and spill combustion gases into the combustion appliance zone(s) (CAZ). See the Weatherization Field Guide for the guidelines. A worst case depressurization test is necessary to measure the CAZ's pressure and where it falls in the MDG. Dwellings with wood burning appliances or other appliances that cannot be tested for Worst Case Draft shall not be above the MDG, unless make-up air exists or is installed for the proper operation of the appliance.

When a dwelling has primary and secondary CAZs there will be multiple MDGs. The Building Depressurization Limit (BDL) is the most restrictive MDG in the dwelling. For instance, if a dwelling has a primary CAZ of -2 and secondary CAZ of -5, -2 is the more restrictive standard. When a dwelling has no exhaust appliances, enter a nominal 10 cfm in order to generate Depressurization Limit Test (DTL) information. That amount may be adjusted based on end-state planning for a dwelling. The worst-case depressurization test, when documented in the Diagnostic Workbook, also provides guidance in the form of warnings when a forced air distribution system needs to be sealed or modified.

Worst Case Depressurization Test: This depressurization test procedure consists of a series of steps to measure the worst possible depressurization in a Combustion Appliance Zone (CAZ). Each step is documented in the electronic workbook and the workbook calculates the Worst Case Depressurization. An individual Worst Case Depressurization test shall be completed for each separate CAZ in a dwelling that contains a combustion appliance. If a dwelling does not have a combustion appliance in the home, a Worst Case Depressurization test is not required. Worst Case Depressurization testing must be completed before and after weatherization is complete.

WisWAP Reporting: The Worst Case Depressurization w/o Draft measure is performed when a draft test is not completed and only a worst case depressurization test is completed.

Worst Case Draft Test (WCD): A WCD test consists of 3 steps.

1. Complete worst case depressurization testing.
2. Configure CAZ for Worst Case Depressurization
3. Complete combustion safety testing under worst case depressurization configuration.

Complete the following tests for each appliance as follows: spillage, draft and CO (carbon monoxide testing. WCD testing on all natural draft and fan assisted Category 1 gas appliances and oil fired appliances.

These test results are entered into the Diagnostic Workbook. Based upon the entries, the workbook will indicate if the appliance meets weatherization program specifications or if the testing indicates additional action steps are needed. All natural drafting and fan assisted appliances remaining at the close of the weatherization work are to be verified as operating safely and drafting at or above the minimum acceptable draft pressures. For natural draft

or fan assisted appliances that cannot be tested, such as wood burning appliances or fireplaces, follow the Depressurization Tightness Limit protocols listed below.

WisWAP Reporting:
The Worst Case Draft measure is performed when a draft test is completed. Include the time completing worst case depressurization testing and the combustion safety testing.

Depressurization Tightness Limit (DTL): This calculation provides the recommended minimum building tightness (CFM_{50}) and that may impact the safety of combustion appliances. The electronic workbook calculates the DTL for completed weatherization units. Dwellings with wood burning appliances or other appliances that cannot be tested for Worst Case Draft shall not be below the final DTL maximum CFM_{50} building limit, unless make-up air is existing or is installed for the proper operation of the appliance.

10.5.1.1 Water Heater Drafts when the CAZ is Overly Depressurized
There are circumstances when a water heater's combustion appliance zone is depressurized more than the MDG yet the naturally drafting water heater maintains an acceptable draft when tested under worst case depressurization. In this circumstance the drafting water heater may be left in place under the following conditions:

1) The Diagnostic Workbook has been completed for both pre and post weatherization conditions. All appropriate blanks have been completed on the Blower Door Tests Sealing Summary form and House or Mobile Home Safety form, pages 1 and 2.
2) All warning notices electronically generated by the worst case depressurization test results impacted by the HVAC distribution system have been properly addressed.
3) Under worst case depressurization conditions, the existing water heater:
   a. Establishes an acceptable draft at steady state operation.
   b. Does not spill combustion gases after 1 minute of operation.
   c. Shows no evidence of flame roll-out when fired.
4) The water heater venting system is properly sized for the appliance.
5) The carbon monoxide measured in the flue is less than or equal to 100 parts per million (as measured) or 200 ppm (air-free).
6) A carbon monoxide alarm shall be installed in the CAZ as close to the water heater as the manufacturer's specification will allow.

10.5.1.2 Building is Below Depressurization Tightness Limit
This applies to dwellings with wood burning appliances or other appliances that cannot be tested for Worst Case Draft. When a dwelling's final CFM_{50} is below the DTL CFM_{50} a multi-point series of blower door readings shall be completed. The multi-point test will provide a more accurate flow exponent for the dwelling. For the majority of dwellings the default exponent of 0.65 provides an acceptable model for calculating building depressurization limits. On very tight buildings a change in the flow exponent will impact on the amount of ventilation needed and the depressurization limit for the building. Flow exponents usually vary between 0.5-0.9. Generally multi-point test numbers with exponents that are greater than 0.65 indicate the remaining air leaks are smaller and more diffuse, generating a higher DTL CFM_{50}; the test results with an exponent around 0.5 indicate larger leaks, generating a lower DTL CFM_{50}. The Diagnostic Workbook provides a worksheet to document the multi-point test and calculate the flow exponent.

When the Diagnostic Workbook generates a warning notice to add make-up air to a dwelling, grantees shall enter the actual cfm flow rates of the exhaust appliances. This is necessary as the estimates for the amount of make-up air to add are based on the cfm flow rates documented in the workbook.

Diagnostic and combustion safety testing is also referenced in Appendix B – 1-4 Unit Building Measures, Specifications, and NEAT Modeling Requirements. The Weatherization Field Guide also covers combustion safety testing and includes the Building Depressurization Guidelines for combustions appliances.

10.5.2 Combustion Safety Testing and Depressurization in 5+ Unit Buildings

Test the building's Combustion Appliance Zones (CAZ) for depressurization under worst case conditions. A Worst Case Draft (WCD) test shall be completed in every CAZ that has naturally vented combustion appliances. Each atmospherically vented appliance shall have an adequate draft and no spillage under Worst Case Draft (WCD) conditions. Use the Diagnostic Workbook, to document the worst case depressurization with draft test.

In buildings with a central dedicated mechanical room, air seal and fire-stop to isolate the mechanical room (combustion appliance zone or CAZ) from the rest of the building. Provide properly sized combustion air as needed. Seal forced air distribution leaks in the CAZ.

In buildings with individual mechanical systems in each unit or common areas, identify the CAZ in each unit or area. Ensure that there is properly sized combustion air for each appliance. Test naturally drafting combustion appliances to ensure there is adequate draft under worst case depressurization conditions.

In buildings that incorporate a garage, determine the control methodology for managing combustion by-products. Ensure that the exhaust ventilation is properly operating and properly sized. Install a carbon monoxide monitoring system that activates the garage ventilation equipment. Where feasible, use diagnostic equipment to ensure that there are no air pathways between the garage and occupied areas.

Diagnostic and combustion safety testing is also referenced in Appendix D - the Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications.

10.5.3 Mechanical Ventilation in 1-4 Unit Buildings and Mobile Homes

Install properly sized mechanical ventilation when needed to ensure indoor air quality. Ventilation calculations are based on ASHRAE 62.2-13. See Appendices B and C for details.

Customers may refuse the installation of the ventilation in their home. Any customer refusing the installation of ventilation shall sign the "Refusal of Ventilation; Release of Liability, Indemnification and Waiver of Claims" form available on the Home Energy Plus Web site. Refusal of ventilation does not constitute refusal of a major measure. A copy of the waiver shall be given to the customer and the original copy retained in the client file.

10.5.4 Mechanical Ventilation in 5+ Unit Buildings

Install properly sized mechanical ventilation when needed to ensure indoor air quality. Unless superseded by local codes, use 62.2-10 to calculate the requirements for continuous ventilation beyond the local exhaust ventilation requirements. See Appendix D for details.

ASHRAE 62.2 "Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings" covers low-rise residential structures up to 3 stories. When ASHRAE 62.2 is not applicable, follow the ventilation standards of the local authority having jurisdiction. The default code for all locations is WI Commercial Building Code SPS 364, "Heating, Ventilating and Air Conditioning," Table 364.0403, under the classification "Private dwellings, single and multiple living areas." Installations shall adhere to any commissioning requirements, codes, and regulations by the authority having jurisdiction.

10.5.5 Air Sealing-1-4 Unit Buildings and Mobile Homes

Air sealing work shall be guided by a blower door. Exceptions to that requirement may include very large buildings. Major air sealing involves finding and sealing large openings that exchange outdoor air with the conditioned space. These large openings may large visible holes in the structure, key junctures where building components come together or bypasses, which are conduits for air travel within the building cavities. Major air sealing is generally completed prior to other shell measure activities.

All air sealing in 1-4 unit buildings and mobile homes shall be documented on the Diagnostic Workbook, Blower Door Data form. For 1-4 unit and buildings and mobile homes air sealing work is categorized in three ways - non-guideline sealing, guideline sealing and minor infiltration sealing:

1) *Non-guideline sealing* is major air-sealing work that is needed prior to other shell-measure activities. Examples of non-guideline sealing include installing window glass (where glass is missing), sealing large holes in the building envelope, sealing key junctures and bypasses. Non-guideline air sealing can be completed whether or not blower door testing is performed.

   Major air-sealing activities are generally completed prior to other shell measure activities. Sealing these major leaks should result in a significant drop in the blower door reading and/or changes in pressure diagnostics readings. Bypasses are conduits for air travel within building cavities.

   Major air leaks and bypasses will often be found between the conditioned space and intermediate zones such as floor cavities, attics, crawl-spaces, attached garages, and porch roofs. Spend as much time as needed to seal major air leaks, bypasses and key junctures.

2) *Guideline sealing* is sealing work completed, using the Wisconsin Cost-Effective Sealing Guidelines including minor sealing work, such as weather-stripping doors, installing sash locks and caulking cracks.

3) *Minor infiltration* is air sealing work that targets drafts, directed primarily at improving comfort for the dwelling's occupant(s) and is limited to one hour when blower door testing is not completed. The reason for not testing, as well as the work hours for comfort sealing, shall be documented

Blower door tests on 1-4 unit buildings and mobile homes are categorized into four types of tests:

1) *As Is Blower Door Test* is the test completed prior to any work being done to the building. This test documents the overall leakiness of the building before weatherization work starts and the existing conditions. The sealing work completed on a building based on the As Is Test is the *Non-Guideline Sealing***.** It is completed on the building prior to installing any other shell measures. It includes installing window glass where missing, sealing gross holes in the building envelope, sealing construction key junctures, the sill box area, and all major attic bypasses.

   As a "rule of thumb" for sealing "all major attic bypasses", conditioned air leaking into attics should be no greater than 10 percent of the total CFM50 of the final blower door test. Example: a home with a final test of 2200 CFM50 should have no more than 220 CFM leakage between house and the attics, holes roughly equaling 22 square inches. Document any unusual circumstances on the Blower Door Test form.

2) *Pre-Blower Door Test* is the test completed after installing shell measures. It is the pre-guideline test, performed just prior to running the *Wisconsin Cost-Effective Guidelines (WCEG)*. Sealing work completed on a building based on the pre-test is called *Guideline Sealing*. The Diagnostic Workbook estimates the amount of leakage reduction needed to be cost-effective during a certain amount of time. It is based on what it costs to heat the house and what it costs to do sealing work. *Guideline Sealing* includes the sealing of holes between the building and the outside. Installers should periodically check to make sure their sealing is cost-effective. If the sealing is cost-effective the WCEG program will indicate: "Continue sealing". If the WCEG Program indicates that sealing is not cost-effective the WCEG program will indicate "STOP sealing work", and if the installers agree, sealing work should stop and the Guideline Sealing work is completed.

3) *Zone Pressure Diagnostics* is a testing process which will be used whenever it is appropriate. This test involves measuring the pressure changes in areas of a structure, usually outside of the pressure barrier, during a blower door test. It is useful in determining how the area is linked to the building. It is required when a building has an attached garage. There is no separate WisWAP reporting line for this testing process. It is usually completed as a part of *Non-guideline Sealing*, but may also be used in *Guideline Sealing* work. This testing process may also be appropriate to use as follows:

   - To determine if bypasses (total path) are at less than 10 percent of the blower reading,
   - building has Health and Safety problems related to a poor pressure envelope/air barrier,
   - A structural moisture problem exists related to heat escaping into unheated zones,

- High fuel consumption in the home is not obviously linked to lack of insulation or the heating plant,
- The building has a high pre-CFM50 blower door test,

Multiple zones are present and determining linkage between zones or identifying sealing priorities is necessary.

4) *Final Blower Door Test* is the test completed at the end of all work on the structure.

10.5.6 Air Sealing 5+ Unit Buildings

Air sealing work shall be guided by a blower door when possible. Exceptions to that requirement may be based on a building's size and configuration or other issues. Major air sealing involves finding and sealing large openings that exchange outdoor air with the conditioned space. These openings may be large visible holes in the structure, key junctures where building components come together or bypasses, which are conduits for air travel within the building cavities, such as common walls between units or trash disposal chutes. Major air sealing is generally completed prior to other shell measure activities.

Seal all probable heat bypasses, and key junctures. Repair or replace glass as needed. Whenever feasible, based on site-specific conditions, use diagnostic tools such as depressurization, infrared scanners, and smoke pencils to determine the appropriate sealing locations in the building, specific units, and common areas. Provide sealing work that will improve the tenant comfort zone. Air sealing procedures may differ between low-rise and high-rise buildings, as the stack effect increases. Combustion safety procedures may differ between central versus individual combustion appliance zones (CAZ).

For energy audit purposes, estimate the air leakage in the building by taking the square footage of the building surface above grade by a leakiness factor. Use the chart in Appendix D - the Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications as a guide for estimating air leakage per cubic feet per minute (CFM) per 50 Pascals.

Diagnostic and combustion safety testing are also referenced in Appendix D - the Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications.

10.6 Required Equipment

The Division requires that a Grantee and/or their contractors use professional weatherization, and diagnostic equipment. Direct access to computers is required to model jobs with electronic energy audits and to document diagnostic field tests. The following list of required Air Sealing and Combustion Analysis equipment represents the required minimum of equipment. Other equipment may be necessary to deliver weatherization services effectively and efficiently.

10.6.1 Minimum Required Equipment for Instrumented Air Sealing

1) Fully instrumented and calibrated blower door, Minneapolis Model 3 or equivalent, capable of measuring CFM50 (Cubic feet per minute at 50 Pascals).

2) Laptop or notebook computers equipped with the Wisconsin Diagnostic Workbook software.
3) DG-3 or calibrated DG-700 handheld Digital Micro-manometer, or equivalent.
4) Smoke generating equipment.

10.6.2 Minimum Required Heating System Analysis Equipment

The following tests and equipment are required on combustible appliances. Document test results in the customer file, Heating System Installation Checklist, or the Wisconsin Diagnostic Workbook as appropriate. The testing of combustion appliances during inspections is considered a program support cost and not a measure. Ambient carbon monoxide (CO) shall be monitored during combustion and draft testing.

Combustion Appliance Test Requirements	**Required Heating System Analysis Equipment**
1) Combustible gas leaks	Gas leak detector
a. Test all gas lines and connections downstream from the regulator or meter b. Confirm leaks with soap-bubble test	Soap bubble solution
2) Combustion analysis of oil/gas heating systems	Combustion analyzer
a. Steady-state efficiency	
b. Flue gases: CO_2 or O_2, and CO	
c. Stack temperature	
3) Smoke level for oil heating systems	Smoke tester
4) Draft testing of all naturally drafting appliances	Draft gauge (IWC range +0.10 to 0 to - 0.14" WC) or micro-manometer (Pascals)
5) Distribution system temperature rise	Thermometer (with acceptable temperature range)
6) Forced air system distribution air flow	Air flow testing equipment
7) Heat exchanger leak test	Heat exchanger leakage testing equipment
8) Testing the thermostat anticipator	Ammeter
9) CO of gas cook stove (air free or as measured)	Combustion analyzer (air free) or carbon monoxide detector (as measured)
a. Cook top b. Oven	
10) Monitor ambient CO	Personal CO monitor

Chapter 11 – Weatherization Materials and Specifications

11.1 General

Installation of materials shall follow required health and safety protocols and shall be of professional quality in order to ensure the effectiveness of the measure. All heating envelope building measures shall be installed to meet a minimum expected service life of 20 years. Materials shall be installed to meet manufacturer's specifications. All work will meet applicable codes and regulations. Products shall be designed and rated for their intended use. Materials used shall meet the requirements outlined in this chapter. See also 6.8 Warranty Requirements.

11.2 Insulation Fact Sheets and Information

The Federal Trade Commission rule "Trade Regulation Rules: Labeling and Advertising of Home Insulation: (16 CFR Part 460) requires that Grantees:

1) Retain the manufacturers' fact sheets for insulation your agency installs.
2) Provide the customer with a contract or receipt for the insulation you install.
   a. The receipt shall be dated and signed by the installer.
   b. To figure out the R-value of the insulation, use the data that the manufacturer provides.
   c. If you install insulation in more than one part of the house, put the data for each part on the receipt. You can do this on one receipt, as long as you do not add up the coverage areas or R-values for different parts of the house.
   d. Do not multiply the R-value for one inch by the number of inches you installed.
   e. For loose-fill insulation, the receipt shall show the coverage area, initial installed thickness, minimum settled thickness, R-value installed, total R-value, and the number of bags used.
   f. For aluminum foil, the receipt shall show the number and thickness of the air spaces, the direction of heat flow, and the R-value.

Grantees shall provide a certificate, including the information outlined above, for each building or mobile home. Agencies shall affix the certificate (more than one, if necessary for multi-units) near an attic hatch, electrical panel, or other visible location. An Insulation Labeling Template is available on the HE+ WisWAP Grantee Information page under the Field Forms heading.

11.3 Recycled Insulation Products

A Grantee that meet the criteria listed in Section 11.3.1 below, shall comply with the Environmental Protection Agency (EPA) regulations dealing with the purchase of building insulation products, as specified in EPA regulations 40 CFR Part ~~248~~247. These regulations implement Section 6002 of the Resource Conservation and Recovery Act (RCRA), which encourages recycling of materials. The regulations cover insulation products used in commercial, industrial and residential applications. They apply to insulation products used to improve the thermal effectiveness of building envelopes, but do not apply to insulation for air handling units, insulation for acoustic purposes, or cold storage insulation. Commercially available insulation products that can contain recycled materials include cellulose, fiberglass, Perlite, composite board, plastic foams and boards and rock wool. There are

EPA recommended minimum recovered materials standards for all of these products except fiberglass.

11.3.1 Criteria for use of Recycled Products

The EPA recycling regulations apply to all direct purchases of products from vendors or suppliers or contractors of:

1) At least $10,000 worth of insulation products in the previous fiscal year, or
2) A single purchase in excess of $10,000 of a covered product in the current fiscal year.

When a Grantee meets these criteria, the Grantee shall comply with the regulations in the current and following fiscal years.

A Grantee that meets the criteria shall comply with the following:

3) Specifications for insulation products shall allow for the purchase of items containing recovered materials, and
4) Establish an affirmative procurement program to facilitate procurement of insulation products containing recovered materials.

11.4 Weatherization Standards for Materials

A Grantee shall purchase weatherization materials and use the installation procedures that meet or exceed the standards prescribed in this chapter. Weatherization materials standards include any of the following Government standards listed here. The following Government standards are produced by the Consumer Product Safety Commission, and are published in title 16, Code of Federal Regulations.

Thermal Insulating Materials for Building Elements Including Walls, Floors, Ceilings, Attics, and Roofs Insulation: Organic Fiber.	Safety Standard in 16 CFR part 1209;1404
Fire Safety Requirements for Thermal Insulating Materials According to Insulation Use – Attic Floor – insulation materials intended for exposed use in attic floors shall be capable of meeting the same flammability requirements given for cellulose insulation.	16 CFR part 1209
Enclosed spaces – insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting smoldering combustion requirements.	16 CFR part 1209

The following standards not otherwise set forth in part 440 are incorporated by reference and made part of part 440. The following standards have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on January 3, 2002 and a notice of any change in these materials will be published in the Federal Register. [The standards incorporated by reference are available for inspection at the Office of the Federal Register Information Center, 800 North Capitol Street, Suite 700, Washington, DC 20001]

The standards incorporated by reference in part 440 can be obtained from the following sources:

- Air Conditioning and Refrigeration Institute, 4301 N. Fairfax Drive, Suite 425, Arlington VA 22203: 1-703-534-8800 http://www.ahrinet.org
- American Architectural Manufacturers Association, 1827 Walden Office Square, Suite 104, Schaumburg, Illinois 60173-4268; 1-847-303 5664 http://www.aamanet.org
- American Gas Association, 400 N. Capitol Street, NW, Washington DC 20001; 1-202-824-7000 http://www.aga.org
- Americana National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036; 1-212-642-4900 http://ansi.org
- American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990; 1-212-591-7722 www.asme.org
- American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; 1-610-832-9585 www.astm.org
- Association of Home Appliance Manufacturers, 1111 19th Street, Suite 402, NW Washington, DC 30036; 1-202-872-5955 http://www.aham.org
- Federal Specifications, General Services Administration, Federal Supply Service, Office of the CIO and Marketing Division, Room 800, 1941 Jefferson Davis Hwy., Arlington VA 22202; 1-703-305-6288 http://www.gsa.gov/
- Gas Appliance Manufacturers Association, 2107 Wilson Boulevard, Suite 600, Arlington, VA 22201; 1-703-525-7060
- National Association of Manufacturers,1331 Pennsylvania Avenue, NW Washington, DC 20004-1790; 1-202-637-3000 http://www.nam.org
- National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; 1-617-770-3000 http://www.nfpa.org
- Sheet Metal and Air Conditioning Contractors Association, 4201 Lafayette Center Drive, Chantilly, Virginia 20151-1209; 1-703-803-2980 http://www.smacna.org
- Solar Rating and Certification Corporation, c/o FSEC, 1679 Clearlake Road, Cocoa FL 32922-5703; 1-321-638-1537 http://solar-rating.org
- Steel Door Institute, 30200 Detroit Road, Cleveland, OH 44145-1967; 1-440-899-0010 www.steeldoor.org
- Steel Window Institute, 1300 Sumner Avenue, Cleveland, OH 44115-2851; 1-216-241-7333 http://www.steelwindows.com
- Tubular Exchanger Manufacturers Association, 25 North Broadway, Tarrytown, NY 10591; 1-914-322-0040 http://www.tema.org
- Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096; 1-847-272-8800 http://www.ul.com
- Window & Door Manufacturers Association, 1400 East Touhy Avenue, Suite 470, Des Plains, IL 60018; 1-800-223-2301 http://www.wdma.com

More information regarding the standards in this reference can be obtained for the following sources:

- Environmental Protection Agency, 401 M Street, NW Washington, DC 20006; 1-202-554-1080 http://www.epa.gov
- National Institute of Standards and Technology, U.S. Department of Commerce, Gaithersburg, MD 20899; 1-301-975-2000 http://www.nist.gov
- Weatherization Assistance Program, Office of Building Technology Assistance, Energy Efficiency and Renewable Energy, 1000 Independence Avenue, SW, EE-42, Washington DC 20585-0121 http://www.waptac.org

11.4.1 Thermal Insulating Materials for Walls, Floors, Ceilings, Attics and Roofs

Insulation – mineral fiber: Blanket insulation Roof insulation board Loose-fill insulation	 ASTM[1] C665-98 ASTM C726-00a ASTM C764-99
Insulation – mineral cellular: Vermiculite loose-fill insulation Perlite loose-fill insulation Cellular glass insulation block Perlite insulation board	 ASTM C516-80 (1996) e1 ASTM C549-81 (1995) e1 ASTM C552-00 ASTM C728-97
Insulation – organic fiber: Cellulose fiber insulating board Cellulose loose-fill insulation Cellulose wet-spray insulation	 ASTM C208-95 ASTM C739-00 ASTM C1149-97
Insulation – organic cellular: Preformed block-type polystyrene insulation Rigid preformed polyurethane insulation board Polyurethane or polyisocyanurate insulation board faced with aluminum foil on both sides Polyurethane or polyisocyanurate insulation board faced with felt on both sides	 ASTM C578-95 ASTM C591-00 FS[2] HH-I-1972/1 (1981) FS HH-I-1972/2 (1981) and Amendment 1,10/03/85
Insulation – composite boards: Mineral insulation board Perlite board Gypsum board and polyurethane or polyisocyanurate composite board Materials used as a patch to reduce infiltration through the building envelope	 ASTM C726-00a ASTM C728-97 FS HH-I-1972/4 (1981) Commercially available

[1] ASTM indicates American Society for Testing and Materials [2] FS indicates Federal Specifications

11.4.2 Thermal Insulating Materials for Pipes, Ducts, and Equipment such as Boilers and Furnaces (Standards for Conformance)

Insulation – Mineral fiber: Pre-formed pipe insulation Blanket and felt insulation (industrial type) Blanket insulation and blanket type pipe insulation (metal-mesh covered, industrial type)	 ASTM[1]C547-00 ASTM C553-00 ASTM C592-00
Block and Board Insulation Spray applied mineral fiber thermal and sound absorbing insulation High-temperature fiber blanket insulation Duct work insulation	ASTM C612-00 ASTM C1014-99ae1 ASTM C892-00 ASTM C1290-00

Insulation – Mineral cellular: Calcium silicate block and pipe insulation Cellular glass insulation Expanded Perlite block and pipe insulation	 ASTM C553-95 ASTM C552-00 ASTM 610-99
Insulation – organic cellular: Preformed flexible electrometric cellular insulation in sheet and tubular form Unfaced preformed rigid cellular polyurethane insulation	 ASTM C534-99 ASTM C591-00
Insulation Skirting	Commercially available

[1] ASTM indicates American Society for Testing and Materials

11.4.3 Fire Safety Requirements for Insulating Materials According to Insulation Use

Attic floor:	Insulation materials intended for exposed use in attic floors shall be capable of meeting the same smoldering combustion requirements given for cellulose insulation in ASTM[1] C739-00
Enclosed space:	Insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting the same smoldering combustion requirements given for cellulose insulation in ASTM C739-00
Exposed interior walls and ceilings:	Insulation materials, including those with combustible facings, which remain exposed and serve as wall or ceiling interior finish, shall have a flame spread classification not to exceed 150 (per ASTM E84-00a)
Exterior envelope walls and roofs:	Exterior envelope walls and roofs containing thermal insulation shall meet applicable local government building code requirements for the complete wall or roof assembly
Pipes, ducts, and equipment:	Insulation materials intended for use on pipes, ducts, and equipment shall be capable of meeting a flame spread classification not to exceed 150 (per ASTM E84-00a)

[1] ASTM indicates American Society for Testing and Materials

11.4.4. Storm Windows and Window Replacements (Standards for Conformance)

Storm windows: All storm windows Aluminum frame storm windows Frameless plastic glazing storm Movable insulation systems for windows	 AAMA/NWWDA [1] 101/I.S.2-97 AAMA [2] 1002.10-93 ASTM[3] D4726-00 Required minimum thickness for windows is 6 mil (0.006“)[4] Commercially available
Replacement windows: All windows Steel frame windows Rigid vinyl frame windows	Replacement windows shall meet ENERGY STAR® standards[4] AAMA/NWWDA 101/I.S 2-97 Steel Window Institute recommended specifications for steel windows, 1990 ASTM D4726-00

[1] AAMA/NWWDA indicates American Architectural Manufacturers Association/National Wood Window and Door Association (Now the Window and Door Manufacturers Association)
[2] AAMA indicates American Architectural Manufacturers Association [3] ASTM indicates American Society for Testing and Materials [4] Wisconsin Weatherization Specifications

11.4.5 Storm Doors and Door Replacements (Standards for Conformance)

Storm (glass) doors: All storm (glass) doors Aluminum frame storm doors Sliding glass storm doors	 AAMA/NWWDA[1] 101/I.S.2-97 AAMA 1102.7-97 AAMA 1002.10-93
Rigid vinyl storm doors:	ASTM [2] D3678-97 and D4726-00
Vestibules: Materials to construct vestibules	 Commercially available
Replacement doors: All replacement doors Steel doors Wood doors Flush doors Stile and rail door	Replacement doors shall have a minimum value of R-5. For mobile homes a commercial mobile home replacement door is acceptable.[3] AAMA/NWWDA[5] 101/I.S 2-97 ANSI[4] A250.8-98 ANSI.NWWDA[5] I.S, 1-97 (Amendment, exterior door provisions) ANSI/NWWDA[5] I.S. 6-97

[1] AAMA/NWWDA indicates American Architectural Manufacturers Association/National Wood Window and Door Association (now the Window and Door Manufacturers Association
[2] ASTM indicates American Society for Testing and Materials
[3] Wisconsin Weatherization Specifications
[4] ANSI indicates American National Standards Institute
[5] ANSI/NWWDA indicates American National Standards Institute/National Wood Window and Door Association (now the Window and Door Manufacturers Association)

11.4.6 Caulks and Sealants (Standards for Conformance)

Caulks and Sealants: Glazing compounds for metal sash Oil and resin based caulks Acrylic (solvent types) sealants Butyl rubber sealants Chlorosulfonated polyethylene sealants Latex sealing compounds Elastometric joint sealants (normally considered to include polysulfide, polyurethane, and silicone) Preformed gaskets and sealing materials Duct sealing mastic	 ASTM[1] C669-00 ASTM C570-00 ASTM C920-98e1 FS[2] Commercial Item Description A-A-272 (6/7/95) ASTM C920-98e1 ASTM C834-00e1 ASTM C920-98e1 ASTM C509-00 UL[3] 181A-M Second Edition, 1994 and UL 181B-M First Edition, 1995

[1] ASTM indicates American Society for Testing and Materials
[2] FS Indicates Federal Specifications
[3] UL indicates Underwriters Laboratory

11.4.7 Weather Stripping (Standards for Conformance)

Weather stripping:	Commercially available
Vapor retarders:	Selected according to the provisions cited in ASTM[1] C755-97. Permeance not greater than 1 perm when determined according to the desiccant method described in ASTM E96-00. Ground moisture vapor retarders shall meet tear and puncture resistance standard ASTM[1] E1745.
Items to improve attic ventilation	Commercially available

[1] ASTM indicates American Society for Testing and Materials

11.4.8 Heat Exchangers (Standards for Conformance)

Heat exchangers, water-to-water and steam-to-water:	ASME[1] Boiler and Pressure Vessel Code, 1998, Sections II, V, VIII, IX, and X, as applicable to pressure vessels. Standards of Tubular Exchanger Manufacturers Association, Eighth Edition, 1999
Heat exchangers with gas-fired appliances[2]	ANSI/UL[3] 462, Ninth Edition, approved by ANSI February 28, 1997

[1] ASME indicates American Society for Mechanical Engineers
[2] The heat reclaimer is for installation in a section of the vent connector from appliances equipped with draft hoods or appliances equipped with powered burners or induced draft and not equipped with a draft hood
[3] ANSI/UL indicates American National Standards Institute/Underwriters Laboratories

11.4.9 Boiler/Furnace Control Systems (Standards for Conformance)

Automatic set-back thermostats:	Listed by UL[1] Conformance to NEMA [2] DC3-1989 (R1996)
Line voltage or low voltage room thermostats	Listed by UL Conformance to NEMA DC3-1989 (R1996)
Clock thermostats	Listed by UL Conformance to NEMA DC3-1989 (R1996)
Automatic gas ignition systems	ANSI[3] Z21.21-2000 AGA Certification Seal
Energy management systems	Listed by UL
Hydronic boiler controls	Listed by UL
Other burner controls	Listed by UL

[1] UL indicates Underwriters Laboratory
[2] NEMA indicates National Electrical Manufacturers Association
[3] ANSI indicates American National Standards Institute

11.4.10 Water Heater Modifications (Standards for Conformance)

Insulate tank and distribution piping	(See insulation section of this chapter)
Install heat traps on inlet and outlet piping	Applicable local plumbing code
Install/replace water heater heating elements	Listed by UL [1]
Electric, freeze-prevention tape for pipes	Listed by UL
Install stack damper, gas-fueled	ANSI[2] Z21.66-R 1996, including Exhibits A&B, and ANSI Z223. 1-1999 (same as NFPA[3] 54-1999)
Install stack damper, oil-fueled	UL 17, Third Edition, 1994, NFPA 31-2001, NFPA, 211-2000 (same as ANSI A52.1), and ANSI/NFPA 70-21999 (same as IEEE[4] National Electrical Code)
Install water flow modifiers	Commercially Available

[1] UL indicates Underwriters Laboratories
[2] ANSI indicates American National Standards Institute
[3] NFPA indicates National Fire Prevention Institute
[4] IEEE indicates Institute of Electrical and Electronics Engineers

11.4.11 Replacement Water Heaters (Standards for Conformance)

See 11.5 Additional Minimum Requirements for ENERGY STAR® and AHRI rating.

Electric (resistance) Water Heaters	10 CFR[1] 430 and UL[2] 174. ~~Non-mobile home: Minimum .94 EF[3]~~ ~~Mobile homes:~~ Minimum ~~.93~~ .95 EF rated.~~for mobile homes[3]~~
Heat Pump Water Heaters	UL 1995, Second edition, 1995. Electrical components to be listed by UL.
Gas Water Heaters	Non-mobile home: ▪ 30 gallon – minimum .63~~1~~ EF[3] (only if 40 gallon upgrade not feasible) ▪ 40 and 50 gallon ~~or larger~~ - minimum .67 EF[3] Mobile homes: All replacements shall be mobile-home rated. ▪ 30 gallon – minimum .63~~1~~ EF[3] ▪ 40 gallon – minimum .62 EF[3]~~and~~ ▪ 50 gallon – minimum ~~minimum~~ ~~.59~~ 60 EF[3]
Rated ≤75 kBtu/hr Rated ≥75 kBtu/hr	
Oil Water Heaters	10 CFR 430 and ANSI[4] Z21.10.1-1998 ANSI Z21.10.3-1998 UL 732, Fifth Edition, 1995, Revised 2/3/05

[1] CFR indicates Code of Federal Regulations
[2] UL indicates Underwriters Laboratories
[3] Wisconsin Weatherization Specifications
[4] ANSI indicates American National Standards Institute

11.4.12 Solar Water Heating Systems (Standards for Conformance)

Solar water heating systems, including forced circulation, integral collector storage, thermo-	System shall be certified per SRCC[1] OG 300, July 16, 1998

siphon, and self-pumping systems:	

[1] SRCC indicates Solar Rating and Certification Corporation

11.4.13 Waste Heat Recovery Devices (Standards for Conformance)

Desuperheater/water heaters:	ARI [1] 470-1995 and UL[2] 1995, Second Edition
Condensing heat exchangers	Commercially available components installed per manufacturers' specification. NFPA[3] 211-2000 (same as ASSI A52.1) may apply in certain instances. See also Heat Exchangers section of this appendix.
Heat pump water heating heat recovery systems	UL 1995, Second Edition, 1995. Electrical components to be listed by UL
Energy recovery equipment	Energy Systems Analysis and Management, 1997 (SMACNA[4])

[1] ARI indicates Air Conditioning and Refrigeration Institute
[2] UL indicates Underwriters Laboratories
[3] NFPA indicates National Fire Prevention Association
[4] SMACNA denotes Sheet Metal and Air Conditioning Contractors' National Association

11.4.14 Boiler Repair and Modifications/Efficiency Improvements (Standards for Conformance)

See 11.5 Additional Minimum Requirements for ENERGY STAR® and AHRI rating.

Install gas conversion burners	ANSI[1] Z21.8-1994 (for gas or oil fired systems), ANSI Z21.17-1998, and ANSI Z223.1-1999 (same as NFPA 54-1999). AGA[2] Laboratories Certification Seal
Replace oil burner	UL[3] 296, Ninth Edition, 1994 and NFPA [4] 31-2001
Install burners (oil/gas)	ANSI Z223.1-1999 for gas equipment and NFPA 31-2001 for oil equipment
Re-adjust boiler water temperature or install automatic boiler temperature reset control	ASME[5] CSD-1-1998, ANSI Z223.1-1999, and NFPA 31, 2001
Replace/modify boilers	ASME boiler and Pressure Vessel Code, 1998, Section II, IV, V, VI, VIII, IX, and X. Boilers shall be Hydronics Institute Division of GAMA equipment.
Clean heat exchanger, adjust burner air shutter(s), and check smoke number on oil-fueled equipment. Check operation of pump(s) and replacement filters.	Per manufacturer's instructions
Replace combustion chambers	Refractory linings may be required for conversions
Replace heat ex-changers, tubes	Protection from flame contact with conversion burners by refractory shield.
Install/replace thermostatic radiator valves	Commercially available. One-pipe steam systems require air vents on each radiator; see manufacturers' requirements.
Install boiler duty cycle control system	Commercially available. ANSI/NFPA 70-1999 (same as IEEE National Electrical Code) and local electrical code provisions for wiring.

[1] ANSI indicates American National Standards Institute
[2] AGA indicates American Gas Institute
[4] NFPA indicates National Fire Prevention Association
[5] ASME indicates American Society for Mechanical Engineers

[3] UL indicates Underwriters Laboratories

11.4.15 Heating and Cooling System Repairs and Tune-ups/Efficiency Improvements (Standards for Conformance)

Install duct insulation	ASTM[1] C612-00 (see insulation sections of this chapter)
Reduce input of burner; de-rate gas-fueled equipment	Local utility company and procedures if applicable for gas-fueled furnaces and ANSI[2] Z223.1-1999 (same as NFPA[3] 54-1999 including Appendix H
Repair/replace oil-fired equipment.	NFPA 31-2001
Replace combustion chamber in oil-fired furnaces or boilers	NFPA 31-2001
Clean heat exchanger and adjust burner; adjust air shutter and check CO2 and stack temperature. Clean or replace air filter on forced air furnace	ANSI Z223.1-1999 (same as NFPA 54-1999) including Appendix H
Install vent dampers for gas-fueled heating systems	Applicable sections of ANSI Z223.1-1999 (same as NFPA 54-1999) including Appendix H, I, J, and K. ANSI Z21.66-1996 and Exhibits A&B for electrically operated dampers
Install vent dampers for oil-fueled heating systems Reduce excess combustion air: A. Reduce vent connector size of gas-fueled appliances B. Adjust barometric draft regulator for oil fuels	Applicable sections of NFPA 31-2001 for installation and in conformance with UL[4] 17, Third Edition, 1994 ANSI Z223,1-1999 (same as NFPA 54-1999) part 9 and Appendices G&H NFPA 31-2001 and per furnace and boiler manufacturers' instructions
Replace constant burning pilot with electronic ignition device on gas-fueled furnaces or boilers	ANSI Z21.71-1993
Readjust fan switch on forced air gas-or oil-fueled furnaces	Applicable sections and Appendix H of ANSI Z223.1-1999 (same as NFPA 54-1999. for gas furnaces and NFPA 31-2001 for oil furnaces.
Replace burners	See install burners (oil/gas)[5]
Install/replace duct furnaces (gas) Install/replace heat pumps	ANSI Z223.1-1999 (same as NFPA 54-1999). ARI[6] 210/240-1994. UL 1995, Second Edition, 1995. (See 11.4.16 Replacement Furnaces)
Replace air diffusers, intakes, registers, and grilles	Commercially available
Install/replace warm air heating metal ducts	UL 181, Ninth Edition, 1996, including UL 181A, Second Edition, 1994 and 181B, First Edition, 1995
Filter alarm units	Commercially available

[1] ASTM indicates American Society for Testing and Materials
[2] ANSI indicates American National Standards Institute
[3] NFPA indicates National Fire Prevention Association
[4] UL indicates Underwriters Laboratories
[5] Wisconsin Weatherization Specifications
[6] ARI indicates Air Conditioning and Refrigeration Institute

11.4.16 Replacement Furnaces, Boilers and Wood Stoves (Standards for Conformance)

See 11.5 Additional Minimum Requirements for ENERGY STAR® and AHRI rating.

Chimneys, fireplaces, vents and solid fuel burning appliances	NFPA[1]211-2000 (same as ANSI[2] A52.1).
Gas-fired furnaces	ANSI Z21.47-1998 and ANSI Z223.1p1999 (same as NFPA 54-1999).
Oil-fired furnaces	UL[4] 727, Eighth Edition, 1994 and NFPA 31-2001.
Liquefied petroleum gas storage	NFPA 58-2001
Ventilation fans; Including electric attic, ceiling and whole-house fans	Shall meet ENERGY STAR® standards[3], UL 507, Ninth Edition, 1999.

[1] NFPA indicates National Fire Prevention Association
[2] ANSI indicates American National Standards Institute
[3] Wisconsin Weatherization Specifications
[4] UL indicates Underwriters Laboratories

11.4.17 Air Conditioning and Cooling Equipment (Standards for Conformance)

Air Conditioners:	
Central air conditioners	ARI [2] 210/240-1994, SEER rating of 13
Room size units	ANSI/AHAM[3] RAC 1-1992
Other cooling equipment including evaporative coolers, heat pumps, and other equipment	UL[4] 1995, Second Edition, 1995

[2] ARI indicates Air Conditioning and Refrigeration Institute
[3] ANSI/AHAM indicates American National Standards Institute/Association of Home Appliance Manufacturers
[4] UL indicates Underwriters Laboratories

11.4.18 Screens, Window Films, and Reflective Materials (Standards for Conformance)

Insect screens	Commercially available
Window films	Commercially available
Shade screens:	
Fiberglass shade screens	Commercially available
Polyester shade screens	Commercially available
Rigid awnings:	
Wood rigid awnings	Commercially available
Metal rigid awnings	Commercially available
Louver systems:	
Wood louver awnings	Commercially available
Metal louver awnings	Commercially available
Industrial-grade white paint used as a heat-reflective measure on awnings, window louvers, doors, and exterior duct work (exposed)	Commercially available

11.4.19 Refrigerators (Standards for Conformance)

Refrigerators/Freezers	Technical specifications are available on the HE+ Procurement Information page in Refrigerator/Freezer Attachment 4. For modeling requirements see Appendices B.5.3, C.3 and D.4.3. ***Refrigerators only:*** Preference may be given to ENERGY STAR® rated products. ~~Replacement refrigerators shall meet ENERGY STAR® standards.[1]~~ ~~UL[1] 250. Replaced units shall be disposed of properly per Clean Air Act 1990, Section 608, as amended by CFR[2] 82, May 14, 1993~~

~~[1] UL indicates Underwriters Laboratories~~
~~[2] CFR indicates Code of Federal Regulations~~
~~[3] Wisconsin Weatherization Specifications~~

11.4.20 Fluorescent Lamps and Fixtures (Standards for Conformance)

Compact fluorescent lamps (CFLs) Note: Grantees may use www.energystar.gov/CFLs to check for availability of ENERGY STAR® rated CFLs, and use non-rated CFL's when ENERGY STAR® is not available, documenting this in the customer file. Fluorescent lighting fixtures	Shall meet ENERGY STAR® standards[1] ANSI/UL[2] 542, Seventh Edition, February 6, 1997 and UL 1993, First Edition, 1993 UL 1598/CSA 250-2001, Fourth Edition, 1995

[1] Wisconsin Weatherization Specifications
[2] ANSI/UL indicates American National Standards Institute/Underwriters Laboratories

11.5 Additional Minimum Requirements for Replacement Mechanical Equipment

Equipment	ENERGY STAR® Required	AHRI Rating Required	Minimum AFUE, EF or Thermal Efficiency	Other specifications
Heating Systems: 1-4 Unit Building				
Gas Forced Air	No	Yes	≥ 90%	Condensing/ sealed combustion.
Oil Forced Air	No	Yes	≥ 83%	
High Efficiency Gas Boilers	No	Yes	≥ 90%	Modulating boiler with turndown ratio of 5:1.
Standard Efficiency Gas Boilers	No	Yes	≥83%	Based on energy audit modeling protocol.
Oil Boilers	No	Yes	≥ 83%	
Gas Space Heaters	No	Yes	NA	Air circulating fan required.
Oil Space Heaters	No	No	NA	Air circulating fan required.
Heating Systems: Mobile Homes (all equipment shall be rated for manufactured housing)				
Forced air gas	No	Yes	≥ 90%	Condensing, sealed combustion; shall fit footprint of existing system
Forced air oil	No	Yes	≥ 79%	Condensing, sealed combustion; shall fit footprint of existing system
Forced air electric	No	NA	NA	Repair only; conversion recommended.
Other	NA	NA	NA	Default to 1-4 unit space heaters.
Water Heaters: Mobile Homes (all equipment shall be rated for manufactured housing)				
Gas: 30 gallon	No	Yes	.~~61~~ 63 EF	
Gas: ~~≥~~40 gallon	No	Yes	.~~59~~ 62 EF	
Gas: 50 gallon	No	Yes	.60 EF	
Electric: 30 to 50 gallon	No	Yes	.~~93~~ 95 EF	
~~Electric: ≥ 40 gallon~~	~~No~~	~~Yes~~	~~.93 EF~~	-
Water Heaters: 1-4 Unit Buildings				
Gas: 30 gallon	No	No	.~~61~~ 63 EF	Natural vent allowed for Health & Safety replacements of leaking water heaters with no draft issues; commercially available.
Gas: ~~≥~~40 and 50 gallon	Yes	Yes	.67 EF	Power vented.
Electric: 30 to 50 gallon	No	Yes	.~~94~~ 95 EF	
~~Electric: ≥ 40 gallon~~	~~No~~	~~Yes~~	~~.94 EF~~	-
Water Heaters: 5+ Unit Buildings (Commercial Equipment exempt from Energy Star requirements; shall be properly commissioned)				
Gas: 30 gallon	No	No	.63~~1~~ EF	See 1-4 unit notes.
Gas: 40 and 50 gallon	Yes	Yes	.67 EF	Power vented.
Electric: 30 to 50 gallon	No	Yes	.95~~4~~ EF ~~or 98%~~	
~~40 gallon or larger gas~~	~~Yes~~	~~Yes~~	~~.67 EF or 95%~~	~~Power vented~~

~~40 gallon or larger electric~~	~~No~~	~~Yes~~	~~.94 EF or 98%~~	~~-~~
Indirect water heaters	No	No	NA	
Heat Pump Water Heater	Yes	No	≥ 2.0	
Heating Systems: 5+ Unit Buildings (Residential Systems)				
Gas Forced Air	No	Yes	≥ 90%	Condensing/ sealed combustion.
Oil Forced Air	No	Yes	≥ 83%	
Gas Boilers	No	Yes	≥ 92%	
Oil Boilers	No	Yes	≥ 83%	
Heating Systems: 5+ Unit Buildings (Commercial Systems)				
Furnace (including rooftop units)	N/A	Yes	≥ 80% EF	
Gas Boilers	N/A	Yes	≥ 94% EF	
Light Oil Boilers	N/A	Yes	≥ 85% EF	
Heavy Oil Boilers	N/A	Yes	≥ 83% EF	

Chapter 12 – Health and Safety

12.1 General Policy

A Grantee shall identify Health and Safety hazards during the energy audit, notify the property owner and occupants of these hazards, and, depending on their severity, treat the identified hazards prior to or during weatherization activities. Elimination of Health and Safety hazards, using weatherization program funds, shall be done in conjunction with the installation of energy conservation measures. Health and Safety costs are limited to $1,000 per individual dwelling unit unless a SIR≥ 1 is verified by a NEAT or MHEA audit.

12.1.1 Health and Safety Inspection

A Health and Safety Inspection is required on each audited dwelling. The Health and Safety Inspection Checklist includes two parts:

Part 1: General Conditions
This includes the general areas inspected and documents the conditions at the time of the Energy Audit. If visual evidence of mold or moisture problems exists, Part 2 of the inspection shall be completed.

Part 2: Moisture Audit
The moisture audit identifies areas where moisture and/or mold are present. See 12.3 Mold Guidelines for additional information.

Both the occupants and the building owner shall be informed of Health and Safety conditions. The Health and Safety Inspection forms shall be signed by the agency representative, the customer(s) who will receive weatherization services, and the building owner. The Health and Safety Inspection Checklist(s) shall be maintained in the client file. The Health and Safety Inspection Checklist is available on the HE+ WisWAP Grantee Information page under the Field Forms heading.

Grantees may develop a Release of Liability form for use with customers and building owners. The Division has developed an optional form which is available on the HE+ WisWAP Grantee Information page under the Field Forms heading.

If conditions noted on the inspection checklist are severe, it may be necessary to defer weatherization services. See 2.5 Deferral of Weatherization Services for more information.

12.1.2 Health and Safety: Level of Concern

Potential or actual threats to Health and Safety vary by degree. Definite Health and Safety concerns, which are not an immediate threat to the occupants, may be described as non-imminent conditions. Health and Safety concerns that are an immediate threat to the occupants may be described as an imminent condition.

Non-imminent conditions may be addressed in part or full at the discretion of the local Grantee. At a minimum, residents shall be informed of the problem and shall be provided with recommendations or information on how to address the problem. Examples of non-

imminent conditions may include minor electrical problems, maintenance problems, or a "potential" for indoor air problems.

Imminent conditions shall either be addressed by the building owner prior to the weatherization work or by the Grantee as a part of the weatherization work. Elimination of Health and Safety hazards using weatherization program funds shall be done in conjunction with the installation of energy conservation measures. Some "imminent conditions" will be hazards that may be easily tied to weatherization measures such as heating system, chimney or water heater failure, carbon monoxide leaks or other treatable indoor air quality problems.

Other imminent conditions will exceed the scope of the weatherization program. Major structural failure, lead paint contamination, major electrical overload, or faulty sewer systems are examples of conditions that exceed the scope of the weatherization program. A reasonable effort shall be made to refer the dwelling owners to other sources, such as HUD HOME, which may help address the hazards. Weatherization services shall be coordinated with other funding sources, where possible. If the Health and Safety hazards cannot be eliminated the building shall be deferred until the hazards can be eliminated.

12.1.3 Worker Safety

Worker safety is the responsibility of the Grantee. In contracting with Grantees, the Division assumes Grantee compliance with all applicable federal, state, and local safety and health regulations. The Grantee is responsible for enforcing all work rules to ensure a safe working environment~~ for the workers and contractors~~.

~~Material~~ Safety Data Sheets (~~M~~SDS) shall be available to workers in printed or digital format, and the information contained in them shall be readily accessible from a work site.

Weatherization crew members are required to take the OSHA 10 hour training. Crew leaders are required to take the OSHA 30 hour training. This requirement does not apply to ~~sub~~contractors. ~~Subcontractors~~ Contractors are responsible for their own safety plans.

The Grantee is responsible for ensuring agency personnel ~~workers and contractors~~ are properly trained and certified when certification is required (e.g., Lead Safe Renovator), including required ~~. R~~respirator training and fit testing. ~~are also required when necessary for agency personnel and contractors.~~ Grantees shall verify contractors have obtained required certifications (e.g., Lead Safe Renovator).

12.1.4 Deferred Weatherization Services

Refer to 2.5 Deferral of Weatherization Services for policy instructions.

12.1.5 Occupant Pre-Existing Health Conditions

Grantees shall determine whether there are existing occupant health issues that may be adversely affected by weatherization materials or measures. If a customer is sensitive to certain weatherization materials or conditions, the related measure may be waived without penalty to the customer. Whenever possible, the Grantee shall devise ways of installing materials to reduce exposure of the occupants so that weatherization work may be

performed safely. Possible approaches may include temporary containment areas, HEPA filtered equipment, temporary removal or relocation of individuals that may be adversely affected, or alternative installation methods or materials that meet the specifications of the Weatherization program.

An optional Release of Liability form is available for Grantee use (see Section 12.1.1). Use of this form can assist Grantees in meeting federal requirements to both 1) inform customers of potential health risks, and 2) require occupants to reveal known or suspected health concerns prior to weatherizing.

12.2 Lead Safe Weatherization

Lead-based paint is a potential health hazard that crews may encounter in housing constructed before 1978. Grantees shall conduct weatherization work in a manner that protects workers and customers from lead paint hazards. Grantees shall adhere to the regulations of all authorities having jurisdiction over lead-based paint. Appendix E of this Manual contains the Division's "Minimum Standards for Lead Safe Weatherization (LSW)" policy.

Program funds may be used to minimize the potential hazard associated with disturbing painted surfaces through the course of installing energy conservation measures. Program funds may not otherwise be used for the abatement, stabilization, or control of lead-based paint hazards that may exist in a dwelling unit. Program funds shall not be used for routine clearance testing of dwellings after work is completed. Wisconsin Department of Health Services (DHS) approved lead test kits may be used when cost-effective. Testing shall be limited to building components that will be disturbed. Note that the approved test kit must be used by a person with Certified Renovator credentials at minimum, and requires the property owner's permission.

The following basic guidelines shall be taken into consideration when determining whether or not to test for lead:

- Homes built from 1978 on may be assumed to be free of lead-based paint.
- In houses built prior to 1930, it is logical to assume the presence of lead-based paint.
- In homes built between 1930 and 1978, testing may not be warranted if the area to be disturbed is small.
- Using Lead Safe Weatherization techniques is a good way to ensure a job-site is appropriately clean after work is complete.

See the DHS website for detailed test kit information and requirements.

12.2.1 Dwelling Units Receiving HUD Funding

Local Grantees shall determine if a dwelling unit referenced in an application for weatherization services is enrolled in a HUD funded program and if the HUD funded program requires meeting the standards of rule 24 CFR Part 35 (Subpart R) issued under sections 1012 and 1013 of Title X, the Residential Lead-Based Paint Hazard Act of 1992. Enrollment in a HUD funded program for these purposes shall be defined as a dwelling unit which has had any HUD funds invested in it within the prior twelve months from the date of application for weatherization services or will have HUD funds invested before the

completion of the weatherization project. Dwelling units receiving HUD funds shall meet the standards established in HUD's Lead-Based Paint Poisoning Prevention in Certain Residential Structures rule (referenced above). Weatherization funds may *not* be used to meet the HUD standards. Energy conservation measures, which as a by-product meet some or all of the HUD standards, are permitted.

A Grantee shall make a reasonable effort to identify resources that would enable a unit that receives HUD funding to be completed under the weatherization program and meet the HUD standards.

12.3 Mold Guidelines for Weatherization

Mold is a potential hazard that crews and sub-contractors may encounter in dwellings. Improperly completed weatherization work may create or exacerbate conditions conducive to the development of mold. A Grantee shall ensure that workers, occupants, and owners are made aware of mold hazards and conditions that may allow for mold to develop.

12.3.1 Notification and Inspection

A moisture audit shall be completed on each unit where moisture is identified as a potential Health and Safety issue. Completion of the mold inspection checklist is required (see 12.1.1 above). The completed checklist shall be maintained in the client file. To every extent possible, the source of any mold found shall be identified. Occupants and owners shall be notified of the discovery of mold, the potential conditions causing the mold, and possible remedies. The EPA pamphlet, "A Brief Guide to Mold, Moisture and Your Home", shall be given to occupants and owners at the time of audit.

12.3.2 Training for Mold and Moisture

All Grantee field staff including work crews, energy auditors, and ~~sub~~contractors performing audits, shall receive Division approved training in identifying the presence of mold, the likely causes of mold outbreaks, and methods to address mold.

12.3.3 Testing

Program funds shall not be used for routine testing in every dwelling unit to determine the presence or strain of mold before work starts of after work is completed.

12.3.4 Treatment

The purpose of the weatherization program is to install energy conservation measures in eligible dwelling units. Program funds may be used to minimize and/or eliminate mold causing conditions in conjunction with the installation of energy conservation measures. Identified mold areas that comprise in total less than 10 square feet are not required to be addressed as a part of weatherization.

12.4 Asbestos Containing Materials (ACM) Guidelines for Weatherization

Grantee field staff and ~~sub~~contractors whose work may lead to contact with known or suspect asbestos containing materials (ACM), including vermiculite insulation, shall be

protected from potential asbestos exposure and minimize disturbance of the material. Weatherization operators shall provide employees with training and equipment to minimize worker and customer exposure to asbestos containing materials.

Grantees shall adhere to the regulations of all authorities having jurisdiction over ACM. The Division's complete "Asbestos Containing Materials Policy and Procedures" document is included in this Manual as Appendix F.

Grantees shall meet the following requirements related to asbestos:

a. Grantees shall have at least one person on staff who maintains Department of Health Services (DHS) certification as Asbestos Supervisor and Asbestos Inspector. This person is referred to as the Hazardous Materials Coordinator.

b. All field workers who may encounter or disturb known or suspect ACM shall be trained in asbestos Operations and Maintenance (O&M) at a minimum.

Grantees shall refer to the Division's full policy in Appendix F for additional guidance and requirements.

12.5 Use of Spray Polyurethane Foam

Spray Polyurethane Foam (SPF) is a frequently used weatherization product, and due to its chemical components and potential to cause adverse health effects, it is important for weatherization agencies and workers to understand and practice safe use of SPF.

Based on EPA and OSHA guidelines, agencies shall address the following issues related to the use of Spray Polyurethane Foam:

1) Hazard Communication – It is important that anyone who works with SPF be made aware of the health risks associated with isocyanates, a chemical component of SPF, which include the potential for causing occupational asthma. Safe storage and handling procedures shall be used according to the manufacturer's instructions and Safety Data Sheet (SDS). Customers shall be notified when SPF is being used and of safety precautions to prevent exposure.

2) Limit Access to Area – The work area shall be contained to prevent customers or others not equipped with personal protective equipment from entering the area during or directly after product application, per the Safety Data Sheet. Warning signs shall be posted at entrances to the work area when occupants are present. The signs shall be readable and shall be in the occupants' primary language, when practical.

3) Personal Protective Equipment – Anyone applying SPF or occupying an area where SPF is being applied shall use appropriate PPE. It is recommended that workers wear a supplied air respirator, gloves, and protective clothing to prevent breathing vapor or other direct exposure to SPF. Access to the work area shall be restricted to those wearing adequate PPE.

4) Ventilation – It is necessary to properly ventilate an area where SPF is being applied and to maintain ventilation until the SPF has fully cured. Use the SDS estimated curing time as a guide to how long ventilation should be continued. Various products may have variable curing times. Use air exhaust techniques to move air out of areas where SPF is applied.

5) Flammability – SPF can be flammable and shall not be used close to any open flame or operating combustion appliance that may increase the hazard of fire. See 11.4.3 Fire Safety Requirements for Insulation.

6) Cleanup – The area where SPF is applied shall be cleaned thoroughly so that building occupants are not exposed to particulates or dust, especially when SPF has been trimmed or cut. Restrict access to the affected area until sufficient cleanup has been done.

12.6 Cooking Stoves

Weatherization funds cannot be used to repair or replace a cooking stove or oven with carbon monoxide emissions. See the Field Guide for guidance on providing instruction to customers regarding cleaning ranges to reduce carbon monoxide leakage. If a gas leak is detected, repair of gas leaks is an allowable measure. If the unit is not repairable or the cost of the repair is excessive, the unit shall be deferred until issue is resolved.

12.7 High Efficiency Particulate Air (HEPA) Filter Shrouds on Power Tools

Power tools shall be HEPA shrouded whenever materials other than wood, metal, glass or fiberglass are being cut, drilled, or similarly disturbed *unless* the building was constructed in 1978 or later, **and** the material has tested negative for asbestos. This requirement is to protect the health and safety of workers and clients by controlling lead dust and suspect or confirmed asbestos containing material (ACM) fiber emission.

12.8 Comprehensive Health and Safety Planning

Grantees shall perform Comprehensive Health and Safety Planning to comply with applicable federal, state, and local health and safety regulations and related program policy. Grantees may use the Health and Safety Planning Guide provided on the Home Energy Plus website to assist with Comprehensive Health and Safety Planning.

Appendix A – Definitions and Acronyms

Air Sealing
A systematic approach to tightening a dwelling unit's building shell to reduce uncontrolled heat loss through the building shell.

Appliance
Any device powered by electricity, oil, or gas designed for household use. This includes, but is not limited to refrigerators, freezers, dehumidifiers, heating systems, and water heaters.

Applicant/Case Head
The person whose name is in Line Item 4 of the Home Energy Plus application form, DOA-9549. Applicant and case head are the same and are used interchangeably for purposes of this manual. A case head shall be 18 years or older or a minor head-of-household (see definition). Exception: A dependent child can be a case head in cases where all adults in the household are ineligible aliens, and the dependent child is either a citizen or an eligible alien, and the dependent child has a Social Security number.

Authorized Representative
A person who has signed an Affidavit of Agent and who is listed as the authorized representative on the Authorization of Representative form.

Baseload Measures
An energy conservation measure that reduces the daily non-heating electrical use of a dwelling unit. An example of a baseload measure is the installation of compact fluorescent lighting in place of incandescent lighting.

Blower Door
A diagnostic tool used to locate points of infiltration in the building envelope and help prioritize the air sealing protocols.

- **As Is Blower Door Test** – The blower door test completed prior to any work on the building.
- **Pre-Blower Door Test** – The blower door test taken after any non-guideline sealing is done. This is the initial test for the Wisconsin Cost-Effective Guidelines.
- **Final Blower Door Test** – The blower door test taken at the completion of Wisconsin Cost-Effective sealing protocols to measure CFM 50 reduction.

Callbacks
Additional work required as a result of a final inspection or complaint/concern and occurs prior to a dwelling unit being reported as complete.

Categorical Eligibility
A household with income over 60 percent of State Median Income may be eligible for weatherization services if the household satisfies the categorical eligibility tests. The County WHEAP provider can determine if a household meets the categorically eligible requirements.

Client Notification Requirements
The weatherization program has notification requirements for owners and occupants in several areas. Examples include deferral and denial, including appeal information (see Chapter 2), Health and Safety (see Chapter 12), and tenant notification (see Chapter 3). This is not an exhaustive list.

Completed Energy Audit
A completed energy audit includes all data collection a complete work order, signed agreements, and no contingencies or reasons for deferral. The date shall be recorded in WisWAP in the Audit Completion Date field.

Completed Measure
A measure that has been installed in accordance with all standards and specifications contained in this manual and/ or other program guidance, including the Weatherization Field Guide.

Completed Unit
A dwelling unit that has received all the appropriate weatherization measures required by the computerized energy audit software and meets the following criteria: the unit has passed a final inspection; the property owner, or the owner's authorized representative, has completed the owner sign-off document, or a good faith effort has been made to obtain the sign-off; a completion date is entered on the associated WisWAP job.

~~**Computerized Audit System**~~
~~The Division uses DOE's Weatherization Assistant Energy Audit software for its computerized audit system. This software package includes the National Energy Audit Tool (NEAT) for use on 1to 4 unit buildings and Mobile Home Energy Audit (MHEA) for use on mobile homes.~~

Contractor
A business entity that enters into a contractual agreement with a Grantee for the provision of services and/or commodities. A contractor may include a vendor or lower-tier subcontractors.

Cost Allocation
A method used to assure that costs are charged to funding sources appropriately and accurately. Cost allocation plans identify the methodology by which this takes place.

Damaged Materials
Materials specifically assigned or designated for a specific dwelling unit/job that are damaged and made unusable either during transit to the job site or at the job site, prior to installation.

Deferral of Service
A temporary delay of weatherization services to an eligible dwelling unit because of the presence of hazardous working conditions or other conditions that impede completion of weatherization work.

Denial of Service
A permanent delay of weatherization services to an eligible dwelling. Denials are limited to dwellings that are not eligible (e.g., previously weatherized, customer/owner did not correct reasons for deferral, insufficient number of eligible dwelling units in multi-unit), or there are no energy conservation measures to complete at the dwelling.

Disability
A self-declared physical or mental impairment or a designation made by a state or federal program that substantially limits one or more of a person's major life activities; or results in the person receiving either Veteran's or Social Security disability benefits.

Division
The State of Wisconsin, Department of Administration, Division of Energy Services

Department of Energy (DOE)
The federal U. S. Department of Energy (US DOE) whose mission is to advance energy technology and promote related innovation in the United States. DOE also refers to funds provided by US DOE.

DOE Special Household Characteristics (for service priority)
The DOE special household characteristics are factored into the prioritization of households on the DES WHEAP Referral Report. The DOE identifies priority categories of elderly (persons 60 and older), persons with disabilities, and families with young children (under six), which may also be used to determine the priority of service. The DOE identifies additional flexibility to target services by adding the categories of high residential energy user, and households with a high energy burden.

Dwelling Unit
A structure, including a stationary mobile home, apartment, group of rooms, or a single room occupied as a separate living quarters. A dwelling unit has an identifiable site address such as a fire number or street address. A United States Postal Service PO Box number is a mailing address and does not constitute a dwelling unit address.

Economic Unit
A person or group of persons, related or unrelated, who live together in a dwelling unit and jointly share in providing the necessities of life for the person(s) in the group. The necessities of life are shelter, heat and utilities. NOTE: Persons living in a cooperative housing arrangement who have their own room and share common spaces are all part of a single economic unit.

Elderly Person
A person who is 60 years of age or older.

Eligible Dwelling Unit
A dwelling unit occupied (or, with DES permission for certain rental units, will be occupied within 180 days of completion) by an eligible low-income household, that; was not previously weatherized; or, was weatherized prior to October 15, 2000 and the residence is served by

a Public Benefit participating electric utility: or, was weatherized prior to October 1, 1994 with DOE funding (See Chapter 3 for eligibility requirements for multi-unit buildings).

Energy Assistance
The component of the Wisconsin Home Energy Assistance Program (WHEAP) that provides households with benefits to assist in meeting the cost of home energy.

Energy Audit
An inspection of the dwelling unit that documents its conditions from a thermal, structural, appliance, lighting, and safety perspective. This may be based on a Division approved energy audit software program that generates a list of recommended weatherization measures for the dwelling unit, according to the software program's specifications.

Energy Conservation Measures (ECMs)
The measures installed in a home that return energy cost savings. ECMs are in contrast with Health and Safety and repair measures that do not return an energy cost savings.

ENERGY STAR® Standards
When stated in this manual that a product "shall meet ENERGY STAR® standards," it shall be labeled and listed on the Energy Star® website and shall conform to the set of criteria used by ENERGY STAR® to rate products.

Fair Market Value
The best estimate of gross proceeds if a unit of property were to be sold in a public sale.

Final Inspection
The inspection performed on a dwelling unit, by someone who did not audit the building and did not perform work on the unit, following the completion of on-site work and the correction of any callbacks. An inspection that results in a callback is not considered a final inspection. The final inspection (following any corrected callback issues) shall be performed before the owner or authorized agent can sign off. The final inspector shall sign off on the inspection.

Fiscal Audit
The review and/or inspection of any or all fiscal or accounting records or procedures of a local Grantee or their subcontracted agencies. See 4.6 Financial Audits.

Free Rider
A dwelling unit in a multi-unit building whose occupants do not meet the eligibility requirements of the weatherization program, but which shall receive weatherization services and be reported as a completed unit because the building has been approved to receive weatherization services.

Good Faith Dispute
A contention by an agency that goods delivered or services rendered were of a lesser quantity or quality than ordered or specified by contract, were faulty or were installed improperly, or any other reason giving cause for the withholding of payment by the agency until the dispute is settled.

Grantee
The non-profit entity under contract with the Division to provide weatherization services to low-income families as defined in 10 CFR 440.15 (Sub-Grantees). (US DOE refers to local Weatherization Program Operators as Sub-Grantees, while the State of Wisconsin uses the terminology of 'Grantee' to refer to weatherization agencies.)

Guideline Sealing
Air sealing work completed using the Wisconsin Cost-Effective Guidelines (WCEG).

Group Homes
Facilities that provide housing for families and/or unrelated individuals. A group home has a clearly definable identity that distinguishes it from more informal, family-type setting, for example, a residence for persons with disabilities.

Heating Costs
Costs of any source of heating in a dwelling unit used for residential heating purposes. Heating costs for commercial, business or any purpose other than heating the dwelling unit of the household are excluded.

High Energy Burden Household
A low-income household whose residential energy burden (residential expenditures divided by the annual income of that household) exceeds the median level of energy burden for all low-income households in the State.

Home Energy
All fuel sources used in a dwelling unit including all heating costs and non-heating costs. Non-heating costs are often referred to on utility bills as baseload costs (the base costs before heating costs are included).

Household
Any persons or group of persons living together in a dwelling unit on the Home Energy Plus Application date, who are an economic unit and who directly purchase home energy or make undesignated payments for energy in the form of rent.

Improper Invoice
An invoice presented for payment not submitted with adequate or correct information for processing. Examples include incorrect price, cash discount not shown, incorrect reference to purchase order number, missing required forms or documents, or submittal to the incorrect address for processing, as identified in the Contract.

Indoor Air Quality
The quality of indoor air relative to its acceptability for healthy human habitation. Assessing, and ameliorating when necessary, the quality of indoor air is a major concern of the weatherization process. For example, the presence of by-products of a combustion appliance is considered unhealthy indoor air.

Infiltration

The uncontrolled air entering the building, usually at its lower portion.

Landlord Contribution
The portion of the cost of weatherization that is born by the owner of a rental property.

Lead Safe Work
Conditions that meet the OSHA, EPA and DHS requirements for adequate protection from lead exposure for both the building occupants and the workers and contractors performing the weatherization activities.

Low Income Home Energy Assistance Program (LIHEAP)
The program that is federally designated under 42 U.S.C. 8621 and provides block grants to states. LIHEAP provides benefits and services to assist low-income households with the cost of energy used for home heating. These federal funds are used together with other funding sources to operate the Wisconsin Home Energy Assistance Program (WHEAP).

Lost Materials
Materials that cannot be accounted for at the time of inventory reconciliation, including stolen materials.

Major Weatherization Measures
A measure that needs to be completed in order to effectively weatherize the building and/or maintain the integrity of other weatherization measures. If major measures are refused by a household, the dwelling unit is ineligible to receive any weatherization services.

Master-Metered Units
Rental units where all units are metered by one device and the owner is responsible for paying the heating costs.

Manufactured Home Energy Audit (MHEA)
MHEA is a computerized energy audit tool used for manufactured homes and is part of the Weatherization Assistant s~~S~~oftware package. See Weatherization Assistant and Audit Tools section on the HE+ WisWAP Grantee Information page.

Minor Infiltration
Sealing work performed when blower door testing cannot be performed. Minor infiltration work is limited to probable attic bypass and key junctures, glass repair or replacement, and miscellaneous sealing that will affect the occupants comfort.

Multi-Family Building
A building that contains five or more dwelling units.

Multi-Unit Building
A building that contains more than one dwelling unit.

National Energy Audit Tool (NEAT)
NEAT is a computerized energy audit used for one to four unit buildings and is part of the Weatherization Assistant s~~S~~oftware package. See the Weatherization Assistant and Audit Tools section on the HE+ WisWAP Grantee Information page.

Non-Guideline Sealing
Air sealing work performed prior to running the Wisconsin Cost-Effective Guidelines.

Office of Management and Budget (OMB)
The federal Office of Management and Budget issues Circulars in the areas of uniform administrative requirements ~~(A-110, cost principles (A-122)~~ and financial audits (2 CFR 200). ~~(A-133).~~

Optional Weatherization Measures
Weatherization measures, as determined by the Division that may be performed by Grantees at the discretion of the owner/household on their dwelling. Customers can refuse these measures, but the Grantee shall offer them.

Owner Sign-Off
A document signed by the dwelling unit owner or authorized representative that states the weatherization work has been completed as agreed and in an acceptable manner.

Poverty Level
Household income in relation to family size based on federal poverty guidelines.

Pressure Diagnostics
The practice of measuring air pressures and flows in a building to control air leakage.

Program Income
Income earned by a Grantee from grant supported activities, including but not limited to income from service fees, sale of commodities, usage or rental fees, and royalties, patents and copyrights. Program income shall be used to complete additional dwelling units. Landlord contributions are not considered Program Income.

Program Participant
A person that has been determined to be eligible for the Weatherization Program and who will receive or has received weatherization work on their current dwelling.

Public Benefits
Created as a portion of the “Reliability 2000” bill signed into law October 27, 1999 as part of the 1999-2001 Wisconsin State budget, Wisconsin Act 9, s. 16.957, Utility Public Benefits.

Quality Control Inspector (QCI)
An inspector certified by the Building Performance Institute who possesses the knowledge, skills and abilities in the National Renewable Energy Laboratory QCI Job Task Analysis.

Rental Dwelling Unit
A dwelling unit occupied by a tenant whose name does not appear on the proof of ownership document.

Renter
A person who holds, or has the use of, property by payment of rent.

Repair Materials
Items necessary for the effective performance or preservation of weatherization materials (e.g., shingles and other materials for repairing roof leaks; or protective materials, such as paint used to seal materials installed under the Weatherization Program).

Residence
A dwelling unit where household members listed on the WHEAP application are living at the time of the WHEAP application date.

Rework
Work done on a unit already reported as a completed unit.

Room
A living room, kitchen, dining room, bedroom, family room, den, study or other room, excluding bathrooms, entryways, unfinished basements, hallways, unheated attics and porches, closets or areas occupied by persons who are not part of the applicant's economic unit. The number of rooms in a dwelling unit is determined by the WHEAP agency as part of the application process and is a factor in establishing WHEAP benefits. Rooms or other areas used only for commercial/business purposes are not considered eligible space for weatherization services.

Savings-to-Investment Ratio (SIR)
A term used in NEAT and MHEA that refers to the ratio between the energy cost savings over a period of time versus the investment cost of installing a weatherization measure.

Separate Living Quarters
Living quarters in which the occupants do not live and eat with any other persons in the structure and which have either direct access from the outside of the building or through a common hall or complete kitchen facilities for the exclusive use of the occupants. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements, and includes shelters for homeless persons.

Single-Family Dwelling Unit
A structure containing no more than one dwelling unit.

Standard Work Specifications (SWS)

Guidelines and specifications that identify outcomes for a whole-house approach to installing residential energy efficiency measures. The SWS were developed by the National Renewable Energy Laboratory and the U.S. Department of Energy.

Subsidized Housing
Programs operated under the U.S. Housing Act of 1937, the National Housing Act, Section 101 of the Housing and Urban Development Act of 1965, Section 202 of the Housing Act of 1959, Title V of the Housing Act of 1949 or any program listed in the most current State of Wisconsin Inventory of Federally Assisted Rental Housing and the Housing Authority Directory.

Temporary Shelter
A dwelling unit with the principal purpose to house, on a temporary basis, individuals who may or may not be related to one another. Examples of temporary shelters include transitional housing for homeless persons, and domestic abuse shelters. Nursing homes or similar institutional care facilities are not eligible dwellings.

Unusable Materials
Weatherization materials that can no longer be installed due to damage incurred at the warehouse; inadvertent ordering of an incorrect size or the elimination by the Division of previously allowable weatherization measures. A Grantee may only charge unusable materials to the contract if approved, in writing, by the Division.

Weatherization
The improvement of a dwelling unit to reduce energy consumption. It often includes the installation of insulation and replacement or modification of the unit's heating system.

Weatherization Assistant Software
The Weatherization Assistant is an energy audit software tool developed for the U.S. DOE Weatherization Assistance Program by the Oak Ridge National Laboratory. The Weatherization Assistant includes NEAT for site-built single-family houses and MHEA for mobile homes.

Wisconsin Cost-Effective Guidelines (WCEG)
WCEG is a method that helps crews achieve cost-effective air sealing by providing feedback during the air-sealing process. Information on WCEG is available in the Wisconsin Weatherization Field Guide located on the HE+ WisWAP Grantee Information page.

Weatherization Measures
Energy conservation measures, energy related Health and Safety Measures and other repairs as determined by the Division that may be performed on dwelling units by a Grantee funded per weatherization program requirements.

WHEAP Agency
A county or its contractor that administers the Wisconsin Home Energy Assistance Program. See HE+ Where to Apply webpage to locate a WHEAP Agency by county.

WHEAP Referral Report (priority list)

A list of potential weatherization households prioritized based on the largest WHEAP benefits for heat, utilities, furnace repair and replacement using the following formula: Sum of calculated energy benefits plus the sum of Furnace Repairs and Replacement Costs plus the sum of DOE special household member characteristics. Each DOE special household characteristic (e.g., elderly, persons with disabilities, children under 6) is applied to the sum. Tribal referrals are included in the WHEAP Referral list.

Work Agreement
A written agreement between a Grantee and the owner/agent of an eligible building that discloses the type and amount of weatherization work to be done on the building; and other conditions both parties shall agree to, including the right for representatives from the Grantee as well as state and federal government, or their designee, to verify the delivery of weatherization services and the quality of those services. The owner/agent shall sign the work agreement prior to the installation of weatherization measures. The Division requires a Grantee to use work agreement templates located on the HE+ WisWAP Grantee Information page under the Field Forms heading.

Work Order
Document that specifies the work to be done and materials to be installed on a dwelling unit.

Appendix B – 1 to 4 Unit Building Measures, Specifications and NEAT Modeling Requirements

B.1 General Specifications

1) All work will be completed in a professional manner.
2) All materials will be installed to manufacturer specifications. For more specific information on installation procedures and guidance see the Weatherization Field Guide.
3) All debris shall be removed from the job site and disposed of properly.
4) All work will follow applicable codes and regulations of the authorities having jurisdiction. See Appendix E – Minimum Standards for Lead Safe Weatherization (LSW) and Appendix F – Asbestos Containing Materials (ACM) Policy and Procedures.
5) Contractors providing services must be licensed and/or registered to provide those services if required by the authority having jurisdiction.
6) Building permits and any related costs are the responsibility of the Grantee.
7) The Division administrator or his/her designee will be the final authority for any questions regarding these specifications and measures.
8) A description of maintenance and operation requirements of completed measures shall be provided to occupants.
9) Grantees shall make a reasonable effort to install products that meet ENERGY STAR® standards, whenever feasible. They are listed as materials specifications in several areas.
10) All materials used shall meet the requirements outlined in Chapter 11 – Weatherization Materials of this Manual.

B.2 NEAT Audit Use in 1-4 Unit Buildings

Run the NEAT audit as indicated in Chapter 10 for all 1-4 unit jobs. Install the measures listed in the NEAT Recommended Measures report, Energy Savings Measures Economics list (or Energy Savings Measures Economics - Adjusted list when fuel consumption data is modeled). In addition, complete the following measures using Wisconsin's protocol:

- Programmable thermostats
- Lighting efficiency improvements
- Domestic water heater measures (not water heater replacement)
- Refrigerator and freezer removal incentives
- Sealing and insulating duct work
- Miscellaneous heating system work
- Heating system clean and tunes
- Exhaust ventilation

B.3 Building Shell Measures

B.3.1 Attic and Kneewall Areas

General Policy: Model all attics for insulation. Seal applicable key junctures.

Specifications:

1) Complete air sealing of key junctures and bypasses before adding insulation.
2) Insulate access hatches to the R-value of the attic insulation or maximum structurally allowable, whichever is lower.
3) Insulate the vertical and sloped areas to the maximum structurally allowable.
4) Vent all exhaust fans to the exterior. Seal and insulate all ducting for exhaust fans, reducing the potential of condensation, to a minimum of ~~R-6~~R-8.
   a. Ducts with existing insulation do not have to be re-insulated. Ensure insulation is secure and provides continuous coverage.
5) Prior to insulation, prepare the attic by installing barriers around fan housing, chimneys, access points, and recessed lighting. If live knob and tube wiring cannot be eliminated from the attic, install a barrier to maintain air space around wires.
6) Identify all electrical junction boxes and live knob and tube barriers with flags.
7) If heating system distribution runs through the attic, seal all seams and insulate to an ~~R-10~~R-11 prior to installing any insulation over the distribution ducts.
8) Install attic ventilation based on local code requirements or if there is a potential moisture source that cannot be isolated or controlled by air sealing.

NEAT Modeling Guidance:

Enter the amount of existing insulation. *Do not* specify how much insulation to add. NEAT will select the most cost-effective amount to add. Note: If NEAT selects an R-value that is greater than what is structurally allowable for an eyebrow, porch roof, outer ceiling joist that is less than 15 inches tall, or other similar condition, enter the maximum amount and re-run the audit.

When attic insulation is being modeled, include the cost of attic prep work such as damming, electrical junction boxes, and addressing other hazards in the Additional Cost field. Attic access costs are built into the Grantee average cost for unfloored, unfinished attics and in collar beam and outer ceiling joist for finished attics. The total cost of the measure may be adjusted in the Additional Cost box if access work is not required or the estimated cost would not be accurately represented.

When attic insulation is not being installed but attic prep work needs to be addressed, model the work in the Itemized Cost tab as “Attic Prep-No Insulation” and check “Include in SIR.” Report the work in WisWAP using the related measure, “Attic Prep-No Insulation.”

B.3.2. Sidewall Insulation

General Policy: Model all un-insulated sidewall cavities for insulation. Model each sidewall where voids are 10 percent or more of the sidewall area. Install insulation to the R-value allowed by the NEAT audit, using “dense pack insulation techniques” for loose-fill insulation.

Specifications:

1) The exterior layer of siding shall be removed to drill through sheathing and any sub-layers of siding.
   a. If siding cannot be removed, there shall be documentation in the customer file of the conditions that limited the removal of the siding.
2) Transite (slate) siding shall be removed intact only by persons with appropriate Department of Health Services (DHS) asbestos certification, unless the siding has been tested and does not contain asbestos. (See Appendix F, for complete asbestos policy).
3) Sidewall insulation shall be installed following Lead Safe Weatherization (LSW) procedures, under the supervision of a Lead Safe Renovator when applicable (See Appendix E for complete lead policy). Any person who completes this work shall have been trained in LSW procedures.
4) See the Weatherization Field Guide for more details on "dense pack insulation techniques."

NEAT Modeling Guidance:
Enter all sidewalls and their specifics into the audit. *Do not* skip walls that are already insulated.

B.3.3 Foundation Insulation

General Policy: Model foundation walls or floors that define the heating envelope and slab-on-grade foundations for insulation. Model the type of insulation and the R-value, based on site conditions and the materials available, in the NEAT audit. Install a minimum 6--mil vapor retarder over exposed earth.

A minimum 8 ½" x 11" laminated sign shall be posted inside of the crawlspace access. The sign shall include contact information of the installer and caution those entering the crawlspace not to damage the air barrier, ground moisture barrier, insulation, mechanical components specific to the crawlspace, shall prohibit storage of hazardous and flammable materials, and shall instruct those entering to contact the agency if damage occurs to any materials in the crawlspace. An optional Crawlspace Sign Template is available on the WisWAP Grantee Information page under the Field Forms heading.

Specifications:

1) Complete air sealing prior to insulating, unless spray foam is being used for both purposes.
2) Model uninsulated sill box areas for installation of faced fiberglass batts or 2-part foam.
3) Model floors for insulation where they define the heating envelope to the maximum R-value structurally allowable.
   a. Install a minimum 6--mil vapor retarder over exposed earth floors, unless it presents a tripping or slipping hazard. Walk boards may be installed for access to mechanical systems.
4) Model insulation for accessible crawl-space walls for R-12 2-part foam or R-19 fiberglass in unintentionally conditioned areas. Other products including R-11

fiberglass, R-19 2-part foam, or rigid insulation may be modeled and installed if it meets a minimum SIR of 1.0.

a. Note: 2-part foam insulation may be used to insulate crawl-spaces only when the area may be isolated by a thermal barrier, such as half-inch drywall or plywood, from the interior of the building. For more information see Wisconsin Uniform Dwelling Code (UDC) SPS 321.11.

b. Install a minimum 6-mil vapor retarder over exposed earth floors.

5) Model exterior insulation of all accessible slab-on-grade foundations, inaccessible heated crawlspace foundations, and conditioned basements having an average above grade exposure of 30” or more on the exterior surface of the exterior wall.

   a. Insulate the exposed foundations with R-5 foam board with durable weather resistant coating, to a minimum of 6” below grade.

NEAT Modeling Guidance:

Always enter foundation details into the audit “Foundation” tab. NEAT will model the insulation of all foundation assemblies in the Foundation tab, except for slab-on-grade. Model slab-on-grade insulation in the Itemized Cost tab.

1) Model interior and exterior basements and crawlspaces for insulation in the foundation tab.

   a. Model the crawlspace wall when the area is heated or unintentionally conditioned and plumbing and heating distribution runs through the space.

   b. Model the basement wall when the basement is heated and the average above grade exposure is 30” or more

2) Model floor insulation only when the floor defines the heating envelope and if the area below does not have plumbing and heating system distribution ducts running through it. Exceptions can be made for sealing and insulating limited duct work if the audit produces an SIR of 1.0 or greater for the measures and the job.

   a. When modeling floor insulation, do not model wall and sill boxes for insulation separately. Incorporate the sill box area in the floor area to be insulated.

   b. Model the cost of the vapor retarder over exposed earth floors with the foundation insulation. If insulation is not installed, the measure shall be modeled as an itemized cost and reported as XHAQ035 – Health and Safety Air Quality – Other Remediation.~~model the cost as a repair.~~

3) When modeling for crawlspace foundation wall insulation do not model for sill boxes separately.

   a. Incorporate sill box area into the foundation wall treatment.

4) Model un-insulated sill boxes for insulation if not modeling for foundation wall insulation.

5) Model slab-on-grade exterior perimeter insulation in the Itemized Cost tab. Select the measure from the drop-down menu. Note that for modeling purposes, slab-on-grade widths are assumed to be 12”. Each square foot equals one lineal foot. Model the information as follows:

   a. Description: Slab exterior perimeter insulation.

   b. Cost: Insert local costs per lineal foot based for square foot category.

      i. Category 1: Less than 150 square feet;

ii. Category 2: Equal to or greater than 150 square feet.

c. Material: R-5 rigid board.
d. Energy Savings: Per lineal foot 0.041.
e. Divide total by SSE of heating system.
f. Life: 20 years.
g. Fuel Saved: Primary heating system fuel.
h. Check "Include in SIR".

B.3.4 Windows

General Policy: All windows modeled for replacement shall be in the primary heating envelope. The work shall be done in a lead safe manner under the supervision of a certified Lead Safe Renovator (see Appendix E for complete lead policy). Replace a window as an energy conservation measure if the measure meets a minimum 1.0 SIR when tested with the NEAT audit. Windows with primary single pane glass and wood or metal frames may be replaced under the conditions outlined below.

Window replacement is categorized into two areas:

1) An Energy Conservation Measure when the measure is modeled as a shell measure and meets a minimum 1.0 SIR.
2) A Repair Measure when windows are entered into the "Itemized cost" tab and the cumulative SIR for the building is a minimum 1.0 SIR. Check "Include in SIR."

Basement windows may or may not be located in the primary heating envelope contingent on the conditioning of the foundation. When a basement is located in an unheated (unconditioned) area, the windows are not in the primary heating envelope and may not be replaced. Basement windows may only be installed as a repair measure. Basement windows are exempt from the requirement to meet ENERGY STAR® standards.

Specifications: To consider a window for replacement, it shall meet both of the following conditions:

1) The window(s) shall be located in the primary heating envelope.
2) The window(s) shall have rotted or deteriorated frames or sashes.

Note: Photographs are required for each window to be replaced. The photograph shall document specifically why the window was replaced, e.g., rotted frame or rotted sash, rotted frame and rotted sash with deteriorated paint film.

Repair or replace window glass as an Air Sealing measure when the glass is cracked or broken, but there is no degradation of the window's frame and or sash.

NEAT Modeling Guidance:

1) To model the window as an energy conservation measure, use the "Shell, Windows" tab.
   a. Select "Retrofit Option", "Evaluate All".
   b. *Do not* select any other option.

2) To model the window as a Repair measure, use the "Itemized Cost" tab: Check "Include in SIR" box. The cumulative building SIR shall be 1.0 or greater in order to complete the planned Repair measures.
3) Basement windows cannot be modeled as an energy conservation measure. If the basement is unintentionally conditioned or conditioned, the windows may be replaced as a repair.

B.3.5 Air Sealing

General Policy: Use a blower door to guide air sealing work. Exceptions to that requirement may include very large two to four unit buildings. Complete Non-guideline Sealing (large openings in the building shell, key junctures, and bypasses) prior to installing any other shell measures. Use Zone Diagnostics where appropriate or required. Complete the Wisconsin Cost-Effective Sealing Guidelines (WCEG) after other shell work is completed. See Chapter 10 of the Weatherization Manual or the Field Guide for the definitions of the air sealing categories and more guidance on testing 2 to 4 unit buildings and decision making for depressurization.

Specifications:

1) Seal all major attic bypasses, the sill box area, and key junctures, as guided by the blower door. If the blower door shows that a sill box does not leak, do not air seal it. Replace missing or broken window glass and gross holes in the building envelope. Seal chases that run through the building and may be open to the outside of the thermal boundary. Examples of these heat bypasses are open interior walls, garbage chutes, plumbing and heating chases, and fire hose compartments. These measures are classified as Non-Guideline Sealing. Non-Guideline Sealing measures are completed on the building prior to installing any other shell measures. Non-guideline air sealing can be completed whether or not blower door testing is performed.
2) As a "rule of thumb" for sealing "all major attic bypasses", conditioned air leaking into attics should be no greater than 10 percent of the total CFM50 of the final blower door test.
3) Conduct building depressurization tests in all units.
4) Zone pressure diagnostics testing shall be used whenever appropriate. Typically that is when the dwelling has one or more of the following conditions:
   a. An attached garage. Note: Zone testing is required when the dwelling has an attached garage.
   b. To determine if bypasses (total path) are at less than 10 percent of the blower reading.
   c. Health and Safety problems related to a poor pressure envelope/air barrier.
   d. Structural moisture problems related to heat escaping into unheated zones.
   e. High fuel consumption not obviously linked to a lack of insulation or the heating system.
   f. A high pre-CFM50 blower door test.
   g. Multiple zones where determining linkage between zones or identifying sealing priorities is necessary.
5) Follow the Wisconsin Cost-Effective Sealing Guidelines (WCEG).

6) When a blower door test cannot be completed, perform Minor Infiltration and non-guideline sealing. Minor Infiltration air sealing targets drafts, to improve occupant comfort, and is limited to one hour.
7) Use depressurization tests utilizing the Diagnostic Workbook to guide forced air distribution system work, air sealing, and the maximum exhaust ventilation. Take steps to address depressurization that exceeds the guidelines.

All air sealing work, depressurization testing, and worst case draft tests shall be completely documented in the Diagnostic Workbook, Blower Door Data form and the House Safety forms. If Zone Diagnostics is completed, document the results on the appropriate Zone Diagnostics form: Add a Hole, Open a Door, or Garage ZPD.

NEAT Modeling Guidance:
Air sealing is identified in the “Air and Duct Leakage” tab.

1) Enter the blower door reading or estimate in the “Before Weatherization (Existing)” cfm blank. Indicate the cfm is at 50 Pascals in the “House Pressure Different” blank.
2) In the "After Weatherization” (Target or Actual) enter the post cfm projection. Indicate the cfm is at 50 Pascals in the “House Pressure Different” blank.
3) A Grantee’s average cost per cfm50 reduction will be entered in the cost box when you ‘tab’ through the empty box if it is entered as a default in the preferences by each user.
4) Multiply the estimated cfm50 reduction by this amount and enter it into the cost box. If the cost entered differs from the grantee’s average cost there shall be documentation in the comments box as to why a different cost was entered for this job. Variances from the average cost shall be based on an actual “Before Weatherization” blower door test. One example of conditions where the cost of air sealing may be lower than the average costs is a balloon framed building where addressing sidewall insulation and key junctures may achieve significant reductions in air leakage at a much lower cost.

The information entered in the Air Leakage section generates a baseline SIR for the building. For actual sealing work, follow the procedures in the Weatherization Air Sealing Guidelines.

B.4 Mechanical Systems Measures

B.4.1 Heating Unit Replacement

General Policy: Replacement heating systems modeled in the NEAT Heating System tab with a minimum SIR of 1.0 are considered energy conservation measures (ECMs). Fuel switching replacement heating systems from electric to gas, oil to gas, or LP to natural gas is allowed when gas is available to the building and the measure meets a minimum 1.0 SIR when modeled as an ECM. All costs associated with the heating system replacement shall be included in the modeled replacement costs for the evaluation of the SIR. Model all heating systems as an ECM first, unless otherwise indicated.

Informational Modeling: If the heating system replacement has an SIR of less than 1.0, model the replacement in the Itemized Cost tab as a Health and Safety Replacement for

each job. Not all heating systems will be replaced. Follow the protocol below to determine if the system will be replaced.

Inspection forms and efficiency and safety test results on all replaced and existing heating systems shall be maintained in the dwelling file.

1) Natural Gas and LP Forced Air Furnaces:
   a. Inspect and test natural gas and LP furnaces for safety and efficiency.
   b. Model all furnaces for replacement as an ECM by selecting “Evaluate All”.
   c. Unsafe furnaces that have a measure SIR of less than 1.0.
      i. Replace the heating system if the job has a cumulative SIR of 1.0 or greater when modeled with the Health and Safety replacement.
   d. If the system is safe, determine the useful life of the furnace using the Useful Life Calculator. If the system has less than 5 years of useful life and estimated repair costs greater than $500, replace the system if the job has a cumulative SIR of 1.0 or greater when modeled with the Health and Safety replacement.
2) Oil Forced Air Furnaces:
   a. Inspect and test oil furnaces for safety and efficiency.
   b. Model all furnaces for replacement as an ECM by selecting “Evaluate All”.
      i. With agreement from the building owner, model fuel switching to gas for oil furnaces that are candidates for replacement.
      ii. Oil tanks placed out of service shall be sealed off or removed in accordance with Wisconsin Administrative Code ATCP 93. (The Code can be found at https://docs.legis.wisconsin.gov/code/toc/atcp.) Note: A contractor shall be certified in accordance with chapter SPS 305 to perform tank cleaning and tank removal at properties other than 1 and 2-unit dwellings.
   c. Unsafe furnaces that have a measure SIR of less than 1.0.
      i. Replace the heating system if the job has a cumulative SIR of 1.0 or greater when modeled with the Health and Safety replacement.
3) Boilers:
   a. Inspect and test boilers for safety and efficiency.
   b. Model all boilers for replacement by selecting “Evaluate All”. First, model only a high efficiency (>90 percent) gas boiler. If Wx Assistant does not select the high-efficiency replacement boiler, then rerun the audit and model the standard efficiency (>83 percent) boiler.
      i. With agreement from the building owner, model fuel switching oil to gas.
   c. Unsafe furnaces that have a measure SIR of less than 1.0.
      i. Replace the heating system if the job has a cumulative SIR of 1.0 or greater when modeled with the Health and Safety replacement.
4) Vented Space Heaters:
   a. Inspect and test all space heaters for safety and efficiency.
   b. Model all space heaters for replacement as an ECM by selecting “Evaluate All”.
   c. Unsafe space heaters that have a measure SIR of less than 1.0.

i. Replace the space heater if the job has a cumulative SIR of 1.0 or greater when modeled with the Health and Safety replacement.

d. Direct vented wall space heaters shall be sealed combustion and a minimum of 80 percent AFUE and listed in AHRI.

i. With agreement from the building owner, model fuel switching oil to gas and convert room heaters to direct vent wall heaters, where feasible.

e. Replacement room heaters shall be a minimum of 65 percent AFUE and listed in AHRI.

f. Oil space heater replacement shall be approved on a case-by-case basis. Submit information for review to the Home Energy Plus Help Desk.

i. Include the BID # of the job, the reason for replacement, the reason why no heater conversion is planned, and the manufacturer's specifications including the AFUE.

5) Other Space Heaters:

a. Stand-Alone Electric; Repair, replacement, and installation are not allowable costs.

b. Un-Vented Space Heaters: Weatherizing a home with an unvented space heater is not allowed.

6) Electric Conversion: Replace furnaces or baseboard heaters when there is an SIR of ≥1.0 for both the measure and the job.

a. Modify the heating system type in the Heating tab to reflect planned replacement of the system, and include the AFUE of the new system.

b. Use the Electric Fuel Switch Calculator Worksheet to determine the MBtu savings to be entered into the NEAT audit.

c. To determine the SIR for the measure and the job, enter the conversion information generated by the calculator into the NEAT Itemized Cost tab.

i. The required information includes the correct WisWAP measure line identification, the savings from the calculator, the fuel type saved, and the lifetime and the cost of the conversion.

ii. Proceed if the replacement system and the job have a minimum SIR of 1.0.

d. The Worksheet is available on the Home Energy Plus website. The completed worksheet results shall be printed and retained in the client file.

7) Wood (as primary system): Replacement units are considered a Health and Safety measure. Smoke detectors shall be installed in buildings with wood heating systems. Do not model as an ECM.

8) Non-electric Secondary heating systems may be replaced if the system is a safety hazard and cannot be eliminated with the replacement of a primary system. The replacement of the secondary heating system shall be modeled as a Health and Safety measure with the NEAT audit.

Specifications: All replacement heating systems except for space heaters and wood space heaters shall meet the minimum efficiency standards as specified in Chapter 11 and listed in the AHRI Directory of Certified Product Performance. Replacement wood space heaters shall be listed appliances. Wood heater installation shall conform to the NFPA 211.

1) Use the existing distribution system and gas supply line whenever safe and feasible.

2) Properly remove and dispose of existing unit.
3) New installations require a dedicated electrical circuit rated or fused to match the amperage of the new system's requirements for overcurrent protection.
4) Provide an owner's manual with a heating system replacement on or near the heating system. The manual shall be attached in a durable device that allows for repeated customer access.
5) Properly size replacement heating systems units following REScheck™, ACCA Manual J, or an equivalent industry-accepted sizing procedure.
   a. When sizing boiler systems, take in to consideration the capacity of the existing terminal devices and whether or not domestic hot water will be heated with the boiler. If the load is too high or too low for the house, make the necessary adjustments to the radiators.
6) Space heaters (non-wood and electric resistant baseboard) require:
   a. An air circulating fan (not applicable to electric baseboard).
   b. A properly grounded duplex receptacle for electrical service.
   c. A fire-rated floor protector if required PMI, sized to the width and length of the space heater.
7) Install a condensate pump where needed to reach an appropriate drain. Condensate pipes generally may drain to 1) the laundry stand pipe; 2) a new standpipe, indirect or local waste pipe; or 3) a floor with a floor drain when the pipe can be properly secured and does not pose a hazard to the occupants. All installations require an air break. Condensate lines cannot be drilled directly into any drain pipe. For the more information see Wisconsin Uniform Dwelling Code (WI UDC) SPS 382.33. Local jurisdictions may vary on acceptable options.
8) Condensate pumps may be installed using existing receptacles, new GFCI receptacles, or directly wired per pump and furnace manufacturer's recommendations and the authority having jurisdiction.
9) When required, an approved gas pipe type will be installed, supported, and electrically bonded in accordance with NFPA-54 and the WI Uniform Dwelling Code. Follow the manufacturer's specifications for installation. For more information see NFPA-54 and WI SPS 323.16.
   a. When CSST is present in the building and not correctly bonded, bond the gas piping system to the electrical ground in accordance with NEC 250.94 and 250.104.
10) Verify and make adjustments, if necessary, so that flue-gas oxygen, temperature, draft, and carbon monoxide levels are within the manufacturer's specifications.
11) Ensure that all remaining naturally vented combustion appliances are properly drafting.
12) Seal openings in chimneys where naturally vented combustion appliances are eliminated. A written notice on the chimney where sealed, that the chimney is no longer functional, is recommended.
13) Heating system replacements shall maintain the existing fuel type unless:
   a. Natural gas or LP gas is available and the fuel switch replacement measure has a minimum SIR of 1.0 when tested with the NEAT audit as an energy conservation measure; or
   b. The existing system is electric and the lifecycle savings meets a minimum SIR of 1.0 when the projected savings are calculated using the Electric Heat Conversion Worksheet and entered into the NEAT Itemized Cost tab; or
   c. There are multi-fueled systems exhausting into the same chimney.

d. All costs associated with fuel conversion shall be included when modeling the heating system for replacement.

NEAT Modeling Guidance:
Model heating systems for replacement as an energy conservation measure in the Heating tab unless otherwise indicated.

1) If the existing furnace will be replaced with other funds or electric heat will be converted to another fuel, model the AFUE of the heating system that will be in place at the close of weatherization work.
2) When modeling a gas forced air heating system for replacement, model only a high efficiency replacement unit.
3) In the Heating tab: System Retro: Evaluate All.
4) Enter the actual AFUE of the replacement system.
5) Enter the estimated cost for the heating system replacement. Include repair costs as indicated in Chapter 10, Itemized Costs and Special Data Entry Procedures.
6) If the replacement has an SIR of less than 1.0, enter the total replacement cost in the Itemized Cost tab as a Health and Safety measure, check “Include in SIR” and run the audit for Informational Modeling to see if the job can support the cost of an in progress replacement.

When an unsafe heating system must be replaced:

1) Document the unsafe conditions in the audit comments box. Also indicate that this was an unsafe heating system tested as an ECM.
2) See Chapter 10, Requirement to Update Weatherization Assistant on In-Progress Jobs when heating systems need to be replaced in-progress.
3) See Health and Safety section for more information.

When multiple heating systems exist:

1) Secondary Electric Baseboard.
   a. Grantees may expand existing, non-electric heating distribution systems to replace electric systems as an energy conservation measure, with the owner’s approval. Actual consumption records are required.
      i. If the primary system is being modeled for replacement as an energy conservation measure in the heating system tab, include all of the expansion costs in the replacement cost. Provide documentation of costs in the comments box.
         1. Enter the electric system as a secondary system and check the box to eliminate it with primary system replacement. Determine and enter the percentage of the building served by the secondary system. Enter the Output Units and Output Capacity (kW or kBtu per hour)
         2. If the primary system is selected by NEAT as an ECM, the secondary system can be replaced with the added distribution system.

ii. If the primary system is not being modeled for replacement enter the modification costs, use the Electric Fuel Switch Calculator Worksheet to determine the MBtu savings to be entered into the NEAT audit.

1. To determine the SIR for the measure, enter the conversion information generated by the calculator into the NEAT Itemized Cost tab.
   - The required information includes the correct WisWAP measure line identification, the savings from the calculator, the fuel type saved, the lifetime and the cost of the conversion.
   - The worksheet is available on the Home Energy Plus website. The completed worksheet results shall be printed and retained in the client file.
2. Enter the electric system as a secondary system. Determine and enter the percentage of the building served by the secondary system. Enter the Output Units and Output Capacity (kW or kBtu per hour).
3. If the secondary system conversion entered as an itemized cost is selected by NEAT as an ECM, secondary system can be replaced with the added distribution system.

2) Replacing Multiple Space Heaters with a forced air system.

a. Grantees may evaluate replacing multiple space heaters with a forced air system as an energy conservation measure, with the owner's approval.

i. Enter largest (Btu) space heater as primary heating system. Determine and enter the percentage of the building served by the selected primary system. Enter space heater details on capacity, efficiency and condition.

ii. Select 'evaluate all' for replacement system option. Enter AFUE for replacement furnace under standard replacement.

1. This is the only option available and you may get a warning that the entered AFUE is too high.

iii. Enter the total cost of the replacement furnace and the total cost of installing the new distribution system. Provide documentation of costs in the comments box.

iv. Enter remaining space heaters as secondary heating systems and check the box to eliminate with primary system replacement. Determine and enter the percentage of the building served by each secondary system. Enter space heater details on capacity, efficiency and condition.

v. If the primary system is selected by NEAT as an ECM, the multiple space heaters may be replaced with a furnace and forced air distribution.

When a secondary heating system must be replaced:

1) Determine if the secondary system may be eliminated.

a. If the system may be eliminated without any additional action, with the owner's approval, remove the system and properly seal any flues.

b. If the primary system is being modeled for replacement first as an energy conservation measure in the heating system tab, enter the secondary system and check the box to eliminate it with primary system replacement. Wood heaters that will be eliminated with a primary system replacement shall also be included in the heating system tab.

c. Determine and enter the percentage of the building served by the secondary system, the BTU input and output, and the SEE.

2) If the secondary system cannot be eliminated, model the secondary heating system replacement as a Health and Safety measure in the Itemized Cost tab. See Health and Safety section for more information.

B.4.2 Other Heating Systems Work

General Policy:
Order a clean and tune only when it is 1) required by policy, 2) diagnostic tests indicate that efficiency can be improved, or 3) when the system is in a questionable state and current protocol does not allow for replacement (see also 10.1.3(2)(b)). Based on the auditor's inspection, a clean and tune may be performed on natural gas and LP heating systems that will not be replaced. Perform a clean and tune on primary oil heating systems that will not be replaced. Evaluate and test distribution systems. Seal major return and supply leaks. Modify the distribution system as needed to properly heat the house. Seal and insulate ducts in unheated areas. Model system repair costs with the appropriate measure or in the itemized cost tab if the repair addresses multiple measures. Programmable thermostats may be installed when the existing thermostat must be replaced and the occupant is willing and able to program the replacement thermostat (however, they are not recommended for boilers).

Specifications:

1) Clean and tune primary oil furnaces or oil boilers that will not be replaced. Secondary systems may receive a clean and tune as determined by the auditor.
2) Clean and tune gas furnaces and gas boilers if needed based on the auditor's inspection.
3) When existing CSST is found not bonded, the agency may properly bond the existing CSST per NFPA 54 (sec 7.13.2), 2015 IFGC (sec 310.1.1), and NFPA 70 (NEC).
~~3)~~4) When performing a clean and tune, installing a dedicated circuit is not required. However, if the circuit is rated for higher amperage than is required by the heating system, provide a properly sized fuse or breaker at the appliance or at the service panel.
~~4)~~5) For sealed combustion heating systems installed as a one-pipe (exhaust only) system, convert the appliance to a two-pipe (intake and exhaust) system. Comply with manufacturer's instructions and NFPA 54 for location of intake pipe.
   a. Inspect and test forced-air heating systems for temperature rise, airflow, and for Health and Safety problems
   b. Seal all gross holes, and seal distribution leakage as directed by the Worst Case Depressurization test recommendations in the Diagnostic Workbook when naturally drafting appliances are present in the building and when negative indoor air quality conditions exist in the basement CAZ.
   c. Take corrective action if a building CAZ is excessively depressurized or is otherwise negatively impacting natural-draft appliances.
   d. Measure the heating system's temperature rise and air flow to confirm that they meet manufacturer's requirements. (Note: see the Field Guide for additional guidance).

e. Seal and insulate ductwork in unheated areas ~~to R-10~~with a minimum of R-11 foil-faced insulation. Ducts may be insulated with two-part foam products that meet the federal specification for duct insulation.

f. Install dampers and balance systems where ductwork is added.

g. Perform ductwork modifications as necessary to ensure client comfort and to verify that the temperature rise for the heating system meet manufacturer specifications for new furnace installations. Install cold air returns to second floor rooms as needed and where feasible.

h. In rooms other than kitchens and bathrooms with limited or no return air, add a return duct, undercut the door, or install a transfer grille or jumper-duct to improve the return airflow, with the owner's permission.

i. Return grills are not allowed in the combustion appliance zone and shall not be installed in unconditioned areas or unintentionally conditioned areas.

j. Consult with customers about the removal of existing supply grills on the plenum. A new supply register may be installed to replace plenum grilles at a location where conditioning is needed (e.g., a laundry area or work bench).

~~5)~~6) Boiler distribution systems shall be inspected for proper operation.

a. Flush the existing distribution system according to manufacturer's instructions. If instructions are not available, flush until water runs clear and free of sediment. For zoned systems, flush each zone separately.

b. Bleed air from the entire system.

c. Install an automatic fill valve ~~, air-excluding device,~~ and back-flow preventer if they are not present.

~~c.~~d. On compression (bladder style) expansion tanks, install an air excluding device if not present. Systems with standard (non-compression) style expansion tanks should not have automatic air excluding devices installed.

~~d.~~e. Install a compression tank, or fill the expansion tank and the system to the correct level. ~~If an existing tank is a pre-pressurized diaphragm type and the tank is older than ten years, install a properly sized new one.~~

~~e.~~f. Ensure all safety systems are operational. If a pressure relief valve is not present or not functioning properly, install one.

~~f.~~g. Install an electric vent damper where feasible for standard efficiency models.

~~g.~~h. Install thermostatically controlled radiator valves on the major radiators.

~~h.~~i. Install outdoor reset and boiler controls, if feasible.

~~i.~~j. Inspect radiators. Repair or replace as necessary.

~~j.~~k. Install automatic and manual air bleed valves to eliminate air from each high point in the distribution system if they are not present and functioning properly.

~~k.~~l. Inspect supply and return lines and connections and repair leaks.

~~l.~~m. Insulate supply and return piping, outside conditioned spaces, with foam or fiberglass pipe insulation.

~~m.~~n. Extend new piping and radiators to conditioned areas like additions and finished basements, currently heated by space heaters.

~~n.~~o. Insulate pipes in the circulating loop between the boiler and an indirect domestic water heater.

~~6)~~7) Outdoor reset controls

a. High efficiency boiler: Install an outdoor air temperature sensor and boiler controls to improve efficiency. Include outdoor reset for all boilers and warm weather shut-down, unless it affects domestic hot water.
b. Non-high efficiency boiler: Consider implementing the requirement identified in 6) a. above.

~~7)~~8) Install programmable thermostats with forced air systems. Relocate thermostats to interior walls and instruct occupants regarding the operation of setback thermostat. Programmable thermostats are the only allowable replacement thermostats that can be reported as an energy conservation measure. A reasonable effort shall be made to upgrade existing thermostats to a programmable thermostat that meets the household's needs. Properly recycle any thermostat that has been replaced. Many locations have designated collection facilities for household hazardous waste or conduct annual or occasional “clean sweeps.” Contact the nearest DNR regional office for local options: http://dnr.wi.gov/files/pdf/pubs/co/co110.pdf.

~~8)~~9) In the event the Grantee elects not to install a programmable replacement thermostat, a working thermostat shall not be replaced. If the current thermostat is non-functional, a conventional thermostat may be used but the cost shall be treated as a Repair Measure. The rationale for this is that there is no energy savings associated with a non-programmable thermostat. Report thermostats separately from heating system replacement costs. Properly recycle any thermostat that has been replaced.

~~9)~~10) Replace oil filters.

~~10)~~11) For forced air units that receive a clean and tune or replacement, provide the occupant with one of the following MERV 6 or higher filters:
a. One deep pleated (3" depth or more) disposable furnace filter, or
b. Six 1"-2" disposable filters (one installed; five replacements), or
c. One permanent cleanable filter.

~~11)~~12) Special filters for air cleaning may only be installed as a Health and Safety measure, based on a medical condition.

~~12)~~13) All forced air systems shall have a filter cover. Magnetic filter covers are allowable only if they provide an adequate seal to the ductwork to prevent air leakage.

~~13)~~14) For all heating system work, including replacements, a tag shall be prominently affixed to the heating unit identifying who the customer should call for service. The tag information shall include the name, address, and telephone number of the service organization.

~~14)~~15) Conduct Worst Case Draft (WCD) and building depressurization tests in all jobs having naturally vented combustion appliances. Documentation of the dwelling’s WCD test results shall be included in the dwelling file.

NEAT Modeling Guidance:

1) Model all modifications and repairs as indicated in Chapter 10.
2) Do not model programmable thermostats with the NEAT audit. Follow the specifications above to determine if a programmable thermostat should be installed. Identify the measure in the Itemized Cost tab. Do not check “Include in SIR”.
3) Do not model heating system clean and tune in the Heating tab. NEAT will generally select a clean and tune even if the heating system meets the criteria for replacement (B.4.1).

a. If the heating system needs a clean and tune it, add it in the Itemized cost tab. Do not check "Include in SIR".

B.4.3 Water Heater Replacement

General Policy: Model water heater conversion or replacement as an energy conservation measure with the NEAT audit based on the criteria listed in the specifications.

Informational Modeling: When end-state planning indicates a potential draft problem for naturally drafting water heaters (e.g., spillage or lack of sufficient draft) at the completion of weatherization, Informational Modeling is required. If a replacement has an SIR of less than 1.0, model the replacement in the Itemized Cost tab as a Health and Safety measure to determine if the job will have a cumulative SIR of 1.0 or greater with the replacement.

If the job does not have an SIR of 1.0 or greater with the replacement, the auditor shall determine if the job can be managed to avoid the draft problem, or if the job needs to be deferred.

Specifications:

1) Fuel switch water heater conversions: Model Water Heater conversion from electric to gas, LP to natural gas, or oil to gas as an energy conservation measure when the following conditions are met:
   a. Gas is available.
   b. The existing electric water heater is not load-controlled (time of use).
   c. The customer agrees to the conversion.

   Replace the water heater if selected by the audit as an ECM. The replacement water heater shall be power vented and shall meet ENERGY STAR® minimum EF standards, except where specified. See item 2 below.
2) Replacement without fuel switching. Model electric to electric or gas to gas water heater replacement as an energy conservation measure with the NEAT audit if the existing water heater is over-sized for the household or the water heater needs to be replaced as a Health and Safety Measure. Replace the water heater if the measure is selected by the audit as an ECM.
   a. The replacement electric water heater shall have a .954 EF.
   b. The replacement gas water heater shall meet the minimum ENERGY STAR® standard of .67 EF for 40 or 50 gallon units ~~or larger~~. Upgrade 30 gallon units to .67 EF 40 gallon units, wherever feasible. When not feasible, install a 30 gallon unit at 0.~~61~~ 63 EF.
3) Indirect water heaters may be installed when the building has, or will have, a high efficiency boiler and the water heater is selected as an as an energy conservation measure with the NEAT Audit (a minimum 1.0 SIR). Model the water heater in the Baseload tab using the Indirect Water Heater Factor worksheet, to establish the Energy Factor (EF) and Recovery Factor (RE) for the planned installation.
   a. When an existing indirect water heater must be replaced because of health and safety conditions model the replacement follow the procedures in 5) below.
   b. Removal and disposal of the old water heater is required.

4) The sizing of replacement water heaters shall consider the number of people in the household.
5) Replacement based on Health and Safety: Model the replacement water heater in the Baseloads tab. Check Replacement Required and Include in SIR. If the measure SIR is 1.0 or greater, report it in WisWAP as an ECM. If it is less than 1.0, report it as a Health and safety replacement. If the SIR is less than 1.0 and total Health and Safety costs are less than $1000, Include in SIR can be unchecked. Note: Replacement water heaters of the same type, with higher EF are allowed when a leaking water heater is replaced as a Health and Safety measure and there are acceptable draft and combustion appliance zone (CAZ) depressurization readings.
6) Affix a tag to the water heater identifying who the customer should call for service. The tag shall be prominently displayed and include the service provider's name, address, and telephone number.

NEAT Modeling Guidance:

Model all water heater replacements as an energy conservation measure in the "Baseload: Water Heater" tab. Fuel switching is allowable if the conversion criteria listed above in the specifications are met.

1) In the Baseload tab, model electric to electric, electric to gas, oil to gas, and gas to gas replacement or indirect water heater installation as an energy conservation measure. If the measure is selected by the audit as an ECM, replace the water heater.
   a. Model a replacement electric water heater with a minimum efficiency of .~~94~~ 95 EF.
   b. Model a replacement gas water heater that is power vented with the minimum ENERGY STAR® standard of .67 EF for 40 and 50 gallon units. Upgrade 30 gallon units to .67 EF 40 gallon units wherever feasible. When not feasible, install a power vented 30 gallon unit at .63~~1~~ EF.
2) Model a replacement water heater of the same type with higher EF when a leaking water heater is replaced as a Health and Safety measure and there are acceptable draft and CAZ depressurization readings.

B.5 Baseload Measures

B.5.1 Lighting

General Policy: Replace all incandescent light bulbs that have an estimated burn time of 1.5 hours or greater with CFLs meeting ENERGY STAR® standards. Replace all halogen torchieres with CFL torchieres.

Specifications:

1) Replace all incandescent bulbs that have an estimated burn time of 1.5 hours or greater with CFLs meeting ENERGY STAR® standards. Note: Grantees may use www.energystar.gov/CFLs to check for availability of ENERGY STAR® rated CFLs, and use non-rated CFL's when ENERGY STAR® is not available, documenting this in the customer file.

2) Replacement CFLs shall be appropriate for the intended use.
3) Replace all halogen torchieres with fluorescent equivalent fixtures, remove and dispose of old fixtures.
4) CFL dedicated replacement fixtures may be used, if appropriate.
5) Increase lighting efficiencies in common areas of multi-unit buildings.
6) All replacement CFLs and fixtures shall be installed and inspected prior to the completion of the dwelling unit.
7) Provide CFL disposal and clean-up instructions to customers with Guidebook.

NEAT Modeling Guidance:
DO NOT MODEL CFLs with NEAT. Follow policy and specifications listed above.

B.5.2 Domestic Water Heater Measures

General Policy: Insulate existing water heater tanks with less than R-10 insulation to R-24. ~~a minimum of R-10. Water heaters that are ENERGY STAR® labeled are exempt from this requirement.~~ Install showerheads and flow restrictors. Reduce water heater temperature to 120 degrees, where feasible.

Specifications:

1) Install 1.5 GPM or less showerheads and faucet aerators on every fixture.
2) Reduce water heater temperature to 120 degrees.
3) Insulate existing water heater tanks with less than R-10 existing insulation to R-24. ~~a minimum of an R-10~~. Mechanical fasteners and tape are required.
   a. When adding insulation to a water heater, install an extension pipe to the PRV if none is present.
   b. Do not add on to existing piping to address non-compliant code issues.
   c. Install PRV pipe extensions with the same inside diameter as the PRV.
4) Insulate all pipes on the circulating loop between the boiler and a sidearm water heater.

NEAT Modeling Guidance:
DO NOT MODEL domestic hot water measures with NEAT. Identify them in the Itemized Cost tab and do not check “Include in SIR.”

B.5.3 Refrigerator Replacement and Removal

General Policy: Model the refrigerator for replacement. The replacement unit shall meet the specifications in 11.4.19 Refrigerators (Standards for Conformance). Replacement refrigerators are limited to one per household. The unit being replaced shall be the least energy efficient one. De-manufacture and properly dispose of existing unit.

The refrigerator unit shall be a top freezer automatic defrost model with no through the door ice or water and no automatic ice-maker. Bottom-freezer refrigerator units shall be considered on a case-by-case basis for households with accessibility considerations. Model

the bottom-freezer replacement unit with the energy audit. If the audit generates an SIR of 1.0 or greater, document the reasons for installation of the specialty unit in the customer file. If the replacement does not have an SIR of 1.0 or greater, submit a waiver request to the Help Desk, specifying why a bottom-freezer unit is warranted. Side-by-side refrigerator/freezer units are not an allowable weatherization installation.

Offer a $100 incentive for removal of functional secondary refrigerators manufactured prior to 1993 or units with R12 refrigerant listed on the label, whenever possible. Remove, de-manufacture and properly dispose of operating secondary refrigerators. Incentives may be paid for the removal of a maximum of two refrigerators per household. Additional units that do not qualify for a bounty may be removed with customer approval. Report disposal costs in WisWAP with a comment about the additional unit disposal.

Specifications:

1) Follow the guidelines below to size the replacement refrigerator:

Existing Size	Modeled Size*	Example Exceptions
14.5 – 19.4 Cu. Ft.	17.5 – 19.4 Cu. Ft.	Large households, dimensions of opening
19.5 – 21.4 Cu. Ft.	19.5 – 21.4 Cu. Ft.	

*When exceptions dictate model the appropriate size. Use 16 Cu. Ft. refrigerator models rather than 15 Cu. Ft. when feasible.

2) De-manufacture and properly dispose all refrigerators removed.
3) Offer a $100 incentive for removal of additional functional units not being replaced.
   a. Incentives to remove a unit may be paid for a maximum of two refrigerators per household.

NEAT Modeling Guidance:
Model refrigerator replacement with NEAT. Replace the refrigerator if the measure has a minimum 1.0 SIR.

DO NOT MODEL refrigerator REMOVAL with NEAT. Follow the specifications above for removal incentives. Identify the removal in the Itemized Cost tab of NEAT. Do not check "Include in SIR."

B.5.4 Freezer Replacement and Removal

General Policy: Model functioning freezers for replacement that are equal to or greater than 14 cubic feet. The replacement unit shall meet the specifications in 11.4.19 Refrigerators (Standards for Conformance)~~ENERGY STAR® standards~~, and be a manual defrost freezer of comparable or smaller size than the existing freezer. Replacement freezers are limited to one per household. De-manufacture and properly dispose of existing units.

Existing chest type freezers shall be replaced with chest type freezers. An upright freezer may only be installed if a manual defrost chest type freezer will not fit in the allotted space or the occupant is unable to access a chest type freezer (see below for modeling instructions).

Offer a $100 incentive for removal of functioning freezers that are not being replaced, are ≥ 14 cubic feet and were manufactured prior to 1993 or have R12 refrigerant listed on the label. De-manufacture and properly dispose of freezer that is being removed. Incentives may be paid for the removal of a maximum of two freezers per household. Additional units that do not qualify for a bounty may be removed with customer approval. Report disposal costs in WisWAP with a comment about the additional unit disposal.

Specifications:

1) Document existing freezer information in the customer file and as required in WisWAP.
2) ~~All replacement freezers shall meet ENERGY STAR® standards.~~
2) Model freezers in NEAT using values obtained from the Freezer Replacement Calculator to determine if the freezer has an SIR of 1.0 or more. Maintain a copy of the completed Freezer Replacement Calculator in the client file (See 8.2 Client Files).
3) Replacement freezers shall be approximately equal to or less than the size of the existing freezers. In situations where downsizing is not feasible, consider the size of the family and the way they use the freezer in selecting a replacement freezer.
4) Upright freezer installations may be installed only if a manual defrost chest type freezer will not fit in the allotted space or the occupant is unable to access a chest type freezer. The limitations include:
   a. Replacement upright freezers shall be of comparable size or smaller than the existing upright freezer, but cannot exceed 19 cubic feet.
   b. ~~The upright freezer may be installed if the installation has an SIR of 1.0 or more.~~ Determine all costs associated with the upright freezer installation (delivery, set-up, removal, and proper de-manufacture and disposal of the existing unit). The upright freezer may be installed if the installation has an SIR of 1.0 or more. ~~Model freezers in NEAT using values obtained from the Simple Freezer Tool to determine if the upright freezer has an SIR of 1.0 or more. Maintain a copy of the completed Simple Freezer Tool in the customer's file.~~
5) Offer a maximum $100 incentive for removal of additional functional units.
   a. De-manufacture and properly dispose of all freezers removed.
   b. Incentives to remove a unit may be paid for a maximum of two freezers per household.
6) Consolidation: When two freezers are present, with the owner's permission model the combined total consumption for the two units with a single replacement unit of comparable volume up to 19 cubic feet. Units less than 14 cubic feet also qualify under consolidation.

NEAT Modeling Guidance:

Model replacement freezers in the itemized cost tab using values obtained from the Freezer Replacement Calculator ~~Simple Freezer Tool~~. Check "Include in SIR". The ~~Simple Freezer Tool~~Freezer Replacement Calculator is available on the T&TA site ~~at http://homeenergyplus.weccusa.org~~ under the Technical Assistance tab.

B.6 Health and Safety Measures

General Policy: Health and Safety measures are defined as the cost of materials and labor necessary to eliminate or reduce hazards existing before, or as a result of the installation of weatherization materials. Elimination of Health and Safety hazards using weatherization program funds shall be done in conjunction with energy conservation measures. Products meeting ENERGY STAR® standards shall be used when available. All H&S measures will be entered in the NEAT Itemized cost tab. See Chapter 10 for additional requirements. See B.8. NEAT User Defined Measures for 1-4 Unit Buildings for the list of Health and Safety measures to be included in the SIR. See also Chapter 12 Health and Safety for further information on specific topics. Health and safety measures are reported separately in WisWAP.

B.6.1 Depressurization and Worst Case Draft Testing

General Policy: See Chapter 10.

Specifications:

1) Complete depressurization testing on all dwellings with combustion zones before and after weatherization is completed.
2) Complete combustion safety tests on all dwellings with natural draft or fan assisted combustion appliances to ensure safe operation.
3) Confirm that the final CFM50 in dwellings with solid fuel burning appliances present or with appliances that cannot be tested for WCD are above the DTL. Install makeup air in dwellings that are below DTL or document existing make-up is already present.
4) Remedies for poor draft may include modifications to the flue or chimney, repairs or modifications to the furnace distribution system, or elimination of other negative pressures in the combustion zone.

NEAT Modeling Guidance:

Do not include worst case costs or makeup air costs when calculating the $1,000 limit for H&S costs.

1) List Worst Case and Makeup Air measures using the "Itemized Cost" tab.
2) Do not check the "Include in SIR" box.

It is not necessary to re-run NEAT if Health and Safety costs end up exceeding $1,000 for activities occurring during the course of weatherization that could not have been known at the time of the energy audit, except for heating system and water heater replacements (see 10.1.3). The decision to proceed with sidewall or attic insulation shall be made prior to the rewiring of those areas.

B.6.2 Water Heater Repair or Replacement

General Policy: Perform End-State Planning and Informational Modeling as outlined in Chapter 10. The decision whether or not to leave a natural draft water heater in a dwelling

shall be based on safe operation of the water heater (acceptable spillage, draft, and CO test results). Water heaters may be replaced as a Health and Safety measure if other methods to address poor draft and spillage listed in the depressurization specifications above, have failed. Water heaters may also be replaced if they are actively leaking.

Specifications:

1) Water heaters replaced because of depressurization problems or leaking shall follow the replacement specifications listed in B.4.3, Water Heater Replacement.
2) Replace actively leaking water heaters with same type, and higher Energy Factor, unless the water heater is eligible for conversion.
3) Photo documentation of the leaking water heater is required in the client file.

B.6.3 Mechanical Ventilation

General Policy: Install properly sized mechanical ventilation when needed to ensure indoor air quality. Whole building ventilation is based on the blower door measured air tightness, the number of occupants and the building dimensions. Use ASHRAE 62.2 calculations generated by the electronic Diagnostic Workbook to determine if ventilation is required. See the Weatherization Manual Chapter 10 and the Weatherization Field Guide, Chapter 5 for more details on mechanical ventilation installation requirements.

Existing local exhaust ventilation may be modified to provide either continuous or intermittent whole house ventilation at the required amount, based on the integrity of the existing installation. Using the Diagnostic Workbook, enter the CFM50, flow exponent, weather factor, building dimensions and occupant count, and the calculator will provide the ASHRAE 62.2 whole house ventilation requirements for the building, including an infiltration credit for the additional natural ventilation used to reduce the required amount of mechanical whole house ventilation. Whole house ventilation is calculated based on the current actual occupancy and floor area. *Do not* size the system for the number of bedrooms plus one. When a blower door test cannot be completed on the job; ventilation is based on the ASHRAE 62.2 with no infiltration credit.

In two to four unit buildings, where accurate individual unit blower door tests are not completed, use the ASHRAE formula to determine the building's ventilation requirements. Divide the total required ventilation between the units based on the percentage each unit contributes to the building's ventilation requirements.

Specifications:

The installation of mechanical ventilation is not required in buildings requiring 0 CFM or buildings with a calculated 20 CFM natural ventilation per occupant, or greater, as determined by the workbook. Install whole house ventilation only in buildings requiring more than 15 CFM continuous ventilation. Exceptions include:

1) Install local exhaust ventilation for spot moisture control in buildings requiring 1 CFM or more, where the existing spot ventilation is not operated by the occupants for a

reasonable amount of time per day. Provide the customer with education on proper use of spot ventilation.

2) Install local exhaust ventilation for spot moisture control in buildings requiring 1 CFM or more, where there is no ventilation. Provide the customer with education on proper use of spot ventilation.
3) Grantees may install local exhaust ventilation in any buildings where there is documented evidence of moisture or indoor air problems. Use ASHRAE 62.2 to determine the needed ventilation and utilize a controller that best meets the customer's needs.

Ventilation controllers shall have an on/off control option for customers. This may be accomplished by installing a controller with an on/off switch or a separate switch. Customers shall be provided with information on the current controller settings, ventilation needs and spot moisture control. This information is included in the document "Ventilation and Your Home", available on the Home Energy Plus Web site.

NEAT Modeling Guidance:

1) Model Health and Safety costs using the "Itemized Cost" tab.
   a. Do not include ventilation costs when calculating the Health and Safety costs.
2) Do not check the "Include in SIR" box.

B.6.4 Replacing Wood Heaters

General Policy: All replacement wood space heaters shall be listed appliances. All wood heaters shall meet applicable local codes and EPA requirements. All installations shall conform to the NFPA 211. All other applicable requirements shall be followed when replacing a wood stove.

Specifications:

1) All installations meet manufacturer's specifications.
2) All wood heating units are certified to meet the EPA emission standards or local standards, whichever is most restrictive.
3) Installed units are certified and labeled by:
   a. National Fire Protection Association under 211; or
   b. International Conference of Building Officials; or
   c. Other equivalent listing organization.
4) Visually inspect chimney for safe operation by referring to NFPA 211.
5) Install a stack thermometer where appropriate on all wood space heater installations. Follow the manufacturer's recommendation for proper installation.
6) Follow the manufacturer's recommendations for providing outdoor combustion air.
7) All clients shall receive in-home operation instructions to include proper wood-burning practices, proper maintenance and safety recommendations including the need for fire extinguishers.

It is important that customers understand the potential impact of exhaust ventilation on wood heater operation.

B.6.5 Other Health and Safety Measures

General Policy: Examples of other Health and Safety measures include:

1) Asbestos treatments, as necessary.
2) When not present or when existing smoke detectors are non-functional, install a smoke detector in the basement and on each floor in the thermal envelope. When feasible, locate the alarms in the vicinity of the sleeping area(s). See Weatherization Field Guide Chapter 5.~~Install smoke detectors in dwellings with wood heat. A smoke detector shall be installed on the floor where the wood heater is located and in the bedroom area if bedrooms are located on a separate floor. See Weatherization Field Guide Chapter 5~~
3) When not present or when existing carbon monoxide alarms are non-functional, install a carbon monoxide alarm in the vicinity of sleeping area(s).If the sleeping areas cannot be monitored with one detector more than one detector shall be installed. See Weatherization Field Guide Chapter 5. ~~Install carbon monoxide alarms in units where naturally vented combustion appliances, including gas ranges, will remain at the completion of the work, and all dwellings with attached garages.~~

NEAT Modeling Guidance:

Model Health and Safety measures exceeding $1,000 using the "Itemized Cost" tab. Select the measure from the drop-down menu. Check "Include in SIR" box. The minimum cumulative building SIR shall be 1.0 in order to complete the planned repairs.

B.7 Repair

General Policy: Repair is defined as items necessary for the effective performance or preservation of weatherization materials. For modeling purposes all repair measures shall be modeled with the energy conservation measure that requires the repair for effective performance or preservation. When the repair covers multiple ECMs, model the repair in the Itemized Cost tab. Report the repair costs under the appropriate Repair category in WisWAP. Buildings that cannot be weatherized without the repairs shall be deferred. Examples of repairs include repair of leaking roofs, repair of electrical systems, or repair of hot and cold water leaks.

NEAT Modeling Guidance:

Model repairs with the ECM that requires the repair. If the repair is required for multiple ECMs, model the repair in the Itemized Cost tab.

1) Select the measure from the drop down menu.
2) Check "Include in SIR" box.
3) The minimum cumulative building SIR shall be 1.0 in order to complete the planned repairs.

B.7.1 Window Repair or Replacement

General Policy: See B.3.4 Window Replacement.

B.7.2 Door Replacement

General Policy: Model door replacements in NEAT. Primary doors may be replaced only as a repair measure. Replace doors as a repair measure when there is a deteriorated door that cannot be repaired. If the building has a minimum cumulative SIR of 1.0 the door replacement may be completed.

Specifications:

1) Replacement doors shall be a minimum of R-5.
2) Patio doors are not an allowable measure.
3) Doors may be replaced only if the door is in the primary heating envelope and has any of the following characteristics:
   a. Rotting occurring on either the door jamb or the door blank;
   b. Holes or cracks in the door jamb or door blank; or
   c. Door repair will not allow the door to operate correctly.

All door replacement and/or repair shall be completed using Lead Safe Weatherization procedures, under the supervision of a Lead Safe Renovator. Any person who completes this work shall have been trained in Lead Safe Weatherization procedures.

Note: Photographs shall be taken to document specifically why the door was replaced.

NEAT Modeling Guidance:

Model replacement doors using the Itemized Cost tab.

1) Select the measure from the drop down menu.
2) Check "Include in SIR" box.
3) The minimum cumulative building SIR shall be 1.0 or greater in order to complete the planned repairs.

B.8 NEAT User Defined Measures for 1-4 Unit Buildings

Itemized Cost Tab: Include in SIR Guide

B.8.1 Energy Conservation Measures

#	Type	Measure Name	Include In SIR
1	Air Infiltration	ABD010 Blower Door Setup	No
2	HVAC Systems	JHSM035 Seal Ducts	No
3	HVAC Systems	JHSM010 Disposable Filters	No
4	HVAC Systems	JHSM005 Clean and Tune	No

5	HVAC Systems	JHSM015 Setback Thermostat	No
6	HVAC Systems	JHSM011 Cleanable Filters	No
7	Baseloads	PCFL005 CFL Bulbs	No
8	Baseloads	PCFL025 CFL 3-Way Bulb	No
9	Baseloads	PCFL020 Exterior CFL Bulbs	No
10	Baseloads	PCFL010 Torchiere Replacement	No
11	Baseloads	PCFL015 LED Exit Light	No
12	Baseloads	MWHT005 Flow Restrictors	No
13	Baseloads	MWHT025 Tank Insulation	No
14	Baseloads	MWHT020 Showerhead	No
15	Baseloads	MWHT015 Reduce Temperature	No
16	Baseloads	MWHT010 Pipe Insulation	No
17	Building Insulation	DIA120 Attic Prep - No Attic Insulation	Yes
18	HVAC Systems	JHSM020 First Floor Ductwork	Yes
19	HVAC Systems	JHSM030 Insulate Ducts	No
20	HVAC Systems	JHSM025 Second Floor Ductwork	Yes
21	Baseloads	VFR005 Freezer Replacement	No
22	Baseloads	VFR010 Freezer Removal	No
23	Baseloads	URR005 Refrigerator Replacement	Yes
24	Baseloads	URR010 Refrigerator Removal	No
25	Building Insulation	DIFO020 Exterior Foundation Insulation (Slab)	Yes
26	HVAC Systems	JHSR060 Electric Conversion	Yes
27	HVAC Systems	JBM010 Compression Tank	Yes
28	HVAC Systems	JBM035 Backflow Preventer	Yes
29	HVAC Systems	JBM005 Automatic Fill Valve	Yes
30	HVAC Systems	JBM060 Boiler Distribution System Modifications	Yes
31	HVAC Systems	JBM020 Outdoor Reset	Yes
32	HVAC Systems	JBM055 Zone Valves	Yes
33	HVAC Systems	JBM040 Modulating Aquastat	Yes
34	HVAC Systems	JBM025Radiator New or Replacement	Yes
35	HVAC Systems	JBM030 Radiator Valves	Yes
36	HVAC Systems	JBM045 Intermittent Ignition Device (IID)	Yes
37	HVAC Systems	JBM015 Electric Vent Damper	Yes
38	Baseloads	MWHC005 Gas power vent from conventional gas	Yes
39	Baseloads	MWHC010 Gas power vent from electric	Yes
40	Baseloads	MWHC035 Indirect Fired Water Heater	Yes

B.8.2 Repairs and Health & Safety Measures

#	Type	Measure Name	Include In SIR

1	Health and Safety	XHAL005 CO Detector New or Replace	Yes if Total H&S >$1000
2	General Repairs	ZRAQ005 Dryer Venting	Yes
3	Health and Safety	XHAR005 62.2 Exhaust Ventilation	No
4	Health and Safety	XHAQ005 Worst Case Draft Test	No
5	Health and Safety	XHAQ006 Worst Case Depressurization w/o Draft	No
6	General Repairs	ZRRS040 Other Repair	Yes
7	Health and Safety	XHHW010 Water Heater Repair	Yes if Total H&S >$1000
8	Health and Safety	XHAQ035 Other Remediation Air Quality	Yes if Total H&S >$1000
9	Health and Safety	XHAQ045 Gas Leak Repair	No
10	Health and Safety	XHHS025 Furnace Repair	Yes if Total H&S >$1000
11	General Repairs	ZRRS045 Ventilation - Soffit/Roof/Gable	Yes
12	Health and Safety	XHHW007 Gas power vent from conventional gas	Yes if Total H&S >$1000
13	Health and Safety	XHEL015 Upgrade or Repair Electric	Yes if Total H&S>$1000
14	General Repairs	ZREL005 Upgrade or Repair Electric Service	Yes
15	Health and Safety	XHAQ007 Chimney Liner	Yes if Total H&S >$1000
16	Health and Safety	XHAL010 Smoke Detector New or Replace	Yes if Total H&S >$1000
17	Health and Safety	XHAL020 Combo Smoke/CO Detector	Yes if Total H&S >$1000
18	General Repairs	ZRHW005 Water Heater Repair	Yes
19	General Repairs	ZRHW010 Plumbing Repair or Replace	Yes
20	Health and Safety	XHHS020 Furnace Replace	Yes if Total H&S >$1000
21	Health and Safety	XHHS030 Ducts Repair or Replace	Yes if Total H&S >$1000
22	Health and Safety	XHAP015 Appliance Repair or Replace	Yes if Total H&S >$1000
23	General Repairs	ZRHS030 Thermostat Replacement - Not Energy Star	Yes
24	General Repairs	ZRRS030 Door Replacement R9	Yes
25	General Repairs	ZRRS005 Chimney	Yes
26	General Repairs	ZREL015 Knob and Tube Replace Attic	Yes
27	General Repairs	ZREL020 Knob and Tube Replace Walls	Yes

28	Health and Safety	XHHS010 Boiler Repair	Yes if Total H&S >$1000
29	Health and Safety	XHHS015 Boiler Radiators, Repair or Replace	Yes if Total H&S >$1000
31	Health and Safety	XHHW004 Electric to Electric .94	Yes if Total H&S >$1000
32	Health and Safety	XHHW005 Water Heater Replace	Yes if Total H&S >$1000
33	Health and Safety	XHHS005 Boiler Replace	Yes if Total H&S >$1000
34	Health and Safety	XHHW008 Gas power vent from electric	Yes if Total H&S >$1000
35	General Repairs	ZRRS035 Window Replacement Energy Star Rated	Yes
36	General Repairs	ZRRS020 Walls	Yes
37	General Repairs	ZRRS010 Floors	Yes
38	General Repairs	ZRRS015 Roof	Yes
39	Health and Safety	XHSS030 Lead Paint Remediation	Yes if Total H&S >$1000
40	Health and Safety	XHAR015 Heat or Energy Recovery Ventilator	No
41	Health and Safety	XHAR010 Exhaust Ventilation with Makeup Air	No
42	Health and Safety	XHHS035 Space Heater Replace	Yes if Total H&S >$1000
43	Health and Safety	XHHS040 Space Heater Repair	Yes if Total H&S >$1000
44	Health and Safety	XHHS050 Wood Repair	Yes if Total H&S >$1000
45	Health and Safety	XHHS045 Wood Replace	Yes if Total H&S >$1000
46	Health and Safety	XHHS055 Electric Replace	Yes if Total H&S >$1000
47	Health and Safety	XHHS060 Electric Repair	Yes if Total H&S >$1000
48	Health and Safety	XHAQ040 Cook Stove Repair	Yes if Total H&S >$1000
49	Health and Safety	XHHW015 Plumbing Repair or Replace	Yes if Total H&S >$1000
50	Health and Safety	XHSS035 Other Remediation Structure	Yes if Total H&S >$1000
51	Health and Safety	XHSS005 Chimney	Yes if Total H&S >$1000

52	Health and Safety	XHSS010 Floors	Yes if Total H&S >$1000
53	Health and Safety	XHSS015 Roof	Yes if Total H&S >$1000
54	Health and Safety	XHSS020 Walls	Yes if Total H&S >$1000
55	Health and Safety	XHAQ025 Dehumidifier New or Replace	Yes if Total H&S >$1000
56	Health and Safety	XHAS005 Attic with Vermiculite	Yes if Total H&S >$1000
57	Health and Safety	XHAS010 Attic with Non-Vermiculite ACM	Yes if Total H&S >$1000
58	Health and Safety	XHAS015 Sidewalls with Vermiculite	Yes if Total H&S >$1000
59	Health and Safety	XHAS020 Sidewalls Slate/Stucco Siding	Yes if Total H&S >$1000
60	Health and Safety	XHAS025 HVAC/Distribution	Yes if Total H&S >$1000
61	Health and Safety	XHAS030 Miscellaneous ACM	Yes if Total H&S >$1000
*	Health and Safety	XHAR007 Local Exhaust Ventilation	No
*	Health and Safety	XHAR009 Venting Existing Exhaust	No
*	General Repairs	ZRHS035 Fuel Switching	Yes

* New Item

Appendix C – Mobile Home Measures Summary and MHEA Modeling Requirements

C.1 General Specifications

1) All work will follow applicable codes and regulations.
2) All work shall follow the regulations of all authorities having jurisdiction.
3) All materials will be installed to manufacturer specifications.
4) All debris shall be removed from the job site and properly disposed, recycled, or delivered to a licensed hazardous waste facility, as is appropriate.
5) All building permits are the responsibility of the Grantee.
6) The Division Administrator or his or her designee will be the final authority for any questions regarding these specifications and measures.
7) Grantees shall provide a description of maintenance and operation of measures to building occupants.
8) Products meeting ENERGY STAR® standards are listed as materials specifications in several areas. Grantees shall install products meeting ENERGY STAR® standards where indicated.
9) All materials used shall meet the requirements outlined in the Weatherization Manual.
10) Document all exceptions to the Field Guide installation procedures.
11) Use the MHEA Audit for all manufactured housing. Install the measures listed on the MHEA Recommended Measures report, Energy Savings Measures Economics list (or Energy Savings Measures Economics, Adjusted list when fuel consumption data is modeled). There are some exceptions. Complete the following measures using Wisconsin protocols:
    - Programmable thermostats
    - Compact florescent lighting
    - Low-flow shower heads
    - Faucet flow restrictors
    - Refrigerator and freezer bounties
    - Air and duct sealing

C.2 Shell and Shell Interactive Measures

All shell and shell interactive measures shall be completed in the order listed.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Test and Seal Duct Work	• Use blower door and pressure pan or duct blaster to guide distribution sealing. • Seal supply ductwork in mobile home belly so that cumulative reading of all registers is ≤ 3 Pascals (@ 50 Pa pressure difference). Seal major supply leaks: 1) furnace to plenum connection; 2) boot to floor and boot to plenum duct; 3) slip joint connections; and; 4) Crossover connections in doublewide units. • Visually inspect with a mirror and flashlight. • Convert all belly-return systems to a living space return system by rerouting returns to furnace cabinet door. Assure that there is adequate return air.	Do not model duct sealing for mobile home distribution systems. In "Ducts/Infiltration, Air and Duct Leakage" tab, DO NOT check "Evaluate duct sealing". Document whole house blower door readings (or estimates) in the Air or Duct Leakage tab. For actual sealing work, follow WI Policy and Specifications (column to the left).
Repair Holes Belly	• Repair any holes in the mobile home belly, using a proper repair material. • Note: Seal duct work in the mobile home belly prior to sealing belly.	Model measure with MHEA. Belly repair may be modeled as an Energy Conservation Measure (ECM) if costs are included with belly insulation and the SIR ≥ 1.0, or as a repair measure. “Itemized Cost” tab: check “Include in SIR”. To report belly repair as an ECM the repair materials shall be an insulation product, such as polyisocyanurate board.

Floor Insulation	• Insulate mobile home floors (belly cavity) to maximum structurally allowable with blown fiberglass insulation.
	• Insulate to maximum structurally allowable below the heating ducts.
	• Install a minimum of 2 inches of insulation between water pipes and the belly barrier and below the ducts.
	  • When not possible, installing an exterior patch of insulation is allowed.
	  • Install blown fiberglass at a density of 1.25 to 1.75 pounds per cubic feet.
	• *Do not dense-pack or over-fill area.*
	• Coverage shall be complete under heated areas.
	  • Exceptions shall be documented and linked to excessive floor cavity depth, structural issues or Health and Safety issues.
	• A 6-mil vapor barrier may be installed over exposed earth, based on site conditions.
		Model measure with MHEA.
		Identify # of inches to closest R-value for WisWAP report. Use an insulation value of R-2.5/inch.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	Note: Prior to insulating the belly: Seal duct work and repair holes in the belly.	
Air Sealing: Non-guideline	• Complete Non-guideline Sealing work. For Specifications see air sealing below.	Follow WI Policy and Specifications (column to the left). For modeling instructions, see air sealing below.

Attic Insulation	• Insulate to R-19, or maximum structurally allowable with blown fiberglass insulation.
	  • Insulate with complete coverage and uniform density.
	  • Vent all exhaust fans to the exterior. Insulate exhaust fans ducts when feasible to R-10.
	  • Attic preparation includes building barriers around fan housings and recessed lighting and sealing chimney and other obvious bypasses.
	  • Install blown fiberglass at a density of 1.25 to 1.75 pounds per cubic feet.
	• *Do not dense-pack or over fill area.*
		Model measure with MHEA:
		Identify # of inches to closest R-value for WisWAP report. Use an insulation value of R-2.5/inch.
		Include attic access costs in attic insulation cost or in "Itemized Cost" tab in MHEA.
		Identify costs for the attic access separately for WisWAP.

Sidewall Insulation	• Insulate to R-11.
	  • Inspect exterior siding and the interior wall materials to determine if installing insulation is needed and to assure that conditions allow for insulation installation. Inspect the electrical system. Repair, as needed, based on allowable program repair costs.
	  • Insulate walls with complete coverage and uniform density throughout the accessible wall cavity.
	  • Installing insulation above windows is not required.
	• *Do not dense-pack or over fill so as to create siding or interior wall structural problems.*
	• Walls with an exterior access for the water heater may be treated in one of two ways:
	  • Insulate water heater closet door and associated wall area. Cover air vents if they are present and route combustion air (for gas units) from underneath the belly or through skirting.
	  • Seal and insulate the common wall between the living area and water heater closet. Water heater and pipes shall be insulated to prevent freeze-up problems.
	• **Caution:** Assure that the combustion air sleeve is properly sealed and drawing air from outside of the water heater CAZ. Assure that the water heater is properly drafting at the completion of the work.
	• Note any exceptions to treatment.
		Model measure with MHEA.
		Identify # of inches to closest R-value for WisWAP report. Use an insulation value of R-2.5/inch.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Windows: Insider Storms	• Install insider storm windows on windows with primary single pane glass and no storm when the measure SIR is ≥1.0. • Install insider storm windows on windows with primary single-pane glass and no storm as a repair when not selected by MHEA as a measure, and the cumulative SIR is ≥1.0. • Replace damaged insider storm windows on windows with primary single pane glass as a repair and the cumulative SIR is ≥1.0. Repair or replace storm window glass, when the glass is cracked or broken, but there is no degradation of the storm window's frame.	Model interior storm windows as an ECM by using the "evaluate all" option under the window tab. Model interior storm windows as a repair in the "Itemized Cost" tab and check "Include in SIR." *Enter quantity and location in the comments section of the itemized measure.*
Windows: Replacement	• Replace primary windows when the measure SIR is ≥1.0 • Primary windows that qualify can be modeled as a repair when the measure SIR is <1 and the cumulative SIR is ≥1.0. • Replacement windows shall meet ENERGY STAR® standards. **Specifications:** To consider a window for replacement, it must meet both of the following conditions: 1) The window(s) must be located in the primary heating envelope. 2) The window(s) must have rotted, broken or deteriorated frames or sashes. Note: Take photographs of each window to be replaced. The photographs shall document specifically why the window was replaced. Repair or replace window glass, when the glass is cracked or broken, but there is no degradation of the window's frame and or sash.	Model primary windows as an ECM by using the "evaluate all" option under the window tab. Model replacement windows as a repair in the "Itemized Cost" tab and check "Include in SIR." *Enter quantity and location in the comments section of the itemized measure.*
Air Sealing	• For more information on WI protocols and air sealing see **Chapter 10 Air Sealing-1-4 Unit Buildings and Mobile Homes** • Use Blower Door to guide sealing work, whenever possible • Complete any non-guideline sealing, such as missing or broken windows, key junctures and all major bypasses. • Seal all major bypasses and key junctures. Note: attic bypasses shall be sealed prior to insulating attic. • Follow Wisconsin Cost-Effective Sealing Guidelines. • Use the Diagnostic Workbook to guide air sealing, and maximum exhaust ventilation.	Enter data from whole house blower door readings (or estimates) in the Air or Duct Leakage tab. The air sealing estimate establishes a baseline SIR for the mobile home. In the 'Duct/Infiltration' tab, DO NOT check 'Evaluate Duct Sealing.' Enter pre blower door reading (or estimate) CFM50; enter a post-blower door estimate. Enter the grantees average cost for mobile home air sealing will

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options

	• See **Chapter 10 Combustion Safety Testing and Depressurization in 1-4 Unit Buildings and Mobile Homes** to determine the options for addressing combustion appliances in mobile homes exceeding the maximum depressurization guidelines
	• Conduct worst-case draft (WCD) tests in all units having naturally vented combustion appliances.
	  • Test each combustion zone. Test the heating system first and then test the water heater as necessary.
	  • The tests may also be done at the same time using multiple testing options on the digital gauge and hose configuration.
	  • When water heater closet has an exterior door, try to insert testing equipment probe via interior pathways.
	  • Measure the combustion zone with respect to the outside.
	  • When testing outside, use baffles or other devices to shelter the reference tap if high wind is a factor. Follow the depressurization guidelines below.
	  Heating Systems:
	  Natural Draft: -5 Pascals
	  Induced Draft: -15 Pascals
	  Sealed Combustion: -25 Pascals
	  Water Heaters:
	  Natural Draft: -2 Pascals
	  Direct Vent: -5 Pascals
	• Direct vent water heaters shall have a dedicated combustion air sleeve and continuous flue vent. The combustion air sleeve shall be properly sealed to assure that combustion air is drawn from outside of the water heater CAZ .The water heaters shall be rated for mobile home use. Some manufacturers may refer to direct vent water heaters as sealed combustion.
		be entered in the cost box when you tab through an empty box.
		Multiply the estimated cfm50 reduction by this amount and enter it into the cost box.
		If the cost entered differs from the grantee's average cost there shall be documentation in the comments box as to why a different cost was entered for this job. Variances from the average cost shall be based on an actual "Before Weatherization" blower door test.
		One example of conditions where the cost of air sealing may be lower than the average costs is when sealing a large hole in the belly rodent barrier achieves a significant reductions in air leakage at a much lower cost.
		For actual sealing and safety testing follow WI Policy and Specifications (column to the left).

C.3 Baseload Measures

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Lighting	• Replace all incandescent light bulbs that have an estimated burn time of 1.5 hours per day or more with CFLs meeting ENERGY STAR® standards, when availableNote: Grantees may use www.energystar.gov/CFLs to check for availability of ENERGY STAR® rated CFLs, and use non-rated CFL's when ENERGY STAR® is not available, documenting this in the customer file. • Replacement CFL shall be appropriate for intended use.	Do not use MHEA to guide lighting retrofits. Use WI policy and specifications.

<table>
<tr><th>Measure</th><th>WI Policy and Specifications</th><th>MHEA Modeling and Measure Options</th></tr>
<tr><td></td><td>• Replace all halogen torchieres with CFL torchieres.</td><td></td></tr>
<tr><td>Refrigerator Replacement and Removal</td><td>Replace existing unit with a properly sized product meeting specifications in 11.4.19 Refrigerators (Standards for Conformance)~~ENERGY STAR® standards~~. The refrigerator unit shall be top freezer automatic defrost with no through the door ice or water and no automatic ice-maker. Bottom freezer refrigerator units will be considered on a case-by-case basis for households with accessibility considerations. Side-by-side refrigerator/freezer units are not an allowable weatherization installation. Replacement refrigerators are limited to one per household. De-manufacture and properly dispose of pre-existing unit.

Specifications:
1) Follow the guidelines below to~~Unless there are special conditions,~~ size the replacement refrigerator~~ based on household size~~:

<table>
<tr><th>Existing Refrigerator Size</th><th>Modeled Size*</th><th>Example Exceptions</th></tr>
<tr><td>14.5 – 19.4 Cu. Ft.</td><td>17.5 – 19.4 Cu. Ft.</td><td rowspan="2">Large households, dimensions of opening</td></tr>
<tr><td>19.5 – 21.4 Cu. Ft.</td><td>19.5 – 21.4 Cu. Ft.</td></tr>
</table>
*When exceptions dictate model the appropriate size

2) De-manufacture and properly dispose all refrigerators removed.
3) Offer a $100 incentive for removal of additional functional units not being replaced.
a. Incentives to remove a unit may be paid for a maximum of two refrigerators per household.
4) Additional units that do not qualify for a bounty may be removed with customer approval.</td><td>Model refrigerator replacement with MHEA.

Use MHEA's recommendations for refrigerator replacement.

For installation guidance, follow WI Policy and Specifications (column to the left).

MHEA cannot model removal incentives. Follow WI Policy and Specifications (column to the left).</td></tr>
<tr><td>Freezer Replacement and Removal</td><td>Model functioning freezers that are equal to or greater than 14 cubic feet. The replacement unit shall ~~meet ENERGY STAR® standards, and~~ be a manual defrost freezer of comparable or smaller size than the existing freezer. Replacement freezers are limited to one per household. De-manufacture and properly dispose of existing units.

The ~~Simple Freezer Tool~~ Freezer Replacement Calculator is available on the T&TA site at http://homeenergyplus.weccusa.org under the Technical Assistance tab. Existing chest type freezers shall be replaced with chest type freezers. An upright freezer may only be installed if a manual defrost chest type freezer will not fit in the allotted space or the occupant is unable to access a chest type freezer (see below for modeling instructions).

Offer a $100 incentive for removal of functioning freezers that are ≥ 14 cubic feet. De-manufacture and properly dispose of freezer that is being removed. Incentives may be paid for the removal of a maximum of two freezers per household. Additional units that do not qualify for a bounty may be removed with customer approval. Report disposal costs in WisWAP with a comment about the additional unit disposal.</td><td>Do not use MHEA to guide freezer replacement. Follow WI Policy and Specifications (column to the left).

MHEA cannot model removal incentives. Follow WI Policy and Specifications (column to the left).</td></tr>
</table>

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	Specifications: 1) Document existing freezer information in the customer file and as required in WisWAP. 2) All replacement freezers shall meet the specifications in 11.4.19 Refrigerators (Standards for Conformance). ~~ENERGY STAR® standards.~~ 3) Replacement freezers shall be approximately equal to or less than the size of the existing freezers. In situations where downsizing is not feasible, consider the size of the family and the way they use the freezer in selecting a replacement freezer. 4) Upright freezer installations may be installed only if a manual defrost chest type freezer will not fit in the allotted space or the occupant is unable to access a chest type freezer. The limitations include: a. Replacement upright freezers shall be of comparable size or smaller than the existing upright freezer, but cannot exceed 19 cubic feet. b. The upright freezer may be installed if the installation has an SIR of 1.0 or more. Determine all costs associated with the upright freezer installation (delivery, set-up, removal, and proper de-manufacture and disposal of the existing unit). 5) Offer a maximum $100 incentive for removal of additional functional units. a. De-manufacture and properly dispose of all freezers removed. b. Incentives to remove a unit may be paid for a maximum of two freezers per household.	
Domestic Hot Water Treatments	• Install showerheads, flow restrictors, insulate 6' of hot and cold water pipes from water heater. • Reduce water heater temperature to 120 degrees. • Install water heater tank insulation on water heaters with < R-10 to R-24. ~~up to R-10 minimum (unless they are Energy Star®).~~ • Follow the manufacturer's recommendations, if any, for additional tank insulation.	DO NOT use MHEA to guide domestic hot water heater treatments. Follow WI Policy and Specifications (column to the left).

C.4 Mechanical Measures

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Heating System	**Inspect heating System** Evaluate for condition and health and safety issues. Complete a steady-state efficiency test following the manufacturer's recommendations.	Model all heating systems in MHEA.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	Clean and Tune and Repair Based on the auditor's inspection, a clean and tune may be performed on natural and LP Heating systems that will not be replaced (see also 10.1.3(2)(b)). Perform a clean and tune on oil heating systems that will not be replaced.	Do not model tune and clean with MHEA; this measure has been disabled. Order tune and clean based on inspection.
	Heating System Replacement Replace the heating system as and energy conservation measure (ECM) based on MHEA recommendation. Informational Modeling: If the heating system replacement has an SIR of less than 1.0, model the replacement in the Itemized Cost tab as a Health and Safety Replacement for each job. Not all heating systems will be replaced. Follow the protocol below to determine if the system will be replaced. Unsafe furnaces that have an SIR less than 1.0. • Replace the heating system if the job has a cumulative SIR of 1.0 or greater with the Health and Safety replacement. If the system is safe, determine the useful life of the furnace using the Useful Life Calculator. If the system has less than 5 years of useful life and estimated repair costs greater than $500, replace the system if the job has a cumulative SIR of 1.0 or greater with the Health and Safety replacement. Fuel switch of primary heating system is allowed if the savings-to-investment ratio (SIR) of both the measure and the job are 1.0 or greater when modeled with MHEA, and natural gas or LP are available. • All replacement heating systems shall be rated for manufactured housing, and meet the minimum efficiency standards, specified in Chapter 11 and as listed in the AHRI Product Directory: http://www.ahridirectory.org/ahridirectory/pages/home.aspx. • Replacement wood systems are exempt from the efficiency standard. Note: repair or replacement of a wood heating system is a health and safety measure. See health and safety for more information. • Install properly sized units according to REScheck®, ACCA Manual J, or an equivalent industry accepted sizing formula. • The replacement heating system shall fit the footprint of the existing heating system to ensure that the compartment accommodates the replacement heating system. • All replacement units shall meet applicable local codes. • Use a condensate pump when necessary to reach a suitable drain. • Condensate lines shall be installed in a manner that	**Model heating system replacement with MHEA as an ECM.** Replace heating system based on MHEA's recommendation.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	guards against freezing. • Include a new base with the replacement heating system unless the existing base matches the new furnace. • Properly remove and dispose of the existing furnace. • A tag shall be prominently affixed to the heating unit identifying who the customer should call for service. The tag information shall have the name, address, and telephone number of the service organization. • Use existing distribution system and gas supply line. • Replace the fuel line filter for oil furnaces. • See Duct Sealing Section for additional information. • Convert all belly-return systems to a living space return system by rerouting returns to furnace cabinet door. • Assure that there is adequate return air. • Before installing the furnace, carefully seal the base plate to the floor in order to prevent air leakage through the belly and floor. • Attach the furnace base firmly to the duct connector. Seal all seams between the base, the duct connector, and main duct with mastic and fabric tape. • Provide a complete water-tight weather seal at the roof penetration. Reinforce the area underneath the roofing with plywood or other strong material if necessary to create a strong patch and to prevent a low spot in the roof at the penetration. It is best for any roof patch to be slightly elevated from the surrounding roof, to prevent water collection at the patch.Provide occupant with additional filter media of the type recommended by the heating system manufacturer or similar to materials already present on the system. • Provide an owner's manual with heating system replacements. • Unsafe heating systems and wood systems may be replaced as a Health and Safety Measure. See health and safety measures for more information.	

Programmable Thermostats	• Upgrade existing thermostat to a programmable thermostat, which meets the household's needs.
	  • Instruct occupants regarding operation of programmable thermostat.
	• Maintain existing thermostat for households unwilling or unable to use programmable thermostat.
	  • If the current thermostat is nonfunctional, a conventional electronic thermostat may be installed but the cost shall be treated as a repair.
	  • Relocate thermostat to interior walls.
	• Properly recycle old thermostats containing mercury. Many locations in Wisconsin have designated collection facilities for household hazardous waste or conduct annual or occasional "clean sweeps." Contact the nearest DNR regional office for local options: http://dnr.wi.gov/files/pdf/pubs/co/co110.pdf
		Do not use MHEA to guide programmable thermostat installation. Use WI policy and specifications.
		
		Report thermostats separately from heating system replacement costs.
		
		Programmable thermostats are reported as an ECM.
		
		Non-programmable thermostats are reported as a repair.

Water Heater	• Replace water heaters based on MHEA	Model all water heaters

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Replacement	recommendation. • Fuel switching from electric, oil, or LP to natural gas or LP is encouraged when there is gas available and no time of use is present. • The replacement water heater shall be rated for mobile home use and meet the following minimum efficiency standards as listed in the latest edition of the AHRI Directory of Product Performance: http://cafs.ahrinet.org/gama_cafs/sdpsearch/search.jsp?table=RWH. • 30 gallon gas units shall have a minimum .61 EF; larger gas units shall have a minimum .59 EF. • Electric units shall have a minimum .93 EF. • Informational Modeling: • When end state planning indicates a potential draft problem for naturally drafting water heaters (e.g., spillage or lack of sufficient draft) at the completion of weatherization, Informational Modeling is required. If a replacement has an SIR of less than 1.0, model the replacement in the Itemized cost tab as a Health and Safety measure to see if the job would still have an SIR of 1.0 or greater with the replacement. • If the job would not have an SIR of 1.0 or greater with the replacement, the auditor has to determine if the job can be managed to avoid the draft problem, or if the job has to be deferred. • All replacement water heaters shall be properly sized based on: • The number of people in the household. • The space available for installation. • It is recommended to change out a 30-gallon water heater with a higher efficiency 40 gallon heater when feasible. • Follow manufacturer's instructions and the National Electric Code to establish a proper electrical connection. • Measure and adjust gas pressure to follow manufacturer's specifications. • Follow manufacturer's venting instructions along with the International Fuel Gas Code to establish a properly venting system. • Follow manufacturer's instructions to establish a proper combustion air system. Combustion air shall be properly sealed to prevent the potential of back-drafting. • Ensure there are no gas leaks in any of the supply piping. • Ensure there is a proper sediment trap on gas line. • Ensure that water lines do not leak. • Fill tank with water before turning water heater on. • Measure and adjust temperature settings to 120º F as necessary. • Test for carbon monoxide level in exhaust venting. • Removal and disposal of the old unit is required.	considered for replacement as an energy conservation measure in conversion in the "Baseload: Water Heater" tab. Switching the fuel to natural gas is allowable if the conversion conditions listed in the policy (column to the left) are met. Model electric, oil, and LP to natural gas or LP, and electric to electric and gas to gas replacement as an energy conservation measure. If the measure has an SIR of ≥1.0, replace the water heater as an energy conservation measure. Replacement based on Health and Safety: Model the replacement water heater in the Baseloads tab. Check 'Replacement Required' and Include in SIR. If the measure SIR is 1 or greater, report it in WisWAP as an ECM. If it is less than 1, report it as a Health and safety replacement. If the SIR is less than 1, "Include in SIR" can be unchecked when the cost of Health and Safety measures will not exceed $1,000.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	• A tag shall be prominently affixed to the heating unit identifying who the customer should call for service. The tag information shall have the name, address, and telephone number of the service organization. • Note: water heaters may also be replaced based on Health and Safety conditions.	

C.5 Health and Safety Measures

NOTE: See Chapter 12 – Health and Safety for further information on specific topics.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
If Health and Safety costs will exceed $1,000, include the costs in the SIR. Ventilation costs are exempt from the $1,000.		

Health and Safety: Miscellaneous	• Eliminate hazards that pose an immediate threat to the Health and Safety of occupants.
	• Measures may include, but are not limited to:
	  • Repair unsafe chimneys.
	  • Vent bathroom and kitchen exhaust fans to the exterior.
	  • Install a smoke detector ~~only when there is wood heat~~in the vicinity of the sleeping area(s).
	  • Install a carbon monoxide alarm~~s~~ in the vicinity of the sleeping area(s).~~:~~
	  ~~• Dwelling units where naturally vented combustion appliances, including gas ranges, will remain at completion of the work~~
	  • ~~All dwellings with an attached garage.~~
		Use MHEA 'Itemized Cost' tab to select Health and Safety Measures.
		
		Include Health and Safety Measures in SIR if the estimated costs exceed $1,000.
		
		DO NOT include ventilation costs in SIR.

Health and Safety: Heating Systems	• Unsafe or inoperable heating systems and wood systems may be replaced as a Health and Safety Measure.
	  • Document the unsafe condition(s) in the customer file and MHEA.
	• Wood heating systems shall meet applicable local codes and EPA requirements.
	• Wood heating Installations shall conform to NFPA 211 and HUD requirements for wood heaters in manufactured housing.
	  • Document test results on all replaced and existing heating systems in the dwelling file.
		Use MHEA to model all furnaces for ECM replacement.
		If furnace does not come up as an ECM measure, force the furnace by checking "Replacement Required".
		If furnace has an SIR <1.0 or causes belly insulation to be dropped from the measures list, replace as a Health & Safety measure.
		Use MHEA 'Itemized Cost' tab to select Health and Safety furnace replacement.
		Check “Include in SIR” if the estimated cost of the

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
		Health and Safety Measures exceed $1,000.
Health and Safety Water Heaters	• Assure natural gas or LP water heaters are properly drafting. Options may include modifications to the flue or chimney to achieve sufficient draft, balancing pressure between rooms in the mobile home, assuring that combustion air is drawn from outside the CAZ. • Replace actively leaking water heaters with same type, higher Energy Factor, unless the water heater is eligible for conversion (see water heater replacement above). Photo documentation of the leaking water heater is required in the customer file. • Replacement water heaters shall meet the specification listed under "Mechanical Systems, Water Heater Replacement."	Replacement based on Health and Safety: Model the replacement water heater in the Baseloads tab. Check Replacement Required and Include in SIR. If the measure SIR is 1 or greater, report it in WisWAP as an ECM. If it is less than 1, report it as a Health and safety replacement. If the SIR is less than 1, "Include in SIR" can be unchecked when the cost of Health and Safety measures will not exceed $1,000. Follow WI Policy and Specifications (column to the left) for Health and Safety water heater replacement.
Health and Safety Ventilation	• Install properly sized mechanical ventilation when needed to ensure indoor air quality, based on the Diagnostic Workbook calculations. See Appendix B for policy and specifications. • New/replacement fans installed shall meet ENERGY STAR® standards OR be designed specifically for mobile home retrofit. • Do not over-size exhaust ventilation in tight mobile homes (low cfm50). (See Chapter 10 on more information on combustion safety requirements).	Use MHEA 'Itemized Cost' tab to select Health and Safety Measures. DO NOT include ventilation costs in SIR.

C.6 Repair Measures

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
Model all repair costs with the MHEA audit. Include in SIR.		

Repair: Miscellaneous	• Necessary repairs for the installation and preservation of weatherization materials.
	• Examples of repair measures include:
	  • Dryer Venting
	  • Upgrade or Repair Electric Service
	  • Water Heater Repair
	  • Water Heater Access Door Replacement
	  • Plumbing Repair or Replace
	  • Chimney Repair
	  • Floors Repair
		Model repair measure with MHEA using "Itemized Cost" tab. Check "Include in SIR".
		
		Repair may also be modeled as an added cost with an associated shell measure, such as roof repair modeled with attic insulation. Repair cost shall be reported as repair in WisWAP.

Measure	WI Policy and Specifications	MHEA Modeling and Measure Options
	• Roof Repair • Walls Repair • Ventilation - Soffit/Roof/Gable	If job cumulative SIR ≥ 1.0 the measure may be completed.
Window Replacement	• Install replacement windows only when an insider storm window will not address the problem. • Model window replacement as a repair in the MHEA's itemized cost tab. The windows may be replaced if the cumulative SIR for the mobile home is >= 1.0. • Replacement windows shall meet ENERGY STAR® standards. • The work shall be done in a lead safe manner. • Replace windows only in the primary heating envelope. • Repair windows with a cracked or broken pane of glass, but where degradation of the frame and or sash is not substantial. • Take photographs of each window to be replaced. The photograph shall document specifically why the window was replaced (e.g., deteriorated frames and sash).	Model windows as a Repair. Use "Itemized Cost" tab. Check "Include in SIR". If job cumulative SIR ≥ 1.0 the measure may be completed.

Door Replacement	Primary doors may be replaced following the conditions stated in protocols below. Replacement doors are not required to meet ENERGY STAR® standards.
	• Replace doors only in the primary heating envelope that have any of these characteristics:
	  • The existing door is damaged beyond repair and constitutes a severe air-leakage problem.
	  • Moisture damage on either the door jamb or the door blank.
	  • Large holes or cracks in the door jamb or door blank.
	• Replacing patio doors is not an allowable measure.
	• Replacement doors shall qualify as either :
	  • A standard mobile home replacement door, or
	  • A standard door of at least R-5.
		Model door replacement with MHEA, using one of two methods.
		
		Use "Itemized Cost" tab. Check "Include in SIR".
		
		Use 'Door' tab: check 'Replacement Door Required'.
		
		If job cumulative SIR ≥ 1.0 measure may be completed as a repair.

C.7 MHEA User Defined Measures

Itemized Cost Tab Health & Safety or Repair Measures

C.7.1 Energy Conservation Measures

#	Type	Measure Name	Include In SIR
1	Air Infiltration	ABD010 Blower Door Setup	No
2	HVAC Systems	JHSM035 Seal Ducts	No
3	HVAC Systems	JHSM010 Disposable Filters	No
4	HVAC Systems	JHSM005 Clean and Tune	No
5	HVAC Systems	JHSM015 Setback Thermostat	No
6	HVAC Systems	JHSM011 Cleanable Filters	No

7	Baseloads	PCFL005 CFL Bulbs	No
8	Baseloads	PCFL025 CFL 3-Way Bulb	No
9	Baseloads	PCFL020 Exterior CFL Bulbs	No
10	Baseloads	PCFL010 Torchiere Replacement	No
12	Baseloads	MWHT005 Flow Restrictors	No
13	Baseloads	MWHT025 Tank Insulation	No
14	Baseloads	MWHT020 Showerhead	No
15	Baseloads	MWHT015 Reduce Temperature	No
16	Baseloads	MWHT010 Pipe Insulation	No
17	Building Insulation	DIA120 Attic Prep - No Attic Insulation	Yes
18	HVAC Systems	JHSM020 First Floor Ductwork	Yes
19	HVAC Systems	JHSM030 Insulate Ducts	No
21	Baseloads	VFR005 Freezer Replacement	No
22	Baseloads	VFR010 Freezer Removal	No
23	Baseloads	URR005 Refrigerator Replacement	Yes
24	Baseloads	URR010 Refrigerator Removal	No
25	Building Insulation	DIFO020 Exterior Foundation Insulation (Slab)	Yes
26	HVAC Systems	JHSR060 Electric Conversion	Yes

C.7.2 Repairs and Health & Safety Measures

#	Type	Measure Name	Include In SIR
1	Health and Safety	XHAL005 CO Detector New or Replace	Yes if Total H&S>$1000
2	General Repairs	ZRAQ005 Dryer Venting	Yes
3	Health and Safety	XHAR005 62.2 Exhaust Ventilation	No
4	Health and Safety	XHAQ005 Worst Case Draft Test	No
5	Health and Safety	XHAQ006 Worst Case Depressurization w/o Draft	No
6	General Repairs	ZRRS040 Other Repair	Yes
7	Health and Safety	XHHW010 Water Heater Repair	Yes if Total H&S>$1000
8	Health and Safety	XHAQ035 Other Remediation Air Quality	Yes if Total H&S>$1000
9	Health and Safety	XHAQ045 Gas Leak Repair	No
10	Health and Safety	XHHS025 Furnace Repair	Yes if Total H&S>$1000
11	General Repairs	ZRRS045 Ventilation - Soffit/Roof/Gable	Yes
13	Health and Safety	XHEL015 Upgrade or Repair Electric	Yes if Total H&S>$1000
14	General Repairs	ZREL005 Upgrade or Repair Electric Service	Yes

16	Health and Safety	XHAL010 Smoke Detector New or Replace	Yes if Total H&S>$1000
17	Health and Safety	XHAL020 Combo Smoke/CO Detector	Yes if Total H&S>$1000
18	General Repairs	ZRHW005 Water Heater Repair	Yes
19	General Repairs	ZRHW010 Plumbing Repair or Replace	Yes
20	Health and Safety	XHHS020 Furnace Replace	Yes if Total H&S>$1000
21	Health and Safety	XHHS030 Ducts Repair or Replace	Yes if Total H&S>$1000
22	Health and Safety	XHAP015 Appliance Repair or Replace	Yes if Total H&S>$1000
23	General Repairs	ZRHS030 Thermostat Replacement - Not Energy Star	Yes
24	General Repairs	ZRRS030 Door Replacement R9	Yes
25	General Repairs	ZRRS005 Chimney	Yes
26	General Repairs	ZREL015 Knob and Tube Replace Attic	Yes
27	General Repairs	ZREL020 Knob and Tube Replace Walls	Yes
30	Health and Safety	XHHW003 Electric to Electric Mobile Home .90	Yes if Total H&S>$1000
32	Health and Safety	XHHW005 Water Heater Replace	Yes if Total H&S>$1000
35	General Repairs	ZRRS035 Window Replacement Energy Star Rated	Yes
36	General Repairs	ZRRS020 Walls	Yes
37	General Repairs	ZRRS010 Floors	Yes
38	General Repairs	ZRRS015 Roof	Yes
39	Health and Safety	XHSS030 Lead Paint Remediation	Yes if Total H&S>$1000
40	Health and Safety	XHAR015 Heat or Energy Recovery Ventilator	No
41	Health and Safety	XHAR010 Exhaust Ventilation with Makeup Air	No
42	Health and Safety	XHHS035 Space Heater Replace	Yes if Total H&S>$1000
43	Health and Safety	XHHS040 Space Heater Repair	Yes if Total H&S>$1000
44	Health and Safety	XHHS050 Wood Repair	Yes if Total H&S>$1000
45	Health and Safety	XHHS045 Wood Replace	Yes if Total H&S>$1000
46	Health and Safety	XHHS055 Electric Replace	Yes if Total H&S>$1000

47	Health and Safety	XHHS060 Electric Repair	Yes if Total H&S>$1000
48	Health and Safety	XHAQ040 Cook Stove Repair	Yes if Total H&S>$1000
49	Health and Safety	XHHW015 Plumbing Repair or Replace	Yes if Total H&S>$1000
50	Health and Safety	XHSS035 Other Remediation Structure	Yes if Total H&S>$1000
51	Health and Safety	XHSS005 Chimney	Yes if Total H&S>$1000
52	Health and Safety	XHSS010 Floors	Yes if Total H&S>$1000
53	Health and Safety	XHSS015 Roof	Yes if Total H&S>$1000
54	Health and Safety	XHSS020 Walls	Yes if Total H&S>$1000
55	Health and Safety	XHAQ025 Dehumidifier New or Replace	Yes if Total H&S>$1000
*	Health and Safety	XHAR007 Local Exhaust Ventilation	No
*	Health and Safety	XHAR009 Venting Existing Exhaust	No
*	General Repairs	ZRHS035 Fuel Switching	Yes
*	General Repairs	ZRRS036 Mobile Home Insider Storm	Yes

* New Item

Appendix D - Multifamily Building (5+ Unit) Weatherization Measures, Improvements, and Specifications

D.1 General Policy and Specifications

1) All work will be completed in a professional manner.
2) All materials will be installed according to manufacturer specifications. For more specific information on installation procedures and guidance see the Wisconsin Weatherization Field Guide.
3) All debris shall be removed from the job site and disposed of properly. Any hazardous materials shall be properly disposed of or recycled where appropriate.
4) All work will follow the Wisconsin Commercial Building Code, any commissioning requirements as applicable or other codes and regulations by the authority having jurisdiction.
5) Building permits, plan review and approval, and any related costs are the responsibility of the Grantee, or contractor implementing a measure under contract to the Grantee.
6) Contractors providing services in five plus unit buildings shall be licensed and/or registered to provide those services, if required by the authority having jurisdiction.
7) The Division Administrator or his/her designee will be the final authority for any questions regarding these specifications and measures.
8) A minimum inspection sample of 8 units or 25 percent, whichever is larger, is required for all buildings. The inspection sample shall include units from each floor and each building exterior wall orientation (e.g. direction), and shall be representative of each type of unit in the building. All common areas shall be inspected and addressed in the energy audit.
9) Building owner contributions may be used to the cover the cost (or portion of the cost) of any weatherization measure allowed by the State of Wisconsin that does not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building, under the following conditions:
    a. The owner's contribution shall be equal to or exceed the buy-down amount needed to generate an SIR greater than or equal to 1.0.
    b. The owner's contribution shall be at least 15 percent of the total cost of measures performed when the heat is master-metered.
    c. The buy-down of measures shall not result in other cost-effective measures being dropped from the improvement package. All measures that were cost-effective after the initial energy audit is conducted shall remain on the list of measures to be completed at the property.
    d. The cumulative SIR of the building's measures package shall be greater than or equal to 1.0.
    e. There shall be documentation in the building/customer file of the energy audit, including measures that will be completed which have an initial SIR of less than 1.0.
    f. A summary of all costs associated with the weatherization of the building, including non-federal resources, shall be retained in the building/customer file. For 5-24 unit buildings, use the Owner Contribution worksheet, which is part of the 5-24 Unit Workbook, to document the calculations in the file.

g. Where owner contributions are substantial, it is recommended the contribution be received in advance and placed into an escrow account prior to starting weatherization work.

10) Weatherization measures that will change the appearance of buildings that are 50 years or older are subject to review by the Wisconsin Historical Society. See the Wisconsin Weatherization Program Manual, Chapter 8.5 for more information and instructions.
11) Grantees shall make every effort to install products meeting ENERGY STAR® standards, whenever feasible. They are listed as materials specifications in several places. If a product meeting ENERGY STAR® standards is not available, request approval from the Division to use another product (see lighting exception below). Products that meet ENERGY STAR® standards do not require prior approval. Note: Grantees may use www.energystar.gov/CFLs to check for availability of ENERGY STAR® rated CFLs, and use other energy efficient lighting types when ENERGY STAR® is not available, documenting this in the customer file.
12) All materials used shall meet the requirements outlined in the Weatherization Manual, Chapter 11 - Weatherization Materials.
13) All weatherization work shall be completed in an asbestos and lead safe manner, as applicable. Where required, lead safe work shall be supervised by a certified Lead Safe Renovator. For more information, see the Weatherization Manual Chapter 12.2 Lead Safe Weatherization and Appendix E – Minimum Standards for Lead Safe Weatherization (LSW), and see section 12.4 on asbestos and Appendix F - Asbestos Containing Materials (ACM) Policy and Procedures.
14) The Wisconsin Department of Natural Resources (DNR) requires 5+ unit buildings be inspected for asbestos by a Certified Asbestos Inspector prior to renovation. See the following DNR fact sheet for details on when notification to DNR is required: http://dnr.wi.gov/files/PDF/pubs/am/AM366.pdf
15) Fuel consumption documentation requirements.
    a. Master metered 5-24 unit buildings shall have heating fuel consumption records for the preceding 12 months submitted by the building owner as a part of the certification process.
    b. Master metered buildings with 25+ units shall have actual master meter consumption records for both heating and electrical records.
    c. Buildings with individual mechanical systems in each unit shall have the actual consumption records for each unit. Tenants not certified as Home Energy Plus eligible (free riders) will need to provide fuel consumption records to the building owner or the grantee.
        i. When fuel records are unavailable, free riders will need to sign a release to allow access to their utility records.
    d. When fuel records are not available for individual units, use the Therm Calculator worksheet in the 5-24 Unit Workbook. This calculator will project the total building fuel consumption using a median consumption projection for units without actual data, based on heating costs or partial consumption data.
16) Buildings with 5 to 24 units will be modeled using the NEAT audit.
    a. Actual fuel records or Therm Calculator projections shall be used in conjunction with the energy audit.
    b. Use the 5-24 Unit Workbook, available on the T&TA site at http://homeenergyplus.weccusa.org under the Technical Assistance tab, to generate savings information for multiple measures. The savings information and

costs shall be incorporated into NEAT's Itemized Cost section to evaluate multiple measures.
   c. Single measures or measures not addressed in the 5-24 Unit Workbook shall be modeled in the appropriate NEAT tab.

17) Buildings with 25 units or more:
   a. Shall be modeled using the TREAT audit, using a DES-designated auditor.
   b. Shall use actual heating and electrical consumption records in conjunction with the energy audit.
   c. Shall be submitted for DES review at the following stages:
      i. After building assessment and utility consumption are complete.
      ii. When TREAT audit is completed.
      iii. When estimated costs are obtained for modeled measures.
      iv. When bid specifications are completed (for measures that will be bid).
      v. When bids are received.
      vi. When the building is completed.
18) Grantees shall provide the property owner with all design documents related to the building's improvement. This includes documents such as a drawings, manuals, work plans, and warranties. The service provider is also required to demonstrate to the owner or their representative start-up, operation, control, adjustment, and trouble-shooting of various equipment upgrades. These requirements are outlined in Section D.7, Property Owner Education Standards.
19) Instructions for modeling 5-24 unit buildings using the Weatherization Assistant software are posted on the Home Energy Plus website under Multifamily Resources (5+): http://homeenergyplus.wi.gov/category.asp?linkcatid=494&linkid=122&locid=25

D.2 Building Shell Measures

In most cases, the entire building exterior shell will be modeled with NEAT or TREAT. NEAT modeling may include separate audits for each unit or the units may be modeled for cumulative measures and average conditions. This is contingent on the building design. As noted above, actual data from a representative sample of 25 percent of a building's units is required using either audit.

D.2.1 Ceiling or Attic Areas

General Policy: Model all ceiling/attic spaces for insulation up to R-50. Model the maximum capacity that the space can accommodate and the energy audit will model. Install the level of insulation the energy audit selects with an SIR greater than or equal to 1.0. Determine the effective R-value of the existing insulation based on the number of gaps in the insulation coverage. Seal applicable key junctures and bypasses prior to insulating. Incorporate related repair cost into the ceiling/attic insulation costs.

Specifications:

1) Install insulation in such a manner that there is complete and consistent coverage of the area with no gaps, mounds, or untreated penetrations through the field of insulation.
2) Determine the effective R-value of existing insulation by assessing the gaps in the insulation coverage. Use the following information to guide effective R-value estimates.

a. Good - One inch of insulation in good condition with unbroken coverage will have an R-value between 2.5 and 3.75 (contingent on the type of product).
b. Fair - One inch of insulation in fair condition (small gaps and penetrations) will have an R-value between 1.75 and 2.6 (approximate 30 percent loss in R-value).
c. Poor - One inch of insulation in poor condition (a number of gaps and penetrations) will have an R-value between 1.0 and 1.5 (approximate 60 percent loss in R-value).

3) Insulate hatches or doors to the R-value of the ceiling/attic insulation or the maximum structurally allowable, whichever is lower. Pre-fabricated scuttles may be used. Box around scuttles to allow for repeated access. ~~Secure the hatch with mechanical fasteners.~~
4) Insulate limited-access ceilings or attics, such as vertical, horizontal, or sloped to the maximum structurally allowable. Common methods include the “dense pack” technique for loose-fill insulation or rigid insulation installed with a roof cap.
5) The cost of necessary repair measures shall be included with the energy conservation measure (ECM) being modeled.
6) Seal important joints, chases, chutes, and bypasses before or during insulation.
7) Vent all exhaust fans to the exterior and seal and insulate the exhaust duct to a minimum of ~~R-6~~R-8.
8) Build barriers around fan housings, recessed lighting, and knob and tube wiring as part of ceiling/attic preparation procedures.
9) Install roof venting as needed.
10) Post an insulation certificate near the entrance to the treated area.

D.2.2 Sidewall Insulation

General Policy: Model all uninsulated exterior walls of heated spaces to the maximum structurally allowable. Install insulation if the SIR is greater than or equal to 1.0. Incorporate related repair cost into the sidewall insulation costs.

Specifications:

1) Insulate the sidewalls using the “dense pack” technique for loose-fill insulation.
   a. Other insulation products are subject to review and approval by the Division of Energy Services.
2) Follow procedures in the WI Weatherization Field Guide for insulation blower setting and installation techniques.

D.2.3 Foundation Insulation

General Policy: Model foundation walls or floors that define the heating envelope, including the exterior walls of unintentionally conditioned crawlspaces, sill boxes, and slab-on-grade assemblies, for insulation with an energy audit. Start with modeling the maximum R-value the energy audit allows, based on structural capacity. Install the R-value that generates the highest SIR greater than 1.0, or provides the best R-value within the package of improvements. Install insulation only if the SIR is greater than or equal to 1.0. Incorporate related repair cost into the foundation insulation costs.

Specifications:

1) Insulate floors where they define the heating envelope to the maximum R-value structurally allowable.
2) Insulate the accessible areas of slab-on-grade foundations to a minimum of R-5, and to a maximum of 6” below grade. Use foam board with a durable weather resistant coating.
3) Seal and insulate accessible crawl-space walls to a minimum of R-12 and to a maximum of R-19. Typical applications include fiberglass insulation, 2-part foam, or rigid insulation.
   a. Install a vapor retarder over exposed earth in limited-access crawl-spaces.
   b. Do not install a vapor retarder in any traffic area.
4) Seal and insulate sill box areas using faced fiberglass, rigid board, or 2-part foam up to a maximum of R-19. The sill box area shall be sealed prior to insulating.
5) Do not install insulation if it will cause or worsen an existing moisture problem.
6) Follow procedures in the WI Weatherization Field Guide for installation techniques.

D.2.4 Window Replacement

General Policy: Model windows that meet the replacement criteria as an improvement. Replacement windows shall meet ENERGY STAR® standards. Replace the window as an ECM if the SIR is greater than or equal to 1.0. Building owners may opt to replace existing windows that do not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building. The owner’s contribution shall be equal to or exceed the buy-down amount needed to generate an SIR equal to or greater than 1.0.

Specifications:

1) Windows to be replaced shall be located in the primary heating envelope and shall be beyond repair (e.g. have rotted or deteriorated frames or sashes). Cloudiness inside insulated glass (IG) units because of seal leakage does not constitute “failure” of the window or of the IG unit.
2) Re-weather stripping of existing windows is allowed as an air sealing measure.
3) Photographs of 25 percent of the windows to be replaced shall document why the windows were replaced (e.g., rotted frames or rotted sashes). The sample shall be representative of each floor and each building exterior wall orientation (e.g. direction).
3) A window with a cracked or broken pane of glass, but where degradation of the frame and or sash is not occurring, will have only the glass repaired or replaced.
4) Window replacement in pre-1978 buildings shall be completed using lead-safe work practices, under the supervision of a certified Lead Safe Renovator. For more information see the Weatherization Manual Chapter 12.2. – Lead Safe Weatherization and Appendix E – Minimum Standards for Lead Safe Weatherization (LSW).
5) Window replacements in buildings that are 50 years old or older are subject to historic review by the Wisconsin Historical Society.

D.2.5 Door Replacement

General Policy: Model doors that are deteriorated beyond repair for replacement as an improvement or a repair. Doors may be replaced within the entire improvement package or when the building has a cumulative SIR equal to or greater than 1.0.

Specifications:

1) Replacement doors shall have a maximum U-value of .2.
2) Replacement patio doors are not an allowable measure. Doors may be replaced only if the door is in the primary heating envelope and has any of the following characteristics:
   a. Rotting is occurring on either the door jamb or the door blank.
   b. Holes or cracks are present in the door jamb or door blank.
   c. Door repair will not allow the door to operate correctly.
3) Photographs shall be taken of all doors to be replaced.
4) Door replacements in buildings that are 50 years old or older are subject to historic review by the Wisconsin Historical Society.

D.2.6 Air Sealing

General Policy: In 5-24 unit buildings, complete pre- and post-retrofit blower door tests whenever feasible. Seal all probable heat bypasses and key junctures. Repair or replace glass as needed. Whenever feasible, based on site-specific conditions, use diagnostic tools such as depressurization, infrared scanners, and smoke pencils to determine the appropriate sealing locations in the building, specific units, and common areas. Provide sealing work that will improve the thermal boundary of the building and address the tenant comfort zone. Air sealing procedures may differ between low-rise and high-rise buildings. Combustion safety procedures may differ between central versus individual combustion appliance zones (CAZ). For energy audit purposes, estimate the air leakage in the building by taking the square footage of the building surface above grade by a leakiness factor. Use the chart below as a guide for estimating air leakage per cubic feet per minute (CFM) per 50 Pascals.

Building Tightness Projections: 5+ Unit Buildings
(all measurements are CFM/square foot above grade)

		Post WX	
Building Type	**Pre-WX**	**Average**	**Very Tight**
Wood Frame		(25% Reduction)	(35% Reduction)
Average	1.00	0.75	0.66
Leaky	1.25	0.9	0.8
Very Leaky	1.5	1.1	0.9
Masonry	0.66	0.5	0.4

In the “Air and Duct Leakage” tab, enter the pre-CFM50 blower door reading and estimated post-CFM50 reading. The grantee’s average costs per cfm50 reduction will be entered in the cost box when you ‘tab’ through the empty box. Multiply the estimated cfm50 reduction by this amount and enter it into the cost box. If the cost entered differs from this amount there shall be documentation in the comments box as to why a different cost was entered for this job.

Specifications:

1) Prior to insulating, air seal as follows:
   a. Use the Multi-family Building Air Sealing Checklist to check and air seal typical air leakage locations, including but not limited to, heat bypasses between party walls and between the building and buffer zones, and building's key junctures.
   b. Whenever feasible, use depressurization, infrared scanners, and smoke pencils as diagnostic tools to guide air sealing of attic bypasses, the sill box area, and key junctures.
   c. Replace missing or broken window glass and seal gross holes in the building envelope.
2) After insulating, provide sealing work that will improve conditions in the tenant’s comfort zone.
3) See section E. Health and Safety, E.1 Depressurization and Worst Case Draft Testing for information on safety tests that may have an impact on air sealing. All air sealing shall be completed using materials with the proper fire rating. See the Weatherization Manual, Chapter 11 – Weatherization Materials, for more information.
4) Where appropriate, follow the basic air sealing procedures in the WI Weatherization Field Guide.

D.3 Mechanical Systems Measures

D.3.1 Heating Unit Replacement

General Policy: Model heating systems for replacement with an energy audit under the conditions listed below. The combustion efficiency of heating systems shall be measured. The annual efficiency shall be entered into the energy audit. Fuel switching replacement heating systems from oil, LP, or electric (furnace only) to natural gas is allowed when the total cost for fuel switching the system is modeled with an energy audit (or an SIR calculator) and the measure has an SIR of at least 1.0. The replacement of both primary and secondary heating systems is allowable as long as each replacement meets a minimum SIR of 1.0.

In TREAT model the primary and secondary heating systems. In TREAT model the primary system for replacement as an ECM first. In buildings with individual heating systems in each unit and/or common areas, test all heating systems in sample units. Total the BTU output capacity for the building and average the efficiency information in the energy audit.

Building owners may opt to replace existing heating systems that do not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building. Miscellaneous heating system repair measures that are required for the heating system to function properly shall be incorporated with the cost of the heating system replacement. The owner’s contribution shall be equal to or exceed the buy-down amount to generate an SIR equal to or greater than 1.0. Note: as stated in the General Policy and Specifications, the buy-down of measures shall not result in other cost-effective measures being dropped

from the improvement package. All measures that were cost-effective after the initial energy audit is conducted shall remain on the list of measures to be completed at the property.

Replacement heating systems shall meet ENERGY STAR® standards whenever possible. Replacement heating systems that are not addressed in these specifications are subject to review and approval by the Division of Energy Services. All replacement heating systems shall follow the requirements of the Wisconsin Commercial Building Code, SPS 364 and the International Mechanical Code, as referenced by SPS 364 or any other commissioning requirements of the authority having jurisdiction.

1) Gas Heating Systems - Natural Draft: Model all gas-fired heating systems for replacement. Inspect fan-assisted systems for potential safety issues and model for replacement if safety issues cannot be repaired.
2) Gas Heating Systems - Sealed Combustion: Inspect systems for potential safety issues and model for replacement if safety issues cannot be repaired.
3) Oil Heating Systems: Model for replacement if the existing system is 10 years or greater in age. Inspect systems less than 10 years old for potential safety issues and model for replacement if safety issues cannot be repaired.
4) Space Heaters: Model for replacement if the existing space heater is 10 years or greater in age. If necessary, use the 5-24 Unit Workbook to generate savings information for multiple space heaters, incorporating the savings information and costs into NEAT's Itemized Cost section. Include all of the costs associated with the fuel switch in the replacement costs. Inspect systems less than 10 years old for potential safety issues and model for replacement if safety issues cannot be repaired.
5) Electric Furnace Conversion: Model for replacement with gas furnace with the energy audit or the Electric Heating System Conversion Calculator. Model conversion to a hydronic (boiler-driven) fan coil unit with TREAT. Include all of the costs associated with the fuel switch in the replacement costs. Inspect all units that will not be replaced for potential energy conservation measures and safety issues.

Specifications: All replacement heating systems, except wood burning units, shall meet the minimum efficiency standards specified in Chapter 11 and as listed in the AHRI Directory of Certified Product Performance: http://www.ahridirectory.org/ahridirectory/pages/home.aspx. The type of efficiency standard varies based on the fuel type and the heating system type (commercial versus residential).

1) Use existing distribution system and gas supply line.
2) Properly remove and dispose of existing unit.
3) Provide an owner's manual with heating system replacements. Ensure that the owner or building manager receives training regarding effective operation, and procedures for start-up, operation, maintenance, and seasonal shut-down.
4) Install properly sized and commissioned units following the requirements of the Wisconsin Commercial Building Code or the authority having jurisdiction.
5) Install a condensate pump where needed to reach an appropriate drain. Condensate pipes generally may drain to 1) a laundry stand pipe; 2) a new standpipe, indirect or local waste pipe; or 3) a floor with a floor drain when the pipe can be properly secured and does not pose a hazard to the occupants. All installations require an air break. Condensate lines cannot be drilled directly into any drain pipe. For the more

information see the Wisconsin Plumbing Code SPS 382.33. Condensate pumps may be installed using existing receptacles, new GFCI receptacles, or directly wired per manufacturer's recommendations.

6) When required, an approved gas pipe type will be installed, supported, and electrically bonded in accordance with NFPA-54. Follow the manufacturer's specifications for installation. For more information see NFPA-54/International Fuel Gas Code Chapter 4.
   a. When CSST is present in the building and not correctly bonded, bond the gas piping system to the electrical ground in accordance with NEC 250.94 and 250.104.
7) Seal openings in chimneys where atmospheric vented appliances are eliminated. When sealed, a written notice on the chimney that the chimney is no longer functional is recommended.
8) The installer shall guarantee materials and labor for heating system replacement for a period of one year, starting from the date of satisfactory installation.

D.3.2 Other Heating Systems Work

General Policy: When possible, model the following measures/improvements with the energy audit. When an improvement is not a specific measure, incorporate it and any additional improvement that will maximize the heating system's efficiency, into the improvement package.

6) Natural Gas and LP Heating Systems that will not be replaced *may* receive a clean and tune, based on inspection. Oil heating systems that will not be replaced *shall* receive a clean and tune.
7) Distribution systems shall be evaluated and tested. Seal all hydronic return and supply leaks. Seal all large forced air return and supply leaks. Modify as needed. Seal and insulate ducts and make-up air cabinets in unheated areas.
8) When existing CSST is found not bonded, the agency may properly bond the existing CSST per NFPA 54 (sec 7.13.2), 2015 IFGC (sec 310.1.1), and NFPA 70 (NEC).
~~8)~~9) Programmable thermostats may be installed on forced air systems when the existing thermostat must be replaced and the occupant is willing and able to program the replacement thermostat.
~~9)~~10) Duct air handler systems that supply secondary heat to common areas, via fan coil units fed by the central boiler, may be installed to eliminate a secondary heating system.
~~10)~~11) Improve controls to maximize energy savings.

Specifications:

1) Forced Air:
   d. Clean and tune oil furnaces, unless replaced. Clean and tune gas furnaces if needed.
   e. Forced air distribution systems shall be inspected and tested for adequate return air and for health and safety problems.
   f. Seal all major return and supply leaks.
   g. There shall be adequate air flow for the system. Follow the manufacturer's recommendations. (Note: see the WI Weatherization Field Guide for additional guidance).

h. Seal and insulate ductwork in unheated areas to ~~R-10~~with a minimum of R-11 foil-faced insulation, including make-up air ducts for ventilation systems. Ducts may be insulated with two-part foam products that meet the federal specification for duct insulation. In addition, when possible, incorporate the ducts into the heating envelope by insulating over the ducts to the R-value of the surrounding attic or crawl-space insulation.
   i. Install dampers and balance systems where ductwork is added.
   ii. Install cold air returns to all first floor rooms where feasible, except for kitchen and bathrooms.
   iii. Install cold air returns to second floor rooms as needed.
   iv. Cold-air return grills are not allowed in the combustion appliance zone and shall not be installed in unconditioned areas or unintentionally conditioned areas.
   v. Warm-air registers shall not be installed in the combustion appliance zone, unless the area is an intentionally conditioned area. Consult with building owner or manager about the removal of existing grills in the combustion appliance zone.

i. Relocate existing thermostats that are located on exterior walls to interior walls, when the thermostat will not be replaced.

j. Install programmable thermostats when the existing thermostat must be replaced and the occupant is willing and able to program the new thermostat. Every effort shall be made to upgrade existing non-programmable thermostats to programmable thermostats.
   i. Instruct occupants on how to use the programmable thermostat.
   ii. Programmable thermostats are the only allowable replacement thermostats that can be reported as an ECM.
   iii. If a programmable replacement thermostat cannot be installed, a working thermostat shall not be replaced. If the current thermostat is non-functional, a conventional thermostat may be used but the cost shall be treated as a repair improvement and added to the improvement package. The rationale for this is that no energy savings is associated with a non-programmable thermostat. Report thermostats separately from heating system replacement costs.

k. Replace oil filters.

l. For existing forced air units, provide occupant with one (1) deep pleated (3" depth or more) disposable furnace filter, six (6) 1"-2" fiberglass disposable filters (1-installed, plus 5 replacement filters), or a permanent cleanable filter for forced air systems. If a deep pleated filter was provided when the furnace was cleaned and tuned, do not provide an additional filter.
   i. Special filters for air cleaning may only be installed if approved by the Division.

m. All forced air systems shall have a filter cover. Magnetic filter covers are allowable only if they provide an adequate seal to the ductwork to prevent air leakage.

2) Boilers:

Boiler distribution systems shall be inspected for proper operation.

a. Flush the existing distribution system according to manufacturer's instructions. If instructions are not available, flush until water runs clear and free of sediment. For zoned systems, flush each zone separately.

b. Ensure new circulating fluid is treated to meet boiler manufacturer's specifications. Install or replace a permanent chemical treatment system where required.
c. Bleed air from the entire system.
d. Install an automatic fill valve ~~, air-excluding device,~~ and back-flow preventer if they are not present.
~~d.~~e. On compression (bladder style) expansion tanks, install an air excluding device if not present. Systems with standard (non-compression) style expansion tanks should not have automatic air excluding devices installed.
~~e.~~f. Install a compression tank, or fill the expansion tank and the system to the correct level. ~~If an existing tank is a pre-pressurized diaphragm type and the tank is older than ten years, install a properly sized new one~~.
~~f.~~g. Ensure all safety systems are operational. If a pressure relief valve is not present or not functioning properly, install one.
~~g.~~h. Install an electric vent damper where feasible for standard efficiency models.
~~h.~~i. Install thermostatically controlled radiator valves on the major radiators, when feasible.
~~i.~~j. Install outdoor reset and boiler controls, if feasible.
~~j.~~k. Inspect radiators. Clean, repair or replace as necessary.
~~k.~~l. Install automatic and manual air bleed valves to eliminate air from each high point in the distribution system if they are not present and functioning properly.
~~l.~~m. Inspect supply and return lines and connections and repair leaks.
~~m.~~n. Insulate all accessible pipes within the boiler room and in other areas accessible and feasible within the heating envelope. Insulate pipes outside conditioned spaces.
   i. For hot water systems, install one and a half-inch fiberglass insulation on all pipes less than or equal to one and a half inches, and two inches of fiberglass insulation on all pipes greater than one and a half inches in diameter.
   ii. For steam systems, install one and a half-inch fiberglass insulation on all pipes less than or equal to one and a half inches, and three inches of fiberglass insulation on all pipes greater than one and a half inches in diameter.
~~n.~~o. Extend new piping and radiators to conditioned areas, such as additions and finished basements currently heated by space heaters.
~~o.~~p. Identify and model with the energy audit, either as an improvement or as part of the improvement package, any modification needed to maximize the efficiency of the boiler system.

3) Space heaters (non-wood and electric resistance baseboard) require:
a. An air circulating fan (does not apply to baseboard).
b. A properly grounded duplex receptacle for electrical service.
c. A fire-rated floor protector if required per PMI, sized to the width and length of the space heater.

4) All heating system work:
a. A tag shall be prominently affixed to the heating unit identifying who the customer should call for service. The tag information shall include the name, address, and telephone number of the service organization.
b. Conduct Worst Case Draft (WCD) test of the combustion appliance zone and building depressurization tests in all jobs having naturally vented combustion

appliances. The goal of this test is to ensure that all appliances are properly drafting. Documentation of the dwelling's WCD test results shall be included in the building file.

D.3.3 Water Heater Replacement

General Policy: Model water heater conversion or replacement as a measure or improvement with the energy audit, based on the criteria listed in the specifications. When needed to model multiple water heater replacements, use the 5-24 Unit Workbook to generate savings information. Incorporate the savings information and costs into NEAT's Itemized Cost section. Building owners may opt to replace existing domestic hot water heating systems that do not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building. The owner's contribution shall be equal to or exceed the buy-down amount needed to reach an SIR of 1.0. The replacement system shall be properly sized. All work will follow the Wisconsin Commercial Building Code, any commissioning requirements that apply, or other codes and regulations by the authority having jurisdiction.

Specifications:

1) Gas to gas replacements or system conversion: Model direct-fired gas storage water heaters for replacement which are greater than 5 years old and have an Energy Factor (EF) of <.61. Replace the water heating system if the replacement has a minimum 1.0 SIR when modeled with the energy audit. The replacement water heater shall be one of the following:
   a. Power-vented and have a minimum EF of .67 (for 40 and 50 gallon units) or a thermal efficiency of 95 percent.
      i. 30 gallon water heaters shall have a minimum EF of .~~61~~63, and may be installed only when the unit cannot be upgraded to a 40 gallon unit.
   b. An indirect water heater working with a high-efficiency boiler system.
   c. A heat pump water heater with an EF of 2.0 or greater.
   d. One of the units listed above with a solar component. For solar water heaters modeled with the NEAT audit, use the itemized Cost section.
2) Fuel switch water heater conversions**:** Fuel switching replacement water heating systems from electric to gas or LP to natural gas is allowed when the total cost for fuel switching the system is modeled with the energy audit, the measure meets a minimum 1.0 SIR, and the building owner agrees to the conversion. Building owners may opt to replace existing water heating systems that do not meet a minimum 1.0 SIR test as a part of their contribution toward the weatherization of the building. The replacement system shall be properly sized and represent an increase in efficiency of at least 5 percent over the existing water heating system. The replacement shall be completed prior to the final inspection of the weatherization measures.
3) Electric to electric: Model the existing water heater system for replacement if the system is not properly sized, the water heater needs to be replaced based on safety concerns, or there is the potential to maximize energy efficiency. Replace the water heating system if the replacement has a minimum 1.0 SIR when modeled with the energy audit. The replacement water heater shall be one of the following:
   a. An electric storage water heater with a minimum thermal efficiency of 98 percent for commercial units or .~~94~~ 95 EF for individual units.

b. A heat pump water heater with an EF of 2.0 or greater.
c. One of the units listed above with a solar component. For solar water heaters, contact the Home Energy Plus Help Desk (heat@wisconsin.gov) for assistance in calculating the savings costs.

4) The replacement water heater(s) shall be sized properly for its intended use.
5) Removal and proper disposal of the old water heater is required.
6) Affix a tag to the water heater identifying who the customer should call for service. The tag shall be prominently displayed and include the service provider's name, address, and telephone number.

D.4 Baseload Measures

D.4.1 Lighting

General Policy: Convert incandescent lighting to more efficient fluorescent (CFL) and refraction lighting as a single improvement package or measure as identified in the specifications. Replace exit lighting with LED replacements. When needed, use the 5-24 Unit Workbook to generate the savings for lighting packages, incorporating the savings information and costs into NEAT's Itemized Cost section. Individual lighting may be modeled with the energy audit.

Specifications:

1) Package lighting conversion for the entire building in the following locations and conditions:
   a. Exterior lighting that operates from dusk until dawn or longer.
   b. Lighting in corridors and common areas, with occupancy sensors where feasible.
   c. Model tenant lighting that is used most frequently for the longest duration.
2) Replacements CFLs shall meet ENERGY STAR® standards and the bulb shall be appropriate for the intended use. Note: Grantees may use www.energystar.gov/CFLs to check for availability of ENERGY STAR® rated CFLs, and use other energy efficient lighting types when ENERGY STAR® is not available, documenting this in the customer file.
   a. The use of induction lighting to replace exterior mercury vapor or high pressure sodium lighting is allowed.
   b. The use of LED lighting is allowed only in exit lights.
3) Replace all halogen torchieres in tenant areas with fluorescent equivalent fixtures; remove and dispose of old fixtures.
4) All replacement CFLs and fixtures shall be installed and inspected prior to the completion of the dwelling unit.

D.4.2 Domestic Water Heater Measures

General Policy: Insulate existing water heater tanks with less than R-10 insulation to R-24. ~~a minimum of R-10. Water heaters that are ENERGY STAR® labeled are exempt from this requirement.~~ Install low-flow showerheads and faucet flow restrictors. Insulate accessible hot and cold water pipes. Reduce water heater temperature to 120 degrees, where feasible.

Specifications:

1) Install 1.5 GPM or less showerheads and faucet aerators on every fixture.
2) For central boiler water heaters, insulate all accessible pipes within the boiler room, including the pipes in the circulating loop between the boiler and the water heater.
   a. For hot water systems install one and a half-inch fiberglass insulation on all pipes less than or equal to one and a half inches and two inches of fiberglass insulation on all pipes greater than one and a half inches in diameter.
   b. For steam systems install one and a half-inch fiberglass insulation on all pipes less than or equal to one and a half inches and three inches of fiberglass insulation on all pipes greater than one and a half inches in diameter.
3) Reduce water heater temperature to 120 degrees.
4) Where a recirculating pump is present, install an aquastat control on the return end of the loop to shut off the pump when the line is hot. Set the aquastat to turn on the pump when the line temperature drops to 110 degrees. Set the control to provide a deadband of 5 degrees or more.
5) Insulate existing water heater tanks with less than R-10 insulation to R-24. ~~a minimum of R-10.~~ Mechanical fasteners and tape are required.

D.4.3 Refrigerator Replacement and Removal

General Policy: Model all refrigerators with the energy audit. When needed, use the 5-24 Unit Workbook to generate savings information for multiple refrigerators. Incorporate the savings information and costs into NEAT's Itemized Cost section. Replace refrigerators if the measure has an SIR greater than or equal to1.0. Replacement ~~existing~~ refrigerators ~~with a properly sized product meeting~~shall meet the specifications in 11.4.19 Refrigerators (Standards for Conformance)~~ENERGY STAR® standards~~. Replacement refrigerators are limited to one per household. De-manufacture and properly dispose of pre-existing unit.

If the owner has a list of refrigerators owned in all units, verify the accuracy of the list in the 25 percent sample of units audited. If no list exists, verify during the audit the make and model and age of every refrigerator to be replaced.

Remove, de-manufacture, and properly dispose of functional secondary refrigerators with R-12 refrigerant listed on the label, whenever possible. Offer a $100 incentive for removal. Incentives may be paid for the removal of one unit per tenant household.

Specifications:

1) The refrigerator unit shall be top-freezer automatic defrost with no through the door ice or water and no automatic ice-maker.
   a. Bottom-freezer refrigerator units will be considered on a case-by-case basis for households with accessibility considerations.
   b. Side-by-side refrigerator/freezer units are not an allowable weatherization installation.
2) Replacement refrigerators shall be ~~properly sized for the tenant household. Match the size of the existing unit unless downsizing is an option~~of comparable size. Use 16 Cu. Ft. refrigerator models rather than 15 Cu. Ft. when feasible.

3) De-manufacture and properly dispose all refrigerators removed.

Offer a $100 incentive for removal of additional functional units not being replaced. Incentives to remove a unit may be paid for a maximum of one per tenant household.

D.5 Health and Safety Measures

General Policy: Health and Safety measures are defined as the cost of materials and labor necessary to eliminate or reduce hazards existing prior to, or potentially resulting from the installation of weatherization materials. Elimination of Health and Safety hazards, using Weatherization Program funds, shall be done in conjunction with the installed ECM. Products meeting ENERGY STAR® standards shall be used unless otherwise indicated. When using TREAT, include the Health and Safety measures in the building's improvement package. When using NEAT, include the Health and Safety measures in the Itemized Cost section. See also Chapter 12 – Health and Safety for further information on specific topics.

D.5.1 Depressurization and Worst Case Draft Testing

General Policy: Test the building's Combustion Appliance Zone (CAZ) for depressurization under worst case conditions. A Worst Case Draft (WCD) test shall be completed in every CAZ that has naturally vented combustion appliances, including gas or wood fireplaces, or space heaters. Each atmospherically vented appliance shall have an adequate draft and no spillage under Worst Case Draft (WCD) conditions. The depressurization tightness limits and adequate draft standards are outlined in the Weatherization Field Guide. See Air Sealing Specifications 4 through 7 below for specific approaches to building CAZ configurations. See the Weatherization Field Guide for depressurization testing procedures where they are applicable.

Specifications:

1) When feasible, isolate the CAZ from the rest of the building. Use fire-stopping materials as required by code.
2) Complete combustion safety tests on dwellings to ensure safe operation of all atmospheric vented appliances.
3) Ensure natural gas or LP water heaters and heating systems draft properly. Remedies for poor draft may include modifications to the flue or chimney, repairs or modifications to the furnace distribution system, or elimination of other negative pressures in the combustion zone.
4) In buildings with central heating systems, isolate the mechanical room (combustion appliance zone or CAZ) from the rest of the building.
   a. Provide properly sized combustion air as needed.
   b. Seal forced air distribution leaks in the CAZ.
5) In buildings with individual heating systems in each unit and/or common areas, identify the CAZ in each unit or area.
   a. Ensure that there is properly sized combustion air for each appliance.
   b. Test naturally drafting combustion appliances to ensure there is adequate draft under worst case depressurization conditions.
6) In buildings that incorporate a garage, determine the control methodology for managing combustion by-products.

a. Ensure that the exhaust ventilation is controlled effectively, operates properly, and is properly sized.
b. Where needed, install a carbon monoxide monitoring system that activates the garage ventilation equipment.
c. Where feasible, use diagnostic equipment to ensure that there are no air pathways between the garage and occupied areas.

7) All air sealing shall be completed using materials with the proper fire rating. See the Weatherization Manual, Chapter 11 on Weatherization Materials for more information.
8) Install carbon monoxide alarms in all units that have gas appliances.

D.5.2 Mechanical Ventilation

General Policy: Install properly sized mechanical ventilation when needed to ensure indoor air quality. Unless superseded by local codes, use 62.2 to calculate the requirements for continuous ventilation beyond the local exhaust ventilation requirements. Ventilation upgrades are not required unless the individual living unit requires more than 25 cfm of continuous ventilation. See Chapter 10 for 5+ unit Code references.

Unless blower door information is available to determine the natural ventilation rate, the required minimum ventilation to be installed is calculated using the ASHRAE 62.2 formula: [7.5 CFM (bedrooms+1) +.01 CFM (heated floor area)] or Commercial Building Code Table 364.0403. This minimum rate may be adjusted for 62.2 when a blower door test is completed for the building and the measured natural ventilation is higher than presumed by ASHRAE 62.2. The installation of mechanical ventilation is not required in individual living units requiring 0 to 25 CFM of continuous ventilation. Exceptions, primarily for addressing local exhaust requirements, are cited below.

Specifications:

1) Whole building ventilation systems shall be properly commissioned when required by the local authority having jurisdiction.
2) Ensure that each individual living unit has functional local exhaust ventilation for the main bathroom. This local exhaust ventilation shall operate at a minimum of 50 cfm under customer operation.
3) Install continuous mechanical ventilation as required by ASHRAE 62.2 or WI Commercial Building Code SPS 364 (Table 364.0403), as applicable. When using 62.2 the Diagnostic Workbook, Page 1, may be used to calculate whole building and individual unit ventilation requirements.
4) Install ventilation only in individual living units requiring more than 25 cfm continuous ventilation. Exceptions include:
   a. Install continuous local exhaust ventilation for moisture control in individual living units requiring 1-25 CFM, where the existing ventilation is not operated by the occupants for a sufficient length of time per day. Provide the customer with education on proper use of local ventilation.
   b. Install local exhaust ventilation, either customer operated or continuous, for moisture control in individual living units requiring 1-25 CFM, where there is no ventilation. Provide the customer with education on proper use of local ventilation.

c. Install local exhaust in individual living units requiring 1-25 CFM and whole building ventilation in any building where there is documented evidence of indoor air problems.
d. Document the exception conditions that generated the installation of the ventilation.

1) Install (or restore existing) whole building supply ventilation in any building where there is documented evidence of indoor air problems.
   a. Base whole building or individual unit ventilation requirements the number of bedrooms plus one or the number of occupants, whichever is greater (62.2), or the persons or cfm per square feet (Table 64.0403).
   b. Document the exception conditions that generated the installation of the ventilation.
   c. Utilize a controller which allows for an adjustment to the fan cfm based on changes to the household size. Ventilation controls shall give an on/off option for customers. The building owner or maintenance staff shall be supplied with the equipment manufacturer's information and instructions for the adjustment of fan cfm.
2) In buildings that incorporate a garage, determine the control methodology for managing combustion by-products. If present, ensure that the exhaust ventilation is properly operating and properly sized. See WI Commercial Building Code SPS 364 (Table 364.0403) for the minimum sizing requirements. See D.5.1 Depressurization and Worst Case Draft Testing, Specification 5 for more information on safety requirements for buildings that incorporate garages.

D.6 Repair

General Policy: Repair is defined as an improvement necessary for the effective performance or preservation of weatherization materials. Model needed repairs as a part of the improvement or the energy conservation measures with the energy audit. If the improvement/measure, modeled with the repair cost, has an SIR equal to or greater than 1.0, the measure may be completed. Examples of repairs include:

- Repair of leaking roofs.
- Repair of electrical systems.
- Repair of hot and cold water leaks.

D.7 Property Owner Education Standards

D.7.1 Project Record Documents

1) Maintain on site one set of the following record documents (record actual revisions to the work):
   a. Drawings.
   b. Specifications.
   c. Addenda.
   d. Change Orders and other modifications to the Contract.
   e. Reviewed shop drawings, product data, and samples.
   f. Manufacturer's instruction for assembly, installation, and adjustments.

2) Ensure entries are complete and accurate, enabling future reference by Property Owner.
3) Store record documents separate from documents used for construction.
4) Record information concurrent with construction progress.
5) Specifications - Legibly mark and record at each product section a description of actual products installed, including the following:
   a. Manufacturer's name and product model and number.
   b. Product substitutions or alternates utilized.
   c. Changes made by Addenda and modifications.
6) Record Drawings - Legibly mark each item to record actual construction including:
   a. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   b. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   c. Field changes of dimension and detail.
   d. Details not on original Contract drawings.

D.7.2 Warranties and Bonds

1) The Division will consider requests to obtain a performance bond from contractors or subcontractors performing work on multifamily projects. See Chapter 6.7.2 of this Manual for guidance on Bid/Performance Bonds.
2) Obtain warranties, executed in duplicate by responsible Contractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Property Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined. (See Ch. 6.8 on Warranties).
3) Verify that documents are in proper form, contain full information, and are notarized.
4) Co-execute submittals when required.
5) Retain warranties and bonds until time specified for submittal.
6) Include originals of all warranties in operation and maintenance manuals, indexed separately on a table of contents.

D.7.3 Demonstration and Instruction

1) Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
2) For equipment or systems requiring seasonal operation, perform demonstration for other season during seasonal change-over, not more than six months after equipment is placed in service.
3) Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Property Owner personnel.

D.8 NEAT User Defined Measures for 5-24 Unit Building Weatherization

Itemized Cost Tab: Default Include in SIR Settings

#	Type	Measure Name	Include In SIR
1	Building Insulation	DIA120 Attic Access - No Attic Insulation	No
1	Health and Safety	XHAL005 CO Detector New or Replace	Yes
2	Building Insulation	DIFO020 Exterior Foundation Insulation (Slab)	Yes
2	General Repairs	ZRAQ005 Dryer Venting	Yes
3	Baseloads	PCFL005 CFL Bulbs	Yes
3	Health and Safety	XHAR005 62.2 Exhaust Ventilation	No
4	Baseloads	PCFL020 Exterior CFL Bulbs	Yes
4	Health and Safety	XHAQ005 Worst Case Draft Test	No
5	Baseloads	PCFL025 CFL 3-Way Bulb	Yes
5	Health and Safety	XHAQ006 Worst Case Depressurization w/o Draft	No
6	Baseloads	PCFL010 Torchiere Replacement	Yes
6	General Repairs	ZRRS045 Ventilation - Soffit/Roof/Gable	Yes
7	HVAC Systems	JHSM035 Seal Ducts	No
7	General Repairs	ZRRS040 Other Repair	Yes
8	HVAC Systems	JHSM010 Disposable Filters	No
8	Health and Safety	XHHW007 Gas power vent from conventional gas	Yes
9	HVAC Systems	JHSM005 Clean and Tune	No
9	Health and Safety	XHHS025 Furnace Repair	Yes
10	HVAC Systems	JHSM015 Setback Thermostat	No
10	Health and Safety	XHHW010 Water Heater Repair	Yes
11	HVAC Systems	JHSM030 Insulate Ducts	No
11	Health and Safety	XHAQ045 Gas Leak Repair	No
12	HVAC Systems	JHSM011 Cleanable Filters	No
12	Health and Safety	XHAQ035 Air Quality Other Remediation	Yes
13	Baseloads	MWHT020 Showerhead	No
13	Health and Safety	XHAQ007 Chimney Liner	Yes
14	Baseloads	MWHT005 Flow Restrictors	Yes
14	Health and Safety	XHAL010 Smoke Detector New or Replace	Yes
15	Baseloads	MWHT010 Pipe Insulation	No
15	Health and Safety	XHEL015 Upgrade or Repair Electric	Yes
16	Baseloads	MWHT025 Tank Insulation	No
16	Health and Safety	XHAL020 Combo Smoke/CO Detector	Yes
17	Baseloads	MWHT015 Reduce Temperature	No
17	General Repairs	ZREL005 Upgrade or Repair Electric Service	Yes
18	Baseloads	VFR005 Freezer Replacement	No
18	General Repairs	ZREL015 Knob and Tube Replace Attic	Yes
19	Baseloads	URR005 Refrigerator Replacement	Yes
19	Health and Safety	XHHS020 Furnace Replace	Yes

#	Type	Measure Name	Include In SIR
20	Baseloads	VFR010 Freezer Removal	No
20	Health and Safety	XHAQ040 Cook Stove Repair	Yes
21	Baseloads	URR010 Refrigerator Removal	No
21	Health and Safety	XHAP015 Appliance Repair or Replace	Yes
22	HVAC Systems	JHSM020 First Floor Ductwork	Yes
22	Health and Safety	XHHW005 Water Heater Replace	Yes
23	HVAC Systems	JHSM025 Second Floor Ductwork	Yes
23	General Repairs	ZRHW010 Plumbing Repair or Replace	Yes
24	HVAC Systems	JBM010 Compression Tank	Yes
24	General Repairs	ZRHW005 Water Heater Repair	Yes
25	HVAC Systems	JBM035 Backflow Preventer	Yes
25	General Repairs	ZRRS030 Door Replacement R9	Yes
26	HVAC Systems	JBM005 Automatic Fill Valve	Yes
26	Health and Safety	XHHS030 Ducts Repair or Replace	Yes
27	HVAC Systems	JBM060 Boiler Distribution System Modifications	Yes
27	Health and Safety	XHSS035 Structure Other Remediation	Yes
28	HVAC Systems	JBM055 Zone Valves	Yes
28	General Repairs	ZRHS030 Thermostat Replacement - Not ENERGY STAR®	Yes
29	HVAC Systems	JBM025 Radiator New or Replacement	Yes
29	General Repairs	ZRRS005 Chimney	Yes
30	HVAC Systems	JBM040 Modulating Aquastat	Yes
30	Health and Safety	XHHW015 Plumbing Repair or Replace	Yes
31	HVAC Systems	JBM020 Outdoor Reset	Yes
31	General Repairs	ZRRS035 Window Replacement U .30	Yes
32	HVAC Systems	JBM030 Radiator Valves	Yes
32	Health and Safety	XHAQ030 Asbestos Removal	Yes
33	HVAC Systems	JBM045 Intermittent Ignition Device (IID)	Yes
33	General Repairs	ZRRS010 Floors	Yes
34	HVAC Systems	JBM015 Electric Vent Damper	Yes
34	Health and Safety	XHHW004 Electric to Electric .94	Yes
35	Baseloads	PCFL015 LED Exit Light	Yes
35	Health and Safety	XHAQ025 Dehumidifier New or Replace	Yes
36	Baseloads	PCFL030 Fixture Replacement	Yes
36	General Repairs	ZREL020 Knob and Tube Replace Walls	Yes
37	HVAC Systems	VNT001 Exhaust Ventilation	Yes
37	General Repairs	ZRRS020 Walls	Yes
38	HVAC Systems	VNT005 Ventilation Controls	No

#	Type	Measure Name	Include In SIR
38	General Repairs	ZRRS015 Roof	Yes
39	HVAC Systems	VNT010 Heat or Energy Recovery Ventilator	No
39	Health and Safety	XHHS010 Boiler Repair	Yes
40	General Heat Waste and Air Infiltration	ABD010 Blower Door Setup	No
40	Health and Safety	XHHS060 Electric Repair	Yes
41	Health and Safety	XHAR015 Heat or Energy Recovery Ventilator	No
42	HVAC Systems	JHSR007 Gas Boiler – ENERGY STAR®	Yes
42	Health and Safety	XHHS005 Boiler Replace	Yes
43	HVAC Systems	JHSR010 Gas Forced Air 90%	Yes
43	Health and Safety	XHSS005 Chimney	Yes
44	HVAC Systems	JHSR035 Oil Boiler	Yes
44	Health and Safety	XHAR010 Exhaust Ventilation with Makeup Air	No
45	HVAC Systems	JHSR040 Oil Forced Air	Yes
45	Health and Safety	XHHW008 Gas power vent from electric	Yes
46	Baseloads	MWHC005 Gas power vent from conventional gas	Yes
46	Health and Safety	XHHS035 Space Heater Replace	Yes
47	Baseloads	MWHC010 Gas power vent from electric	Yes
47	Health and Safety	XHSS010 Floors	Yes
48	Baseloads	MWHC035 Indirect Fired Water Heater	Yes
48	Health and Safety	XHHS015 Boiler Radiators, Repair or Replace	Yes
49	Baseloads	MWHR005 Electric Upgrade .94	Yes
49	Health and Safety	XHSS015 Roof	Yes
50	Health and Safety	XHSS020 Walls	Yes
51	Health and Safety	XHHS050 Wood Repair	Yes
52	Health and Safety	XHHS040 Space Heater Repair	Yes
53	Health and Safety	XHHS055 Electric Replace	Yes
54	Health and Safety	XHSS030 Lead Paint Remediation	Yes
55	Health and Safety	XHHS045 Wood Replace	Yes
*	Health and Safety	XHAR007 Local Exhaust Ventilation	No
*	Health and Safety	XHAR009 Venting Existing Exhaust	No
*	General Repairs	ZRHS035 Fuel Switching	Yes

* New Item

Appendix E – Minimum Standards for Lead Safe Weatherization (LSW)

E.1 Background

Department of Energy (DOE) policy requires state weatherization programs to comply with Lead Safe Weatherization (LSW) protocols, which shall be implemented during the course of any weatherization activity which disturbs paint in buildings constructed prior to 1978. This policy requires compliance with the Environmental Protection Agency's (EPA) Lead Renovation, Repair, and Painting Program (LRRPP) which includes additional regulations such as Certified Lead Safe Renovator training. Lead Safe Weatherization applies to all work where paint will be disturbed in pre-1978 buildings. Additional Certified Renovator requirements apply in pre-1978 buildings when more than six square feet of interior paint per room will be disturbed, more than twenty square feet of exterior paint will be disturbed, and any time that windows are replaced or demolished.

The State of Wisconsin Department of Health Services (DHS) has an agreement with the EPA to enforce compliance, training, and certification for lead safe renovation through State of Wisconsin statutes, DHS Chapter 163. There are some areas where Wisconsin's DHS 163 is more restrictive than EPA's requirements. Weatherization work shall follow the most restrictive requirements of the authorities having jurisdiction.

The authorities having jurisdiction over working with lead in Wisconsin include:

- **WI Department of Health Services** (DHS) for any lead related work activities.
- **WI Division of Energy Services** (DES) for Lead Safe Weatherization work.
- **U.S Department of Energy** (DOE) for Lead Safe Weatherization work.
- **OSHA** and **WI Department of Safety and Professional Services** regulations for worker safety.
- **WI Department Natural Resources** (DNR) regulations for waste disposal.
- **U.S. Department of Housing and Urban Development** (HUD) for all HUD housing.
- **U.S. Environmental Protection Agency** (EPA) for buildings on Tribal Lands.

Unless a building is certified as "lead-free," or painted surfaces to be disturbed have tested free of lead, all weatherization activities conducted on dwelling units constructed prior to 1978 ("target housing") including any "child-occupied facility" shall be performed in a lead safe manner utilizing lead safe work practices. For the purposes of the Weatherization Assistance Program, the following definitions from DHS 163.03 are to be used:

1. "Certificate of lead−free status" or "lead−free certificate" means a certificate issued under this chapter by a certified lead inspector or risk assessor, and registered with the department that documents a finding by the inspector or risk assessor that a premises, dwelling or unit of a dwelling is free of lead−bearing paint as of the date specified on the certificate.

2. "Target housing" means a dwelling constructed prior to 1978, except for any of the following:
   (a) A dwelling for the elderly or persons with disabilities unless a child under 6 years of age resides, or is expected to reside, in the dwelling.
   (b) A dwelling in which the living area is not separated from the sleeping area.

3. "Child−occupied facility" means a building or portion of a building constructed prior to 1978, and including common areas, that meets any of the following:
   (a) A facility licensed or certified to provide day care services.
   (b) A building or portion of a building, visited by the same child under 6 years of age, on at least 2 different days within any week, Sunday through Saturday, provided that each day's visit lasts at least 3 hours and the combined annual visits last at least 60 hours.

E.2 General Weatherization Grantee Requirements

Grantees shall comply with both Lead Safe Weatherization (LSW) and Lead Safe Renovator requirements to minimize exposure of customers and workers to lead hazards. To meet these standards, crews and contractors shall follow the general principles of working clean and working wet. Best practices for working clean and working wet are covered in the joint EPA-HUD curriculum document "Steps to LEAD SAFE Renovation, Repair, and Painting."

It is the responsibility of the weatherization grantee to identify the applicability of LSW or Lead Safe Renovator requirements and to ensure customer and worker safety. The weatherization grantee is responsible for ensuring that contractors are notified in advance of requirements (such as in the Request for Bid), are trained in and practice LSW, and that Certified Renovators are present and complete a Renovation Recordkeeping Checklist when required.

Grantees shall have a written policy to demonstrate how the Lead Safe Weatherization and Lead Safe Renovator requirements are implemented.

E.2.1 Lead Safe Weatherization (LSW) Requirements

Lead Safe Weatherization requires grantees to work in a lead safe manner on all pre-1978 housing. When 6 ft^2 or less of interior painted surface per room, or 20 ft^2 or less or exterior painted surface will be disturbed, specific LSW protocols apply. Grantees and contractors shall document LSW work was performed by photographing setup, containment, and cleanup procedures, and maintain these records for review. Documentation that the customer received the EPA pamphlet "The Lead Safe Certified Guide to Renovate Right" shall be maintained for every weatherization job. Every weatherization file shall also contain a Wisconsin Weatherization Assistance Program Lead Safe Weatherization Form to document whether LSW or Lead Safe Renovator work was performed on the home, or that the home was exempt from both requirements.

E.2.2 Certified Lead Safe Renovator Requirements

Lead Safe Renovator requirements apply in pre-1978 housing when more than 6 ft^2 of interior painted surface per room or more than 20 ft^2 of exterior painted surface will be disturbed, or when windows will be replaced or demolished. Whenever Lead Safe Renovator requirements apply, a Wisconsin Weatherization Assistance Program Renovation Recordkeeping Checklist shall be completed.

Weatherization Program grantees shall have a Certified Lead Safe Renovator assigned to every job where Lead Safe Renovator requirements apply. The Certified Lead Safe Renovator:

- Shall be present at the work site while warning signs are being posted, work area containment is being established, and work area cleaning is being performed.
- Shall ensure establishment of appropriate containment areas and use of lead safe work practices during the renovation.
- Shall be readily available to workers throughout the lead safe renovation process. Readily available means reachable by phone and able to return to the work-site within thirty minutes of being contacted.
- Shall complete a Renovation Recordkeeping Checklist for the lead safe work done.
- Shall document lead safe work with photographs to be retained in job file.
- Shall provide training on lead safe work practices to uncertified workers, if such workers are left on-site performing work subject to the Certified Lead Safe Renovator Requirements.
- Shall have a valid Lead Safe Renovator certification card on-site.
- May provide pre-renovation education materials to occupants and owners.
- May conduct pre-renovation component testing using a DHS-recognized test kit.
- Shall conduct post-renovation cleaning verification.

E.2.3 Certified Lead Safe Company

Weatherization Program grantees shall be certified as a Lead Safe Company by DHS. The EPA refers to Lead Safe Companies as “firms.” A Lead Safe Company has at least one certified Lead Safe Renovator.

For each employed or contracted worker who is not a certified lead safe renovator, the company shall maintain documentation of the training provided, including the worker’s name, specific topics taught to the worker, the name and department certification number of the instructor for each topic, and the training date for each topic.

E.2.4 Lead-Safe Certified Renovation Firm

Weatherization program grantees that work in buildings on Tribal Land shall be certified as Lead-Safe Certified Renovation Firms by EPA. Grantees can become certified by applying online at http://www2.epa.gov/lead/epa-lead-safe-certification-program. Individual Lead-Safe Renovator certifications for employees are valid on Tribal Lands.

E.2.5 Customer Notification

Lead Safe Weatherization (LSW) Notification Requirements
Weatherization grantees shall have an adult occupant of every unit sign an acknowledgement of receiving the EPA pamphlet “The Lead-Safe Certified Guide to Renovate Right”. The occupant shall acknowledge receipt of the EPA pamphlet prior to start of any lead safe work. The acknowledgement shall include the occupant’s name, address, and signature. It may either be on a separate sheet or included in the Work Agreement. It shall be written in the same language as the contract for work, or for rental properties, the same language as the tenant lease. The acknowledgement form shall remain on file for

three years from the date of signature.

If the grantee cannot get a signed acknowledgment (the occupant is not home or refuses to sign the form), the pamphlet can be sent by mail with a certificate of mailing, to be placed in the customer file at least seven days before the start of work. As a last alternative for rental properties only, the self-certification form on the last page of the EPA pamphlet can be completed and signed by grantee staff to indicate that delivery took place.

In addition to providing a copy of the pamphlet to occupants, designated local grantee staff (e.g., intake specialist, auditor, crew leader) shall discuss the hazards associated with lead-based paint and lead dust, and describe how LSW will be conducted in the home when applicable.

Certified Lead Safe Renovator Notification Requirements
There are additional DHS notification requirements when the scope of work meets the Certified Lead Safe Renovation threshold. For work in common areas of multi-unit dwellings (two or more units), and any child occupied housing, the grantee shall either provide written notice to each affected household or post clearly visible informational signs that include:

(a) The general nature and locations of the planned renovation activities.
(b) The expected starting and ending dates.

If the scope, location, or expected starting and ending dates of the renovation activities change after the initial notification to occupants, the company performing the renovation activities shall provide further notification to the owner and occupants by one of the above methods.

DHS requires a signed and dated statement recording steps taken to notify occupants of upcoming paint disturbing activities in these housing types. The Renovation Recordkeeping Checklist can be used to document how occupant notification was carried out.

Within ten business days after any renovation work, the grantee shall have provided a copy of each document created for the renovation to the persons contracting for, and to any occupants affected by the renovation. This includes the completed Renovation Recordkeeping Checklist, and a copy of the Work Agreement which is provided to all occupants prior to the start of any weatherization measures being installed (per the Customer Bill of Rights). All documents related to the renovation work shall be kept on file for three years.

E.2.6 Weatherization Worker Protection

LSW requires that, at a minimum, workers follow these procedures and safety precautions:

- Wear personal protective gear specifically suited for the particular LSW measure. Use National Institute for Occupational Safety and Health (NIOSH) approved respirators (covering at least half of the face) with HEPA filters.
- Use disposable overalls (with hood or a disposable painter’s cap), gloves (cloth, plastic, or rubber as appropriate), goggles, and disposable shoe/boot covers.
- Keep dust to a minimum and confine dust and paint chips to the work area.
- Clean up area during and after work.

- Properly post a notification at all areas where lead safe work is taking place.
- During weatherization work, wash your hands and face frequently, particularly when leaving the work area, and especially before leaving the area for the purpose of eating, drinking, or smoking.
- Before leaving a confined work area, remove your protective clothing and protective shoe/boot covers to avoid exposing others.
- Before leaving a confined work area, and before returning tools and equipment to vehicles, clean all tools to avoid exposing others and creating a lead-hazard at the next Weatherization job.
- Get annual medical exams to check blood lead levels. Do non-lead related work if your blood lead level becomes too high.
- Inform your employer if you develop signs of lead poisoning.

E.3 LSW Work Practice Standards

E.3.1 Containment

Containment means physical measures taken to prevent any dust or debris from spreading beyond the work area to non-work areas. The level of containment shall be determined by the auditor/inspector or supervisor before work is assigned to a crew or contractor.

Every home and each Weatherization measure is unique, therefore the level and type of containment required will be based on the hazards present, the scope of work activities, and any customer health issues. Although Weatherization jobs require individual assessments, LSW work generally falls into two levels of containment for which the related standards are outlined below.

Level 1 Containment: LSW during Minor Repair and Maintenance Activities
Level 1 containment is required in pre-1978 homes when 6 ft^2 or less of interior painted surface per room or 20 ft^2 or less of exterior painted surface will be disturbed. In Wisconsin, these measures usually fall into “minor repair and maintenance activities” defined by DHS as “activities, including minor heating, ventilation or air conditioning work, electrical work, and plumbing that disrupt 6 ft^2 or less of painted surface per room for interior activities or 20 ft^2 or less of painted surface for exterior activities where none of the work practices are prohibited or restricted by DHS 163.14 (11).” This work does not involve window replacement or demolition.

Level 1 containment consists of methods that prevent dust generation and contain any debris generated during the work process. The containment establishes the work area which shall be kept secure.

Measures that *may* fall within this guideline include:

- Installing or replacing a thermostat
- Drilling and patching test holes
- Replacing HEPA filters and cleaning HEPA vacuums
- Changing a furnace filter
- Removing caulk or window putty (interior or exterior)
- Removing weather-stripping

Level 2 Containment: Certified Lead Safe Renovator Activities
Level 2 containment is required when Weatherization activities will disturb *more than* 6 ft^2 of interior surface per room or *more than* 20 ft^2 of exterior surfaces in homes built prior to 1978. Level 2 containment consists of methods that define a work area that will not allow any dust or debris from the work area to spread. Level 2 containment requires the covering of all horizontal surfaces, constructing barrier walls, sealing doorways, covering HVAC registers with approved materials, and closing windows to prevent the spread of dust and debris.

Measures requiring level 2 containment *may* include:

- Drilling holes in interior walls
- Drilling holes in exterior walls, removing painted siding
- Cutting attic access into ceiling or knee walls
- Using a plane on a door which is in place
- Replacing door jambs and thresholds
- Replacing doors
- Furnace replacement

Additionally, Level 2 containment shall *always* be used when the following types of work will be performed (even if the activities will disturb less than the minimum areas within the Level 1 category):

- Window replacement or demolition

Containment Measures

- Crews and contractors shall take steps to protect occupants from lead-based paint hazards while the work is in-progress by using appropriate containment strategies.
- Occupants, especially young children or pregnant women, may not enter the work site. Occupants are allowed to return only after the work is done and the home has passed a visual inspection.
- Occupants' belongings shall be protected from lead contamination. This can be done by removing them from the work area or covering them in protective bags and sealing it to prevent dust from getting on the items.
- The work site shall be set up to prevent the spread of leaded dust and debris.
- Warning signs shall be posted at entrances to the worksite when occupants are present, at the main and secondary entrances to the building, and at exterior work sites. The signs shall be readable 20 feet from the edge of the worksite. Signs shall be in the occupants' primary language, when practical.
- If containment of the work area cannot be achieved with occupants in the unit (e.g., work will take several days and involves the kitchen, bathrooms, or bedrooms that cannot be sealed off from use), occupants shall move out of the unit or the work shall be deferred until containment can be achieved.
- Ensure that containment does not interfere with occupant and worker egress in an emergency.

The following prohibitions related to containment shall always be observed:

- NEVER allow residents and pets access to the work area while work is underway.
- NEVER open windows and doors allowing lead dust to float into other parts of the building or outside.
- NEVER allow furniture and other objects to remain in the weatherization work area

while weatherization work is being performed unless they are covered and sealed in 6 mil polyethylene sheeting or bags.

E.3.2 Prohibited Work Activities

These are some important prohibitions that shall be followed when working in pre-1978 homes:

- NEVER use reusable cloth or fabric, such as a painter's drop cloth, as protective containment sheeting. Polyethylene, and in some cases when working on the exterior, garden fabric are the only acceptable protective containment sheeting and shall never be reused.
- NEVER use brooms and shop vacuums for cleanup. Wet cleaning and HEPA vacuums are the only acceptable methods for cleanup.
- NEVER use a conventional shop vacuum with HEPA filters – only HEPA-designed vacuums are acceptable for LSW.
- NEVER turn leaded paint into leaded dust by dry scraping, sanding (unless needed around electrical outlets) or grinding, or using abrasive blasting or planning.
- NEVER use an open-flame torch or heat gun (above 1100°F) to remove paint or window glazing. Open flame/high heat methods to remove paint create fumes that are dangerous for workers to breathe. Small lead particles created by burning and heating also settle on surrounding surfaces and are very hard to clean up.
- NEVER use a high pressure washer unless it contains a HEPA filter for exhaust control and water collection.
- NEVER use a methylene chloride paint strippers.

E.3.3 Proper LSW Cleanup and Debris Disposal

Following the containment standards in the previous section will minimize the level of effort required to properly clean up the job site. All dust, dirt, material scraps, containers, wrappers, and work related debris shall be removed from the customer's home. A HEPA vacuum shall be used to clean up the work areas. Further cleaning may be necessary based on the hazard.

At the conclusion of the job, once all workers have "cleaned" the work areas thoroughly, Weatherization workers shall adhere to the following:

Safe and Secure Disposal

- Bag and gooseneck-seal all waste in heavy duty (6 mil minimum) poly bags.
- Safely dispose of all waste in accordance with federal, state, and local regulations.

E.3.4 Cleaning and Visual Inspection

Checking the quality of worksite cleanliness is a two-phase process:

Phase 1: Cleaning

This includes worker visual inspection during the cleaning process. Look for any visible paint chips, dust, or debris as you clean, using proper techniques. Proper techniques include:

- Clean high to low
- Clean two feet beyond containment
- HEPA vacuum, wash, and rinse

Phase 2: Visual Inspection
A visual inspection for remaining dust or debris shall be made after work is complete. When applicable, a Certified Lead Safe Renovator shall conduct the visual inspection, and note the results on a Renovation Recordkeeping Checklist. There should be no evidence of settled dust following a cleanup effort. If dust is observed, the Weatherization crew shall be required to repeat the cleaning.

If work is done outside the house, the grounds around the dwelling and all exterior horizontal surfaces shall also be examined visually to make certain that all dust and debris have been removed and that paint chips were not left behind.

Appendix F – Asbestos Containing Materials (ACM) Policy and Procedures

F.1 Purpose

The purpose of this policy is to provide direction to Wisconsin Low Income Weatherization Assistance Program grantees regarding asbestos containing materials (ACM) that may be disturbed during weatherization work. This policy does not supersede the regulations of other authorities having jurisdiction over ACM or worker safety in Wisconsin. These authorities include:

- **Wisconsin Department of Health Services** (DHS) for regulated asbestos work activities (DHS Chapter 159).
- **Wisconsin Department Natural Resources** (DNR) regulations for waste disposal and transport. Note: An individual or business that transports less than 20 tons per year of solid waste (including asbestos) is exempt under section NR 502.06(2)(b) of Wisconsin Administrative Code from the requirement to have a solid waste transportation license. Other asbestos transport and disposal requirements still apply.
- **OSHA** and **Wisconsin Department of Safety and Professional Services** regulations for worker safety in the private and public sectors, respectively.
- **Wisconsin Division of Energy Services** (DES) for Weatherization Assistance Program funded weatherization work completed in conjunction with asbestos abatement or standard Operations and Maintenance procedures.
- **Department of Energy** for all DOE funds used in the Weatherization Assistance Program.
- **Department of Housing and Urban Development** for all HUD housing.

F.2 Asbestos Containing Materials and Weatherization

Energy auditors, inspectors and workers may encounter asbestos containing materials (ACM) in the following building components, materials, equipment, or circumstances:

- **Attic Insulation** – Some attic insulation materials, including vermiculite insulation; when inspecting or insulating attics, air sealing attics, boxing mechanical penetrations through the attic floor, or extending exhaust ventilation through the attic to the roof.
- **Siding** – Transite (slate) siding, stucco; when testing sidewalls for insulation or insulating sidewalls.
- **Heating Systems** – Insulation on boilers and forced air systems, primarily on the distribution systems, which must be addressed to seal or modify the distribution system or replace the equipment.
- **Roofing** – Some roofing materials; when installing roof ventilation or performing minor roof repair.
- **Sidewalls** – Some sidewall insulation materials, including vermiculite insulation; when testing sidewalls for insulation, insulating sidewalls, or installing windows and doors.

- **Drywall** – Some older drywall or plaster applications; when testing sidewalls for insulation or insulating sidewalls from the interior, installing doors and windows, or completing minor demolition work. Some new drywall from foreign suppliers has been found to contain asbestos.
- **Miscellaneous Materials** – Including, but not limited to, flooring, textured paints, electrical wiring insulation, older construction mastics, and caulk and putty, which may be cut, drilled, removed, or otherwise disturbed in the process of weatherizing a home.

All building components except for metal, glass, wood, and fiberglass shall either be assumed to contain asbestos or proven not to contain asbestos through bulk sampling by a certified Asbestos Inspector and analysis by an accredited laboratory. Vermiculite insulation is always assumed to contain asbestos as there is currently no EPA approved testing method to demonstrate the presence or absence of asbestos in vermiculite insulation.

F.3 General Policy

Weatherization Assistance Program customers and on-site workers shall be protected from asbestos exposure when ACM may be disturbed during the course of weatherization activities. On-site workers, including energy auditors, inspectors, supervisors, installers, and contractors that inspect or complete weatherization work shall minimize the disturbance of known or suspect ACM. When work exceeds Operations and Maintenance (O&M), and is determined to be cost effective, the work shall be performed by appropriately certified staff or contractors.

~~Note that, per DHS guidance, the following weatherization work will always exceed O&M: (1) removal or disturbance of transite (slate) siding and (2) disturbing stucco siding.~~ For attics containing vermiculite insulation, the determination of whether work will exceed O&M limits shall be made on a case-by-case basis. Removal of vermiculite insulation is not allowed. ~~per DOE guidance.~~

Grantees and contractors shall comply with all applicable regulations, and ensure that any asbestos related work is performed by individuals with the appropriate training and current certifications when required.

The grantee shall develop an Implementation Plan which identifies how the requirements of this policy will be met, including designation of responsibilities within an agency, whether certified staff or contractors will be used for work that exceeds O&M, and how contractor and crew performance and worker safety requirements are monitored.

F.3.1 Training and Certification

Training and Certification Requirements
Grantees shall meet the following requirements related to asbestos:

a. Grantees shall have at least one person on staff who maintains DHS certification as Asbestos Supervisor and Asbestos Inspector. For the purposes of this policy, this person is referred to as the Hazardous Materials Coordinator.

b. All field staff that may encounter or disturb known or suspect ACM shall be trained in asbestos Operations and Maintenance (O&M) at minimum.

Training and Certification Options
Work that exceeds O&M limits and is determined to be cost effective by an energy audit shall be performed by appropriately certified grantee staff or contractors. All such "regulated asbestos activities" shall be performed by persons who are employed by a certified Asbestos Company. Disturbance of ACM beyond O&M limits, taking bulk samples of suspect ACM, and performing air sampling are "regulated asbestos activities."

Slate siding may be removed only by an Asbestos Supervisor, an Exterior Asbestos Supervisor, or an Asbestos Worker or Exterior Asbestos Worker (under the supervision of an Asbestos Supervisor or Exterior Asbestos Supervisor). Stucco may only be disturbed by an Asbestos Supervisor or Asbestos Worker. Exterior Asbestos Workers and Supervisors are not trained or allowed to disturb stucco.

Grantees may choose to use Training and Technical Assistance (T&TA) funding to:

a. Train and certify employees in asbestos disciplines (outlined in DHS Chapter 159) including Asbestos Worker, Asbestos Supervisor, Asbestos Inspector, Exterior Asbestos Worker, and Exterior Asbestos Supervisor.

b. Obtain and maintain certification as an Asbestos Company. When employees perform a DHS "regulated asbestos activity," the employer shall be a DHS certified Asbestos Company.

c. Provide air sealing and insulation training to a certified Asbestos Company to complete work on Wisconsin Weatherization Assistance Program eligible homes where disturbance of ACM will exceed O&M limits. Training, but not certification as a Company, or maintenance of certifications, may be provided to contractors meeting retention requirements.

F.3.2 Limitations of Operations and Maintenance Work

Weatherization staff trained only in Operations and Maintenance shall limit their activities to working with known or suspect ACM that falls under O&M work. This is defined as work that:

- Disturbs or incidentally removes no more suspect ACM than would fit in a single glove bag or disposal bag no larger than 60 inches by 60 inches, properly filled, ~~and~~ sealed and transported (i.e., integrity of bag is not compromised by volume or weight).
- Is non−repetitive.
- Is not a series of small jobs that, if performed sequentially, would require certification.
- Is conducted by an individual or individuals with documented proof of completing at least a 16-hour Operations and Maintenance training course as described in 40 CFR 763.92(a).

F.3.3 Competent Person

On all worksites with asbestos operations, OSHA requires that employers designate a "competent person" who can identify asbestos hazards in the workplace and has the authority to correct them. For O&M work, the competent person is someone who is O&M trained at a minimum. For all work exceeding O&M limits, the competent person is a DHS certified Asbestos Supervisor. For work disturbing ACM on the exterior of a home, either a certified Asbestos Supervisor or a certified Exterior Asbestos Supervisor may be the designated competent person.

F.3.4 Identification of Suspect Asbestos Containing Materials

The grantee shall inform the property owner and occupant of the existence and location of any suspect ACM *that is friable or otherwise presents a hazard* by documenting it on the Health and Safety Checklist. Any suspect ACM *that will be disturbed* during the weatherization process shall be identified and documented on the Health and Safety Checklist as well as in the Work Agreement (see Section F.4.2, Energy Audit Procedures).

Whenever weatherization work involving known or suspect ACM may exceed O&M limits, the Hazardous Materials Coordinator shall be notified. The Hazardous Materials Coordinator shall make a determination if the work falls within, or will exceed O&M limits. If the work exceeds O&M limits, the Hazardous Materials Coordinator shall ensure that the work is performed by persons and organizations with the required asbestos certifications (see also, F.4.4 Hazardous Materials Coordinator Role).

F.3.5 Testing for Asbestos

When weatherization work will involve disturbance of suspect ACM, grantees may opt to have the material tested. Bulk sampling may only be performed by a certified Asbestos Inspector who is employed by a certified Asbestos Company, as this is a DHS "regulated asbestos activity." Testing for asbestos is an allowable cost. Analysis of bulk samples shall be performed by a National Voluntary Laboratory Accreditation Program (NVLAP) listed laboratory, using EPA approved test methods. There is no EPA recognized method to test vermiculite insulation for the presence or absence of asbestos, therefore vermiculite insulation shall be assumed to contain asbestos.

If test results determine that the material contains asbestos, as defined by DHS 159.04 (see section G, Glossary of Terms), grantees may consider proceeding with the asbestos work following the modeling guidelines outlined in the next section. The grantee shall retain the results of testing in the customer file regardless of the outcome. If testing is not conducted, or the material is vermiculite insulation, the grantee shall proceed using the modeling guidelines for asbestos work.

F.3.6 Modeling to Determine if Asbestos Work is Cost Effective

The cost of asbestos work shall be modeled with the related major Energy Conservation Measure (ECM) using the electronic energy audit or calculator required for the building type. Actual fuel consumption records for the building shall be used when modeling asbestos related work in all cases.

- If the major ECM, including the cost of any asbestos work, and the entire job both have a Savings to Investment Ratio (SIR) of 1.0 or greater, the planned work may be completed by appropriately trained or certified staff or contractors.

- If the major ECM does not have an SIR of at least 1.0 when the cost of asbestos work is included, but the job has a cumulative SIR of 1.0 or greater, determine if weatherization of the building will be effective without the measure. If so, complete the job without completing the ECM. An example of this is a building with asbestos in the attic of a split entryway, where the basement and a primary house door are accessed via the entryway, and the area is unintentionally heated. In this case, the building's primary thermal envelope may be effectively weatherized without addressing the suspect ACM. Retain documentation explaining the rationale for this decision.

- If the major ECM does not have an SIR of at least 1.0 when the cost of asbestos work is included, and the weatherization of the building will be seriously compromised by deleting the measure, the job shall be deferred. An example of this is a building with suspect ACM in the attic. The audit might recommend air sealing as a measure with an SIR of greater than 1.0, but air sealing work would be ineffective without attic bypass sealing. If asbestos work must occur for the attic bypass sealing to be performed, then the cost shall be modeled with the ECM. If the SIR falls below 1.0, the job shall be deferred. When a job is deferred, the owner of the property shall be informed that if they plan to remove or otherwise abate the ACM, air sampling must be performed in the work area to determine whether it meets acceptable clearance levels.

- While the asbestos abatement work shall be incorporated into the cost of the major ECM for modeling purposes, the actual work shall be reported in the WisWAP system as a health and safety measure.

F.4 Procedures

F.4.1 General Guidance

Employers are subject to OSHA regulations which require training, protective measures, and engineering controls for workers who may be exposed to asbestos on the job. Publication OSHA 3096 outlines these requirements, therefore grantees should review this document to become familiar with the applicable regulations. Note that grantees are responsible for ensuring that contractors follow applicable requirements while on the job site performing work under a weatherization contract. Grantees' Implementation Plan shall identify how they meet exposure protection requirements. The policy shall also include a process for when suspect ACM is encountered after the start of the weatherization work. Photos of asbestos containment measures shall be taken to demonstrate safe work practices are used, and shall be retained in the client file.

A summary of asbestos work classifications and related protective measures is found in the tables on pages 37-42 of OSHA Pub. 3096. Grantees shall provide personal protective equipment to all employees that may encounter or work with suspect ACM, including:

1. Respirators that are NIOSH approved for asbestos.

2. Disposable protective clothing.
3. HEPA vacuums for fiber containment and decontamination.

Grantees shall follow all relevant OSHA regulations pertaining to the use of such equipment, including the required respirator fit testing, and a medical surveillance program for employees as applicable.

Personal air monitoring may be performed, following regulations outlined in OSHA 3096. Air sampling can only be performed by a certified Asbestos Supervisor employed by a certified Asbestos Company, as this is a DHS "regulated asbestos activity."

If air sampling is not performed to establish a Permissible Exposure Limit (PEL) or Negative Exposure Assessment, then employers shall assume worker exposure will exceed the PEL and workers shall use personal protective equipment including HEPA filtered respirators with a Protection Factor (PF) sufficient to prevent exposure to any level of fiber concentration that may be present in the asbestos work area. Positive pressure Supplied Air or Powered Air Purifying Respirators (PAPR) have the highest PF, followed by Full Face, then Half Mask negative pressure type respirators.

F.4.2 Energy Audit Procedures

Identifying and Documenting Suspect ACM
Energy auditors shall routinely look for suspect ACM during each energy audit. When suspect ACM is found, the auditor shall:

- Avoid or minimize disturbance of suspect ACM while performing an energy audit (see F.4.3 Blower Door Testing).
- Document the location of suspect ACM *that is friable or otherwise presents a hazard* on the Health and Safety checklist.
- Document any suspect ACM *that will be disturbed* during weatherization work on the Health and Safety Checklist and on the Work Agreement.
- Inform the customer about suspect ACM verbally during the energy audit process whenever possible.
- Provide information about suspect ACM that would be disturbed during weatherization to the Hazardous Materials Coordinator (including the Building ID number, type of building material or component, and related measure or measures to be performed).
- Notify the Hazardous Materials Coordinator whenever disturbance of suspect ACM during weatherization work may exceed O&M limits.

Work Orders with Operations and Maintenance
All O&M work shall be referenced in the work order as part of the ECM. The following information, at minimum, shall be detailed and included with the work order:

a. Only O&M trained workers may perform work that may disturb or remove known or suspect ACM.
b. A description and the specific location(s) of known or suspect ACM that will be disturbed.
c. A determination of whether blower door tests may be completed by installers.

d. Instructions to use the appropriate personal protective equipment.
e. Instructions to minimize disturbance of the known or suspect ACM.
f. Instructions to use appropriate safety procedures and to use containment barriers if needed.
g. Instructions to perform proper clean-up and disposal of any waste generated.

F.4.3 Blower Door Testing

Perform blower door tests based on what is present in the dwelling:

- When only non-deteriorated and non-friable ACM (suspect or confirmed) is present, perform normal *depressurized* blower door tests.
- When friable ACM (suspect or confirmed, including vermiculite) is present, perform *pressurized* blower door tests.

F.4.4 Hazardous Materials Coordinator Role

Grantees shall have at least one person who maintains DHS certification as Asbestos Supervisor and Asbestos Inspector. For the purposes of this policy, this person is referred to as the Hazardous Materials Coordinator. This individual shall perform or maintain oversight of the completion of tasks, and implementation of the policy in general related to this assigned role. The assignment of responsibilities identified in this policy shall be outlined in the grantee's Implementation Plan.

Primary Responsibilities
The Hazardous Materials Coordinator shall:

a. Establish whether suspect ACM may be addressed using O&M procedures during installation of the various energy conservation measures (ECMs);

b. Ensure that all field staff who may encounter or disturb ACM have received O&M training or have appropriate DHS asbestos certification;

c. Establish a process for determining when work will exceed O&M limits.

d. Identify control options based on assessment of the hazards involved with each type of measure in general, and also taking into account potential site-specific factors;

e. Ensure that whenever a contractor performs work in which suspect ACM may be disturbed (such as siding, plumbing, electrical, or HVAC), they have O&M training or required DHS certification, and are performing the work appropriately;

f. Ensure that consistent procedures are used for estimating costs of asbestos-related work for the purpose of modeling;

g. Ensure that when "regulated asbestos activities" are performed, DHS notifications are submitted and that all other DHS requirements are being met.

~~g.~~h. Ensure that records of asbestos abatement or management activities are maintained as required by DHS 159.19(7) and OSHA 1926.1101(n).

~~**Data Collection**~~
~~The Hazardous Materials Coordinator shall maintain a record of all units where known or suspect ACM is encountered that would be disturbed during weatherization. The record~~

~~shall include the WisWAP Building ID number, the type of ACM (for example transite, vermiculite, roofing materials), the related weatherization measure, and whether:~~

~~1. The measure was completed using O&M procedures.~~
~~2. The measure was completed by a certified Asbestos Company.~~
~~3. The measure was not performed.~~
~~4. The job was deferred.~~

F.4.5 Weatherization Work Procedures when Asbestos is Disturbed

General Guidelines

All workers who may disturb known or suspect ACM while weatherizing homes shall have completed O&M training at a minimum, and shall adhere to all appropriate asbestos work protocols. Only workers trained and certified as Asbestos Worker or Asbestos Supervisor (or Exterior Asbestos Worker or Supervisor) may conduct asbestos work that exceeds O&M. The following procedures shall be followed when performing weatherization work related to known or suspect ACM:

- An indication of what type of blower door test may be completed by installers shall be included on the work order. If a special situation dictates that a blower door test cannot be completed, use an infrared scanner when conditions permit, to identify heat bypasses and key junctures that may require air sealing. Perform non-blower door guided “non-guideline” air sealing and “comfort sealing.”
    - ✓ “Non-guideline” sealing work is limited to probable attic bypasses and key junctures, glass repair or replacement. Seal major air leaks first. Stop “non-guideline” work when the major air leaks have been sealed. “Comfort sealing” is miscellaneous sealing that will affect the occupants’ comfort and is limited to one labor hour.
- Utilize containment methods to limit the spread of ACM that is being disturbed.
- Use wet methods whenever possible when disturbing known or suspect ACM.
- Verify wall stability and seal all cracks and holes prior to installing sidewall insulation.
- When insulating over vermiculite insulation (suspect ACM) in an attic:
    - ✓ Seal ceiling and wall fixtures, openings, and penetrations to isolate vermiculite from the living area.
    - ✓ Minimize entry into and exit from the attic.
    - ✓ Utilize an exterior access to the attic when possible (such as a large gable end or roof vent) to limit movement of workers and equipment through the living area of the home.
    - ✓ Set up poly containment barriers to prevent migration of asbestos fibers into the living area.
    - ✓ Limit the movement of the existing vermiculite insulation when completing air sealing.
    - ✓ Utilize a HEPA vacuum with an extended hose to collect dust when disturbing vermiculite insulation.
    - ✓ For enclosed cavity attics, do not dense pack entire attic floor. Dense pack key junctures by drilling and using the bag method. HEPA vacuum attic floor prior to drilling and use HEPA vacuum to collect dust during drilling.
    - ✓ Utilize walk planks to minimize disturbance for air sealing and to blow insulation, and leave the planks in attic.

- ✓ Do not dense-pack floor cavity junctures where knob and tube is present.
- ✓ In un-floored attics, blow attic insulation so that existing insulation disturbance is minimized.
- ✓ Install sign in attic near the entrance to alert owners and maintenance or emergency workers of the presence of potential ACM.
- ✓ Take photographs of the final insulation application and retain or reference in the customer file.

- Ensure work area is cleaned thoroughly to remove asbestos fibers that might remain.
- Decontaminate work tools, disposable protective suits, and the outside of respirators prior to leaving work area by use of a HEPA vacuum and disposable wet wipes.
- Do not remove respirator until disposable protective suit is removed and disposed.
- Dispose of protective suit and any tools that cannot be cleaned in a plastic containment bag sealed with duct tape.
- Label and dispose of any asbestos waste as required by law.

Knob and Tube Wiring and Asbestos
When knob and tube wiring work is performed which will disturb ACM, the following guidelines shall be followed:

- Any sub-contractors involved shall have the appropriate asbestos credentials for the planned work.
- See General Guidelines above and coordinate with weatherization crew so that work may be done simultaneously.
- Locate knob and tube by removal of fixtures within the unit, or by sight in the attic whenever possible.
  - ✓ Place locater through fixture box into the attic from inside the unit to minimize the need to move insulation to locate fixtures.
  - ✓ Use proper containment.
- Leave abandoned knob and tube in place. Do not remove knob and tube under floors of floored attics.
- Install junction boxes where wiring enters floor, eliminate knob and tube around perimeter of attic floor whenever possible.
- Seal all openings in fixture boxes from inside the unit and note location of sealed boxes for weatherization crews.

F.4.6 Final Inspection

The final inspection shall be conducted following these guidelines at any weatherization job where ACM or suspect ACM was disturbed:

- Review audit and completed work for compliance with asbestos O&M or abatement work procedures.
- Review photographs of any control methods used during asbestos work.
- Do not enter attics with vermiculite insulation that have been re-insulated and the scuttles permanently sealed.
  - ✓ Review photographs of the final insulation application to be retained in the customer's file.
  - ✓ Inspect typical heat by-passes and key junctures as possible to determine that proper comfort sealing was completed. If feasible, use an infrared scanner to inspect the completeness of the air and thermal barrier.

- All other aspects of the final inspection can be performed in the usual manner.

F.5 Definitions

Asbestos Company: A person that performs, supervises, or offers to perform or supervise a regulated asbestos activity. “Asbestos Company” includes an exterior asbestos company.

Asbestos-Containing Material (ACM): A material or product that contains more than 1 percent of asbestos, as determined using the method specified in 40 CFR Part 763, Appendix E to Subpart E, Section I, “Polarized Light Microscopy,” and a material meeting the definition of suspect asbestos-containing material.

Competent Person: A person who OSHA recognizes as able to identify asbestos hazards in the workplace and has the authority to correct them. For O&M work, the designated competent person shall be someone who is O&M trained. For work beyond O&M, the designated competent person shall be a certified Asbestos Supervisor.

Friable Asbestos-Containing Material: Asbestos-containing material that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure, including previously non-friable asbestos-containing material when that material is damaged to the extent that when dry it may be crumbled, pulverized or reduced to powder by hand pressure.

Suspect Asbestos-Containing Material: Vermiculite insulation and any untested material used in or on a building component, *except for* metal, glass, wood or fiberglass.

Vermiculite Insulation: Vermiculite that has been expanded through a heating process and is used as loose-fill building insulation. It is a “suspect asbestos-containing material.”

Operations and Maintenance (O&M): The repair, operation, service or maintenance of a building that may result in the disturbance of asbestos-containing material or suspect asbestos-containing material.

Regulated Asbestos Activity: An asbestos abatement activity, asbestos management activity, or asbestos training activity for which certification or accreditation is required under DHS Chapter 159.

Appendix G – Policy for Handling Sensitive Data

G.1 General Guidelines

Contracted agencies shall ensure program employees, both internal and subcontracted, shall take reasonable efforts to protect and secure sensitive information. Sensitive data are any information of which the loss, misuse, or unauthorized access to, or modification of could adversely affect the Home Energy Plus Program, contracted agencies, program employees, and/or customers. Sensitive data and information includes, but is not limited to Social Security Numbers (SSNs), Personal Identifiable Information (PII) meaning information that can directly identify a specific individual, applicant household member or account specific information.

For the purposes of the following policy, sensitive data has two tiers.

Tier One sensitive data includes:

- SSNs by themselves or in combination with any PII (including date of birth, names, address, phone number, fuel account number and name, and income information), and
- The combination of date of birth and name without an SSN.

Tier Two sensitive data includes:

- PII elements that may be needed to complete effective business communications in support of the Home Energy Plus Programs (name, address, phone number, fuel account information, and income information).

Grantees and their contractors shall limit the use and exchange of sensitive data to the minimum required to conduct Home Energy Plus Program business effectively.

When using sensitive data individually or in quantity, contracted Home Energy Plus Program agencies, contractors, contractors and participants shall take reasonable actions to ensure the protection of sensitive program data that are: collected, displayed, transferred, stored, analyzed, or destroyed. This appendix identifies minimum requirements that shall be used for equipment, information collected and methods of transferring sensitive information. Contracted agencies shall have documentation and planned procedures in place for the handling of sensitive data and be able to make them available upon request.

G.2 Non-Disclosure Statement

A contracted agency shall not disclose sensitive data to any persons other than those directors, officers, employees, and agents (including subcontractors) who have a business-related need to have access to such information for the limited purposes of the Contract and who have been apprised of, and agree to maintain, the confidential nature of such information in accordance with the terms of the Contract. A contracted agency shall be responsible for the breach of the contract by any such persons including subcontractors.

A contracted agency shall require all agency employees with access to sensitive data ~~such representatives~~ to agree to and sign the Home Energy Plus Non-Disclosure Agreement. ~~, and shall be responsible for the breach of the contract by any such representatives.~~ The

Non-Disclosure Agreement form is located on the Home Energy Plus Program Information page under the Program Agreements/Forms heading.

This agreement shall be reestablished annually, based on individual program requirements.

G.3 Desktops

Desktops that are used for collecting, displaying, transferring, analyzing or storing Tier One or Tier Two sensitive data, shall apply the following standards:

1. Desktops shall be locked when left unattended by authorized personnel. Re-entry into the desktop shall require a user login and password.
2. An automated screen saver lock shall be enabled after 15 minutes of inactivity. Re-entry into the desktop will require a user login and password.
3. Hard drives shall be cleansed using at least a seven pass overwrite procedure (commonly referred to as the Department of Defense (DOD) standard), where the drive is written over electronically to eliminate all data prior to surplus or re-assignment to another user or work area. Contracted agencies shall make available upon request verification that the device has been sanitized meeting industry standards, seven pass overwrite, degaussing (sanitation based on magnetism), or complete physical destruction of the hard drive media.

G.4 Portable Computing Devices

Portable computing devices that are used for collecting, displaying, transferring, analyzing or storing Tier One or Tier Two sensitive data, shall apply the following standards:

1. Personally assigned portable computing devices shall have full disk (hard drive) encryption, requiring a login and password.
2. Portable computing devices shall have the boot up from external or secondary devices disabled. Boot up shall only be permitted from the hard drive.
3. An automated screensaver lock shall be enabled after 15 minutes of inactivity. Re-entry into the laptop will require a user login and password.
4. Portable computing devices that are inactive for 15 minutes shall automatically lock.
5. Do not store Tier One sensitive data on shared pool portable computing devices.
6. Hard drives shall be cleansed using at least a seven pass overwrite procedure (commonly referred to as the Department of Defense (DOD) standard), where the drive is written over electronically to eliminate all data prior to surplus or re-assignment to another user or work area. Contracted agencies shall make available upon request verification that the device has been sanitized meeting industry standards, seven pass overwrite, degaussing (sanitation based on magnetism), or complete physical destruction of the hard drive media.

G.5 Portable Media

Portable devices used for collecting, displaying, transferring, analyzing or storing Tier One or Tier Two sensitive data, shall apply the following standards:

1. Files that contain Tier One sensitive data shall require a password to open.
2. Media that may contain sensitive information shall be encrypted and require a login and password to access the media prior to file or folder access.
3. Shall be stored in a restricted access location, surrounded by a durable physical barrier that is not portable.

4. Disposal of the media shall require wiping electronic media with at least a 7 pass overwrite of the entire medium, degaussing (sanitation based on magnetism) or complete physical destruction of the medium.

G.6 General Electronic File Creation and Storage

Tier One sensitive data shall not be used to name files or folders. Faxing or transmitting original or copies of SSN cards, Driver's Licenses, Identification Cards or any Tier One data is prohibited.

G.7 Shared Network Drive

Files containing Tier one and Tier Two sensitive data stored on a network drive shall be stored in a secured folder limited to staff that require access to the data.

G.8 File Transfer Protocol (FTP) Sites

Tier one and Tier Two Sensitive data on FTP sites shall require the following standards:

1. Files require a password to open.
2. The password shall not be stored in the file name, file properties or other related information files about the file (aka metadata).
3. Password is to be provided to the end user via phone, email or other separate method of communication.
4. Sensitive data shall not be stored on an FTP site as a long term or permanent solution.

G.9 Email

Agencies shall not email Tier One sensitive data. Agencies may not request applicants to submit Home Energy Plus applications by email; and agencies shall not accept Home Energy Plus applications by email. Upon receipt of application materials from applicants or household members by email, the material shall be quarantined and handled appropriately. The sending individual shall be contacted, informed of the policy and provided an alternative option for submitting the application.

G.10 Hard Copies

Storing hard copies:
Tier One sensitive data that are printed or physically displayed on media shall:

1. Be stored in a locked access location (key code door, key, combination lock, etc.).
2. Meet programmatic requirements for record retention requirements. See specific program policies for requirements.
3. Be disposed of through complete destruction of the material, including shredding the media into confetti or burning the materials.

Tier Two sensitive data that are printed or physically displayed on media shall:

1. Be stored in a restricted access location.
2. Meet programmatic requirements for record retention requirements. See specific program policies for requirements.

3. Be disposed of through complete destruction of the material, including shredding the media into confetti or burning the materials.

Hard copies in transit:
When Tier One sensitive data are printed or physically displayed on medium that is in transit:

1. The data shall be stored in a location secured by a durable physical barrier requiring a key, such as a locking metal file case, locking vehicle trunk, lock box, or delivery truck.
2. Always be attended by an authorized individual.
3. When transporting hard copies containing Tier One data, a log shall be maintained of applications in transit from the point of origin and point of receipt.
4. The log of hard copy applications in transit will be made available upon request.

When Tier Two sensitive data are printed or physically displayed on medium that is in transit:

1. Always be attended by an authorized individual.

G.11 Quality Assurance

Contracted agencies shall have procedures established to ensure:

1. Employees and contractors are made aware of the policy requirements annually. The agency is responsible for ensuring signers of the Non-Disclosure Agreement have a full and complete understanding of the Home Energy Plus Policy for Handling Sensitive Data.
2. Technology and devices are within the standards set forth by The Policies for Handling Sensitive Data.
3. When scanning (making an electronic copy of) documents for storage, the original hard copy or source data are to be maintained until the scanned document imagery is secured. Original hard copies and source data are to be handled and destroyed in accordance with applicable document retention guidelines.
4. Documentation is written and maintained for plan of action regarding incident management and data handling. Employees are to immediately notify their supervisor if it is suspected that sensitive data may have been compromised in any way (i.e. loss, theft, unattended media, including but not limited to, PCs and laptops). Incident Information to be recorded and retained:
   a. Date and time of incident.
   b. Location of incident.
   c. Description of what happened to expose the data.
   d. List of potential impacted identities shall be made available upon request in a password secured document.
   e. Plan of prevention and correction.
   f. Incident information will be password protected in a secured folder on the network drive and restricted to the necessary authorized individuals.
   g. The Division of Energy Services shall be notified of any incidents and corrective actions.
5. Contracted agencies and subcontracted agencies shall not:

a. Scan, photocopy, or retain photo identification of program clients or household members.
b. Scan, photocopy, or retain Social Security cards of program clients or household members.
c. Send or request materials to be sent containing social security numbers by public or private mail, post, or messenger service.

G.12 Definitions

Contracted agency: An agency that has entered an agreement for program delivery on behalf of the Home Energy Plus Program or Wisconsin Department of Administration, Division of Energy Services.

Degaussing: A method of eliminating data on a storage device, were the drive is subjected to sufficient levels of magnetism to result in destruction of all data on the drive.

Desktops: A personal computer that is intended as a non-portable workstation.

Email: An electronic system which is used to exchange messages between individuals through the internet.

File Transfer Protocol (FTP) site: An internet site intended to transfer files or folders.

Hard Copies: A hard copy is any information printed, written or displayed on a surface, such as paper.

Overwrite procedure: A method of eliminating data on a storage device, were the drive is repeatedly written over electronically to eliminate all data.

Metadata: Any related information about the file or data.

Personal Identifiable Information (PII): Any information by itself or combined with additional information that can be used to directly identify a specific individual.

Portable computing devices: Any computer that is designed as a portable workstation for an individual.

Portable media: A drive, disk, or storage device that can be removed from one computer and used on another computer.

Scanning: Making an electronic copy of physical document.

Sensitive data: Any information of which the loss, misuse, or unauthorized access to, or modification of could adversely affect the Home Energy Plus Program, contracted agencies, program employees, and/or customers.

Shared network drives: Drives that are accessible to individuals through a server for the purposes of sharing electronic files and folders.

Solid state storage media: A data storage devices that uses integrated circuits to hold data.

Social Security Number (SSN): A nine digit number issued to an individual by the Social Security Administration.