Weatherization Works

KHC Kentucky Housing Corporation
Investing in quality housing solutions.

KENTUCKY WEATHERIZATION PROGRAM MANUAL (WXPM)

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Introduction

The Weatherization Assistance Program (WAP) is administered by Kentucky Housing Corporation (KHC). The program is designed to increase the energy efficiency of low-income eligible dwellings at or below 200 percent of poverty, reduce heating costs, and improve the health and safety of the dwelling. Services include but are not limited to an evaluation of the dwelling, heat systems, and a computerized energy audit. Benefits include but are not limited to repair/replacement of a heating system; testing for gas leaks, carbon monoxide, and other health and safety issues; checking combustible appliances such as stoves, furnaces, and water heaters; installing insulation; refrigerator replacement; sealing air infiltration; installing smoke and carbon monoxide detectors; and energy savings devices.

The sources of funding for the program includes an annual allocation from the U.S. Department of Energy (DOE) and the Kentucky Cabinet for Health and Family Services (CHFS) for Low Income Home Energy Assistance Program (LIHEAP). In 2022, KHC received a five-year allocation from DOE Bipartisan Infrastructure Legislation (BIL), which expires June 30, 2027, to provide weatherization services.

KHC developed the Weatherization Program Manual (WXPM) to provide specific guidelines that must be followed by KHC and by subgrantees contracted with KHC to operate the WAP in a defined geographic area within Kentucky. All such organizations are referred to as Subgrantees throughout this manual.

KHC works with Community Action of Kentucky (CAK) to provide Weatherization services to each county in Kentucky through partnerships with local Community Action Subgrantees (CAA) and other eligible entities. Each local Subgrantee will provide weatherization program information to eligible households in their service area and ensure that those who want to apply have an opportunity to do so.

All authorized changes to the WAP and WXPM will be made in the form of a written Program Notice (PN) via eGram. It is the responsibility of the Subgrantee to familiarize themselves with and implement said updates within their WAP.

Please note: Federal and state regulations will not be part of this manual but are incorporated by reference. In the event of a conflict between the Federal and State regulations and this WXPM, the more stringent shall prevail. Subgrantees are encouraged to visit www.nascsp.org to stay current on federal changes to the program.

Chapter 1: Getting Started with WAP

KHC will allocate Weatherization funds to Community Action Kentucky (CAK) and local Community Action Agencies (CAAs), and other entities via third-party grant agreements. (All contracted partners will be referred to as Subgrantees.) Any new Subgrantees will be selected based upon required state and federal procedures, which will include a Request for Proposal (RFP), unless special circumstances prevail, and unique skills are needed. Any new or replacement Subgrantee will meet the criteria outlined in the WAP Grant Agreement and must follow all DOE and KHC program policies and procedures.

Subgrantees are notified of funding availability for weatherization activities within their respective service areas for the upcoming Program Year. In the draft of the DOE State Plan, Subgrantees are advised of the allocation by funding source, the maximum administration by funding source, and the training allocation. Likewise with the LIHEAP funding provided by CHFS, Subgrantees receive the breakdown in their contracts.

1.1 Technical Submission

KHC will require technical submission for all applicable funding sources for Subgrantees via e-mail. The technical submission process is as follows:

- KHC will check Sam.gov for Subgrantee eligibility.
- KHC will send an email which includes the following attachments:
    - Contract
    - Authorized Signature Form
    - Request for Subgrantee's Authorized Signature Policy
- Subgrantees should review contracts, sign, and date them.
- In an email addressed to wxadmin@kyhousing.org, subgrantees should attach the signed contract and all other requested documents.
- KHC will send via email the executed contract, in which the Subgrantee will retain a copy in their files.

1.2 Subcontract Amendments

Proposed amendments to a subcontract must be made in writing to cover any changes in the scope of work or allocation, which includes the following:

- Changes in contract objectives.
- Increase or decrease in funding.

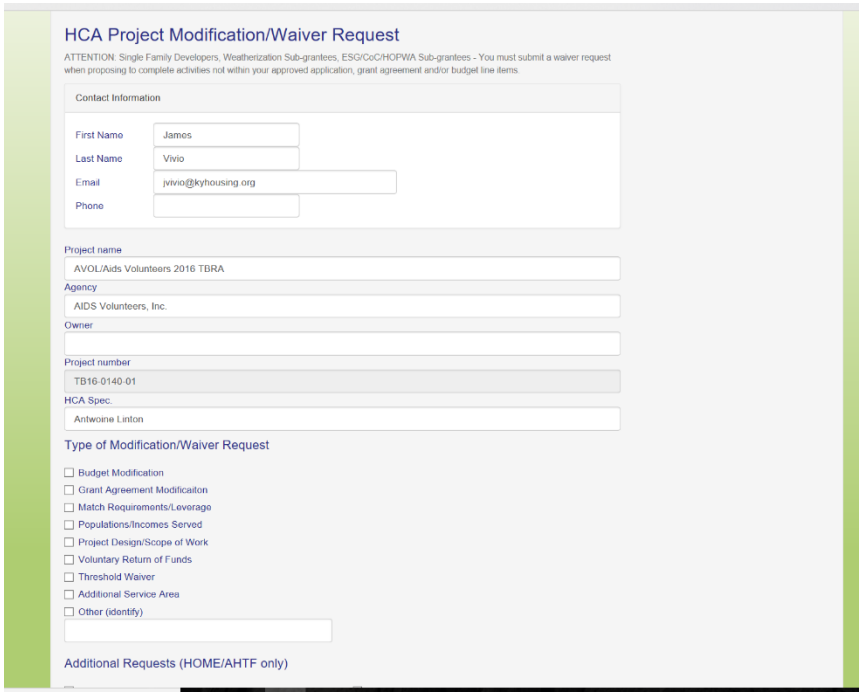
Written requests must be submitted to KHC through the Performance Draw Management System via waiver request, and it should include justification for the amendment request. Requests for amendments will be reviewed by KHC to analyze justification. All approved amendments are to be maintained by KHC in the Subgrantee grant agreement folder for future audit purposes.

1.3 Waiver/Modification Procedures

General waivers and modifications can be submitted via HCA Project Modification/Waiver Request. Each request will be reviewed by staff who will analyze justification to determine if it is an allowable request. Once a determination on the request has been made Subgrantees will be notified via email. Reasons for a waiver/modification request range from any budget modification, project design, site plan, etc. If Subgrantees are not sure a waiver/modification request needs to be sent, please contact the HCA Agency Partner Portal.

Access the HCA Wavier

1. Log in to the PFDM system.
2. Access the project you would like to submit the waiver for.
3. Click Forms.
4. Click HCA Waiver to open the form.



5. Complete and submit the form.

The form auto-populates project information. The populated information can be changed with the execption of the project number. If the project number is incorrect, please contract the HCA Agency Partner Portal.

1.4 Financial Audits

Subgrantees shall be responsible for complying with the audit requirements of 2 CFR 200. All Subgrantees shall, for audit purposes, keep sufficient programmatic and financial records and documentation to support expenditures and shall be responsible for assuring that audits are performed according to contract terms.

Subgrantees shall accept responsibility for any audit exceptions and for corrective actions necessitated by administrative findings arising from failure to comply with the terms of the contract or any laws and regulations applicable to federally funded activities.

A copy of each Subgrantee's draft and final audit reports may be submitted one of two options:

Option 1	Option 2
Mail to: Kentucky Housing Corporation **Housing Contract Administration** **1231 Louisville Road** **Frankfort, KY 40601**	**Email to: wxadmin@kyhousing.org**

1.5 Conflict of Interest

The provision of any type or amount of weatherization assistance may not be conditioned on an individual's or family's acceptance or occupancy of housing owned by the sub-subgrantee. No sub-subgrantee may, with respect to individuals or families occupying housing owned by the sub- subgrantee, or any parent or subsidiary of the sub-subgrantee, carry out the initial evaluation required under 10 CFR Part 440. For the procurement of goods and services, the sub-subgrantees must comply with the codes of conduct and conflict of interest requirements under 2 CFR Part 200. Sub-subgrantees must disclose all real, potential, or perceived conflicts of interest to KHC as outlined in 2 CFR Part 200, as applicable, regarding the receipt of, assistance provided with, or expenditure of KHC funds. All conflicts of interest must be disclosed and resolved prior to providing weatherization assistance to the household.

Potential conflicts of interest may arise from many situations. Some of the more common examples are as follows:

- Requests for program assistance from employees, families of employees or board members, or families of board members of Subgrantees or sub-subgrantees
- Subgrantees or sub-subgrantees contracting with or procuring materials from employees, families of employees or board members, or families of board members of subgrantees or sub-subgrantees.

Subgrantee/sub-contractor employees may not receive the WAP services unless all client and dwelling eligibility criteria of the program have been met, the priority point system strictly followed, all program protocols strictly followed, and no preferential treatment is given. In these events, the process below must be followed.

Process to Submit a Conflict of Interest

The application has the following questions:

1. Are you an employee (or weatherization contractor) of the agency? If yes, what is your position?
2. Are you an immediate family member of an employee (or weatherization contractor) or board member of the agency? If yes, who and what position does the person hold? What is the relationship?

All subgrantees should ensure that these two questions are answered.

Immediate family members are defined as spouse, parent, child, brother, sister, grandparent, grandchild, including steps, and in-laws; and any person cohabitating with a covered person, as well as any immediate family member related by blood, marriage, or adoption, but not distant relations such as cousins, aunts, uncles, who do not reside with the covered person.

Tier 1

Subgrantee Employees not described in Tier 2 (Non-Weatherization) - Subgrantees should follow their internal conflicts-of-interest policies.

Tier 2

Subgrantee Weatherization Staff (including contractors), Board Members, Executive Director or other leadership or staff positions that oversee the weatherization program or funding, and Immediate Family Members of the either of these groups - Persons that fall into the Tier 2 category are ineligible to apply for assistance under the weatherization program. Subgrantees may, on a case-by-case basis, submit a request to KHC for a waiver of this requirement. Subgrantees will need to follow the Conflict-of-Interest waiver request process outlined below. Subgrantees should include in the waiver request a plan of how the weatherization employee that is in conflict will
not be working on the house.

1. Subgrantee should advertise that the conflict-of-interest waiver will be discussed at a board meeting (can be documented by social media advertisement).
2. Subgrantee should document in board minutes the applicants reviewed for conflict-of-interest. (Board chair should sign the minutes.)
3. Subgrantee's attorney drafts a letter, providing a legal opinion that granting the waiver request would not be in violation of federal, state, or local laws or regulations or Subgrantee's policies.
4. Subgrantees submit conflict of interest waiver requests through the KHC PDMS, attaching the attorney letter, board minutes, and job descriptions.
5. KHC will review the conflict-of-interest waiver request and may approve or deny the request in its sole discretion. KHC will also document the files.

All Conflicts-of-Interest policies will be reviewed by KHC legal to determine reasonableness, and the admin/financial monitors will add this to the monitoring checklist for compliance.

1.6 Data Breach

In the event of a data breach, Subgrantee will notify KHC in the most expedient manner possible, and without unreasonable delay, but in no event later than seventy-two (72) hours from the determination of a security breach relating to the data in Subgrantee's possession. Subgrantee agrees to comply with all provisions of KRS 61.932, including that Subgrantee shall implement, maintain, and update security and breach investigation procedures which are appropriate to the nature of the information disclosed, at least as stringent as the security and breach investigations procedures and practices in KRS 61.932(1), and reasonably designed to protect the data from unauthorized access, use, modification, disclosure, manipulation, or destruction. On the event of Subgrantee committing an unauthorized disclosure of data listed in KRS 61.931(6)(a) through (f), subgrantee shall provide to KHC a copy of all reports and investigations relating to such investigations or notifications that are required by federal law or regulation.

1.7 Dispute Resolutions

Subgrantees have the responsibility to resolve all client complaints, including applicant denials, project deferrals, and work quality issues. Subgrantees shall establish a clear, objective, and prompt dispute resolution process. If the internal procedures fail to remedy a complaint, the resolution process must include mediation and arbitration.

Clients must be informed at time of application of their right to file a grievance. Subgrantees will also be responsive to requests for information regarding the dispute resolution process. Clients may withdraw a grievance at any time with the understanding that they may re-enter the process at the point they withdrew if a complaint is not resolved.

The following model is an example of a resolution process. The model can be modified to meet a Subgrantee's structure and approach. Remember to carefully consider on a case-by-case basis client grievance that cannot be easily or quickly resolved.

1. A grievance must be filed in writing for a Subgrantee to take action, except when a client complaint can be resolved quickly.
2. Subgrantees' process must include the following client rights:
    a. Have a representative speak on behalf of the client – including an interpreter if needed.
    b. Review and obtain copies of the client's file.
    c. Present oral and written statements.
3. The client will be informed of a decision to the resolution process within 10 working days of complaint receipt.
4. Subgrantees must:
    a. Document each step of a grievance proceeding, including communication with the client.
    b. Make all compliant and grievance documentation, including all resolutions, formal and informal, available to KHC for review upon request.
    c. If the client wishes to appeal any decision resolution, these will be sent to KHC to resolve.
5. KHC role and responsibilities:

a. Approve Subgrantee's dispute resolution process.
b. Monitor Subgrantee's use of approved process.
c. Be available for technical assistance and consultation.
d. Process any appeals.
e. Review complaints that KHC receives and determine if client has gone through all steps of approved dispute resolution process. If not, refer client back to Subgrantee to complete approved process.

KHC recommends coordinating with the local dispute resolution center and professional arbitration services when crafting a dispute resolution process. The Subgrantee must make every attempt to resolve the grievance/complaint prior to referring the client to KHC. If the Subgrantee fails to obtain resolution, they may contact KHC for additional assistance. KHC will get involved only after being assured by the Subgrantee that all means to resolve the grievance/complaint have been exhausted. If KHC is unable to resolve the issue, and funded through LIHEAP, the client issue may escalate to the ombudsman at Cabinet for Health and Family Services.

1.8 Client Property Damage

It is the responsibility of the Subgrantee to handle any complaints received from clients regarding personal property damage resulting from weatherization services provided by the Subgrantee.

The Subgrantee shall promptly investigate any complaints received and determine if the complaint is warranted and make restitution to the client, if applicable.

Note: Any costs incurred by the Subgrantee in repair of damages to client property cannot be charged against the weatherization contract, including staff time involved in making repairs.

It is the sole responsibility of the Subgrantee to maintain adequate liability insurance to cover any damages to persons or property in connection with weatherization activities performed by the Subgrantee or its representative. This cost should be charged to the Subgrantee's liability insurance budget line item in the planning forms.

Chapter 2: Eligible Clients

2.1 Eligible Clients

To be eligible for weatherization assistance, an applicant must fill out a weatherization application, provide required documentation of income, homeownership, and documentation of prior 12 months' energy usage for the home to be weatherized, and meet the following income eligibility criteria:

Total income of the family residing in the dwelling to be weatherized must be at or below 200 percent of poverty determined in accordance with criteria established by the Director of the U.S. Office of Management and Budget. Program Notices from DOE will indicate an effective date of any revised poverty guidelines.

2.2 Categorical Client Eligibility

In WAP, two types of categorial eligibility exist – Social Security/TANF and HUD-Means Testing.

2.2.1 Social Security/TANF

If the applicant household contains a member who has received cash payments under Title XVI (SSI) of the Social Security Act or KTAP at any time during the twelve (12) month period preceding the determination of eligibility, the applicant is categorically eligible.

This does not mean that if the client is earning disability social security income that they are to receive assistance automatically. These individuals may have disability income plus other income that exceeds income limits, thereby removing their eligibility.

The ruling means that if the client has received Title IV or Title XVI assistance (welfare assistance); they are already disabled, but very low-income.

Application intake workers must carefully determine which Title the social security is awarded under before determining eligibility.

2.2.2 HUD-Means Testing

Any applicant receiving assistance from the following HUD-funded programs is eligible for weatherization services without documenting income, under DOE guidance. However, LIHEAP guidance requires income documentation.

Types of HUD programs

- Housing Choice Voucher (HCV)
- HOME (TBRA & other)
- Public Housing Authorities (PHAs) (Multi-Family)
- Section 8 Project-Based (Multi-Family)

Documentation of HUD-program eligibility must be obtained and retained in the client file.

2.2.3 Documentation Processes per Program

HCV Program – KHC provides HCVs to 87 counties in the state. All other counties are served by local PHAs or city/county governments. The HCV Program provides income-based, rental assistance, which allows clients to rent any unit which accepts the HCV voucher.

KHC Counties	Non-KHC Counties
Contact wxadmin@kyhousing.org with name of applicant and address.	Subgrantee will have to work with client to obtain backup documentation from the HCV department.

KHC will pull backup documentation and add to Hancock documents and notify agency.	Types of backup documentation: • Screen shot from system • Current HAP contract • Other

HOME Reinvestment Program – KHC receives grant funds from HUD to operate the HOME Reinvestment Program, which as two prongs: Tenant-Based Rental Assistance (TBRA) and HOME Development. TBRA provides income-based rental assistance through a network of homeless and housing providers who subcontract with KHC. HOME Development supports new housing construction and some rehabilitation to homebuyers/homeowners.

- HOME TBRA - Letter from housing provider.
- HOME Development – rarely will this qualify. Check with KHC for qualified applicant and documentation.

PHAs and Section 8 Project-Based – Traditionally referred to as "public housing", both of these HUD-funded programs offer rental assistance, which is based on a particular. Project-based is administered by KHC through a HUD contract, and the assistance remains with an assigned unit regardless of the who leases the unit as long as they are income-qualified.

PHAs	Project-based Units
• Copy of current lease (If it mentions public housing/project-based. • Other	Contact KHC.

If subgrantees have any questions regarding HUD-means testing and documentation with the funding streams, contact KHC.

2.3 Income Definitions and Proof of Income

For purposes of this program, income is determined as follows:

Income means cash receipts earned and/or received by the applicant before taxes during applicable tax year(s) but not the income exclusions listed in the guidance. Cash receipts includes regular payments from social security. The income exclusions include Federal non-cash benefit programs such as Medicare, Medicaid, Food Stamps, school lunches, and housing assistance. Therefore, the Subgrantee would have to include all social security payments but exclude all Medicare premiums.

2.3.1 Income Computation

The gross income, including any irregular income, of all current household members must be computed and verified for the month prior to application. For instance, for any application taken in November, the gross income for October of all persons residing in the household on the date of application would be considered. If an application is taken in December, then November's income is considered.

Irregular income is income received all at one time or in lump sum payments such as for the sale of agricultural products, payments for contract work, Christmas Bonuses, etc. Any irregular income received in the month prior to application must first be pro-rated, on a monthly basis, over the period it is intended to cover before it is added to the household's income. For example, the profit from the sale of a crop could be a one-time payment for the entire year and the monthly income would be calculated as 1/12 of the entire profit. Contract labor or income that is received in one lump sum for work performed over a period of months would be divided by the number of months in the contract, or worked, before it is added to the household's income.

2.3.2 Calculating Monthly Income for Currently Employed Clients

WAP income eligibility is based on the household's prior month's income. Since many forms of income are distributed weekly, subgrantees should convert cumulative weekly pay into monthly pay to determine eligibility for the program. One month of gross income is used to determine eligibility. Four weeks does not equal one month. Two bi-weekly pay periods also do not equal one month. If the customer is working regularly, collecting pay stubs is the best option to determine eligibility. If an employee is paid weekly OR bi-weekly, collect all pay stubs received in the prior month and use the appropriate formula below.

Formula for Regular Hours (use this formula if the employee works a set number of hours each week that do not change)

(Hourly Wage) X (# of hours worked in a week) x 52 divided by 12= gross monthly income.

Formula for Inconsistent Hours
Collect all pay stubs received from the previous month.

(Sum of all stubs)/(# of weeks covered by the stubs) = Average weekly gross income received in the month

(Average weekly gross income received in the month X 52)/12 = gross monthly income

**When Not to Use Formula: The exceptions for using either formula occurs when an employee was hired or terminated mid-month. If this is the situation, the applicant's income will be the gross amount of income that the applicant received during the month prior to applying for WAP.*

2.3.3 Calculating Income from Annualized Income (Unemployed Clients)

If an applicant only receives income for part of the year in which the application is submitted, subgrantees can annualize income. For example, Applicant A received income during January, February, and March. The method of annualizing income to determine eligibility is multiplying by four the amount of income received during those three months.

Please note that the Annualization of Income method is not allowed to be used if applicants have income for the prior 12 months to the application date. In that case, actual household income for each month in the 12-month period preceding the application date must be used to calculate an applicant's income and complete verifiable documentation.

2.3.4 Countable Income

Countable income includes both earned and unearned income but is not limited to:

- Non-recurring lump sum payments; (i.e. vacation pay, sick leave pay, or bonuses)
- Wages or tips
- Statutory benefits such as VA Pensions; Black Lung Payments; Railroad Retirement; Social Security Retirement; Disability or Survivorship Benefits
- Farm earnings
- Rental, including room or boarder earnings
- Self-employment earnings (gross)
- Kentucky Temporary Assistance Program (KTAP), Temporary Aid for Needy Families (TANF)
- Supplemental Security Income (SSI)
- Alimony
- Unemployment Compensation
- Private pensions
- Worker's Compensation
- Royalties
- Support from an individual(s) outside the household including contributions, personal loans, etc.

2.3.5 Excluded Income

Excluded Income shall be:

- Child support payments received by the household are not counted as income for WAP
- Payments received by the household from a state, federal, or local subgrantee designated for a particular purpose and which the consumer must use for that purpose, such as payments for Kinship care payments, VA Aid and Attendance, Incentive Payments, Pell Grants
- Any payments made by the Division of Protection and Permanency for child foster care, or subsidized adoption
- Payments made to others on the household's behalf, such as Medicaid, or vendor payments
- Michelle P. Waiver income

- Loans
- Reimbursements for expenses (Example: Reimbursement to K-TAP subgrantees for transportation expenses)
- Incentive payments or income normally disregarded in KTAP (Example: Ready to Work Program)
- Federal payments or benefits which must be excluded according to federal law (LIHEAP, Food Stamps)
- Supplemental Medical Insurance payments and reimbursements.
- Income Tax refund
- Wages of students in primary, middle or high school
- Wages of senior employment programs such as Title V
- AmeriCorps
- Capital gains
- Any assets drawn down as withdrawals from a bank
- Money received from the sale of a property, house, or car
- One-time payments from a welfare subgrantee to a family or person who is in temporary financial difficulty
- Gifts, loans, or lump-sum inheritances
- Resources from grants, scholarships, fellowships, and educational loans
- One-time insurance payments or compensation for injury
- Non-cash benefits, such as the employer-paid or union-paid portion of health insurance
- Employee fringe benefits, food, or housing received in lieu of wages
- The value of food and fuel produced and consumed on farms
- The imputed value of rent from owner-occupied non-farm or farm housing
- Federal non-cash benefit programs such as Medicare, Medicaid, Food Stamps, school lunches, and housing assistance
- Combat zone pay to the military
- Assistance payments based on need supplied by the State or other entity
- Work expenses of the blind
- Handicapped income required for an approved program if self-support, and black lung disability

2.3.6 Income Verification

Verification of income is required of all households making application for assistance. The applicant should be advised that verification of all income of all household members is required to determine eligibility and that all information will be held confidential.

The primary responsibility for obtaining verification will be with the applicant. The applicant should be made aware of this responsibility but assisted, as needed, in obtaining verification.

1. **Unearned Income**: Verify unearned household income, as appropriate, from one or more of the following:

- K-TAP, or Kinship Care
- Most recent DCBS award letter for K-TAP or Kinship Care
- Social Security award letter*
- Pension statement
- Internal Revenue Service records
- Veterans Administration records
- Railroad Retirement records
- Court support records
- Union records
- SSA verification forms
- College financial aid award documents
- Contracts for sale of property
- Bank statements for interest income only**
- Statement from absent parent or copy of checks from absent parent for support payments
- Statement from individual providing income to the applicant

*In situations where a client has an overpayment from Social Security or SSI taken directly out of their check, Subgrantees should count the gross income, which is the amount of income BEFORE any overpayment or medical deductions.

****Bank Statements should not be used to verify Social Security or SSI benefits.** In this case, the applicant should provide the Subgrantee with the Social Security award letter or a proof of income letter from the Social Security Administration. Bank statements may be used to identify other incomes that may be included in the household. Once another income source is identified, Subgrantees should ask for back-up documentation to verify the income.

2. **Earned Income**: Verify earned household income, as appropriate, by one or more of the following:
    - Pay stubs
    - Employer statement or contract
    - Records maintained by individual on self-employment income
    - Contracts
    - Current income tax return
    - Records of income and expenses on farm and /or rental income

2.3.7 Proof of Eligibility

Subgrantees are reminded that proof of income eligibility must be included in the client file. Income eligibility verification begins at the time the weatherization application is completed and signed by the client. Further income eligibility verification continues and is required if the weatherization application becomes greater than 12 months old and weatherization services have not commenced **or** if the client's household income changes after the time of initial completion of the weatherization application, and before weatherization services have commenced.

1. Availability of Supporting Documentation: For purposes of review and audit, each file must contain a weatherization application from the client that contains the required demographics and income for the entire family living in the residence.

   The file must also contain evidence provided by the Subgrantee that the client is eligible to receive WAP services.

   This evidence may include but is not limited to the following: copies of proof of income documents, a memorandum from a third-party certification office stipulating the income levels of the family and source documentation for each income source listed on the application.

   All documents must be clear and legible.

2. Eligibility Determined by Outside Subgrantee/Program: If income eligibility is determined by an outside Subgrantee or program, i.e. Low-Income Home Energy Assistance Program (LIHEAP) or the U.S. Department of Housing and Urban Development (HUD), any document used to determine eligibility, such as a copy of LIHEAP eligibility or a copy of the HUD building list, will suffice as evidence of client eligibility. This document and any related documents must be retained in the client file.

3. Self-Certification: After all other avenues of documenting income eligibility are exhausted, self-certification is allowable. However, evidence of the various attempts at proving eligibility must be contained in the client file, including a notarized statement signed by the potential applicant indicating that he has no other proof of income.

4. Clients claiming zero income must sign a declaration of zero income, and all declarations of zero income must be notarized if the entire household is declaring zero income.

2.3.8 Re-Certification of Eligibility

An applicant must be re-certified when eligibility lapses due to the length of time the applicant was waiting to receive weatherization services. As a reminder, re-certification of eligibility must occur at least every 12 months.

After an applicant has been determined income eligible for assistance, the Weatherization Program Director or Executive Director must sign the weatherization application certifying eligibility before any work can be done to the dwelling.

At the time of income eligibility determination, the applicant shall be given a written notice of his/her rights and method to file a complaint. An eligible applicant's notice must include the priority point total and the priority point range at the time of application. If the applicant is ineligible, the notice must explain why they are not eligible.

An applicant will remain eligible for weatherization services for 12 months from the date of verified eligibility.

If weatherization work is expected to begin between 12 and 15 months from the date of verified eligibility, the household must show continued eligibility.

A signed declaration of income statement for the previous three months may be used to update application if necessary. If weatherization work has not begun after 15 months from the date of application, the household must recertify in full. Weatherization work begins on the date of initial energy audit.

2.4 Priority Point System

Priority shall be given to identifying and providing weatherization assistance to families whose annual household income does not exceed 200% of the poverty level. Once this has been established, the household will be prioritized according to its occupancy with preferences given to those households containing an individual who is elderly, a young child (children at/or below the age of 6) or disabled. Households with a high energy burden (a low-income household whose residential energy expenditure exceeds the median level of energy burden for all low-income households in the state per WAP 10 CFR 440, part 440.3) are factored into the priority ranking.

After applicants have been certified as income eligible for WAP assistance, the application is to be prioritized using the points obtained on the back of the application. The Subgrantee shall advise the applicant at the time of intake that it is the client's responsibility to promptly notify the Subgrantee of any change in his/her status (such as income, age, health, etc.), if it changes from the time of application, which could affect the client priority rating.

2.4.1 Assigning Points

Household Points
Elderly or disabled occupants = 10 points each. For example, a two-person household in which both occupants are elderly and disabled will be awarded 20 points.

Children at or below age of 6 in the household = 5 points (regardless the number of children at or below 6 years).

Income Points
100%-150% of Poverty Level = 1 Points
75%-99% of Poverty Level = 2 Points
< 75% of Poverty Level = 3 Points

Fuel-Type Points
Electric = 8 Points
Coal * = 2 Points
Propane = 6 Points
Wood * = 4 Points
Oil = 4 Points
Gas = 3 Points

***** *If household contains only Elderly or Disabled, add (4) points for heating with wood and (6) points for heating with coal.*

Energy Burden Points

$0.00	/ $0.00	= %
Total Energy Cost	Annual Income	

*Zero income = 15 Points
0-5% = 2 Points
6-14% = 4 Points
15-21% = 6 Points
22-28% = 8 Points
29-33% = 10 Points
> 34% = 15 Points
Anything above 15% of income is considered high energy burden.

Households that are eligible and have children identified by the Department for Community Based Services' (DCBS) local office as being at risk of being removed from the home if the home conditions are substandard and are in need of weatherization, will be red flagged as priority and will receive service immediately. DCBS will make the referral to the Subgrantee using a DPP1299, Referral for Emergency Weatherization Program. The local subgrantee shall inform the local DCBS office of the status of the applicant by completing the information on the bottom of the DPP1299 and returning to the local office.

Applications are taken throughout the contract period and maintained until services are provided. The Subgrantees are required to re-prioritize applications on a regular basis (defined by Subgrantees in their policies and procedures). If the application is on file longer than twelve (12) months, the subgrantee **must** contact the client to re-verify the information given at the time of application before service is provided. If the family size or source of income has changed, a new application must be processed.

The Subgrantee must review and prioritize all weatherization applications on a regular basis, at least once every six (6) months, in order to ensure that those applicants with highest priority ranking are served first. Applicants not receiving sufficient priority ratings for the period reviewed will be annotated and will remain eligible for the following period. Subgrantees have the option of prioritizing applications by county or for the entire service area, whichever helps the Subgrantee utilize the work crews/contractors in the most cost-efficient manner.

It will be the responsibility of each Subgrantee to ensure that all counties in its service area receive the same outreach and intake opportunities relative to their share of eligible household population. Each Subgrantee must have the capacity to find and identify eligible households throughout its service area. KHC will monitor each Subgrantee's files on a routine basis to ensure that sufficient applications are being taken throughout its service area.

2.4.2 Documenting Disability for Priority Points

Guidance: 10 CFR Part 440.3 Definitions:

Persons with Disabilities means any individual (1) who is a handicapped individual as defined in section 7(6) of the Rehabilitation Act of 1973, (2) who is under a disability as defined in section 1614(a)(3)(A) or 223(d)(1) of the Social Security Act or in section 102(7) of the Developmental Disabilities Services and Facilities Construction Act, or (3) who is receiving benefits under chapter 11 or 15 of title 38, U.S.C.

Applicants must provide proof of disability before being eligible for priority points awarded to persons claiming a disability during the application prioritization process. A Social Security disability award statement or the attached "Verification of Disability" form is acceptable documentation.

2.5 Client Utility Cost Calculations

When gathering electric and fuel cost/usage information, obtain these costs and usage for the most recent 12-month period preceding the date the weatherization application is filled out and signed by the client. Applicants do not have to establish a 12-month residency before application. It is allowable to annualize partial energy usage information to complete the application. Every effort should be made to obtain any available information about past usage. But, if only partial data is available, file documentation of what the annual calculation was based on, is all that is necessary.

Also note that minimum usage fees charged to the client even when there is no actual usage must also be included in the total cost of electric and fuel for the client. This must be accounted for when performing utility cost calculations and priority point calculations on the weatherization application. If applicable, this must also be noted on the WX 710 and weatherization application when applicable in the comments section.

Minimum usage fees must also be taken into account when setting up utility costs in the NEAT/MHEA cost and setup libraries.

2.6 Client Privacy

Subgrantees will maintain the privacy of client personal information.

1. Personal information collected, used, or acquired in connection with the Weatherization Program shall be used solely for the purpose of providing weatherization services. Subgrantees agree not to release, reveal, publish, transfer, sell, or otherwise make known to unauthorized persons a client's personal information without his or her express written consent or as required by law. Written consent must include what client information may be shared and to whom or which agencies/businesses. Subgrantees must acquire signed client releases enabling Weatherization Program access to utility and other energy vendor billing records and account information, including account number, the name to which the account is billed and verify the billing address is accurately recorded for all clients. Account

information must be gathered for all energy vendors, both electric and the primary heating source, and must include both consumption and expenditure data.

2. Subgrantees agree to implement physical, electronic, and managerial safeguards to prevent unauthorized access to personal information. Personal information includes information that would identify an individual's health, education, business, use or receipt of governmental services, name, address, age, telephone number, social security number, driver's license number, and finances including financial profiles, credit card numbers, or other identifying numbers.
3. KHC reserves the right to monitor, audit, and investigate the use of personal information collected, used, or acquired by local subgrantees. Not properly maintaining clients' confidential information could result in termination of a contract or subcontract.
4. Subgrantees agree to indemnify and hold harmless KHC, the State and its officers, employees, and authorized agents for any damages related to local subgrantees' unauthorized use of personal information.
5. Subgrantees shall include this client privacy policy in all subcontracts. In addition, Subgrantees shall include in subcontracts a clause stating that subcontractors agree to indemnify and hold harmless local subgrantees, the State and its officers, employees and authorized agents for any damages related to subcontractors' unauthorized use of personal information. Subgrantees are responsible for monitoring the use of personal information collected by subcontractors.

2.7 Required Client File Documents

1. WX weatherization application Client Application with all sections completed and signed.
2. Proof of income and/or zero income for each household member age 18 or over. **Note:** An entire household declaring zero income must have **notarized** zero income declarations for each member age 18 or over.
3. Proof of homeownership by homeowner, including Landlord if applicable.
4. Heating and electric costs for the past 12 months.
5. Subgrantee/Landlord Agreement, WX Rental, if applicable.
6. Must include the NEAT/MHEA Generated Work Order for Regular Weatherization from the approved audit software, including in-house estimate, bidding copy for contractors, if applicable, crew copy, and actual costs/work measures.
7. NEAT/MHEA Generated Work Order for Energy Systems, Health and Safety Measures, including in-house estimate, bidding copy for contractors, if applicable, crew copy, and actual costs/work measures.
8. NEAT/MHEA Generated Client Completion Report
9. Heat System Inspection Form, (WX 900 G, WX 900 E, WX 900 SF, WX 900 OIL), as applicable with all sections filled out and signed as applicable.
10. WX 710 with all sections filled out and signed as applicable.
11. WX 910 Request to Exceed/Fuel Change Request, if applicable.
12. WX BLR: Base Load Record.
13. WX Mold Assessment and Release Form.
14. Documentation to prove Lead Safe Work Practices were performed, when applicable.

15. Documentation showing usage of an EPA approved Lead Paint Testing Kit, or Written Certification of Assumption of Lead Paint presence in the home completed by a Certified Renovator, when applicable.
16. Written evidence the client has received a copy of EPA's "Renovate Right" pamphlet.
17. Written evidence the client has received a copy of EPA's "A Brief Guide to Mold, Moisture, and Your Home."
18. Written evidence the client has received any other required Health and Safety Client Education documents as applicable listed in Chapter 12, section 12.5, step 1.
19. Section 106 Project Review Form.
20. A complete NEAT/MHEA printout of recommended work measures, including SIRs for each work measure.
21. Subgrantee Contractor Agreement, if applicable.
22. WX 15 Change Order, as applicable
23. WX 16 Contractor's Notice of Completion, as applicable (optional).
24. WX 16A Deficiency Notice, as applicable.
25. WX 17 Private Contractor's Invoice, as applicable.
26. Written evidence to show Worst-Case Scenario/CAZ testing has been performed, as applicable.
27. Supporting documentation to verify all material and labor costs reported on the WX 710, including but not limited to: vendor invoices, payroll records, contractor invoices, inventory records, etc.
28. WX weatherization application, a Client Screening Questionnaire.
29. Hold Harmless Statement.
30. Weatherization application status notification(s).
31. Client notification of right to appeal and of the subgrantee grievance process.
32. Documentation and work sheets showing compliance with ASHRAE 62.2-2016, including dwelling mechanical ventilation requirements calculations and method used for selecting proper sizing and type of mechanical ventilation used.
33. Photographs saved either electronically or hard copy of the home interior and exterior, including all areas that will be receiving weatherization work before and after weatherization work has been performed.
34. Infrared camera video/picture scans taken at each client home before and after weatherization work is performed should be printed or electronically saved.
35. An electronic version of the NEAT/MHEA audit for each weatherization job that is readily available for export to KHC monitors for review as required.
36. Clients having insulation installed as part of their participation in the WAP must receive a contract or receipt for the insulation installed containing the information required in 16 CFR, Part 460, Labeling and Advertising of Home Insulation, Section 460.17. There must be documentation demonstrating the client received this information in the file.
37. KHC Client Education Checklist completed and signed.
38. KHC Client Health and Safety Screening Questionnaire completed and signed.
39. Client Release of Information Form – See Section 2.6.

Chapter 3: Eligible Dwellings

To be eligible for weatherization services, a dwelling must be occupied by an eligible household, which meets the criteria in Section 2.1, and approved by the Subgrantee. Shelters and multifamily units are also eligible households for assistance and are referenced in Chapter 4. Assistance is applied to the dwelling, not the family. Therefore, if a previously assisted family moves to a new dwelling, the family may apply for assistance again.

3.1 Single-Family Dwelling

3.1.1 Owner Occupied

1. If the applicant can be verified as the sole owner by a deed, certificate of title, (for manufactured housing), or a will, the dwelling shall be considered owner occupied.
2. If the applicant is occupying a dwelling for which he/she is making mortgage payments or for which he/she has signed a land contract or entered into a lease with the option to purchase, the property shall be considered owner occupied.
3. KHC recommends (however does not mandate) that the land contract or the lease with option be legally recorded. This action would help protect the client as well as help ensure the funds are being used correctly on the property served.
4. If the applicant applying for assistance has a legal fractional or limited interest in the property and pays no rent, such property shall be considered owner occupied.

3.1.2 Renter Occupied

3.1.2a Subgrantee Requirements for Rental Units

For any rental unit to receive weatherization service the occupants must meet the current income eligibility guidelines. Furthermore, the Subgrantee shall establish clear ownership of the property including all parties with fractional and limited interest. A Weatherization Application Form shall be completed for each dwelling unit to be served as well as the following:

1. The Subgrantee shall educate the occupant(s) about the weatherization work that will likely be performed on their dwelling.

2. The Subgrantee shall oversee the project. As such, the Subgrantee will assist as needed in every aspect of the job: scheduling, inspecting, special arrangements if any, resolving disputes, and obtaining all needed signatures and documentation.

3. The Subgrantee shall ensure that all households in weatherized units have a direct means of communicating with its representatives during both the weatherization work and the ensuing 18-month rental control phase.

4. The Subgrantee shall inspect, document, and develop work specifications for each living unit using accepted inspection processes and appropriate energy audit software. The Subgrantee shall perform and document a final inspection which all parties involved must sign to verify completeness of and satisfaction with, all work performed.

Additionally, the Subgrantee shall:

1. Educate the occupant(s) about the weatherization work that will be performed on their dwelling.
2. Oversee every aspect of the job including: scheduling, inspecting, resolving any disputes, obtaining all required signatures and documentation and handling any special arrangements, if needed.
3. Ensure that all households which have been weatherized have a direct means of communicating with its representatives during both the weatherization work and the ensuing eighteen (18) month rental control phase.
4. Inspect, document, and develop work specifications for each dwelling unit using accepted inspection processes and appropriate energy audit software (see Chapter 12).
5. Perform and document a final inspection using post inspection procedures (See Chapter 7.1) where all parties involved must sign WX 710 to verify the completeness of and satisfaction with all work performed.

3.1.2b Owners

Once eligibility is confirmed, the owner(s) of the housing unit(s) must agree to the following:

1. To not increase the rent on any dwelling unit weatherized for a period of 18 months from the date of the final inspection as documented by the WX-710. Furthermore, the owner shall not alter any other rental agreement that is in place for an 18-month period beginning with the date of the final inspection. For example, rent that includes utilities shall not be altered during the 18-month period unless it can be demonstrated in writing that such an alteration shall be in the best interests of the tenant occupying the rental unit. The Subgrantee, as well as Kentucky Housing Corporation (KHC), shall reserve the right to accept or deny such alterations on a case-by-case basis.

2. To enter into an Subgrantee/Landlord Weatherization Agreement for Rental Property (WX Rental). This document shall be signed by the subgrantee and owner and kept on file with the subgrantee overseeing the project.

3. To not sell the rental unit(s) for a period of 18 months.

4. To reimburse the Kentucky Housing Corporation (KHC) Weatherization Assistance Program (WAP) the full cost of all weatherization funds in the event that unforeseen circumstances shall necessitate the sale of any and all

rental units served within the 18-month period beginning with the date of the final inspection.

5. To inform all tenants about the scope and type of work that will likely be performed on their dwelling(s). This shall take place in conjunction with the program's routine client education component.

3.1.2c Tenant(s)

Once eligibility is confirmed the tenant(s) of the housing unit(s) must agree to the following:

1. To abide by all conditions set forth on the Weatherization Application, including providing access to their dwelling for the contractor or work crew, representatives of the Subgrantee, and KHC staff, as the dwelling is being weatherized.

2. To report to the Subgrantee representative and KHC any increase in rent or other alteration in their rental agreement with the owner for an 18-month period beginning with date of the final inspection.

3.2 Multi-Family Dwelling

3.2.1 Rental Units

Any occupant of a rental unit is eligible for weatherization service provided the occupant's household meets the income guidelines established by the DOE. Dwelling units in the building must be income eligible units or must become eligible dwelling units within one hundred eighty (180) days under a federal, state, or local government program for rehabilitating the building or making similar improvements to the building. See Eligible Dwelling Unit table for guidance.

Eligible Dwelling Unit Table

Building Type	Unit #	Type of Multi-Family	Stories	Eligible Dwelling Units (at least)
Duplex	2	NA	NA	50%
Triplex	3			66%
Quadraplex	4			50%

Low-rise Multi-Family	5 or more	Small	3 stories or less	66%
High-rise Multi-Family	25+	Large	More than 3 stories	

Additionally, the owner(s) of the dwelling must agree to the conditions set forth below and enter into an Subgrantee/Landlord Agreement (WX Rental) with the landlord(s). Before any weatherization services are provided, including inspection of rental unit(s), ownership of the unit(s) must be clearly established. Legal ownership, including fractional or limited interests, must be verified by a copy of the legal title (deed). A copy of the title shall be kept on file with the Subgrantee overseeing the weatherization project.

- If the applicant applying for assistance has no legal interest (including fractional or limited interest) in the property being occupied, the property is considered a rental regardless if rent is paid or not.

- If the applicant applying for assistance has a legal fractional or limited interest in the property but pays some sort of rent to one or more of the other fractional or limited interest owners, the property shall be considered a rental.

- If the applicant applying for assistance does not legally own the property but pays no rent and no other entity pays rent on his/her behalf, the property shall be considered a rental.

3.2.2 Subgrantee, Owner, and Tenant Acknowledgments

3.2.2a Subgrantee Requirements for Rental Units

For any rental unit to receive weatherization service the occupants must meet the current income eligibility guidelines. Furthermore, the Subgrantee shall establish clear ownership of the property including all parties with fractional and limited interest. A Weatherization Application Form shall be completed for each living unit to be served as well as the following:

1. The Subgrantee shall educate the occupant(s) about the weatherization work that will likely be performed on their dwelling.

2. The Subgrantee shall oversee the project. As such, the Subgrantee will assist as needed in every aspect of the job: scheduling, inspecting, special arrangements if any, resolving disputes, and obtaining all needed signatures and documentation.

3. The Subgrantee shall ensure that all households in weatherized units have a direct means of communicating with its representatives during both the weatherization work and the ensuing 18-month rental control phase.

4. The Subgrantee shall inspect, document, and develop work specifications for each living unit using accepted inspection processes and appropriate energy audit software. The Subgrantee shall perform and document a final inspection which all parties involved must sign to verify completeness of and satisfaction with, all work performed.

Additionally, the Subgrantee shall:

1. Educate the occupant(s) about the weatherization work that will be performed on their dwelling.

2. Oversee every aspect of the job including the following: scheduling, inspecting, resolving any disputes, obtaining all required signatures and documentation, and handling any special arrangements, if needed.

3. Ensure that all households which have been weatherized have a direct means of communicating with its representatives during both the weatherization work and the ensuing eighteen (18) month rental control phase.

4. Inspect, document, and develop work specifications for each dwelling unit using accepted inspection processes and appropriate energy audit software (see Chapter 12).

5. Perform and document a final inspection using post inspection procedures (See Chapter 7.1) where all parties involved must sign WX-710 to verify the completeness of and satisfaction with all work performed.

3.2.2b Owners

Once eligibility (per WAP federal guidance for single and multifamily) is confirmed, the owner(s) of the housing unit(s) must agree to the following:

1. To not increase the rent on any living unit weatherized for a period of 18 months from the date of the final inspection as documented by the WX-710. Furthermore, the owner shall not alter any other rental agreement that is in place for an 18-month period beginning with the date of the final inspection. For example, rent that includes utilities shall not be altered during the 18-month period unless it can be demonstrated in writing that such an alteration shall be in the best interests of the tenant occupying the rental unit. The Subgrantee, as well as Kentucky Housing Corporation (KHC), shall reserve the right to accept or deny such alterations on a case-by-case basis.

2. To enter into an Subgrantee/Landlord Weatherization Agreement for Rental Property (WX Rental). This document shall be signed by the subgrantee and owner and kept on file with the subgrantee overseeing the project.

3. To not sell the rental unit(s) for a period of 18 months, and

4. To reimburse the Kentucky Housing Corporation (KHC) Weatherization Assistance Program (WAP) the full cost of all weatherization funds in the event that unforeseen circumstances shall necessitate the sale of any and all rental units served within the 18-month period beginning with the date of the final inspection.

5. To inform all tenants about the scope and type of work that will likely be performed on their dwelling(s). This shall take place in conjunction with the program's routine client education component.

3.2.2c Tenant(s)

For any rental unit to be considered an eligible unit the occupants must meet the current income eligibility guidelines. Once eligibility is confirmed the tenant(s) of the housing unit(s) must agree to the following:

1. To abide by all conditions set forth on the Weatherization Application Form, including providing access to their dwelling for the contractor or work crew, representatives of the Subgrantee, and KHC staff, as the dwelling is being weatherized.

2. To report to the Subgrantee representative and KHC any increase in rent or other alteration in their rental agreement with the owner for an 18-month period beginning with date of the final inspection.

3.3 Re-Weatherization

A Subgrantee shall not use contract funds to install weatherization materials or otherwise provide weatherization services to a dwelling unit previously serviced with weatherization contract funds unless one of the following conditions is met:

- The dwelling unit has been damaged by fire, flood, or act of God and repair of the damage to weatherization materials is not paid for by insurance. Such dwellings shall be reported as re-weatherized.
- It is determined by a designated KHC representative that appropriate and/or sufficient materials were not originally installed in the dwelling. Written prior approval must be received from KHC before additional materials are to be installed. The additional cost documentation must be in the client file. These homes shall not be reported in the monthly activities report as new completed homes for the reporting period.

- Eligible dwelling units previously weatherized on or before September 30, 2012, and utilizing LIHEAP funds may receive further assistance. *No DOE funds may be used to re-weatherize units which were weatherized on or after rolling 15-year date from job completion, defined as the Inspection or QCI completion*. These dwellings must receive an entirely new dwelling needs evaluation/energy audit and are eligible for the full range of services. They should be reported as a re-weatherized completion for LIHEAP funding.

3.4 Fund Restrictions and Exceptions

DOE has placed the following restrictions on the use of Weatherization funds:

1. No funds will be used to improve the value of units designated for acquisition or clearance by a federal, state, or local program within 12 months from the date weatherization of the dwelling unit would be scheduled for completion.

2. No funds will be used to weatherize dwellings defined as Recreational Vehicles(s) (RV)(s) and/or Camper(s), and these dwellings are not eligible for any services provided by the Weatherization Assistance Program. RVs or Campers means a trailer, semitrailer, truck camper or motor home primarily designed and originally constructed to provide temporary living quarters for recreational, camping, or travel use. These vehicles have temporary utility hook up capability and are designed to be transported on a regular basis with or without licensure or permit. Some manufacturers of these vehicles have identification designations that describe them as a mobile home but a manufacturer's designation does not qualify for proof of eligibility status.

3.5 Historic Properties

Subgrantees that undertake weatherization work with funding from KHC must ensure that properties listed on or eligible for the National Register of Historic Places abide by the Secretary of the Interior's Standards for Historic Preservation as required in 36 CFR 800 and the National Historic Preservation Act (NHPA) of 1966.

The U.S. Department of Energy (DOE), Kentucky Heritage Council, the Kentucky Energy and Environment Cabinet, and Kentucky Housing Corporation (KHC) signed an amendment to the Programmatic Agreement that governs how the Kentucky weatherization network handles historical properties. This policy governs historical properties, which requires all dwellings over 50 years in age or in historical neighborhoods must be submitted to KHC for review and submission the Kentucky Heritage Council. Properties under 50 years old and not in historical neighborhoods are not subject to this guidance.

Manufactured housing (e.g. mobile homes) is excluded from a SHPO review.

Dwelling units in which **all** the weatherization measures meet the following exemptions may proceed without a SHPO review.

3.5.1 Exterior Work.

Except for the following modifications, all properties, that are 50 years or older require consultation with the SHPO. Additionally, for any undertakings involving any type of ground disturbance, the results of a preliminary records review from the outside consultant is required.

A. Air sealing of the building shell, including caulking, weather-stripping, and other air infiltration control measures on windows and doors, and installing thresholds in a manner that does not harm or obscure historic windows or trim.

B. Thermal insulation, such as non-toxic fiberglass and foil wrapped, in walls, floors, ceilings, attics, and foundations in a manner that does not harm or damage historic fabric.

C. Blown in wall insulation where no holes are drilled through exterior siding, or where holes have no permanent visible alteration to the structure.

D. Removable film on windows (if the film is transparent), solar screens, or window louvers, in a manner that does not harm or obscure historic windows or trim.

E. Reflective roof coating in a manner that closely resembles the historic materials and form, or with materials that restore the original feature based on historic evidence, and in a manner that does not alter the roofline, or where not on a primary roof elevation or visible from the public right-of-way.

F. Storm windows or doors, and wood screen doors in a manner that does not harm or obscure historic windows or trim.

G. In-kind replacement or repair of primary windows, doors and door frames, so long as the windows, doors or door frames resemble existing substrate and framing.

H. Repair of minor roof and wall leaks prior to insulating attics or walls, provided repairs closely resemble existing surface composite.

3.5.2 Interior Work

Any properties with proposed interior work that fall into the following modifications under this section will not require a submission to SHPO. Interior modifications found to have no potential adverse effects to the historic properties include undertakings to interior spaces where the work will not be visible from the public right of way; no structural alterations are made; no demolition of walls, ceilings or floors occurs; no drop ceilings are added; or no walls are leveled with furring or moved. These interior modifications include the following:

A. Energy efficiency work within the building shell:

    a. Thermal insulation in walls, floors, ceilings, attics, crawl spaces, ducts, and foundations

    b. Blown in wall insulation where no decorative plaster is damaged.

c. Plumbing work, including installation of water heaters, as long as there are no known archeological sites within 500 feet of the project area footprint that are documented as eligible or listed on the National Register of Historic Places.

d. Electrical work, including improving lamp efficiency.

e. Sealing air leaks using weather stripping, door sweeps, and caulk and sealing major air leaks associated with bypasses, ducts, air conditioning units, etc.

f. Repair or replace water heaters.

g. Adding adjustable speed drives such as fans on air handling units, cooling tower fans, and pumps

h. Install insulation on water heater tanks and water heating pipes.

i. Install waste heat recovery devices, including desuperheater water heaters, condensing heat exchangers, heat pump and water heating heat recovery systems, and other energy recovery equipment.

j. Repair or replace electric motors and motor controls like variable speed drives.

k. Incorporate other lighting technologies such as dimmable ballasts, day lighting controls, and occupant-controlled dimming.

B. Work on heating and cooling systems:

a. Clean, tune, repair or replace heating systems, including furnaces, oilers, heat pumps, vented space heaters, and wood stoves.

b. Clean, tune repair or replace cooling systems, including central air conditioners, window air conditioners, heat pumps, and evaporative coolers.

c. Install insulation on ducts and heating pipes.

d. Conduct other efficiency improvements on heating and cooling systems, including replacing standing pilot lights with electronic ignition devices and installing vent dampers.

e. Modify duct and pipe systems so heating and cooling systems operate efficiently and effectively, including adding return ducts, replace diffusers and registers, replace air filters, install thermostatic radiator controls on steam and hot water heating systems, provided the property is not considered individually eligible or listed on the National Register of Historic Places, or the property does not fall within a National Register eligible or listed district.

f. Install programmable thermostats, outdoor reset controls, UL listed energy management systems or building automation systems and other HVAC control systems.

C. Energy efficiency work affecting the electric base load of the property:

   a. Convert incandescent lighting to fluorescent.

   b. Add reflectors, LED exist signs, efficient HID fixtures, and occupancy (motion) sensors.

   c. Replace refrigerators and other appliances.

D. Health and safety measures:

   a. Installing fire, smoke or carbon dioxide detectors / alarms

   b. Repair or replace vent systems on fossil-fuel-fired heating systems and water heaters to ensure that combustion gasses draft safely to outside, provided the property is not considered individually eligible or listed on the National Register of Historic Places, or the property does not fall within a National Register eligible or listed district.

   c. Install mechanical ventilation, in a manner not visible from the public right of way, to ensure adequate indoor air quality if house is air-sealed to building tightness limit.

If any measure is identified that does not meet the above exemptions, a SHPO review is required.

3.5.3 Process for SHPO Review

1. Subgrantees pull property from waiting list.

2. Determine the age of property.

3. Subgrantees may use PVAs to determine an approximate age. However, the PVA dates are just a rough estimate. Follow-up with homeowner to confirm if the PVA is correct.
4. Interview homeowner to determine what age of the property and the history of the property. Sample questions – Who built it? Was it a grandfather or a father? Has it had renovations? Has it had additions? If so, when were they built?

5. If the age of property cannot be determined by these methods, take a few pictures of the property and send them to wxadmin@kyhousing.org. SHPO will help determine the age for us.

6. Do energy audit on property.

If property is over 50 years old, submit the following to KHC at wxadmin@kyhousing.org.

1. Brief description of the history of the property

2. Energy audit -and detailed work scope with highlights on how measures will be installed. (For example, if installing insulation, will you blow it? If installing CO detectors/smoke alarms, are the walls plaster or drywall?)

3. Maps – include an aerial map with a latitude/longitude map

4. Interior and exterior photos of the property (including all four sides of home)

5. Description of ground disturbance, if any

Approvals will take up to 30 days to return.

While waiting for Kentucky Heritage Council approvals, Subgrantees may pull the next homeowner from your waiting list and begin the weatherization process with that household. Once you receive the historical review approval, you place the approved household next in line for weatherization services.

3.6 Lead-Based Paint

All local agencies must comply with the requirements of the Environmental Protection Agency (EPA) Final Rule, 40 CFR Part 745, Subpart E, Residential Property Renovation, Pre-Renovation Lead Information Rule and Lead Safe Weatherization (LSW) requirements implemented by the Department of Energy (DOE).

A lead hazard information pamphlet and written notification of the scope, location, and expected starting and completion dates of proposed work will be provided to owners and tenants of homes and multifamily housing built prior to 1978. If a determination is made in accordance with applicable EPA rules that lead-based paint is not present in the areas affected by the proposed work, a copy of the determination must be included with the notice.

- Local agencies will provide the EPA pamphlet, *Renovate Right* or reproductions of it when copied and presented in full before renovation activities begin.
- Notification will be provided in the native language of the client if EPA has made non-English versions of the pamphlet available. If a pamphlet in the client's native language is not available, the English version shall be presented.
- Notification by certified mail must be provided no more than 60 days and no fewer than seven days before renovation activities begin. The notification requirement applies even if only common areas, and not individual dwelling units, will have worked performed.

Subgrantees must secure written acknowledgement that the owner has received notification. If the property is a rental, local agencies must obtain written acknowledgment from the tenant head of household. See https://www.epa.gov/reg-flex/small-entity-compliance-guides. .

If subgrantees are unable to secure written acknowledgement from an adult occupant, the subgrantees must comply with one of the following:

- Certify in writing that notification has been delivered to the dwelling and that the local agency has been unsuccessful in obtaining a written acknowledgment. See the Future Sample Pre-Renovation Form as found in the EPA pamphlet, *Renovate Right.*
- Obtain a certificate of mailing at least seven days prior to the renovation.
- Please reference all other lead base paint sections of this WXPM.

3.7 Flood Permitting

Weatherization Subgrantees can meet the state flood permitting requirements for properties in the 1% Flood Plain that have non-substantial repairs by using a general flood permit. Please follow the procedures below.

1. Look up all properties to determine if they are in the 1-percent flood plain.

2. Determine the value of the structure through the local PVA offices and document the file.

3. If the measures (energy conservation measures and health and safety measures) are non-substantial (less than 50% of the property value), download the Floodplain General Permit for Non-Substantial Repairs, which can be found on the Energy & Environment Cabinet website or the HCA Agency Partner Portal.

4. All local flood permitting processes will need to be followed as well. Subgrantees can find local flood permitting contacts at https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Documents/FloodplainCoordinatorsList.pdf.

5. Keep all permitting documentation in the file.

6. If the measures are substantial repairs (over 50% of the property value), the unit must be deferred in Hancock with the floodplain as the reason.

Non-Substantial repairs is the repairs or enhancements are less than 50% of the value of the home in a 12-month period. If Subgrantees braid weatherization funding with other repair funding, such as AHTF Home Repair, the entirety of the repairs must be below 50% of the value of the home according to state policy. Local permitting offices could have a different policy, so subgrantees should check with them.

Chapter 4: Program Guidance on Multifamily Weatherization

Multifamily rental projects must adhere to all the policies for rental units under Section 3.2.

Multifamily buildings are eligible if 66 percent of the dwelling units in the building (50 percent if fewer than five) meet WAP's income eligibility requirement for a family unit whose income is at or below 200 percent of the poverty level determined in accordance with criteria established by the Director of the Office of Management and Budget. For the purposes of

certifying a complex as eligible for Weatherization, all information will be current as of the date of initial application by the Landlord and verified by the Subgrantee. Subsequent move-outs by tenants after this time will not affect the eligibility of the complex. However, after a period of one year has elapsed, the multifamily complex will need to be recertified. Income data needs to be collected on these properties in order to give them an accurate priority point number.

Each property will be assigned a Priority Point number. This number will be determined by combining all priority points per eligible household and dividing that number by the total number of income eligible households that the property contains. This "Average" will be the number that is used to rank that property for the purposes of receiving Weatherization services.

Maximum expenditure for a multifamily unit cannot exceed the total number of income eligible units multiplied by the DOE. For example, in 2022, if 66 units of a 100-unit complex are occupied by income eligible tenants, the total allowable budget including administration, support and eligible measures (SIR of ≥ 1) for the project would be 66 x $8,009 = $528,594. Health and Safety (H&S) percentages as outlined in the State Plan are applicable to multifamily rental projects. Likewise, the same calculation can be applied to the LIHEAP funding to braid dollars in units.

4.1 Multifamily WX Process

Any occupant of a rental unit of any kind is eligible for weatherization service provided the occupant's household meets the income guidelines set by the Department of Energy (DOE). Additionally, the owner(s) of the dwelling must agree to the conditions previously stated and enter into a Landlord/Tenant Agreement with the tenant(s). Apart from these conditions the following restrictions apply to weatherizing rental housing units:

1. Subgrantees must contact KHC to request approval to pursue a multi-family building or complex prior to any review of the complex/building begins.

2. All rental weatherization projects shall be prepared and completed in accordance with the appropriate DOE approved energy audit software, local ordinances, state weatherization assistance program policy and prevailing building codes.

3. Multi-family buildings or complexes may be chosen through a variety of strategies, including but not limited to, project-based lists, advertising, or cold calls.

4. If Subgrantees want to pursue weatherization services for buildings they own (in full or in part), they must advertise in local media (e.g. newspapers, community cable channels, websites, etc.) to inform the community and provide a public comment period.

5. Subgrantees may do an initial "walk through" of the building prior to any applications or energy audits to determine that weatherization measures can be installed (if and when they are identified).

6. No undue or excessive enhancement to the value of the dwelling units is allowed. Only weatherization measures generated from the approved audit software, that is appropriate to the type of structure, may be installed. All Health and Safety measures must be in conformance with the Health and Safety section of this plan.

7. Project files should include but are not limited to the following:

   - WX Rental (Subgrantee/Landlord Agreement) signed by the subgrantee and owner/ or agent.
   - Legal deed of property showing proper ownership.
   - WX Multi-Family workbook.
   - Income Verification documents for each resident (as applicable).
   - Utility information for each resident (as applicable).
   - Photocopy of Social Security or other accepted documentation for legal non-residents must be attached to each application (as applicable).
   - SHPO Request to KHC, if applicable.

8. Subgrantees will need to prioritize those properties that were interested in participation in the WAP.

9. After each property has been assigned a priority number, the waiting list is established, and properties will be completed in that order. At this time, Subgrantees should not proceed with the project until they have received approval to move forward from KHC.

10. After a multifamily complex is selected to receive service, Subgrantees will set up a meeting with the landlord/or agent to discuss the weatherization process, details of the program, energy audit procedures, tenant notification and schedule of events. During this meeting, owners will be informed that they can contribute financially to weatherization in order to have some measures, that otherwise do not model as energy saving, completed by the Subgrantee. This process is known as “buying down measures”.

    Example of “buying down measures”: Owner at Cambridge Station would like to replace the existing 15-year-old heat pumps at his complex. Under the energy audit, this replacement is not justified at the three thousand dollars per unit replacement cost. Owner is willing to contribute one thousand dollars per heat pump replacement to bring the total cost to two thousand dollars making the new SIR at least 1:1. This measure can now be completed using Weatherization funds.

11. Evaluators/energy auditors will conduct a dwelling needs assessment including an energy audit and prepare a list of the most cost-effective energy conservation measures and prepare a project scope of work. Measures must have a Savings to Investment Ratio of .6 or higher for the use of LIHEAP funds. Only measures that have an SIR of .6 or higher at the initial energy audit or

that have a .6 or higher on the client completion report (after work is completed) may be paid for with LIHEAP funding. No DOE funds may be used to pay for measures below an SIR of 1.0. If an owner has expressed interest in having other measures completed and is willing to contribute financially, the evaluator/energy auditor can prepare a list of those measures and the amount that the owner would need to contribute.

12. Subgrantees will review Scope of Work with property owners and initiate weatherization work.

13. Upon completion, subgrantees will perform quality control inspections.

14. Building owners/ or agents are required to sign off on final inspection.

15. Each individual unit will be invoiced in Hancock along with the total project cost.

16. All multifamily rental projects must comply with programmatic notices available on WAPTAC and WAP regulations.

4.2 Shelters

A dwelling unit or units whose principal purpose is to house on temporary basis individuals who may or may not be related to one another are shelters and are eligible to receive services. Nursing homes, prisons, or similar institutional care facilities are not eligible. For determining the number of eligible dwelling units within a shelter, count each weatherization application square feet or each floor of the shelter, whichever creates the greater unit count as a dwelling unit.

A written narrative must be submitted to KHC for approval prior to initial inspection of the shelter. The narrative must include the following:

- Shelter name
- Shelter address
- Shelter square footage
- Target population
- Maximum capacity per night
- Shelter eligibility criteria (must serve low-income eligible dwellings as identified under Chapter 2: Eligible Clients and Chapter 3: Eligible Dwellings)
- Client services
- Need for weatherization assistance

Once approved, Subgrantees will issue a public notice in the largest local newspaper and/or on their website. The public notice must be published a minimum of two weeks prior to the Dwelling Needs Assessment completion. Charges for the advertisement cost may be charged to Program Support (see Chapter 9).

4.3 Exclusions and Limitations

While verifying client and unit eligibility, the following exclusions and limitations should be considered:

- All rental weatherization projects shall be completed in accordance with the appropriate DOE approved energy audit software or prescriptive list; local ordinances; prevailing building codes and state weatherization assistance program policy;
- Subgrantees who wish to serve multifamily structures larger than stand-alone four-plex units must advertise (in local media, e.g. newspapers, community cable channels, websites, etc.) the opportunity for all area owners/landlords/developers to have his/her properties assessed for weatherization services by the WAP. For such projects, KHC reserves the right to allow or deny service based on the written justification provided by the Subgrantee, all other conditions described in this section, and assurance that all Equal Opportunity requirements with respect to contracting (if applicable) are met. No owner-occupied residence shall be weatherized if it is being offered for sale;
- No renter-occupied residence shall be weatherized if it is being offered for sale, unless both of the following apply:
    - It can be demonstrated that the residence will continue to be occupied by eligible tenants; and
    - Weatherization work performed is not incorporated into the sale price.
- No institutional buildings (university, nursing home, hospital, motel, etc.) are to be weatherized;
- If a Subgrantee wishes to weatherize an emergency shelter, or transitional units, the Subgrantee must have prior written approval from KHC.

Chapter 5: Private Sector Contracting

5.1 Sub-Contracting Option

KHC allows all Subgrantees the option of subcontracting regular weatherization or health and safety measures of eligible dwellings with private sector general contractors. An approved contractor of a Subgrantee may not sub-contract any weatherization work with another contractor unless that contractor is an approved contractor on the subgrantee's own approved contractor list and has met all the requirements to work as an approved contractor in the WAP with the Subgrantee.

Subgrantees must certify annually that neither the organization nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in a weatherization contract with KHC by any federal department or subgrantee as part of the General Weatherization Work Plan. Subgrantees are prohibited to enter into contracts with parties that are suspended or debarred, or whose principals are suspended or debarred. Subgrantees must ensure that all subcontractors meet the same minimum criteria. Documentation found at www.sam.gov must be maintained in all subcontractor files.

5.2 Creation of an Approved Contractor's List (ACL)

To establish and maintain an annual approved contractor's list, the following process is required and must be performed with proof documented in the subgrantee's records;

1. The Subgrantee shall place a legal advertisement in all local newspapers of the geographical areas served or other forms of advertisement, such as website and social media. If using website for advertisement, the advertisement shall remain for an entire year. The advertisement shall solicit licensed (if applicable), insured, contractors to perform Energy System repairs or replacements and/or regular weatherization. The advertisement should give notice of an orientation meeting for interested contractors. This meeting should briefly explain the WAP including inspection procedures, work procedures, form requirements, bidding procedures, suspension criteria and reimbursement policy. Other topics may be included as necessary per individual subgrantee. This meeting can be performed by the Subgrantee staff. A subgrantee may elect to post a contractor solicitation on the subgrantee website in lieu of newspaper advertisement. This solicitation should remain on the website throughout the year.

2. A Weatherization Contractor Application (WX10) and the Non-Financial Agreement (WX12) must be completed by the contractor and returned to the Subgrantee. The WX10 is to be closely reviewed and all information verified in writing by the Subgrantee using the Contractors Work Reference (WX11). The following proof of insurance minimums, proof of training/certifications, etc... are required and apply to contractors performing regular and/or health and safety weatherization work:
    a. Certificates of Insurance for General Liability and Comprehensive Coverage for general contractors performing work must meet the minimum coverage

requirements in the amount of $800,000 or greater if annual contractual requirements change.

b. HVAC contractors must have minimum Certificates of Insurance in the amount of $500,000.00 general liability and $300,000 property damage or greater if annual contractual requirements change.
c. Electrical contractors must have minimum Certificates of Insurance in the amount of $500,000.00 general liability or greater if annual contractual requirements change.
d. Plumbing contractors must have minimum Certificates of Insurance for General Liability in the amount of $250,000 or greater if annual contractual requirements change.
e. Proof of compliance with workers compensation and unemployment insurance laws of the Commonwealth of Kentucky.
f. Contractors must have EPA certified RRP firm status as applicable.
g. Contractors must have proof of all required training listed in the state plan.
h. Contractors must have proof of non-debarment.

3. If the contractor meets all the criteria, the WX12 must be signed by the appropriate Subgrantee staff. At this time, the Subgrantee should notify the contractor in writing to acknowledge approval or disapproval. If disapproved, the Subgrantee will document the reason(s) in the letter.

4. Once an Approved Contractor's List has been developed, a procedures meeting must be scheduled by the Subgrantee for all participating contractors. KHC Weatherization staff will also be notified in advance. KHC reserves the right to attend such meetings. The program policies and procedures will be explained in detail and all applicable forms and manuals will be discussed as needed. All contractors shall attend this meeting regardless of their experience. Certificates of Insurance shall be kept on file by the Subgrantee to insure coverage on an annual basis. Notice of changes in coverage must be mailed directly from the insurance company to the Subgrantee. Any approved contractor who has a lapse in insurance coverage will not be allowed to work in the program until insurance coverage is re-instated and in force.

5. Subgrantees must allow private contractors an opportunity to apply at least on an annual basis. Advertisement in local publication(s) (newspaper) and/or on the subgrantee Web site must be posted for the purpose of public awareness. However, subgrantees may add contractors to the ACL anytime during the year if the Subgrantee encounters an additional need for contractors. KHC requests that all Subgrantees maintain an open contractor list so new contractors can be added at any time.

6. The Subgrantee can remove a contractor from the ACL for reasons covered under the non-financial agreement, bidding procedures, suspension criteria, or other related Subgrantee policies. The contractor must be notified in writing of the removal and be given an opportunity to respond.

5.3 Formation of Bidding Procedures

The Subgrantee shall maintain a description of the bidding procedures that includes the following:

1. Compliance with all applicable program manuals
2. Criteria for measurements, quantities, locations, and change orders
3. Methods for resolving discrepancies between the dwelling needs evaluation/energy audit and the contractor's interpretation of the measure descriptions
4. Procedure for completing the contractors bid
5. Starting dates, extensions, change orders, inspections, and completion dates
6. How bids will be awarded
7. Posting of a spread sheet in a conspicuous place to provide documentation of the winning bid after bids are opened

5.4 Preparation and Award of Bids

1. The Subgrantee will perform the dwelling needs evaluation/energy audit to determine the specific needs of the dwelling; perform an energy audit, and cost estimate/bid specifications.
2. Bid packets will be sent to all approved contractors and shall contain letter of invitation to bid, including NEAT/MHEA generated work orders, bid forms, and all other applicable forms. The deadline for returning bids shall be included.
3. The contractors are required to submit bids on the NEAT/MHEA generated work order and bid form.
4. The Subgrantee shall compare its in-house estimate with the contractors bid. In order to be eligible, the contractors bid must fall within a range of 15 percent, plus or minus, of the in-house bid for each project. From the pool of eligible bids, the Subgrantee will determine the lowest or best bid.
5. The bids can be awarded individually or in packets. If all bids exceed the 15 percent range of the estimate they shall be returned to the contractors for a re-bid. If the second attempt also exceeds the estimate, the work order shall be reviewed by the responsible dwelling needs evaluator/energy auditor and program coordinator for possible errors or omissions and a decision made either to award the best bid or if a re-bid must occur. Subgrantees must insure cost reasonableness.
6. The winning contractor shall be notified.

5.5 Change Orders

If during the work process any changes, additions, or deletions are needed that change the scope of work from the original work order and related contract, the Subgrantee, contractor, and client must agree upon the change and sign a WX-15 Change Order.

For any major alteration to a bid, the Evaluator /Energy Auditor must visit the work site to ensure that a Change Order is necessary and reasonably priced. Some minor change orders can be allowed without a work site visit if the Subgrantee clearly understands the nature of the repair. Either way, the Change Order should be signed by all parties, thereby recognizing the contract amount has been revised. In some instances, the Change Order will decrease the contract amount due to the elimination of a certain measure. Nonetheless, a completed WX-15 must be on file reflecting that action.

All change orders become part of the final WX-17 Private Contractors Invoice.

5.6 Final Inspection/Reimbursement

1. The WX-16 Contractors Notice of Completion and Approval will be sent by the Contractors to the Subgrantee when the job has been completed. This is an optional form.

2. The Subgrantee will schedule a post inspection/quality control inspection.

3. If work meets program standards, the reimbursement process shall begin.

4. If the job does not meet program standards, the Subgrantee shall list the corrections needed on a WX-16A Deficiency Notice and allow the contractor sufficient time to correct all deficiencies. Upon completing the RE-WORK, the contractor shall notify the Subgrantee to perform a RE-WORK inspection. If the RE-WORK inspection meets the program standards, the job will be approved, and the Subgrantee shall start the reimbursement process.

5. The WX-17 Private Contractors Invoice will be sent to the Subgrantee when the job has been post-inspected and the WX 710 Completed Dwelling Report has been completed and signed by the post inspector/quality control inspector.

Note: On-site, in-progress inspections shall be performed as necessary. Only work that has documentation of being inspected and accepted may be invoiced.

5.7 Contractor Training Session Fees Incurred

Training and Technical Assistance (T&TA) funds may also be used to train contractors at the Subgrantee level participating in the program. In making the determination to pay for contractors' training, Subgrantees should secure a retention agreement in exchange for the training. The retention agreement should require that contractors will work in the program for a specific amount of time and must align with the cost of the T&TA provided. Examples of contractor/subgrantee retention agreements can be found on EERE's website under **WPN 10-1**

(https://www.energy.gov/scep/wap/articles/archived-weatherization-program-notice-10-1-program-year-2010-weatherization).

A contractor who incurs training session fees directly related to required weatherization training sessions mandated by KHC will be reimbursed only for the training session fees incurred for each required training session. Costs associated with training contractors (such as travel, hotel, and/or meals) who work with the weatherization program may also be charged to T&TA. Stipends can be paid out of DOE Formula funds for contractors who attend training of $100 per day per person per contractor.

Contractor training requirements are located in Chapter 6.

5.8 Dwelling Needs Evaluations/Energy Audits

Private contractors who provide Dwelling Needs Evaluation (DNE)/Energy Auditor and Post Inspection/Quality Control Inspector services are subject to the same requirements as stipulated and applicable in Chapter 5, Sections 5.2, 5.3, and 5.4 of this manual. In addition, all private contractors providing DNE/Energy Auditor and post inspection/quality control inspection services for the weatherization assistance program must comply with all applicable chapters and sections of this manual regarding requirements for the DNE/Energy Audit and the Post Inspection /Quality Control Inspection process contained in, but not limited to, Chapters 9 and 12 of this manual.

Chapter 6: Training

6.1 Personnel Qualifications Standards

The Subgrantee must ensure that all staff assigned Dwelling Needs Evaluator (DNE)/Energy Auditor (EA), crew leader, crew, or Quality Control Inspector (QCI) as any portion of their job duties have attended the required trainings based on the job duties and meet all job requirements. All contractors performing any type of weatherization services must also adhere to the training requirements of the job duties they are performing.

KHC reserves the right to exclude from the program any crew leaders or private contractors who do not demonstrate, after extensive training, an ability to install weatherization materials in accordance with program requirements and standard work specifications.

Participation in and the successful completion of advanced, refresher, and other related training as required by KHC is mandatory to remain qualified to perform material installations.

Evidence of the required training completions must be maintained in the subgrantee files.

Subgrantees must comply with OSHA standards although KHC does not require subgrantees to attend OSHA trainings. OSHA still requires that all workers receive training to address specific hazards that the worker can reasonably expect to encounter on a job site such as (but not limited to) fall protection, use of personal protective equipment, electrocution, and the safe

operation of power tools. KHC strongly recommends OSHA training for all workers as a best practice.

6.2 Training Certifications by Position

6.2.a New Hire/Retrofit Installer Training

New hires are usually nervous about the weatherization work, but they are also usually excited and have a desire to learn. Here are the steps to starting them out on a good path.

- Lead Safe Work Practices training (online)
- Intro to Weatherization online course http://www.learnree.com/ mold and moisture, asbestos awareness, KY WX Field Guide
- Retrofit Installer Technician training course (recommended after 60 – 90 days of employment)[1]

6.2.b Crew Leader

- Pre-requisite RIT training (must be certified through KHC)
- Crew Leader training (must be certified through KHC)
- ASHRAE 62.2 – 2016 (online)
- Zonal Pressure Diagnostics (online)
- Leakage, Envelope and Ducts training (LED)
- Combustion Appliance Zone Safety training (CAZ)
- Certified Lead Renovator training (RRP)

6.2.c Dwelling Needs Evaluator (DNE)/Energy Auditor

There are two education/credentialing tracks available to those who perform energy audits in Kentucky's Weatherization Assistance Program:

1) Kentucky Dwelling Needs Evaluator (DNE) certification track; or

2) BPI Energy Auditor certification track.

3) Many of the DNEs in Kentucky also choose to pursue their EA certifications so that they can become Quality Control Inspectors.

KHC may downgrade or suspend evaluator's certification status for failure to perform job duties to standards.

Dwelling Needs Evaluator (DNE)

- DNE Course (3-weeks)
- NEAT/MHEA (WA Web) audits
- ASHRAE 62.2 – 2016 (online)

[1] Crew members of subgrantees or contractors, who are performing retrofit installer tasks, do not have to pass the Retrofit Installer Training exam; however, they must attend and complete the training and be supervised on the job by a crew leader.

- Zonal Pressure Diagnostics (online)
- Leakage, Envelope and Ducts training (LED)
- Combustion Appliance Zone Safety training (CAZ)
- Infrared camera use (optional)
- Intro to Weatherization online course http://www.learnree.com/ – mold and moisture, asbestos awareness, KY WX Field Guide
- First Aid/CPR
- Certified Lead Renovator training (RRP)
- Field Shadowing (must pass)
- DNE Refresher every five years

Energy Auditor (EA)

- BPI Energy Auditor certification
- Prior DNE certification (optional)
- NEAT/MHEA (WA Web) audits
- ASHRAE 62.2 – 2016 (online)
- Zonal Pressure Diagnostics (online)
- Leakage, Envelope and Ducts training (LED)
- Combustion Appliance Safety training (CAZ)
- Infrared camera use (optional)
- Intro to Weatherization online course http://www.learnree.com/ – mold and moisture, asbestos awareness, KY WX Field Guide
- REE Heat Systems class (if not a certified DNE)
- Certified Lead Renovator training (RRP)
- Required Field Shadowing (must pass) if not obtained with DNE
- DNE Refresher every five years

Note: Energy Auditors, who received their EA certification from another state, will need to attend REE Heat Systems class to learn Kentucky specific guidelines.

6.2.d Quality Control Inspector (QCI)

- Pre-requisite is BPI Energy Auditor certification
- BPI Quality Control Inspector certification
- NEAT/MHEA (WA Web) audits
- ASHRAE 62.2 – 2016 (online)
- Zonal Pressure Diagnostics (online)
- Leakage, Envelope and Ducts training (LED)
- Combustion Appliance Zone Safety training (CAZ)
- Infrared camera use (optional)
- Intro to Weatherization online course http://www.learnree.com/– mold and moisture, asbestos awareness, KY WX Field Guide
- Certified Lead Renovator training (RRP)

Anyone holding a BPI QCI certification and performing pre-inspection or final inspection services where a QCI certified staff is required must uphold BPI and KY W AP standards of ethics. When any QCI staff becomes aware of activities in violation of

the Weatherization Assistance Program requirements, they are obligated to report those activities to Kentucky Housing Corporation. This section applies to KHC, agency and contract staff. Agreements with contracted staff must include the duty to report violations of BPI and KY WAP standards of ethics.

KHC will take a three-step approach to QCI inspectors who are not inspecting units using the standards adopted in the Kentucky Weatherization Field Guide and the NREL SWS. KHC reserves the right to issue (or not issue) one verbal warning before beginning the process below if the deficiency found is not systemic throughout the inspector's performance.

In the case of BPI-certified QCIs, the first offense will begin with a written reprimand and notification to BPI of the circumstances involving the issuance of the reprimand.

Second offense will result in a written reprimand and notification to BPI of the circumstances involving the issuance of the reprimand and a six-month suspension from inspecting (pre- or post-inspection) for the WAP in Kentucky.

Third offense will result in debarment from inspecting (pre- or post-inspection) for the WAP in Kentucky, and KHC will notify BPI of the circumstances involving the debarment.

6.3 Field Shadowing

After successful completion of all training requirements in the candidate's selected credentialing track, s/he is awarded "Conditional Status." An evaluator in Conditional Status may not perform solo work, they must be monitored by the agency's fully certified evaluators and administrative staff to ensure quality. Once an evaluator in Conditional Status is ready for Field Shadowing, the agency must contact its KHC Technical Monitor to schedule the shadowing visit. Field Shadowing must be scheduled no later than six (6) months from the date the candidate achieved Conditional Status. Failure to complete the Field Shadowing within the required timeframe will result in the revocation of Conditional Status and the candidate will be required to attend refresher training to have Conditional Status reinstated.

Field Shadowing is the final step in the approval process for performing dwelling needs evaluation under either credentialing track (EA or DNE). During Field Shadowing, a KHC Technical Monitor/Trainer accompanies the candidate as s/he performs whole-house dwelling needs evaluations in the four situations they will encounter in their field work (site-built homes, mobile homes, homes with gas heat, and homes with electric heat.) The purpose of Field Shadowing is to evaluate the candidate's competence in four main categories: information collection, health & safety, building assessment, and evaluating data. Once a candidate demonstrates proficiency during Field Shadowing, they are approved to work as evaluators in the KY WAP.

Full status evaluators may be required to successfully complete advanced, refresher or other training courses deemed mandatory by KHC to remain qualified to perform dwelling evaluations.

6.4 Training Criteria

All WAP field staff and participating private contractors must meet the training requirements identified in this chapter for their job duties and tasks. Training shall be provided by KHC's training staff or by KHC-approved training entities. All training must be completed before performing any work.

Failure of a Subgrantee staff member or private contractor to meet the training criteria will result in that individual or private contractor being prohibited from performing the assigned or contracted activities on client dwellings. Participation in, and the successful completion of advanced, refresher, and other related training is required to remain qualified to perform program activities. KHC will make every effort to assist the Subgrantee personnel with attaining the required skill levels.

To better enable the Subgrantees to identify qualified contractors available to assist them with Weatherization efforts, KHC will permit contractors who have not yet received the required Lead Safe Work Practices (LSWP) training to begin weatherization work, as long as they stipulate that they will obtain the LSWP training within 90 days from the date they start the work. All other training and certification requirements must already have been met; the 90-day exception only applies to LSWP training. However, no contractor may work on a lead-positive dwelling prior to completion of the LSWP and/or RRP training requirement regardless of them being within the 90-day exception window.

KHC understands it is conceivable that a contractor might initially agree to the 90-day period in order to begin working, then complete the work before the 90 days is up and at that point refuse to obtain the training. KHC acknowledges that the Subgrantee would have no realistic way to force the contractor to obtain the training if such a scenario were to happen. KHC recommends that Subgrantees consider taking steps to ensure compliance such as retaining remittances to the contractor(s) until the training is completed, and/or if the contractor is working on multiple properties and hasn't completed all the properties when the 90 days lapse, instructing the contractor to cease work on the remaining properties until the training has been completed. During this grace period, contractors must not work on homes where LSWP have been prescribed in the work write up.

KHC will approve otherwise satisfactory work performed by a contractor who failed to complete the training as long as the Subgrantee took meaningful steps to encourage such compliance.

KHC will provide training and technical assistance to all Subgrantees as follows:

1. **Routine Technical Assistance:** Technical assistance covering work quality issues or installation of work measures can be provided during monitoring visits or at any time the Subgrantee encounters a problem. Subgrantees may request technical assistance or training by contacting the REE training staff. If the monitor identifies major problems, more extensive technical assistance will be scheduled in the

immediate future following the monitoring visit. Technical assistance related to the actual installation of weatherization measures will be provided by experienced staff.

2. **Programmatic Technical Assistance:** Technical assistance covering programmatic aspects of operations will be provided by KHC's Housing Contract Administration (HCA) staff as necessary. Subgrantees may request technical assistance for programmatic issues by contacting the HCA department.
3. **State Training:** REE offers a continuous training schedule to address the training needs of the KY WAP network. Appropriate Subgrantee staff and private contractors may register for trainings at any time during the program year by contacting REE.
4. **Field Training:** The REE training facility has sufficient training labs to provide hands-on reinforcement of classroom training. However, field training sessions may be scheduled at the discretion of REE training staff when deemed necessary.

Note: While each Subgrantee is allocated sufficient funds to attend trainings and conferences, prudent use of the training funds is expected. Subgrantees are required to maintain information in their files to document that all expenses for training are both reasonable and necessary for implementation of the weatherization program. Expenses for out of state trainings shall include documentation showing why a similar training could not be accessed in Kentucky. Training and Technical Assistance (T&TA) funds allocated to Subgrantees cannot be used to pay for EA/QCI training/testing in excess of three times per staff person. Additional trainings/testing for that person's EA/QCI certification must be covered by another funding source.

6.5 Required Training for all Contractors/Sub-Contractors

6.5.a Training and Certification Requirements for Sub-Contractors (General Weatherization)

Any contractor crew performing general weatherization installation work (and their employees) must attend comprehensive training for their job duties, i.e. installer staff must attend Retrofit Installer Technician (RIT) training, crew leaders must attend Crew Leader training, etc. Contractors do not need to pass the RIT certification, but they must attend training or use the badge system (see section 6.5). Crew leaders must be certified in RIT.

- Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)
- Lead Safe Work Practices (required for crew members)
- Certified Lead Renovator (RRP) (required for one crew member per job)
- Lead Safe Firm certification

Subgrantees who have RRPs on staff may use them to cover the RRP requirement for contractors as long as they meet the EPA requirements for onsite supervision in pre-1978 houses. EPA regulations for RRP can be found at https://www.epa.gov/lead/lead-renovation-repair-and-painting-program-rules#rrp. Subgrantees who have lead-safe firm certifications may use those certifications to cover contractors; however, memos

to the contractor file should be in place to document the use of lead-safe firm certification for the contractor.

6.5.b Technicians (Subgrantee Staff or Sub-Contractors)

All technicians are required to be licensed in their respective discipline (HVAC, Electrical, etc.) Technicians shall maintain their professional licenses in accordance with KRS 227A.010-150 for electric, KRS 198B.650-689 for HVAC, and meet all requirements regarding fees and continuing education. If contractors are only performing duties within their license requirements (respective discipline), they do not need to attend general weatherization installation trainings. If technicians are installing ASHRAE fans, they must attend ASHRAE 62.2 – 2016 online training. RIT and crew leader certifications is not required for technicians/contractors if they are operating under their licenses and/or installing ASHRAE fans.

6.6 Badge System

The badge system is an alternative to attending RIT in-person training. Persons who are interested in an RIT badge would need to partner with a QCI who can approve completed field measures and contact KHC for approval to participate in the badge system. Badge participants would take pictures of all specified measures completed in homes and send to the QCI for approval. Once the QCI approves all work tasks, all documentation is sent to KHC for a determination on if the submitted work earns a RIT badge. Persons interested in the badge system for RIT should contact the REE Training Center for more detailed instructions.

6.7 Registering for Training on the REE Learning Management System

Subgrantees can find the REE Website User Guide on the HCA Partner Agency Portal in the Weatherization/LIHEAP section under Training Tools and Documents. This document will guide the Subgrantee Admin Users. You can also use this link to navigate directly to the document. https://kyhmis.zendesk.com/hc/en-us/articles/29284368982555-v2-0-REE-Website-User-Guide

6.8 Equipment Maintenance

Maintenance of all equipment is a shared responsibility between the evaluator/energy auditor and the Subgrantee. The evaluator/energy auditor shall take care that the equipment which is used stays in good working order and receives any recommended factory maintenance when applicable. The Subgrantee shall see that its evaluator/energy auditor has access to a safe, roadworthy vehicle.

Chapter 7: Inspection, Monitoring, and Training Procedures

7.1 Subgrantee Inspection of Weatherization Work

7.1.1 Policy

1. Subgrantees must have defined, written internal monitoring procedures to perform regularly as a means for quality control, compliance assurance, and risk assessment. Such procedures must include written inspection procedures that ensure comprehensive and consistent inspections of all units weatherized.
2. No dwelling will be reported to KHC as completed until the Subgrantee has performed a final inspection/quality control inspection and certified that appropriate work has been completed in a quality manner. A WX 710 Completed Dwelling Report signed by an inspector/quality control inspector without a proper inspection performed will be considered a fraudulent act.
3. Inspections shall take place within 30 days of completion of work on the residence.
4. Any unit weatherized with DOE funds shall be inspected by a trained, qualified, and Building Performance Institute (BPI)-certified Quality Control Inspector (QCI).
    a. Must be certified as a DNE/Quality Control Inspector by KHC/BPI.
    b. Training and testing will be provided by KHC.
    c. Newly hired inspectors must have work reviewed by a KHC certified DNE/Quality Control Inspector until such time they become certified

7.1.2 Procedure

Client files must include signed and dated documentation of all inspections and final approval. All forms should be completed in their entirety before parties sign them. Clients and inspectors should sign forms on the day of the inspection.
Restriction: Subgrantee personnel who are an assigned DNE/Energy Auditor or a Post Inspector/Quality Control Inspector on any weatherization project that is paid for with DOE/LIHEAP funds shall not provide labor for installation of any work measure that is paid for with DOE/LIHEAP funds.

7.2 KHC Monitoring Procedures

KHC is responsible for on-site monitoring of all WAP Subgrantees. On-site monitoring activities conform to 10 CFR 440.12(b)6 and involve at a minimum, one annual on-site monitoring visit to the Subgrantee's office location and on-site visits to a selection of client homes that received weatherization services.

Previous monitoring findings and recommendations will also be reviewed (via emailed photo documentation or follow-up onsite visit) to evaluate the success and appropriateness of all corrective actions implemented by the Subgrantee.

An exit interview with the Subgrantee's weatherization director and other appropriate staff will be held at the conclusion of the monitoring visit to present and discuss all observations, concerns, findings, and recommendations. Subgrantees shall be informed at the exit interview of all areas of non-conformity identified during the monitoring visit.

A written monitoring report will be provided for the Subgrantee within thirty (30) days of the exit interview. If follow-up meetings or additional documentation are necessary to complete

the assessment of work or determine appropriate corrective actions, the written report will be issued within thirty (30) days of such meetings or receipt of requested documentation. The report will contain a description of the monitor's findings and, if necessary, recommendations for corrective action. A response to the monitoring report with a corrective action plan, when requested, must be submitted to KHC within the time frame specified on the monitoring report cover letter. Subgrantees identified as having administrative or technical problems may be referred for additional technical assistance from the respective monitor. Subgrantees working under a Corrective Action Plan will be monitored closely for signs of improvement.

7.2.1 Technical Monitoring

- Inspecting a representative sample of the dwellings completed by the Subgrantee to ensure that all work and work quality meets WAP standards, work quality is satisfactory, all prescribed work is completed, all work complies with and follows NEAT/MHEA or EA-QUIP audit priorities and expenditure maximums and performance of diagnostic procedures
- Performing blower door tests, health and safety tests, and other tests deemed necessary
- Reviewing NEAT/MHEA or TREAT cost and setup libraries for accuracy and completeness
- Reviewing client files and related forms/documents of dwellings inspected to ensure that all required forms and documents are included and that they are accurate and complete
- Reviewing program operations to ensure proper administration of allocated funds; and adherence to all programmatic protocols and regulations
- Evaluating Subgrantees for achieving performance standards based on criteria set forth by KHC
- Determining training and technical assistance needs
- The monitor may also look at the approved contractor list and the Completed Dwelling Report, WX 710

The monitor will compare the evaluation, work procedure and post inspection/quality control inspection performance results with the prescribed standards defining the requirements for each area. Corresponding applicant files for each inspected dwelling will be reviewed for completeness, accuracy, appropriate documentation and eligibility.

KHC will also monitor NEAT/MHEA audit library set up costs during the annual onsite technical review. The Subgrantee is responsible for updating the approved audit software library. Any Subgrantee found to be paying substantially more for job materials than other Subgrantees in their geographical area will be required to rebid those materials and/or services. KHC reserves the right to approve or deny any inputs that appear to not be cost effective.

A Subgrantee shall not use program funds to correct identified deficiencies of a monitored dwelling unit previously serviced with weatherization contract funds when it has been determined by KHC's monitor that work quality is substandard. These units will be identified on the monitoring report as RE-WORKs. However, missed opportunities are only

eligible for weatherization funding if they have not yet been reported as DOE completions. Subgrantees will need to contact KHC for further assistance with funding.

Monthly, KHC Weatherization staff will review invoices, Detailed Invoice Report and WX 710 Completed Dwelling Reports, for accuracy and compliance with Weatherization Program Policy. When there are discrepancies, KHC will contact the Subgrantee for an explanation and either approve or disapprove the cost.

KHC reserves the right to request and review a pre-determined sample of electronic NEAT/MHEA client files containing the audit, work order, client completion report, and setup/supply libraries of completed jobs that have been submitted to KHC as completed units. A hard copy of the WX 710 Completed Dwelling Report will also be requested for review. The review will consist of the following:

1. Verify that all home information, including heating system, cooling system, building shell, ducts/infiltration, base load, health and safety, and other relevant data has been correctly and completely entered into the audit per program requirements.

2. Verify that all recommended energy conservation measures generated by the audit have an individual and cumulative estimated SIR value of .6 or higher if using LIHEAP funds and 1.0 or higher using DOE funds.

3. Verify that all work measures being paid for with funds other than DOE/LIHEAP have been clearly segregated and reported in the audit, work order(s), and client completion report.

4. Verify that the audit and work order(s) contain only allowable and program compliant work measures generated by the audit.

5. Verify that sufficient details are contained in the work order(s) for each work measure to adequately explain and document what materials are installed, how they are installed, and where they are installed.

6. Verify the number of hours reported for performing the DNE/energy audit, computer data entry, post-inspection, installing work measures, and travel/pickup activities are accurate, reasonable, and within applicable limits as determined and mandated by KHC.

7. Verify that the final SIR of each Energy Conservation Measure (ECM) as reported and the cumulative final SIR of all combined ECMs, is .6 or higher for ECM's paid for with LIHEAP funds and 1.0 or higher for ECM's paid for with DOE funds.

   Note: No ECM will be paid for by KHC if the SIR is less than .6 for LIHEAP funding or less than 1.0 for DOE funding.

7.2.2 Contractual/ Administration/ Fiscal Monitoring

Subgrantees will also undergo a Contractual/Administrative/Fiscal Review conducted by KHC compliance staff. This review is primarily concerned with the contractual, administrative, and accounting aspects of program operations and does not include a field review. Compliance staff schedules these reviews independently and while some areas will overlap, this form of monitoring is not the same as a technical monitoring which is based largely on field work evaluation.

For fiscal and contract performance monitoring, KHC weatherization monitors will verify compliance with and documentation of these fiscal requirements: expenditures, source and application of funds for expenditures, access to and retention of fiscal records, previous contract audit, cost, other resources, invoicing, liability insurance policy, equipment purchase approval and property inventory maintenance. KHC weatherization staff will monitor the invoices and expenditures monthly for expenditures to the appropriate funding source.

For contractual monitoring, the KHC compliance officer will verify compliance with and documentation of these contractual requirements: disallowed cost reimbursements, reporting, personnel policies, record confidentiality, conflict of interest and nepotism, client and dwelling eligibility, availability for required training, purchase bidding, listed assurances and certifications and record retention.

Chapter 8: Providing Weatherization Services

KHC provides weatherization services based upon the house-as-a-system approach integrating advanced weatherization technologies into service delivery. This approach includes data collection, testing, assessments, and education for all eligible clients. Services include an energy audit, a complete visual assessment, assessment of electric base load measures (water heaters, refrigerators, compact fluorescent light bulbs, lighting fixtures, and space heaters), diagnostic tests, energy-related health and safety assessment, client health and safety/conservation education, appropriate low-cost measures, applicable weatherization-related repairs, and a thorough consideration of the client and residence.

8.1 Dwelling Needs Evaluations/Energy Audits

1. All homes must receive a comprehensive, on-site dwelling needs evaluation, also called an energy audit, prior to receiving weatherization services. (See Chapter 7) The cost of this evaluation must be included in the average cost per home.
    a. Only a Kentucky WAP-certified DNE may conduct the dwelling needs evaluation.
    b. All final post inspections must be performed by a BPI-certified Quality Control Inspector (QCI) if any DOE funds have been invested in the unit.
    c. **Restriction:** Only one person may perform a dwelling needs evaluation per home. KHC will not reimburse a Subgrantee for more than one person performing an energy audit on a home.
    Exception: One DNE trainee approved by KHC for field training (conditional DNE status) may accompany the DNE for a limited number of inspections that are pre-approved by KHC.
    d. **Restriction:** Any person who performs a dwelling needs evaluation on a DOE/LIHEAP funded weatherization project may not perform any installation of work measures paid for with DOE/LIHEAP funds if that same person performs the post inspection on those work measures. KHC will deem any material and labor costs for such work measures installed by that person to be unallowable costs and will not reimburse the subgrantee for such costs. **Exception:** If a person performs a dwelling needs evaluation on a DOE/LIHEAP funded weatherization project but does not perform the post inspection on any work measures paid for with DOE/LIHEAP funds, that person may perform installation of such work measures, and the associated labor and material costs will be allowable costs and reimbursable to the subgrantee.

2. Guidance for oversight of work hours

    Below are guidelines for assessment of worker efficiencies. Based on a survey of Kentucky Subgrantees, these are suggested maximum times it should take evaluators and inspectors to perform duties on a typical job.

Onsite client education during the evaluation process.	1 hour
Onsite house evaluation (this does not include client education time).	5 hours
Office time preparing audit, work write up, file documentation and bid docs.	6 hours
H&S Post inspection for heat system work.	1 hour
H&S Post inspection for heat system work involving gas and oil appliances.	2 hours
Final Post inspection.	4.5 hours
Call back inspection due to failing at final or heat system post.	1 hour

While these times are suggested maximums, a Subgrantee could reasonably expect the average time for these activities to be less, except for client education. It is also important to note that travel time to and from the home is not included in these times; however, travel time will be evaluated for reasonableness.

3. Evaluators in conditional DNE status must have work reviewed by a KHC-certified DNE until such time that they become fully certified.

   NEAT and MHEA has been adopted as the authorized energy audit tool to be used in the WAP for single-family houses and mobile homes. Other audit software will be reviewed for use in other dwelling applications when applicable. Kentucky Housing Corporation (KHC) will update the Fuel Cost once a year in the audit software. Subgrantees are responsible for updating and/or checking the prices on the other audit libraries every six (6) months.

   KHC requires local subgrantees to calculate and maintain current costs for materials and labor to be used in the NEAT/MHEA auditing process. All audit cost estimates must be within 15 percent, of actual job costs for each job. Subgrantee must be sure that KHC can access all energy audits for all jobs.

4. Subgrantees are responsible for ensuring that all staff performing computerized energy audits maintains proficiency using the most currently released and approved version of NEAT/MHEA.

5. The most cost-effective measures as determined by the NEAT/MHEA software will be installed subject to funding availability.
   a. Measures not included in the NEAT/MHEA generated work measures list will result in disallowed costs.
   b. When using NEAT/MHEA, individual measures and the total package (except for health and safety measures) must have an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
      Leveraged funds may be used to reduce the measure cost to bring the SIR to as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.

6. Subgrantees will review evaluation findings and a weatherization-specific scope of work with all clients receiving weatherization services.

7. Subgrantees will obtain client/property owner's signatures authorizing the installation of weatherization measures prior to work commencing. The client's signature will be obtained on the weatherization application. If the unit is a rental, the property owner's signature will be obtained on the WX Rental form.

8. Lead Paint testing with an EPA approved lead paint test kit must be performed on all homes determined to have been built prior to 1978 or assume lead is present. If testing is performed, all areas of the home that will be disturbed by weatherization work measures shall be tested. Evidence of lead testing must be retained in the client file.

9. Photographs of the interior and exterior of the home must be taken during the pre- and post-inspection process. Photos are not required to be printed but must be retained as a permanent part of the client record.

10. If a DNE/Energy Auditor encounters obstructions/debris in any interior/exterior part of the home that would impede the DNE/Energy Audit process and/or the process of installing prescribed program work measures, the client must be asked to remove such obstructions/debris before commencing with the DNE/Energy Audit and/or the prescribed work measures. If the client refuses or is unable to provide clear access to all necessary areas of the home, the unit must be deferred.

8.2 Restrictions on Window and Door Repair and Replacement

8.2.1 Policy

Subgrantees may repair or replace exterior windows and doors as an Energy Conservation Measure (ECM) only. Windows and doors must be entered as a standalone measure not incidental to another measure. Modeling must include the U-value and Solar Heat Gain Coefficient (SHGC) of the proposed replacement. (See Kentucky WA Web Policies and Procedures.) Leveraged funds may be used to buy down the cost of door and window replacements in order to reach an SIR of .6 or higher for LIHEAP funds and 1.0 or higher for DOE funds.

If windows and doors do not reach the targeted SIR, they may qualify as an Incidental Repair Measure if they preserve the integrity of another ECM. However, they cannot be an IRM for air sealing.

8.2.2 Procedure

1. Client files must include the following documentation:
    a. Verification that installed measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds if repair or replacement is based on energy efficiency.
    b. Photos of existing windows and doors.
    c. All necessary measure-specific justification.

2. See Chapter 9, *Allowable Costs.*

8.3 Heating System Replacement

8.3.1 Policy

1. Subgrantees may replace home heating systems if at least one of the following conditions is met:
   a. Existing heating system is beyond repair.
   b. Existing heating system can be repaired but only at greater cost than replacement.
   c. Absence of a permanent, central heating system.
   d. When an evaluation of cost-effectiveness determines the SIR as approved in the LIHEAP state plan and 1.0 or higher for DOE funds based on NEAT/MHEA or other approved energy audit software.
   e. Health and safety.
2. Subgrantees shall inspect and test the heating system(s) in each dwelling unit for safe operation prior to delivering weatherization services.
3. Test all combustion heating systems for safety before and after weatherization work.
4. Secondary heating systems must be checked for safety, and any hazards corrected.
5. Funds other than DOE may be used to buy down the cost of the measure to achieve an SIR of 1.0 or higher.
6. Replacement furnaces/space heaters, water heaters, and heat pumps will not be allowed based solely on a unit being at the end of its estimated life expectancy, but they can be replaced if they model out as an ECM with an SIR of at least as approved in the LIHEAP state plan and 1.0 for DOE funds.

8.3.2 Procedure

1. Programmatic

   Client files must include the following documentation:

   i. Verification the installed measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds <u>if it is based on energy efficiency.</u> Written justification for replacement and photographs of the heat system being replaced must also be included.
   ii. Written justification and photographs if replacement is health and safety-related.
   iii. A narrative clearly explaining the condition of the heating system prior to weatherization.
   iv. A clear record of who analyzed or worked on the heating system, when, and what was done.
   v. A clear record of duct assessment, sealing, and insulating for forced-air systems.
   vi. Estimated repair costs used to justify replacement.
   vii. Paid invoices for all work contracted out or done by an outside heating technician.
   viii. All necessary measure-specific justification.

ix. Proof of delivery to client the following documents: owner's manuals, operating and maintenance instructions for all new equipment/appliances installed in the home.

2. See Section 5.6, Fuel Switching.
3. See Chapter 9, Allowable Costs.
4. Required Installation Standards and Materials Specifications
   - The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

8.4 Repair and Replacement of Solid Fuel Burning Appliance Systems

8.4.1 Policy

1. Repair or replacement of solid fuel burning appliance systems is an allowable cost. Subgrantees may replace solid fuel burning appliance systems if it is more cost-effective to replace the unit or system than it is to perform necessary repairs.

   An audit for solid fuel burning appliance systems must be completed prior to repair or replacement.

2. If a Subgrantee chooses to include repair or replacement of solid fuel burning appliance systems in its weatherization program, the following must be in place:
   a. All applicable restrictions and code regulations must be met.
   b. Subgrantee must have appropriate liability insurance.
   c. Qualified personnel must perform all installations, maintenance, and inspection. All work must be post- inspected.

3. Subgrantees must provide consumer education on safe operation, proper maintenance, and clean and efficient burning techniques.
4. All solid fuel repair and/or replacement must meet the following required standards
   a. Certification and labeling by the National Fire Protection Association under NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances. The local fire marshal or building inspector will have the most current information on the standard.
   b. Certification by the Underwriters Laboratory for systems with electrical parts (http://www.ul.com/).
   c. Environmental Protection Subgrantee emission standards or local standards if they are stricter (https://www3.epa.gov/).
   d. The following apply for mobile homes:
      - Systems that are certified and labeled for mobile homes.
      - Installation in accordance with manufacturer's recommendations and local codes.
      - Additional Requirements for Solid Fuel Burning Appliance Systems Solid fuel burning appliance systems shall be provided with

combustion air ducted directly to the appliance. Combustion air shall be provided as recommended by the manufacturer's specifications.

5. If the number of air changes per hour (ACH) is greater than .35, solid fuel-burning appliances shall be installed in a location and manner to provide ventilation and combustion air supply to allow proper combustion of fuel, chimney draft, and maintenance of safe temperatures.
6. Where buildings are so tight that normal infiltration does not provide the necessary air, outside air shall be introduced.
   Combustion air may be supplied to the room in which the solid fuel appliance system is located in lieu of direct ducting, in an existing home, provided that:
   a. The appliance system is not designed for directly connected outside air;
   b. The existing construction prohibits the introduction of outside combustion air directly to the appliance system; and
   c. The combustion air source shall be located as close to the solid fuel burning appliance system as possible, shall be provided with a back-draft damper, and shall be no less than six inches in diameter.

8.4.2 Allowable Costs

Repair and replacement of solid fuel burning appliance systems are allowable costs under DOE. These measures fall within the total health and safety measures and repairs limits (See Section 5.11 *Health and Safety Measures and Repairs*). See Chapter 6, *Allowable Costs*, for allowable expenditures.

8.4.3 Procedure

1. Programmatic
   a. Client files must include the following documentation:
      - WA10 audit
      - Clear record of who analyzed or worked on the heating system, when, and work performed.
      - Inspection approval.
      - Paid invoices for all work contracted out or performed by an outside heating technician.
      - All necessary measure-specific justification.
      - Proof of Delivery of owner's manuals/instructions consumer conservation education.
   b. Subgrantee files must include the following documentation:
      - Necessary permits.
      - Liability insurance.
   c. See Chapter 6, *Allowable Costs.*
   d. See Chapter 14, *Energy Systems Policies.*
2. **Required Installation Standards and Materials Specifications**
   The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

8.5 Repair and Replacement of Space Heaters

8.5.1 Policy

1. Subgrantee may repair and/or replace space heaters under one of the following conditions:
   a. Energy efficiency: If the total cost is justified using an evaluation of cost-effectiveness where the SIR is as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
   b. Client health and safety.
2. Subgrantee must follow these general requirements for repair and replacement:
   a. **Repairs**
   Make repairs to space heaters as necessary to address health and safety issues.
   b. **Provisions for working smoke detectors**
   Inspect to ensure that a working smoke detector is installed on the same floor as the space heater. The cost of smoke detectors may be charged to Health and Safety Costs.
   c. **Other safety hazards**
   Check to ensure that no obvious building/NFPA code violations or other safety hazards related to the space heater are evident, for example electric wiring and heater vent pipe.
   d. **Permits and inspections**
   Secure building permits where required and have qualified inspections made before any heater is put into operation. The cost of permits may be charged to Program Costs.
   e. **Consumer education**
   Provide consumer education on safety hazards and the proper operation of equipment, proof of delivery of owner's manual/operating instructions for replacement units installed, including the operation, testing, and battery replacement of smoke detectors.
3. Subgrantee must follow the specific requirements listed below for space heater and fuel types.
   a. Space heater type: Portable, Stand Alone Electric
      - Repair, replacement or installations are not allowed on portable, standalone electric space heaters. Removal of portable, standalone electric space heaters is recommended per DOE WPN 22-7.
      - DOE WPN 22-7 requires checking the circuitry to ensure adequate power supply for each existing portable, standalone electric space heater in the home.
      - DOE WPN 22-7 also requires that the client must be informed of hazards and a signed waiver must be obtained if removal of portable, standalone electric space heaters is not allowed by the client.
      - The following types of electric heaters are not defined as portable, standalone electric space heaters and the restrictions and requirements of section 3 (a) above do not apply:

    - Baseboard units permanently attached and code-compliant wired to the home and home electrical wiring system.
    - Zoned heating system components.
    - Other permanently installed electric heating units.

b. Unvented combustion space heaters
    - In homes with unvented space heaters, subgrantees will determine if a vented space heater can be installed to carry the major heating load. If the unvented space heater must remain the primary heating source, the Subgrantee may not weatherize the house. See specific fuel types below for further direction. Refer to Chapter 14, Energy Systems Policies.
    - When Subgrantees replace unvented space heaters with vented ones as the primary heat source, they must advise the owner and tenant of the inherent dangers of the old heaters, and they should strongly advise the party that owns the unvented heater(s) to permanently remove them from possible future use.
    - Unvented space heaters cannot be left in manufactured housing; refer to National Fire Protection Association (NFPA 54) and WPN 22-11. Clients' refusal to allow unvented space heaters to be removed, the home must be deferred.
    - When Subgrantee cannot weatherize a house because of unvented space heaters, they should verify that such use is in accordance with the manufacturer's instructions and Underwriter's Lab listing (http://www.ul.com/). If in doubt, the local Fire Marshall must be contacted for assistance. The client must be advised of the proper operation of the heater and the safety hazards inherent in using unvented heaters.

c. Vented combustion space heaters
    - Oil-fired space heaters (always vented), vented kerosene space heaters, and vented gas space heaters should be treated as if they are furnaces.
    - Subgrantee may perform tune-ups and clean heater units, vents, and ducts.
    - See the following information on fuel types for the repair and replacement of vented gas and kerosene space heaters.

d. Fuel type: Gas
    - Unvented gas space heaters are prohibited as a primary heat source (secondary only in site-built).
    - Repair of vented gas heaters is allowed, provided that the following concerns are addressed and documented in the client file:
        - Cost benefits of repair vs. replacement.
        - Methods to deal with health and safety concerns for the occupants.
        - Identification of, and compliance with, applicable codes.
        - Consumer education on the proper use and maintenance of the equipment.

- Replacement of a gas space heater is only allowed when the existing unit is in poor mechanical condition or poses health and safety risks for other reasons.
    - Gas space heaters may not be installed in bedrooms or bathrooms or comparable areas of shelters and group homes. Exception: refer to BTU limitation in NFPA 54, chapter 9.
    - Replacement should be with another gas heater.

e. Kerosene
- Unvented kerosene space heaters are prohibited.
- Repair of vented kerosene space heaters is allowed, provided that the following concerns are addressed and documented in the client file:
    - Cost benefits of repair vs. replacement.
    - Methods to deal with health and safety concerns for the occupants.
    - Identification of, and compliance with, applicable codes.
    - Consumer education on the proper use and maintenance of the equipment.
- Repairs to existing vented kerosene heaters may be considered when they are the only source of heat and no reasonable alternative exists.

8.5.2 Allowable Costs

Repair and replacement of space heaters are allowable costs under DOE. See Chapter 6, *Allowable Costs*, for allowable expenditures.

8.5.3 Procedure

1. Programmatic
    a. Client files must include the following documentation:
        - Verification the measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds if it is based on energy efficiency.
        - Written justification and photographs, if health and safety related.
        - All necessary measure-specific justification.
        - Smoke detector installation as applicable.
        - Copies of mechanical permits where required and results of inspections.
        - Delivery of consumer education, and proof of delivery of owner's manual/operating instructions for replacement units installed
    b. See Chapter 6, Allowable Costs.
    c. See Chapter 11, Health and Safety/ Energy Systems Policies.
2. Required Installation Standards and Materials Specifications
    The current approved Field Guide, all applicable NFPA codes, and other applicable codes/regulations must be strictly followed.

8.6 Water Heater Repair and Replacement

8.6.1a Policy

1. Subgrantees must consider repairing water heaters, including replacement of elements, wiring, and thermostats.
   a. Subgrantee may replace a water heater if the cost of repair exceeds the cost of replacement or if the broken water heater is more than 10 years old. Subgrantees must provide documentation to substantiate that a repair cost estimate has been obtained.
   b. Water heater replacements should first be considered as an ECM if an SIR of at least as approved in the LIHEAP state plan and 1.0 for DOE funds is obtained through the NEAT/MHEA audit.
2. Subgrantees may replace water heaters under one of the following conditions:
   a. Energy efficiency if the total cost is justified using an evaluation of cost-effectiveness where the SIR is as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
   b. Client health and safety. Requires written approval from KHC before proceeding with the replacement by submitting the appropriate form. The subgrantee must provide and submit documentation to prove that a replacement is justified in the following manner: photographs of the existing water heater and a detailed narrative explaining why the existing water heater is creating a health and safety problem that can only be eliminated by replacing the unit.
3. If a gas water heater is installed, a worst-case depressurization test must be performed after installation of the unit.

8.6.2 Allowable Costs

Water heater repair and replacement are allowable costs under DOE. Unless health and safety related, repair and replacement must be included in the SIR calculation for all funding sources and in the DOE per home expenditure average. See Chapter 6, Allowable Costs, for allowable expenditures.

8.6.3 Procedure

1. Programmatic
   a. Client files must include the following documentation:
      - Verification of the installed measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds if it is based on energy efficiency.
      - Written justification and photographs if health and safety related.
      - Worst-case depressurization test results as applicable.
      - Cost comparison documentation.
      - All necessary measure-specific justification.
      - Proof of delivery of owner's manual/operating instructions for replacement units installed.

8.7 Refrigerator Replacement

8.7.1 Current Policy

1. Subgrantee may replace refrigerators with weatherization funding when the demonstrated SIR is as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
   a. Subgrantee may choose one of the KHC-approved methods to determine the SIR. These methods include the following:
      - Use the WA10 or another approved energy audit software program (TREAT software for multi-family projects over 25 units) to determine the SIR for refrigerator replacement.
        - Input the meter reading of existing refrigerator.
        - Enter model numbers into the WA10 to determine the efficiency if it is listed in the data dictionary.
   b. Leveraged funds can be used to bring the SIR of a marginally cost-effective measure to as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
   c. All units in an eligible multi-unit project may receive a replacement refrigerator if the SIR is as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
2. Replacement refrigerators must meet the following criteria:
   a. Energy Star or better energy efficiency. A non-Energy Star refrigerator may be installed provided the SIR for the non-Energy Star model is demonstrated to be higher than the SIR for the Energy Star model.
   b. Top-mount freezer (two door models).
   c. Models with no extra features such as door ice, through door water dispensing, or automatic icemakers. A like-for like replacement refrigerator may be installed if it still meets the SIR as approved in the LIHEAP state plan and 1.0 or higher for DOE funds. This is to include the cost of disconnect and reconnection of existing water supply only.
3. Prior to replacement by the Subgrantee, residents must agree via a written agreement to the removal of the old refrigerator and all non-functioning, unused, or underused refrigerators.

   The old refrigerator must be removed from the property and disposed of properly per Section 608 of the 1990 Clean Air Act, as amended by 40 CFR 82, Subpart F, 1995. Written documentation proving the old unit was disposed of properly is required.

   Ownership of the replacement refrigerator falls to whomever owned the refrigerator that was replaced, either the owner/occupant, property owner, or renter.

8.7.2 Allowable Costs

Refrigerator replacement, including costs associated with CFC disposal, is an allowable cost under DOE. Refrigerator replacement must be included in the SIR

calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

8.7.3 Procedure

1. Programmatic
   a. Client files must include the following documentation:
      - Verification installed measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds using proven methods.
      - All necessary measure-specific justification.
      - Client approval.
      - A photograph of the old fridge and new refrigerator installed.
      - Ownership status of the replaced refrigerator.
      - Copies of the manufacturer's warranty and client's signature indicating receipt of original warranty.
      - Proof of delivery of owner's manual/operating instructions for replacement units installed.
      - Refrigerator disposal method.
      - Reclaimed refrigerant disposal method.

8.8 Fuel Switching

8.8.1 Policy

1. KHC does not permit the general practice of non-renewable fuel switching when replacing heating systems and hot water tanks.
2. Subgrantee must submit a WX-910 Request to Exceed/Fuel Change Request to their technical monitor if they propose to switch fuels as part of their weatherization services. The request must include clear justification for switching with photographs.
3. The new fuel source unit cannot exceed the cost of replacement using the existing fuel source unless the difference comes from fuel source costs.
4. When switching a fuel source, all costs associated with the installation of a gas heating system or water heater, and all required elements of the new heating system (providing a new supply line, flue, chimney, ducts, etc.), must be considered as part of the total cost.

8.8.2 Allowable Costs

Fuel switching is an allowable cost under DOE with prior KHC written approval. See Chapter 6, Allowable Costs, for allowable expenditures.

8.8.3 Procedure

Programmatic

1. Submit written application, WX 910 Request to Exceed/Fuel Change Request to assigned KHC field representative. Include supporting documentation (as defined by WPN 23-6, Attachment 5).
2. Client files must include the following documentation:
   a. Copy of written notification submitted to KHC.

b. A complete cost analysis justifying the work.
c. Justification for health and safety replacement.
d. All necessary measure-specific justification.

3. KHC will send all documentation to DOE for final approval, following WPN 23-6, Attachment 5.

8.9 Closed Wall Cavity Insulation

8.9.1 Policy

All closed wall cavities that can be insulated shall be insulated by means of dense-pack insulation methods at a density of 3.5 pounds per cubic foot unless the wall covering will not sustain pressures of insulating. Installed measure must have an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.

8.9.2 Allowable Costs

Closed wall cavity insulation is an allowable cost under DOE. The measure must be included in the SIR calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

8.9.3 Procedure

Programmatic

Client files must include the following documentation:

1. Verification the installed measure has an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
2. All necessary measure-specific documentation.

8.10 Energy-Efficient Lighting

8.10.1 Policy

1. Retrofit of lighting fixtures, replacement of incandescent screw-in bulbs with or LED screw-in bulbs, and replacement of halogen or incandescent torchiere lamps are allowable weatherization measures under the following provisions:
   a. Eligible Units
      - Owner-occupied dwellings.
      - Rental units where tenants pay electric bills.
        - Do not install lights in locations where the building owner pays the electric bills, such as common areas or master-metered buildings except when building owner is a nonprofit organization.
        - Retrofit of lighting fixtures and replacement of halogen or incandescent torchiere lamps are allowable if costs are justified with an SIR calculation as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
        - All measures must directly benefit low-income tenants.
        - All incandescent screw-in bulbs can be replaced with LED screw-in bulbs.
2. Every effort should be made to arrange cost sharing with utilities and use utility funds first.

3. Subgrantees must provide residents with information on the following:
    a. LED features
    b. Potential savings
    c. Proper use and care
    d. Use and replacement limitations
    e. Place to purchase replacement bulbs

8.10.2 Allowable Costs

Retrofit of lighting fixtures, replacement of incandescent screw-in bulbs with compact fluorescent or LED screw-in bulbs and replacement of halogen or incandescent torchiere lamps are allowable costs under DOE funds.

Retrofit of fixtures and replacement of halogen or incandescent torchiere lamps with must be included in the SIR calculation for all funding sources and in the Average WX Costs. See Chapter 6, Allowable Costs, for allowable expenditures.

8.10.3 Procedure

Programmatic

1. Client files must include the following documentation:
    a. Receipts or inventory reduction paperwork.
    b. For lighting fixture retrofits and replacement of halogen or incandescent torchiere lamps, verification that installed measures have an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.
    c. All necessary measure-specific justification.
    d. Delivery of consumer education.
    e. See Chapter 6, Allowable Costs.

8.11 Health, Safety Measures, and Repairs

8.11.1 Policy

Energy-related health and safety hazards identified prior to, or as a result of, the installation of weatherization materials must be addressed (see Section 12.1, Health and Safety Plan). Energy-related health and safety measures and repairs are intended to protect building occupants. Subgrantees must inform clients of any health and safety hazards that may be beyond the scope of the weatherization program. In addition, the subgrantees must provide written documentation and obtain signatures that provide proof the client has been educated and fully informed about any Health and Safety issues/problems discovered in their home. (Reference the current KHC-approved DOE Health & Safety Plan.

8.11.2 Allowable Costs

Energy-related health and safety measures and repairs are allowable costs under DOE funds.

8.12 Testing for Excessive Carbon Monoxide (CO)

8.12.1 Policy

1. All homes with combustion appliances must be tested for combustion safety before, during and after weatherization work.
2. No weatherization work can be done unless the CO levels are acceptable.
3. If CO is above acceptable levels, weatherization funds may be used to clean, and repair appliances owned by low-income occupants.

8.12.2 Allowable Costs

Combustion safety testing and appliance cleaning and repair are allowable costs under DOE. These measures fall within the total health and safety measures and repair limits. These measures do not need to be included in the SIR calculation for all fund sources or in the Average WX Costs.

8.12.3 Procedure

Programmatic Client files must include the following documentation:

a. Results of pre- and post-weatherization combustion safety report for every appliance tested.
b. Receipts or invoices for any corrective work.

8.13 CO Detectors, Smoke Detectors, and Fire Extinguishers

8.13.1 Policy

1. Subgrantees must install Carbon Monoxide (CO) alarms and smoke alarms in dwelling units where these devices are nonexistent or non-functioning.
   a. CO alarms must be, UL listed, installed in accordance with the manufacturer's recommendations and located in compliance with the Standard Work Specifications. Installed CO alarms must have the capability to accurately detect and display low levels of carbon monoxide to 10 ppm and comply with other program requirements. Electric plug-in CO alarms must have battery backup.
   b. Smoke alarms must be installed in accordance with the manufacturer's recommendations, listed in accordance with UL 217, comply with NFPA 72.
   c. CO and Smoke alarms designed for the hearing-impaired must be installed when the client is hearing-impaired.
2. Where multiple smoke alarms are installed, interconnection is required. Activation of any one smoke alarm shall activate all of the alarms in the individual unit. Hard-wiring and interconnection is not required in existing areas provided:
   a. The alteration or repair does not cause the removal of wall or ceiling finishes exposing the structure, and
   b. No attic, crawl or basement is available which can provide access for hard wiring and interconnection without the removal of interior finishes.
3. Smoke alarms/detectors must be located:
   a. In every sleeping room.

b. Outside of each sleeping area in the immediate vicinity of the bedrooms.
c. On each additional story (including basements).
d. In split-level dwellings where an intervening door is located between the adjacent levels. However, in split-level dwellings without an intervening door, a smoke alarm installed on the upper level shall suffice for the adjacent lower level, provided that the lower level is less than one full story below the upper level.
e. Near every combustion zone. This alarm can serve the requirements of the above stipulations, where feasible.

4. Providing fire extinguishers is allowed only when solid fuel-burning heating systems are present. Fire extinguishers must be installed according to the manufacturer's recommendations, be type ABC, UL listed, ≤ 10 lb. and with a permanently affixed wall bracket to receive the extinguisher. The client must sign a written agreement to allow a fire extinguisher to be installed in the home within sight of the solid fuel burning heat system when standing at the unit. Subgrantee must discuss and provide information on the use and upkeep of the extinguisher to the client.

5. Subgrantee must provide the occupant(s) of the dwelling unit with verbal and written information regarding the following:
a. Dangers of CO and smoke.
b. How to operate and reset the CO and smoke alarm.
c. How to read the CO alarm.
d. How to respond to CO levels above 10 ppm.
e. How to change the batteries of CO and smoke alarm.

8.13.2 Allowable Costs

Carbon monoxide and smoke alarm installation is an allowable health and safety cost under DOE. This measure falls within the total health and safety measures and repairs limits. These measures are not included in the SIR calculation or in the Average WX Costs.

8.13.3 Procedure

Programmatic
1. Client files must include documentation of the following:
a. CO and smoke alarm installation.
b. Detector location(s).
c. Detector model type.
d. Delivery of consumer education.
e. Proof of delivery of owner's manual/operating instructions for replacement units installed
2. Subgrantee must keep a copy of CO and smoke alarm model specifications for all models installed in subgrantee files.

8.14 Diagnostic Tests and Air Sealing

8.14.1 Policy

1. Subgrantee must perform diagnostic tests prior to installment of weatherization measures and upon completion of each project based on the following:
   a. Type of residence
   b. Site conditions
2. Subgrantee must perform air sealing where it is determined by a weatherization audit to be effective based on one of the following considerations:
   a. Health and safety (between attached garage and living space)
   b. Building durability
   c. Energy efficiency if the total cost is justified using an evaluation of cost-effectiveness where the SIR is as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.

8.14.2 Allowable Costs

Diagnostic tests and air sealing are allowable costs under DOE. Both must be included in the SIR calculation for all fund sources and in the Average WX Costs.

8.14.3 Procedure

Programmatic

1. Client files must include the following documentation (tests must include the name(s) of the tester(s) and test dates):
   a. Pre- and post- weatherization blower door test results, including the location of the doorway where tests were taken and photos of diagnostic readings.
   b. Pre- and post-measurements for the following:
      - Duct pressure pan
      - Dominant duct leakage
      - Pressure differential
      - Duct tester readings
   c. Reason(s) air sealing target not attained, if applicable.
   d. Paid invoices for materials, measures, repairs, or modifications.
   e. Verification of the installed measure has an SIR as approved in the LIHEAP state plan and 1.0 or higher for DOE funds if it is based on energy efficiency. All necessary measure-specific justification.

8.15 Deferral Standards

A deferral is a dwelling that has been inspected by a qualified person who has determined that conditions are present which prohibit rendering service (See Chapter 12, Health and Safety for additional guidance). At a minimum in order for a dwelling to be a deferral the dwelling must receive a thorough walk-through visual inspection of the interior/ exterior of the home including the attic and crawl space.

8.15.1 Policy

1. It is the role of the Dwelling Needs Evaluator/Energy Auditor to weigh all factors and decide whether to proceed or not.
2. Deferring weatherization work does not mean assistance will never be available, but that any work must be postponed until problems can be resolved and alternative sources of help are found, as necessary.
3. In the event the Dwelling Needs Evaluator/Energy Auditor determines the dwelling is a deferral, the following procedures shall apply:
    a. The Dwelling Needs Evaluator/Energy Auditor is required to verbally inform the client why deferral status has been given. The client shall also be informed in writing (via certified mail or subgrantee must obtain a signed document acknowledging receipt of deferral notice) as to why the dwelling cannot be weatherized. If there are conditions that the client must correct before service is provided, those conditions must also be stated in writing. A copy of the client deferral letter must be retained in the client file.
    b. Subgrantee is encouraged to refer the client to any alternate program such as home rehab, if one is available in the area. A copy of the referral letter must be retained in the client file.
4. A deferral is not a completion. Reimbursements for deferrals shall be obtained through the normal monthly invoicing process, see Chapter 6.3 Invoicing. Subgrantee must provide a status explanation in the comments section of the WX 710 Completed Dwelling Report and the electronic invoicing system.
5. Installation of CO and/or smoke detectors is prohibited.
6. Material costs are ineligible for reimbursement.
7. KHC will only reimburse the subgrantee for the actual Dwelling Needs Evaluator's/Energy Auditor's Labor spent traveling to and from the client's home and for actual time spent at the client's home performing the walk-through inspection. WX Labor costs will automatically be displayed on the 702 Invoice as Program Support, see Chapter 6.3 Invoicing.
8. Subgrantee must develop deferral guidelines and a standardized form.
    a. Deferral guidelines may include, but not limited to the following:
        - The client has known health conditions that prohibit the installation of insulation and other weatherization materials.
        - The building structure or its mechanical systems, including electrical and plumbing, are in such a state of disrepair that failure is imminent, and the conditions cannot be resolved in a cost-effective manner.
        - The house has sewage or other sanitary problems that would further endanger the client and the weatherization installers if weatherization work were performed.
        - The house has been condemned or electrical, heating, plumbing, or other equipment has been "red tagged" by a local or state building official or utilities.
        - Mold and Moisture problems are so severe they cannot be resolved under existing health and safety measures and minor repairs.

- Dangerous conditions exist due to high carbon monoxide levels in combustion appliances and cannot be resolved under existing health and safety measures.
- The client is uncooperative, abusive, or threatening to crew, auditors, inspectors, contractors, or others who must work on or visit the house.
- Lead-based paint is determined to be in the home. The extent and condition of lead-based paint in the house would potentially create further health and safety hazards.
- Asbestos anywhere on the interior or the exterior of the dwelling would require deferral of weatherization services if any weatherization work measure would disturb the asbestos. Asbestos cannot be handled, altered, disturbed, cut, drilled, sanded or be subjected to any other action that would create a danger to the homeowner or any weatherization staff/contractor.
- Pest infestation within the dwelling or in any area outside of the dwelling where weatherization staff/contractors would have to work.
- In the judgment of the Dwelling Needs Evaluator/Energy Auditor, conditions exist which may pose a risk from fire, falling, poor sanitation, endanger the health and/or safety of the work crew/contractor or limit access for evaluation or measure installation. Work should not proceed until the condition is corrected.

b. Standardized Deferral Form sent to the potential client should include the following:
   - Evaluation date
   - Reason for deferral
   - Date issue must be resolved, if applicable
   - Contact information

9. Subgrantee must actively pursue all alternative options on behalf of the client, including referrals, and use good judgment in dealing with difficult situations.

8.15.2 Deferral Documentation

Programmatic

1. Subgrantee must provide clients with deferral documentation. If the property is a rental, property owners must receive a copy.
2. Client files must include a copy of deferral documentation including pictures.
3. An example of deferral documentation would include: a certified letter on Subgrantee's letterhead stating the reasons for the deferral, including referrals to other possible programs or subgrantees who can offer assistance when feasible.

8.15.3 Corrected Deferral Conditions

1. If a client has subsequently corrected issues/problems identified that constituted a deferral at the time of the dwelling needs evaluation/energy audit or the initial application/screening process, the following process will apply:
   a. The items identified that caused the initial deferral determination must be verified as having been corrected. Verification may take the form of a document specifically listing all items that caused the deferral, and a description of the actions taken that corrected the problems/issues. This document must be signed/dated by the client and once verified, signed/dated by the weatherization director and or a Certified Dwelling Needs Evaluator/Energy Auditor. The method of verification must also be disclosed on this document, i.e.: on site verification at the client's home, etc.
   b. An applicant will remain eligible for weatherization services for 12 months from the date of verified eligibility. In addition to step 1, eligibility must also be reassessed and verified again by examining the WX weatherization application and Prioritization. In the event a unit is deferred, and if the client corrects the deferral reason within 12-15 months of deferral, the client may be served after continued eligibility is confirmed. A signed declaration of income statement for the previous three months may be used to update the WX weatherization application and Prioritization, if necessary. If weatherization work has not begun after 15 months from the date of eligibility, the household must reapply in full.
   c. Once items 1 and 2 have been satisfied, the client application will be allowed to be moved to the top, the next to be served, on the prioritization list.

8.16 Low Flow Showerheads

Low flow showerheads are an allowable cost of the program and they must be considered when inputting house data into the WA10 audit.

Chapter 9: Allowable Costs

9.1 General Standards for Allowable Costs

Subgrantee files must contain all required expenditure documentation. See Chapter 5, Providing Weatherization Services, for allowable weatherization measures and fund source limitations and allowances.

9.1.1 Allowable weatherization costs must meet the following criteria:

1. Be reasonable for the performance of the contract and of benefit to the program for which the funds are provided.
2. Be allocated to the contract under these policies.

3. Conform to any limitations or exclusions set forth in these policies or in the contract as to type or amount of cost of items.
4. Be consistent with policies and procedures that apply uniformly to other activities of the organization and are accorded consistent treatment.
5. Be in accordance with generally accepted accounting principles. See "The Yellow Book" (OMB Circular A-123) issued by the federal Office of Management and Budget https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2016/m-16-17.pdf
6. Be adequately documented.
7. Be in accordance with the terms and conditions of the DOE rules published in 10 CFR 440 and in 10 CFR 600.

9.1.2 State and Local Taxes

1. Charge applicable state and local taxes on purchases to the same budget category and funding source as the purchased item or service.
2. Local subgrantees making weatherization improvements under the weatherization program for low-income homeowners or renters are eligible for exemption from state sales tax and use tax. See Kentucky State Department of Revenue regulations. Purchases of qualified materials must be accompanied by a *Buyers' Retail Sales Tax Exemption Certificate.*

9.2 General Standards of Fiscal Accountability

1. Method of Compensation: KHC will reimburse Subgrantees for all allowable costs upon receipt of authorized requests for reimbursement as directed by KHC.
2. Accounting and Auditing: Subgrantee is responsible for complying with all applicable guidelines and procedures, demonstrating responsible management of cash flow, inventory control, equipment purchase, and administrative costs. Accounting and bookkeeping activities must comply with Generally Accepted Accounting Principles and applicable Federal/State laws and regulations.
3. Subcontracting: Subgrantees must select contractors using competitive procedures among potential bidders for weatherization services.
4. Record-keeping:
   a. Local subgrantees must keep records that fully disclose the following:
      - Amount and disposition of funds received.
      - Total cost of a weatherization project.
      - Source and amount of funds used from all funding sources.
      - Records must be retained for three years from the last financial audit or the completion of the length of commitment, whichever is later.
      - The fiscal records for all dwelling unit expenditures must be traceable. Costs charged to each funding source must have purchase orders, invoices, inventory records, time sheets, and other source documents for identifying funding sources.

b. Reports: Local subgrantees will provide reports or answers in writing to specific questions or surveys requested by KHC or its funding sources by the specified deadline.

5. Inventory Control: Local subgrantees are required to maintain an inventory of materials and non-expendable tools and equipment. Inventory and related records must be made available to KHC or DOE monitors upon request.
   a. All nonexpendable property that has a useful life of one year or more, and with an acquisition cost of $5,000 or more shall be tagged by KHC.
   b. All nonexpendable property purchased with weatherization contract funds, whether tagged or newly purchased but not yet tagged by KHC, is to be reported on the Equipment Inventory Count Sheet required as part of the contract closeout. Information to be included on the Equipment Inventory Count Sheet include but are not limited to the following:
      - Funding source
      - Location (city and county)
      - Condition (good, fair, not usable)
      - Description (simple description of item: power saw, power drill, etc.)
      - Tag number
      - Manufacturers serial number, if available
      - Purchase price
      - Date of purchase
   c. When items of nonexpendable property are stolen, a police report must be obtained by the Subgrantee which details each stolen item by tag number or, in the case of untagged equipment, manufacturers serial number (if applicable).
   d. Inventory and Separation of Materials and Supplies: A separate inventory system for DOE funds must be in place to ensure that materials and supplies are properly charged to the correct program. This system must track material and supply purchases and also track their use on specific job locations. All purchases shall require supervisory approval and shall be made in accordance with policies and procedures outlined in the WXPM.
6. Reversion of Property: For all nonexpendable property with a value of $5,000 or more and with a life expectancy of at least one year, the Subgrantee should reach out to the network to see if any other Subgrantee has a need for the equipment. If they do, the two Subgrantees should work together to transfer the equipment internally and inform KHC of the transfer. If they do not, the Subgrantee should contact KHC and work with KHC on a process to dispose of the equipment.
7. Authorized Expenditures: 2 CFR 200 and 10 CFR 440 are used as general guidelines for determining which weatherization costs are allowed.
   a. Exceptions exist where costs conform to specific categories in the applicable contract, policies and procedures, weatherization budget, state law, or local ordinance.
   b. KHC determines the proper interpretation of the federal or state procedures as they relate to costs allowed or prohibited under this program.

9.3 Invoicing and Reporting Procedures

Reimbursement of expenditures incurred by Subgrantees shall be requested monthly using the web-based invoicing system. Expenditures may be reported using an accrual or cash basis accounting system.

Subgrantees are required to submit one invoice per month to KHC for prior month expenditures. At no time should more than 60 days lapse between submissions of invoices. Invoice submission shall include, but not limited to, submission of an electronic copy of the 702 Invoice, all WX 710 Completed Dwelling Reports for Completed and Deferred units,

Section 106 Historic Preservation Review forms for Completed units, and additional documentation as required. The Subgrantee will submit the Weatherization 702 Invoice for reimbursement of contractor's and/or crew-based service costs. Service costs should be divided between materials and labor as shown on the WX 710.

KHC approval for the Subgrantee invoices will be contingent on a thorough review of all supporting documentation submitted and reconciliation of costs back to the 702 Invoice. Where KHC identifies a significant difference in program operations costs requested on the 702 Invoice and the total of such costs on the Completed Dwelling Reports, or any costs not justified by proper supporting documentation, KHC may deny these costs until the Subgrantee submits acceptable justification to KHC. In the instance where a draw is denied, a revised 702 Invoice and/or corrected supporting documentation will be required before approval can be granted.

Invoice Reconciliation

All costs invoiced must be reported on the 702 Invoice. Program Support/Indirect (overhead) Costs will not be assigned to the Health and Safety categories on any 702 Invoice. Program Support/Indirect (overhead) Costs will not be assigned to Regular WX on the WX 710 Completed Dwelling Report. Program Support will only be reported in an aggregate amount on the 702 Invoice as WX Program Support. Labor costs billed on the job level for Walk Away units will automatically be recorded on the 702 Invoice in the WX Program Support Monthly column.

All material and labor adjustments to previous monthly entries must be entered on the Job level within the electronic invoicing system and must be done within the quarter the draw was marked complete. The units that are being adjusted must be identified by providing an updated WX 710, in addition to the WX 710 from the time the job was marked complete.

Service costs for material and labor must be listed with the job they are incurred. All material purchased and inventoried must be listed in the Section 3 WX Inventory and/or Section 4 H&S Inventory sections of the electronic invoicing system and detailed on each job as they are used, in the appropriate (H&S or WX) "Materials Used from Warehouse" rows.

Note: KHC reserves the right to request the Subgrantee provide supporting documentation during random draw audits throughout the program year. Subgrantees must retain the documentation in their files for auditing purposes.

9.4 Cost Categories

DOE WAP allows expenditures in the following seven categories: Administration, Training and Technical Assistance, Program Operations, Health and Safety, Vehicles and Equipment, Liability Insurance, and Financial Audits. The Kentucky State Plan for WAP details specifically what categories are allowed each year. The following sections describe eligible costs and documentation required for such costs to be in compliance with the existing state plan.

9.4.1 Administration

KHC will retain no more than 5 percent of available funds for administrative purposes, of which a portion will be made available to CAK for their administrative assistance. The Subgrantee will receive at least 5 percent administrative funds. KHC will work to get more administrative funds in the DOE state plan if available and applicable. In determining the amount of additional administrative funds, if any, that may be allocated to qualified Subgrantees up to the DOE maximum, the administrative burden of each of the Subgrantees in administering the weatherization program will be considered.

At the decision of KHC and based on the amount of the overall allocation of weatherization funds, an additional 5 percent may be allocated to Subgrantees if the following conditions are met:

- The Subgrantee is not administering the program under any sanctions or a corrective action plan and;
- The Subgrantee received less than $350,000 of new DOE funds to administer the program.

9.4.1a Allowable Costs

Administrative costs are costs associated with those functions of a general nature not clearly identifiable with a program. These functions include planning, budgeting and accounting, and establishment and direction of local subgrantee policies, goals, and objectives.

Allowable administrative costs include costs associated with functions, such as:

- General board/committee meetings
- Executive Director
- General staff meetings
- Office management
- Accounting, auditing, and budgeting
- Corporate legal services
- Personnel management
- Purchasing and distribution of supplies
- Insurance and bonding
- Receptionist, switchboard, mail distribution, filing, and other central clerical services
- Word processing and computer services

- Computer equipment used for administrative functions
- Organizational and procedure studies
- General record keeping
- Office space/facilities lease or rental – including outstations
- Utilities in the office space/facilities
- Postage
- Duplicating/copying
- Telephone equipment and services
- Administrative staff training
- Applicable state and local taxes

9.4.1b Methods of Distributing Costs

- Charge direct supervision of program services to the services billing category, not to administration. Personnel typically identified as administration may relate, at times, more directly to program activities than to administration. Even some hours of "management staff" may be properly allocated to program operation costs, but only if the positions are not included in an indirect cost pool.
- Cost Allocation Plans: The Subgrantee auditor must approve plans used to spread central administrative costs across local subgrantee programs.
- Indirect Rates
  - Local subgrantees may apply a federally approved indirect cost rate to charge administrative costs only if both of the following conditions are met:
    - The subgrantee has an approved indirect cost agreement with a cognizant federal subgrantee.
    - The indirect cost agreement precludes the application of the indirect rate to direct client benefits in this program.
  - The application of indirect cost charges may not result in exceeding applicable contract budget limits.

9.4.1c Cost Documentation

Local subgrantee files must include the following documentation:

a. Description of subgrantee subcontracting process and copies of pertinent contracts.
b. All necessary records that disclose fiscal accountability.
c. Expenditure documentation as described in 2 CFR 200.

9.4.2 Training and Technical Assistance

Expenditure of contract funds awarded specifically for Training and Technical Assistance (T&TA) purposes are subject to the following conditions:

a. Training must have direct application and benefit to local subgrantee weatherization programs and assigned staff. If the training is not strictly

for the benefit of the weatherization program staff, local subgrantees must document how other programs will share the training costs.

b. Priority is to be given to direct training opportunities for staff, crews, and subcontractors.
c. Subgrantee staff salaries while attending training, providing training, traveling to and from training and participating in on-the-job training is an allowable expense if identified in the subgrantee budget as such. Equipment and materials related to training may also be purchased with these funds.
d. Contractor Retention Agreements: Before sending a contractor to training, subgrantees must have a signed Contractor's Training Commitment Agreement form on file for each requesting contractor. The contractor must commit to participation in the program for a period of 24 months. If the contractor fails to honor the retention agreement or if they are removed from participation for cause, the contractor must repay the training session fee costs of training to the WAP.
e. Meal Reimbursement from T&TA: Meal reimbursement must follow internal Subgrantee policies related to travel.
f. Training Cost Reimbursement Policy for Private Contractors: Private Contractors will only be reimbursed for training session fees, travel costs, meals, and lodging.

Local Subgrantee files must include all applicable expense documentation used to create a request for reimbursement.

9.4.3 Program Operations

Program operation costs are costs that can be clearly identifiable with a program. Program operation costs include material and labor costs associated with installing weatherization measures, making weatherization-related repairs, and other costs necessary to operate a weatherization program (often referred to as "program support").

Required: Estimated Regular Weatherization Service costs computed on the NEAT/MHEA audit and related work orders for each home receiving weatherization services must be within 15% of ACTUAL total service costs of each home receiving weatherization services paid with DOE funds.

Allowable program costs may include:

1. Materials allowed per program regulations, either purchased directly by the Subgrantee or charged by an approved subcontractor. (See Section 6.4)
2. Storage or warehousing of allowed weatherization materials.
3. Payment of staff involved in purchasing, inventory management, and distribution of allowed weatherization materials.
4. Payment involved in fabricating allowed materials.
5. Costs charged by a subcontractor.
6. Local subgrantee weatherization crew costs.

7. Direct supervision of program services and other direct program management/oversight responsibilities.
8. Intake and outreach staff labor.
9. Weatherization audit and inspection.
10. Transportation of materials, crews, tools, and equipment to and from the storage and weatherization sites (includes maintenance and insurance of vehicles).
11. Printing when associated with materials used in energy conservation education or outreach.
12. Office space and utilities as a percentage of the area used for direct applicant services.
13. Office space and utilities used by program support personnel in program support functions.
14. Telephone calls when documented as used for direct applicant services.
15. Copying when copied materials are given to an applicant.
16. Postage for material mailed to prospective or current applicants.
17. Equipment and tool purchase and maintenance—including computer and other electronic equipment and software used by weatherization program activities.
18. Payments permitted under the federal Workforce Investment Act (formerly JTPA) to supplement wages paid to training participants and public service employment workers under that program.
19. Securing building permits when necessary for the installation of weatherization measures.

9.4.3a Weatherization Materials

Materials Installed

The costs of the purchase and delivery of Regular Weatherization materials that will be or have been installed in eligible dwellings, including any delivery charges, itemized as follows:

- All DOE materials purchased by the Subgrantee and installed by its employees shall be itemized by type, unit price, units installed, total unit costs and total costs for each dwelling that receives service.
- All DOE materials installed by subcontractors of the Subgrantee shall be itemized by unit of work or by type and quantity, depending on the measures being performed, total unit costs and total costs for each dwelling that receives service.

Materials Specifically Not Allowed

a. Low-flow toilets are specifically not allowed using DOE funds.
b. Vinyl siding is not considered an air barrier and therefore it is specifically not allowed as an air infiltration measure using DOE funds.
c. Carbon monoxide/smoke detectors installed in a dwelling that has received a Walk-Away/Deferral status at the time of a dwelling walk-through inspection.
d. KHC will make the final determination on whether costs of other materials not specifically addressed in this manual are allowable.

There is an expectation that Subgrantees will use inventory on hand in a reasonable amount of time, therefore, limiting the amount of carryforward each year.

9.4.3b Weatherization Labor

Labor shall refer to the total of all documented labor costs associated with work on and at the job site. Excluded from Labor is down time due to weather, leave, and any other costs not attributable to actual work on a dwelling. These labor costs are considered Program Support.

Subgrantee labor costs for work performed shall be documented on all dwellings for each priority measure completed. Labor is the product of employee hours attributed to a specific unit including pre-evaluating, delivering materials, installing materials, inspecting, and travel time. Staff time must be reflected in time sheets, or equivalent, that identifies the job being charged.

Labor for private contractors shall be documented for each itemized unit of materials installed.

Note: Labor cost(s) related to repairing client property damage caused by subgrantee staff is a **non-allowable** labor cost(s) that cannot be charged to the Weatherization Assistance Program. Also refer to section 2.13 of this manual.

9.4.3c Program Support

Costs associated with the direct provision of Weatherization services (traced to a specific unit address), excluding administration, materials and labor, shall be allowed for the items listed below:

- Staff Wages: Wages for personnel such as weatherization program directors, field supervisors, evaluators, inspectors/energy auditors/quality control inspectors, intake staff, inventory control personnel and other similar positions with duties related to the direct provision of regular weatherization services. Fringe benefits such as FICA, retirement, health, life, unemployment insurance, and Workmen's Compensation for program support staff. Wages paid for duties in support of the program such as down time due to weather, leave, and any other costs not attributable to actual work on a dwelling are also considered program support
- Transportation: Any travel using privately owned vehicles for the purpose of pickup and delivery of materials, transporting of work crews to work sites, or for other service delivery activities.
- Storage: Rent, utilities, and insurance for storage facilities.
- Vehicle Costs: Gasoline, oil, filters, tires, batteries, plugs, belts, all repair parts and labor, insurance and license tags for vehicles used for weatherization service delivery activities.
- Purchase of Tools and Equipment.
- Maintenance of Equipment: Parts and labor related to repairing tools and equipment.
- Miscellaneous: Program support costs not covered by any other line item. Budgeting funds in this line item must have prior approval of KHC.
    - Utilities in the office space/facilities
    - Postage
    - Duplicating/copying

Note: Subgrantees should clearly outline in their policies and procedures how they are charging costs that appear in administrative and program support costs.

9.4.4 Health and Safety

REQUIRED: ESTIMATED Health and Safety costs computed on the NEAT/MHEA audit and related work orders for each home receiving weatherization services must be within 15% of ACTUAL total service costs of each home receiving weatherization services paid with DOE funds.

9.4.4a H&S Materials

The costs of the purchase and delivery of Health and Safety materials that will be or have been installed in eligible dwellings, including any delivery charges:

- All DOE materials purchased by the Subgrantee and installed by its employees shall be itemized by type, unit price, unit installed, total unit costs and total costs for each dwelling that receives service.
- All DOE materials installed by subcontractors of the Subgrantee shall be itemized by unit of work or by type and quantity, depending on the measures being performed, total unit costs and total costs for each dwelling that receives service.

9.4.4b H&S Labor

Health and Safety Labor shall refer to that portion of labor associated with providing Health and Safety Service associated to a particular unit.

Costs associated with the direct provision of Health and Safety measures at the dwelling site and shall include:

- Staff Wages: Wages paid to crew leader, energy systems technicians and crew laborers.
- Staff Fringes: Fringe benefits such as FICA, retirement, health/ life, and unemployment insurance, and Workmen's Compensation paid for staff budgeted in labor. May include any items purchased that are used on the job by crew workers but remain in their possession when terminating their employment.
- Private Contractors: Labor costs charged by private contractors for installation of health and safety measures.

9.4.5 Vehicles and Equipment

Equipment and Vehicle Purchases: KHC will approve and monitor all vehicle purchases by Subgrantees with DOE funds. Subgrantees must have a written Procurement Policy, which follows 2 CFR §200 requirements for procurement.

All purchases of equipment with values exceeding $5,000 require KHC written approval.

Requests for vehicles purchased with DOE funding require prior written DOE approval. In addition, the following requirements and conditions apply:

- Request vehicle from KHC through memo template found on the HCA Agency Partner Portal.
    - Secure quotes according to the Subgrantees written Procurement Policy.
    - Ensure that 2 CFR §200 is followed.
    - State in the memo reason for replacement and what will happen to the current vehicle(s).
    - Include with request the specifications sent for the quotes (or other procurement policy documentation).
- KHC will request permission from DOE and apply allocation formula of DOE and LIHEAP funds to the purchase.
    - DOE needs purchase request, identifying grantee/sub-grantee.
    - Describe where and how the vehicle will be used, specify full- or part-time use in WX.
    - Identify funding sources to be used for purchase.
    - Statement of replacement or ramp-up.
        - Address trade-in value.
        - Indicate DOE/WAP cost-sharing.
    - Follow subgrantee procurement and 2 CFR §200 (i.e. 3 quotes)
    - KHC will provide the breakdown on braiding of funding for DOE/LIHEAP.
    - Sub-grantee will pro-rate costs per funding source over a 3-month (or otherwise prescribed by KHC) to program support per funding stream and allocable percentage.
    - See WPN 24-6 for additional guidance.
- All vehicles obtained with weatherization contract funds will remain the property of KHC and shall be used exclusively for weatherization purposes. Personal use or use of vehicles for purposes other than weatherization program purposes is strictly prohibited. Vehicles may not be used for commuting purposes to and from an employee's home.
- Liability and comprehensive coverage, minimum of $1,000,000 must be maintained on all vehicles purchased with Weatherization funds.
- The Subgrantee must maintain a vehicle record (log) including, but not limited to the following: vehicle number (serial number), description, tag number, mileage, and purpose of use.
- All warranty requirements of the vehicle must be followed and after termination of warranty period, proper maintenance and care must be provided by the Subgrantee.
- Disposition: For guidance in disposing a vehicle, contact the HCA Agency Partner Portal.
- Title of Vehicle: The title of the vehicle will be registered in KHC's name only. All vehicles will be included in the KHC Inventory System. KHC will need the following to Tag the new vehicle:
    - Copy of Title
    - Purchase Order Number and Copy of Invoice
    - License Number
    - Vehicle Identification Number (VIN)

- Funds used to purchase vehicle
- Location (where vehicle will be used)
- Identity of Custodian

So that the vehicle may be included in the Inventory System, copies of the Certificates of Title and Registration are to be forwarded to: wxadmin@kyhousing.org.

Securing KHC's Interest in Motor Vehicles, Equipment, and Fixtures: Subgrantees are responsible for ensuring KHC's financial interest in motor vehicles, equipment, and fixtures with purchase values of $5,000 or more, purchased under KHC contracts.

9.4.6 Liability Insurance

Liability insurance refers to the general contractor, or other policies that provide protection in case of personal injury or property damage resulting from the weatherization services. It may be charged to the liability insurance activity. Pollution Insurance is also an allowable expenditure in the Liability Insurance activity.

Liability insurance does not include vehicle-related insurance, error and omissions, or worker's compensation. Those policies should be charged to other budget line items (i.e., vehicle-related is program support; errors and omissions is admin; and worker's compensation is program support.)

9.4.7 Financial Audits

DOE allows general financial audits for WAP, only, to be charged to the financial audit line item of the contract. Charge direct supervision of program services to these functions not to administration.

9.5 Leveraged Funds

1. When non-DOE funds (such as utility company funds) are combined with DOE funds on a weatherization project, DOE's share will be the minimum amount necessary to complete the weatherization work after funds from the other sources are used.
2. DOE funds for weatherization must not be used to supplant other funds or programs.
3. Any and all materials used on a weatherization Job or placed into Weatherization inventory that is not purchased by DOE or LIHEAP funds.
4. Assigning a value to the DSM or Donated materials should reflect current market value at the time of the installation.
5. Subgrantees shall document costs associated with providing weatherization services on an individual dwelling, report period and cumulative basis following the procedures in this section.
6. Subgrantees can use leveraged resources when determining whether certain measures to be installed in a dwelling unit are cost-effective and meet the program requirements that the SIR is at least as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.

This guidance is specifically designed to address the DOE investment in eligible dwelling units weatherized by the Program. All associated health and safety costs incurred on a dwelling unit are generally treated outside the SIR when determining cost-effectiveness. On the other hand, all energy-related repair costs associated with weatherizing the dwelling units are a part of the SIR when determining cost-effectiveness.

When performing the energy audit on an eligible dwelling unit, the total costs associated with the installation of eligible measures can be discounted by the amount of non-Federal resources leveraged for that particular measure in determining the SIR. The types of non-Federal resources that could be used would include, but are not limited to: landlord contributions, utility funds, donations from private sources, and/or state resources that supplement other similar funds. It is KHC's intent to allow subgrantees some flexibility in calculating the SIR for a specific measure when other funds can be used to offset some of the costs, thereby reducing the federal investment and raising the SIR to 1.0 or greater on the remaining investment.

The cost-effectiveness of the WAP will still be calculated on the total DOE/LIHEAP investments used to weatherize the property. It is not KHC's intent to create projects that are not cost effective in design and installation. KHC expects that all subgrantees will use this SIR calculation allowance only when the cost effectiveness for the entire investment in the property can still be substantiated. Further, it is not KHC's intent to "leapfrog" measures that are already cost-effective in order to accommodate a measure that is included in the package of measures as a result of utilizing the provisions of this guidance. 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.

Note: For the purpose of meeting the SIR requirement by using other resources to reduce the investment in a material or measure, no federal resources or funds may be used to offset the total installation cost. This includes State designated funds which are actually federal-based funds such as LIHEAP, CDBG, etc., may not be used for this purpose. No exceptions will be granted to this provision.

Subgrantees utilizing this guidance will need to conduct an initial energy audit of the building to determine the cost-effectiveness of the federal investment, including measures that are not cost-effective without leveraged resources. Those subgrantees that have non-Federal resources for use in the building will need to run the energy audit a second time with the necessary resources for any specified measure(s) to ensure the total package of measures remain at least with an SIR of as approved in the LIHEAP state plan and 1.0 or higher for DOE funds.

Subgrantees will also be required to complete a summary of all costs associated with the weatherization of the building, including any or all non-Federal resources to be

used. This summary will become part of the building's customer file along with the inputs and results of both energy audits.

9.6 Average Costs

DOE-Specific Limits
When weatherization services are provided with DOE funding, the cost per weatherized dwelling unit may not exceed an average limit established by DOE. DOE adjusts that average limit annually. Those adjustments appear in KHC's annual DOE state plan. Additionally, KHC establishes a maximum average cost for abating health and safety hazards. Those limits also appear in KHC's annual DOE state plan.

Each Subgrantee shall maintain and monitor its costs on an average basis for Health and Safety, and Regular Weatherization per Completed Dwelling, to identify total average costs. **Completed Dwellings shall refer to those dwellings that have received regular weatherization and health and safety services and have been inspected by a certified Dwelling Needs Evaluator (DNE) /QCI and reported as completed in compliance with the WXPM by the DNE/QCI and Subgrantee.**

Average costs shall be calculated based on the procedures in this Section.

Average Regular Weatherization Costs
Average Regular Weatherization Costs equal all Regular Weatherization Materials, plus Regular Weatherization Labor, plus all Program Support, plus all Vehicle and Equipment line costs, divided by completed and re-weatherized units.

Maximum Service Cost on a Single Dwelling

Maximum costs for Health and Safety and Regular Weatherization on any single dwelling shall not exceed set maximum allowable average costs, unless the Subgrantee has requested and received prior written approval utilizing the WX-910 Request to Exceed/Fuel Change form.

These requests will be submitted to the subgrantee's designated monitor/trainer. The narrative must address the subgrantee's current average cost per dwelling and demonstrate why the amount requested is justified over the average level of service other clients receive in their service area. Along with the request the subgrantee will export a complete NEAT/MHEA audit and work write up to the monitor/trainer.

Keep in mind that approvals to exceed maximum service costs on a single dwelling will ultimately affect subgrantee's year end averages. Subgrantees are reminded to maintain projected goals and average costs by year end, regardless of exceed approvals from KHC staff. All clients should receive the same level of (NEAT/MHEA audit allowed) services, regardless of when they were assisted in the contract year

9.7 Federal Rules for Use of Recycled Insulation Materials

1. KHC and local subgrantees must comply with Environmental Protection Subgrantee (EPA) regulations regarding the use of recycled materials (40 CFR 247.12, Comprehensive Procurement Guideline for Products Containing Recovered Materials (www.epa.gov/).

a. Local subgrantees are required to make good faith efforts to procure insulation products that contain recycled materials.
b. Exceptions to this policy may be made only if the following conditions can be documented:
    - Inability of the product to perform its intended purpose.
    - Unavailability of the product at a reasonable price.
    - Inability to obtain the product within a reasonable period of time.
    - Inadequate number of vendors for obtaining and verifying estimates of recovered materials content to insure a satisfactory level of competition at the time of procurement.

2. In addition to meeting procurement specifications, local subgrantees must establish an affirmative procurement program consisting of four items.
    a. Preference program for purchasing designated items.
        - EPA regulations provide three general approaches:
            - Minimum content standards that identify the minimum content of recovered materials that an insulation product must contain.
            - Case-by-case procurement, allowing competition between insulation products made of new materials and those with recovered materials.
            - An alternative approach that accomplishes the same objectives as a) and b).
        - EPA regulations recommend that the procuring subgrantee use minimum content amount for commercially available insulation products that may contain recovered materials. These include:
            - Cellulose, loose fill, and spray-on (75 percent post-consumer recovered paper by weight).
            - Perlite composite board (23 percent post-consumer recovered paper by weight).
            - Rock wool (50 percent recovered materials).
    b. Promotion program.
    c. Procedures for obtaining estimates and certifications of recovered materials content and for verifying the estimates and certifications.
    d. Annual review and monitoring of the effectiveness of the program.

Chapter 10: Deferrals and Weatherization Ready

10.1 Description

Kentucky Housing Corporation administers a Weatherization Ready program to reduce the number of deferred homes that require services outside the scope of weatherization before weatherization services can commence. Repairs and/or issues addressed will be completed to protect installed weatherization measures and allow weatherization services to proceed. Weatherization Ready jobs should result in weatherization job completion, except for natural disasters and homeowner/renter issues that deem it necessary to “walkaway” from a job. KHC and all subgrantees will follow WPN 23-4.

Prioritization for Weatherization Ready funds will be households that reach the top of the waiting list due to priority points but are deferred due to needed repairs. Subgrantee will then review project to determine if project would be eligible for Weatherization Ready funds.

10.2 Deferrals

Homes that structurally cannot protect installed weatherization measures are deemed deferrals. DNEs/EAs will conduct a walk through on each potential home to determine if the structure can protect all weatherization measures installed in it. Examples of deferral reasons are as follows:

- Asbestos present
- Live knob & tube wiring
- Mold & moisture issues
- Unsafe structure (rotten floor joists, rotten floors, etc.)
- Pest infestation
- Leaky roofs
- Evidence of fire
- Hoarding (See Appendix E for clutter rating scales and examples)
- Other (this is not an all-inclusive list)

All deferrals must be entered into Hancock as a deferral with a reason.

Weatherization directors and EAs/DNEs can refer deferrals for weatherization ready. In cases where weatherization ready is not possible, the following process must be followed.

1. The client shall be informed in writing as to why the dwelling cannot be weatherized. If there are conditions that the client must correct before service can be provided, those conditions must also be stated in writing.
2. The Subgrantee is required to refer the client to any alternate program such as home rehab if one is available in the area.
3. The Subgrantee shall clearly indicate in the client file why the dwelling was given deferral status.
4. The Subgrantee must document all referrals to other programs or services in the client file.
5. The client must receive any information prescribed in the Health and Safety section of the WXPM that is appropriate.

10.3 Average Cost Per Unit (ACPU)

The Weatherization Ready program will implement a cap of $10,000 (ACPU) as a cap for the weatherization ready job.

10.4 Weatherization Ready Repairs

- Asbestos Remediation
- Bulk Moisture Control
- Ceiling Repair
- Electrical Upgrade or Repair
- Exterior Drainage Repair (e.g., landscaping or gutters)
- Floor Repair
- Hoarding- Levels 6 or 7 (See Appendix E for clutter rating scales and examples)

- Infiltration Reduction
- Insulation Preparation
- Leak Repair
- Mold Remediation
- Pest Infestation
- Plumbing Repair (including sewer/septic repair)
- Roof Repair/Replacement
- Structure Repair
- Wall Repair (interior and exterior)
- Other (as needed to correct deferrals – must be approved by KHC)

10.5 Process

1. Subgrantee conducts home evaluation and determines that the house is not ready for weatherization install.
2. Subgrantee estimates the repair costs and determines if repairs and costs fall within the guidelines of the repair program.
3. Subgrantee prepares Weatherization Ready Repair Program Request along with supporting documentation: (i.e. audit, scope of work, estimate, photos) and sends via email to wxadmin@kyhousing.org.
4. KHC reviews requests and determines if additional documentation is needed, then approves/denies requests.
   - Revisions can be submitted to KHC when scope of work has changed or exceeded original quote by more than 10%. KHC will approve or deny revision requests.
5. Subgrantee ensure work is completed prior to weatherization. Completed weatherization ready work will be defined as repairs completed and is primer/paint ready.
   - Project must be completed within a reasonable timeframe of 120 days from Weatherization Ready completion billing to regular weatherization completion.
   - If unable to complete project within allotted timeframe, request waiver from KHC.
6. Subgrantees will create an invoice for Weatherization Ready project measure(s) in Hancock and draw down funds from the Program Funding Draw Management system for the Weatherization Ready activity.
7. KHC will track Weatherization Ready funding allocation and expenditure rates.

   DOE Weatherization Ready projects **must** have one measure in the regular weatherization job funded by DOE Formula or DOE BIL.

10.6 Reporting

KHC currently uses Hancock for data tracking. All Weatherization Ready jobs will be kept in deferral status with weatherization ready measures tracked separately from regular weatherization measures. All jobs that go from weatherization ready to weatherization job completion with readiness funding will be tracked. DOE reporting requirements include:

- Year Built

- Housing Type
- Nature of repairs
- Expenditure per unit
- Any Leveraged funds

10.7 Braiding

- DOE Weatherization Ready funds can be braided with LIHEAP Weatherization Ready and AHTF Home Repair.
- Funds are allowed to be utilized with DOE Formula and DOE BIL projects.

10.8 Monitoring

Ten percent of Weatherization Ready projects will be subject to technical monitoring.

Weatherization ready work does not have to be inspected. EAs/DNEs are only evaluating if the home is ready for weatherization. However, KHC reserves the right to use its building inspectors to evaluate work.

Chapter 11: Dwelling Work Procedures

11.1 General Requirements

A dwelling cannot receive further weatherization services until all inoperable furnaces have been made operable, all safety tests performed, all health and safety repairs performed, and all repairs have passed a post inspection/quality control inspection per program protocols. Subgrantees found to have not followed this requirement will be out of compliance with program requirements.

1. Site Eligibility Requirement:
   DNE/EAs and crew leaders will need to evaluate the home to ensure it is free of obstructions/debris in all affected work areas prior to the energy audit and weatherization measure installation.
   If the work crew/contractor encounters obstructions/debris in any interior/exterior part of the home that would impede the process of installing prescribed program work measures, the client must be notified and requested to have said obstructions/debris removed from the affected area(s) before commencing with the prescribed program work measures.

2. Weatherization Work Requirements:

11.1.1 DNE/EAs

The evaluator/energy auditor shall not complete an evaluation where it is determined that conditions at the site pose an immediate health and safety threat to work crews or evaluator/energy auditor as outlined in Chapters 6 and 12. However, at a minimum the evaluator/energy auditor must perform an interior and exterior walk-through inspection of the client's home. It is the energy auditor's/evaluator's responsibility to decide, based on Section 6.16, if unfavorable site conditions exist to such a degree that weatherizing a dwelling is not feasible due to financial limitations, health and safety reasons or technical reasons, and supply photos for client file. Dwellings that fall into this category are generally known as deferrals. NOTE: Installation of smoke and carbon monoxide detectors is prohibited if the home receives deferral status. Service providers shall refer such households to any other source of aid that might be available and make every effort to combine resources to correct site conditions so that the dwelling can be weatherized. Referrals shall be documented in the client files.

In addition, the agencies must provide written documentation with signatures that provide proof the client has been educated and fully informed about any Health and Safety issues discovered in their home by the Dwelling Needs Evaluator/Energy Auditor.

Also refer to**: *DNE Step-By-Step Checklist***, which is in the back of this manual.

11.1.2 Crew Requirements

The following are general requirements for crew leaders of crew-based subgrantees and as indicated for each crew worker:

- Perform all applicable blower door tests and other tests as required, including worst case scenario, CAZ testing when required.
- Document the amount, type and cost of materials installed on each dwelling daily.
- Document the daily direct labor hours per category on the Crew Hours Documentation section of the Work Order.
- When required, utilize Lead Safe Work Practices per 40 CFR 745.
- Follow all applicable OSHA requirements.

11.1.3 Contractor Requirements

The following are general requirements for private contractors performing regular weatherization measures:

- Perform all appropriate blower door tests and other tests as required, including worst case scenario, CAZ testing when required.
- Initiate requests for Change Orders when measures are needed that were not identified on the Work Order or Bid Specifications.
- Complete all required information on applicable weatherization forms.
- When required, utilize Lead Safe Work Practices per 40 CFR 745.
- Follow all applicable OSHA requirements.

11.1.4 Quality Control Inspector Requirements

Signing off on the post inspection/quality control inspection is the most important task an evaluator performs. The post inspection (final) must include an assessment of the energy audit that confirms the accuracy of the filed site data collection, energy audit software inputs, and that measures called for on the work were appropriate and in accordance with KHC's audit procedures and the protocols approved by DOE (WPN 22-4). QCIs must also ensure that the measure costs do not exceed the estimated costs so that the measure is no longer cost effective.

Digital and infrared pictures must be taken of all areas of the home, from both exterior and interior locations, where weatherization work was performed, all diagnostic tests. These pictures must be printed out and retained in the client job file or stored electronically in a secure and readily accessible location.

Certificates of Insulation for each job where insulation was installed in any part of the home must be completed per the requirements of Standard Work Specifications. One completed copy must be given to the client with proof of delivery to the client and one copy must be retained in the client file.

By affixing their signature to the KY WAP QCI Final Inspection Checklist and Completed Dwelling Report, (WX 710), the Evaluator/Quality Control Inspector is putting his/her professional reputation and certification on the line. He/she is attesting to the quality and completeness of the work that was done, and in doing so is stating that he/she has personally inspected all work, performed all test-out procedures, and is guaranteeing the finished project meets all standards.

There are ramifications beyond the repairs and measures that include the safety of the family that has been served.

Post Inspection/Quality Control Inspection Elements

- Is completed and accurate NEAT/MHEA audit or other WX sanctioned audit software reports in the client file?
    - Do the work measures performed on the home agree with the recommended measures of the audit?
- Were mold protocols properly addressed and followed if applicable?
    - Verify that the client has received the mold pamphlet and signed the mold signature form.
    - Visually confirm that mold is not present above the accepted WX threshold.
- Were Section 106/ State Historic Preservation Offices, (SHPO's) protocols properly addressed?
    - Verify the Section 106 form was properly filled out and signed.
- Were lead-based paint protocols properly addressed?
    - Verify that EPA's lead pamphlet "Renovate Right" has been given to the client and that the signature page verifying client's receipt of the pamphlet has been signed and is in the file.
    - Verify that documentation exists to prove that the age of the home was determined AND, if it was built before 1978, verify that DOE and EPA regulations/protocols, (LSW and RRP respectively) were followed. Verify that appropriate documentation is in the file. If applicable, include test kits used with required documentation, pictures, forms, etc.
- Site conditions in general:
    - Any site conditions that would have prevented WX work should have been identified during the pre-inspection. If any conditions were missed, they should be recognized and reported to the client and other appropriate parties via written documentation in the post inspection/quality control inspection. See Sec. 5.11.
- Energy Systems:
    - All heating units are retested as part of the post inspection/quality control inspection. This step ensures there have been no adverse effects on appliances as a result of weatherization.
    - Dwelling Needs Evaluators/Energy Auditors are required to post inspect/quality control inspect and test all units that have had work performed on them before any other WX work is performed.
    - Were worst case scenario/back drafting tests performed?
        - This test uses the home's air handler, exhaust fans, and chimneys/vents to create worst-case depressurization in the combustion appliance zone, (CAZ). This test is required at the time of the post inspection/quality control inspection on all homes that have combustion appliances.
    - When performing a heat system inspection on any system with ducted airflow, a duct blaster must be used. Initial and final leakage measurements must be in audit and with photos.

General: Were any allowable work measures needed on the home that should be evaluated for WX that were not evaluated or not included in the work write up/NEAT MHEA audit?

11.2 General Requirements for post-inspection/ QCI procedures

Safety Standards

Crew Leader - The Crew Leader shall be responsible for assuring that all tools and equipment, including vehicles, are in a safe operating condition and that they are safely used on the job site.

Vehicles - The vehicles should be periodically checked for general operating condition and receive regular service and maintenance. Appropriate boxes and racks should be installed to secure all tools and equipment. If vehicle is unsafe, repairs must be made, or subgrantee must work with the KHC team to dispose of the vehicle if it is deemed unsafe. It is prohibited for employees to drive weatherization vehicles for personal use, including to and from work.

Tools and Equipment - The correct tools and equipment should be used for the measures and materials being installed. All tools and equipment should be periodically checked and maintained to ensure a safe operating condition. Equipment should be operable and up-to-date with industry standards. If equipment replacement is needed, subgrantees should contact the KHC Admin team for disposal guidance. Protective clothing and personal protective equipment (i.e. dual cartridge respirator, goggles, coveralls, and safety ropes) should be worn at all appropriate times.

The Subgrantee shall make available to and require the use of Personal Protective Equipment (PPE) such as, but not limited to the following: hard hats, steel toed boots, eye protection, respirators and dust masks, ground fault interceptors for power tools, and so forth. Also, each crew must be equipped with a standard worksite First Aid Kit. This equipment is considered a Fringe Benefit, but the subgrantee must have a policy built around the inclusion of this.

The Subgrantee shall maintain and display in a common area for review **Material Safety Data Sheets (MSDS**) per OSHA for all materials being installed on job sites. The Subgrantee shall inform its workers as to any dangers associated with the handling, storage, and installation, of these materials.

Energy Systems - Prior to any regular weatherization measures being performed, the crew leader shall confirm, by verifying Work Order documentation or by performing actual tests that no combustible fuel line leaks exist and that 0 parts per million carbon monoxide is present in the ambient air.

Site Conditions - No weatherization measures shall be performed on any dwelling where the Crew Leader, subcontractor, or energy systems technician has identified and determined that conditions at the site pose an immediate health or safety threat to him/her, work crews, or residents. See Sec. 5.11 and Chapter 12.

11.3 Required Tools and Equipment

All weatherization crew and contractors, including DNEs, EAs, and QCIs must be equipped with the following tools and equipment to properly perform energy systems measures and diagnostics:

- Energy systems diagnostic devices, i.e., gas leak detector, combustion efficiency analyzer, draft gauge, volt/ohm meter, personal CO monitor etc.
- Blower door system

- Infrared Camera
- Pressure Pan
- Safety equipment: first aid kit, fire extinguisher, goggles, gloves, etc.
- Hand tools
- Power tools: cordless drill, skill saw, assortment of bits, etc.
- Heavy duty extension cord with surge protector.
- Access to a PC
- Step- and extension ladders capable of allowing access to roofs and attic areas.
- Basic materials needed to perform tests: tape, 6 mil plastic, blocking material.
- Watt Meter
- HEPA Vacuum
- Digital Camera with computer interface/download capabilities
- Flow Hood
- Smoke Generator
- Digital Manometer
- Duct tester
- Thermometer
- Chimney Sweep Brushes
- Flashlight
- Shovel
- All other necessary tools needed to perform work

11.4 Work Orders

All work orders should be generated from the NEAT/MHEA audit software and retained in the file. All work orders should include detailed performance and installation requirements/objectives to be included in crew/contractor work orders from the completed energy audit, including R-values, U-values, installed equipment efficiencies, infiltration and duct sealing targets, Grantee's DOE approved Field Guides and/or SWS, etc.

11.5 Measure Skipping

"Measure skipping" is defined as follows: Not installing, in order of decreasing Savings to Investment Ratio (SIR), the cost-justified Energy Conservation Measures (ECMs) and related Incidental Repairs Measures (IRM) included in the work scope produced by the Department of Energy (DOE) approved energy audit tool or priority list. This could also be the result of failure to evaluate all applicable energy saving measures for the dwelling. Note: Measure dropping is only allowable when necessitated by funding limitations.

Process for Measure Dropping

1. Organize measures in Energy Audit by high to low SIRs.
2. Drop from the bottom up so that the lowest SIR is dropped out of the job.

3. No measures can be skipped over. For example, the second to lowest measure cannot be dropped from the audit unless the lowest measure is dropped from the audit.
4. Major measures with a SIR of 1.0 or greater cannot be dropped. (Major measures include air sealing, duct sealing, attic insulation, wall insulation and floor insulation. Air sealing is the only major measure that can be performed with a SIR below a 1.0.)
5. In addition to major measures, no necessary health and safety measures may be removed from the work order.
~~4.~~6. Air sealing may not be dropped even with a SIR below 1.0.

Energy Saving Measure Economics

#	Recommended Measure	Components	Measure Savings ($/yr)	Measure Cost ($)	Measure SIR	Cost ($)	Cumulative Savings ($/yr)	SIR
1	Seal Ducts		937	535	15.2	535	937	15.2
2	General Air Sealing		199	395	4.4	930	1136	10.6
3	Lighting [Living][2]	Living room	18	19	5.8	949	1153	10.5
4	Lighting [Bathroo][4]	master bathrm	18	38	5.3	987	1171	10.3
5	Lighting [Kitchen][4]	Kitchen ceiling	23	34	4.2	1021	1194	10.1
6	Lighting [Kitchen][3]	Kitchen table light	24	29	3.6	1050	1219	9.9
7	DWH Pipe Insulation		18	98	1.9	1148	1236	9.2
8	Replace Heating [Electric]		428	6027	1.0	7175	1664	2.3
9	CO Monitor is Needed		0	135	0.0	7310	1664	0.0
10	Fix Improper Venting (Clothes Dryer)		0	195	0.0	7504	1664	0.0
11	Install Bathroom Exhaust Fan (master)		0	1061	0.0	8565	1664	0.0
12	Smoke Detector is Needed X 4		0	255	0.0	8820	1664	0.0
13	Vapor Barrier Needed (Basement/Crawlspace)		0	2480	0.0	11300	1664	0.0
14	Water Heater Discharge tube		0	115	0.0	11415	1664	0.0

This is an example of how you would order measures with SIRs in order to calculate which measures are eligible to drop. Contact your technical monitor if you have questions.

Health and Safety measures may not be removed from the audit.

11.6 On-Site Work Process for all DNE/EAs, Crew Leaders, and QCIs

Step 1: Client Relations/Education

1. **Advance Notification**
   - Arrange work schedule so that the client or other adult family member will be home at all times.
   - Make an appointment for an arrival date and time.

2. **Initial Contact**
   Introduce yourself and all crew members.
   - Show subgrantee identification, if available.
   - Establish a good working relationship.

- Do a pre-work walk thru with the client.
- Describe normal routine.
- Estimate number of days for the job.
- Ask client to clear work area of obstructions or inappropriate conditions.
- Ask client to keep children or pets away from work area.

3. **Daily Contact**
    - Advise client of any measures that cannot be installed until obstructions or inappropriate conditions are removed.
    - Explain how materials will be installed.
    - Tell the client what to expect.
        - Crew will be using the blower door.
        - Where work will take place.
        - What kind of tools will be used?
        - What kind of noise will be heard?
        - What kind of odors, if any, will be noticed?
        - Describe condition of work area at end of day.
        - Hazards to be careful of or avoid.
        - Advise client of any work changes or any problems encountered during the job.
        - Inform the client when leaving the work site for lunch and at the end of each day.

For EAs/DNES Only:

Each DNE/Energy Auditor (EA) will develop their own workflow for client education. Some DNE/EAs do the client education at the beginning of the job, and some will do this at the end. (Client pre-inspection interviews should be conducted before weatherization services begins. DNE/EAs can do this as part of client education if needed.) Timing of client education is not as important is ensuring that it is completed. Client education should include the following:

- Explanation of weatherization procedures;
- Encourage clients to ask questions if they have them throughout the process;
- Discuss measures to be performed and timeline;
- Explain the process of quality control inspections;
- Advise client to retain 12-months of utility bills once the work is completed to calculate the energy savings;
- Receive and sign education and disclosure documents pertaining to health and safety issues/problems discovered by the Dwelling Needs Evaluator/Energy Auditor;
- Obtain client's signature on the client agreement;

i. Advise client that work cannot be performed until he or she signs the checklist.
ii. Advise client that once work is started, all work must be completed.
iii. Advise client that if he or she cancels any work, the client shall be liable for material and labor costs incurred on all work completed up to that point.

If client refuses a measure, re-explain the measure and the need. Encourage the client to accept the measure. However, if the client still refuses the measure, the DNE/EA will need to rank the measures in SIR order from highest SIR to lowest SIR. No major measures can be refused and would result in a deferral. Measures can be dropped from the bottom to the top in rank order. For example, if a heat pump is at the bottom of the list and no major measures are below it, it could be dropped if the client does not want the measure. There are three (3) criteria by which a cost-justified measure may be removed:

(1) if a client refuses a non-major measure prior to work beginning, the auditor must deem whether the refusal is justified or not. If deemed to be justified, the measure may be skipped but "the auditor must include in the client file a comprehensive justification, including background/source documents that support the decision to skip a specific measure." All other measures may be installed, as planned.

(2) If the refusal occurs after a job has begun and the declined measure has a higher priority than any other measure already installed, then work must stop and the job is closed out.

(3) Measures can also be dropped from the bottom to the top in rank order due to funding limitations, so long as no major measures and no HSMs are removed.

Major Measures include the following:

- Air sealing
- Duct sealing
- Wall insulation
- Floor insulation
- Attic insulation

Client Education Packet

- A Brief Guide to Mold, Moisture and Your Home
- Lead Safe Certified Guide to Renovate Right
- EPA HTML Publication: Asbestos in Your Home Protect Your Family from Exposures to Asbestos | US EPA
- EPA Publication: A Citizens Guide to Radon (A Citizens Guide to Radon)
- CPSC Guide to Home Wiring Hazards (Publication # 518)
- DOE/EERE: Guide to Home Ventilation
- CPSC Guide: What You Should Know About Space Heaters
- Combustion Equipment Safety and Hazards
- How to Maintain a Clean Home and Correct Unsanitary Conditions (Subgrantee may create an in-house document)
- EPA Indoor Air Pollutants and Sources
- Obtain a signed disclaimer if unvented space heaters are being used and removal is not allowed.
- Obtain a signed disclaimer if portable/stand-alone electric space heaters are used and removal is not allowed.

QCIs

1. **Blower Door Test Interpretation**

- After completing the blower door test, explain results to client.

2. **Exit Interview**
   - Ask the client about the performance of installed measures.
   - Ask about any problems experienced with the crew or private contractor regarding attitudes or behavior.
     - If problems are identified, take corrective actions as necessary in accordance with the Subgrantee personnel policies.
   - Share any additional information concerning measures performed and obtain the required signatures on the post-inspection/quality control inspection form.

Step 2: Energy Systems

EAs/DNEs

1. **Unvented Space Heaters**

   Primary source of heat
   - Do not weatherize dwelling until after a vented primary heating system has been repaired or installed in accordance with local codes, NFPA guidelines, and has passed a post inspection/quality control inspection per program protocols.

   Secondary source of heat
   - Advise client of potential hazards and suggest ways to safely operate.
   - In the case of low volume dwellings, inform client of possible moisture problems.
   - Obtain a signed disclaimer from the client that clearly explains the health and safety hazards of continued use of unvented space heaters and retain copy in client file. Unvented space heaters CANNOT be left in a manufactured home.

2. **Safety Inspection**

   All dwellings
   - Safety inspections shall be performed on all heating systems.
   - Safety inspections shall be performed on all combustible gas water heaters and cook stoves.
   - Safety inspections shall be performed in accordance with the following procedures and per specifications contained in the Energy Systems Policies Chapter of this manual (Chapter 14).
   - All unsafe conditions identified during safety inspections shall be corrected and post inspected per program protocols prior to any further work being performed on the dwelling.

3. **Inoperable Furnace**

   Check electrical connections.
   - Use a volt/ohm meter to verify if wired to active power source and grounded.
   - If not wired to live circuit or if wiring is defective, repair before continuing with safety tests.

   Check fuel source.

- If no fuel is available to operate furnace: advise client that dwelling evaluation cannot continue until sufficient fuel is purchased or utility reconnected so that the furnace can be tested.

A dwelling cannot receive further Weatherization services until all inoperable furnaces have been made operable, all safety tests performed, all health and safety repairs performed, and all repairs have passed a post inspection/quality control inspection per program protocols.

4. **Fuel Leaks**

   Natural gas and LP appliances
   - Sweep all lines and fittings with combustible gas detector.
   - Confirm any leakage sites with bubble solution.
   - All leakage must be corrected immediately.
   - If leakage is severe:
     - Evacuate dwelling
     - Have fuel turned off prior to starting repairs.
   - Replace defective fuel lines and other leaking components in accordance with
     - NFPA 54 for natural gas, or
     - NFPA 58 for LP.
   - Minor leaks can sometimes be repaired by tightening loose fittings.
   - Sweep lines again to verify that repairs have corrected the problem.

   Fuel oil appliances
   - Visually identify leakage sites.
   - Replace any defective fuel line components in accordance to NFPA 31.
   - Some minor leaks can be repaired by tightening loose fittings.

5. **Electrical Inspection/Repair**

   All electrical connections
   - Look for frayed or disconnected wires, scorch marks, blown fuses, etc.
   - Verify the presence of electricity using a volt/ohm meter.
   - Do not attempt to operate any appliance that appears to have electrical problems.
   - All electrical work must be performed in accordance to the National Electrical Code (NEC).

6. **Carbon Monoxide Testing of the Ambient Air**

   Using a CO detector, sweep for the presence of CO in the indoor air, at a duct register and near the heating unit itself.
   - If more than 0 but less than 70 ppm of CO is detected:
     - Proceed with inspection to determine the problem.
     - Eliminate CO in the living area as quickly as possible.

7. **Carbon Monoxide Testing for Cracked Heat Exchanger**
   - Insert CO detector probe into warm air plenum.
   - Activate unit.

- More than 0 ppm of CO indicates,
    - Defect in the heat exchanger, or
    - Possible leakage in the return air duct causing combustion appliance to spill.
- Visually inspect the heat exchanger for cracks, if possible.
    - Observe burner flame pattern for distortion when air handler is engaged.
    - Observe O2 reading on combustion analyzer for change when blower activates (variance of more than 1% indicates a possible crack in the heat exchanger)
- If unit is found to be defective,
    - Replace heat exchanger, if practical, or
    - Replace the entire heating unit in accordance with the appropriate codes.

8. Draft Test for Natural Gas, LP, and Oil

- Activate unit.
- After steady state is achieved (3-5 min.)
    - Insert draft gauge to verify a negative pressure of -2.25 Pa to -.75 Pa based on outdoor temperature
        1. To convert pascals to inches water column, 1 pascal equals .004 inches water column
    - Make note of the reading and continue the inspection.

Note: Weather conditions may affect draft. It may be difficult to obtain draft on hot humid day.

Minimum Draft Requirements:

Outside Air Temp	Minimum Draft Pressure
At 80 degrees	.75 pascals
At 70 degrees	-1 pascals
At 60 degrees	-1.25 Pascals
At 50 degrees	-1.5 Pascals
At 40 degrees	-1.75 Pascals
At 30 degrees	-2 Pascals

Important: All vent pressure measurements are taken with reference to the Combustion Appliance Zone.

If draft is too low, the possible causes are:

- Inadequate fuel pressure,
- Unit under firing,

- Debris or other obstructions in heat exchanger or vent pipe,
- Oversized fluepipe or,
- Improper termination of vent pipe
- Outside condition such as wind that might inhibit draft.

If draft is too high, the possible causes are:

- Fuel pressure set too high,
- Unit over-firing,
- Improper vent pipe termination height.

Determine source of problem and correct before Weatherization can be performed.

9. Dropout Safety Valve Test, Natural Gas, and LP

Confirm that all gas valves are equipped with a dropout safety valve if applicable.

Required Procedure:

- Set the gas control valve to the pilot setting. Extinguish the pilot flame by blowing it out and listen for the dropout safety valve to activate. **Do not turn gas valve to off position**.
- If dropout safety valve does not activate within 2.5 minutes, or within manufacturer specifications, the valve is faulty and should be replaced.
- Test with gas leak detector to verify valve has stopped gas from flowing thru valve.

10. Clocking the Meter, Natural Gas Only

All other appliances (water heater, cook stove, etc.) must be:

- Turned off.
- Activate unit being tested.
- After steady state is achieved, count the seconds it takes for 1 revolution of the smallest dial of the gas meter.
  - Using a BTU conversion card, find the seconds for 1 revolution of the smallest dial.
  - Add three zeroes to this number to identify the actual BTU input of the unit.
- Compare this reading with the BTU input listed on the data plate.
- If actual input is greater than listed input, unit is over-firing and service to repair problem is required. Consult manufacturer specs for percentage of over or under firing which requires service. Typically, 10 percent on 70-80 percent efficient units and 3-5 percent on 90 plus units
- If actual input is less than listed input, unit is under-firing and service to repair problem is required.

11. Analyzing the Flue Gases, All Fuels

Activate unit.

After steady state is achieved (3-5 min.)

- Sample the flue gases with a combustion analyzer.
- If CO level above 400 ppm air-free in the furnace or 200 ppm air-free in the water heater is found, the unit has incomplete combustion.
- Indicate the condition on a Work Order, and then perform a clean and tune and all required repairs.

- Oxygen (O2) Range should be between 6 and 9 percent
- Net Stack should be between 300 and 550 degrees
- Draft should be -.02 to- .04 water column inches (w.c.)
- Gas Pressure should be 3.5" i.w.c. (nat.) 11" i.w.c. (LP) or PMI

- Check the temperature of the flue gas and compare to table.
- If temperature is above the accepted range, unit is over firing.
- If temperature is below the accepted range, unit is under firing.

12. Smoke Test, Oil Only

Activate unit.

Use a smoke tester fitted with a sampling sheet; sample the gases by drawing the pump 10 times only.

- Remove sampling sheet and compare to an approved smoke scale.
- If unit is under-firing or over-firing, unit should be serviced.

13. Venting for Natural Gas, LP, and Oil

Perform a visual inspection of the entire venting system of all combustible appliances.

Venting shall be in accordance to:

- NFPA 54, 58 for natural gas and LP
- NFPA 211, for solid fuel
- NFPA 31, for oil.

Determine if the vent components meet basic clearances.

- If venting does not meet NFPA guidelines or basic clearances,
- Perform repairs as necessary.

14. Confined Spaces

All combustible appliances:

Determine if combustible appliance is in a confined or unconfined space. Refer to NFPA 54.

If unit is in a confined space:

- Correct the situation by adding ventilation according to NFPA codes or,
- Relocate the appliance, if practical.

15. Check and Tune (aka Clean and Tune) (Natural Gas, LP, Oil)

Reference Kentucky Weatherization Field Guide and Standard Work Specifications

If preceding tests require corrective measures:

- Perform a check and tune.
- To correct under-firing or over-firing of an appliance, adjust fuel pressure using a tube manometer.
- To verify that the thermocouple is properly functioning, perform a millivolt test of the circuit.
- If a reading of 12 millivolts cannot be reached after adjustment, replace the thermocouple.

- Using a milliamp tester, adjust the heat anticipator to match the amp draw of the gas valve.

16. Air Distribution System, Forced Air Furnaces Using Natural Gas, LP, Oil

- Test the high limit control, belt driven or direct drive.
- If limit controls fail to shut down the unit at the proper temperature setting,
    - ○ Replace defective limits.
- Check temperature rise from cold-air return to warm air plenum.
    - ○ Adjust blower motor to establish a rise of 40 to 70 degrees.

17. Checking Amperage of Blower Motor

Using an amp probe, verify amperage rating of the blower motor, check for obstruction within the blower housing or return air plenum. Replace the blower motor if the amperage cannot be improved.

18. Solid Fuel Inspection

- Visually inspect the entire appliance as detailed in the Energy Systems Technical Reference chapter.
- Visually inspect the quality of fuel being used.
- If the dwelling is below .35 ACH
    - ○ Install a fresh air vent for each appliance.
- If corrective measures are necessary,
    - ○ All materials installed must be in accordance with NFPA 211.

19. Electric Furnaces and Space Heaters

Inspect for loose wires, missing filter and other obvious defects.
Activate unit.

- Determine if it is functioning correctly.
- If unit is faulty, perform a check and tune.

20. Water Heaters

Inspect for obvious signs of damage.

- Scorch marks, rust, disconnected venting etc.

If unit uses natural gas or propane,

- Evaluate like any other combustion appliance.
- If needed, perform a check and tune.

21. Cooking Equipment Using Natural Gas and Propane

- Sweep for fuel leaks using a gas detector.
- If fuel leaks are found, repair, if possible.
- Activate equipment and perform combustion analysis for CO emission. Maximum allowable CO above each burner is 25 ppm as measures and 225 ppm as measured in the oven.
- If CO emissions are found, repair, if possible.

22. Replacement Furnaces

- Calculate replacement size using the approved audit software.
- All replacement units must be rated at or above 80 percent efficiency.

23. Smoke Detectors

- Install smoke detectors per manufacturer recommendations.

All dwellings.

Refer to Section R313 of KY Residential Code. Smoke alarms to be located:

  - In each sleeping room
  - Outside of each separate sleeping area in the immediate vicinity of the bedrooms
  - On each additional story of the dwelling, including basements
  - On each level in split level dwellings where an intervening door is located between the adjacent levels.

- An alarm located only on the upper level is permitted where there is no intervening door between the adjacent levels and the lower level is less than one full story below the upper level.
- Where interior alterations, repairs or additions requiring a permit occur or a sleeping room is added or created, the individual dwelling unit shall be provided with smoke alarms as required for the new dwellings, with such alarms hard wired and interconnected.
- Hard wiring and interconnection is not required in existing areas provided:
  - The alteration or repair causes the removal of wall or ceiling finishes exposing the structure, and
  - No attic, crawl or basement is available which can provide access for hard wiring and interconnection without the removal of interior finishes.

24. CO Detectors

- All dwellings - Install CO detectors per manufacturer recommendations
- Electric plug-in CO detectors should have a battery backup.

QCIs

Energy systems AND electrical-related Health and Safety work measures must be inspected prior to any weatherization measures being provided.

Specific post inspection/quality control inspection checks must be performed depending on the type of energy systems and fuel. It is the responsibility of the Inspector/quality control inspector to ensure that the dwelling energy systems have been repaired and present no further health and safety problems and to certify that the weatherization process can continue. Post inspectors/Quality Control Inspectors should utilize the respective energy systems checklist to document post-inspection/quality control inspection testing of the energy system.

The inspector/Quality Control Inspector must check all individual measures listed on the Work Order and ensure that they were performed in accordance with acceptable material and installation standards.

1. **Fuel Leaks**

   Natural gas and propane
   - Using a combustible gas detector sweep all lines, connections and fittings to ensure no leakage is occurring.
   - If leakage is detected, immediately arrange for repairs.

   Oil
   - Visually inspect the entire oil delivery system for signs of leakage.
   - If leakage is detected, immediately arrange for repairs.

2. **Electrical Inspection**

   Visually check all wiring associated with the heating system(s).
   - Verify that there are no loose, frayed, or disconnected wires.
   - Verify that the energy system is on a dedicated circuit
   - Verify that the energy system overcurrent protection is properly sized
   - If defects are identified, immediately arrange for repairs.

3. **Carbon Monoxide Testing of the Ambient Air**

   Activate all combustion appliances.
   - Using a CO analyzer, sweep air registers and appliances for the presence of CO in the ambient air.
   - If CO is detected, identify the source, and arrange for immediate repairs.

4. **Dropout Safety Valve Test**

   All applicable appliances
   - Perform drop-out safety valve test.
   - If the drop-out feature does not work, arrange for immediate replacement of gas valve.

5. **Back-Drafting Test**

   All combustion appliances
   - Perform back-drafting test.
   - If back-drafting occurs, identify the reason and arrange for repairs.

6. **Mechanical Ventilation Exhaust Venting, Combustible Air Intake, Combustible Surfaces Clearances, and Duct Systems**

   Visually inspect all work for completeness and adherence to this manual and applicable codes.

   New Mechanical Ventilation Systems Installed:

   Use a flow hood and digital manometer to measure actual cfm fan flow rate of each new mechanical ventilation system installed. Record all actual measured readings, and then add up each reading from the new mechanical ventilation equipment installed to verify that the total equals or exceeds the final adjusted fan flow mechanical cfm required for the home as

determined by ASHRAE 62.2-2016 (or current version in force). Adjust as needed to obtain required mechanical ventilation rate. Retain the recorded readings document in client file with photos.

Visually inspect all newly installed mechanical ventilation systems to ensure all equipment components were installed and that installation configurations, including attached ducting, grilles, etc. conform to the requirements of ASHRAE 62.2 standards. Provide client with operating/maintenance instructions for equipment and obtain proof of delivery document to be retained in client file.

If any work is not acceptable:

- Prepare a list and obtain photos of all deficiencies.
- Arrange for RE-WORK.

7. **Client Education Requirements**
    - Clearly explain all alterations, repairs and additions.
    - Clearly explain removal and/or replacement of unvented, dangerous, or inoperable units.
    - Obtain signed statements as required by state or Subgrantee policies.
    - Carefully explain the operation and maintenance of new energy systems devices of any kind.
    - Provide client with owner's manuals, written operating and maintenance instructions and obtain a signed proof of delivery of these documents to be retained in client file.

8. **Manufacturer Information and Guarantee**
    - Client should receive all information and guarantees on all equipment or parts that were installed. Client should be informed of one (1) year contractor labor warranty. Retain a copy of all such documents. Obtain proof these documents were delivered to the client and retain proof of delivery document in the client file.

Step 3: Air Infiltration/Moisture/Incidental Repairs

EAs/DNEs

1. **Blower Door Testing Requirements**

All dwellings shall receive a blower door-driven inspection to:

- Evaluate initial air tightness.
- Identify leakage characteristics and sites.

Test data shall be documented on the Work Order to:

- Ensure compliance with ASHRAE 62.2-2016.
- Measure effectiveness of treatments.

Refer to the blower door operations manual for specific details regarding blower door operation and testing instructions.

Establishing target blower door cfm^{50} at pre-inspection:

Best practice for calculating the target blower door cfm is to use 1 cfm per square foot of conditioned floor space in a habitable space. Example: A 1000 ft^2 home would have a targeted blower door of 1000 cfm_{50}. However, though 1 cfm per square foot is ideal, at a minimum the targeted blower door cfm should be based on the ASHRAE 62.2-2016 base formula times 20.

Conditioned floor area (CFA) is the total square footage of a dwelling's enclosed conditioned space on all floors. It's measured at the exterior surfaces of the walls enclosing the conditioned space, and includes the floor area of: Lofts, Mezzanines, and Interior stairways. If a basement will be included in total floor area, then the blower door must be performed with the interior door to basement open. If not, the door should always be closed.

Example: A 1000 ft^2, 3-bedroom house would have a target blower door of 1200 cfm_{50}.

Formula

1000 x .03 = 30 +7.5 x (3+1) =60

60 (20) = 1200 cfm_{50}

Breakdown of the formula above:

Step #1: 3 cfm for every 100 ft^2 of conditioned floor area

1000 ft^2 x .03 = 30 cfm

Step #2: 7.5 cfm x (the number of bedrooms + 1) (3 bedrooms + 1 = 4)

2. **x 4 = 30 cfm**

Step #3: Add the sum of step #1 (30) and the sum of step #2 (30)

30 cfm + 30 cfm = 60 cfm

Step #4: Multiply the answer from step #3 (60 cfm) by the N factor (20)

60 x 20 = 1200 cfm

Document thoroughly with before and after pictures any conditions that may result in these targets not being achievable. For example: Boxed framing, floors, walls, ceiling, or homes with balloon framing, lathe and plaster interior, etc. ***Contact subgrantee's technical monitor prior to beginning work when such conditions exist.***

Follow Work Order instructions for completing all blower door tests.

- Mechanical ventilation is an allowable cost measure to be charged under Health and Safety. ASHRAE 62.2-2016 (or most current version in force) standards must be followed.

~~Conduct zone pressure diagnostic testing per the KWFG and SWS.~~

4.3. **Cost Estimate and Limitation**

Material and labor needs shall be estimated for each measure identified during the evaluation.

REQUIRED: Total estimated costs on the work order(s) estimate(s) must be within 15% of final total job costs that are billed to KHC on the WX 710.

REQUIRED: Total NEAT/MHEA estimated costs from the energy audit report of Recommended Work Measures must be within 15% of final total job costs.

REQUIRED: Electronic copies of all jobs utilizing NEAT/MHEA must be available at each subgrantee for exporting to KHC monitoring staff for review as required prior to weatherization.

Air Infiltration Measures

- The estimated cost of each treatment shall be evaluated against its potential cfm reduction to identify the most cost-effective measures to perform.
- Repairs made to obvious holes in the building envelope, not related to installing insulation, that will result in a large cfm reduction shall be charged to Infiltration.
- Tightening of heating system ducts shall be charged as a stand-alone duct-sealing measure.
- Caulking, weather stripping and other treatments for sources of minor air infiltration shall be charged to Infiltration.

Moisture Related Repairs

Repair costs associated with energy related bulk moisture problems shall be charged to the building component in which they are located or which they most directly affect.

KY Weatherization has adopted DOE's "Energy Related Mold and Moisture: Awareness and Impacts for Weatherization" as the state protocol. Level 1, small isolated areas of 10 ft² or less, can be stabilized and cleaned within DOE and KY guidelines with DOE funds only to ensure the health and safety of workers and the clients. See Mold and Moisture, Chapter 12, Sec.12.16, for energy related bulk moisture repair procedures. Evaluators/Energy Auditors have three (3) options during the evaluation process:

1. Delay work until conditions are corrected;
2. Refer client to another option for clean up;
3. Subgrantee cleanup of energy related mold and moisture conditions and proceed with Weatherization;
4. Defer unit and submit to weatherization ready.

Ventilation (kitchen and bathroom exhaust) measures necessary to reduce high indoor relative humidity shall be charged to Health and Safety.

Incidental Repair

Incidental Repair Measures (IRMs) are those repairs necessary for the effective performance or preservation of weatherization materials. When are pair activity is a component of an energy

efficiency measure that is being installed then the installation and materials are part of the efficiency measure and are classified as an IRM. Such repairs include, but are not limited to, repairing (or replacement if repair costs exceeds 75% of new installation) windows and doors which could not otherwise be caulked or weather stripped and providing protective materials, such as paint, used to seal materials installed under this program. The cost of incidental repairs must be follow the process below:

1. The IRM must be included in the appropriate energy conservation measure (ECM), which must maintain at least a 1.0 SIR.
2. If IRMs push the ECM SIR below a 1.0, the IRM should be pulled from the ECM and entered into a categorical IRM for the overall energy audit, and
the total package must maintain at least a 1.0.
3. For units that do not meet one of the two outcomes above, they must be deferred and referred to the weatherization ready component.

5.4. **Exterior Evaluation**

Inspect entire exterior of dwelling.

Required: Photographs must be taken of the exterior, including areas that will receive work and those photographs must be printed out and retained in the client file or stored electronically in a secure and readily accessible location.

Identify all exterior thermal boundaries.

- Note any conditions that may require preparatory work prior to the initial blower door test.

Inspect for potential sources of bulk moisture.

- Evaluate general condition of roof system, roofing material, chimney and valley flashing.
- Examine the guttering/downspouts system for improper drainage away from dwelling.
- Inspect condition of exterior siding for signs of blistering or peeling paint (that exposes raw wood) which indicates strong moisture movement from within the building envelope and high indoor relative humidity.
- Inspect condition of attic space for signs of improper venting of appliances, roof leaks, plumbing penetrations, and bypasses identified during use of blower door. Any indication of moisture or mold should be analyzed and determined whether energy related or non-energy related.
- Inspect the basement/crawlspace for conditions indicating excessive bulk moisture (seasonal or constant) from outside the structure which indicates ground water problems or poor perimeter drainage.
- Inspect unconditioned spaces for existing moisture control systems (vapor retarders and ventilation).

Evaluate the extent of existing moisture problem.

- Corrective repairs must be performed where problems will be compounded by weatherization measures or where problem will negatively affect the performance of weatherization measures. Do not exceed Level 1 clean up procedures, as they would be outside the scope of weatherization. DOE funds may only be used for level 1.

- If corrective repairs can be accomplished within the scope of the program, note all repair needs on the Work Order in categories in which the moisture problems most affect.

~~6.~~5. Interior Evaluation

Inspect the entire interior of the dwelling, conditioned and unconditioned areas.

Required: Photographs must be taken of the interior, including areas that will receive work and those photographs must be printed out and retained in the client file or stored electronically in a secure and readily accessible location.

Identify all interior thermal boundaries.

The internal thermal boundary is the line that separates a home's conditioned spaces from its unconditioned spaces. It's created by insulating and air sealing the areas that divide the interior from the exterior, such as walls and ceilings.

A thermal boundary is important because it helps maintain a consistent and comfortable temperature in a home. If the thermal boundary isn't clearly defined, some areas of the home may be technically outside the boundary, resulting in cold floors, stuffy rooms, and drafty hallways.

To locate a building's thermal boundary, you can trace the insulated shell of the building on paper drawings. You can do this on the plan view of each level and on every cross section.

A buffered wall in the context of energy efficiency refers to a wall design that incorporates materials with high thermal mass, like brick or concrete, which can absorb and release heat slowly, acting as a buffer against rapid temperature fluctuations inside a building, thereby improving overall energy efficiency by reducing the need for excessive heating or cooling.

Required: When an occupiable space of a home adjoins a garage, all walls, floors, and ceilings that separate the garage from the occupiable space must be evaluated for air sealing measures if deemed necessary to prevent contaminants from entering the occupiable space of the dwelling per ASHRAE 62.2-2016 (or most current version in force).

Required: Duct sealing is also a required work measure per ASHRAE 62.2-2016 (or most current version in force). All duct work outside the conditioned space shall be sealed. If the air handler and/or ducts are in an adjacent garage, the garage door to the outside must be open when the duct is tested for leakage.

- Document any conditions that may require preparatory work prior to initial blower door test.
- Inspect interior for sources of high moisture production.
- Ask about any seasonal moisture related problems, such as, window condensation, frost formation or sweating, mildew, mold growth on interior surfaces.
- All clothes dryers must be exhausted to the outdoors.

- Document use of unvented space heaters. If any are used as the primary heat source, no weatherization measures can be performed until corrected.
- Inspect condition of existing exhaust fan(s) in kitchen and bathroom for proper operation. If not functioning, document repair or replacement needs on Work Order under Health and Safety.

If any of the above observations need corrective repairs, subgrantees can include those as either H&S repairs/minor repairs or Incidental Repairs per policy. See Incidental Repair section or the H&S Plan.

~~7.~~6. **Non-Correctable Moisture Problem**

- Dwelling is not eligible for Weatherization services if the following moisture conditions exist, which cannot be corrected within the scope of the program.
- Level 2 or greater cleanup is beyond the scope of the program, and referrals should be made to other partners to assist with the repairs before weatherization can be performed.

~~8.~~7. **Building Envelope Inspection/Repairs**

Inspect condition of building envelope components, (ceilings, walls, and floors).

- Document repair needs for large holes on the Work Order under Infiltration.
- Document repair needs that can be classified as incidental to installing ceiling, wall, or floor insulation in the appropriate category.

~~9.~~8. **Doors and Windows Inspections**

Inspect all doors and windows separating conditioned and unconditioned areas.
Define the needs on the work order, such as any replacement parts needed, large holes in panes or panels.

~~10.~~9. **Blower Door Setup / Dwelling Preparation**

Setup: Reference blower door operation and testing standards manual that is dependent upon the model.

- Setup the blower door in the tightest and most convenient exterior door.
- Setup should be centrally located when possible.

Prepare house for depressurization test.

- Deactivate all combustion appliances (set to pilot or otherwise disable at thermostat or disconnect.)
- All heat/air conditioning systems must be turned off.
- Close all other exterior doors.
- Close all windows.
- **Close** all interior doors to **unconditioned** areas.
- **Open** interior doors to **conditioned** spaces.
- Prepare wood/coal stoves and fireplaces.

~~11.~~10. **Initial Blower Door Test**

- Depressurize the dwelling to 50 Pa

- Determine initial air infiltration rate in cubic feet per minute (cfm) from manometer.
- Complete the blower door data on the Work Order.

Interpretation of Initial Air Infiltration Rate

Evaluate dwelling overall needs based on an interpretation of its initial air infiltration rate.

- Document corrective measures under Infiltration.
- At a minimum, the dwelling air infiltration rate should be reduced to the predetermined target cfm rate. If the cfm rate cannot be achieved, contact your technical monitor for guidance.

~~12.~~11. **Depressurization Inspection and Zone Pressure Diagnostic Testing**

Perform visual inspection.

- Check each area of the dwelling.
- Use blower door pressure diagnostics technique to evaluate building envelope leakage.
- Thoroughly inspect areas of strong air flow for air leakage openings that are large in size and located in areas of the highest-pressure difference, ceilings and floors.
- Position one interior door at a time so that it is open about one inch and notice the amount of air coming through the crack.
    i. If a strong blast of air exists, there must be a large amount of leakage into the room from the outside.
- Inspect for large holes in building components, missing or broken glass, partially open access doors, etc.
- Perform zone pressure diagnostic testing. ~~For further guidance, visit the~~ www.learnree.com ~~for the online zonal training.~~

All Dwellings with Forced Air Distribution Systems (Ductwork)

- Inspect entire system (supply, return and plenum) for leakage around register penetrations and through the duct.
- Using a duct tester, evaluate total leakage and leakage to outside following procedures outlined in the manufacturer's guidelines. Perform pressure-pan testing following procedures outlined in the manufacturer's guidelines (see Pressure Pan Diagnostics guidelines in the back of this manual.)
- Pressure-pan tests can help identify leaky or disconnected ducts. With the house depressurized by the blower door with reference to the outdoors, pressure-pan readings are taken at each supply and return register.
- Improper connections must be corrected and sealed.
- Determine duct tightening needs under Duct Sealing.
- Determine duct insulation needs.

~~13.~~12. **De-pressurization/Bypass Inspection**

Install necessary access doors to all unconditioned areas.

a. De-pressurize dwelling and inspect for bypasses.
    i. Critical framing junctures.
    ii. Framing openings connected to attic and crawlspace/basement.
    iii. Chase way openings connected to attic crawlspace/basement.

iv. Dropped or soffitted ceilings.
v. Protrusions through ceiling and walls connected to unconditioned space.

b. Inspect the attic.
   - Stairways (folding stairs).
   - Split level stud spaces
   - Duct chase ways
   - Open wall cavities (interior and exterior)
   - Knee wall/floor joist openings
   - Plumbing stack
   - Chimney chase
   - Pocket doors

c. Inspect crawlspace/unconditioned basement.
   - Access doors
   - Band joist/sill plate
   - Chimney chase
   - Duct chase
   - Plumbing chase
   - Service penetrations

2. **Prioritizing Air Infiltration Reduction Treatments**

Prioritize air leakage sites based on blower door inspection.

Required: When an occupiable space of a home adjoins a garage, all walls, floors, and ceilings that separate the garage from the occupiable space must be evaluated for air sealing measures if deemed necessary, in order to prevent contaminants from entering the occupiable space of the dwelling per ASHRAE 62.2-2016 (or most current version in force).

Required: Duct sealing is also a required work measure per ASHRAE 62.2-2016 (or most current version in force). All duct work outside the conditioned space shall be sealed. If the air handler and/or ducts are located in an adjacent garage, the garage door to the outside must be open when the duct is tested for leakage.

a. Develop whole-house approach with priority given to a combination of attic bypass and duct system treatments/insulation, and wall and floor insulation.
b. Select the most cost-effective treatments that will, at a minimum, reduce the dwellings air infiltration rate to the target cfm Rate as noted on the Work Order.
c. Missing building envelope components; ceiling, wall and flooring materials. See WPN 19-5 and the IRM policy for more details on incidental repairs that will be needed.
d. Large holes in building envelope (e.g., missing or broken glass, access ways).
e. Duct system tightening repairs shall have high priority and shall be charged as a standalone duct sealing measure.
f. Bypasses (see number 11, De-pressurization and By-pass section)
a. Air leakage treatments
   Actual application of treatments will be based on blower door test.

Crew Leaders & Crew

1. **General Requirement**
   All crew leaders or private contractors are responsible for the following guidelines and requirements on all dwellings.

   Priority shall be given to air leakage and bypasses in areas of high-pressure differential (high and low portions of the thermal boundary).

   Consideration shall be given to the interactive relationship of priority measures in weatherizing a dwelling. Priority treatments such as duct sealing, air bypass sealing, and dense pack insulation reduce the infiltration rate significantly while at the same time improving the thermal performance of the dwelling.

   Crews and private contractors shall be responsible for performing treatments in order of priority as noted on the Work Order and adhering to infiltration reduction guidelines.

   Refer to blower technical reference chapter of this manual for specific instructions regarding set up and operation of the blower door.

2. **Interim Blower Door Testing**
   Blower door testing is required before any work is performed and after completion of each priority treatment.
   - To verify cost effectiveness

   Blower door testing schedule
   - Before any work is performed, compare to DNE test.
   - After all Infiltration work but before attic bypasses are addressed.
   - After attic bypass measures.
   - After attic insulation or, in the case of balloon framing, after attic and wall insulation.
   - After wall insulation.
   - After floor insulation.

3. **Preparation at Warehouse**
   - Identify and obtain all materials and PPE needed to perform air infiltration measures as listed on the Work Order.
   - Check all information included with the Work Order.
   - Confer with evaluator/Energy Auditor.
     - Ask questions if any confusion exists.

4. **Preparation On-Site**
   - Briefly explain to the client the activities to be performed.
   - Install blower door.
     - Setup in same exterior door used for the DNE, if possible.
     - Calculate infiltration rate at highest attainable Pa, up to -50.
     - Compare cfm rate to DNE test on Work Order.

- If there is a (+) or (-) 100 cfm difference,
  - Recheck setup and preparation.
  - Confer with client regarding temporary repairs or sealing performed by Evaluator/Energy Auditor.
  - Contact the Evaluator/Energy Auditor regarding his dwelling preparation procedure.
- If the PRE-WORK Test is acceptable then proceed with the measures as prescribed on the Work Order.

- If Work Order calls for installing attic ventilation
  - Cut all necessary vent holes and then,
  - Check infiltration rate to see if cfm Rate has increased.
- If cfm rate has significantly increased,
  - Perform all necessary attic bypass treatments.
  - Identify/confirm the thermal boundaries of the living area.
  - Identify/confirm framing type and critical framing junctures.

Identify potential air bypasses.
Determine where insulation will not contribute to air stoppage.
If dwelling has a forced air heating system with distribution system passing through an unconditioned space,

- Evaluate the air distribution system contribution to the overall air leakage rate.
- Use the pressure pan method to estimate duct system leakage. Pressure pans are required and must meet 1.0 or lower standards.
- Use duct tester for total duct leakage and leakage to outside. Duct blaster testing is also required and readings are based on IECC 2009 standards.

Note: *There are cases where some infiltration repair is necessary in order to evaluate and effectively treat the air distribution system.*

5. **Building Leakage Characteristics**

6. **First Priority Infiltration Measures and Incidental Repairs**

Measures to stop air infiltration should be performed on the thermal boundaries of the living area, where possible.
Air infiltration reduction work shall begin with the repair of holes in the building envelope.

- Missing components.
- Temporarily sealed leakage sites as noted on the Work Order.
- Repairs that can be classified as incidental to attic, walls, and floor insulation should be charged to those measures.

Identify and repair other holes in the building envelope as noted on the Work Order.

Repair moisture related problems as described on the Work Order.

- Charge repairs to the measures to which they are incidental.
- Perform blower door test.

7. **Bypasses: Identification and Treatment**

Plumbing Chase Treatment

- Plumbing chases are used to conceal supply, drain, and vent pipes.
- They typically run from basement to attic, with openings at each floor where pipes branch off.
- They can be located in either the interior or exterior wall.
- Seal off vertical plumbing chases at the crawl space or basement ceiling and at the attic floor.
- Close off as much of the hole as possible with aluminum flashing, shingles, or rigid foam insulation.

Note: Polystyrene should not be exposed to temperatures above 140 degrees Fahrenheit. Caulking or spray foam sealant can be used to seal any remaining gaps.

Exterior and Partition Wall Treatment

- Exterior and interior partition walls which do not have top plates, or which have gaps between the top plate and the finish wall need to be sealed off.
- Seal with expanding foam, foam backer rod (crack filler), or by stuffing fiberglass insulation wrapped in plastic into the cavity.
- Large gaps, such as found with balloon framing will require an air barrier, sealed in place.
- Fiberglass alone does not impede air movement.

Note: If wall is open at crawlspace, the same procedures should be used.

Pocket Door Treatment

- Pocket doors (doors that slide into the wall cavity) can present major bypass leakage areas.
- Seal the wall cavities, into which the pocket door slides, from the attic, wall, and basement with rigid insulation, caulked in place.
- When the pocket is connected to an exterior wall cavity, deal with this juncture at exterior wall with fiberglass insulation stuffed tightly into the open cavity.

Chimney Treatment

- Combustible materials must be at least 2” away from chimney.
- This leakage path should be sealed at all levels.
- Before sealing the gaps around a chimney, inspect it to make sure there are no combustible materials in contact with it, and make any necessary repairs.
- To safely seal the gap, cut flashing to fit over the surrounding joists and tightly against the chimney.
- Seal the flashing at joists and chimney with long-lasting, high temperature sealant such as hi-temperature caulk.
- Install insulation shield to prevent insulation from coming into contact with chimney.
- Check with your local building code official about local building codes.

Metal Chimney Treatment

- Chimneys should be sealed at the attic and, if applicable, floor level.
- Seal using the same procedures described for masonry chimney.

- Make sure manufacturer specifications are met and adhered to, especially pertaining to double wall flue pipe.

Attic Access Treatment

- Should be weather-stripped and insulated to the same R-value as attic.
- Hatchways can be insulated by securing insulation to the backside of the access door.
- To insulate fold downstairs, build an insulated enclosure sized to fit over the stairs.
- Charge repairs to attic insulation.

Penetrations through Attic Floor

- Holes for wires, pipes, and vents, etc. Seal with caulk and/or expanding foam. Caulking used to seal around heat producing devices, chimneys, or flues serving combustion appliances must be rated for that application (High temp).

Duct Penetrations Treatment

- Forced air system ducts usually have small holes and gaps where the ducting penetrates ceiling, floor, and walls.
- Identify / confirm leakage areas.
- Seal all cracks and gaps around duct penetrations with caulk or foam sealant.
- Sealing duct leakage in an unconditioned area:
  - Seal all areas in supply and return with mastic and tape.
  - Perform an incremental reading after this component.

Recessed Light Treatment

- Caulk around fixture from below, with a high temperature flexible caulk.

Note: From an energy conservation standpoint, such fixtures should be replaced with a ceiling fixture or an IC Rated recessed lighting fixture.

Dropped Ceiling Treatment

- Dropped ceiling may be present over showers, bathtubs, kitchens and bathrooms laundry chutes and stairways. Sunk below the attic floor, they may allow air to leak into the attic.
- Install ceiling at attic floor level and insulate to prescribed level.
- Add new joist or braces if necessary.

Attic/Knee Wall Treatment

- Seal all cracks and seams between heated and unheated space.
- At the floor joist/ceiling cavities connected to the knee wall attic area, seal tightly, using rigid foam or waxed cardboard, and caulking.

Whole House Fan Treatment

- To seal whole house fans, a tight-fitting insulation cover either on the attic or living space side, should be made which is installed each fall and removed each spring.

- If possible, request permission to remove and seal hole.

Basement Air Leakage Treatments

- Use the same treatments described for plumbing chases, exterior and partition walls, and chimneys.

False Walls and Ceilings Treatment

- False walls and ceilings are commonly found over laundry chutes, plumbing access spaces, and built-in closets.
- These spaces may be open to attic, crawlspaces, chimney cavities, plumbing chases, or the outside.
- Large openings may be closed off with foam sealant, polyethylene sheeting, or rigid board insulation, sealed in place.
- Seal small cracks with caulk.

Storage Closets

- Storage closets can be a significant source of leakage, especially when the ceiling level had been dropped. It is common to find these areas unfinished.
- Large holes and gaps should be sealed with rigid materials and caulk.

Fireplace(s) Treatment

- Fireplaces, without a tight-fitting damper, lose large amounts of heat out the chimney.
- If a damper exists, advise the client to close when fireplace is not in use.
- When a damper does not exist, an inexpensive alternative is to build a temporary damper out of plywood; it should be cut and friction-fitted into the fireplace flue; hang a ribbon or some means of a reminder for the client so this seal will be removed before a fire is lit.
- Seal any gap where the wall and fireplace meet with high temperature caulk.
- If fireplace is not and will not be in use, install permanent cover over fireplace and install metal cap over chimney.

8. Blower Door Test

After all measures have been performed as prescribed in the Work Order, including any change orders,

- Crew leader/private contractor must perform a blower door test to obtain the cfm leakage at this point.
- If the cfm leakage has not met the target air infiltration reduction guideline, identify additional leakage sites and proceed as necessary.

QCIs

1. General Requirement

It shall be the responsibility of the inspector to ensure:

- Completeness of work performed.
- Work was performed as prioritized on Work Order.
- Material specifications and installation standards were followed.

2. **Post Inspection/Quality Control Inspection Blower Door Test**
    - Perform -50 pascal depressurization.
    - Check quality and completeness of infiltration reduction treatments.
        - Refer to Blower Door Pressure Diagnostic Techniques.
    - Compare reading with DNE blower door reading and with target work reading.
        - Post inspection/quality control inspection reading should be comparable to target work reading (within a range of (+) or (-) 200cfm)
    - Conduct Zone Pressure Diagnostic testing.

3. **Post Inspection/Quality Control Inspection Readings Below 2,000 cfm at -50 PA**
   All dwellings with combustion appliances
    - Shall be tested for potential back-drafting or spillage caused by exhaust device operation. See Step 8 of this chapter.
    - See Blower Door Technical Reference chapter,
    - Back-drafting/spillage potential test.
    - Forced air distribution systems shall be tested for room pressures that exceed 3 Pa caused by imbalanced supply and return duct systems.

4. **Ceiling, Walls, and Floor Repairs**
   Check for:
    - Correct material.
    - Correct installation.
    - Completeness of work.
    - Quality of work.

5. **Glass Replacement**
   Check for:
    - Correct material.
    - Correct installation.
    - Completeness of work.
    - Quality of work.

6. **Window and Door Repair/Replacement**
   Check for:
    - Correct material.
    - Correct installation.
    - Completeness of repair.
    - Quality of work.
7. **Caulking and Weather-Stripping**
   Check for:
    - Correct material.
    - Correct installation.
    - Completeness of repair.
      Quality (neatness) of repair.

Step 4: Duct Insulation/General Heat Waste

EAs/DNEs

1. **Duct Insulation**

   Ensure all necessary repairs to the duct system are made prior to insulating. Remember to determine existence of exterior duct condensation and repair relative humidity issues where ducts are located before insulating ductwork.

   Evaluate for insulation, all duct work located in non-conditioned areas.

2. **Water Heater Insulation**
   - Ensure all necessary repairs to the water heating unit are made in accordance with energy systems evaluation and repair criteria.
   - Evaluate the unit for insulation, if appropriate.
   - Refer to the Standard Work Specifications for requirements.

Crew Leaders & Crew

1. **Duct Insulation**
   - Insulate all duct work located in non-conditioned areas using approved materials.

2. **Water Heater Insulation**
   - Visually inspect the heater for obvious defects and their conditions that require repairs as described in Energy Systems.
   - Install an approved water heater jacket on all water heaters as applicable.
   - Bind jackets with 3 straps and adhesive tape rated for that application.
   - Double wrap tape seams (no duct tape).
   - Install foam pipe sleeve insulation on the first five (5) feet of the hot and cold-water pipes exiting the heater.
   - Secure seams with adhesive tape rated for that application (no duct tape).

QCIs

It shall be the responsibility of the Inspector/Quality Control Inspector to ensure that all duct insulation, all water heater jackets, and all other measures listed in this component were installed correctly.

Step 5: Attics/Ceilings

EAs/DNEs

1. **Living Area Inspection**
   a. Inspect ceilings of all living areas for damage (e.g., water, fire, electrical, etc.).
   b. Interview occupant regarding roof leaks regarding any prior damage.
   c. Document the location of all heat producing devices installed in the ceiling or projecting through the ceiling.
   d. REQUIRED: Use thermal camera to scan entire attic/ceiling area of home to verify existence or non-existence of attic insulation. Save images of thermal scans made, print out, and retain in client's job file or store electronically in an accessible location.

2. **Attic Access Doors**
    a. REQUIRED: All houses must have a permanent attic access door installed per the Standard Work Specifications in either the interior or the exterior of the home if one does not already exist. If attic measures are required, the entrance can be charged to the weatherization measures. If the audit does not require attic measures, subgrantees will need to find other funding to pay for the access work.
    b. Access doors
    c. Must provide direct vertical access minimum opening of 16" X 24" for horizontal surface, and 16" X 36" for vertical surface.
    d. Document additional needs for permanent access doors on Work Order.

3. **Structural Capabilities (Attics)**
    a. Ceiling joists must support the weight of any and all inspectors/installers.
    b. Ceiling material must support the combined weight of insulation.
    c. If structure does not meet these standards, dwelling cannot be weatherized until appropriate repairs are made.

4. **Roof Leaks**
    a. The source and cause of all roof leaks/water damage must be identified and corrected where there is existing insulation or before any insulation can be installed.
    b. Roof repairs (see Incidental Repair Measures) may include patching or replacing deteriorated roofing; roof coating; and repairing or replacing defective sheathing, valley and chimney flashing, and framing members. These are the most common IRMs under roof repairs, but other needed repairs could be covered under IRMs.

5. **Electrical Wiring (attic)**
    a. Inspect all electrical wiring and all connections.
    b. Document all problems/hazards and all corrective measures on Work Order

6. **Heat System Components (attics)**
    a. Identify all heat system components in attic, such as furnace, water heater, exhaust flue, combustion air supply, and ducts.

All HVAC units must be installed to code.

7. **Heat Producing Devices (attics)**
    a. Identify all heat producing devices such as recessed fixtures, doorbell transformers, fan motors, and other devices. (Knob and tube wiring that is active must result in a deferral.)

8. **Ventilation (attics)** –In all cases where there is either existing insulation or where insulation will be installed, sufficient and appropriately placed vents shall be installed to meet the following guideline.

    a. One square foot NFA of attic ventilation is required for every 300 square feet of attic area (1/300 ratio). Where a high-low combination is used or when a vapor barrier is

installed, one square foot of ventilation to every 150 square feet of attic area (1/150 ratio) is required where cross venting is used.

b. Thoroughly inspect all existing eave and soffit vents.
c. Determine most suitable ventilation measures, taking into consideration attic shape, size, and roof type.
d. A combination of high-low ventilation is the preferred system.
e. Any existing kitchen and bath exhaust fans venting into the attic must be vented to the outdoors and insulated per Kentucky Weatherization Field Guide and standard work specifications.
    i. Document all ventilation needs on Work Order.

9. Ceiling Insulation

a. All Attic Areas
b. Where possible, insulation shall be installed in all ceilings over the living area.
c. The minimum R-value for insulation on horizontal ceiling surfaces is based upon the recommendations from the audit software.
d. The following requirements apply if the home has existing or no insulation and/or new insulation is to be installed:
    i. Identify all heat producing devices, temporarily uncover them, and note permanent blocking needs on Work Order.
    ii. Identify ceiling joists cavities with eave vent, check for blockage and if none exists, measure the rafter cavities for the proper size chutes and document the number needed on the Work Order.
    iii. Install chutes, dams, tubes, or other blocking devices to prevent blown insulation from plugging air channels from soffit vents into the attic.
    iv. Install an attic access hatch/door if none is present. Also install permanent blocking around all horizontal attic access doors.
    v. Determine the R-value and note additional needs on the Work Order.
e. Knee wall areas

Where possible, insulation shall be installed in all attic knee walls and the roof slope above the knee walls.

f. Mobile Homes

All ceiling/roof cavities shall be filled with insulation, where possible.

Ceilings must be structurally capable of supporting the weight of the insulation.

Ceiling cavity height must be at least 3 inches at center point.

g. Note all insulation and blocking needs on the Work Order.

Crew Leaders & Crew

1. General Requirement

The crew leader or private contractor is responsible for performing the following treatments as prescribed by the work order and according to the Material specifications and Installation Standards Chapter of this manual. A blower door test must be performed to seal air flow

bypasses before insulation is installed. A blower door depressurization test must be performed after the entire treatment has been performed.

2. **Roof Leaks**
   All houses and mobile homes
   - Confirm location of roof leaks and repair accordingly.
   - Use safety precautions on steep roofs.
   - Do not walk on mobile home roofs; walk boards should be used.

3. **Blower Door Test**
   If separate crew is installing insulation,
   - Verify that all attic bypasses have been addressed prior to installing insulation.

4. **Attic Ventilation**
   Houses only
   - All necessary holes for the entire attic ventilation system should have been cut out prior to addressing attic bypasses.
   - Install all necessary components.

5. **Blocking**
   All houses and mobile homes
   - Block around all heat producing devices as prescribed by the Work Order.
   - Block around insulation for proper ventilation as prescribed by the Work Order.

6. **Install Insulation**
   Houses
   - Deliver insulation to the attic through an exterior opening (access door, gable, or roof vent), if possible.
   - Wear protective clothing including a respirator and goggles during installation.
   - Install blocking for heat producing devices.
   - Install depth markers
   - Install junction box covers
   - Install marker flags (for junction boxes, electrical connections, can lights, etc.).
   - Install insulation according to the Work Order.
   - Inspect blocking of heat producing devices and ventilation baffles before leaving attic and correct as needed.
   - Install insulation certificate.

   Mobile homes (loose fill insulation exterior application edge method)
   - Install blocking around furnace flue and all other heat producing devices.
   - Remove gutter and trim, in 8-foot sections at a time.
   - Prop up metal roof with 2” X 6” blocks.
   - Insert blowing hose or a fill tube to the opposite side.
   - Insulate cavity and remove hose slowly while filling the entire cavity.
   - Inspect blocking around heat producing devices.

- Reattach metal roof, sections of gutter and trim as each 8-foot section is insulated.
- Clean area.

Mobile homes (loose fill insulation interior application)

- Remove ceiling in furnace closet, if applicable, install blocking around exhaust flue a minimum of 3" and reinstall ceiling.
- Measure from each exterior wall and strike minimum of 2 lines equally spaced from one end of the mobile home to the other.
- Install a plastic drop cloth over furniture.
- Drill 2" holes, 24" apart.
- Insulate cavities.
- Install plastic plugs (caulk with clear silicone, if necessary).
- Remove drop cloth and clean area.

7. **Attic Access**

Required: All houses must have a permanent attic access door installed in either the interior or the exterior of the home if one does not already exist. Minimum opening size is nominal 16" x 24" for horizontal surface and nominal 16" x 36" for vertical surface.

- Install all permanent horizontal and vertical access ways according to the Work Order.
- Insulate and weather-strip according to the Work Order and KY WX Field Guide/Standard Work Specifications.
- Exterior access doors must be hinged and have a lockable hasp installed.

8. **Blower Door Test**

All houses and mobile homes

- Install the blower door and depressurize the house.
- Document all applicable information on the Work Order and sign on the appropriate line.

QCIs

1. **General Requirement**

All attics shall be visually inspected on all dwellings. All attic areas must be entered and inspected to ensure that all measures described on the Work Order were performed in accordance with the Material and Installation Standards manual. REQUIRED: Use thermal camera to scan entire attic/ceiling area of home to verify existence or non-existence of new attic insulation installed. Save images of thermal scans electronically or print out and retain in client's job file.

2. **Loose Fill**

All dwellings

- Inspect for correct blocking procedures around all heat producing devices, combustion air grilles, chutes for soffit vents and other miscellaneous devices.
- Determine if bypasses have been identified correctly and sealed accordingly.

3. **Flexible**

All dwellings

- Inspect for correct blocking procedures around heat producing devices.
- Inspect for proper fasteners to ensure adherence.
- Verify that insulation that cannot be seen was purchased by, examining purchase orders and invoices.

4. **Rigid Board**
   - Inspect for a friction fit.
   - Confirm thermal and fire rating.
   - Verify that insulation that cannot be seen was purchased.
     - Examine purchase orders and invoices.

5. **Roof Leaks**
   - Visually inspect all repaired areas.
   - Determine if repairs will stop leaks.
   - Rooftop inspections are required when rooftop measures are performed.
     - Chimney repair, new roofing materials, etc.
   - Interview the client regarding leaks.
     - Determine if leaks have been repaired.

6. **Ventilation**
   - Determine if the correct amount of net free ventilation was evaluated and installed.
   - Determine if the vents have been placed in the correct position.
   - Determine if the vents were installed correctly.

7. **Attic Bypasses**

   Pressurize the dwelling and while inside each attic area determine if all bypasses were sealed.

Step 6: Walls

EAs/DNEs

1. **Wall Insulation Evaluation**
   a. Insulation shall be evaluated for all walls that are thermal boundaries including those separating conditioned and unconditioned spaces within the dwelling.
   b. REQUIRED: Use a thermal camera to scan entire applicable wall areas of home to verify existence or non-existence of wall insulation in all exterior walls and/or walls following the thermal boundary of the home. Save images of thermal scans made, print out and retain in client's job file or store electronically in an accessible location.

2. **Electrical Wiring**
   a. Under no circumstances shall wall cavities in dwellings with live knob and tube wiring be evaluated for insulation.
   b. If the wall measure is required by SIR calculations, subgrantees will not be allowed to skip it, so the house should be deferred.
   c. In case of deferral, the house should be referred to weatherization ready.

3. **Moisture and Structural Problems**
    a. Inspect all perimeter walls of conditioned areas for:
        i. Moisture and structural problems.
        ii. Roof leaks at wall junctions.
        iii. Gutters where insufficient overhang exists.
        iv. Missing down spouts.
    b. Note all repair needs on Work Order.

4. **Heat Producing Devices**
    a. Inspect all perimeter walls of conditioned areas for heat producing devices that require blocking.
    b. Wall cavities, where blocking cannot be installed around heat producing devices, shall not be evaluated for insulation. Document the Work Order.
    c. Document all blocking needs on the Work Order.

5. **Existing Insulation**
    a. Inspect for existing insulation by removing a small section of siding, or by drilling 1" holes at each corner of house (at retrofit locations), or from attic if wall cavities are open, or by removing an outlet cover and using a nonconductive probe.
    b. Do not drill into walls, ceilings or floors if lead paint or asbestos is determined to be or assumed to be present in the home.
    c. An estimate by age is reasonable if not better information is available. For example, common fiberglass wall insulation was R9 prior to 1975, R11 from 1975 – 1995, and R13 after 1995.
    d. Insulation shall not be evaluated for cavities with existing insulation.

6. **HVAC Ducts**
    a. Cavities that serve as HVAC ducts shall not be evaluated for insulation.
    b. Describe all cavities that should not be insulated and their location on the Work Order.

7. **Distance to Ground Surface**
    a. Cavities where the bottom of the floor joists band board is within 18" or less of the ground surface shall not be evaluated for insulation. Note the location of all such cavities on the Work Order.
    b. All cavities above 18" of the ground surface shall be evaluated for insulation.

8. **Siding**

Vinyl and aluminum

    a. Determine feasibility of removing siding.
    b. If siding cannot be removed, determine feasibility of installing insulation from the interior of the dwelling.

Asbestos

    a. Asbestos cannot be removed, cut, sanded, or drilled.

b. Determine feasibility of installing insulation from the interior of the dwelling.

Brick veneer

a. Determine feasibility of removing fascia board and using fill tube method.
b. Determine feasibility of an interior installation.
c. Determine feasibility of drilling between mortar joints.

Cosmetic considerations

a. In all cases, it shall be the Evaluator/Energy Auditor determination as to whether the installation of wall insulation can be performed without significantly detracting from the looks of the exterior or interior of the dwelling.
b. Where the client will not allow wall insulation due to cosmetic considerations and the Energy Auditor believes it can be performed without detracting from the dwellings looks, the dwelling shall not receive further weatherization services. Measure skipping for all major measures is not allowed for any reason. No cost-effective measures may be skipped under any circumstances, or the ~~The~~ dwelling must be deferred. (See WPN 23-6)
c. It is allowable to paint plugs to match surrounding surfaces. Use computer matched paint where possible.

4. Preparatory Work

a. Check all cavities for possible routes for loose fill insulation to escape during insulation process.
b. Blocking for balloon framings
c. Cracks or joints at framing junctures
d. Siding in need of repair or replacing
e. Blocking for heat producing devices
f. Built-in closets
g. Pocket doors
h. Document location of all blocking needs on Work Order.

5. Determine Type of Insulation to Use

Loose-fill cellulose and fiberglass

a. Shall not be installed when wall cavities are exposed (uncovered wall cavities or wall sheeting is not present).
b. Can be installed from exterior and interior.

Dense-pack cellulose

a. Shall not be installed when wall cavities are exposed (uncovered wall cavities or wall sheeting is not present).
b. Can be installed from exterior and interior.
c. Must be blown at a density of 3.5 pounds per cubic foot.

Flexible (batt)

Shall be installed in exposed wall cavities (uncovered wall cavities or wall sheeting is not present).

Rigid board

a. Rafter slopes above knee walls.
b. Other applicable areas.
c. Must be covered by ½" gypsum or equivalent when exposed in the living area.

6. Recommended Methods for Estimating Wall Insulation Needs

Loose Fill Cellulose *(always refer to product coverage data) will be determined by the NEAT/MHEA audit.*

Crew Leaders & Crew

1. General Requirement

Crew Leaders and private contractors shall be responsible for performing all repairs as listed on the Work Order before installing sidewall insulation. Wall insulation materials shall only be installed in walls between conditioned and unconditioned areas.

2. Incidental Repairs

All dwellings – Repair all incidental measures as described on the Work Order.

3. Blocking of Heat Producing Devices

All dwellings

- Locate and block around all heat producing devices and repair as listed on the Work Order.
- If a heat producing device has been added since the evaluation, do not fill that cavity until blocking has been provided.

4. Dwelling Preparation

Houses only

- Remove siding if needed.
- Locate and mark all cavities that will require caution when drilling, (exterior side); i.e. all electrical outlets, fuse or breaker boxes, etc.
- Drill 1" or 2" holes for cellulose insulation.
- Drill 2" holes for loose fill mineral fiber or when a fill tube method will be used.

5. Installation Methods

Balloon frame application

- Seal top and bottom plates with approved air sealing materials.
- Locate cavities and drill 2'' hole at top or bottom of each cavity.
- Insert a non-conductive tube and install insulation.
- Install plugs, painted to match existing surfaces.
- Clean up area.

Fill tube application (houses)

- Remove siding if needed.
- Locate cavities and drill a 2" hole at the top or bottom of each cavity.
- Insert a non-electric conductive tube and install insulation.
- If blockage exists, drill additional holes as needed.

- Install plugs.
- Clean up area.
- Fill tube method can also be used when insulating from the living area side.

Fill tube application (mobile homes)

- Re-nail and tighten interior surface as prescribed on the Work Order.
- Remove exterior trim and J-channel at the floor level (exterior).
- Remove screws from siding, six feet at a time, from floor level up to 2 feet.
- Insert fill tube and insulate.
- Reinstall screws, J-channel and trim per section.

Flexible (houses)

- Install batts with no voids.
- Neatly cut out areas for outlets, receptacles, etc.
- Follow installation guidelines around water pipes.
- In a conditioned basement, neatly cut to pressure fit at the band joist area.
- Follow manufacturer installation guidelines.

Flexible (mobile homes)

- Follow same instructions for siding removal for loose fill.
- Place the batt on a nonconductive flexible surface with a piece of vapor retarder (4 mil plastic toward the inside) and slowly push the batt to the top of the wall. (Vinyl-faced insulation may be used in place of the 4-mil plastic.).
- Rigid foam board, cut to fit.
- Install with no voids.
- Install with a friction fit.

6. **Incremental Blower Door Test**
   Perform a blower door depressurization test.
   - Document results on the Work Order.

QCIs

1. **General Requirement**
   It shall be the responsibility of the Inspector/quality control inspector to ensure that all materials prescribed by the Work Order have been installed in compliance with material and installation standards. It is recommended that all insulation measures that will not be visible after completion receive an On-site, in-progress inspection to ensure quality and completeness standards. REQUIRED: Use a thermal camera to scan entire applicable wall areas of home to verify existence or non-existence of new wall insulation installed in all exterior walls and/or walls following the thermal boundary of the home. Save images of thermal scans made electronically or print out and retain in client's job file.

2. **Loose Fill**
   - Inspect for correct dwelling evaluation procedures.

- Validate blocking.
  - In-progress inspection recommended.
- Remove at least 10 percent of the total plugs.
  - Determine the existence and density of insulation.
  - Reinstall plugs.

3. **Flexible**
   - Determine if the insulation has been installed correctly, if visible.
   - If the insulation will not be visible after installation, arrange for an in-progress inspection.
   - If an in-progress inspection could not be performed, confirm expenditures by examining invoices.

4. **Rigid Board**
   - Verify that the material has a fireproof covering for interior application.
   - Perform in-progress inspections, if applicable
   - If an in-progress inspection could not be performed, confirm expenditures by examining invoices.

Step 7: Floors/Foundations

EAs/DNEs

1. **General Requirement**

Floor insulation shall be evaluated for the following areas:

a. Unconditioned basement
b. All accessible floor areas in houses and mobile homes
c. At the band joist area and foundation walls of dwellings with conditioned basements.

The auditing software will dictate the R-value for floor insulation.

2. **Moisture Inspection**
   a. Talk to client regarding seasonal or constant moisture under dwelling.
   b. Inspect crawl interior and exterior of the dwelling for any correctable causes of excess moisture.

3. **Ground Cover**

Crawlspaces enclosed by solid foundation or skirting.

a. Install 6 mil polyurethane where possible.
b. Ground cover shall only cover 100 percent of the area. If 100 percent coverage cannot be obtained, no ground cover shall be installed.

4. **Foundation Ventilation**

Crawlspaces enclosed by solid foundation or skirting:

a. Ventilation must be installed where there is existing insulation or where floor insulation is to be installed.

b. Where ground cover is installed, and no moisture problems exists, Net Free Vent Area must be 1 ft^2 per every 1,500 ft^2 of crawlspace. When ground cover is installed, and moisture problems do exist, Net Free Vent Area must be 1 square foot per every 300 square feet.
c. Where ground cover is not installed, the Net Free Vent Area must be 1 square foot per every 150 square feet of crawl space.

5. **Estimating Floor Insulation**
   a. Calculate the floor area to be insulated.
   b. Divide the total square feet by the coverage of the type of insulation to be used.
   c. For floors with oversized floor joist cavities, calculate for the larger width of insulation and cut to size accordingly.

6. **Pipe Wrap Evaluation**
   a. Measure the size and length of pipe wrap needed; however, in an unconditioned space pipe wrap is an IRM and only allowed with an insulation measure on the floor.
   b. Document attachment methods on the Work Order.

Crew Leaders & Crew

1. **General Requirement**
   Crews and private contracts shall be responsible for adhering to the material and installation standards as described on the Work Order, KWFG and Standard Work Specifications

2. **Moisture Problems**
   Check the foundation area for excessive moisture.
   - If excessive moisture exists, contact the evaluator/energy auditor for instructions.

3. **Incidental Repairs**
   Perform any repairs needed as prescribed on the Work Order.

4. **Floor Insulation, Foundation, Ventilation, and Pipe Insulation**
   Flexible insulation
   - Repair all moisture related problems before installing insulation as prescribed on the Work Order.
   - Install a ground cover, if applicable, and foundation ventilation.
   - Install insulation (perimeter or under floor insulation) and new belly board, if applicable.
   - Install pipe insulation as prescribed.
   - Install a crawlspace door with lockable hasp, if applicable.

   Loose fill insulation
   - Repair all moisture related problems.
   - Install a ground cover and foundation ventilation, if applicable.
   - Repair existing belly board as prescribed on the Work Order.
   - Install insulation and check for leakage into HVAC ducts periodically.
   - Install water pipe insulation, if pipes are exposed.
   - Install or repair the crawlspace door as prescribed on the Work Order.

5. **Blower Door Test**
   Perform a blower door depressurization test.
   - Document results on the Work Order.

QCIs

1. **General Requirement**
   It shall be the responsibility of the quality control inspector to make a complete visual inspection of the entire accessible crawlspace area. The quality control inspector shall determine if all measures prescribed by the Work Order have been correctly performed according to material and installation standards. The quality Control Inspector shall also confirm the quantity of materials used.

2. **Floor Insulation**
   - Determine if the correct materials have been used.
   - Determine if the insulation has been installed correctly.
   - Mobile homes
     - Remove loose fill patches in at least 5 different locations throughout the belly board and determine the coverage of insulation.

3. **Pipe Insulation**
   - Determine if the correct type and size pipe wrap was used.
   - Determine if the installation meets standards.

4. **Foundation Ventilation**
   - Determine the correct amount of venting needed for the dwelling.
   - Confirm that the amount of venting installed is adequate and meets material and installation standards.

5. **Crawlspace Door**
   - Determine if the door meets material and installation standards.
   - Determine if the door is free from obstructions and will operate freely.

6. **Skirting**
   Metal or vinyl
   - Determine if the material meets specifications.
   - Determine if the installation is plumb and square.
   - Determine if the correct fasteners were used.
   - Determine if an adequate access way has been provided.

Step 8: Worst-Case Scenario

EAs/DNEs

This test is required for all atmospheric draft combustion appliances at the time of **EACH** of the following:

- During the dwelling needs evaluation/energy audit
- During each day of weatherization work at the end of each workday
- During the post inspection/quality control inspection of all work measures

This test uses the home's air handler, exhaust fans, and chimneys to create worst-case depressurization in the combustion zone. During this worst-case situation, measure the indoor-outdoor pressure difference and spillage. The reason for these tests is that worst-case conditions do occur, and chimneys should vent their combustion gases even under these extreme conditions. Draft is the pressure difference between the chimney and combustion zone. Atmospheric draft appliances are spillage-tested during the worst-case conditions. This worst-case spillage test will determine if the venting system exhausts the combustion gases when the combustion zone pressure is as negative as possible.

A digital manometer is usually used for accurate and reliable readings of combustion-zone depressurization.

Procedures

1. With exterior doors and windows closed, connect a digital manometer to read the pressure difference between combustion zone WRT outdoors and record the current natural pressure difference, and perform baseline function.
2. Turn on the exhaust fans, clothes dryer, open and close interior doors until the negative pressure difference between the combustion zone and outdoors is at its most negative pressure difference. Then record pressure.
3. Turn on air handler, open and close interior doors until the negative pressure difference between the combustion zone and outdoors is at its most negative pressure difference. Then record pressure.
4. Determine which scenario has the most negative pressure. This is the maximum or worst-case depressurization value. All testing is performed in this worst-case condition.
   A combustion zone-to-outdoors pressure difference of more than –5 pascals during this test indicates a danger of back drafting of naturally drafted gas and oil appliances.
   A combustion zone-to-outdoors pressure difference of –8 pascals or more indicates a danger of flame roll-out.
5. Operate each atmospheric draft boiler, furnace, or water heater under these same worst-case conditions. Test for back drafting with smoke, a negative draft should be observed within 2 minutes of start-up. Testing for spillage by drilling combustion vent pipe may be necessary. (Some local authorities having jurisdiction may not allow subgrantees to drill into the pipe, depending on the type of material. Subgrantees will need to check with local authorities having jurisdiction on what is allowable.)

6. Take all necessary steps to identify and remove excessive negative house pressures. Also, take appropriate measures to increase draft by undertaking chimney improvements, combustion air, or other measures to encourage the venting of combustion gases.

Ambient CO levels should be monitored in the combustion zone during draft testing, especially if depressurization of the combustion zone exceeds –5 pascals during house-depressurization testing.

If ambient CO levels in the combustion zone exceed 70 parts per million (ppm), draft tests should cease for the technician's safety. The combustion zone should be ventilated before testing and repair of CO problems resumes.

Naturally drafting chimneys should have –1 to –15 pascals of draft, depending on outdoor temperature (measured chimney with reference to the combustion zone) while at worst-case conditions. The lower the outdoor temperature, the higher this negative draft should be. Combustion gases shouldn't spill for longer than 2 minutes from the combustion device while operating at worst-case conditions.

Special Procedures Regarding Solid Fuel

Solid fuel appliances (including wood and coal burning stoves and fireplaces, pellet stoves, etc.,) will involve performing all steps outlined in Step 8 with the following exceptions and special steps applying only to the solid fuel appliance:

1. A draft and spillage test is not required of the solid fuel appliance.
2. A carbon monoxide test is not required of the solid fuel appliance.
3. If the home has a fireplace that the owner uses, set up and turn on the blower door to a 300-cfm flow rate with Ring B to simulate.

NOTE: Before performing your tests, extinguish all flames in solid fuel appliances. Do not perform worst case draft and pressure testing/CAZ testing, with any fires burning in any solid fuel appliance.

The WX 710 must identify that this test has been done and the appliance(s) has/have passed and list the draft numbers attained, per appliance, during the test.

For further information, refer to the approved Field Guide, Standard Work Specifications, and NFPA 211.

QCIs

Perform worst case scenario/CAZ testing during the post inspection/quality control inspection when applicable. Documentation including pictures to prove the test was performed must be included in the client file.

Step 9: Determine If Lead-Based Paint Protocols Must Be Followed

(See Section 12.15: Lead Paint and Lead Safe Weatherization Work Practices.)

Required: Lead Paint testing with an EPA approved lead paint test kit must be performed on any and all areas of the home that will be disturbed by weatherization work measures if the home was determined to have been built before 1978. Evidence that testing was performed must be retained in the client file.

If the home is older than 1978 and lead paint testing was not performed, it must be assumed lead paint positive and LSW and RRP rules must be used.

If lead paint testing is performed by the Dwelling Needs Evaluator/Energy Auditor using a swab test kit, the following procedures are required:

General Requirements:

- This test can only be performed by a Certified Renovator.
- Test painted surface areas that will be affected. In other words, test the paint on surface areas that you will be disturbing, i.e. cutting, drilling, etc.
- Use an EPA recognized swab test kit to perform the tests. Examples of two brands are: "LeadCheck"® or "D-Lead" ®
- Follow the manufacturer's instructions for preparing the surface to be tested, i.e.: using a utility knife to make a cut through all paint layers down to the bare building material for each test surface and preparing the test swab and test verification card before swabbing the test surface.
- Follow lead safe work practices referenced in Section 12.15 as applicable while performing these swab tests.

Once the test has been completed, take pictures of the results, document the test date, results and other pertinent information to be retained in the client files for a period of three years.

Note: In lieu of using a test swab kit, the Certified Renovator may collect a paint chip from the components to be disturbed for laboratory analysis to determine if Lead-based paint exists. If homes are pre-1978, subgrantees must use lead-safe work practices if they are unable to test lead-based paint.

Step 10: Determine if Baseload Measures Are Needed

On the WX-BLR baseload record sheet:

- Record metered data from refrigerator and visually inspect refrigerator condition.
- Gather existing interior lighting information.
- Record existing shower head GPM water usage rate.
- Record water heater data and usage. Document if servicing/re-venting of the clothes dryer is required per the Kentucky Weatherization Field Guide and Standard Work Specifications.

Required: Low-flow showerheads must be considered in all NEAT/MHEA audits.

Crew Leaders & Crew must Perform worst case scenario/CAZ testing at the end of each workday when applicable. Refer to testing procedures in this section.

QCIs

It shall be the responsibility of the quality Control Inspector to ensure that all measures performed in the base loads section of the Work Order meet all material and installation standards.

Inspect and test per program requirements as applicable all new appliances installed to verify the installation meets applicable codes and other requirements and is operating within manufacturers specifications.

Provide client with all owner's manuals, maintenance and operation instructions, and obtain a signed proof of delivery of these documents to be retained in the client file.

A Quality Control Inspector is a residential energy efficiency professional who ensures the completion, appropriateness, and quality of energy upgrade work by conducting a methodological audit/inspection of the building, performing safety and diagnostic tests, and observing the work.

In addition, a Quality Control Inspector is an evaluator who verifies the work performed against the work plan, specifications and standards, performs building diagnostics, records/reports findings and concerns, and specifies corrective actions to ensure the completion, appropriateness and quality of the work providing for the safety, comfort, and energy savings of the building occupants.

Required Qualifications/Certification: To Become a Quality Control Inspector, a National standardized written test and a field test must be completed successfully. In addition, a minimum amount of continuing professional education must be completed each year as determined by BPI and the Department of Energy, Weatherization Assistance Program.

For more information regarding Quality Control Inspector requirements and responsibilities please refer to the Building Performance Institute Quality Control Inspector Certification Scheme Handbook.

Chapter 12: Baseload Measures

A baseload measure is a retrofit, repair, or modification which is intended to conserve energy usage not associated with heating or cooling. Baseload measures can potentially be applied to all homes and are reliable energy savers.

12.1 Justification

Homes that are in a state of advanced deterioration will be less likely to benefit from baseload measures in that their basic repair needs will often cost up to or beyond the state mandated "cap" per job. For all other homes, baseload measures can deliver verifiable and sustained energy savings. Therefore, baseload measures shall be routinely considered as part of the initial home evaluation/energy audit and applied as necessary.

Justification for baseload measures and their prioritization within an individual project are built into the audit procedures contained in NEAT/MHEA. They are further described in detail in the Kentucky Weatherization Field Guide, and Standard Work Specifications. The audit is designed to assign a Savings to Investment Ratio (SIR) to each baseload measure, ranking it among all measures in terms of energy savings.

12.2 Typical Baseload Measures

Typical baseload measures fall under one of the following categories:

1. **Water heating and temperature management.** Repairs under this category include water heater wraps, pipe insulation, low-flow showerheads, and adjusting water heater temperature to approximately 120°F.

2. **Refrigeration assessment and replacement.** Metering with an approved metering instrument new notice: all units considered for replacement must be metered are required to determine the efficiency of a refrigerator. Units manufactured on or after 1993 do not require metering. Units must be metered a minimum of 2 hours. Those units that fail to meet the minimal standards of efficiency are candidates for replacement. In many cases, the NEAT/MHEA audit can identify inefficient units in its onboard database.
    a. **Units to be replaced shall be taken to a facility, licensed to reclaim refrigerant.** Written documentation to prove the refrigerator was properly disposed of per EPA requirements is required. No refrigerator taken out of service shall be sold or returned to service.
    b. **Refrigerator Replacement units** shall conform to program standards. See Sec 5.7 Adjustment of temperature settings and cleaning coils are also baseload measures. All other appliance replacements should be energy-star rated, and all replacements should be documented in client files. All replacements should be entered into the energy audit software as regular weatherization measures, and the SIR should be at least a 1.0 for DOE funding or a .6 for LIHEAP funding as long as the replacement is not a H&S replacement.

3. **Lighting assessment and replacement.** Lighting shall be evaluated using the NEAT/MHEA audit. Replacements shall be in accordance with its recommendations. In instances where a local program is partnered with another funding source (such as a utility company), the replacement protocols in place will be sufficient to meet program standards.

4. **Servicing clothes dryers**. Clothes dryers shall be serviced in accordance with the Kentucky Weatherization Field Guide.

Chapter 13: Energy Systems Policies

13.1 Qualified Personnel

All energy systems inspections and analyses shall be conducted by persons who have satisfactorily completed training courses mandated by Kentucky Housing Corporation. KHC reserves the right to exclude inspectors who fail to demonstrate adequate ability based on training reviews and field performance. Further, KHC may require that heat system inspectors/energy auditors receive specialized training in selective areas when such training proves necessary.

13.2 Inspections

All dwellings shall receive a comprehensive heat system(s) inspection performed by an inspector/energy auditor who meets the qualifications set forth by KHC.

The heat system inspection shall include, but is not limited to, its description in the Dwelling Needs Evaluation/Energy Audit chapters 8 and 12 of the Weatherization Program Manual. The purpose of the heat system inspection is to verify the safety of the dwelling heating equipment.

Replacement of equipment, repairs, and other modifications to heat systems shall be done according to established industry methods. Adherence to applicable codes is mandatory.

13.3 Life Threatening Situations

If a life-threatening situation is identified, steps shall be taken immediately to rectify the problem. A contractor or qualified in-house service person shall be made aware to give it priority status.

The following situations are examples of life-threatening situations:

- Significant fuel leaks.
- Carbon monoxide levels that exceed limits herein described. (see Section 12.5 of this Chapter)
- Electrical malfunctions posing immediate danger to occupants or technicians.
- Back-drafting of any heating equipment.

13.4 Combustible Fuel Leaks

Fuel leaks must be repaired as quickly as possible. Depending on the severity of the leak(s), it may be necessary to vacate the occupants from the premises. Contact the vendor for direction on how to handle the situation. In situations where the leakage can be repaired safely, arrange for a qualified contractor or in-house service person to do so immediately.

13.5 Addressing Carbon Monoxide Presence/Carbon Monoxide Detectors

All dwellings must comply with NFPA 72 regarding carbon monoxide detectors. Any concentration of CO greater than 0 ppm in the ambient or supply air is an indication of potential malfunction that must be

identified and repaired immediately. Arrange for the repair from a qualified contractor or in-house service person.

Cooking Equipment: Burners that pass a visual inspection and 225 ppm as measured in the oven exhaust are acceptable when tested in compliance to established work procedures. KHC requires all gas cook stoves to have a range hood.

When a gas cook stove is present, and there is currently not a kitchen exhaust fan, which is ducted to the exterior, KHC will require one to be installed. Under certain circumstances, it may not be economical or practical for the kitchen exterior exhaust fan to be installed. In these instances, a written request must be submitted to your KHC Monitor and a determination will be made on a case-by-case basis. The request and response must remain in the client file.

Some cooking equipment can be functioning while producing excessive amounts of CO. If conditions cannot be repaired within the scope of the cooking equipment evaluation procedures, inform the client that services cannot be rendered until the conditions are corrected. In situations where there is no way to rectify the CO problem discontinue work, document the file with cleaning and tuning and retest. If that does not rectify the situation, the cookstove can be replaced with LIHEAP funds. Place all supporting documentation in the file.

13.6 Unvented Heating Equipment

No dwelling using unvented combustion heating equipment as a primary heating source shall be weatherized until all such equipment is removed or disabled and replaced with a code-compliant vented combustion appliance to function as the primary heating source if funding/cost limitations will allow it.

Obtain a signed statement from the client documenting that they have been informed of the dangers of using unvented heating equipment in the home.

Heating appliances equipped with Oxygen Depletion Switches (ODS) and commonly known as **ventless** shall be acceptable where they provide secondary heat only in site-built homes. Secondary unvented space heaters are allowed in site-built homes with the additional limits as follows:

(1) In bedrooms, capacity may not be greater than 10 KBTU/hr

(2) In bathrooms, capacity may not be more than 6 KBTU/hr

(3) Capacity shall not be greater than 40 KBTU in any other location.

24 CFR 3280.707(b) which is cited in WPN 22-7: Health & Safety Frequently Asked Questions does not allow manufactured homes to be left with any unvented fuel-fired space heaters, even as secondary heat sources. Accordingly, any client who will not let subgrantees remove the space heaters will result in a deferral. KHC understands that the space heaters are the property of the homeowner, and subgrantees need to be respectful of personally owned property. KHC recommends the following process to meet the guidelines so that the fuel-fired space heaters are not left.

1. Get a picture of the unit before starting the removal.
2. Safely unhook and cap off the gas supply. (Performed by a licensed professional.)

3. Remove the unit from the wall.
4. Get pictures of the unit removed.
5. Create a client waiver and have them sign it, which states that the unvented fuel-fired space heater as secondary heat source was not left, and they understand the dangers of installing this type of heat source.

Please focus your efforts on client education and the dangers of leaving this type of secondary heat source in the home. Client education on this subject will be key in having a seamless disconnect of the secondary source.

13.7 Definition of Heating System

A heating system is the equipment by which energy is used to condition air for warmth or produce heat for hot water and cooking. The components of any combustion heating equipment shall include a device such as a furnace, space heater or water heater, its electrical and fuel supply, venting, and distribution system.

Electrical heating systems include a heat producing device such as a furnace, space heater, or water heater, power supply, and distribution system.

Primary Heating System
A qualified inspector/energy auditor shall determine the primary heating system of a dwelling. The primary heating system shall be inspected for safety prior to weatherizing the dwelling. Generally, the primary heating system is the equipment that uses the most energy in the conditioning of air for warmth.

Secondary Heating System
A qualified evaluator/energy auditor shall determine the secondary heating system of a dwelling. The secondary heating system(s) shall be inspected for safety prior to weatherizing the dwelling. Generally, the secondary heating system is that equipment which is used for warmth but is supplemental to another system with more capacity.

Water heating equipment, and to some extent, cooking equipment, can also be thought of as secondary heating systems and must be inspected and repaired in accordance with program standards.

13.8 Heating System Requirements and Treatments

General: All dwellings to be weatherized must have a safe, operable heating system or combination of heating equipment that is a fixed and permanent system.

1. **Definition of a fixed and permanent heating system:**

   A fixed and permanent heating system is one that includes at least **one** or **more** of the following characteristics:

- It is permanently wired into the home's electrical circuit wiring system.
- It is attached to one or more components of the home building envelope.

- It is attached to and receives its fuel from a fuel line/piping delivery system.
- It is connected to a code compliant masonry chimney or factory built metal chimney/flu system used to vent combustion byproducts outside of the home's building envelope.
- It is connected to a supply and return ducting system used to distribute conditioned air throughout the occupiable interior space of the building envelope.

Any heating system that does not possess at least one of the above characteristics will not be treated as a fixed and permanent heating system.

Examples of a fixed and permanent heating system:

- Electric, gas, propane, oil, and heat pump/split system furnaces connected to the home electrical circuit wiring system, and connected to supply and return ductwork, and, if required, connected to a code compliant masonry or factory built metal chimney/flu system
- Electric baseboard space heaters affixed to the wall of the interior building envelope of the home and permanently wired into the home electrical circuit wiring system
- Natural gas, propane, oil, wood, and coal-vented space heaters connected to a code-compliant masonry chimney or factory built metal chimney/flu system.

Note: Weatherization services are strictly prohibited on a home that does not have a permanent and fixed heating system as its primary heating source as defined above and has passed a DNE health and safety inspection/Quality Control Inspection.

2. Policy for primary heating systems that are not permanent and fixed:

No dwelling may receive weatherization services if the home does not have a fixed and permanent heat system/source as their primary source of heat.

Examples of heating sources/systems that are not considered fixed and permanent include but are not limited to: portable, stand-alone electric space heaters and portable, stand-alone kerosene space heaters.

If the dwelling does not have a fixed and permanent heating system, a determination must be made by the Dwelling Needs Evaluator/Energy Auditor as to whether a fixed and permanent heating system can be installed in the client's home per WX Program protocols and requirements. If it is determined that a fixed and permanent heating system can be installed, installation should be performed. All work must pass a post inspection/quality control inspection before any further weatherization work is performed. If it is determined that a fixed and permanent heating system cannot be installed, the job must be treated as a deferral/walk-away. All dwellings that use any kind of unvented combustion heating equipment refer to Section 14.6.

For dwellings with an inoperable heating system, repair the existing system, if practical. For modeling purposes, enter the system as ~~in operable~~ inoperable and use H&S funding to repair or replace. If the cost of repairing the inoperable system exceeds 75 percent of the cost of a replacement unit of equivalent capacity, replace the unit. If the system is being replaced under a different funding stream,

subgrantees will still enter it as inoperable. LIHEAP H&S can be used to fund the repair or replacement. If an inoperable HVAC will be modeled, the efficiency must be input as the original efficiency of the unit. For example, an 80% AFUE furnace that is inoperable will still be entered as 80%.

If non-DOE funds will be used for the replacement, it is imperative the WaWeb model is aware of the replacement so that the HVAC is properly interacted as required by 10 CFR 440.21(e).

This can be done by: (1) modeling the replacement as a mandatory replacement (NOT included in SIR) or (2) model the replacement unit as if it is the existing heating system (this is the recommended method)

If DOE funds will be used for an H&S replacement:

(1) replacement must be evaluated as an ECM replacement first (and be funded as ECM if cost-effective)

(2) If not cost-effective, model the replacement as a mandatory measure with 'Include in SIR' unchecked.

-
- For dwellings without an existing heating system that are utilizing unvented space heaters, treat unvented space heaters as described in section 14.6. Install a vented heating system of adequate capacity to heat the dwelling. This heating system can be a forced air furnace with ductwork, or a combination of vented space heaters.
- For dwellings with operable primary heating systems but with no fuel source, do not weatherize until the fuel source is restored and the system is inspected and treated according to program requirements.
- Replacement of heating equipment shall be equivalent to existing systems regarding capacity. Supplemental equipment is not allowed.

13.9 Issues Concerning Fuel and KHC Policy

Acquiring Fuel
The acquisition of fuel is not permissible with weatherization funds. Deposits, delivery charges, and other expenses concerned with the purchase of fuel are also prohibited. The purchase of LP tanks is prohibited.

Supply Lines
The weatherization program allows for the purchase of supply lines and other delivery system components from the meter or tank to the point of connection to an approved heating system. However, the following restrictions apply:

Natural Gas and Propane
The meter is the property of the fuel vendor. Work is allowed from the house side of the meter only unless local community standards dictate otherwise.

Tanks are the property of the vendor or the owner. Work is allowed from the connection at the second stage regulator tank to the heating unit only.

Oil Systems
The tank, although the property of the vendor or occupant, may be inspected for leakage and water accumulation. A tank which is defective because it is leaking fuel is the responsibility of the vendor or occupant. Excessive water found in a tank must be drained away and, if necessary, sufficient fuel made available to perform an energy system evaluation prior to the dwelling receiving additional services.

Work is permissible from the tank to the connection(s) of the heating unit(s) only.

Electric Systems
Work may only be performed from the service panel (including breakers and conductors) or breaker box to the circuitry of the dwelling or to the heating/cooling equipment. Exterior hardware such as meters, weather heads, and conduit are the responsibility of the client or vendor.

Private Wells
All piping, pumps, regulators, etc. used in the delivery of cost-free fuel from a private well or other source and located outside the dwelling is the responsibility of the owner. The weatherization program will only replace or repair fuel line components from the point of entry into the dwelling to its connection with approved heating equipment.

Changing Fuel Sources
It is possible to change the fuel source of a dwelling provided there is an economic or circumstantial justification. It is required that KHC staff be contacted beforehand for prior approval. Subgrantees must complete and submit a WX 910 form with documentation and justification for approval.

13.10 Solid Fuel Systems – Primary and Secondary Units

- All devices that utilize solid fuel shall be inspected for safety by a qualified inspector/energy auditor.
- A solid fuel system of any kind shall include a stove, its venting components, and any protective or shielding materials necessary to have an approved system.
- All dwellings that utilize solid fuel shall be equipped with a fresh air inlet in situations where a blower door reading indicates .35 air changes per hour (ACH) or less.

Solid fuel systems in mobile homes

- Existing units which have been deemed acceptable by a qualified evaluator/energy auditor can be improved regarding venting, clearances, and repairs.
- A replacement unit must be an approved model for use in a mobile home.

13.11 Chimneys

Masonry chimneys which are in use at a dwelling must be inspected for safety and adequacy by a qualified evaluator/energy auditor. Those masonry chimneys that do not meet the applicable codes must be fitted with an approved liner kit if the chimney is to remain in use.

Factory-built chimneys are acceptable replacements provided they are installed per manufacturer instructions.

13.12 Water Heater Replacements

Replacement of water heating equipment is permissible if any of the criteria in section 8.6 apply:

Non-electric Water Heaters in Bathrooms
Any non-electric water heater located in a bathroom shall be permitted to stay in place provided adequate combustion air can be supplied to the unit. There are a few approaches to address this issue:

1. Build a combustion closet.

2. Contact your monitor if you cannot build a combustion closet for more options.

In very rare cases, where space or structures do not allow for the construction of an enclosure, the water heater may be left in place provided interior combustion air is supplied at a level that satisfies the BTU rating of the device. However, contact your monitor to ensure there are no other options, and this is allowable.

New installations in bathrooms shall be enclosed and supplied with adequate combustion air according to code, or the unit must be a direct-vent type.

13.13 Reference Publications and Other Literature

Subgrantees that perform weatherization services shall acquire the publications and industry literature that KHC deems necessary. These publications include but are not limited to NFPA, IRC, IFGC, and NEC 70, and other applicable code books, manuals, and commercial materials. Lack of use and knowledge of these publications may result in a poor monitoring. These publications will guide technical work in the field. The following link will help subgrantees access some of the publications while others may have to be purchased.

Digital Codes (iccsafe.org)

13.14 Smoke Detectors and Carbon Monoxide Detectors

Dwellings that lack a working smoke detector and/or carbon monoxide detector shall be supplied with an approved device(s), installed according to manufacturer instructions. “Hearing impaired” type smoke detectors and carbon monoxide detectors are required for hearing impaired clients. All requirements of Section 5.13 of this manual must also be met. All installed smoke detectors and/or carbon monoxide detectors must comply with NFPA 72.

13.15 Warranty Periods and Extended Care

Subgrantee labor on installations and repairs is not guaranteed after the date of the final inspection/quality control inspection. It is the responsibility of the local Subgrantee to make the client aware of all specific contracted installation and parts warranties extending beyond the date of final inspection.

The contracts for HVAC or other work using DOE funds must ensure that adequate guarantees of workmanship, implied or otherwise, are part of the bid process. These costs are generally built into the

contract including the equipment, workmanship, and the length of time covered by any implied warranty required in the bid specifications.

Once a home is reported to DOE as complete, the required final inspection/quality control inspection indicates that all work performed was installed correctly, including all work that may have been contracted out such as furnace work, etc. Performing activities such as routine maintenance, repairs or warranty-type work is not permitted using DOE funds for work beyond those costs already invoiced.

Chapter 14: Health and Safety

Allowable energy related health and safety actions are those actions necessary to maintain the physical wellbeing of both the occupants and/or weatherization workers where:

- Costs are reasonable as determined by DOE in accordance with this approved Master Plan;
- The actions must be taken to effectively perform weatherization; or
- The actions are necessary because of weatherization work.

The average DOE cost for abating health and safety hazards shall not exceed 15% of the final average of DOE and LIHEAP funded costs per unit. No single unit shall exceed $4,000 of health and safety cost, without written approval from KHC. Health and safety activities that are not direct components of an efficiency measure shall be charged as a health and safety cost.

The WXPM and the Kentucky Weatherization Field Guide (Version 03.21.2021) function as the primary guidance for compliance for KHC sub-grantee(s) and their subcontractors. In this manner, a reliable source of H&S regulations is always available to the program operators, and a consistent system is in place that is readily understood by all participants.

The Kentucky WAP Network will not move any H&S measure to Incidental Repair Measures. Building rehabilitation is beyond the scope of the WAP. H&S funds should not be used when the repair is a component of an ECM. In that case, the repair should be cost-justified as an IRM and follow the guidelines set forth in the Master File, section 5.1.

14.1 Air Conditioning and Heating Systems

14.1a Primary Heating/Cooling Systems

A qualified inspector/energy auditor shall determine the primary heating system of a dwelling. The primary heating system shall be inspected for safety prior to weatherizing the dwelling. If a life-threatening situation is identified, steps shall be taken immediately to rectify the problem. A contractor or qualified in-house service person shall be made aware to give it priority status.

The following situations shall be considered life threatening:

- Significant fuel leaks.

- Carbon monoxide levels that exceed limits herein described. (see Section 13.19 of this Chapter)
- Electrical malfunctions posing immediate danger to occupants or technicians.

When a space conditioning system does not qualify as an ECM, the following conditions must be met before the unit can be replaced or repaired with Health and Safety funds. When considering replacement, priority must be placed on installing a more energy efficient unit such as a heat pump when replacing an electric heating system, or a 90+ efficiency unit when replacing a standard efficiency gas heating system.

- "Red tagged," inoperable, or nonexistent primary heating system may be replaced, repaired, or installed where climate conditions warrant, consistent with this guidance.
- Primary air conditioning system replacement, repair, or installation is allowed only in homes where current occupants meet Grantee's definition of "at-risk" AND climate conditions warrant *OR as a result of an energy efficient system replacement of an inoperable or nonexistent primary heating system*. "System" can mean a central unit or several individually operating units; however, when a central unit is in place, it shall be considered the primary unit, and all other units are to be considered secondary.
- Use proper sizing protocols (Manual J, wiring sizing, breaker sizing, State Approved sizing protocols, NEAT/MHEA outputs, etc.) based on post-weatherization housing characteristics, including installed mechanical ventilation, when installing or replacing a heating or cooling appliance.
- Unsafe primary units must be repaired, replaced and removed, or rendered inoperable, or deferral is required.
- Replacement or installation of secondary units is not allowed.
- Unsafe secondary units, including space heaters, must be repaired, removed or rendered inoperable, or deferral is required.
- See Hazardous Materials Disposal section for more information.

14.1b Secondary Heating Systems Including Unvented Secondary Space Heaters

Unsafe primary units must be repaired, replaced and removed, or rendered inoperable, or deferral is required. Maintenance and repair of secondary heating units is allowed. Replacement of secondary heating units is not allowed. This system must be operational and inspected using all WXPM test protocols before any other weatherization begins. Unvented combustion space heaters are not considered a primary heat source. Removal is required, except as a secondary heat source and where the unit conforms to ANSI Z21.11.2. Secondary heat source only applies to site-built. Removal is required in the mobile home. Units that do not meet ANSI Z21.11.2 must be removed prior to weatherization but may remain until a replacement heating system is in place. Testing for air-free carbon monoxide (CO) is to be performed per the WXPM. All units must have an ANSI Z21.11.1 label.

14.1c Documentation Required for At-Risk Occupants

The weatherizing agency must determine presence of at-risk occupants before proceeding with evaluation services. *The Health & Safety Client and Home Screening Questionnaire (H&S Screening) form* must be reviewed and signed by the client at the time of application intake and by evaluator before

the evaluation is started. It can be found *on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, http://www.kyhousing.org/Development/Single-Family/Pages/Weatherization-Assistance-Program-Resources.aspx*

To document "at-risk", subgrantees will need a letter by a qualified medical professional, which documents that the client's health requires AC and would be improved with it installed.

14.1d Testing Protocols

- Make sure primary systems are present, operable, and performing correctly.
- Check DOE-approved audit to determine if the system can be installed as an energy conservation measure (ECM) prior to replacement as an H&S measure. When replacing HVAC systems, priority must be placed on installing a more energy efficient unit such as a heat pump when replacing an electric heating system, or a 90+ efficiency unit when replacing a standard efficiency gas heating system.
- Determine and document presence of "at-risk" occupants when installing air-conditioning as a Health and Safety (H&S) measure OR as a result of an energy efficient system replacement of an inoperable or nonexistent primary heating system.
- Electric systems: verify that all wiring and breakers is compliant with data plate and NEC.
- Combustion equipment: inspect chimney and flue and test for Combustion Appliance Zone (CAZ) depressurization.
- Solid fuel appliances: look for visual evidence of soot on the walls, mantel or ceiling or creosote staining near the flue pipe.
- Combustion safety and efficiency testing: Worst-case depressurization tests identify problems that weaken draft and restrict combustion air. Combustion analyzers sample combustion by-products to evaluate safety and efficiency.
- Evaluating Heat Pumps/electric furnace: Look for a temperature rise of around half the outdoor temperature in degrees Fahrenheit. Check for operation of strip heat by measuring amperage.

14.1e Client Education

- When deferral is necessary, provide information to the client, in writing, describing conditions that must be met in order for weatherization to commence. A copy of this notification must also be placed in the client file.
- Discuss appropriate use and maintenance of units.
- Provide all paperwork and manuals for any installed equipment.
- Discuss and provide information on proper disposal of bulk fuel tanks when not removed as part of the weatherization work.
- Where combustion equipment is present, provide safety information including how to recognize depressurization.

- The inspector conducts a client education segment as part of the initial inspection to assure that the occupants are fully aware of measures. This procedure is documented by using a signed receipt from the head of household which confirms that the information was not only distributed, but also explained. The "Checklist" form must be used to verify receipt and explanation of client education material. Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this linkhttps://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx. This receipt is kept in the client file.
- A printable version of Preventing Carbon Monoxide Poisoning can be found here https://www.epa.gov/sites/default/files/2015-08/documents/pcmp_english_100-f-09-001.pdf
- A printable version of, "What You Should Know About Space Heaters" can be found here http://www.hipspro.com/pubs/SpaceHeatSafety.pdf
- A printable version of "Combustion Equipment Safety" can be found here https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/26464.pdf

14.1f Training

Any service provider weatherization staff assigned dwelling needs evaluation or inspection activities as any portion of their job duties must participate in and successfully pass each training requirement listed as well as any other training deemed necessary by KHC.

- Dwelling Needs Evaluator (DNE) class
- NEAT/MHEA, EA-Quip Software
- Leakage, Envelope and Ducts (LED) class
- Combustion Appliance Zone Safety (CAZ) class
- Zonal Pressure Diagnostics (Zonals) class
- ASHRAE 62.2-2016 class
- Intro to WX online course (Mold & Moisture, Asbestos Awareness, KY WX Field Guide)
- Lead Renovator Certification (RRP)
- First Aid Certification
- CPR Certification
- DNE Field Shadowing

All personnel performing repairs or replacements of air conditioning and heating systems must be trained and certified in the field of their designation.

14.2 Asbestos - All

When Asbestos Containing Material is suspected a blower door test is not allowed.

Encapsulation by an appropriately trained professional is allowed. However asbestos encapsulation and testing cost are not reimbursable by the KY WAP. Removal is not allowed.

Asbestos anywhere on the interior or exterior of the dwelling that would need to be addressed either directly or incidentally during the weatherization process is not an allowable H&S cost. Additionally,

asbestos testing or abatement is not an allowable H&S cost. The approach is not to disturb, cut or drill said material and avoid those measures that might do so, unless they are major measures. In instances where measures can be installed without disturbing asbestos surfaces or materials, that is the best approach. In instances where a local authority such as Code Enforcement imposes specific guidelines or requirements, Subgrantee program staff are to make themselves aware of those restrictions and comply with them. If it is determined that weatherization work cannot be performed without creating a hazard the project is to be deferred. The client is to be informed in writing of the potential hazard and the agency must not return to weatherize until an AHERA certified professional issues a clearance statement. A copy of this statement/report must be kept in the client file.

14.2a Testing Protocols

- Visually inspect exterior wall surface and subsurface, floors, walls, and ceilings for suspected Asbestos Containing Materials.
  Asbestos encapsulation and testing cost are not reimbursable by the KY WAP.

14.2b Client Education

Clients must be informed that suspected asbestos is present and how precautions will be taken. Clients will be instructed not to disturb suspected asbestos containing material. Clients must be provided information and explanation on asbestos safety information and steps to correct deferral conditions (where applicable). The clients are required to a sign a form, provided by the weatherizing agency, indicating they have been informed (where applicable).

Using the "Asbestos In The Home" pamphlet or printing the information found on this link https://www.cpsc.gov/safety-education/safety-guides/home/asbestos-home will be considered as compliant asbestos information. The "Checklist" form must be used to verify receipt and explanation of client education material.

Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx. This receipt is kept in the client file.

14.2c Training and Certification Requirements

It is mandatory that all dwelling needs evaluators, crew leaders and weatherization workers attend a course that is specifically targeted to educating these professionals on how to identify asbestos containing materials and work around them without creating a hazard. This course is presented via webinar, or web posting, by KHC Training Staff to educate the weatherization staff on how to identify asbestos containing materials.

14.3 Asbestos – In Vermiculite

When vermiculite is suspected to be present, unless third party testing determines otherwise, the unit is to be deferred.

Asbestos encapsulation and testing cost are not reimbursable by the KY WAP.

14.3a Client Education

Clients must be informed that suspected asbestos is present and how precautions will be taken. Clients will be instructed not to disturb suspected asbestos containing material. Clients must be provided information and explanation on asbestos safety information and steps to correct deferral conditions (where applicable). The clients are required to a sign a form, provided by the weatherizing agency, indicating they have been informed (where applicable).

Using the "Asbestos In The Home" pamphlet or printing the information found on this link https://www.cpsc.gov/safety-education/safety-guides/home/asbestos-home will be considered as compliant asbestos information. The "Checklist" form must be used to verify receipt and explanation of client education material.

Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx. This receipt is kept in the client file.

14.3b Training and Certification Requirements

No handling and or altering of asbestos materials is allowed. It is mandatory that all dwelling needs evaluators, crew leaders and weatherization workers attend a course that is specifically targeted to educating these professionals on how to identify asbestos containing materials and work around them without creating a hazard. This course is presented via webinar, or web posting, by KHC Training Staff to educate the weatherization staff on how to identify asbestos containing materials and work around them without creating a hazard.

14.4 Asbestos – On Pipes, Furnaces, Other Small Covered Surfaces

Regarding pipes, furnaces, and other small-covered surfaces, assume asbestos is present in the covering materials. Encapsulation is allowed by an AHERA asbestos control professional and should be conducted prior to blower door testing. Asbestos encapsulation and testing are not reimbursable costs within the Kentucky WAP. Policies have been in effect for asbestos presence and related work practices for many years. The approach is not to disturb, cut or drill said material and deter those measures that might do so.

14.4a Client Education

Clients must be informed that suspected asbestos is present and how precautions will be taken. Clients will be instructed not to disturb suspected asbestos containing material. Clients must be provided information and explanation on asbestos safety information and steps to correct deferral conditions (where applicable). The clients are required to a sign a form, provided by the weatherizing agency, indicating they have been informed (where applicable).

Using the "Asbestos In The Home" pamphlet or printing the information found on this link https://www.cpsc.gov/safety-education/safety-guides/home/asbestos-home will be considered as

compliant asbestos information. The "Checklist" form must be used to verify receipt and explanation of client education material.

Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx. This receipt is kept in the client file.

14.4b Training and Certification Requirements

No handling and or altering of asbestos materials is allowed. It is mandatory that all dwelling needs evaluators, crew leaders and weatherization workers attend a course that is specifically targeted to educating these professionals on how to identify asbestos containing materials and work around them without creating a hazard. This course is presented via webinar, or web posting, by KHC Training Staff to educate the weatherization staff on how to identify asbestos containing materials and work around them without creating a hazard.

14.5 Biologicals and Unsanitary Conditions

Addressing bacteria and viruses is not allowed. Cleaning or repairing biological and unsanitary conditions to perform weatherization is not allowed. Deferral may be necessary in cases where a known agent is present in the home that may create a serious risk to occupants or weatherization workers.

14.5a Testing Protocols

A sensory inspection is required. Clients must be informed of observed conditions. Clients must be provided information and explanation on how to maintain a sanitary home and steps to correct deferral conditions (where applicable).

14.5b Client Education

Clients must be informed of observed conditions. Clients must be provided information and explanation on how to maintain a sanitary home and steps to correct deferral conditions (where applicable). An informational form called, "How to Maintain a Clean Home" *can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.*

14.5c Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training

The curriculum covers our program manual, the KY Field Guide, and pertinent section of the SWS.
Also included in the DNE curriculum are WX Policy, Procedure Training, Blower Door Usage and elements of Mold and Moisture.

- Four Modules of online Energy Related Mold and Moisture (includes Indoor Air Quality)

14.6 Building Structure and Roofing

During the pre-inspection or initial inspection of the dwelling, the evaluator/energy auditor must have access to all aspects of the structure to adequately and appropriately gather data for the NEAT or MHEA energy audit. Clothing, dogs, trash, or other impediments restricting access to any portion or portions of the dwelling may necessitate deferral of the unit.

Minor repairs will be less than 40% of the total H&S measures. Examples of minor repairs would be repairing a section of roofing or structure that is below 10sqft in size. Building rehabilitation is beyond the scope of the WAP. H&S funds should not be used when the repair is a component of an ECM. In that case, the repair should be cost-justified as an incidental repair.

All KY weatherization jobs use site-specific NEAT-MHEA audit software.

14.6a Client Education

Clients must be notified in writing of structurally compromised areas when applicable.

14.6b Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or “evaluators”) must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training or Energy Auditor Training
- WX Policy and Procedure Training

This training includes how to identify structural and roofing deficiencies.

14.7 Code Compliance

Correction of preexisting code compliance issues is not an allowable cost other than where they are triggered by performing weatherization measures. State and local (or jurisdiction having authority) codes must be followed while installing weatherization measures. H&S funds should not be used when the repair is a component of an ECM, such as fixing a light fixture to install a CFL/LED bulb. In this case the cost should be cost-justified as an incidental repair.

When correction of preexisting code compliance issues is triggered and paid for with WAP funds, cite specific code requirements with reference to the weatherization measure(s) that triggered the code compliance issue in the client file.

Follow State and local or AHJ codes while installing weatherization measures, including H&S measures.

Specific situations commonly triggering cold compliance work requirements:

- Non code compliant wiring or breaker sizing on secondary heat systems or primary heat systems that are in need of repair.
  Condemned properties and properties where "red tagged" H&S conditions exist that cannot be corrected under this guidance must be deferred.

14.7a Client Education

Clients must be notified of observed code compliance issues.

14.7b Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:
The following training curriculums are updated whenever new versions of code are adopted in Kentucky.

- DNE/Energy Auditor Training or Energy Auditor Training
- WX Policy and Procedure Training

14.8 Combustion Gasses

14.8a Testing Protocols

Combustion safety testing is required when combustion appliances are present.

Test naturally drafting appliances for spillage and CO during CAZ depressurization testing pre- and post-weatherization and before leaving the home on any day when work has been done that could affect draft (e.g., tightening the home, adding exhaust).

Inspect venting of combustion appliances and confirm adequate clearances.

Check DOE-approved audit to determine if the appliance can be justified as an ECM prior to replacement as an H&S measure.

Proper venting to the outside for combustion appliances, including gas dryers is required. Correction of venting is allowed when testing indicates a problem. Inspection and testing is required per the WXPM.

14.8b Protocols for Addressing Hazards Discovered During Testing

Personnel are instructed to wear a personal CO detection monitor always when the danger of combustion gases are present. The EPA's suggested maximum 8-hour CO exposure is 9 ppm (as measured) in room air. CO at or above 9 ppm is often caused by malfunctioning combustion appliances in the home, although cigarette smoking or auto exhaust are also common CO sources. The EPA's one-hour CO limit is 35 ppm (as measured). At any time if CO reaches a dangerous level 70ppm (as measured) the personnel are instructed to evacuate the dwelling and report the issues.

Correction of venting issues should be completed as an incidental repair when it is a component of an ECM. Proper venting to the outside for combustion appliances, including gas dryers is required. Combustion safety testing is required when combustion appliances are present. Inspections must include:

- Inspections of venting of combustion appliance and confirmation of adequate clearances to combustibles.
- Testing natural draft appliances for draft and spillage under worse case conditions before and after air sealing.
  Inspection of stovetop cooking burners and oven burner for operability and flame quality. Replacement of cook stoves is not allowed. Repair is an allowable H&S cost.

14.8c Client Education

Clients must be provided information and explanation of combustion safety and hazards information. This procedure is documented by using a signed receipt from the head of household which confirms that the information was not only distributed, but also explained. The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

A printable version of Preventing Carbon Monoxide Poisoning can be found here, https://www.epa.gov/sites/production/files/2015-08/documents/pcmp_english_100-f-09-001.pdf

A printable version of, "What You Should Know About Space Heaters" can be found here, http://www.hipspro.com/pubs/SpaceHeatSafety.pdf

A printable version of "Combustion Equipment Safety" can be found here, https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/26464.pdf

14.8d Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training or Energy Auditor Training

The curriculum for DNE covers combustion appliance zone safety.

- Energy Systems Training

This curriculum covers all aspects of diagnostic testing and the aspects of the Kentucky program, that comply with BPI 1200 standards, with written and hands on instruction.

14.9 Electrical

Minor electrical repairs are allowed where health and safety of the occupant/worker(s) is at risk. Upgrades and repairs are allowed when necessary to perform specific weatherization measures. A visual inspection must be conducted and inspections and testing must be performed. Knob and tube wiring shall not be covered or encapsulated with insulation in Kentucky. The removal and replacement of knob and tube requires electrical license and is allowed as an incidental repair to an ECM such as installing insulation. Decommissioning of knob-and-tube wiring to allow for insulation. When a wiring connection is broken, a certified electrician must be used to repair the connection.

Examples of "minor" or allowable costs would include the following:

- Repairing/replacing wiring, fuses, and circuit breakers to ensure that wiring isn't overloaded
- Installing S-type fuses (where appropriate) to prevent circuit overloading
- Ensuring that all wire splices are enclosed in electrical junction boxes. If you plan to cover a junction box with insulation, attach a flag to mark its location.
- Verifying that the electrical system is grounded

An example of electrical repairs beyond the scope of weatherization would include upgrading of electrical service. (i.e. 100amp to 200amp).

All KY weatherization jobs use site-specific NEAT-MHEA audit software.

14.9a Client Education

Clients must be provided information and explanation on the hazards of overloading circuits, basic electrical safety/risks and overcurrent protection when applicable.

A printable version of, "A Guide To Home Wiring Hazards" can be found here, https://www.cpsc.gov/s3fs-public/518.pdf

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

14.9b Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training or Energy Auditor Training
  This curriculum has two days devoted to electric theory, principles and code.
- Energy Systems Training
- Basic A/C and Heat Pump Inspection

This curriculum includes diagnostics, and NEC 70 code compliance.

All personnel performing repairs or replacements of electrical systems must be trained and certified in the field of their designation.

14.10 Formaldehyde, Volatile Organic Compounds (VOCs), Flammable Liquids, and Other Air Pollutants

Formaldehyde, tobacco smoke, thinners, solvents, cleaners, and any other substances capable of negatively impacting indoor air quality are identified through the on-site inspection process. Basic strategies such as proper storage and ventilation are used to eliminate problems. Air sealing thresholds are maintained so that the presence of these pollutants is not concentrated and allowed to reach toxic levels. However, this is primarily an occupant responsibility. In some cases, deferral may be an option.

14.10aTesting Protocols

Removal of pollutants is allowed and is required if they pose a risk to workers. If pollutants pose a risk to workers and removal cannot be performed or is not allowed by the client, the unit must be deferred. Removal of pollutants that is not necessary to perform weatherization (e.g. cleaning old paint cans and oil out of a garage) is not allowed. When deferral is necessary, provide information in writing describing conditions that must be met for weatherization to commence.

14.10b Client Education

Clients must be informed of observed conditions and associated risks. Client must be given written information and explanation on safety and proper disposal of household pollutants when applicable. Printing copies of the information on the following links will serve a compliance to this phase.

Clients must sign the Checklist to verify receipt and understanding of this information
https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality
https://www.epa.gov/indoor-air-quality-iaq/care-your-air-guide-indoor-air-quality
https://www.epa.gov/indoor-air-quality-iaq/care-your-air-guide-indoor-air-quality#learn

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

14.11 Fuel Leaks

Repair and replacement of fuel line leaks are allowable costs under DOE examples of allowable cost would be tightening or replacing existing fittings, installation of drip leg, or appliance connectors. Examples of fuel leak repairs that are considered beyond the scope of weatherization would include replacement of bulk storage tanks, meters, or repairs or replacements that would require line excavation.

14.11a Remediation Protocols

- Sweep all gas lines, valves and joints with the electronic combustible gas detector compliant with BPI 1200 standard.
- Accurately locate leaks using a noncorrosive bubbling liquid, designed for finding gas leaks.
- The following repairs require proper license or designation.
- Repair all gas leaks.
- Replace kinked or corroded flexible gas connectors.
- Replace flexible gas lines manufactured before 1973. The line's manufacture date is stamped on a date ring attached to the flexible gas line. If a date ring isn't present, and you believe the gas line predates 1973, then replace the flexible gas line.
- Inform clients in writing by documenting pre and post client education checklist when fuel leaks are detected.

14.11b Client Education

Clients must be informed of observed conditions and associated risks.

14.11c Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training
- Energy Systems Training

The curriculum for both trainings covers policy and procedures when encountering fuel leaks.

All personnel performing repairs or replacements of fuel lines must be trained and certified in the field of their designation.

14.12 Gas Ovens / Stovetops / Ranges

When you measure CO at 225 ppm as measured at the oven vent while the oven is lit or observe the burner is not burning properly while they are lit, consider these remedies:

- Adjust to reduce the CO level or recommend a service call by a gas combustion specialist to adjust the fuel air mixture of the burners.
- Install a CO alarm in the kitchen. In the case of CO measurements greater than the above standards,
- Arrange an immediate service call to identify and correct the cause of CO production.
- Install an exhaust fan on all gas stoves unless KHC approves the non-installation of the exhaust fan.
    1. Solid metal ducting to the outdoors.
    2. A weatherproof termination fitting.
    3. A backdraft damper, installed in the fan housing or termination fitting.
    4. Noise rating of 3 sones or less.

Replacement of these appliances is not allowed.

14.12a Testing Protocols

Testing Oven:

- Check oven for stored items.
- Turn the oven on and set it to bake on high temperature.
- Sample the CO level in exhaust gases at the oven vent and in the ambient air after 10 minutes**.**
- If the CO reading is over 225 ppm as measured or if the ambient-air reading rises to 70 ppm or more during the test, discontinue testing.

Testing burners:

- Test each stove-top burner separately, performing a visual inspection
- Have a certified individual clean and adjust burners not burning properly

14.12b Client Education

Clients are educated about the following safety practices in using their gas range.

- Never use a range burner or gas oven as a space heater.
- Open a window and turn on the kitchen exhaust fan when using the range or oven.
- Buy and install a CO alarm and discontinue use of the oven and range burners if the ambient CO level rises above 9 ppm, and the stove cannot be cleaned and/or repaired.
- Never install aluminum foil around a range burner or oven burner.
- Keep range burners and ovens clean to prevent dirt from interfering with combustion.
- Burners should display hard blue flames. Yellow or white flames, wavering flames, or noisy flames should be investigated by a trained gas technician.

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

A printable version of "Combustion Equipment Safety" can be found here, https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/26464.pdf

14.12c *Training*

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training
  Covers CO action levels, gas leak detection and proper test procedure.
- ASHRAE 62.2 Training

CO action level and requirements for exhaust are covered.

All personnel performing repairs or replacements of gas ranges and ovens must be trained and certified in the field of their designation.

14.13 Hazardous Materials Disposal [Lead, Refrigerant, Asbestos, Mercury (Including CFLs / Fluorescents), Etc.]

14.13a Disposal Procedures and Documentation Requirements

Lead:
The certified renovator must perform the post-renovation cleaning verification.

Refrigerants for: air conditioners & heat pumps.
When replacing a refrigerator and heat pump, the old appliance must be removed from the property and disposed of properly per Section 608 of the 1990 Clean Air Act, as amended by 40 CFR 82, Subpart F, 1995. See *Specifications for the Low-Income Weatherization Program* for proper disposal methods. Written documentation proving the old unit was disposed of properly is required.

Asbestos:
No handling or altering of asbestos materials is allowed. It will be mandatory that all dwelling needs evaluators/energy auditors, crew leaders and weatherization workers attend a course that is specifically targeted to educating these professionals on how to identify asbestos containing materials and work around them without creating a hazard. This course is presented via webinar or web posting, by KHC training staff.

Hazardous Waste Materials generated in the course of weatherization work shall be disposed of according to all local laws, regulations and/or Federal guidelines, as applicable.

Document proper disposal requirements in contract language with responsible party.

Refer to *Lead* and *Asbestos* sections for more information on those topics.

14.13b Client Education

The Subgrantee shall inform all potential clients as to the hazards associated with Lead Based Paint through the Environmental Protection Agency (EPA) pamphlet *Renovate Right*. The Subgrantee shall document and keep on file signed statements from all clients verifying that this information has been conveyed. Barring any objection from the client, weatherization service may then be rendered with knowledge of and compliance with EPA's Lead; Renovation, Repair and Painting Program (RRP) and Lead Safe Work Practices (LSWP).

Refrigerant:
Clients are to be advised not to disturb refrigerant.

Asbestos:

Clients must be informed that suspected asbestos is present and how precautions will be taken. Clients will be instructed not to disturb suspected asbestos containing material. Clients must be provided information and explanation on asbestos safety information and steps to correct deferral conditions when applicable. The clients are required to sign a form, provided by the weatherizing agency, indicating they have been informed when applicable.

Inform clients about proper recycling of fluorescent bulbs and mercury thermostats by stores, municipal waste departments, or other recycling organizations.

Inform client in writing of hazards associated with hazardous waste materials being generated/handled in the home. Using the, "Protect Your Family from Lead in Your Home" pamphlet or printing a copy from this link https://www.epa.gov/sites/default/files/2020-04/documents/lead-in-your-home-portrait-color-2020-508.pdf will be considered as compliant lead information.

Using the "Asbestos In The Home" pamphlet or printing the information found on this link https://www.cpsc.gov/safety-education/safety-guides/home/asbestos-home will be considered as compliant asbestos information.

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

14.13c Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training or Energy Auditor Training
- Energy Systems Training
- Lead Based Weatherization Safe Work Practices
- RRP Certified Renovator
- ASHRAE 62.2 Training

The following topics are covered in the curriculum of the above trainings when hazardous material subject matter is appropriate.

- Appropriate Personal Protective Equipment (PPE) for working with hazardous waste materials.
- Disposal requirements and locations.
- Health and environmental risks related to hazardous materials.

14.14 Injury Prevention of Occupants and Weatherization Workers

14.14a Guidance Regarding Repair and Installation of Stairs, Handrails, Porch Deck Boards, Etc.

Workers must take all reasonable precautions against performing work on homes that will subject workers or occupants to health and safety risks. Minor repairs and installation may be conducted only when necessary to effectively weatherize the home; otherwise, these measures are not allowed.

14.14b Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training
  Injury and prevention of Occupants/Workers safety is covered in the visual inspection phase of the evaluation procedures.

14.15 Lead Based Paint

14.15a Safe Work Protocols

Crews must follow EPA's Lead; Renovation, Repair and Painting Program (RRP) when working in pre-1978 housing unless testing confirms the work area to be lead free. Deferral is required when the extent and condition of lead-based paint in the house would potentially create further H&S hazards.

Only those costs directly associated with the testing and lead safe practices for surfaces directly disturbed during weatherization activities are allowable.

All workers on site on any Weatherization project, whether they be a crew-based employee of one of the subcontractors or a private sector contractor, must complete an eight (8) hour Lead Safe Work Practices training. The intent of this course is to educate the worker about lead hazards and the proper ways to deal with them, and in doing so, to work in such a way as to not expose clients or their families to these hazards. All crews and contractors are required to carry HEPA vacuum machines, respirators, disposable bio suits, and all other items required for Lead Safe Work Practices.

The program manual addresses this area specifically with detailed guidance for onsite protocols:

- Wear a tight-fitting respirator and disposable coveralls.
- Seal work areas within a home with tape and plastic. Cover furniture, carpet, and other surfaces with plastic drop cloths or tarps.
- Spray water on disturbed areas to minimize dust.
- Clean-up work area each day. Sweep carefully and wet mop as needed. Use a HEPA vacuum cleaner to collect dust and paint chips.
- Keep children away from work area at all times.

While this represents only a summary of the overall Lead Safe Work Practices and training, it illustrates KY WX's awareness of the issue and how it is integral to safety on weatherization projects.

14.15b Testing Protocols

Testing to determine the presence of lead in paint that will be disturbed by WAP measure installation is allowed with EPA-approved testing methods. If testing is not performed and lead paint is suspected, LSWP must be performed.

Testing methods must be economically feasible and justified.

Job site set up and cleaning verification by a Certified Renovator is required.

Grantees must verify that crews are using lead safe work practices during monitoring.

Subgrantees must follow EPA's Lead Renovation, Repair and Painting (RRP). In addition to RRP, Weatherization requires all weatherization crews working in pre-1978 housing to be trained in Lead Safe Weatherization (LSW).

Deferral is required when the extent and condition of lead-based paint in the house would potentially create further health and safety hazards.

14.15c Client Education

The head of household of every home to be weatherized receives the informational pamphlet "Renovating Right".

The inspector/energy auditor also conducts a client education segment as part of the initial inspection to ensure that the occupants are fully aware of the hazards posed by Lead Based Paint exposure. Using the, "Protect Your Family from Lead in Your Home" pamphlet or printing a copy from this link https://www.epa.gov/sites/default/files/2020-04/documents/lead-in-your-home-portrait-color-2020-508.pdf will be considered as compliant lead information.

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

14.15d Training and Certification Requirements

All Subgrantees and private sector contractors must have Lead Renovator Firm status. All evaluators (inspectors) must have Lead Renovator (RRP) certification as well as all crew leaders. This is a requirement for contracting with the program. This applies to contractors performing and/or managing the following activities: weatherization related work, inspection services, energy auditing services, dwelling needs evaluation or like services. Private contractors must also meet the requirement of having adequate RRP certified employees among their ranks. As new contractors apply to work on WX projects the EPA requirements must be explained during the application process.

Private contractors will be required to furnish proof of RRP and Lead Renovator Firm status as a condition of working for the WX program. The monitoring staff will routinely check that documentation is on file at each agency, verifying compliance with the EPA rules.

All weatherization crews working on pre-1978 homes must receive the DOE approved LSW training and a certified renovator must be assigned to the project and be readily available.

State Monitor/Trainers must be Certified Renovators and complete a KHC-approved LSWP training.

*Client files and Subgrantee Employee certifications are reviewed during KHC Technical and Programmatic monitoring. Employee certification for RRP certification is reviewed by the KHC Programmatic Monitor. Client files are reviewed for proper documentation including photo documentation.

14.15e Documentation Requirements

The Subgrantees must give the client a copy of the EPA publication *The Lead-Safe Certified Guide to Renovate Right pamphlet, found at this link* *https://www.epa.gov/sites/default/files/documents/renovaterightbrochure.pdf*, and have the client sign the Sample Pre-Renovation Form located in the back of the Pamphlet to certify the client has received the pamphlet. That signed form must be kept in the client's file as proof the client received educational material about the dangers of lead paint.

Documentation in the client file must include Certified Renovator certification; any training provided on-site; description of specific actions taken; lead testing and assessment documentation; and, photos of site and containment set up. Include the location of photos referenced if not in file.

14.16 Mold and Moisture

14.16a Guidance for Dealing with Moisture Related Issues

Limited water damage repairs that can be addressed by weatherization workers are allowed when necessary in order to weatherize the home and to ensure the long-term stability and durability of the measures.

Source control (i.e. correction of moisture and mold creating conditions) is allowed when necessary in order to weatherize the home and to ensure the long-term stability and durability of the measures. Source control is independent of latent damage and related repairs.

Where severe Mold and Moisture issues cannot be addressed, deferral is required.

Mold cleanup is not an allowable H&S cost. The Kentucky Weatherization program is not a mold remediation program and funds should not be used to test, abate, remediate, purchase insurance, or alleviate existing mold conditions identified during the audit, the work performance period, or the quality control inspection. Most typically, weatherization services may need to be delayed. Upon the discovery of a mold condition, the local agency must provide some form of notification or disclaimer to

the client describing what was done to the home in an attempt to alleviate the condition or to prevent new mold growth.

Surface preparation where weatherization measures are being installed (e.g., cleaning mold off window trim in order to apply caulk) must be charged as part of the ECM, not to the H&S budget category.

Minor moisture problems that can be corrected within the scope of the program include:

- Install a ground moisture barrier, where accessible, which is a piece of heavy plastic sheeting (6 mil minimum) laid on the ground.
- Overlap the ground moisture barrier seams by 12" and seal with polyurethane adhesive.
- Verify that clothes dryers and exhaust fans vent to the outdoors and not into crawl spaces or attics.
- Replace or repair leaky DWH (with proper approval), fittings or connections, installation of appliance connectors or PTR valves.
- Seal water leaks in the foundation.
- Seal water leaks in the roof.
- Remove unvented space heaters, a major source of moisture, from the home.
- Educate clients about ways of reducing home moisture that are under their control.
- Educate customers to avoid excessive watering around the home's perimeter. Watering lawns and plants close to the house can dampen its foundation. In moist climates, keep shrubbery away from the foundation, to allow air circulation near the foundation.
- Insulate, air-seal

Major moisture problems that cannot be corrected within the scope of the program include:

- An enclosed crawlspace or basement that has standing water for significant periods of time due to inadequate ground or surface water drainage.
- Any building with no overhangs and no gutters, exhibiting signs of major moisture problems such as blistering paint and extensive mold/mildew on the inside of the house.

14.16b Client Education

The clients must be provided with a disclaimer on mold and moisture awareness. A printable version of "A Brief Guide to Mold, Moisture and Your Home" can be found here, https://www.epa.gov/sites/production/files/2016-10/documents/moldguide12.pdf

The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.*

14.16c Training

A mold awareness webinar is required training for all crews/contractors. This is available on the KHC website here, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx under the Energy Related Mold & Moisture Webinar

14.17 Pests

Pest infestation within the dwelling or in any area outside of the dwelling where service provider staff or subcontractors would have to work is cause for deferral. (Pests include, but are not limited to: fleas, roaches, rodents).

When a person's health may be at risk and/or WAP work activities could constitute an H&S hazard, the occupant will be required to take appropriate action based on severity of risk.
Failure or the inability to take appropriate actions must result in deferral.

14.17a Testing Protocols

A visual inspection is performed on pre-inspection. Any signs of excessive pest inhabitance (at discretion of evaluator) results in a deferral.

14.17b Client Education

Clients must be informed in writing of observed condition and associated risks.

14.17c Training

KY WX has in place a certification process which works to ensure knowledgeable, qualified individuals are the first persons on the jobsite thereby identifying, H&S issues before any work is done. This goes a long way towards preventing harm to either crew members or clients. KY WX inspectors/energy auditors (or "evaluators") must have passed or participated in training in the following areas:

- DNE/Energy Auditor Training
  Covered in deferral curriculum.

14.18 Radon

In homes where radon may be present, precautions should be taken to reduce the likelihood of making radon issues worse. Extreme cases will result in deferral. The following information from DOE WPN 22-7 is provided to all KY WAP Subgrantees:

Action/Allowability
Required (when applicable):

- Cover exposed dirt floors within the pressure/thermal boundary with a sealed soil gas retarder
- Cover sump well/pits with airtight covers
- Implement ventilation as required by ASHRAE 62.2-2016

Allowable:
In homes where radon may be present, work scope may include additional precautionary measures based on *EPA Healthy Indoor Environment Protocols for Home Energy Upgrades*. Other precautions may include, but are not limited to, sealing any observed floor and/or foundation penetrations, isolating the basement from the conditioned space, and ensuring crawl space venting is installed and operable.

Prohibited:
Using DOE WAP H&S funds for radon mitigation.

14.18a Testing Protocols

Clients must sign an informed consent form prior to receiving weatherization services. This form must be kept in the client file. In homes where radon may be present, work scope should include precautionary measures based on EPA Healthy Indoor Environment Protocols for Home Energy Upgrades, to reduce the possibility of making radon issues worse.

Whenever site conditions permit, cover exposed dirt floors within the pressure/thermal boundary with 6 mil (or greater) polyethylene sheeting, lapped at least 12" and sealed with appropriate sealant at all seams, walls and penetrations (sealed soil gas retarder).

Other precautions **must include** sealing any observed floor and/or foundation penetrations, including covering sump well/pits with airtight covers, isolating the basement from the conditioned space, ensuring crawl space venting is installed, and implement ventilation as required by ASHRAE 62.6-2016.

14.18b Client Education

Clients must be provided with the EPA consumer's guide to radon. Compliance can be verified by using the, "A Citizen's Guide to Radon" pamphlet or by printing a copy from this link, https://www.epa.gov/sites/production/files/2016-12/documents/2016_a_citizens_guide_to_radon.pdf

The client education checklist (which includes radon education) must be in the client file. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx*

14.18c Training and Certification Requirements

Our DNE course curriculum covers radon, what it is and how it occurs, including what factors may make radon worse, and precautionary measures that may be helpful.

Our DNE and Retrofit Installer course curriculum covers proper vapor retarder installation.

A zonal map can be located at https://www.epa.gov/system/files/documents/2024-05/radon-zones-map_updated.pdf.

14.19 Safety Devices: Smoke and Carbon Monoxide Alarms, Fire Extinguishers

Smoke Alarms:

- If hardwired smoke detectors exist, the alteration or repair will require the removal of wall or ceiling finishes exposing the structure.
- In every sleeping room.
- Outside of each sleeping area in the immediate vicinity of the bedrooms.
- On each additional story (including basements).
- In split-level dwellings where an intervening door is located between the adjacent levels. However, in split-level dwellings without an intervening door, a smoke alarm installed on the upper level shall suffice for the adjacent lower level, provided the lower level is less than one full story below the upper level.
- Near every combustion zone. This alarm can serve the requirements of bullets 1 through 4 where feasible.

Carbon Monoxide Alarms:

- CO alarms must be UL-listed, installed in accordance with the manufacturer's recommendations and located in compliance with NFPA.
- Installed CO alarms must have the capability to accurately detect and digitally display low levels of carbon monoxide to 10 ppm and comply with other program requirements.
- Electric plug-in CO alarms must have battery backup.
- CO alarms designed for the hearing impaired must be installed when the client is hearing impaired.

Fire Extinguishers:

- Providing fire extinguishers is allowed only when solid fuel-burning heating systems are present.
- Fire extinguishers must be installed according to the manufacturer's recommendations, be type ABC, UL-listed, ≤ 10 lb. and with a permanently affixed wall bracket to receive the extinguisher.

14.19a Testing Protocols

A visual inspection is performed to determine the need and location of CO/Smoke alarms and fire extinguishers.

14.19b Client Education

Client must be provided verbal and written information on the use of devices installed. The "Checklist" form must be used to verify receipt and explanation of client education material. *Forms can be found on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx.* This receipt is kept in the client file.

A printable version of Preventing Carbon Monoxide Poisoning can be found here, https://www.epa.gov/sites/production/files/2015-08/documents/pcmp_english_100-f-09-001.pdf

A printable version of, "What You Should Know About Space Heaters" can be found here, http://www.hipspro.com/pubs/SpaceHeatSafety.pdf

A printable version of "Combustion Equipment Safety" can be found here, https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/26464.pdf

14.19c Training

The client must sign a written agreement to allow a fire extinguisher to be installed in the home within sight of the solid fuel burning heat system when standing at the unit. The agency must discuss and provide the client with information on the use and upkeep of the extinguisher.

- DNE/Energy Auditor Training
  There is a module in the curriculum that covers the operation and location of these devices.

14.20 Occupant Health and Safety Concerns and Conditions

Occupants will be asked to reveal known or suspected health concerns as part of initial application for weatherization. The occupants of the dwelling will be screened again prior to and during the audit. The client will be asked to disclose information of known risks. It will also require that worker contact information (in the form of agency weatherization office staff phone numbers) be given to the client so client can inform of any issues.

The weatherizing agency must determine presence of at-risk occupants (i.e. elderly, persons with disabilities or other health concerns) before proceeding with evaluation services. When a person's health may be at risk and/or the work activities could constitute a health of safety hazard, the occupant at risk will be required to take appropriate action based on severity of risk. Temporary relocation of at-risk occupants may be allowed. A written request must be submitted to KHC and approval must be granted before any further action is taken. Failure or the inability to take appropriate actions must result in deferral.

The Health & Safety Client and Home Screening Questionnaire (H&S Screening) form must be reviewed and signed by the client at the time of application intake and by evaluator before the evaluation is started. It can be found *on the Weatherization Assistance Program Resources page under the "Weatherization Forms" tab in the center of the page. Use this link, https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Pages/WAP-Resources.aspx*

14.21 Ventilation and Indoor Air Quality (Use ASHRAE 62.2-2016 standards)

14.21a Testing and Final Verification Protocols

On both initial and QCI inspections home is evaluated based on CFM tightness, existing fan flow, square footage, # of bedrooms, and window placement to determine the required mechanical ventilation based on ASHRAE 62.2-2016 standards.

Measure fan flow of existing fans and of installed equipment to verify performance.

14.21b Client Education

Provide information to the client on the function, use, and maintenance of ventilation systems and components. The client must also be provided with a disclaimer that ASHRAE 62.2 does not negate high polluting sources or guarantee indoor air quality.

14.21c Training

ASHRAE 62.2-2016 training of evaluators, energy auditors, and crew leaders is provided by KHC. This training is required and includes proper sizing and evaluation of existing and new systems, depressurization tightness limits, critical air zones, etc. In addition, compliance to standard is evaluated during state monitoring visits to sub grantee and results are used to recommend additional training and focus training efforts.

14.22 Window and Door Replacement, Window Guards

Replacement, repair, or installation of doors, windows or window guards is not an allowable H&S cost but may be allowed as an ECM if it is cost justified.

14.22a Testing Protocols

A visual inspection, in conjunction with diagnostic testing, (i.e. blower door) is performed to determine the condition of existing doors and windows.

14.22b Client Education

Provide written information on lead risks wherever issues are identified. See Lead guidance.

14.22c Training

Training during DNE and *KY WAP Policies and Procedures* covers client education in respect to window replacement and H&S concerns when encountering lead.

14.23 Worker Safety (OSHA, etc)

14.23a Policy for In-Progress Monitoring

Field monitoring performs unit file review for evidence of safe work practices. Field monitoring of in progress units will perform assessments to determine if crews are utilizing safe work practices. Workers

must follow OSHA standards and take precautions to ensure the health and safety of themselves and other workers.

14.23b Training and Certification Requirements

The Kentucky Weatherization Program no longer requires the completion of either the OSHA-10 or the OSHA-30 training courses. However, DOE will continue to encourage Subgrantees to provide this training to their field staff since job site safety is very important. No part of this notice eliminates the need for Subgrantees to follow OSHA standards. OSHA still requires that all workers receive training to address specific hazards that the worker can reasonably expect to encounter on a job site such as (but not limited to) fall protection, use of personal protective equipment, electrocution and the safe operation of power tools. KHC continues to strongly recommend this training for all workers as a best practice even though it is not required. Workers must follow OSHA standards where required and take precautions to ensure the H&S of themselves and other workers.

All Subgrantees and contractors must maintain compliance with the current OSHA Hazard Communication Standard, including on-site organized Safety Data Sheets (SDS) (formerly called MSDS).

Chapter 15: ASHRAE 62.2 2016 Requirements and Procedures

Introduction and Overview:

The Department of Energy has adopted the ASHRAE 62.2- 2016 effective July 1, 2017, for the Weatherization Assistance Program. Information contained in this section references the ASHRAE 62.2-2016 standard. With the MVR requirement having been eliminated from the Weatherization program protocols, the primary purpose of air infiltration measures on a home is to reduce the natural air infiltration rate of the home down as low as possible with mechanical ventilation being introduced into the home to maintain indoor air quality and comply with ASHRAE 62.2-2016 standards and subsequent amendments and/or addendums.

KHC provides training and technical assistance with regards to the currently adopted ASHRAE 62.2-2016 standards and any subsequent amendments and/or addendums to ASHRAE 62.2-2016 for the Weatherization Assistance Program on an ongoing basis to ensure that all required procedures and protocols are followed by all providers of weatherization services. All Subgrantee staff must complete all training required by KHC.

For further guidance, please reference ASHRAE 62.2-2016.

15.1 Exemptions from Mechanical Ventilation Requirements

Any home calculated to need less than 15 cfm (<15) of mechanical ventilation will not need a mechanical ventilation system installed. If the initial blower door estimated final does not require mechanical ventilation a fan does not have to be installed up front (before regular weatherization). If the final blower door reading does require mechanical ventilation of 15 cfm or greater, it can be installed after regular weatherization work has been completed.

15.2 Whole-building Ventilation and ASHRAE 62.2-2016 Overview

Most homes in North America currently rely on air leakage for ventilation. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) publish ventilation standards.

The current ASHRAE 62.2-2016 standard requires fan-powered mechanical ventilation in all homes, as well as local exhaust ventilation in kitchens and bathrooms. Existing homes are exempt from this requirement so long as the Normative Appendix A is followed. The standard allows for natural infiltration (air leakage) to contribute toward the required whole-building ventilation rate. The standard also allows for whole-building fan-powered mechanical ventilation to make up for insufficient local ventilation. All Subgrantees of weatherization services are required to comply with the requirements of the ASHRAE 62.2 currently in force and any subsequent amendments and/or addendums.

This chapter of the Kentucky Weatherization Program Manual utilizes and discusses various components of the ASHRAE 62.2 standard to assist you in complying with the various requirements of the standard. Various sections of the standard are referenced throughout this chapter. For example, when a section number such as "4.1" is listed, that will refer to the actual section contained in the standard wherein more details can be obtained.

Refer to the ASHRAE 62.2-2016 standard for more details, guidance, and exceptions that are beyond the scope of this program manual.

- Copies of the current ASHRAE 62.2-2016 standard and other reference materials can be purchased at the following web site: ~~https://www.techstreet.com/ashrae/standards/ashrae-62-2-2016~~
  https://basc.pnnl.gov/redcalc/tool/ashrae-622-2016

15.3 Subgrantees should use REDCalc for ASHRAE 62.2-2016, which will be required for ventilation requirement calculations.

To comply with ASHRAE 62.2-2016 fan-powered airflow can be provided in a number of ways.

- https://basc.pnnl.gov/redcalc
- A dedicated exhaust or supply fan running continuously or cycling by automatic control.
- A bathroom or kitchen exhaust fan running continuously or cycling by automatic control.
- A central air handler drawing filtered outdoor air into its return.
- A balanced ventilation system such as a heat-recovery ventilator (HRV) or energy-recovery-ventilator (ERV).
- ~~Or follow ASHRAE 62.2-2016 Normative Appendix A~~

15.4 Purpose

ASHRAE Standard 62.2-2016 defines the roles of and minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality (IAQ) in residential buildings.

Defines role of and minimum requirements for:

- Mechanical ventilation

- Natural ventilation
- Building envelope
- Intent is to provide acceptable IAQ

15.5 Scope

Acceptable IAQ is the goal, but not necessarily achieved even if the standard is met:

- Because of the many factors that may affect occupant perception of IAQ: temperature, humidity, noise, lighting, and psychological stress
- Ambient air from outdoors is unacceptable
- Ventilation system (s) are not operated and maintained as designed
- When high polluting events occur: smoking, painting, certain hobby activity and others that overwhelm the ventilation system.

15.6 Whole-Building Ventilation Requirements and Calculations

4.1 Ventilation Rate. A mechanical exhaust system, supply system, or combination thereof shall be installed to operate for each dwelling unit to provide continuous dwelling-unit ventilation with outdoor air at a rate not less than specified in Section 4.1.1.

4.1.1 Total Ventilation Rate. The total required ventilation rate (Q_{tot}) shall be as specified in Table 4.1a or, alternatively, calculated using Equation 4.1a.

- Equation (4.1a) $Q_{tot} = 0.03A_{floor} + 7.5$ (number of bedrooms +1)

15.7 New or Existing Single-Family Buildings

ASHRAE Formula – Eq. 4.1a:

$$\mathbf{cfm_{fan} = 0.03A_{floor} + 7.5\ (Number\ of\ bedrooms + 1)}$$
$$\mathbf{+\ (alternative\ compliance\ supplement)}$$
$$\mathbf{-\ (Infiltration\ credit)}$$

- A = conditioned floor area; As defined by ASHRAE 62.2-2016 Addendum M, and must be followed. Assumes two occupants in master bedroom and one each in the other bedrooms. Over this density, increase ventilation by 7.5 cfm/person. Floor area: All above- and below-grade finished areas, as defined in ANSI Standard Z7651, except that unfinished below-grade, occupiable areas inside the pressure boundary shall be included as floor area.
- Whole building, intermittently operating ventilation may be used under some conditions for compliance.
- Ventilation air must come directly from the outdoors.
- Credit is allowed for envelope air leakage in some cases based on ASHRAE 62.2-2016.

15.8 Whole-Building Ventilation-Occupant Density

4.1.1 Different Occupant Density – where higher occupant numbers are known, increase the ventilation rate by 7.5 cfm for each additional person.

15.9 (4.2) System Type

The whole house ventilation system shall consist of:

- One or more supply or exhaust fans and associated ducts and controls
- Local exhaust fans shall be permitted to be part of a mechanical exhaust system
- Outdoor air connected to the return side of an air handler shall be permitted as supply ventilation as long as minimum return air temperatures are maintained per manufacturer. (Normally 55 degrees F.)

15.10 (4.3) Airflow Measurement

The airflow required is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the ventilation system as Installed and shall be measured using a FLOW HOOD, flow grid, or other airflow measuring device.

15.11 (4.4) Controls and Operation

- The "fan on" switch on a HVAC system shall be permitted as an operational control for systems introducing ventilation air through a duct to the return side of a system.
- Readily accessible override control must be provided to the occupant.
- Local exhaust fan switches and fan on switches are permitted as override controls.
- Controls must be appropriately labeled.
- Exception: An intermittently operating whole-house ventilation may be used if the rate is adjusted per section 4.5 of ASHRAE 62.2-2016.

15.12 (4.5) Variable Mechanical Ventilation:

- See sections 4.5, 4.5.1, 4.5.2, 4.5.2.1, 4.5.2.2, 4.5.2.2.1, 4.5.3 and 4.6 of ASHRAE Standard 62.2

15.13 (5.) Local Exhaust

5.1 Local Mechanical Exhaust - Shall be installed in kitchen and bathroom

NOTE: Each local ventilation system shall be either: intermittent or continuous

5.2 Demand-Controlled Mechanical Exhaust - Designed to be operated as needed by the occupant

5.2.1 Controls and Operation

5.2.2 Ventilation Rate - Minimum airflow rate: Table 5.1 Kitchen 100cfm and Bathroom 50 cfm intermittent

5.3 Continuous Mechanical Exhaust - Installed to operate without occupant intervention

5.3.1 Control and Operation

5.3.2. Ventilation Rate - Minimum delivered ventilation rate: Table 5.2 Enclosed Kitchen 5 ach (based on volume) and bathroom 20 cfm during each hour of operation

5.4 Airflow Measurement

- Must be measured using flow hood or another device
- Exception: ducts meeting Prescriptive Duct Sizing requirements in Table 5.3

15.14 (6.) Other Requirements

- 6.1 Adjacent Spaces – prevent contaminants from adjoining spaces such as garages
- 6.1.1 Compliance for Attached Dwelling Units
- 6.2 Instructions and Labeling – information and instruction for system operation and maintenance
- 6.3 Clothes dryers must be exhausted to the outdoors
- 6.4 Combustion and Solid-Fuel Burning Appliances – negative pressure issues from exhaust fan operation. 15cfm/100ft2 area limit
- 6.5 Air tightness requirements
- 6.5.1 requires air-sealing garage from occupiable space
- 6.5.2 requires duct sealing
- 6.6 ventilation openings
- 6.6.1 habitable space
- 6.6.2 toilets and utility rooms
- 6.7 minimum infiltration
- 6.7.1 filter pressure drop
- 6.6 air inlets
- 6.6.1 ventilation opening
- 6.9 carbon monoxide alarm

15.15 (7.) Air Moving Equipment

- All air – moving equipment used must comply with this standard
- 7.1 Selection and Installation
- 7.2 Sound rating
- 7.2.1 Dwelling unit ventilation or continuous local exhaust fans
- 7.2.2 Demand controlled local exhaust fans
- 7.3 Exhaust ducts
- 7.3.1 Multiple exhaust fans using one duct
- 7.3.2 Single exhaust fan ducted to multiple inlets
- 7.4 Supply ducts

15.16 References: Normative Appendix A: Existing Buildings (ASHRAE 62.2-2016)

A1. Summary

- Provides alternative compliance options for existing buildings and the associated ventilation equipment in the existing building
- Intended for buildings that have already been occupied without meeting the standard (such as WX units)

A2. Dwelling Unit Mechanical Ventilation Rate

Required mechanical rate shall be:

- Ventilation rate in section 4.1
- Plus additional airflow calculated from local exhaust deficit
- Minus Infiltration credit

A3. Local Exhaust

- A3.1 Initial room airflow deficit
- A3.2 Window opening credit (20cfm)
- A3.3 Required Additional Airflow

A4. Air Moving Equipment

- A4.1 Selection installation and sound rating
- A4.2 Airflow rating
  - A4.2.1 Existing fans intended for use as dwelling unit mechanical ventilation must be measured consistent with requirements of section 4.3
  - A4.2.2 Existing fans intended for local exhaust only shall be measured consistent with requirements of section 5.4
    - Exception: if the fan flow rate cannot be measured and the fan airflow rating at .25" of water (62.5 Pa) are not available, but fan airflow rating is available for .1" of water (25 Pa) and the duct sizing requirement of Table 5.3 can be verified, those ratings may be used provided they are reduced by 25%.

15.17 New or Existing Buildings: ASHRAE Formula – Eq. 4.1a

$cfm_{fan} = 0.03A_{floor} + 7.5$ (Number of bedrooms + 1) + (alternative compliance supplement) - (Infiltration credit)

A = conditioned floor area; As defined by ASHRAE 62.2-2016 Addendum M, and must be followed.

- Assumes two occupants in master bedroom and one each in the other bedrooms. Over this density, increase ventilation by 7.5 cfm/person.
- Whole building, intermittently operating ventilation may be used under some conditions for compliance.
- Ventilation air must come directly from the outdoors.
- Credit is allowed for envelope air leakage in some cases, based on ASHRAE 62.2.

.

15.18 Calculating the Infiltration Credit

- Measured Post cfm50 Infiltration
- Infiltration Credit Formula

15.19Alternative Compliance Supplement for Existing Dwellings

- Normative Appendix A of ASHRAE 62.2-2016

15.20 Alternative Compliance Path

- For existing dwellings only.

- Provides an alternative method of meeting Local exhaust requirements in kitchens and bathrooms that do not have existing ventilation as required by ASHRAE 62.2-2016.
- For existing fans being used sound and ducting requirements are not applicable.
- You must measure flow if ratings do ~~n't~~not exist and duct sizing cannot be verified. If you only have a rating at .10 IWC, not .25 IWC, you can reduce the rating at .10 IWC by 25%.
- If you cannot measure flow or determine ratings, you must assume a zero flow for the fan.

15.21 Calculating Intermittent Flow Rates

- Refer to Sections 4.5, 4.5.1, 4.5.2, 4.5.3 and 4.6 of ASHRAE 62.2 Standard

Ventilation sample to illustrate continuous vs. intermittent

Assumptions (I know it's not this simple – but keep it simple)

- Pollutant – continuous source every hour same amount added
- 1 ach dilutes pollutants by ½
- The 3 homes are the identical except ventilation

HOUSE A - Continuous Ventilation – 1 ach thus 24 air changes in day

HOUSE B - Intermittent ventilation 1 – fan is turned on one hour per day with 24 ach (same air exchange as continuous)

HOUSE C - Intermittent ventilation 2 – fan is turned on at noon and midnight with 12 ach (same air exchange as continuous)

"WHICH HOUSE DO YOU WANT TO LIVE IN? "

Example: 1000 ft² home with 3 bedrooms

40 cfm Continuous needed
Intermittent Rate:
Fan runs 50% of the time
With a cycle time of 1 hour
(fan runs 30 minutes per hour)
40cfm ÷ (0.5 x 1) = 80 cfm

40 cfm Continuous needed
Intermittent Rate:
Fan runs 33% of the time
With a cycle time of 1 hour
(fan runs 20 minutes per hour)
40cfm ÷ 33 = 122 cfm

15.22 Prescriptive Duct Sizing

Refer to ASHRAE standard Table 5.3. This table assumes no elbows. Deduct 15' of allowable duct length for each elbow.

15.23 Other Requirements

- 6.1 Adjacent Spaces: Measures shall be taken to minimize air movement across envelope components separating dwelling units from garages, unconditioned crawlspaces, unconditioned attics, and other dwelling units. Pressure boundary wall, ceiling and floor penetrations shall be sealed as shall any vertical chases adjacent to dwelling units. Doors between dwelling units and common hallways shall be gasketed or made substantially airtight. Supply and balanced ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors.
- 6.1.1 Compliance for attached dwelling units: one method of demonstrating compliance with section 6.1 shall be to verify a leakage rate below a maximum of .3 cfm per square foot (150 L/s per $100m^2$) of the dwelling unit envelope area (i.e. the sum of the area of the walls between the dwelling units, exterior walls, ceilings and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTM-E779[2] or ANSI/ASTM-E1827[6]. The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent units.
- 6.2 Instructions and Labeling: Information on the ventilation design and/or ventilation systems installed, instructions on their proper operation to meet the requirements of this standard, and instructions detailing required maintenance (similar to that provided for HVAC systems) shall be provided to the owner and the occupant of the dwelling unit. Controls shall be labeled as to their function (unless the function is obvious, such as a toilet exhaust fan switch). See section 13 of ASHRAE guideline 24[5] for information on instructions and labeling.
- 6.3 Clothes dryers. Clothes dryers shall be exhausted directly to the outdoors. Exception: condensing dryers plumbed to a drain.
- 6.4 Combustion and Solid Fuel Burning Devices:
  The standard requires the following:
  1. Adequate combustion and ventilation air.
  2. That the vent system for all combustion appliances be properly installed.
  3. Maximum exhaust flow: The two largest exhaust fans cannot exceed 15 cfm/ 100 ft^2 if there are atmospherically vented appliances inside the home. If the total net flow exceeds this limit, the net exhaust flow must be reduced by reducing the exhaust flow or providing compensating outdoor air.

15.24 (6.5) Air Tightness Requirements

- 6.5.1 Garages: When an occupiable space adjoins a garage, all walls, floors and ceilings that separate the garage from the occupiable space must be air sealed.
- 6.5.2 Duct systems: All duct work outside the conditioned space shall be sealed. If the air handler and/or ducts are located in the garage, the garage door to the outside must be open when the duct leakage is tested.

- 6.6 Ventilation opening area: Spaces shall have ventilation openings as listed in the following subsections. Such openings shall meet the requirement of Section 6.6. Exceptions: attached dwelling units and spaces that meet local ventilation requirements set for bathrooms in section 5.
- 6.6.1 Habitable space: Each habitable space shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 5 ft^2.
- 6.6.2 Toilets and Utility Rooms: Toilets and utility rooms shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 1.5 ft^2. Exceptions:
    - 1. Utility rooms with a dryer exhaust duct
    - 2. Toilet compartment in bathrooms

15.25 (6.7) Minimum Filtration:

- Mechanical systems that supply air to an occupiable space through ductwork exceeding 10 feet in length shall be provided with a filter having a designated minimum efficiency of MERV 6 or better.

6.6 Air Inlets: Requires that air inlets as part of the ventilation design are not within 10 ft of known source of contamination such as stack, vent, exhaust hood or vehicle exhaust.
6.6.1 Ventilation Openings Operable windows, skylights, through-the-wall inlets, window air inlets, or similar devices shall be readily accessible to occupants.

6.9 Carbon monoxide alarms: A carbon monoxide alarm shall be installed in each dwelling unit in accordance with NFPA 720.

Key Points to Remember:

- Don’t oversize fans
- Use the most efficient equipment available.
- Use the most durable equipment available.
- Set the post ventilation rate as low as possible. Utilize the window credit whenever possible.
- Verify fan rate setting for accuracy after post blower door.
- Take ownership of the process.

15.26 Indoor Air Quality and Ventilation-Required Evaluator Procedures

The evaluation shall include inspection of air infiltration sources, air barriers and ventilation. Specifically, the evaluation shall:

1. Identify existing sources of indoor air pollution for occupants.
2. Evaluate terminations of all exhaust fans and clothes dryers and determine whether the exhaust fans and clothes dryers vent to outdoors.

3. For houses with an attached or “tuck under” garage, identify joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other **sources** of air leakage through walls and ceilings separating the garage from the residence and its attic area
4. Conduct a review of any existing ventilation systems in the dwelling. If it is available, refer to any ventilation system documentation provided by the equipment manufacturer, system designer or installer that could identify the type of systems, location, designed and tested performance, and/or specifications of the equipment.
5. Determine the ventilation requirements as outlined in the following section. Consider the house ventilation as a system, including both whole-building ventilation and local exhaust ventilation
    a. Determine the required whole-building ventilation rate. Calculate the whole-building mechanical ventilation requirement using the approach in ANSI/ASHRAE 62.2-2016: Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, Section 4. The nominal fan size to provide continuous airflow in cubic feet per minute (cfm) is based on the number of bedrooms and the conditioned floor area of the home. Determine the minimum required flow rate in cfm (based on continuous operation) using this formula:

Q_{tot} = (0.03 x conditioned floor area) + (7.5 x (number of bedrooms + 1))

    b. Determine the required local ventilation for each kitchen and for each full bath (any bathroom including either a tub, shower or sauna) as follows:
        i. Each kitchen must have a demand-controlled exhaust fan that operates at a minimum of 100 cfm, for downdraft units in a non-enclosed kitchen it is 300 cfm; in an enclosed kitchen, it is 300 cfm or a capacity of 5 ach and each bath must have a demand-controlled exhaust fan that operates at a minimum of 50 cfm or 20 cfm continuous.
        ii. Measure the flow rate of any existing kitchen and bath fan(s) that exhaust to outdoors.
        iii. For each kitchen and bath, determine the shortfall by subtracting the measured flow from the required flow rate.
6. For each kitchen and bath, any shortfall in the existing ventilation flow may be addressed by adding a new fan, replacing an existing fan, upgrading the fan or ducts to increase flow, or supplementing it with another fan.
    A. **Alternate**: For previously occupied buildings, the alternative compliance path specified in ANSI/ASHRAE 62.2-2016: Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, Appendix A – Existing Buildings, may be used to address a shortfall in local exhaust flow(s). If Appendix A is used, the required whole-building flow rate **Q_{tot}**, shall be adjusted and any existing fans may be left in place. If chosen, apply the alternative compliance path as follows:
        i. For any kitchen or bathroom with an operable window (regardless of how many), 20 cfm may be subtracted as a credit against the shortfall. The result is

referred to as the local exhaust deficit for that room. The 20-cfm credit applies to each kitchen or bathroom independently; an operable window can only reduce the cfm requirement for the room containing the window. For each room, the deficit shall not be less than zero.

ii. Total the deficits of all kitchens and baths for which Appendix A will be used and divide the result by 4. This is the alternative compliance supplement.

iii. Add the final supplement in cfm to the required whole-building continuous ventilation rate, $\mathbf{Q_{tot}}$. For example: A house has an existing kitchen fan with a measured flow rate of 50 cfm, and an operable window exists in the kitchen. The house has one bathroom with no window, and a measured flow rate of 40 cfm. The deficit is (100 - 50 - 20) + (50 - 40) = 40 cfm. The supplement to the whole-building requirement is 40 ÷ 4 = 10 cfm. Thus 10 cfm would be added to the whole-building ventilation rate, Q_{tot}.

iv. The alternative compliance supplement must be added to the whole-building ventilation rate, $\mathbf{Q_{tot}}$, before the infiltration credit $\mathbf{Q_{inf}}$ is subtracted.

7. Infiltration Credit: $\mathbf{Q_{tot}}$ may be further adjusted if a blower door test has been performed.

Note: This credit must be based on the final blower door testing upon completion of any air sealing completed in the dwelling. The following formula can be used to determine the infiltration credit:

15.27 Normative Appendix B

Normative Appendix B—
Infiltration Effectiveness
Weather and Shielding Factors
Reference: ASHRAE 62.2-2016 Normative Appendix B

TABLE B1 US Climates

TMY3	wsf	Weather Station	Latitude	Longitude	State
724210	.50	Cincinnati, Northern KY AP	39.05	-84.67	Kentucky
724220	.48	Lexington Bluegrass AP	38.03	-84.60	Kentucky
724230	.47	Louisville Standiford Field	38.18	-85.73	Kentucky
7244235	.41	Louisville Bowman Field	38.23	-85.67	Kentucky
724236	.38	Jackson Julian Carroll AP	37.58	-83.32	Kentucky
724238	.47	Henderson City	37.62	-87.68	Kentucky
724240	.45	Fort Knox Godman AAF	37.90	-85.97	Kentucky

724243	.42	London-Corbin AP	37.08	-84.08	Kentucky
724350	.46	Paducah Barkley Regional AP	37.05	-88.77	Kentucky
724354	.38	Somerset (AWOS)	38.00	-84.60	Kentucky
746710	.44	Fort Campbell AAF	36.67	-87.48	Kentucky
746716	.43	Bowling Green Warren Co AP	36.98	-86.43	Kentucky

15.28 Client Education Requirements:

- Provide client with information on functions, use, and maintenance of ventilation system and components.
- Include a disclaimer that ASHRAE 62.2-2016 does not account for high polluting sources or guarantee indoor air quality.Obtain signed documents proving delivery of the above materials to the client.

APPENDIX A: Program Definitions

Definitions of WAP Terms

- **200 percent of Poverty**: At or below 200 percent of the poverty level as determined in accordance with criteria established by the Director of the U.S. Office of Management and Budget for the Commonwealth of Kentucky.
- **Acceptable Indoor Air Quality (IAQ)**: air toward which a substantial majority of occupants express no dissatisfaction with respect to odor and sensory irritation and in which there are not likely to be contaminants at concentrations that are known to pose a health risk.
- **Adjustments:** Anything that is found after the initial work measures were first performed and reported as a completion. These units do not constitute a new completion; it is an Adjustment to the original completion. Adjustments can only be allowed to units that have not been reported as completions in the current quarter. All Adjustments must have KHC approval. Please note Service Costs Adjustments to Labor and Materials can only be done in the quarter the job was recorded as Complete.
- **Air Cleaning**: the use of equipment that removes particulate, microbial, or gaseous contaminants (including odors) from air.
- **Air, Exhaust**: air discharged from any space to the outside by an exhaust system.
- **Air, Indoor**: air in an occupiable space.
- **Air, Outdoor**: air from outside the building taken into a ventilation system or air from outside the building that enters a space through infiltration or natural ventilation openings.
- **Air, Transfer**: air moved from one occupiable space to another, usually through doorways or grilles.
- **Air, Ventilation**: outdoor air delivered to a space that is intended to dilute airborne contaminants.

- **Air Change Rate**: airflow in volume units per hour divided by the volume of the space on which the air change rate is based in identical units (normally expressed in air changes per hour [ach]).
- **Annual Exposure**: the time-integrated concentration taken over one year that would occur for a constant source strength.
- **Balanced System**: one or more fans that supply outdoor air and exhaust building air at substantially equal rates.
- **Bathroom**: any room containing a bathtub, a shower, a spa, or similar source of moisture.
- **Cancelled Unit**: This type of job status is client driven and usually applies after work has begun at the unit. Examples of a cancelled job would be: client denies reentry, client denies ECM, client puts house on the market, etc. Labor and Material Service Costs can be billed for reimbursement.
- **Climate, hot humid**: climate in which the wet-bulb temperature is 670 F or higher for 3500 hours or more, or 730 F or higher for 1750h or more, during the warmest six consecutive months of a year that is typical for that geographic area. See section 8.
- **Climate, very cold**: climates that have more than 9000 annual heating degree-days base 65 degrees F.
- **Completed Jobs**: dwellings that have received regular weatherization and health and safety services and have been inspected by a certified DNE/Energy Auditor or QCI.
- **Conditioned space**: the part of the building that is capable of being thermally conditioned for the comfort of occupants.
- **Contaminant**: a constituent of air that may reduce acceptability of that air.
- **Deferral**: occur when subgrantees encounter problems at the unit that are beyond the scope of the Weatherization Assistance Program (WAP). These units have been inspected by a qualified person who has determined that conditions are present which prohibit rendering service. Only Material Service Costs can be billed for reimbursement. The need for this type of job status is subgrantee driven. (Includes historically walk-aways and cancelled jobs.)
- **Department of Energy Glossary**: Link to Weatherization Assistance Program Standardized Training Curricula and terms.
- **DOE Weatherized Unit**: A dwelling on which a DOE-approved energy audit or priority list has been applied, at least one DOE-funded allowable energy conservation measure is installed, and weatherization work has been completed. As funds allow, the measures installed on this unit and paid for with DOE funds have a Savings-to-Investment Ratio (SIR) of 1.0 or greater, but also may include any necessary energy-related health and safety measures, in accordance with 10 CFR 440.21(d): “The cost of incidental repairs must be included in the cost of the package of measures installed in a dwelling and receives a final inspection.” The use of DOE funds on a unit may include, but is not limited to, indirect expenditures (e.g., Administrative, T&TA, amortized equipment) and direct costs such as energy auditing, measure installation, H&S, and inspections. A dwelling unit that meets both the definition of a DOE weatherized unit and uses DOE funds for direct costs must be reported as a DOE-completed unit.
- **Dwelling Unit**: a single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

- **Dwelling Unit, attached (multi-family)**: a dwelling unit sharing demising walls, floors, ceilings, or common corridors with another dwelling unit or occupiable space.
- **Effective annual average infiltration rate**: the constant air infiltration rate that would result in the same average indoor pollutant concentration over the annual period as actually occurs under varying conditions.
- **Exhaust system**: one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope.
- **Exhaust flow, net**: flow through an exhaust system minus the compensation outdoor through any supply system that is interlocked to the exhaust system.
- **Floor area**: all above- and below-grade finished areas as defined in ANSI Standard Z765[1].
- **Habitable space**: building space intended for continual human occupancy; such space generally included areas used for living, sleeping, dining, and cooking but does not generally included bathrooms, toilets, hallways storage areas, closets, or utility rooms.
- **Heating degree -day**: the difference in temperature between the outdoor mean temperature over a 24 h period and a given base temperature of a building space; that is, for heating degree-day base 65°F (18°C), for any one day, when the mean temperature is less than 65°F (18°C), there are as many heating degree-days as degrees Fahrenheit (Celsius) temperature difference between the mean temperature for the day and 65°F (18°C). Annual heating degree-days are the sum of the heating degree-days over a calendar year.
- **High-polluting events**: isolated and occupant-controllable events that release pollutants in excess quantities. Typical cooking, bathing, and laundry activities are not considered high polluting events.
- **In-Progress Jobs**: dwellings that have received, at minimum, an initial inspection but are not yet to the Completed job standards.
- **Infiltration**: uncontrolled inward leakage of air through cracks and interstices in any building element and around windows and doors of a building.
- **Intermittent ventilation**: intermittently operated whole-building ventilation that is automatically controlled.
- **Kitchen:** any room containing cooking appliances.
- **Kitchen, enclosed**: a kitchen whose permanent openings to interior adjacent spaces do not exceed a total of 60 ft^2 (6 m^2).
- **Mechanical cooling**: reducing the temperature of a fluid by using vapor compression method – AC.
- **Mechanical ventilation**: the active process of supplying or removing air to or from an indoor space by powered equipment such as motor-driven fans and blowers.
- **Mixed-use building**: a building containing commercial space (corridors, parking garages, and other common spaces may be present but are not classified as commercial space) in addition to dwelling units.

- **Natural ventilation**: ventilation occurring as a result of only natural forces, such as wind pressures or differences in air density, through intentional openings such as open windows and doors.
- **New Completion:** a dwelling unit that has received Energy Systems (Health and Safety) repair or replacement (if necessary) and Regular Weatherization measures.
- **Non-transient**: occupancy of a dwelling unit or sleeping unit for more than 30 days.
- **Occupiable space**: any enclosed space inside the pressure boundary and intended for the human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas.
- **Owner Occupied Unit**: Any single-family home in which the occupant and applicant can be verified as the sole owner by a deed or a will.
- **Pressure boundary**: primary air enclosure boundary separating the indoor and outdoor air. For example: a volume that has more leakage to the outside that to the conditioned space would be considered outside the pressure boundary. Exposed earth in a crawlspace or basement shall not be part of the pressure boundary.
- **Recreational Vehicles(s) (RV) (s) and/or Camper(s)**: are not eligible for services provided by the Weatherization Assistance Program. RVs or Campers means a trailer, semitrailer, truck camper or motor home primarily designed and originally constructed to provide temporary living quarters for recreational, camping, or travel use. These vehicles have temporary utility hook up ability and are designed to be transported on a regular basis with or without licensure or permit. Some manufacturers of these vehicles have identification designations that describe them as a mobile home, but a manufacture's designation does not qualify for proof of eligibility status.
- **Rental Unit**: Any single-family homes, duplexes, tri-plex or four-plex and multifamily structures for which rent is charged.
- **Readily accessible**: capable of being quickly and easily reached for operation, maintenance, and inspection.
- **Residential occupancies**: occupancies that are not classified as institutional by the authority having jurisdiction and that also contain permanent provisions for sleeping.
- **Re-Work**: KHC monitoring staff identified corrective actions or findings relative to site deficiencies. A WX710 can be submitted to show the corrective action Re-Work has been completed. (Re-weatherized and Re-Work are not the same.)
- **Sleeping unit**: a room or space in which people sleep that can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.
- **Source**: an indoor object, person, or activity from which indoor air contaminants are released; or a route of entry of contaminants from outdoors or sub-building soil.
- **Supply system**: one or more fans that supply outdoor air to the building, causing air to leave by normal leakage paths in the building envelope.
- **System**: equipment and other components that collectively perform a specific function, such as mechanical cooling or ventilation.

- **Time average airflow rate**: the total volume of air provided during a period of time divided by the time period.
- **Toilet**: space containing a toilet, water closet, urinal, or similar sanitary service.
- **Utility**: laundry, lavatory, or other utility room containing sinks or washing equipment.
- **Ventilation**: the process of supplying outdoor air to or removing indoor air from a dwelling by natural or mechanical means. Such air may or may not be conditioned.
- **Walk Away**: See Deferral/Walk Away above.

APPENDIX B: Data Collection Form

Data Collection Form

To be inserted once approved by DOE

APPENDIX C: Pressure Pan Diagnostic Guidelines

Pressure Pan Diagnostic Guidelines

For Duct Systems Located in Unconditioned Attic, Crawl Space, and Garage

1.0 Overview

A pressure pan is used to measure the difference between house pressure and duct pressure, thereby indicating the relative degree of leakage in each duct run. Duct leakage is not quantified, but pressure pan readings can help prioritize duct leakage sealing. Pressure pan diagnostics are used for duct systems outside the living space (in the attic, crawl space and garage).

Pressure pan testing is performed by placing a gasketed pan over each supply register and return grille, one at a time, with the air handler off and the blower door pressurizing (or depressurizing) the house to 50 Pa. The larger the pressure difference between the duct pressure and the house pressure, the leakier the duct run/branch being tested is—and the pattern of pressure pan readings often allows for quick identification of major leakage sites.

If the duct system is perfectly tight, the pressure pan readings will be zero (because house pressure is 50 Pa and duct pressure is 50 Pa). If a duct is completely disconnected, the pressure pan reading could be 50 Pa (because house pressure is 50 Pa and duct pressure is the same as outdoors, which is zero). Pressure pan readings are commonly in the 0 Pa to 20 Pa range. Pressure pan readings must be at 1 Pa or below.

APPENDIX D: Program Forms

Health and Safety Client and Home Screening Questionnaire

https://www.kyhousing.org/Partners/Developers/Single-Family/Documents/HS%20Screening.pdf

Weatherization Client Completion Form:

https://www.kyhousing.org/Partners/Developers/Single-Family/Weatherization-Assistance/Documents/Weatherization%20Client%20Completion%20Form.pdf

APPENDIX E: Clutter

Clutter Image Ratings

Clutter Image Rating: Bedroom

Please select the photo that most accurately reflects the amount of clutter in your room.


1


2


3


4


5


6


7

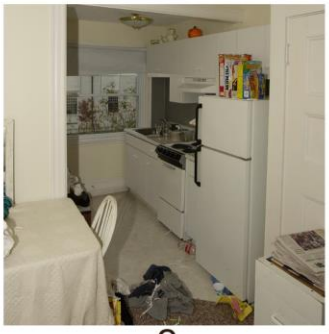

8


9

Clutter Image Rating Scale: Kitchen

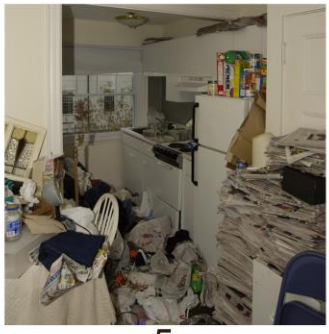
Please select the photo below that most accurately reflects the amount of clutter in your room.

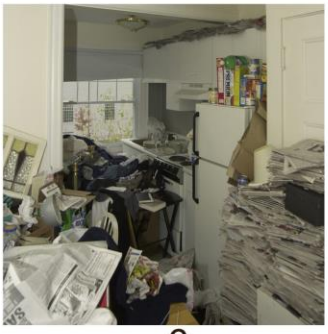

1


2

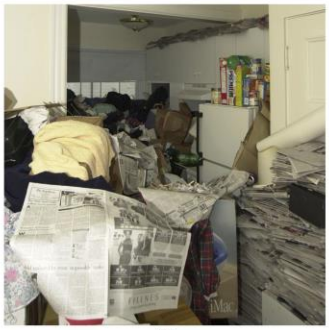

3


4


5


6


7


8


9

Clutter Image Rating: Living Room

Please select the photo below that most accurately reflects the amount of clutter in your room.


1


2


3


4


5


6


7


8


9

APPENDIX F: Acronyms

Acronyms Used in the WAP Manual

Acronym	Full Phrase
AFUE	Annual Fuel Utilization Efficiency
AHERA	Asbestos Hazard Emergency Response Act
AWG	American Wire Gauge
BAQ	Building Analysis and Qualifications
BLL	Blood Lead Level
BTU	British Thermal Unit
CAZ	Combustion Appliance Zone
cfm	Cubic Feet Per Minute
CFR	Code of Federal Regulations
CMF	Construction Management Fee
COI	Conflict of Interest
CO	Carbon Monoxide
CPU	Cost Per Unit
CWSR	Consolidated Weatherization Status Report
DHW	Domestic Hot Water
DUNS	Data Universal Numbering System
EA-QUIP	Energy Audit Using the Queens Information Packet
EBT	Electronic Benefit Transfer
EDR	Equivalent Direct Radiation

EEO	Equal Employment Opportunity
EER	Energy Efficiency Rating
EIBLL	Environmental Intervention Blood Lead Level
EMS	Energy Management System
ESCO	Energy Service Company
FFVR	Fiscal Field Visit Report
GFCI	Ground Fault Circuit Interrupter
H&S	Health and Safety
HEAP	Home Energy Assistance Program
HEPA	High-Efficiency Particulate Air (filter)
HERR	Heating Equipment Repair or Replacement
HNAC	Heating Normalized Annual Consumption
HVAC	Heating, Ventilation, Air Conditioning
IAQ	Indoor Air Quality
IRA	Individual Retirement Account
JTA	Job Task Analysis
kWh	Kilowatt Hour
KWFG	Kentucky Weatherization Field Guide
LIHEAP	Low Income Home Energy Assistance Program
LIHTC	Low-Income Housing Tax Credit
LSWP	Lead-Safe Work Practices

MHEA	Manufactured Home Energy Audit
M/WBE	Minority and Women Owned Business Enterprise
MOU	Memorandum of Understanding
MSDS (or SDS)	Material Safety Data Sheet
NEAT	National Energy Audit Tool
NHPA	National Historic Preservation Act
NPA	Non-Public Assistance
Pa	Pascal(s)
PFVR	Program Field Visit Report
POI	Pollution Occurrence Insurance
ppm	Parts Per Million
QCI	Quality Control Inspector
RFP	Request for Proposals
SIR	Savings-to-Investment Ratio
SSE	Steady-State Efficiency
SSI	Supplemental Security Insurance
SWS	Standard Work Specifications
T&TA	Training and Technical Assistance
TIPS	Targeted Investment Protocol System
TREAT	Targeted Retrofit Energy Analysis Tool
WAP PAC	Weatherization Assistance Program Policy Advisory Council

WPN	Weatherization Program Notice
WXPM	Weatherization Policy Manual
ZPP	Zinc Protoporphyrin (test)

Common WAP Organizations and Their Acronyms

Acronym	Organization Name
AAMA	American Architectural Manufacturers Association
AEA	Association for Energy Affordability, Inc.
AGA	American Gas Association
AHAM	Association of Home Appliance Manufacturers
AHRI	American Health Research Institute, Inc.
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BPI	Building Performance Institute
CAA	Community Action Subgrantee
CAK	Community Action of Kentucky
CDBG	Community Development Block Grant
CHFS	Cabinet for Health and Family Services
CSBG	Community Service Block Grant
D&B	Dun and Bradstreet
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Subgrantee

FEMA	Federal Emergency Protection Subgrantee
HCA	Housing Contract Administration
HEP	Home Energy Professionals
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
ICC	International Code Council
IRS	Internal Revenue Service
KHC	Kentucky Housing Corporation
MHINCC	Manufactured Housing Institute's National Communities Council
NASCSP	National Association of State Community Service Programs
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NPC	Neighborhood Preservation Company
NREL	National Renewable Energy Laboratory
OMB	U.S. Office of Management and Budget
OSHA	U.S. Occupational Safety and Health Administration
RPC	Rural Preservation
SHPO	State Historic Preservation Officer
USDA	U.S. Department of Agriculture
WAP	Weatherization Assistance Program

WAPTAC	Weatherization Assistance Program Technical Assistance Center

Weatherization Assistance Program Resources

All Weatherization Assistance Program forms and resources are on KHC's Weatherization Assistance Program Resources web page. Please contact the HCA Agency Partner Portal for more information about the Weatherization Assistance Program.