Arkansas Energy Office

Weatherization

Subgrantee

Technical Manual

Energy Audit Policies & Procedures

Revised December, 2024

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ACRONYMS

AASIS	Arkansas Administrative Statewide Information System
ACPU	Average Cost per Dwelling Unit
ADEQ	Arkansas Department of Environmental Quality
AEDC	Arkansas Economic Development Commission
AEO	Arkansas Energy Office
AHERA	Asbestos Hazards Emergency Response Act
ANSI	American National Standards Institute
ARWAP	Arkansas Weatherization Assistance Program
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASTM	American Society for Testing Materials
AWAP	Arkansas Weatherization Assistance Program
BCJOS	Building Check & Job Order Sheet
BPI	Building Performance Institute
CAA	Community Action Agency
CAZ	Combustion Appliance Zone
CDBG	Community Development Block Grant
CEU	Continuing Education Units
CFL	Compact Fluorescent Lights
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations
CI	Capital Intensive
CO	Carbon Monoxide
CPG	Comprehensive Procurement Guideline
DFA	Department of Finance & Administration
DHHS	U.S. Dept. of Health & Human Services
DOE	U.S. Department of Energy
DOEPO	DOE Project Officer
ECM	Energy Conservation Measure
ECOS	Energy Conservation Online System
EPA	Environmental Protection Agency
FIFO	First in, First Out
FR	Federal Register
GHW	General Heat Waste
H&S	Health & Safety
HCS	Hazard Communication Standard
HEP	Home Energy Professional
HHS	U.S. Department of Health and Human Services
HUD	Department of Housing & Urban Development
HVAC	Heating, Ventilation & Air Conditioning

ACRONYMS, Continued

IR	Incidental Repair
IREC	Interstate Renewable Energy Council
IRM	Incidental Repair Measure
JAI	Joseph Associates, Inc.
JTA	Job Task Analysis
JTPA	Job Training & Protection Act
KSA	Knowledge, Skills & Abilities
KTW	Knob-and-Tube Wiring
LED	Light-Emitting Diode
LIHEAP	Low Income Home Energy Assistance Program
LIHTC	Low Income Housing Tax Credit
LRRPP	Lead Renovation, Repair, and Painting
LSW	Lead Safe Weatherization
MF	Multifamily
MOU	Memorandum of Understanding
SDS	Safety Data Sheets
MWBE	Minority or Women Owned Business Enterprise
NAECA	National Appliance Energy Conservation Act
NASCSP	National Association for State Community Services Programs
Network	Five (5) agencies around the state providing Weatherization services
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NREL	National Renewable Energy Laboratory
OMB	Office of Management and Budget
OSHA	Occupational Safety & Health Administration
PAC	Policy Advisory Council
PM	Program Monitor
POI	Project Officer
POI	Pollution Occurrence Insurance
PY	Program Year
QA	Quality Assurance
QCI	Quality Control Inspector
QWP	Quality Work Plan
RESnet	Residential Energy Services Network
RFP	Request for Proposals
RRP	Renovation, Repair & Painting Program
SEP	State Energy Program

ACRONYMS, Continued

SHPO	State Historic Preservation Officer
SIR	Savings-to-Investment Ratio
SPF	Spray Polyurethane Foam
SWS	Standard Work Specifications
T&TA	Training and Technical Assistance
US DHHS	US Department of Health & Human Services
USPS	United States Postal Service
VOC	Volatile Organic Compounds
WAP	Weatherization Assistance Program for Low-Income Persons
WAPTAC	Weatherization Assistance Program Technical Assistance Center
WIA	Workforce Investment Act
WPN	Weatherization Program Notice
WTC	Weatherization Training Center

EFFECTIVE July 1, 2024. The guidance in this manual is effective for all energy audits completed after July 1, 2024 with DOE WAP or DHHS LIHEAP funds. These policies will continue to be evaluated for improvement in future program years. The information herein applies only to homes zoned as residential properties, and the living space within commercial buildings zoned as "mixed use" as verified by the local planning or zoning department, or the Assessor's Office property Card.

Technical Standards and Best Practices

Subgrantees are responsible for completing all weatherization work in compliance with the AEO standard and specifications listed below and the Standard Work Specifications for Single Family Homes, Multifamily and Manufactured Homes as adopted by the AEO. This requirement applies to both in house crews and private contractors. A record of adaptations and interpretations may be found in Appendix B of this document and will be updated on an as needed basis. Any updates or modifications will be transmitted to the agencies in writing as well as distributed to their technical committee representatives at quarterly meetings.

Subgrantees must also adhere to all specifications for materials as identified in 10 CFR Part 440, Appendix A and (See Memo Tables).

WPN 22-4 i requires Grantees to update their Quality Work Plans (QWP). WPN 22-4 defines what constitutes a quality installation of weatherization measures, outlines how those measures are inspected and validated, and prescribes acceptable training and credentialing of workers. The requirements are based on the resources developed under the Guidelines for Home Energy Professionals project. Adopting these benchmarks for quality allows the WAP to leverage the institutional knowledge, developed over thirty (30) years, to set the standard for quality in the Program.

The requirements outlined in the four (4) sections of the Quality Work Plan (QWP) listed below will be included in the 2024/25 State Plan.

Guidance:

Section 1: Standard Work Specifications (SWS)
Section 2: Inspections
Section 3: Workforce Training

Section 1. Standard Work Specifications (SWS)

The Standard Work Specifications (SWS) define the minimum acceptable outcomes for home energy upgrades installed on single-family, multifamily, and manufactured housing. These specifications provide objective based outcome requirements for energy efficiency measures installed by the home performance industry. The SWS is maintained by the National Renewable Energy Laboratory (NREL) on a five-year cycle and since 2014 has provided the WAP with a consistent definition of work quality to assist in meeting the goal of increased WAP effectiveness by increasing standardization of installations and technical monitoring outcomes.

SWS-Aligned Field Guides

- Each Subgrantee has been provided with and signed for a copy of "Retrofitting Arkansas", an NREL aligned field guide. This comprehensive field standard guide outlines expectations of work quality and the installation of WAP measures. AEO maintains an accessible DOE approved electronic copy on their website.

- Arkansas will update the field guide for each building type approved for energy audits on a five-year cycle and submit it to the DOE Project Officer for review and approval at least six months prior to the expiration date.

    - Arkansas engages subgrantees and relevant stakeholders in the revision of technical policy including the field guide.

    - Within a Grantee's five-year approval cycle, editorial changes are allowed without further approval unless the changes lead to a variance from the SWS. At that time Grantees would need to re-submit their field guide for review and re-approval and/or submit a variance request.

- Grantees must provide Subgrantees and/or contractors with all technical requirements (e.g., field guide(s), building diagnostic and combustion safety procedures) for field work. The Grantee must confirm receipt of those requirements and provide follow-up and clarification upon request. A signature on a contract can serve as proof of receipt.

    - Crew and Contractor work orders need to demonstrate the performance requirements (e.g., R-value, U-values, equipment efficiency values, etc.) from the energy audit.

Grantees must provide subgrantees and/or contractors with technical requirements for field work. The Grantee must confirm receipt of those requirements and provide follow-up and clarification upon request. The technical requirements must be clearly communicated and the specifications for work to be inspected +must be referenced in subgrantee contracts. Contractors hired by the subgrantee must have agreements that include the same technical requirements referenced above.

The work of the contractor must be consistent with the Grantee standards and field guides. The goal is to ensure:

- The Grantee is implementing quality work plans that align with the SWS.
- All subgrantees staff, contractors, and anyone doing the actual work are aware of these standards.
- Every home is inspected and complies with the SWS as adopted by AEO and approved by DOE.

All tasks performed on client homes must meet the specifications, objectives and desired outcomes outlined in the Standard Work Specifications for Home Energy Upgrades, as adopted by AEO, where applicable.

"Applicable tasks" are those tasks that are addressed in the"Standard Work Specifications for Home Energy Upgrades".

Grantee maintains physical and electronic copies of the "Standard Work Specifications Field Guide for Single- Family Homes" and Manufactured Housing, as well as the Subgrantee Operations Manual. Subgrantees can access these documents through the Grantee's website.

Section 2 Inspections

AEO's Final Inspection & Assurance Statement

AEO requires that every DOE WAP unit reported as a "completed unit" has all weatherization measures installed in a workmanlike manner and in accordance with the priority determined by the energy audit procedures as required by 10 CFR 440.21 and undergoes a final inspection by a certified Quality Control Inspector (QCI), ensuring that all work meets the minimum specifications outlined in the Standard Work Specifications developed by DOE/NREL.

In accordance with WPN 22-4:

- Every client file will have a WAP 08 form that certifies that the unit had a final inspection and that all work met the required standards. The form will be signed by a certified QCI. Signatures will be accepted to demonstrate compliance. If a unit, inspected by the subgrantee QCI, is also inspected by the state, two (2) certification forms will be available in the client file - one for each inspection.
- Final inspection information is entered in ECOS and a percentage reviewed as part of desk monitoring.
- The QCI includes an assessment of the original audit to confirm that the measures called for on the work order are appropriate and compliant with the state audit procedures and protocols approved by DOE and that there are no "missed measures" which should have been considered.

The Use of Quality Control Inspectors

AEO will monitor at least five percent (5%) of all units reported as complete in PY 2024 unless AEO verifies that a subgrantee does not have a completely independent QCI process from its energy auditing function or the agency is on probation or determined via the assessment process to be high-risk. If any of these scenarios apply, AEO will monitor at least ten percent (10%) of all units reported as complete. AEO will monitor at least 10% of all units completed using Infrastructure Grant funding.

Policy & Procedures for Inadequate Inspection Practices

- Subgrantee QCI accompanies state/third party QCI to learn first-hand of any deficiencies in its own inspection and audit.
- State/third party QCI provides feedback during the inspection.
- State/third party QCI addresses incomplete and poor workmanship as well as missed opportunities on site and in reports. Needed specific and/or comprehensive training will be delivered in the field by the state/third-party QCI at the time of the inspection or arranged later.
- State/third-party QCI identifies call backs and missed opportunities and identifies required corrective actions at subgrantee's expense including repayment of the cost of any disallowed measures.

Improvements are expected and AEO will meet with agency administration to review expectations and discuss any disciplinary actions.

Inspection and Monitoring of Work Using Guidelines and Standards

For PY 2024 Arkansas will continue to ensure that Quality Control Inspector (QCI) competency is demonstrated by mandating EA certification with the BPI Home Energy Professional (HEP) QCI micro-credential.

AEO requires that each subgrantee employ or contract with a HEP QCI. Subgrantees must submit to AEO the credentials of all staff employed as a QCI and of any third parties engaged to conduct quality control inspections. AEO will procure a third party QCI to assist with the required number of inspections by the Grantee.

Weatherization Analysis of Effectiveness

Arkansas performs continuous weatherization analysis of effectiveness per 10 CFR

440.14(c)(6)(i). Training content will be based on the following:

(1) Aggregating statewide findings/concerns from technical, administrative, and fiscal monitoring.

(2) Subgrantee staff completing self-assessments for WAP managers who each submit a training plan to AEO for the allocation of T&TA funds, including needed training to maintain required certifications, which will be part of each Subgrant agreement.

(3) DOE findings and concerns.

(4) Training needs for contractors identified by both AEO and subgrantees (AEO will develop a specific policy to enable the use of T&TA funds for training contractors).

(5) AEO requiring self- assessments based on Knowledge, Skills, and Abilities (KSAs), for each subgrantee staff employed in a WAP position. Weatherization directors use these self-assessments, and other information specific to staff, to develop a training plan.

(6) **Path of continuous improvement:** In addition to conducting monthly desk reviews, AEO will conduct on-site monitoring visits.

(7) **Management findings or concerns:** corrective action plans are monitored and tailored training and technical assistance are provided.

(8) **Realized Energy Savings:** ECOS software has the capacity to capture pre and post energy usage which allows actual energy savings to be calculated.

(9) **On-site Inspections of Weatherized Units:** State/Third Party QCI will inspect a minimum of five percent (5%) of units completed with annual grant funds for each subgrantee, unless AEO verifies that the subgrantee has not completely separated the audit and inspection functions, in which case a minimum of ten percent (10%) of completed units will be inspected (see previous Final Inspection section). State/Third Party QCI will inspect a minimum of ten percent (10%) of units completed with Infrastructure funds for each subgrantee.

(10) **Monitoring:** Visits will focus on technical, fiscal, and administrative compliance with all applicable federal and state WAP rules and regulations. Findings will be tracked through a corrective action plan. Any patterns will be noted and addressed.

(11) **Single Agency Audits:** Each subgrantee must submit a financial audit within nine (9) months of the conclusion of the fiscal year. Audits will be reviewed and be used as part of a financial risk assessment.

(12) **Productivity:** AEO will track expenditures and average cost per unit of each subgrantee to monitor utilization of grant funds. AEO will track projected production levels quarterly and provide technical assistance.

QCI Mentorship Option

To support recruitment, efficient onboarding, and career advancement at the Grantee and Subgrantee levels, Grantee may elect to allow a mentorship model. Individuals working toward QCI certification(mentee) under the mentorship of a certified QCI may perform work aligned with the QCI Job Task Analysis, including Final Inspections, monitoring, and the collection of field site data and/or conducting reviews of energy models, but all work must be reviewed and approved by a certified QCI.

If a Grantee chooses to develop a mentorship program, the policy must be submitted to their respective DOE Project Officer for approval and contain the following elements:

- The mentee is a Subgrantee/Grantee employee or contractor pursuing QCI certification.
- A timeline and the number of dwelling units for the mentees to complete training and obtain QCI certification.
- At least one designated mentor, agreed upon by the Grantee and Subgrantee, who can review field inspections, provide on-the-job training and coaching. The use of video or virtual technology is encouraged.
- All work performed by the mentee is reviewed and attested by a certified QCI which includes the printed names, signatures, certification number (for the mentor) and dated by both the mentor and mentee.

Arkansas Mentoring Program

The Arkansas WAP mentorship program was approved for PY 2022 (July 1) and is continuing in PY 2024. It is a creative effort to support recruitment, efficient onboarding, and career advancement at the state and subgrantee levels. At the state level and at the subgrantee level, at least one (1) certified quality control inspector (QCI) is onboard. Arkansas WAP is currently staffed to implement this program successfully.

The mentorship program consists of the following eight (8) items:

1. Staff who currently work for WAP at the state or subgrantee level but not in the technical part of the program, or who are hired from outside to work in WAP without QCI certification, must express interest in becoming a QCI *mentee*.

2. The QCI Job Task Analysis will be reviewed with the mentee in order to define the scope of work that will be part of the learning curve leading to QCI certification.

3. The mentee will work alongside energy auditor and QCI mentors to learn the tasks that are necessary for passing the written and field tests for QCI.

4. At the point that the energy auditor and QCI rate the mentee as proficient to work alone, the mentee will complete inspections that must be reviewed and approved by the certified QCI. The mentee will utilize video or virtual technology to document the steps in the inspection he/she completed; the certified QCI will review and sign off on the mentee's inspection on the WAP08.

5. As a mentee, a minimum of ten (10) audits performed with modeling in software and ten (10) inspections must be completed independently and approved by the certified mentors. Approval will be granted by on- site or virtual review of mentee performance. Both the mentee and certified QCI are required to sign the Arkansas inspection form, WAP08.

6. In addition, Arkansas WAP will bring in qualified trainers from IREC accredited training centers to provide classes for mentees and others on the following topics: building science, building/envelope analysis, mobile homes, and installer. These classes will be offered in various regional locations so that mentees from all subgrantees can easily attend. One of these classes will be taught at least every other month while mentees are receiving on-the-job training and advancing to completion of independent

inspections. Mentees without construction experience will be required to take the installer class while others with verified construction experience will not.

7. Arkansas state WAP will inspect at least ten percent (10%) of completed units where a subgrantee has an ongoing mentorship program.

8. Arkansas expects that a minimum of six (6) months will be necessary to prepare a mentee to take the Energy Auditor and QCI exams.

Grantee Monitoring

Grantee monitoring policies and procedures must align with WPN 20-4, which allows using either DOE's prescribed monitoring policy or a Grantee-developed monitoring policy. If a Subgrantee is utilizing the QCI mentorship option, then the Grantee must perform quality assurance reviews of at least 10 percent (10%) of all completed units. Grantee monitoring of a Subgrantee dwelling unit shall not be completed by the same QCI certified individual that completed the Subgrantee energy audit or final inspection of the same dwelling unit. If the Grantee chooses to develop a monitoring policy that differs from the standard options defined in WPN 20-4, the policy must be submitted to the Grantee's respective DOE Project Officer for approval and contain the following elements:

- Description of the relationship between the certified individuals performing the Final Inspections and the installed work - i.e., are they independent, did they audit the home, did they work on the crew, etc.
- Grantee process for ensuring that monitoring is performed in an impartial and complete manner. This must include review of the energy modeling inputs and outputs as described above.
- Grantee process for reviewing the success of the monitoring policies and resolving any issues that affect the quality and impartiality of the inspection process.

Post Assessment

Post assessment will be monitored as a part of the normal State monitoring duties. The State's technical unit (whether contractors or state employees) will conduct onsite field monitoring to determine if Subgrantees are meeting federal regulations.

The Grantee's WAP Financial Manager and the Program Monitors will monitor for fiscal and programmatic compliance of the WAP. Assessments will document the capacities of Subgrantee's staff as it relates to their duties. Assessments will be seen in documents, such as:

1. Periodic monthly monitoring reports
2. Desk and On-site reviews
3. Year-end financial reviews

Section 3. Workforce Training

Pursuant to the Arkansas' Annual Weatherization Application Package submission, AEO has submitted to DOE the proposed training plan with milestones to ensure the training plan is on pace to be accomplished. The Grantee Application submission instructions provide elements that should be addressed as part of the submission.

Definitions and Training Guidelines

- **Comprehensive Training:** Occupation-specific training which is part of an overall curriculum aligned with the topics within the given JTA being trained. Comprehensive training must be administered by, or in cooperation with, a training program that is accredited by a DOE-accepted credentialing body for the JTA being taught.
- **Specific Training:** Single-issue, short-term training to address technical skills or knowledge gaps.
    - Conference trainings and any training not aligned with a Home Energy Professional JTA are included in this category.
- **Home Energy Professionals:** An umbrella term for those working in the residential retrofit industry with a focus on energy efficiency improvements.
- **Job Task Analyses (JTAs):** JTAs define and catalogue the knowledge, skills, and abilities a practitioner needs to perform a given job effectively and safely. JTAs are used by training providers to develop coursework that can be verified and accredited by a third-party organization.
- **Retrofit Installer/Technician (RIT):** A residential energy efficiency professional who installs energy efficiency upgrades in dwelling units**.**
- **Crew Leader:** A Crew Leader is responsible for supervising and assisting in the retrofitting activities specified in the scope of work. The Crew Leader is responsible for quality control, interacting with the client, managing personnel and materials, and ensuring a safe and efficient job site.
- **Energy Auditor:** An experienced professional who evaluates the health and safety issues, durability, comfort, and energy use of a residential building. The Energy Auditor (EA) conducts advanced diagnostic tests, gathers and analyzes data, and creates energy models to draw conclusions and make recommendations to the client for improvements.
- **Quality Control Inspector (QCI):** A certified residential energy-efficiency expert who ensures the completion, appropriateness, and quality of energy upgrade work by conducting a methodical inspection of the building and performing safety and diagnostic tests.
- **Quality Control Inspector (QCI):** A certified residential energy-efficiency expert who ensures the completion, appropriateness, and quality of energy upgrade work by conducting a methodical inspection of the building and performing safety and diagnostic tests.
- **Installer Badges Toolkit:** The Installer Badges Toolkit provides a flexible, customizable, and voluntary approach to training and skills recognition for WAP RITs and Crew Leaders.

Workforce Training & Technical Assistance Overview

There will be an annual, on-site review of each subgrantee by a technical monitor. The following will be reviewed:

1. Review AEO's technical quarterly/annual report for each agency prior to on-site visit.
2. Review each subgrantee employee's self-assessment prior to on-site visit.
3. Review subgrantee certifications prior to on-site visit. Discuss subgrantee staff of upcoming

4. Review each subgrantee employee's training plan prior to on-site visit and determine if training plans are being followed for persons employed by weatherization. Do plans support renewal of staff certifications? Are there plans for additional staff certifications renewal dates? 5. Verify if each contractor certifications are valid. Check to see if SWSs were issued with work order.
6. Review subgrantee plan for evaluating contractor work.
7. Review subgrantee contractor training plan (if applicable) and determine if improvements have been achieved.
8. Review subgrantee plan for dismissing contractors for poor performance.
9. Conduct inventory check on equipment (including vehicles) and materials. Submit a written report.
10. Gather a list of equipment purchases/dispositions from previous and current program year prior to on-site; visit. Inspect PPE and safety equipment.
11. Check to see if SWS field guides are in subgrantee and contractor vehicles.

Training and Technical Assistance Approach and Activities

PY 2024 will feature in-person training opportunities. Training content will be based on two distinct categories:

1. Comprehensive Training, formerly known as Tier 1 Training, is occupation-specific training which follows a curriculum aligned with the JTA for that occupation. Comprehensive training must be administered by, or in cooperation with, a training program that is accredited by a DOE-approved accreditation organization for the JTA being taught.

2. Specific Training, formerly known as Tier 2 Training, is short-term, training to address acute deficiencies in the field such as dense packing, crawlspace sealing, FLIR, ASHRAE, etc. Conference trainings are included in this category.

Specific training content will be identified from the following:

1. Aggregating statewide findings/concerns from technical, administrative, and fiscal monitoring;

2. Subgrantee staff completing self-assessments for WAP managers who each submit a training plan to AEO for the allocation of T&TA funds, including needed training to maintain required certifications, which will be part of each Subgrant agreement;

3. DOE findings and concerns; and

4. Training needs for contractors identified by both AEO and subgrantees (AEO) will develop a specific policy enable the use of T&TA funds for training contractors).

AEO requires that each subgrantee have at least one (1) certified QCI on staff. This requirement has been met since July 1, 2015. Currently, there are ten (10) certified QCIs employed among the five (5) subgrantees and one (1) QCI employed by the state. AEO will procure, through a Request for Proposals (RFP), a contract for QCI services to complete inspections in fulfillment of Arkansas' Monitoring Plan.

Building Performance Institute (BPI) requires that all individuals who renew, or pursue a new, QCI certification hold an Energy Auditor certification. All QCIs in Arkansas WAP are also certified Energy Auditors. In addition, six (6) certified Energy Auditors who are not QCIs are employed by the subgrantees.

AEO recommends that new staff hired by subgrantees complete Building Analyst and Manufactured Housing training to establish a solid foundation for going on to certification as an Energy Auditor and QCI. AEO provides T&TA funding for subgrantees to include Building Analyst certification for inexperienced, non-credentialed staff in their training plans. Some staff who need to start out with Building Science are supported in obtaining that training.

AEO requires that weatherization directors and field staff (auditors and inspectors) as well as contractors have active certification in lead-safe practices through the Environmental Protection Agency's Renovation, Repair, and Painting program. In addition, AEO technical staff and the Weatherization Manager are required to have this certification.

Maintaining workforce credentials: AEO stays abreast of credentials and their renewal requirements by maintaining a spreadsheet tracker based on the staff certifications submitted by subgrantees. AEO provides T&TA funds for subgrantees to obtain required continuing education units for QCIs and Energy Auditor based on the subgrantee's approved training plans.

Technical training, both Comprehensive and Specific, will be provided by a trainer affiliated with an IREC- accredited training center to provide CEUs leading to and maintaining certifications: QCI, Energy Auditor, Crew Leader, Weatherization Worker, Building Analyst, and Manufactured Housing. AEO has established a working relationship with Caleb Copeland-Cook, affiliated with the IREC accredited training center in New Mexico but located in southern Missouri. Caleb replaced Dan Payne who retired. Staff attended several of Mr. Payne's trainings at his facility and he has come to Arkansas for several trainings. AEO will follow procurement procedures to obtain training during PY 2024.

Training provided by AEO in Arkansas is considered mandatory. Subgrantees have consistently attended available training, and, therefore, AEO has not needed to establish ramifications for non-compliance. In the case of non-attendance at training, AEO would consider requiring absent subgrantee staff to find and attend equivalent training elsewhere.

AEO encourages the following with T&TA funds made available to subgrantees:

1. Attend Building Analyst and Manufactured Housing Training;
2. Attend DOE/National Home Performance Conferences;
3. Attend Energy OutWest Conference;
4. Attend NASCSP conferences, if appropriate.

AEO staff attend the fall and spring NASCSP conferences, Energy OutWest and the National Home Performance conferences. AEO staff will attend one (1) additional conference, if demonstrated to be specifically applicable to weatherization and job duties.

Support of on-the-job training: AEO requires that weatherization field staff new to the job are supervised by trained and certified staff until such time that skills are demonstrated satisfactorily and any required certifications are completed.

Planning for industry-wide initiatives and future program requirements: AEO attends NASCSP conferences each year and through this and other conferences strives to keep abreast of industry standards and to include these areas in Arkansas trainings and requirements. AEO has established, for instance, a relationship for training opportunities with the AR HVACR Association.

AEO will reach out to home industry trainers as needs are identified. In addition, AEO will partner with statewide home performance industry on training issues.

Use of effectiveness and energy savings evaluations to develop training: ECOS generates energy savings data from each job that provides snapshots of savings by different variables. AEO will work with JAI to generate useful reports, such as the range of energy savings from common energy efficiency measures. AEO will seek consultation on using this data to guide development of specific and comprehensive training and assessment of effectiveness.

AEO intends to use as measures of effectiveness (1) job analysis and auditor's judgment/justifications, (2) the timeliness of completion rates for houses audited, (3) a review of reasons for deferral, and (4) measurement of energy savings.

Grantee effectiveness: AEO uses the resources of NASCSP for training and information relevant to implementing and administering the grant. AEO budgets for attendance at these and other conferences.

Training and Technical Assistance (T&TA) Planning Requirements

The Arkansas T&TA plan ensures WAP field workers receive comprehensive training on a regular basis, as defined by AEO, for the position in which the worker is employed. DOE encourages flexibility in designing comprehensive and specific curricula to ensure trainings are customized to meet the needs of the weatherization workforce and unique energy efficiency programs.

AEO in coordination with Subgrantees will decide on the schedule and type of trainings for each profession based on workforce needs and availability of funds. AEO shall develop methods to complete Training Needs Assessments (TNA) which identify and assess training needs and plan for meeting those needs over a defined period, which can span multiple Program Years. The TNA shall be based on the weatherization analysis of effectiveness, DOE and Grantee monitoring recommendations, Subgrantee input, and other available performance data.

Arkansas's training and technical assistance plan includes milestones for the Weatherization grant. Among the elements included in the training plan is comprehensive training for all WAP workers that is aligned with the NREL (JTA) for the position in which the worker is employed.

Per WPN 22-4, Grantee Training plans must address two distinct categories:

1. **Comprehensive Training**: Thorough occupation-specific training which follows a curriculum aligned with the JTA for that occupation. Comprehensive Training must be administered by, or in cooperation with, a training program that is accredited by a DOE-approved accreditation organization for the JTA being taught.
2. **Specific Training**: Single-issue, short-term, training to address acute deficiencies in the filed such as dense packing, crawlspace, ASHRAE, etc. Conference trainings are included in this category.

As DOE instructs, the Arkansas Training Plan ensures that all Weatherization field staff receive ***regular Comprehensive*** training. The proposed training plan includes an analysis of training needs and a plan for meeting those needs over a defined period of time, which can span multiple Program Years. Specific training will be provided on an as-needed basis, however, the majority of worker training should be Comprehensive

Percent of overall trainings:

Comprehensive Trainings:	50
Specific Trainings:	50

Breakdown of T&TA training budget

Percent of budget allocated to Auditor/QCI trainings:	80
Percent of budget allocated to Crew/Installer trainings:	5
Percent of budget allocated to Management/Financial trainings:	15

Timeline 2024/25 Grantee Plan

Grantees must provide a Grantee training plan to ensure that all training meets the requirement outlined in this section. All DOE funded Comprehensive training will be provided by DOE-approved accredited training programs. Accredited training can be administered in a number of ways included traveling training programs, distance learning programs and other options approved by DOE.

All Comprehensive training paid for with WAP T&TA funds must meet the requirements of this section.3

Installers/field technicians

Milestone: By the end of PY 24/25

- Completion of Comprehensive requirements and "Additional Trainings Required."
- Obtain RI Credentials administered by BPI Installers/technicians.
- At least once in every three-year period attend a nationally recognized home energy training conference and participate in a complete track of training sessions. Certificates are required to prove participation.
- New Hires for this position have one (1) year from the date of hire to complete or show evidence of completion of Comprehensive trainings and "Additional Trainings Required."

Comprehensive

- Complete a Retrofit Installer (RI) training program that has been aligned to cover the DOE approved JTA for Retrofit Installers and administered by an IREC approved training provider.
- Obtain the RI credential administered by BPI.

Additional Trainings Required:

- Obtain OSHA 10 certification.
- Obtain EPA Lead RRP certification.
- Completion of a Mobile Home Weatherization Tactics training program
- (Certificate required).

Specific (identified needs via DOE and State monitoring visits) to be completed by the end of PY 24/25.

- Duct sealing.
- Crawl space air sealing and insulation.
- Mobile Home Insulation tactics.
- RI's are responsible for acquiring the required CEUs and maintaining their BPI credential, OSHA 10 and EPA Lead RRP certifications.

Crew Leaders

Milestone: by the end of PY 24/25.

- Completion of Comprehensive requirements for Crew Leader and "additional Trainings Required."
- Obtain the Crew Leader Credential administered by BPI.
- Crew Leaders must repeat Comprehensive training requirements every three (3) years.
- At least once in every three-year period attend a nationally recognized home energy training conference and participate in a complete track of training sessions. (Certificates required to prove participation.).
- New hires for this position have one (1) year from the date of hire to complete or show evidence of completion of Comprehensive trainings and "additional Trainings Required."

Comprehensive

- Complete the Installer requirements in addition to complete a Crew Leader training program that has been aligned with the DOE Approved JTA for Crew Leaders and administered by an IREC approved training provider.
- Obtain the Crew Leader credential administered by BPI.

Additional Trainings Required:

- Obtain OSHA 10 certification.
- Obtain EPA Lead RRP certification.
- Complete an ARWAP approved ASHRAE 62.2 training program (certificate required).
- Successfully complete a Mobile Home weatherization tactics training program
- (certificate required).
- Complete an ARWAP approved training program on the SWS and AR State guidelines.

Specific (identified needs via DOE and State Monitoring visits) to be completed by the end of PY24/25.

- Duct sealing.
- Crawl space air sealing and insulation.
- Mobile Home Insulation tactics.
- Crew Leaders are responsible for acquiring the required CEUs and maintaining their BPI credential, OSHA 10 and EPA Lead RRP certifications.

Energy Auditors

Milestone: by the end of PY 23/2.

- Complete Comprehensive requirements and "Additional Trainings required."
- Obtain the EA credential administered by BPI.
- Energy Auditors must repeat Comprehensive training requirements every three (3) years.
- At least once in every three-year period attend a nationally recognized home energy training conference and participate in a complete track of training sessions. (Certificates required to prove participation).

- New Hires for this position have one (1) year from the date of hire to complete or show evidence of completion of Comprehensive trainings and "Additional Trainings Required."

Comprehensive: Complete an Auditor training program that has been aligned with the DOE approved JTA for Energy Auditor and is administered by an IREC approved training provider.

- Obtain the Energy Auditor credential administered by BPI.

Additional Trainings Required:

- Complete DOE endorsed Health and Safety with Lead Safe Work practices training.
- Obtain OSHA 10 Certification.
- Obtain EPA Lead RRP Certification.
- Complete Infrared Thermography Level 1 training.
- Successfully complete a Mobile Home weatherization tactics training program (Certificate Required).
- Complete sixteen (16) hours of building modeling software training (Provided by JAI).
- Complete an ARWAP approved ASHRAE 62.2 training program (Certificate Required).
- Complete an ARWAP training program on the SWS and AR State guidelines.

Specific (identified needs via DOE and State monitoring visits) to be completed by the end of PY224/25.

- ASHRAE 62.2 2016 Calculations and implementation (conference session).
- Zonal Pressure Diagnostics and Air Sealing.
- IR camera and insulation assessment techniques.
- Energy Auditors are responsible for acquiring the required CEUs and maintaining their BPI credential, OSHA 10 and EPA Lead RRP certifications.

Quality Control Inspector

Milestone: By the beginning of PY 24/25.

- Completion of Comprehensive training.
- Obtain QCI credential administered by BPI.
- By the end of PY 2024/25 completion of "Additional Training Required."
- Energy Auditors must repeat Comprehensive training requirements every five (5) years.
- At least once in every three-year period attend a nationally recognized home energy training conference and participate in a complete track of training sessions. (Certificates required to prove participation).
- New Hires for this position have one (1) year from the date of hire to complete or show evidence of completion of Comprehensive trainings and "Additional Trainings Required."

Comprehensive

- Complete a Quality Control Training program that has been aligned with the DOE approved JTA for Quality Control Inspector and is administered by an IREC approved training provider.
- Obtain the Quality Control Inspector Credential administered by BPI.

Additional Trainings required:

- Complete DOE endorsed Health and Safety with Lead Safe Work practices training.
- Obtain OSHA 10 Certification.

- Obtain EPA Lead RRP Certification.
- Complete Infrared Thermography Level 1 training.
- Successfully complete a Mobile Home weatherization tactics training program (Certificate Required).
- Complete sixteen (16) hours of building modeling software training (as provided by JAI).
- Complete an ARWAP approved ASHRAE 62.2 training program (Certificate Required).

Specific (needs identified via DOE and State monitoring visits) to be completed by the end of PY 24/25.

- ASHRAE 62.2 2016 Calculations and implementation (Conference Session)
- Zonal Pressure Diagnostics and Air Sealing.
- IR camera and insulation assessment techniques.
- Complete an ARWAP approved training program on the SWS and AR State guidelines.
- Zonal Pressure Diagnostics.
- QCI Inspectors are responsible for acquiring the required CEUs and maintaining their BPI credential, OSHA 10 and EPA Lead RRP certifications.

There are no Comprehensive or Specific requirements as stated in WPN 22-4 for Weatherization Directors, Financial Managers or contractors at the Subgrantee level. However, the purpose of the QWP and training plan is to ensure that all of the workforce is well trained for their specific job duties. The DOE is developing curriculum and when it is available, ARWAP will adapt it for Subgrantee level management training. Subgrantee managers are encouraged to utilize DOE's WAP management training resources: https://www.energy.gov/scep/wap/wap-management-training-resources.

Once DOE approved curriculum is available, the following trainings are necessary and will be offered.

Weatherization Directors

Milestone: by the end of PY 23/2.

- Complete Comprehensive training requirements of the Crew Leader Job.
- Classification and "additional Trainings."
- Complete a Comprehensive training program designed for Retrofit Installers, Crew Leaders, Energy Auditors or Quality Control Inspectors at least once every three (3) years.
- At least once in every three-year period attend NASCSP training conference and participate in a complete training track of sessions (Certificates required as proof of participation).
- New Hires will have one (1) year from date of hire to complete or show evidence of prior completion of the Comprehensive Crew Leader training and the "Additional Trainings."

Additional Trainings

- Weatherization Directors Training two (2) days offered by grantee level staff.
- Financial Toolkit training as outlined on waptac.org.
- OMB Circular Training as offered by NASCSP.
- OSHA 10.
- EPS Lead RRP.
- Complete an ARWAP approved ASHRAE 62.2 training program (certificate required).
- Complete sixteen (16) hours of building modeling software training (as provided by JAI).
- Complete sixteen (16) hours of financial management software training (as provided by JAI).
- Mobile Home Weatherization tactics.
- Financial Management software training (as provided by JAI).

Financial Managers

Milestone: By the end of PY 24/25.

- Complete Financial Toolkit training as outlined on waptac.org.
- Complete two-day Weatherization Training offered by grantee level staff.
- Complete sixteen (16) hours of financial management software training (Provided by JAI).
- At least once in every three (3) year period attend NASCSP training conference and participate in a complete training track of sessions. (Certificate required as proof of participation).

Specific (Completed in PY 24/25).

- Weatherization Directors Training—two (2) days offered by grantee level staff.
- Financial Toolkit training as outlined on waptac.org.
- Financial Management software training (as provided by JAI).
- OMB Circular Training (as provided by NASCSP).

Contractors

Milestone: By the end of PY 24/25

Contractors are required to successfully complete ARWAP recommended trainings and attend annual conference training events in order to stay up to date on Specific requirements.

Air sealing/Attic preparation/Wax measure installers and Insulation installers

Milestone: by bid deadline for PY 24/25.

- Completion of Comprehensive requirements for RI and "Additional Trainings required."
- Installers/technicians must repeat Comprehensive training requirements at least once every three (3) years.
- New Hires or new contract awardees will have one (1) year from the date of hire or award to complete or show evidence of completion of Comprehensive trainings and "Additional Trainings Required."

Comprehensive

- Complete a RI training program that has been aligned to cover the DOE approved HTA for Retrofit Installers and administered by an IREC approved training provider.
- Obtain the Retrofit Installer credential administered by BPI.

Additional Trainings Required:

- Obtain OSHA 10 certification.
- Obtain EPA Lead RRP certification.

Specific (identified needs via DOE and State monitoring visits) to be completed by the end of PY 24/25.

- Duct sealing.
- Crawl space air sealing and insulation.
- Mobile Home Insulation tactics.
- Retrofit Installers are responsible for acquiring the required CEUs and maintaining their BPI credential, OSHA 10 and EPA Lead RRP certifications.

HVAC Contractors

Milestone: by bid deadline for PY 24/25.

- Completion of Building Science and Professional training program and obtain certificate (a higher level Building Energy Certification may be substituted i.e., Building Analyst, RESnet rater etc.).
- OSHA 10 certification.
- New Hires or new contract awardees will have ninety (90) days from the date of hire or award to complete or show evidence of training requirement adherence.

Specific (identified needs via DOE and State monitoring visits) to be completed by the end of PY 24/25.

- Duct sealing.
- Zonal Pressure diagnostics.

Plumbing Contractors

Milestone: by bid deadline for PY 24/25.

- Completion of Building Science Professional training program and obtain certificate (a higher level Building Energy Certification may be substituted i.e., Building Analyst, RESnet rater etc.).
- OSHA 10 certification.
- New Hires or new contract awardees will have ninety (90) days from the date of hire or award to complete or show evidence of training requirement adherence.

Electrical Contractors

Milestone: by bid deadline for PY 24/25.

- Completion of Building Science Professional training program and obtain certificate (a higher level Building Energy Certification may be substituted i.e., Building Analyst, RESnet rater etc.).
- OSHA 10 certification.
- An ARWAP approved ASHRAE 62.2 training program (Certificate Required).
- New Hires or new contract awardees will have ninety (90) days from the date of hire or award to complete or show evidence of training requirement adherence.

Additional Specific training needs for subsequent program years will be developed from information obtained by DOE project officer visits, monitoring visits and other sources as deemed necessary by ARWAP management staff. While it is customary and understood that some personnel may perform more than one (1) job duty – for instance QCI and Auditor – those individuals will need to meet the requirements of both job classifications in order to perform those duties.

Further information to carry out the requirements set forth above can be found in the following links or by contacting the U.S. Department of Energy Weatherization Assistance Program, wapinfo@nrel.gov (Subject Line: Quality Work Plan):

- The Standard Work Specifications for Home Energy Upgrades for Single Family, Manufactured Housing, and Multifamily Homes http://sws.nrel.gov
- The IREC ISO 17024 Accreditation Program for Energy Efficiency Training
- Programs http://www.irecusa.org/credentialing
- The NREL Job Task Analysis for Quality Control Inspector http://www1.eere.energy.gov/wip/pdfs/51670.pdf
- Home Energy Professional Quality Control Inspector Certification http://www.bpi.org

Grantees with specific questions related to this guidance should contact their DOE Project Officer.

Tommi Makila
Project Officer
Office of Energy Efficiency and Renewable Energy (EERE) US Department of Energy

The Subgrantee shall be advised after the conclusion of the review process of any employee that did not meet the competency expectation. The employee that has failed to meet expectation will receive an At-Risk rating in the area of noncompliance. A clear and concise expectation of the employee's responsibility (based on State and DOE expectations) will be shared with the Executive Director and Weatherization Program Director. An overall risk assessment will be conducted on the Subgrantee.

I. EMPLOYEE/CONTRACTOR IDENTIFICATION

In addition to compliance with AEO standards and specifications with regards to weatherization work, Subgrantees are to represent the Weatherization Assistance Program in a professional manner. The professional attire and demeanor of the crew or contractor is important. If a Subgrantee uses crews, each crew member should wear shirts that list the name of the Subgrantee and state "Weatherization Assistance Program". Also, each crew member should have an identification badge that is visible at all times or have his/her name printed on the shirt. If the Subgrantee uses contractors, the contractor should have an identification badge with his/her name and that of the company visible at all times. Additionally, all Subgrantee weatherization vehicles should have a permanent or magnetic sign that states "Weatherization Assistance Program" or has the WAP logo and the name of the Subgrantee.

Arkansas Weatherization Assistance Program Graphic Identity Guidelines

The Arkansas Weatherization Assistance Program is committed to an integrated network of Weatherization professionals to serve all Arkansans. One piece of this is projecting an engaging and coherent image. Consistent, high-quality communications materials build recognition for our work among clients, employees, colleagues and our communities.

At the 2010 Arkansas Weatherization Conference a new graphic identity and logo scheme for Arkansas Weatherization programs was unveiled.

This new logo does not take the place of the national Weatherization Assistance Program logo but does distinguish Arkansas as a trend-setting, forward-thinking state that's closely aligned with the national movement to create green jobs and reduce our dependence on foreign sources of energy. The guidance provided here is intended to preserve the strength of the new logo, prevent distortions and misuse of the mark, and ensure statewide consistency.

Please share this guidance with those in your agency who regularly work on weatherization publications and promotional materials. Working together, we can create a strong, cohesive visual presence for the Arkansas Weatherization Assistance Program.

Please see Appendix XX for further guidance.

II. DEVELOPING A QUALITY WORK PLAN ASSESSING SUBGRANTEE CAPACITY

Justification Compliance with federal (and state, if applicable) requirements at the subgrantee level. Per Section 440.15 subgrantees, the grantee shall ensure each subgrantee has the necessary experience and capacity to undertake a timely and effective weatherization program.

Expectation To effectively administer a Federal program, staff must have a clear and consistent understanding of both the program rules (10 CFR 440) and the financial rules (2 CFR 200 and OMB Super Circular) that governs the program. Administrative staff is held responsible for all managerial aspects – some that are specific to the WAP and some that are necessary to successfully implement the financial requirements of any federal grant.

A. Identifying the Minimum Competencies held by Subgrantee Staff

All Subgrantees are required to perform annual assessment of its current WAP workforce to ascertain what the current training and certifications levels are of the workforce as they pertain to the Knowledge, Skills and Abilities (KSAs) required of each occupational position as developed and distributed by the Department of Energy (DOE). The results of the assessment should be taken into account when developing a Training and Technical Assistance (T&TA) plan. Each program year, Subgrantees are required to submit to AEO a T&TA showing the need and utilization of T&TA funds.

In addition, AEO/WAP compiled the Job Task Analysis (JTAs) for all weatherization classifications along with its stated knowledge, skills and abilities (KSAs) and disseminated it to the network to review and conduct a self-assessment on their competencies. On the following pages are the outlines for each classification as determined by the National Renewable Energy Laboratory (NREL).

B. Establishing A Baseline

AEO must review the collected data on each Subgrantee's WAP staff. AEO will document:

1. Each employee's credentials,
2. What training each has received, and
3. Experience level of each employee in performing their assigned duties.

This data will be used to develop a baseline for each employee. A copy of the baseline results will be sent to both the Grantee and the relevant subgrantee.

C. **Evaluating Knowledge, Skills & Abilities (KSA)**

Now that credentials, training received, and experience levels have been gathered, it is now necessary to conduct an active assessment on each employee's KSA through a series of questionnaire, tests, and/or observations.

D. **Recommended Training Plan**

A recommended training plan will be generated on each employee with the expectation that each will be able to effectively demonstrate competencies in the occupational KSAs associated with their position. This plan will contain general training requirements for each occupation within the workforce including technical staff, management, administrative and financial staff. This general requirement will cover necessary training and credentials required of new hires as well as continuing education expectations over a given period of employment.

The deliverables under the Training Plan are:

1. A set of milestones for all current employees as well as new employees to ensure their progress toward the goals stated in the plan.
2. A list of expected continuing education goals for each employee.

All recommended training must be in alignment with the Department of Energy (DOE's) WAP training. AEO and Subgrantees will seek training from an IREQ accredited training center and/or an IREQ accredited trainer.

E. **Training & Technical Assistance**

All individuals involved with subgrantee program management are competent and have completed expected training, as needed.

Only the Quality Control Inspector is expected to have certification at this time. All other staff are not required to have certifications; however, it is expected by DOE that each of these categories of employees have a clear and consistent understanding of both the Program rules (10 CFR 440) and the financial rules (2 CFR 200) that govern the Program.

Administrative staff is responsible for all managerial aspects – some that are specific to the WAP and some that are necessary to successfully implement the financial requirements of any federal grant.

Those staff performing as financial managers should have a thorough understanding of State and subgrantee procurement requirements as well as the 2 CFR 200.

F. Post Assessment

Post assessment will be monitored as a part of the normal State monitoring duties. The State's technical unit (whether contractors or state employees) will conduct on-site field monitoring to determine if subgrantees are meeting federal regulations.

The Grantee's WAP Financial Manager and the Program Monitors will monitor for fiscal and programmatic compliance of the WAP. Assessments will document the capacities of Subgrantee's staff as it relates to their duties. Assessments will be seen in documents, such as:

1. periodic monthly monitoring reports,
2. desk reviews, and
3. year-end financial reviews.

The Subgrantee shall be advised after the conclusion of the review process of any employee that did not meet the competency expectation. The employee that has failed to meet expectation will receive an At-Risk rating in the area of noncompliance. A clear and concise expectation of the employee's responsibility (based on State and DOE expectations) will be shared with the Executive Director and Weatherization Program Director. An overall risk assessment will be conducted on the subgrantee.

G. Contingency Plan – Fail to Meet Competency

After repeated findings, if a particular employee fails to demonstrate the expected competency, the Subgrantee may develop a plan to retain the employee. If the employee is a technical employee, the subgrantee may work out an agreement with other WAP subgrantees to borrow "pre-approved/qualified" employees to fill in while their employee receives additional training. Under this plan, the employee will have up to six (6) months to build up their competencies. If the employee does not meet the KSA's expected by DOE, that specific WAP employee can no longer work in that capacity.

In order to implement a Quality Work Plan, the WAP workforce must have uniform job classifications. These job classifications are created by DOE to ensure a level of competency for weatherization workers in various positions.

Job Classifications consist of:

- **Weatherization Installer/Technician**: Installs weatherization materials on the homes;
- **Weatherization Quality Control Inspector**: Conducts final inspections;
- **Weatherization Crew Chief**: Serves as leader of a crew of Weatherization
- Installers/Technicians;
- **Energy Auditor**: Conducts the actual audit of the home and writes up specifications;
- **Weatherization Contractor**: Contracts with the subgrantee to install weatherization measures on the home.

AEO realizes that each agency will not have staffing at the level indicated and that staff often perform dual roles. In Arkansas, the Weatherization Director functions as the program manager. At some subgrantee agencies, the Weatherization Director and the Energy Auditor perform duties of the Weatherization Inspector.

In your T&TA Plan, you are asked to indicate the role or dual role of each staff person (i.e., Energy Auditor/Weatherization Inspector; Weatherization Director/ Weatherization Inspector). Reminder: the same person can NOT audit and inspect the same home. The AEO will make final approval of key personnel attendance and participation in efforts to ensure identified key personnel receive and attend appropriate training(s) or conference(s).

In addition to the above job classifications, AEO requires that someone be assigned the duties of a Client Education Specialist. The duties of this person can be performed by the Energy Auditor or Weatherization Director.

New contractors must attend Contractors Workshop as scheduled by AEO.

Worker Safety:

Subgrantee must post at agency office and on-work site safety rules for its staff and contractors who work on site in client homes. All relevant rules from OSHA 10 and 30 and OSHA Confined Spaces (effective January 2016) must be addressed.

Weatherization field staff sometimes encounter situations that are hazardous, such as vicious animals, drugs, or unsanitary conditions in and around the home. Each situation will be different and must be addressed on a case-by-case basis. (See Deferrals/Denials section).

III. CLIENT EDUCATION

See Program Year 2010 Weatherization Grant Guidance 3.2 (WPN 10-1, Effective December 18, 2009)

Before and after completing an energy audit on the home, Clients must be given educational materials about energy conservation and any safety issues that exist in the home. Work order has been generated for the installation of measures, the client must be informed of the proposed work before work can begin. A verbal summation of the work to be done initially, but must be followed up in writing on agency letterhead and provided to the client for reference.
Client education may include, but is not limited to:

A. **Energy Savings Kit, if Subgrantee uses** – give to Client and explain how to use each item.

B. **Energy Savings Information** – give Client pamphlet(s) that shows ways to conserve energy. Discuss the main items in the pamphlet.

C. **Health and Safety** - give Client copies of the following brochures, if applicable to that home:

- *A Brief Guide to Mold, Mildew and Moisture, and Your Home*, *(EPA 402-K-023-003)(all homes)*
- *Renovate Right (EPA-740-K-10-001)*, a guide to lead-based paint hazards (all homes built prior to 1978)
- *A copy of the WAP 26 for all positive Lead tests*
- *Asbestos In Your Home (All homes)*
- *Protect Your Family from Asbestos-Containing Vermiculite*. (If applicable) (In homes where vermiculite has been identified)
- *A Citizen's Guide to Radon or A Consumer's Guide to Radon Reduction (*all homes, regardless of known radon issues, and confirmation must exist in client file per WPN 22-7*)*
-

D. **Client Education Checklist** (WAP 13) – have Client initial each item after it is explained. Each space on the checklist must be initialed by the Client or, if not applicable to this Client and home, "N/A" entered in the space.

NOTE: *SOME ITEMS ON THE CHECKLIST CANNOT BE DISCUSSED UNTIL THE FINAL INSPECTION. CLIENT SHOULD NOT BE ASKED TO INITIAL ANY ITEM UNTIL THAT ITEM HAS BEEN DEMONSTRATED OR EXPLAINED.*

Additional handouts required to complete the checklist are:

- Fair Hearings and Appeals form (WAP 23).

Clients must sign the bottom of the form after it is completed. Subgrantee employees who completed the form with the Client before and after weatherization work must also sign;

therefore, more than one (1) line is provided for agency representative signatures.

IV. ENERGY AUDIT

The energy audit is a part of the Energy Conservation Online System (ECOS), which is a web-based system. Subgrantee auditors must use the data collection forms available through ECOS and maintain a completed copy in the client file. The Subgrantees must have adequate segregation of duties for weatherization personnel. DOE has advised that allowing the same auditor to perform both the initial energy audit and the final inspection on the same project presents a conflict of interest. In order to prevent the appearance of a conflict, Subgrantees must have a different individual perform the initial energy audit and final inspection.

It is also a conflict of interest for a contractor to actively participate in determining the scope of work for weatherization projects. In Arkansas, the role of assessing a home and determining the most cost-effective energy conservation measures for that home is left to ECOS and a well-trained, experienced Energy Auditor.

ARWAP is currently undergoing the approval process for the use of Priority List (PL) audits as an alternate Energy Auditing tool, with the goal of beginning its use during the 24/25 PY.

A. **Energy Audit Procedural Checklist**

Included in this energy audit checklist are the required equipment, forms, procedures, practices and standards that must be followed by energy auditors for the use of DOE and leveraged funds. This is a minimum guide. Additional equipment, tests and forms may be required on a case-by- case basis as determined by the experienced auditor. A comprehensive assessment involves an Energy Auditor's evaluation of the dwelling.

All steps outlined are a minimum requirement for site built and mobile homes. Evaluation of a home and its components shall be conducted per the standards in ANSI/BPI-1100-T-2023 and the procedures outlined in ANSI/BPI-1200-S-2017. Energy Auditors are reminded that clients and their homes are to be respected at all times. Program staff and/or contractors should:

- Schedule and keep appointments or call with changes.
- Speak clearly and use everyday vocabulary, explaining any energy terms used; watch for signs that the client doesn't understand.
- Explain and highlight information in written materials, such as the Client Education checklist and booklets you are providing.
- Discuss options with client; do not assume what the client wants.
- Ask permission before using client's restroom or other personal effects.
- Always speak respectfully to client; never use derogatory, demeaning or insulting language at the client's home.
- If you track dirt or other debris into the home, always clean up before you leave.

Equipment/Tools: (minimum)

- Blower door
- Combustion Analyzer
- Gas Leak Detector
- Infrared camera
- Digital camera
- Duct Pans and/or Duct Blaster
- Watts Up Meter or equivalent
- Ladder
- Flashlight
- Measuring tape
- Pencil/Pen/Clipboard

Forms:

Client's Application form (WAP 02)

Client Education form (WAP 13)

- Health and Safety Checklist (WAP 10)
- Lead-Test form (WAP 26)
- Radon Informed Consent (WAP 65)
- Field Data Collection Forms
- Fair Hearing Request form (WAP 23)
- Renovate Right (lead safety), Mold and
- Moisture, Energy Saving Tips booklets
- Paper for diagramming house

1. Client Introduction/Client Interview

- Before entering the client's home, identify who you are and the agency you represent.
- Explain that the purpose of your visit is to evaluate the home for air infiltration and high energy use and that the evaluation will be based on tests you perform using special tools and equipment. Each tool will generate a reading and those readings will be uploaded into an energy audit program which then gives specific recommendations for their home.
- Explain the types of repairs allowed by WAP and emphasize that nothing is certain until the audit is run through the software.
- Ask if there are concerns related to the performance of the home.
- Ask about the condition of the heat and air systems and water heating appliance.
- Ask if there are questions about the program.
- Ask which rooms are used the most.
- Client knowledge of their home and appliances can be invaluable to the Auditor in determining measures to be installed.

2. Client Education

- Review the Client Education pamphlets (*A Brief Guide to Mold and Moisture*, *Renovate Right!,* EPA Citizens Guide to Radon).
- Review the client education checklist (WAP 13) with client; explain items, then ask client to initial each item.

3. Energy Audit Diagnostics

Use standardized ECOS Input forms when conducting the energy audit assessment to ensure all required data is collected.

- Set-up meter to record refrigerator energy consumption. Record model information and serial number on ECOS Input form.
- If home uses propane or natural gas, conduct a leakage test on all supply lines. Leaks must be repaired prior to weatherizing the unit.

Photo Documentation (Accurately reflect the layout and condition of the home)

- Exterior views showing every wall of the home (STEP BACK).
- Legible photos of manufacturer's data plates for heating, cooling, refrigeration, and DHW appliances.
- Photo of wall insulation being investigated.
- Photos of attic area including attic insulation being measured.
- Photos of crawlspace area, including height, crawlspace entrance, and crawlspace joist size.
- Photo of the existing condition(s) for any item that is being installed or repaired.
- Any health and safety issue to be addressed by weatherization.
- Take additional pictures of any areas of concern.
- Photos of the diagnostic test results, including
- Combustion Analysis – WCD of CAZ (manometer), Spillage, Comb. Analyzer showing CO,
- AF, EFF % (SSE), and CO (as measured)
- Refrigerator Metering – Minutes, kWh, Peak Watts, Appliance Data Plate
- Blower Door – BD setup with final ring configuration, Manometer
- Duct Blaster – DB setup, Manometer
- Only those pressure pans which are an unusually high reading need to be photo documented.

On exterior of home:

- Each dwelling unit initial audit documentation shall contain a drawing that reasonably represents the footprint of each level, detailing:
    - Orientation
    - Window and door location
    - Shading landscape
    - All building components in drawing clearly labeled as they are in the auditing software
    - Wall dimensions of thermal boundary

Assessing Shading

- Exterior Shading %. - judge the amount of shade provided by trees or shrubs, and by such things as roof eaves, nearby buildings and porch roofs.
- For Exterior Shading percent, you might consider the following rule of thumb: Enter the approximate percentage of window area frequently shaded by eaves (typically 20%; if the window, is shaded half the day, enter 50%.
- porches (typically 100%), or other physical exterior barriers, such as trees, may require a different percentage.
- Solar screens provide 65-75% shade.
- Outdoor solar films provide 40 to 75% shading
- Awnings 50-90%
- Aluminum louvered sunscreen- 80-85%
- South windows transmit the most solar heat. West windows contribute solar heat in the afternoon, just when summer comfort is most difficult to provide. East windows begin heating the home early in the morning, causing more hours of potential discomfort.
- There is no universally accepted test for measuring the percentage of window shading. This is provided as a guide, rather than a standard
- See" Your Home Cooling Energy Guide, Krigger, John T. 1992

Observe the roofline, note sources of ventilation (gable vents, soffit vents and/or whirly birds), and any signs of damage. Assess condition of walls, windows and doors.

- Test for Lead if home was built prior to 1978. Record test results on Lead- Test Documentation
- Sheet (WAP 26) and Health and Safety Form, WAP 10.
- Test fuel source for leaks.
- Assess for moisture issues and identify moisture control strategies.
- Note any structural issues.
- Visually assess cleanliness, age and condition of central air unit.
- Evaluate outdoor heating/cooling systems in accordance with ANSI-BPI-1200-S-2017.

In interior of home:

- Upon entering the building, the ambient air shall be sampled to determine the level of C0 by conducting measurements in the occupied space including utility rooms.
- Perform carbon monoxide tests using the Health and Safety Checklist (use WAP 10). Combustion analysis will be performed using ANSI/BPI-1200- S-2017 Standard Practice for Basic Analysis of
- Buildings as a guide
  All Gas and liquid fueled appliances, including:

    - Living Area Ambient Air.
    - Space Heater(s).
    - Furnace.

- Water heating appliance.
- Kitchen Range/oven.
- Fireplace
- Stove
- Dryer

- Documentation of primary and secondary heating and cooling appliance data and fuel source(s).
- Go room by room to observe/assess ceilings, walls, and floors for gaps or cracks. Note signs of water damage, mold or mildew. Take pictures of any areas of concern.

- Set-up for Blower Door test.
  - Take pictures with infrared camera.
  - Conduct Pressure Pan on all ducts, including return.
    https://www.energystar.gov/ia/home_improvement/home_contractors/qispec.pdf
- Conduct Blower door subtraction test for additional duct analysis. Guidance on how to perform blower door subtraction method and determine duct leakage to the outside may be found on pages 47-48 of this manual.

- Photo document the blower door tests and readings pre-and post-weatherization.
- Conduct Exhaust flow tests on all exhaust fans.
- Insulation checks:
  - Remove wall plates or find inconspicuous holes to check insulation thickness in walls.
  - Check for insulation around water heating appliances (if applicable) and pipes.

In the crawl space

- Note the foundation type(s) (e.g. slab on grade, crawl space, basement), construction type (e.g., stone brick, poured concrete), location of the thermal boundary, and exposure above grade. When feasible, note location and condition of the pressure boundary and the moisture barrier.
- Take multiple measurements to determine adequate clearance for workers.
- Note the presence or lack of insulation on foundation walls, ceiling (if a basement or crawlspace), and/or floor.
  Note the insulation type, thickness, R-value, quality of contact with the pressure boundary. Note all degradation or installation issues with existing insulation. Verify R value and coverage area.
- Determine the foundation space to be either conditioned or unconditioned, as it will be at the completion of weatherization. If a basement is deemed conditioned, then the walls and sills must be evaluated for insulation, and the floor area of that space will count towards the total conditioned space of the home.
- The floor area of a foundation is only included in the total conditioned floor area if it is within the pressure and thermal boundary and is habitable.
- Conditioned crawlspaces are included if the pressure and thermal boundaries align all the way to the ground. Unintentionally conditioned crawlspaces are not included in the total conditioned floor area of the home.

- A basement mostly below grade does not counts as a story. if it is finished, conditioned, and suitable for year-round use consistent with the rest of the home (equipped with lighting, ventilation, means of egress, and is conditioned) the floor area will be considered in calculating the building model. Unfinished basements are not counted as floor area if they are not within the pressure/thermal boundary.) Any basement that is deemed to be within the conditioned boundary must be included as floor area if it is 7 feet high or more.
    - Verify presence of moisture barrier, debris, worker safety hazards, or ground moisture problems.
    - Locate areas of possible air leakage such as around duct boots, pipes, wires and other plumbing penetrations.
    - Note location and condition of pressure boundary and moisture barrier.

- Note any thermal bypasses observable from the basement or crawl space(s), such as chases or open wall cavities that extend up into the structure, as well as air leaks from the foundation space to the ground or outside.
    - Assess appliance venting and water heating appliance discharge if present.
    - Assess ability to protect installed measures.
    - Conduct gas leak, combustion gas testing and ambient CO testing for determining OSHA confined space requirements.

In the attic

- Conduct gas leak; combustion gas testing and ambient CO testing for determining OSHA confined space requirements.
- Where there is no attic access it may be necessary to inspect multiple areas of attic or vaulted ceiling using a combination of methods (e.g., visual inspection, non-conductive probe, borescope, and/or non-destructive imaging) to determine insulation recommendations.
- Note the attic or roof type (Rafter/joist, truss, vaulted ceiling), location of thermal boundary and location/condition of the pressure and moisture barrier.
- Note any thermal bypasses observable from the attic, such as chases or open wall cavities that extend down into conditioned space and note likely transition areas for leakage remediation that may not be visible (knee wall-to-floor transitions, changes in ceiling height, chimney/duct chases, dropped soffits/stairway ceilings, etc.).
- Assess condition of duct work, insulation, and supports.
- Note features such as chimneys, combustion venting, recessed light fixtures, and/or exhaust fans that need repair or exterior venting. Note any floored/enclosed areas to be insulated, and specify treatment separately from non-floored areas. Note floor joist thickness for accurate insulation installation instructions.

Habitable attic.

A habitable attic shall not be considered a story where complying with all of the following requirements:

1. The occupiable floor area is not less than 70 square feet (17 m2), in accordance with Section R304.
2. The occupiable floor area has a ceiling height in accordance with section R305.
3. The occupiable space is enclosed by the roof assembly above, knee walls.

If a home contains a finished attic that does not satisfy these criteria, the auditor is required to remove that space from the conditioned envelope (thermal/pressure boundary moved to attic floor. If the occupant disagrees the home must be deferred.

- Assess for adequate ventilation and type in accordance with IRC Section 806 where attic ventilation is required by local code. Ensure ventilation is not blocked,
- Note whether space is conditioned or unconditioned
    - Assess for existing insulation, type, depth, listed and effective R value of the knee walls, gable walls, floors, and attic ceiling/rafters.
    - Assess air leakage points such as vent pipes, wiring penetrations, access scuttles and doors, structural anomalies, furnace closet ceilings etc.
    - Make note of need for and location of damming and chutes.
    - Ensure clearance to combustibles requirements for all vent pipes.
    - Measure and make note of floored areas in attic.
    - Assess duct work and appliances located in the attic space.
    - Note any worker or occupant safety issues such as knob and tube wiring.
- Note any structural issues.
- If there are combustible appliances in the unit, combustion and fuel leak tests must be performed on the combustible appliance(s) and the fuel source before proceeding with any other inspection or testing process.
- Clients must agree to correct or allow correction of any health and safety measures before any additional weatherization measures can be performed.
- Test results will determine how or when to proceed in regard to performing weatherization on the dwelling:
    - If combustion appliances test within acceptable limits, proceed with weatherization.
    - If combustible appliances test results are above the allowable CO level, repair or replacement may be coordinated with weatherization (allowable measures only).
    - Per WPN 22-7, No home may be left without a safe functional primary heating system after weatherization where climate conditions require heating (i.e., all climate zones except zone 1 as defined by ASHRAE). If unable to meet this requirement, deferral is required.

Diagnosis of a home with combustion appliances requires that the home is connected to a fuel source and has a sufficient amount of fuel to complete CO and gas leak testing.

In cases where little/no fuel is present:

- Due to inability to pay an overdue utility bill or to purchase additional fuel, such as propane.
    - Refer Client to local LIHEAP agency for home energy assistance or winter crisis funds.
    - Follow-up with LIHEAP agency on Client's status, as you may be able to help meet the ten percent (10%) LIHEAP referral requirement.
    - Refer to other resources in your community if Client cannot be served by LIHEAP.
- Due to the home being disconnected from the fuel source or meter for the required fuel or lacks a fuel storage tank.
    - Contact the local fuel provider or other resources in your community.

- If fuel issues can be resolved by referral to other agencies, weatherization can be postponed until fuel is available. Otherwise, this unit must be deferred or denied *(See VII. Deferral/Denial in this section).*

B. Building Structure

Building rehabilitation is beyond the scope of weatherization; however, program workers frequently encounter such problems. Dwellings whose structural integrity is in question should be referred to other housing Subgrantees for additional work.

Weatherization services may need to be deferred until the dwellings can be made safe for crews and occupants. Incidental repairs necessary for the effective performance or preservation of weatherization materials are allowed. For example, replacing water-damaged flooring as part of replacing a water heating appliance is allowed.

C. Data Collection

The Health and Safety Checklist (WAP 10) and ECOS data collection form must be completed for each dwelling receiving weatherization assistance and must be placed in the Client file. Additionally, the Client file must include each of the following:

- A site plan drawing.
- ECOS forms.
- Health and Safety Checklist (WAP 10), including diagnostic testing data collection results – pre and final.
- Client education checklist (WAP 13).

D. General Heat Waste (GHW) Reduction Measures

See (WPN 23-06, Attachment 1)

A GHW reduction measure is a weatherization measure that has a pre-calculated, "set" amount of energy savings. The calculated energy savings potential is static and uniform whenever that task is installed in a home. GHW may be used unless the audit calculates an SIR of 1.0 or better to install the measure as an ECM. (water heating appliance tank wrap is also in the audit software as an ECM) The following GHW measures are DOE-approved for Installation in eligible dwellings:

1. water heating appliance tank wrap (i.e., insulating blanket).
2. water heating appliance pipe insulation (on first six feet of hot & cold water pipes exiting water heating appliance).
3. Faucet aerators.
4. Low flow showerheads.
5. Furnace/AC filters
6. Limited Weatherstripping, caulking, and duct sealing

GHW reduction measures may be installed on any eligible home when the auditor identifies a need for one or more of the measures. Total GHW measure costs (including labor) for one house must not exceed $250.

The installation of these weatherization materials has been determined by DOE to be generally cost effective without the need for justification in the site-specific energy audit (no SIR requirement). The reason that they are deemed cost effective is that the materials are relatively low-cost and can be quickly and easily installed.

It is essential that each Subgrantee find these materials at the best price available and ensure that contractors and crew understand correct procedures for quick and easy, thus low cost, installation.

E. Air Infiltration/Sealing

According to WPN 23-6 blower door guided air sealing may have a SIR less than 1.0 Air sealing. Attic air sealing, air sealing and crawl space sealing may have a SIR of 0.0 and above and still be an approved measure. The total job SIR still must be equal to or greater than 1.0.

Windows and doors are still a low priority.

Air sealing is a priority and should be performed on the top and bottom plates first. Sealing with caulk in the interior of the house is not an allowable measure, unless access from the attic or from the crawl is not possible. Limited air sealing on exterior walls is allowable as a GHWR measure.

Address all penetrations of the building envelope.

The physical inspection of plumbing, electrical, and HVAC penetrations through ceiling, flooring, and exterior walls is one of the most important parts of the dwelling inspection process. Often the greatest reduction in air infiltration may be realized by these overlooked areas. Recording the location of those air infiltration locations for appropriate sealing is very important.
NOTE: Jalousie windows

De-pressurizing a home with the blower door effectively seals jalousie window and inaccurately measures the leakiness of the windows. DOE advises agencies to pressurize and depressurize homes with jalousie windows and enter an average of those two (2) CFM readings in ECOS. Even with that, ECOS may not call to replace all inoperable jalousie windows with a cumulative and individual SIR of or greater. As always, photo documentation must be kept in the Client file to support all window replacements

F. **Insulation**

Insulation is one of the most-effective and therefore important ECM's that can be installed on a site-built or manufactured home during weatherization. New or additional insulation to bring existing insulation up to Arkansas standards must always be selected as an ECM in audit software in order to calculate a SIR.

Any insulation measure not receiving a SIR of 1.0 or greater must be documented in the client file so that monitors and inspectors have this information directly from the audit software to explain why a particular insulation ECM was not done.

(1) **Attic insulation:**

- New or additional attic insulation must be installed if allowed by audit software. (SIR $\geq$ 1.0).
- If different parts of the attic have varying levels of insulation/no insulation, the square footage of each section where a different level of insulation exists, or no insulation exists must be entered as a separate attic in order to evaluate for the required amount of insulation in each section.
- The goal is to bring each section of the attic up to R-38, the Arkansas standard for attic insulation. However, DOE does recommend allowing the software to evaluate for higher levels of insulation. R-49 is often cost-effective.
- Adding additional insulation to an attic which has less than R-38 is required if cost effective.
- Air sealing the attic, if needed, and attic preparation must precede installation of attic insulation for effectiveness of the insulation. Perform house to zone testing for attic; the attic will indicate it is mostly outside by having the house-to-zone pressure of -50 pa. The closer the attic is to the inside, the negative number will be smaller. Not air sealing the attic will require the zonal pressure diagnostic (ZPD)readings recorded to show it was not necessary (pressure difference of 45 -50). For an open (un-floored), unconditioned attic, a pressure difference of 45 Pascals (pa) with reference to the house must be reached while the home is depressurized to -50 pa. If a pressure difference of 45 has not been attained, attic air sealing is to continue. For floored, unconditioned attics, the pass rate will be a pressure difference of 40 pa with reference to the house while the home is depressurized to -50 pa. If the attic is partially floored, a weighted average of floored/un-floored attic area can be used to determine the pass rate. If it is not possible to reach the pass rate for a home. In these cases, the agency must provide photos and a detailed description of what circumstances prohibited the contractor from reaching the passing zone pressure.
- Photo/infrared documentation of attic air sealing is required in the client file.
- If existing insulation has been installed without attic air sealing and/or appropriate attic preparation, these tasks must be completed during weatherization of the home if cost effective and necessary, as proven through zonal testing.

(2) **Wall insulation:**

- Particular attention should be given to client education about the importance of this measure and how it will be done on the client's home. Permission to proceed is required, as with all measures.
- Wall insulation may be installed from the exterior or from the interior.

- Installing insulation into the wall from the exterior may be accomplished by:
- Unzipping vinyl or steel siding and drilling holes in the air barrier then plugging with plastic or wood plugs when dense packed and replacing siding.
- In either case the end result should be as aesthetically authentic to the structure as is possible
- Incidental repair costs include painting plugs to match the wall color (interior or exterior).

(3) **Floor insulation:**

If there is 24-inches from the bottom of the joist to the ground at an entrance to the crawlspace floor insulation should be installed if cost effective. If the twenty-four inch (24") height tapers lower in areas of the crawlspace, it is still necessary to insulate as long as there is twenty-four inch (24") average clearance underneath ninety percent (90%) of the floor area.

- Existing floor insulation which has been disturbed or deteriorated must be repaired even if clearances do not meet the twenty-four-inch (24") guideline
- Air sealing the floor from the crawlspace must precede installation of floor insulation and be documented by photos in client file. If there is eighteen (18) inches from the bottom of the joist to the ground, air sealing must be completed
- Arkansas uses batt insulation on floors as standard. Other methods allowable in SWS Require:
    - AEO approval.
    - Ground moisture barriers should always be considered in order to protect the installed measure.

G. **Programmable Thermostats**

Are not allowable as a cost-effective measure under ECOS.

H. **Lightbulbs - Compact Fluorescent Lights (CFLs) and Light Emitting Diodes (LEDs)**

Non-LED bulbs may be evaluated for replacement. DOE has determined that replacement of indoor, screw-in incandescent light bulbs with CFLs or LEDs is an allowable weatherization measure.

I. **Seal and Insulate Ducts**

Duct sealing is a priority.

In ECOS the blower door subtraction method is used to assess all ductwork located outside the pressure boundary.

THE BLOWER DOOR SUBTRACTION METHOD

1. **conduct whole house blower door depressurization test**
   - Set up the building for a standard blower door depressurization test.
   - Turn the air handler fan off, open all registers and remove all HVAC filters including remote filters.
   - Temporarily seal all exterior combustion air intakes and ventilation system air intakes that are connected to the duct system.
   - Depressurize the building by 50 Pa with Respect To (WRT) outside.
   - Record whole house CFM50 and turn off the blower door.

2. **Conduct envelope only blower door depressurization test**
   - Tape off all supply and return registers with register sealing tape or paper and painters tape. Include all ventilation system supply and return registers that are connected to the forced air duct system.
   - Depressurize the building to 50 Pa WRT outside with the blower door.
   - Record envelope only CFM50.

3. **Measure pressure in duct system with registers taped off**
   - With the building still depressurized to 50 Pa WRT outside, measure the pressure in the taped off duct system WRT the building. This measurement can be taken at the return or supply plenum using a static pressure probe, or at a supply or return register by punching a small hole through the sealing tape and inserting a pressure tap or hose.

4. **Calculate duct leakage to the outside**
   - Using the pressure measured in number 3, look up the appropriate correction factor using the table below. This correction is needed to account for any underestimation of duct leakage due to connections between the duct system and the building.
   - Calculate: Duct leakage to outside = (whole house CFM50 - envelope only CFM50) x subtraction correction factor (SCF)

House to Duct Pressure (taped off)	Subtraction Correction Factor (SCF)
50	1.00
49	1.09
48	1.14
47	1.19
46	1.24
45	1.29
44	1.34
43	1.39
42	1.44
41	1.49
40	1.54
39	1.60
38	1.65
37	1.71

House to Duct Pressure (taped off)	Subtraction Correction Factor (SCF)
36	1.78
35	1.84
34	1.91
33	1.98
32	2.06
31	2.14
30	2.23
29	2.32
28	2.42
27	2.52
26	2.64
25	2.76
24	2.89
23	3.03

House to Duct Pressure (taped off)	Subtraction Correction Factor (SCF)
22	3.18
21	3.35
20	3.54
19	3.74
18	3.97
17	4.23
16	4.51
15	4.83
14	5.20
13	5.63
12	6.12
11	6.71

Additional guidance regarding the Blower Door Subtraction Method may be found at http://energyconservatory.com or on page 46 of this manual.

The blower door subtraction method must be used during both the initial and final audits if the ductwork is outside the pressure boundary.

Sealing of ducts will be with mastic and mesh netting.
See SWS Field Guide for Single-Family Homes and Manufactured Homes.

At the initial and final audits, there should not be more than three (3) readings above 1.0 and no readings above 3.0. If it is determined by the auditor through the initial duct test that duct-sealing measures are not needed, then no duct test will be required at the final inspection.

If the duct system fails this threshold, all ducts with readings above 3.0 must be sealed within the limitations of funds available. Of the remaining ducts that are over 1.0, if sufficient funds are available, seal highest to lowest, leaving no more than three (3) ducts unaddressed If funds are still available, and any ducts fail this threshold during the final inspection, a rework order must be issued and the ducts further addressed. The only exception to the threshold requirement is:

1. There are no funds available to address further duct sealing;
2. The source of the remaining duct leakage is inaccessible for further sealing.

If sufficient funds are available in the energy audit, best practice would include addressing all ducts with readings above 1.0. In ECOS duct sealing is addressed under Systems. If additional funds are needed, GHWR funds may be utilized within the cap of $250 to seal ducts where leakage is significant to client.

At the beginning of this section it was stated that a visual inspection of the duct system should be performed while evaluating the attic and/or crawlspace for air infiltration and determining the required air sealing activities. Also, pressure pan testing of the ducts is required as it may indicate hard to detect leaks in floor or ceiling ductwork. If it is determined that duct repairs are required, those repairs should be performed before any new or additional insulation is installed. If the central unit is recommended to be replaced by the audit, the Energy Auditor must determine if there is sufficient funding to address all measures and if not, prioritize duct repair work.

NOTE: *IF A MONITORING VISIT REVEALS NO DATA WAS COLLECTED OR IF DATA CANNOT BE PROVIDED UPON REQUEST BY THE STATE OFFICE, THE SUBGRANTEE WILL BE REQUIRED TO RE-VISIT THE HOME AND PERFORM PRESSURE PAN TESTS AT THEIR OWN COST. IF RESULTS INDICATE LEAKAGE, REPAIRS MUST BE COORDINATED AND TEST RESULTS PROVIDED (PHOTO DOCUMENTATION AND FINAL TEST RESULTS) TO THE MONITOR. REIMBURSEMENT PROCESSING MAY BE SUSPENDED UNTIL DATA IS PROVIDED.*

V. REPLACING MAJOR APPLIANCES/SYSTEMS

The Energy Auditor, using the ECOS audit software, determines the most cost effective and energy efficient way to assure that the dwelling being weatherized will be capable of providing the household with a controlled environment.

A. **Heating and Cooling Systems**

Federal regulation (24 CFR 576.403(c) 6) and local codes (2018 IRC: R303.10) require that every home has a functional central heating system that is adequate for the entire "habitable" space.

i) When the energy auditor is attempting to replace a non-working heating/cooling system as an energy conservation measure, they should enter the system as it was originally designed and installed. This includes the capacity, AFUE, and percentage of space conditioned.

ii) AFUE information should come from the data plate or tag on the appliance or may be determined by dividing the design output by the input (e.g., output 80kbtu/input 100kbtu = 80% AFUE).

iii) In the case of electric furnaces, the AFUE will be entered as 100%.

iv) For any HVAC system utilizing a compressed refrigerant cycle (air conditioning or heat pump), the derating allowance outlined in WPN 23-06 may be used to determine the SEER/EER/HSPF of the unit for modeling purposes, after first determining the original SEER/EER of the unit *(See Derating Allowance).*
The current approved modeling software requires a SEER input. To convert EER to SEER: SEER = EER / 0.

v) If a heat pump can be repaired, that is the best course of action before considering replacement. If it can't be repaired or is older than 15 years (expected lifespan of HPs), then modeling as an electric furnace would be appropriate, *but only if the furnace is producing heat only* from the electric strip.

vi) In the building modeling software, when asking for a new heat pump, enter the existing conditions of a non-working heat pump with working backup heat strips as an electric furnace to reflect the working heat strips as the only source of heat. Under these circumstances, if the AC is working, it can be modeled as a central AC, or not modeled at all if inoperable.

If the electric heat strips are not functional then the heat pump should be modeled in the software as a heat pump, and the original specifications and modeled data must be as close to the actual original as possible. Note, the purpose of the derating formula is to reduce the assumed efficiency of the heat pump (or AC) based on its age. No further derating is permitted if using DOE funds and the refrigerant cycle is still functional.,

vii) V0

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viii) If the appliance qualifies for replacement as an Energy Conservation Measure (ECM) with an SIR of 1.0 or greater DOE ECM funds may be used to replace the system.

iX) If the replacement unit does not meet an SIR of 1 or greater, then the unit must be replaced either as a WAP H&S measure o using funding other than WAP.

Derating Allowance

Degraded Efficiency= (Base EFF) x .99 ^{age}

- Base Efficiency (Base EFF) =Typical efficiency of Pre-Retrofit equipment when new (Seasonal Energy Efficiency Ratio

  (SEER), Energy Efficiency Ratio (EER), or Heating Seasonal Performance Factor (HSPF))
- Age= Age of equipment in years.

  For example, an existing HVAC unit that is 20 years old was originally rated at 10 SEER.
  Degraded SEER= 10 x .9920

  Degraded SEER= 10 x .818

  Degraded SEER = 8.18

Switching out an existing heating and/or cooling appliance with a new one may not be the best option or even an allowable process, i.e., unvented combustible fuel space heaters.

Replacement of heating/cooling with a SIR of 1.0 or greater. The preferred method of replacing a heating and cooling unit is by authorization (a SIR of 1.0 or greater) on the energy audit output report. The ECOS Output Report will recommend the replacement of an inefficient central heating and cooling unit. Based upon the data entered in the materials set-up data screen, this will be the correctly sized unit for the home.. Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. The building loads must be based on post-retrofit dwelling characteristics per SWS 5. New or replacement heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed.

(i)

1. **Replacing or Repairing Heating** Systems

When replacing or repairing heating systems, the Subgrantee must have its service provider record the information below.

- Model Number/Brand;
- Type of Metering Device;
- Probe Devices Used;
- Capacitance Specifications (fan, blower, and compressor) (if repaired or replaced);
- Readings/testing results.

In addition, photographic documentation is required when requesting the repair or the replacement of the HVAC system or its parts. The following photographs must be submitted with the waiver request:

- Picture of model and model number;
- Picture of the Evaporator Coil (inlet and exit sides) if accessible. If cleaning please provide pictures of in-progress cleaning;
- Pictures of Evaporator's fins if accessible. If cleaning please provide pictures of in-progress cleaning;
- Pictures of metering device if accessible;
- Pictures of probe device when checking (degrees of superheat, and pressure);
- Pictures of drain pans if accessible.

2. **Replacing or Repairing Cooling Systems**

When replacing or repairing cooling systems, the Subgrantee must have its service provider record the information below.

- Model Number/Brand;
- Type of Metering Device;
- Probe Devices Used;
- Capacitance Specifications (fan, blower, and compressor) (if repaired or replaced);

- Record readings/testing results;
- Amount of refrigerant added (lbs. of refrigerant).

In addition, photographic documentation is required when requesting the repair or the replacement of the cooling system or its parts. The following photographs must be submitted with the waiver request:

- Picture of model and model number;
- Picture of the Evaporator Coil (inlet and exit sides) if accessible. If cleaning please provide pictures of in-progress cleaning;
- Pictures of Evaporator's fins if accessible. If cleaning please provide pictures of in- progress cleaning;
- Pictures of metering device if accessible;
- Pictures of probe device when checking (lbs. of refrigerant and pressure);
- Pictures of drain pans if accessible.

3. **Replacing Air Conditioning Units Using Capital Intensive Funds (CI)**

Special Circumstances Case-by-Case Consideration

DOE policy (WPN 22-7) does have an ***action/allowability*** to replace, repair, or install air conditioning systems as Health & Safety measures in homes of at-risk occupants where climate conditions warrant.

To use this Action/Allowability you must complete a two-step process:1. Determine presence of at-risk occupants. At-risk persons need documentation such as a doctor's statement verifying a medical condition (e.g., asthma, COPD). Presence of elderly persons or children in the household also creates an at-risk situation justifying need for air conditioning.
2. Document the need for replacement or repair.

Subgrantee must attempt to cost justify the replacement as an ECM in ECOS prior to submitting a waiver request for replacement with H&S funds. If no SIR is obtained, a screenshot of the results must be uploaded in ECOS Client Files.

Central Heat/Air Units

Replacement of a central heating (furnace) or a central heating and cooling unit is allowed if recommended by ECOS with a SIR of 1.0 or greater.

General Guidelines for Central Heating & Cooling units:

- Audit must be populated with all sized units.
- Duct work must have been inspected and tested to meet pressure pan guidelines.
- Pressure pan testing results must be recorded. Exterior unit should be installed level and on a base.
- Installation must be completed by a licensed HVAC contractor.

For Energy Star compliance, as required by SWS 5, the minimum SEER2 for Central AC and heat pumps is 15.2. Similarly, the minimum heat pump HSPF2 is 7.8 (split systems) or 7.2 (packaged units).See chart below for conversion from SEER 2 to SEER, HSPF2 to HSPF, and EER2 to EER. Arkansas' building modeling software requires SEER, EER, and HSPF input, which must be converted from the new SEER2, EER2, or HSPF2.rating. Building loads must be based on "post-retrofit dwelling characteristics." (per SWS 5)

Per WPN 23-6,

No existing primary heating unit- the correctly sized unit data- AFUE/HSPF/SEER must be input into the modeling software as both the existing unit and the improvement. If no SIR is obtained, the heat may be replaced as DOE H&S. Units below 95% should be considered for replacement, while non-working heat pumps less than 15 years old should be modeled for repair before attempting to replace.

No existing primary unit, using supplementary heat or cooling devices-

i) Enter the supplementary systems accurately using the original specifications for output, AFUE, etc. The separate systems should be input accurately to reflect the actual % or ft2 of the conditioned space heated/cooled and in total should never exceed more than 100% of the total conditioned space.
ii) All unvented space heaters, whether electric or fuel-fired, should be entered as 100% SSE or AFUE.
iii) All vented heaters should be input with either the measured efficiency or the AFUE from the data plate.
iv) Determine if the appliance qualifies for replacement as an Energy Conservation Measure (ECM) by running the energy audit and attempting replacement with a high efficiency system such as a heat pump.
v) If the replacement unit does not meet an SIR of 1 or greater, then the unit must be replaced either as a WAP H&S measure or using funding other than WAP.

Non-Working Unit-

i) When the energy auditor is attempting to replace a non-working heating/cooling system as an energy conservation measure, they should enter the system as it was originally designed and installed. This includes the capacity, AFUE, and % of space conditioned.
ii) AFUE information should come from the data plate or tag on the appliance or may be determined by dividing the design output by the input (e.g., output 80kbtu/input 100kbtu = 80% AFUE).
iii) In the case of electric furnaces, the AFUE should be entered as 100%.
iv) If the system uses a compressed refrigerant cycle (air conditioning or heat pump), the derating allowance outlined in WPN 23-06 may be used to determine the SEER/EER/HSPF of the unit for modeling purposes.
v) If the appliance qualifies for replacement as an Energy Conservation Measure (ECM) with an SIR of 1.0 or greater DOE ECM funds may be used to replace the system.
vi) If the replacement unit does not meet an SIR of 1 or greater, then the unit must be replaced either as a WAP H&S measure or using funding other than WAP, or the dwelling unit must be deferred from DOE WAP.

Regardless of the funding source, all existing heating or cooling systems must be included in the energy audit evaluation of the dwelling. This includes secondary heating/cooling sources such as space heaters, window A/C units, and solid fuel stoves. This is because all these systems account for energy used by the dwelling and therefore must factor into the evaluation of the weatherization measures in the home. Additionally, all heating and cooling systems in the home must be evaluated for replacement as energy conservation measures by the energy audit.

(ii) **Exception to Audit Recommendation of Central Heating and Cooling Unit.** If the audit does not recommend replacement but a maintenance inspection (by a licensed heating and cooling contractor) indicates that the central unit requires excessive work to bring it to an efficient functioning level, the unit may be replaced. In some instances, the inspection report may recommend needed repairs; however, the following requirements apply:

- There must be a detailed inspection report on the contractor's invoice or letterhead indicating the problem and estimated cost to repair *and* cost of recommended replacement unit.
- All documentation placed in Client File.
- No documentation equals a disallowed cost.

NOTE: *HVAC(R) licensed contractors can work on any part of a defined HVAC System to include:*

- Ducts;
- Furnaces;
- Coils;
- Condensers;
- Pans

- **Gas lines within six (6) feet of the unit,** including disconnecting and connecting the unit and repairing/replacing the connection and the six (6) foot (maximum) line;
- **Electrical connections within ten (10) feet of the unit** as long as the electrical connection is suitable in capacity for equipment to be served and has been provided by others within ten (10) feet of unit;
- *HVAC(R) licensed contractors* cannot perform plumbing work such as installation/repair of water heating appliances.

Source: Bob Higginbottom, Executive Secretary of HVACR Board, Arkansas Dept. of Health, 501-661-2647, Robert.higginbottom@arkansas.gov

b. **Air Conditioning**

Replacing air conditioning as part of a package unit (heat and air in one unit) is allowable with a S1R of 1.0 or greater as described above. Replacing a separate air conditioning unit is allowable with a SIR of 1.0 or greater.

However, replacement of an inoperable unit that cannot be repaired must be based on the needs of the occupants and be done with H&S funds under the following circumstances: occupants are elderly, children, or person(s) with a medical condition documented by a physician's statement of requirement for air conditioning.

Arkansas considers no air conditioning in summer months to be a health & safety issue. If occupants are not at risk, consider entering air conditioning in ECOS as LIHEAP H&S and invoicing as Capital Intensive.

See Weatherization Health and Safety (WPN 22-7, Effective December 15, 2021 https://www.energy.gov/sites/default/files/2021-12/wpn-22-7.pdf)

(1) Air Conditioning units may only be replaced using DOE funds if they obtain an SIR in the modeling software. General guidelines for window units.

Photo documentation in file to show condition. Replace with appropriate sized unit (refer to manufacturers sq. ft. coverage for maximum efficiency) that will condition the living space.

Agencies are required to reclaim refrigerant from window air conditioning units using the process and protocols as indicated in the refrigeration section.

d. **Space Heaters**

Stand-alone Electric Space Heaters

(1) Stand-alone electric-repair, replacement, or installation is not allowed. Removal is recommended.

If the home has no existing central systems and the client is using various supplementary heating and/or cooling devices such as portable space heaters:

a) Enter the supplementary systems accurately using the original specifications for output, AFUE, etc. The separate systems should be input accurately to reflect the actual percentage or feet (2) of the conditioned space heated/cooled and should never exceed more than 100% of the total conditioned space.
b) All unvented space heaters, whether electric or fuel-fired, will be entered as 100% SSE or AFUE.
c) Determine if the appliance qualifies for replacement as an Energy Conservation Measure (ECM) by running the energy audit and attempting replacement with a high efficiency system, or heat pump in the case of an electric furnace.
d) If the replacement unit does not meet an SIR of 1 or greater, then the unit must be replaced either as a WAP H&S measure or using funding other than WAP.

(2) **Unvented Gas-and Liquid-Fueled Space Heaters**

DOE will not permit any DOE-funded weatherization work to proceed where the dwelling unit is heated with an unvented gas and/or liquid-fueled space heater as the primary heat source. This policy applies to unvented natural gas-fired space heaters, unvented propane-fired space heaters, and unvented kerosene space heaters. This policy is consistent with the IRC and the IFGC. If the primary source of heat is an unvented space heater, it must be replaced with a vented one before weatherizing the unit. This is done with LIHEAP Capital Intensive or DOE Health and Safety funds.

DOE requires removal of all unvented gas- and liquid-fueled space heaters and replacement with vented, code-compliant heating systems as a prerequisite to weatherization. However, DOE will allow unvented gas-or liquid-fueled space heaters to remain as secondary heat sources in single-family houses provided they comply with ANSI Z21.11.2. DOE is allowing this flexibility primarily to provide low-income clients an emergency back-up source of heat in the event of electrical power outages. Therefore, preference should be given to code-compliant units that do not require electricity.

Specifically, any unvented gas and liquid-fueled space heaters that remain in a completed single-family house after weatherization. Shall not have an input rating in excess of 40,000 Btu/hour; Shall not be located in, or obtain combustion air from sleeping rooms, bathrooms, toilet rooms, or storage closets, unless:

- Where approved by the authority having jurisdiction, one listed wall-mounted unvented space heater in a bathroom:
- Has an input rating that does not exceed 6,000 Btu/hour;
- Is equipped with an oxygen-depletion sensing safety shut-off system; and
- The bathroom meets required volume criteria to provide adequate combustion air. Where approved by the authority having jurisdiction, one listed wall-mounted unvented space heater in a bedroom:
- Has an input rating that does not exceed 10,000 Btu/hour;
- Is equipped with an oxygen-depletion sensing safety shut-off system; and,

Shall require the enforcement of minimum ventilation guidelines as required by ASHRAE
62.2. American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Low-Residential buildings.

DOE funds may not be used to replace unvented space heaters left in the weatherized dwelling unit as secondary heating sources. AEO allocates Capital Intensive funds (LIHEAP) which may be used to replace non-compliant, unvented secondary space heaters with ANSI Z21.11.2 compliant unvented space heaters.

Current regulations governing weatherization activities require that measures installed in a dwelling unit be selected on the basis of cost effectiveness, with the most cost effective installed first.

The replacement of an unvented space heater with a vented one may not be cost-justified through energy savings. However, DOE strongly encourages WAP to combine other weatherization measures and health and safety considerations with vented space heaters as replacements for unvented space heaters. In such instances, the heat energy demanded by the structure can be lowered by energy-saving, cost-effective weatherization measures so that total energy costs are less or the same, while the indoor air quality is greatly improved through the use of a vented space heater paid for with health and safety funds.

The Manufactured Home Construction and Safety Standards require all fuel-burning, heat-producing appliances in mobile homes, except ranges and ovens, to be vented to outside. Further, all fuel-burning appliances in mobile homes, (except ranges; ovens, illuminating appliances, clothes dryers, solid fuel-burning fireplaces and solid fuel-burning fireplace stoves) must be installed to provide for the complete separation of the combustion system from the interior atmosphere of the manufactured home (i.e., to draw their combustion air from outside). Therefore, mobile homes must have heat source compliant with manufactured housing standards.

Fuel Switching

Fuel-switching policy references:

- 10 CFR Part 440, Weatherization Assistance Program (WAP) for Low-Income Persons
- Energy Audit Guidance (currently Weatherization Program Notice (WPN) 23-06)
- Non- E n e r g y Impacts (currently WPN 22-10) - If an approved Social Cost of Carbon (SCC) adjustment to fuel costs has been implemented by the Grantee.
- Incidental Repair Guidance (currently WPN 19-5)

Policy:
Subgrantees must adhere to this policy as it relates to any fuel-switching measures included in a WAP funded project (heating systems, water heating appliances, etc.). No DOE funds may be used for fuel-switching unless DOE approves it on a case-by-case basis.

Fuel-switching is allowed for either of two reasons:

1. As an Energy Conservation Measure (ECM), when a site-specific energy audit demonstrates the cost effectiveness of the fuel-switch over the life of the measure as indicated by the Savings to Investment Ratio (SIR) of 1.0 or greater.
2. As a Health and Safety (H&S) measure, in compliance with the current DOE-approved Health and Safety Plan.

ECM fuel-switch requests:

1. The SIR for the proposed fuel-switch must:
   a. Be based on a site-specific energy model in which all relevant shell measures (insulation, air sealing, etc.) are also being evaluated for cost-effectiveness.
   b. Be determined using the total material and labor cost for installation including all permits, fees, repairs, and upgrades (e.g., electrical upgrades, duct system improvements). The total measure cost may exclude Incidental Repair measures (IRMs) that satisfy the definition of an IRM per DOE Incidental Repair Guidance. All IRMs must be clearly noted, priced, and justified by the energy audit.
   c. Be based on Grantee-approved fuel costs. H&S fuel-switch requests:

2. Fuel-switching for H&S reasons must align with the Arkansas's current program year DOE-approved H&S plan. The most common H&S reason is due to unsafe combustion systems existing in the home, however any fuel-switch made using H&S funds must not increase the client's utility costs as a result. For this reason, an energy model must still be used to estimate the dwelling's utility costs after Weatherization to verify that the net out of pocket utility costs do not increase for this dwelling because of the fuel-switch. The energy model should also be used to evaluate the fuel-switch to determine if it meets the SIR of 1.0 or greater to be treated as an ECM before selecting the replacement as a H&S measure.

Requirements to Request a Fuel Switch

To justify a request for a fuel switch, the subgrantee must submit information which supports the request to AEO. This information will ensure that all Program rules and guidance are being followed by the Subgrantee in the decision-making process.

The request must include the following:

- An official letter from the Subgrantee stating that the site-specific energy audit demonstrates the cost effectiveness of the fuel switch over the life of the measure as indicated by the Savings to Investment Ratio (SIR).
  - The official letter must also detail why the fuel-switch is being considered and whether the intention of the fuel-switch is for health & safety or energy conservation purposes. (Must be specific)
  - The audit libraries must contain all utility cost information to provide accurate data for the fuel switch decision.
  - All other related charges associated with fuel-switching must be included in ECOS and provided with the letter for approval.
  - This must also include the total material and labor cost for installation, including all permits, fees, repairs and upgrades (e.g., electrical upgrades, duct system improvements).

Prior to submitting: In addition to accepting the administrative burden associated with making decisions about fuel switching, the Subgrantee must also demonstrate an ability to analyze all information collected prior to submitting a fuel-switch request. To demonstrate this internal capability to AEO, the Subgrantee must submit the following documents as part of the request:

- One complete sample audit for each type of fuel-switching scenario anticipated (e.g., one (1) sample audit for switching from an oil boiler to a gas boiler, one (1) sample audit for switching from a gas furnace and central A/C combination to an electric heat pump) with all supporting documentation that demonstrates fuel switching is cost-effective when interacted with all other appropriate energy conservation measures for the building.
  - Supporting documentation must include a copy of the client utility bill(s) which list all charges for the present energy source(s) and cost information including but not limited to the costs charged for the current energy commodity, base and service charges, taxes, supply and transmission charges and renewable energy or energy conservation adjustments.
- A copy of the complete modeled audit, including input report, recommended measures, fuel cost libraries, key parameters, and any other relevant details. PDF copies are acceptable. Preference is for a copy of the actual energy model.
  - The escalation rate used in the energy audit of those energy prices over the life of the new measure.
  - A statement that if a heat pump or other combined heating-and- cooling system is to replace a heating-only (or cooling-only) system, no savings will be attributed to the cooling (or heating) system that was previously not being used in the home, but all the costs of running the system throughout the year will be included in the audit.
- Exterior photos of the home.

- Photos of all appliance(s) that will be replaced if the fuel-switch is approved. Photos must include a legible image of the manufacturer's tag or a photo showing that the tag is missing.
- Details of the proposed replacement appliance(s) including brand, model number, capacity, and efficiency. This must also include the total material and labor cost for installation including all permits, fees, repairs and upgrades (e.g., electrical upgrades, duct system improvements).

Exclusion: No fuel switching measures will be allowed when using a DOE approved Priority List Audit (PL). The use of a Priority List does not meet the standards for case-by- case analysis, because changes in cost cannot be captured and updated.

Review Process

Once all submitted documents have been received, the documentation will be assessed for accuracy and adherence to the above methodology. A written approval will be issued if it is demonstrated that the fuel- switch proposal satisfies the requirements relevant to the reason for the fuel-switch proposal, whether it be for cost-effectiveness or for health and safety reasons.

If the fuel-switch is denied, an explanation will be provided. If the denial is due to errors, omissions, or discrepancies found in the submission, this will be communicated to the Subgrantee. The Subgrantee will have the opportunity to correct the relevant items and resubmit in part or whole, as required for reconsideration of the fuel-switch request.

Final inspection and monitoring:

Quality control inspections will follow the same protocol as with all other DOE-funded weatherization. Monitoring of completed units where fuel-switching occurs will be prioritized by the AEO.

B. Refrigerators

Per WPN 23-6, Attachment 7, refrigerators are not included in Appendix A to Part 440, Standards for Weatherization Materials.

AEO submitted a Request for Special Approval of Energy Conservation Material to use DOE funds for cost-effective refrigerator replacement, which was approved September 27, 2023. Refrigerators may only be replaced if the measure receives a 1.0 SIR or greater to replace it as an ECM.

The current requirement for replacement refrigerators funded by DOE is that they are Energy Star, equivalent, or better (SWS 7.0101.1).

PROCEDURES:
AEO has determined that 100% metering of existing standard freezer over refrigerators is required to evaluate energy consumption. An estimate of annual usage based on when an appliance was new does not take in to account the current condition/consumption and can result in a missed opportunity for energy savings.

Occasionally circumstances may exist that prevent moving the refrigerator to meter it. These occasions must be shown to exist with photographic and written documentation. Only then should the manufacturer's information be used to model it in ECOS.

Subgrantee must keep a list of weatherization jobs where refrigerators were replaced and indicate if the existing refrigerator was metered.

Ten percent (10%) of the replacement refrigerators will be metered to ensure that testing results match the manufacturer's advertised efficiency rating.

The U.S. Department of Energy (DOE) is responsible for developing the test procedures for the Appliance Standards Program. These procedures are published in the Code of Federal Regulations (10 CFR Chapter 11, Part 430). The DOE periodically issues new standards or rulemakings for specific appliances. These are published in the Federal Register (FR). Information on the rulemaking process and FR notices are available at the DOE's Office of Codes and Standards' World Wide Web site at URL: http://www.eere.energy.gov/buildings/appliance_standards/

Note: All refrigerator units replaced must be properly disposed according to the environmental standards in Clean Air Act (1990) section 608, as amended by Final Rule, 40 CFR 82, May 14, 1993.

Refrigerators are a Base Load Energy measure not a Health and Safety measure. Whether or not a refrigerator should be replaced cannot be decided by the age and/or appearance of the unit. The energy efficiency of the unit must be determined using one of the options/methods outlined below.

NOTE: The reading determined as a result of metering the refrigerator should be used in the audit software. Multiple county subgrantees may purchase additional watt meters if needed to meet metering requirement.

Frequently Asked Questions – Refrigerator Replacement

What existing units may be replaced?

- ***Refrigerators and refrigerator-freezers*** – Only new refrigerators and refrigerator-freezers can be installed with DOE funds Agencies may encourage Clients to give up other model types such as chest freezers as part of the refrigerator replacement. For example, a client has an inefficient 15-cubic-foot refrigerator- freezer and a stand-alone upright freezer. The agency may replace both units with a new 18- or 21-cubic-foot refrigerator- freezer if the energy savings compared to both the existing units justify the measure.

What new replacement units may be installed?

- ***Refrigerators and refrigerator-freezers*** –
  - Select an ENERGY STAR® qualified appliance, equivalent, or better
  - Select appliance with a minimum one-year warranty that provides a replacement appliance if repeated issues relating to health, safety, or performance occur
  - Ensure new appliance will not block access to light switches, cabinets, etc. and will fit through the smallest opening between the outside and installation location. New replacement units may **not** have through-the-door ice or water service since this feature increases energy use.

What are the cost-effectiveness requirements?

- ***SIR 1.0*** – the state requires that refrigerator replacement result in a savings-to- investment ratio (SIR) of 1.0 or greater.
- ***Economic lifetime = 15 years*** – DOE believes fifteen (15) years is an appropriate economic lifetime to use in life cycle cost calculations.

What are the metering requirements?

- DOE requires that at least ten percent (10%) of replaced units are metered. AEO requires that 100% of existing-standard freezer over refrigerator units are metered.
- ***Meter at least two (2) hours*** – DOE believes a two-hour minimum metering duration is appropriate.
- ***In addition to metering, DOE's Refrigerator and Freezer Energy Rating Database Search Tool*** may be used to estimate the annual energy use of existing refrigerators that cannot be metered.

https://www.energy.gov/scep/wap/articles/refrigerator-and-freezer-energy-rating-database-search-tool

Can I replace refrigerators based solely on age?

- ***No*** – Although older refrigerators were built to less efficient standards, other factors such as size and manual defrost impact energy use of existing refrigerators. Initially, as the program gains experience, DOE will require agencies to meter or use the Home Energy or accompanying database to estimate the annual energy of existing refrigerators.

What do I do with the existing refrigerator?

- ***Take out of service*** – Make sure the existing refrigerator removed from the house does not find its way back onto the electric grid.
- ***Dispose in an environmentally responsible manner*** – All refrigerators replaced must be properly disposed of according to the environmental standards in the Clean Air Act of 1990, section 608, as amended by Final Rule 40 CFR 82, May 14, 1993.
- ***Take to a de-manufacturing facility or incorporate disposal requirements in vendor contract*** –If none are available locally, specific disposal requirements can be written into the contract with the vendor supplying the new refrigerator. Although this arrangement makes the vendor responsible for the removed refrigerator, states should verify replaced refrigerators are disposed of properly.

Smoke and Carbon Monoxide Detectors: In instances where smoke and carbon monoxide detectors are not present or are not operating properly, new detectors may be purchased and installed with DOE H&S funds. ASHRAE 62.2 requires CO detectors in every dwelling. Carbon monoxide detection is to be located:

1. On every occupiable level
2. In any sleeping room that contains a combustion appliance
3. Outside each separate dwelling unit sleeping area within 21 feet of any door to a sleeping room

In alignment with ICC 907.2.11.1, Arkansas' State Fire Marshall's Office, the Authority Having Jurisdiction (AHJ), requires a smoke detector to be located:

- In sleeping areas,
- In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit
- In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the adjacent levels, 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.

- Multifamily structures may require interconnected alarms; review local code requirements or contact fire Marshall for further guidance specific to your location.

Client Education: Client education, including information on the proper operation of the heating equipment, installed smoke or carbon monoxide detectors and any other measures installed, must be provided. Of critical importance is strong client education regarding the dangers of carbon monoxide and excessive moisture levels, particularly if any unvented space heaters are left in the dwelling as a secondary heat sources for emergency back-up.

Before removing any unvented space heat from a client's home, the client must be informed that the replacement vented space heat requires electricity to operate so will not provide heat during a power outage. Documentation of client understanding is required.

Note: No unvented space heater may remain in a mobile home.

2. **Other Health and Safety Consideration:**

Electrical wiring and chimneys should be checked to ensure they are in good condition and that no obvious building code violations are evident. Masonry chimneys used by vented space heaters should be properly lined in compliance with the IFGC. Safety inspection related to the space heater should include, but not be limited to, a check for adequate floor protection and code-compliant clearances to walls and other combustible materials. Even though many vented space heaters are manufactured with spill switches, it is still a requirement that a worst-case depressurization draft test be performed on all vented units.

i. **Compliance with Local Code, Permitting, and Inspection Requirements:** Installation of space heaters requires knowledge of appropriate industry standards and adherence to all aspects of the applicable building code(s) in the municipality where installation is taking place. Building permits should be secured, where required, (this is a program operations cost) for all space heater work and final inspection by competent professionals should take

place before any heater is put into operation. States are reminded that even licensed heating contractors may not be aware of the stringent requirements of the Weatherization Program, so their work should be reviewed by Program staff.

ii. **Implementation:** Grantee health and safety policy, especially as it relates to space heater repair and replacement, in compliance with the above guidance, must be explained in the applicable State Plan or appropriate amendment to permit Project Management Center review and approval. Funds to address these items as part of weatherization work will be allowable costs. It is especially important to ensure that adequate inspection, safety, liability, and insurance procedures exist and a rework followed. In all cases, an education component for clients should be a part of the space heater work. Further, testing for indoor air quality, especially carbon monoxide levels in homes with unvented space heaters, should be performed. The cost to purchase the testing device and mechanical tools necessary to check for indoor air quality and to train personnel to do the testing are allowable program expenses. These charges may be made to the program operations cost category.

3. **Wood and Other Solid Fuel Heaters**

Maintenance, repair and replacement of primary indoor heating units is allowed where occupant health and safety is a concern. Maintenance and repair only is allowed for secondary heating systems. Subgrantees are required to inspect the chimney and flue and conduct combustion appliance zone (CAZ) testing during depressurization and give client safety information, including recognition of depressurization.

4. **No Heat/Cooling**

Climate conditions in Arkansas require homes to have heat and air. If there is no heat or cooling due to "red-tagged," inoperable, or a non-existent system, the heating/cooling source may be repaired, replaced or installed.

Arkansas considers a home with no heat to be a valid Health & Safety issue. Therefore, if, during the energy audit, a home is discovered to have an inoperable or red-tagged heat source, the proper procedure is to include as Health & Safety in ECOS a mandatory Clean, Tune and Evaluate. If the licensed HVAC technician is unable to repair the unit so that it is safely operational, then replacement of the heat source should be requested, from AEO. If there is no legitimate heat source (a cook stove oven is not considered a legitimate heat source), then installation of heat in the home should be requested. However, if ECOS pulls up an SIR of 1.0 or greater for HVAC replacement/installation, a waiver is not required.

Request a waiver from AEO to install heat in a "no heat" situation, to include the following:

- First, try repairs/replacement as an SIR, if an SIR cannot be achieved, model replacement under H&S;
- Include a description of the existing HVAC equipment, with pictures, if applicable;
- Type of heat you are recommending to be installed based on the size of the house and household composition;
- A request to change type of heating fuel, if applicable.

4. **No Heat/Cooling**

Climate conditions in Arkansas require homes to have heat and air. If there is no heat or cooling due to "red-tagged," inoperable, or a non-existent system, the heating/cooling source may be repaired, replaced or installed.

Arkansas considers a home with no heat to be a valid Health & Safety issue. Therefore, if, during the energy audit, a home is discovered to have an inoperable or red-tagged heat source, the proper procedure is to include as Health & Safety in ECOS a mandatory Clean, Tune and Evaluate. If the licensed HVAC technician is unable to repair the unit so that it is safely operational, then replacement of the heat source should be requested, from AEO. If there is no legitimate heat source (a cook stove oven is not considered a legitimate heat source), then installation of heat in the home should be requested. However, if ECOS pulls up an SIR of 1.0 or greater for HVAC replacement/installation, a waiver is not required.

Request a waiver from AEO to install heat in a "no heat" situation, to include the following:

- First, try repairs/replacement as on SIR, if an SIR cannot be achieved, replace under H&S;
- A description of the existing HVAC equipment, with pictures, if applicable;
- Type of heat you are recommending to be installed based on the size of the house and household composition;
- A request to change type of heating fuel, if applicable.

C. Quality Assurance Inspection and Testing

When all the work has been completed on the dwelling a thorough Quality Assurance Inspection must be completed by an individual possessing the HEP Quality Control Inspector credential. A final blower door test and other required diagnostic tests (CO, pressure pan, etc.) must be performed in accordance with DOE accepted procedures. A complete analysis of the client file must be performed with all discrepancies documented. Upon completion of the inspection all testing data will be recorded on the Health and Safety Checklist (WAP 10) and all discrepancies noted on the WAP 08 form. When weatherization on a dwelling is shown to have failed measures, the QCI must first determine the cause.

Failure could be the result of (1) incomplete measures, (2) missed opportunities; (3) air/duct sealing that did not achieve target or (4) errors in the energy model, which result in changes to the work order.

(1) Incomplete measures- require a rework notice to be issued to the contractor, as well as documentation on the WAP 08 and re-inspection by the QCI.
(2) Missed opportunities – see section 5A. Call Backs
(3) Air/duct sealing that did not achieve target -

Missed opportunities require recalculation of the energy model to include the missed measure, and a change order must be generated given to the contractor. The WAP 08 must be filled out and a re-inspection must take place.

See Section A, Call Backs for information regarding missed opportunities regarding jobs that have already been billed.

If you have spent all your funds and sealed ductwork and the home to the extent possible and have not reached the goal within ten percent (10%) you must re-run the audit with the achieved results to be sure that the overall SIR will remain at 1.0 or above without the additional work.

Notify the grantee that the blower door is not met. All work must comply with program guidelines.

1. **Final Blower Door Test**

   A final blower door test is required. Since air sealing funds are partially awarded based on initial blower door test results and an established target reduction, a considerable effort must be made to achieve the targeted reduction. The target must be met within ten percent (10%) of the goal + or -. The ideal target is zero, with proper ventilation. In instances where the air sealing target is not met the final inspector must make a determination whether additional air/duct sealing opportunities exist and if cost effective measure can be made to reduce the infiltration. If yes, the rework or change order process and additional sealing must occur before final inspection can be completed. If all funds have been spent within the SIR and the goal is still not met; written justification as to why the targeted reading was not met with a statement of what was done to address the leakage, must be included in the Client file. Additional photo documentation may be requested.

2. **Final Infrared Camera Evaluation**

   Using an infrared camera, the Quality Control Inspector should perform another assessment with the blower door running, repeating the pre-weatherization evaluation, to identify any missed items or other air sealing opportunities. Each ECOS recommended measure should be checked for completion, satisfactory workmanship and appropriate photo documentation.

3. **Quality Assurance Checklist (Final Inspection) Form**

Review all work performed with the Client before completing any remaining portions of the Client Education Checklist (WAP 13), Health and Safety Checklist (WAP 10), Client Response form (WAP 09) and Quality Assurance Checklist (WAP 08). The Quality Control Inspector must ensure each of these documents is completed and signed.

If a Client will not sign the Client Response form, and the situation causing the Client's objection cannot be addressed, the state office should be contacted immediately and the Subgrantee must send a certified letter to the Client with the Fair Hearings and Appeals form (WAP 23) attached and copying the state office stating the position of the Subgrantee, referencing applicable program guidelines, and requesting that the Client Response form be signed and returned within two (2) weeks. Each ECOS recommended measure should be checked for completion, satisfactory workmanship and appropriate photo documentation.

NOTE: *CLIENTS MUST BE PROVIDED A COPY OF THE SUBGRANTEE'S FAIR HEARING POLICY WHEN APPLYING FOR PROGRAM SERVICES, AND CAN RESPOND APPROPRIATELY IN WRITING. IF IN DISAGREEMENT WITH THE SUBGRANTEE LETTER. THE SIGNED CLIENT RESPONSE FORM AND FINAL INSPECTION SHEET WILL SIGNIFY A COMPLETED DWELLING. THIS DWELLING IS THEN ELIGIBLE TO BE INCLUDED IN THAT MONTH'S PRODUCTION REPORT TO BE SUBMITTED TO THE DEPARTMENT BY THE 5TH DAY OF THE FOLLOWING MONTH.*

QUALITY CONTROL INSPECTION

Follow the above detailed audit protocols for conducting a final inspection on the unit. In the client interview ascertain the satisfaction level of the client as it pertains to the agency delivering the work, the worker's installing the measures, the quality of the work performed and the results noticed, if any. Document the findings. When conducting a thorough inspection, it is important to adhere to the following guidelines, though more detailed steps may be necessary.

The Client File

When performing a thorough review of the client file the inspector must confirm that the data collected on the building is complete and accurate and that it is entered into the audit software accurately. Items to make note of are:

- Appliance data especially size, fuel type, condition and usage.
- Source Fuel type.
- Energy usage.
- Existing conditions such as insulation levels and window condition.
- Square footage and area calculations.
- Site drawings.

The Visual Inspection

One of the most important aspects of the inspection is the visual inspection conducted while walking around the unit. Some things to observe are:

- Overall condition of the building - note such things that might impact the effectiveness of the weatherization measures or may have impacted the installation of measures such as hoarding, pest infestation, animals, structural integrity, access to attic and crawl etc.
- Air sealing measures installed and missed opportunities.
- Position and condition of insulation, moisture barriers, dams, and chutes.
- Types of materials used and their proper application.
- Health and safety measures installed such as TNP overflow piping, ASHRAE compliant fans and dryer venting.
- General Heat waste measures such as pipe insulation.

Diagnostic testing

Diagnostic testing is required on all units submitted for reimbursement. Testing is necessary to confirm proper operation of appliances and to ensure that actions are taken to eliminate a health and safety hazard, the elimination of which is necessary to effectively perform weatherization work, or the actions are necessary as a result of weatherization work. Gas leakage tests and ambient CO will be conducted on all units except those that are all electric or utilize wood as a fuel source. Diagnostic testing will be done using ANSI/BPI-1200-S-2017 Standard Practice for Basic Analysis of Buildings as a guide, as well as ANSI/BPI-1100-T-2023, Home Energy Auditing Standard.

Exception: In Arkansas, every individual who designs, installs, constructs, maintains, services, repairs, *alters*, or modifies any HVACR system or any portion of an HVACR system in the State of Arkansas must have the appropriate class of HVACR license as prescribed by the HVACR Licensing Board. Unlicensed auditors and inspectors can determine AFUE from the heating appliance tag.. Rather than drilling a hole to obtain an undiluted C/O reading, as drilling a hole in the flue is considered "altering", auditors may obtain a C/O test at the flue termination. DOE funds may be used to pay a contractor to drill the hole for testing if the termination cannot be accessed for testing due to such things as roof deterioration, hazardous conditions caused by weather, or other reasons. If Health and Safety funds are used for drilling the flue, the reason(s)

the termination could not be accessed by the auditor must be documented.

Other tests may include:

- Blower door air infiltration – conducted on all units.
- Exhaust Flow – conducted on all installed exhaust fans as well as those previously existing such as bath exhaust and vent-a-hoods that exhaust to outside of the envelope.
- Combustion diagnostics to include CO in the flue of non-electric fueled appliances, steady state efficiency, heat rise, spillage and back drafting tests. unless restricted by Arkansas Laws, rules, and regulations. No holes may be drilled in heating equipment flue pipes by any person not possessing the proper HVACR license in the State of Arkansas. Auditors will need to use the SSE from the appliance tag rather than testing.
- Pressure pan duct analysis – conducted in addition to blower door subtraction to gauge air leakage in the duct system. Duct blaster must be used when installing/replacing ductwork.
- Infrared Camera – may be used to enhance detection of voids in the air and thermal barriers.

If any installed measure fails at final inspection, a rework order must be generated by the QCI and given to the contractor (for poor workmanship or faulty/missed installations). The WAP 08 QCI Inspection Form Rework Section will be completed by the QCI once the weatherization rework is completed.

If any of the diagnostic tests fail, further evaluation by the QCI is required to determine the cause and the required actions needed to resolve the situation to ensure that home performance upgrade activities do not negatively affect indoor air quality or otherwise cause or exacerbate an unsafe condition in the home., and the final inspection can resume.

Documentation

Documentation is the key to any complete inspection**.** Pictures must be taken to document all measures installed as well as any discrepancies between the audit, final inspection and monitoring inspection. Picture documentation can protect against findings and call backs. Documents to be included in the client file are eligibility related, energy consumption, audit summary, work orders, material receipts, invoices from contractors and client satisfaction forms. In addition, WAP 08 and 10 forms must be completed for all units inspected.

A. Call Backs

See *Policy Regarding the Use of DOE Program Funds to Pay for Call-Back/Add-On Work After Reported to DOE as a Completed Unit.* (WPN 11-03, Effective December 25, 2010 for all units completed after January 10, 2011)

Generally, once a unit has received a final inspection and been reported as complete, call backs for routine maintenance, repairs or warranty-type work cannot be reimbursed with DOE WAP funds. *Any required return visits or reworks related to workmanship omissions, missed opportunities or deficiencies must come at the expense of the agency or contractor using non- DOE funds.*

Missed Opportunities are defined as either Energy Conservation Measures (ECM's) or Health and Safety measures which should have been identified on the audit and performed as a part of a "whole-house" assessment but were not. (See WPN 12-5, page 5) The missed opportunity results in reduced "whole house" weatherization for the client. Missed Opportunities may compromise client Health and Safety or reduce the effective energy savings the program is required to achieve. It should be noted that once homes are inspected, completed and reported, returns to address missed measures or poor workmanship cannot be reimbursed using DOE funds. (Per WPN 11-3) The State of Arkansas will monitor "units-in-progress" to identify potential missed opportunities which can be addressed prior to completion of the unit. Subgrantees are reminded that it remains a crucial function of the assessment phase to effectively identify all cost-effective energy conservation measures (SIR of 1.0 or greater on the audit) and Health and Safety measures to ensure clients receive the full benefit of the Weatherization Assistance Program.

Missed opportunities are different from improperly installed measures. Improperly installed measures are those identified in the assessment/audit but are incomplete or performed poorly. As a result of improper installation, the effectiveness of the interaction of the measures is compromised. This reduces the energy savings the program is charged with achieving. Improperly installed Health and Safety measures compromise the Health and Safety of the residents in the unit being weatherized and as a result, do not provide the safeguards the WAP intended for the client.

It should be stressed that quality installations to achieve the energy conservation or Health and Safety requirements of the program can be attained with proper installation. Subgrantees should be aware that failure to properly install recommended measures identified in the audit/assessment according to the Arkansas Weatherization Assistance Program Field Guide and/or Manufacturer's Recommended Installation Procedure is a workmanship "finding" by the state monitor. This could result in disallowed costs or units. This may also require reimbursement to the program for expenses associated with completed units which demonstrate poor workmanship.

DOE has provided a process by which states can request approval from DOE to pay for significant and unanticipated call back work, however, it is a time-consuming process and will be offered as an option on a limited, case-by-case basis.

VI. HEALTH & SAFETY

Arkansas Weatherization and Assistance Program's comprehensive Health and Safety Plan is divided into six sections:

See *Policy Regarding Health and Safety Guidance* (WPN 22-7 Effective Py 200

A. Heating, Ventilation and Air Conditioning (HVAC);
B. Appliances;
C. General Building Structure;
D. Physical Health and Safety (Client and Worker);
E. General Hazards (Physical and Material); and
F. Health and Safety Practices for Weatherization Workers.

This plan was developed as a collaborative effort between the State of Arkansas Energy Office (AEO), the Arkansas Weatherization Assistance Program Network, Northwest Arkansas Community College – Weatherization Training Center and Pulaski Technical College – Weatherization Training Center and Department of Energy Project Officer.

Health and Safety issues have become an important part of the Weatherization Assistance Program (WAP) as knowledge about the hazards within dwellings has increased since the Program's inception.

OSHA's Hazard Communication Standard (HCS) requires the development and dissemination of such information:

- Chemical manufacturers and importers are required to evaluate the hazards of the chemicals they produce or import, and prepare labels and safety data sheets to convey the hazard information to their downstream customers;
- All employers with hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers and train them to handle the chemicals appropriately.

Arkansas performs compliance monitoring for OSHA rules and regulations when performing monitoring on in progress units and ensures Subgrantees have a Hazard Communication Plan in place.

Arkansas will also adhere to the OSHA Confined Space Rule.

When a health or safety hazard is detected, it is the policy of the AEO administrator of the Arkansas Weatherization Assistance Program, to inform the client and address the hazard according to protocol.

Although WAP funds are primarily used for energy conservation, the Department considers establishing a healthy and safe home environment to be an important component to weatherization work. Therefore, the health and safety of the building, occupants and weatherization crews or contractors must not be compromised by any retrofit material, technique or practice.

This Health & Safety Plan shall apply to Arkansas Weatherization Assistance Programs. It is not intended to override federal, state or local health and safety regulations, codes or ordinances. Such requirements must be followed if they are more stringent, otherwise, the requirements in this plan will apply.

The expenditure limit for Health and Safety measures is twenty-four .99% of the average per dwelling unit cost. The twenty-four point four percent (24.4%) limit for Health and Safety expenditures is agency wide and does not need to be applied evenly across homes. The Health and Safety expenditures are not a part of the average cost per unit. However, authorized (necessary) repairs that support weatherization, such as minor wiring, plumbing to space heater, are part of the limit (as adjusted by DOE) and need to bear whole house Savings to Investment Ratio (SIR) scrutiny.

Incidental repairs may be performed in conjunction with any of the priorities previously listed. Incidental repair costs must be included as part of the total unit cost when determining the maximum and average expenditure per dwelling unit.

An incidental repair is defined as those repairs necessary for the effective performance or preservation of weatherization materials. Such repairs include but are not limited to: framing or repairing 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.

If health and safety issues identified on an individual unit cannot be addressed within the allowable WAP limits then the unit would exceed the scope of this program and must be deferred.

Subgrantees must test for high carbon monoxide (CO) levels and acceptable levels must be reached before weatherization work can start. Maximum acceptable CO readings are as follows:

Carbon Monoxide Action Levels	
Ambient inside of building	9 ppm as measured
Central Furnace (all categories)	400 ppm air free
Boiler	400 ppm air free
Floor Furnace	400 ppm air free
Gravity Furnace	400 ppm air free
Wall Furnace (BIV)	200 ppm air free
Wall Furnace (Direct Vent)	400 ppm air free
Vented Room Heater	200 ppm air free
Unvented Room Heater	200 ppm air free
water heating appliance	200 ppm air free
Oven/Broiler	225 ppm as measured
Clothes Dryer	400 ppm air free
Refrigerator	25 ppm as measured
Gas Log (gas fireplace)	25 ppm as measured in vent
Gas Log (installed in wood burning fireplace)	400 ppm air free in firebox

Air-Free Carbon Monoxide
A measurement of CO in an air sample or flue gas that takes into account the amount of excess air (oxygen, O2) in the sample, incorporating an adjustment to the as-measured CO ppm value, thus simulating air-free (oxygen-free) conditions in the sample. Usually measured in units of parts per million (ppm).

Amendments to Arkansas Weatherization
Assistance Program Health and Safety Plan

From time to time, this plan may be amended and/or revised by the AEO to reflect changes in state or federal regulations, advances in technology, and/or innovative approaches to weatherization. The AEO encourages agencies to submit suggested changes to these practices that will result in the delivery of services in a more cost-effective manner while continuing to provide high quality work. Suggested changes must be accompanied by supporting documentation.

Amendments to these standards will not become effective until the following program year, unless a Program Notice is received from Department of Energy (DOE). The following conditions are where amendments or revisions will become effective immediately:

a. Changes in State or federal law or regulations mandate immediate implementation; or
b. AEO determines that an emergency situation exists, such as a potential threat to life, limb, or personal property, and the proposed amendment and/or revision is necessary for the protection of the health and welfare of Arkansas citizens.

The following sections provide procedures that include a method used to determine when DOE funds will be used to address specific health and safety issues, and how to treat problems that cannot be addressed with DOE funds as well as required training for field workers to identify and test for the presences of health and safety hazards.

A. Heating, Ventilation and Air Conditioning (HVAC)

1. Ventilation

Action/Allowability: 2016 (or most current) ASHRAE 62.2 is required to be met to the fullest extent possible, when performing weatherization. Implementing ASHRAE 62.2 2016 is not required where acceptable indoor air quality already exists as defined by ASHRAE 62.2 2016.
If the ASHRAE normative Appendix A is employed and an existing fan is being replaced or upgraded to meet whole-house ventilation requirements, take actions to prevent zonal pressure differences greater than 3 pascals across any closed door. Implementation of ASHRAE 62.2 is not required if calculations show that sufficient ventilation already exists to satisfy 62.2. Subgrantees may use ASHRAE RED Calc in the field for calculating ventilation requirements, but must enter all ventilation data in the modeling software.

Testing: ASHRAE 62.2 2016 evaluation, fan flow, and follow up testing are required to ensure compliance.

***Client Education/Occupant Health Concerns*:** Provide client with information on function, use, and maintenance of ventilation system and components. Include disclaimer that ASHRAE 62.2 does not account for high polluting sources or guarantee indoor air quality.

Training: ASHRAE 62.2 2016 training required including proper sizing, evaluation of existing and new systems, depressurization tightness limits, critical air zones and other areas included in ASHRAE 62.2 2016.

Identify Measures:
a) Repair or modify existing ventilation if needed.
b) Install new ventilation system if needed.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

2. **Whole-Building Mechanical Ventilation Rate**

The required mechanical ventilation rate, Q fan, shall be the rate Q tot in Section 4.1.1 plus the required additional airflow calculated in accordance with Section A3. If the air tightness of the building envelope has been measured, the required mechanical ventilation rate may be reduced as described in Section 4.1.2. In these cases, Section A3 shall be applied before Section 4.1.2 when determining the final mechanical ventilation rate. For existing buildings, if Q fan is less than or equal to 15 cfm, then whole-building ventilation is not required.

3. **Combustion Gases**

Action/Allowability: Proper venting to the outside for combustion appliances, including gas dryers is required. Correction of venting is allowed when testing indicates a problem.

Testing: Combustion appliances, including furnaces, boilers, space heaters, gas fireplaces, c o o k stoves, gas dryers and water heating appliances, must be tested to determine if CO emissions are within allowable CO levels.

a) Inspect venting of combustion appliances to confirm adequate clearances, use of proper venting materials and complete venting to the exterior of the dwelling.
b) Test a11 naturally drafting appliances for draft and spillage under worst case conditions as well as CO levels before and after air tightening.
c) Inspect cooking burners for operability, flame quality, and C/O emissions.

d) Conduct visual inspection of gas dryer vent. Gas dryers must be vented to the outside with rigid material. Test CO levels at termination.

Client Education/Occupant Health Concerns: Provide client with combustion safety and hazards information, including the importance of using exhaust ventilation when cooking and the importance of keeping burners clean to limit the production of CO.

Training: How to perform appropriate testing; determine when a building is excessively depressurized, and the difference between air free and as measured.

Identify Measures: Maintenance, repair and replacement of PRIMARY heating systems are allowed. A home can have two primary heat sources when a heat source only heats a portion of the home. If a heat source presents a dangerous situation, it can be replaced if it is the only heat source in the area. Prior monitor approval is required. Only maintenance and repair is allowed for SECONDARY systems with DOE funds. Capital Intensive funds (LIHEAP funds) may be used to replace secondary heating systems.

a) Clean gas cook stove,
Replacement of cook stoves is not allowed, only cleaning is allowed. See Appliances and water heating appliances.
b) Clean, repair or replace combustion appliances such as water heating appliances, furnaces, space heaters, to correct hazardous conditions;
c) Repair or replace appliances with combustion gas problems.

Deferral Policy: If the unacceptable CO reading is from a cook stove, other funding sources

must be utilized to rectify the situation before weatherization; follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

4. **Air Conditioning and Heating Systems**

Action/Allowability: Arkansas considers "red tagged", inoperable, or non- existent heating systems to constitute a Health & Safety issue. Evaluation of the home for replacement, repair, or installation is required, unless prevented by other guidance herein. Air conditioning system replacement, repair, or installation is allowed in homes of at-risk occupants.

The Energy Auditor determines the most cost effective and energy efficient way to assure that the dwelling being weatherized will be capable of providing the household with a controlled environment.

Switching out an existing heating and/or cooling appliance with a new one may not be the best option or even an allowable process, i.e., unvented combustible fuel space heaters. Also, the condition of the dwelling or the size of the household may dictate a different measure to provide.

Unvented space heaters may only be left in a home as secondary heating source when the unit has a tag indicating compliance with ANSI Z21.11.2 and conforms with all other requirements as detailed on Pg. 49 of this document. No unvented space heater of any type may remain in a manufactured home.

Testing: Make sure systems are present, operable, and performing.

Client Education/Occupant Health Concerns: Discuss and provide information on appropriate use and maintenance of units and proper disposal of bulk fuel tanks when not removed.

Training: Training curriculum at the Weatherization Training Center addresses CO testing of heating systems. Intermediate Weatherization, Heating, Ventilation, and Air Conditioning (HVAC), Crew Leader, and Weatherization Energy Auditor include details regarding said testing.

Identify Measures:

a) "Red tagged" inoperable system, send HVAC tech.
b) Request waiver from AEO to install heat and/or AC system.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

5. **Space Heaters, Stand Alone Electric**

Action/Allowability: Repair, replacement, or installation is not allowed. Removal is recommended.

Testing: Check circuitry to ensure adequate power supply for existing space heaters.

Client Education/Occupant Health Concerns: Inform client of hazards and collect a signed waiver if removal is not allowed. Place document in clients' file.

Training: Awareness of guidance.

Identify Measures:

a) Allowable as secondary heat source only but recommend removal; collect a signed waiver from Client stating that dangers have been discussed if removal is not allowed.
b) In "NO HEAT" situations, Arkansas WAP requires evaluation for safe heating system and removal of stand-alone space heaters. When "NO HEAT" situation is encountered during an energy audit, a waiver must be required from state WAP office approving heat to be installed.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

6. **Space Heaters, Unvented Combustion**

Action/Allowability: R No DOE-funded weatherization work is permitted if the completed dwelling unit will be heated with an unvented combustion space heater as the primary heat source. The primary heat source must be replaced with a vented unit prior to or by weatherization. The replacement unit must be sized to heat the entire dwelling unit. Removal is required, except as secondary heat where the unit conforms to ANSI Z21.11.2 and additional requirements as described below. Unsafe secondary units, including space heaters, must be repaired, or removed and disposed of, or deferral is required. Secondary unvented space heaters are considered unsafe if they:

- are not listed and labeled as meeting ANSI Z21.11.2;
- have an input rating of more than 40,000 BTU/hour;
- are in a bedroom and have an input rating of more than 10,000 BTU/hour;
- are in a bathroom and have an input rating of more than 6,000 BTU/hour;
- are operating in an unsafe manner (e.g., high carbon monoxide (CO) readings, too close to combustible materials, lack sufficient combustion air volume); 4
- or are not permitted by the Authority Having Jurisdiction (AHJ). No unvented fuel-burning space heating appliances may remain in a MH after weatherization under any circumstances. If an occupant will not allow the removal of an unsafe combustion appliance from the home, deferral is required.

Testing: Testing for air-free carbon monoxide (CO) is allowed. Check units for ANSI Z21.11.2 label.

Client Education/Occupant Health Concerns: Inform Client of dangers of unvented space heaters – CO, moisture, NO2, CO can be dangerous even if CO alarm does not sound.

Training: How to perform air-free CO testing. Understanding the dangers of unvented space heaters.

Identify Measures:

a) 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;
b) Install vented space heater as primary heating source (if needed);
c) Replace secondary heat source as allowable with ANSI Z21.11.2 compliant unit. Grantees may only utilize LIHEAP funding for this type of measure DOE H&S funds cannot be used to replace any secondary heat source.

***Deferral Policy*:**

a) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP;
b) Follow all appropriate Deferral and Referral policies and protocols if Client does not allow removal of unvented, unsafe or non ANSI Z21.11.2 compliant unit.

7. **Space Heaters, Vented Combustion**

Action/Allowability: Should be treated as furnaces.

Testing: Venting should be tested consistent with furnaces.

Client Education/Occupant Health Concerns: Discuss and provide information on appropriate use and maintenance of units and proper disposal of bulk fuel tanks when not removed.

Training: Proper testing methods for safe operation (draft and CO) should be conducted and for steady state efficiency if possible.

Identify Measures: Repair or remove vented space heater due to problems regarding the operation of the unit or high CO readings.

Deferral Policy:

a) Deferral should be exercised when existing code violations are present and correcting them would be beyond the scope of the DOE WAP, and/or when there are problems affecting the heat system/furnace that are beyond the scope of the DOE WAP, such as certain electrical problems. For additional deferral criteria, see deferral section.
b) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

8. **Solid Fuel Heating (Wood Stoves, etc.)**

Action/Allowability: Maintenance, repair, and replacement of primary indoor heating units is allowed where occupant health and safety is a concern. Maintenance and repair of secondary heating units is allowed.

Testing: Required inspection of chimney and flue and combustion appliance zone depressurization.

a) **Wood Stove Clearances**
Stoves that are listed by a testing agency like Underwriters Laboratory have installation instructions stating their clearance from combustibles. Unlisted stoves must adhere to clearances specified in NFPA 211.

b) **Stove Clearances**
Look for metal tags on the wood stove that list minimum clearances. Unlisted stoves must be at least thirty-six (36) inches away from combustibles. However, listed wood stoves may be installed to as little as six (6) inches away from combustibles if they incorporate heat shields and combustion design that direct heat away from the back and sides. Ventilated or insulated wall protectors may also decrease unlisted clearance from one-third to two-thirds, according to NFPA 211. Always follow the stove manufacturer's or heat-shield manufacturer's installation instructions.

c) **Floor Construction and Clearances**
Wood stoves must rest on a floor on noncombustible construction. An example of a noncombustible floor is one composed of only masonry material sitting on dirt. This floor must extend no less than eighteen (18) inches beyond the stove in all directions. Approved floor protectors or the stove-bottom heat shields of listed stoves can allow the stove to rest on a floor containing combustible materials. The floor would need a minimum of one-quarter inch of grouted tile or an approved floor protector extending eighteen (18) inches away from the stove in all directions.

d) **Vent-Connector and Chimney Clearance**
Interior chimneys require a 2-inch clearance from combustibles and exterior chimneys require a 1-inch clearance up to two-thirds. Type-L double wall vent pipe requires only a 9-inch clearance from combustibles.

Client Education/Occupant Health Concerns: Provide client education for every recipient of a new stove which outlines the safe operation and proper maintenance of the unit including recognizing depressurization.

Training: Verifying safe operation of fireplaces/woodstoves, ***Identify Measures:*** System must be operational and inspected before any other weatherization begins. Wood stoves may ***only*** be considered if recommended by the ECOS audit. The energy audit must drive the decision regarding whether a wood stove should be replaced. Additionally, local agencies must:

a) Ensure wood stove installations, maintenance and inspections are performed by qualified personnel only.
b) Ensure vent meets national or local codes, and that both adequate floor protection and clearances are verified;

c) Ensure the appliance is installed in accordance with manufacturer's recommendations.
d) Ensure that only wood stoves which are certified and labeled by the National Fire Protection Association under 86M-1986 and 211-1984, the International Conference of Building Officials, or other equivalent listing organizations may be purchased with DOE funds and that electrical parts are certified and labeled by Underwriters Laboratory. These organizations require the manufacturer to test the heater and include detailed instructions for safe installation. After July 1990, stoves must also be certified to meet the Environmental Protection Agency (EPA) emission standards or local Standards if they are stricter;
e) Ensure that only a wood stove certified and labeled for mobile homes may be installed in a mobile home. The label should reference the Department of Housing and Urban Development's (HUD) Mobile Home Standard and name the independent testing laboratory. Installation must be done in accordance with the manufacturer's recommendations;
f) Ensure that the inclusion of wood stoves is coordinated with State and County fire marshals (or equivalent) to ensure that restrictions and codes are met. All applicable permits must be obtained, and all work must receive approval from subsequent inspections; and
g) Wood stoves must be removed from manufactured homes if not approved for use with manufactured homes.

Additional information regarding procedures for solid fuel burning appliance inspections may be found in the ANSI BSR/BPI-1200-S-2017 Standard Practice for Basic Analysis of Buildings

Deferral Policy:

a) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.
b) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP if Client does not allow removal and/or replacement with listed unit.

B. **Appliances**

1. **Appliances and water heating appliances**

Action/Allowability: Replacement of water heaters is allowed on a case-by-case basis. Replacement and installation of other appliances are not allowable health and safety costs. Repair and cleaning are allowed. *Also see Air Conditioning and Heating Systems and Combustion Gases and Refrigerant*.

Testing: Determine whether appliances/ water heating appliances are performing safely. Combustion safety testing is required when combustion appliances are present. In every home that has fuel burning devices that have the capability of malfunction and/or "spill" such as water heating appliances, stoves/cookers, fireplaces or gas heating there is a risk of a carbon monoxide build up which could result in carbon monoxide poisoning.

Client Education/Occupant Health Concerns:

a) Discuss and provide information on appropriate use and, maintenance of appliances/ water heating appliances. The Client acknowledges that staff has explained and demonstrated how to use their appliance and/or water heating appliance prior to finalizing weatherization work in their home. The Client Education Checklist is signed by the Client; this document is placed in the Clients' file.
b) Arkansas WAP does not consider cook stoves to be a form of safe home heat. Clients shall be educated regarding the dangers of using cook stoves for home heating.

Training: Awareness of guidance and diagnostic training and testing.

Identify Measures:

a) Test all combustion appliances.
b) Clean, repair and/or replace appliances with combustion gas problems.
c) Replacing cook stoves and dryers is not allowable.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

2. **Refrigerant**

Action/Allowability: Reclaim refrigerant per Clean Air Act 1900, Section 608, as amended by 40 CFR82, 5/15/93.

Testing: Arkansas WAP Subgrantees shall ensure that sub-contractors who would be charged with refrigerant reclamation (e.g., removal of old refrigerators or air conditioning units) follow all EPA testing protocols and are EPA-approved section 608 type I certified or universal certified.

Client Education/Occupant Health Concerns: Clients should not disturb refrigerant.

Training: EPA-approved section 608 type I or universal certification.

Identify Measures:

a) Proper disposal by WAP. (Disposal of refrigerants must be in accordance with EPA's safe disposal requirements).
b) If WAP agency is not using a licensed vendor with EPA approved certification, there must be a signed agreement (WAP 19) with the company providing refrigerator/air conditioners guaranteeing removal of old appliances and proper disposal of refrigerants according to EPA requirements.

Deferral Policy:

a) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.
b) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP if Client does not allow removal of old air conditioner and/or refrigerator.

C. General Building Structure

1. Building Structure and Roofing

Action/Allowability: Building rehabilitation is beyond the scope of the Weatherization Assistance Program. Minor roof repair is allowed by DOE in order to protect installed measures, however, Arkansas does not allow minor repairs to roofs. with Weatherization funds. Roof repairs must be done by leveraging funds from other sources.

Testing: While conducting the initial audit, the building structure will be inspected for structural integrity to ensure that access to areas necessary for weatherization is safe for entry and performance of assessment, work, and inspection.

a) The Energy Auditor must have access to all aspects of the structure in order to adequately and appropriately gather data for the energy audit. Clothing, dogs, trash or other impediments that block necessary access to any area of the dwelling may constitute a deferral.
b) Minor repairs, not to exceed 600.00, may be done to protect DOE or LIHEAP materials installed only if they will protect the energy saving investment. Dwellings whose structural integrity is in question should be referred to other appropriate local and state agencies or programs.
c) Incidental repairs which are necessary for the effective performance or preservation of weatherization materials are allowed. and must not drop the overall SIR to less than 1.0. If an incidental repair measure drops the overall SIR below 1.0, the home must be deferred, the measure removed from the job and the job referred to other appropriate local and state agencies or programs. If the job has an overall SIR of 1.0 or greater without the IRM, once the measure has been addressed outside of regular Weatherization, Weatherization may proceed.
d) Every client file that contains an incidental repair must specifically identify what energy conservation measure it is preserving or protecting.

Client Education/Occupant Health Concerns: Notify client of structurally compromised areas.

Training: How to identify structural and roofing issues.

Identify Measures: Incidental repairs as cost allowable.

Deferral Policy:

a) Weatherization services may need to be delayed until the dwelling can be made safe for crews and occupants.
b) Homes with structural problems that create or exacerbate Health & Safety issues **must** be deferred.
c) Homes with conditions that require more than incidental repair should be deferred. *See Mold and Moisture guidance below*.

2. **Drainage-Gutters, Down Spouts, Extensions, Flashing, Sump Pumps, Pumps, Landscape, etc.**

Action/Allowability: Major drainage issues are beyond the scope of the Weatherization Assistance Program.

Testing: Conduct visual inspection.

Client Education/Occupant Health Concerns: Importance of cleaning and maintaining drainage systems. Provide information on proper landscape design.

Training: How to recognize drainage issues.

Identify Measures: Incidental repairs may be performed as preventive measures. Major drainage issues are beyond the scope of the WAP.

Deferral Policy: Homes with conditions that may create a serious health concern that require more than incidental repair should be deferred. *See Mold and Moisture guidance*.

3. **Window and Door Replacement, Window Guards**

Action/Allowability: Replacement, repair, or installation is not an allowable health and safety cost or an efficiency measure unless cost justified. Window guards are not allowed.

Testing:

a) Perform lead testing;
b) Pulling an acceptable SIR.

Client Education/Occupant Health Concerns: Provide information on lead risks.

Training: Awareness of guidance.

Identify Measures:

a) Broken or missing glass in windows must be replaced or repaired. Those merely
cracked should receive minimal treatment.
b) Any other measures must be cost effective as determined by the energy audit.
c) Must follow LSW (Lead-Safe Work) requirements for pre-1978 homes when working on windows and doors.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

D. Physical Health & Safety (Client and Worker)

1. Code Compliance

Action/Allowability: Correction of preexisting code compliance issues is not an allowable cost other than where weatherization measures are being conducted. State and local (or jurisdiction having authority) codes must be followed while installing weatherization measures.

Testing: Visual inspection. Local code enforcement inspections.

Client Education/Occupant Health Concerns: Inform Client of observed code compliance issues.

Training: How to determine what code compliance may be required. Subgrantees are required to check with the local code enforcement office in the city or county where the weatherization job is located if:

a) any circumstances in the home are suspected to be out of compliance with applicable code, so that Client may be informed of problems that are beyond the scope of the weatherization program, and
b) any weatherization measure to be installed is governed by codes, including license required of installers and permits necessary for the work to be done.

Identify Measures: Follow all State and Local Codes when installing weatherization measures.

Acquire all required permits and licenses pertinent to installing weatherization measures. These vary by jurisdiction, and it is the responsibility of each Subgrantee agency to know what the codes are in each of the areas they work in, as well as what permits and licenses are required in each of the areas they work in.

Deferral Policy: Condemned properties and properties where "red tagged" health and safety conditions exist that cannot be corrected under this guidance should be deferred.

2. **Occupant Preexisting or Potential Health Conditions**

Action/Allowability: When a person's health may be at risk and/or the work activities could constitute a health or 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 on a case-by-case basis. At-risk is defined as an elderly person, disabled person, child or other person with medical problems affected by heat, cold, poor air quality or disruption of the home environment. A physician's statement is required for Health & Safety measures if the medical condition is the reason that the measure is being installed. Otherwise, Client may self-report health issues so that necessary accommodations may be made during the weatherization process.

Testing: Require occupant to reveal known or suspected health concerns as part of initial application for weatherization. Screen occupants again during audit.

Client Education/Occupant Health Concerns: Provide client information of any known risks. Provide worker contact information so client can inform of any issues.

Training: How to assess occupant preexisting conditions and determining what action to take if the home is not deferred; awareness of potential health hazards.

Identify Measures: Weatherization agencies including subcontractors are required to take all reasonable precautions against performing work on homes that will subject the occupants or themselves to health and/or safety risks.
In cases where an occupant's health is fragile, or has been identified to have a health condition, including allergies, and/or the crew work activities would themselves constitute a health and/or safety hazard, the occupant(s) at risk shall be required to leave during the performance of the work activities.

In cases where an occupant is identified as having an allergy to a specific weatherization material, that material will not be installed. If comparable alternative materials are available, the occupant has no known allergy to the alternative materials, the materials meet DOE regulations, and DOE has approved a waiver requesting to install the materials crews may substitute the alternative material(s) If no safe alternative material meeting DOE standards is available, the measure shall not be installed. All must be well documented in the client file. No major measure may be skipped, or the home must be deferred.
"Major Measure" is defined as follows: A high priority measure, which if skipped, would result in "partial" weatherization of a unit. Major measures are as follows: air sealing, duct sealing of ducts outside the thermal boundary, attic insulation, wall insulation and floor or belly insulation.

Deferral Policy:

a) Failure or the inability to take appropriate actions must result in deferral.
b) A dwelling unit should not be weatherized where there is a major code violation or where there is a potentially harmful situation that may adversely affect the occupants or agency's weatherization crew and/or other staff.
c) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

3. **Occupational Safety and Health Administration (OSHA) and Crew Safety**

Action/Allowability: Workers must follow OSHA standards and Safety Data Sheets (SDS) and take precautions to ensure the health and safety of themselves and other workers. SDS must be posted wherever workers may be exposed to hazardous materials.

Testing: Grantees must perform assessments to determine if crews are utilizing safe work practices. Training will be made available at the Arkansas Weatherization Training Center.

Client Education/Occupant Health Concerns: WAP Workers must follow OSHA standards and Safety Data Sheets (SDS) and take precautions to ensure the health and safety of Clients, themselves and other workers. SDS must be posted wherever workers may be exposed to hazardous materials.

Training: Use and importance of personal protection equipment.

a) OSHA 10-hour training is required for all weatherization workers.
b) OSHA 30-hour training is required for crew leaders and Weatherization Directors.

Identify Measures: All crew leaders, energy auditors and AEO field staff must complete training by July 1, 2018.

Deferral Policy:

a) Weatherization work may be deferred if doing the work would put crews at undue health and safety risk.
b) Referral should be made when problems are identified that are beyond the scope of the DOE WAP, such as electrical or other code violations or conditions that pose a health or safety risk to crews and/or Clients. Examples of referral agencies include, but are not limited to, local housing authority agencies, other Community Action Agencies or (CAA other local agencies, landlords, other appropriate funding sources.
c) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

4. **Injury Prevention of Occupants and Weatherization Workers—Measures Such as Repairing Stairs and Replacing Handrails**

Action/Allowability: 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.

Testing: Observe if dangers are present that would prevent weatherization.

Client Education/Occupant Health Concerns: Inform Client of observed hazards and associated risks.

Training: Awareness of potential hazards.

Identify Measures: Workers will take all reasonable precautions against performing work on homes that will subject workers or occupants to health and safety risks *see Other Health and Safety Practices section*.

a) If crews encounter a situation where a staircase is deemed unsafe, for example, and the staircase is necessary to reach the area where the crews need to perform the weatherization work, and repairing the staircase requires only minor repair work and installation measures, crews shall perform the minor repair work so that they may safely perform the weatherization work to the home.
b) Injury Prevention Issues are addressed in the Client Education Checklist (WAP 13) and Health and Safety Checklist (WAP 10). A copy of the Client Education Checklist is placed in the clients' file.

Deferral Policy: If the repair work required is deemed to be beyond the scope of the DOE WAP (major repair is required such as rebuilding an entire staircase), the weatherization work to that area of the home shall be deferred until the home owner has satisfactorily installed the required repair(s). Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

E. General Hazards Physical & Material

1. Spray Polyurethane Foam (SPF)

Action/Allowability: Use EPA recommendations (available online at http://www.epa.gov/dfe/pubs/projects/spf/spray_polyurethane_foam.htl) when working within the conditioned space or when SPF fumes become evident within the conditioned space. When working outside the building envelope, isolate the area where foam will be applied, take precautions so that fumes will not transfer to inside conditioned space, and exhaust fumes outside the home.

Testing: Check for penetrations in the building envelope including while blower door is running. Sensory inspection inside the home for fumes during foam application.

Client Education/Occupant Health Concerns: Precautions for using Spray Polyurethane Foam is addressed in the Client Education Checklist (WAP 13) and Health and Safety Checklist (WAP 10). A copy of the Client Education Checklist is placed in the Clients' file.

Training:

a) Training on use of various products with specification for each application type. SDS sheets. Temperature sensitivity.
b) Workers using foam products must receive training on the proper use of these various products and understand the specification for each application type.
c) Documentation of installers viewing an installation video or online training and verification of reading and understanding product use information must be kept at the Subgrantee agency.

Identify Measures:

a) Comply with all applicable codes, OSHA, NIOSH and SDS and Instructions.
b) SDS sheets are mandatory for any foam product used and a thorough understanding of the temperature sensitivity of the product in use is required.
c) Liquid Foam Air Sealant. Liquid closed-cell polyurethane foam is a versatile air sealing material. Closed-cell foam is packaged in a one- part injectable variety and a two-part sprayable variety. It has a very high R-value per inch and is ideal for insulating and air sealing small, poorly insulated, and leaky areas in a single application. Installation is easy compared to other materials to accomplish the same air sealing tasks. However, cleanup is difficult enough that you probably don't want to clean up multiple times on the same job. Instead identify all the spots needing foam application, make a list, and foam them one after another.
d) One-Part Foam: This gap filler has tenacious adhesion. One-part foam is best applied with a foam gun rather than the disposable cans. Cleanup is difficult if you get careless. When squirted skillfully into gaps, this material reduces air leakage, thermal bridging, and air convection through the assemblies to which it is applied. One-part foam isn't effective or easy to apply to gaps over about one (1) inch or to bottomless gaps. This product can leave small air leaks unless applied with skill.
e) Two-Part Foam: Good for bridging gaps larger than one (1) inch. Two- part foam has become very popular for use with polyurethane foam board to sealing large openings. Cut foam board to close-enough tolerances around obstacles and fill the edges with the two-part foam. Two-part foam should be sprayed to at least an inch of thickness when it serves as an adhesive for foam board patches over large holes for strength.
f) Foam Construction Adhesive: Polyurethane foam dispensed from foam guns is an excellent adhesive for joining many kinds of building materials. It works well in joining foam sheets together into thick slabs for access doors through insulated building assemblies.

Deferral Policy:

a) Deferral should be exercised when existing code violations are present and correcting them would be beyond the scope of the DOE WAP.
b) Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.
c) If any household members have any respiratory problems use alternative sealing materials.
d) Alternative sealing materials may be used.

2. **Electrical, Knob-and-Tube Wiring**

Action/Allowability: Minor electrical upgrades and repairs necessary in order to install specific weatherization measures and where health or safety of the occupant is at risk are allowed. Arkansas state code prohibits installing insulation over knob-and-tube wiring. Thus, insulating over knob-and-tube wiring is not allowable in Arkansas.

Testing: Visual inspection for knob-and-tube wiring. Voltage drop and voltage detection testing are allowed. Check for alterations that may create an electrical hazard.

Client Education/Occupant Health Concerns: Provide information on overloading circuits, over-current protection, and basic electrical safety/risks.

Training: How to identify electrical hazards; Local code compliance.

Identify Measures: Arkansas WAP will screen for the presence of knob-and- tube wiring during the application process (Client Application-WAP 02). If the applicant acknowledges the presence of knob-and-tube wiring at the time of application, the client will be referred to the appropriate agency for assistance to remedy this problem. The client may possibly have new wiring by the time the client's name is at the top of the priority list.

3. **Electrical, Other than Knob-and-Tube Wiring**

Action/Allowability: When the H&S of the occupant/worker(s) is at risk, minor repairs, are allowed when necessary for weatherization measures. Upgrades and repairs are allowed when necessary to perform specific weatherization measures.

Testing: Visual inspection - Voltage drop and voltage detection testing are allowed.

Client Education/Occupant Health Concerns: Provide information on over-loading circuits, electrical safety/risks.

***Training*:** How to identify electrical hazards; Local code compliance.

***Identify Measures*:** Energy audit must identify electrical hazards. Repair of problems must be by a licensed electrician.

a) Frayed, loose, or damaged wiring.
b) Missing junction boxes where wires meet: must be installed prior to insulating.
c) Light fixtures hanging by wire.
d) Electrical outlet or switch with loose wires or other issues.
e) Appliances or electrical equipment incorrectly wired or otherwise incorrectly connected to electrical power.
f) Electrical problems/upgrades necessary to install weatherization measures.

Deferral Policy: Any electrical problem that is beyond the scope of WAP.

4. **Fire Hazards**

Action/Allowability: Correction of fire hazards is allowed when necessary to safely perform weatherization.

Testing: Check for fire hazards in the home during the audit and while performing weatherization.

Client Education/Occupant Health Concerns: Inform client of all observed hazards.

Training: How to identify fire hazards.

Identify Measures: At all times crews are to look for potential fire hazards:

a) Combustion appliances shall be checked for inadequate clearances between the appliances (including venting systems) and combustible materials.
b) Chimneys and wood stove flues shall be checked for potentially dangerous levels of creosote build-up.
c) Observations of fire hazards (existent/nonexistent) will be noted on the Health and Safety Checklist (WAP 10) and placed in the Clients' file.

Deferral Policy: Local agencies may use health and safety funds to remedy potential fire hazards prior to and during the course of weatherization work within reasonable limits. If the issue cannot be remedied, crews may defer weatherization work until the owner or other qualified agency has remedied the potential fire hazard problem.

5. **Smoke, Carbon Monoxide Detectors, and Fire Extinguishers**

Action/Allowability: Installation of smoke/CO detectors is allowed where detectors are not present, are inoperable, or have exceeded manufacturer's stated lifetime Replacement of functional smoke/CO detectors that are not beyond the manufacturer's stated lifetime is not an allowable cost. All smoke/CO alarms installed must be 10-year sealed battery units. Check with local AHJ to determine interconnection requirements. Arkansas WAP will not install fire extinguishers,

Testing: Check for operation.

Client Education/Occupant Health Concerns: Provide occupant with verbal and written information on use of newly installed devices and the potential risks of not properly maintaining these devices.

Training: Where to install detectors; Local code compliance.

Identify Measures:

a) Verify operation and age of installed alarms
b) Install CO alarms in every home where alarms are not present or are inoperable in compliance with ASHRAE 62.2-2016 which references NFPA 720 (note: NFPA 720 has been incorporated into NFPA 72).
c) Install smoke alarms where the AHJ requires them if alarms are not present or are inoperable.
d) Replace functional smoke alarms and carbon monoxide alarms if they are beyond the manufacturer's stated lifetime (usually 10 years)
e) Replace functional smoke or CO alarms batteries if designed to be replaceable.
f) Install smoke/CO detectors when accurately operating units do not already exist. CO alarms must adhere to Arkansas Fire Code 915.2.

Carbon monoxide detection locations:

- Refer to page 55 of this manual for equipment placement requirements.

Smoke alarm locations:

- Refer to page 55 of this manual for equipment placement requirements.

Deferral Policy: No Deferrals

6. **Asbestos - In Siding, Walls, Ceilings, etc.**

Action/Allowability: In Arkansas, no handling and/or altering of asbestos materials is allowed. All precautions must be taken not to damage siding. Siding suspected of containing asbestos should never be cut or drilled or removed from the home; if confirmed or presumed asbestos is present the agency is required to defer the home and refer for Sample collection and testing of suspected ACM conducted by an Asbestos Hazard Emergency Response Act of 1986 (AHERA) certified tester, or to an appropriately trained asbestos control professional for encapsulation or removal. No blower door testing will be conducted, and weatherization shall not commence until documentation has been provided by a certified professional deeming the material non asbestos containing, or stating the ACM has been removed or encapsulated.

Testing: Inspect exterior wall surface and subsurface for asbestos siding prior to drilling or cutting.

Client: Education/Occupant Health Concerns: Inform the Client that suspected asbestos siding is present. Clients are educated on asbestos dangers. A copy of "*Asbestos In Your Home*" is given to each Client during the initial audit process. These actions are documented on the Client Education Check List (WAP 13) and placed in the Client's file.

Training: How to identify asbestos containing materials.

Identify Measures: Keep activities to a minimum in any areas having damaged material that may contain asbestos. Do not further disturb the material. Weatherization work must be deferred.

Deferral Policy: If ACMs are present, the home **must** be deferred. Client must be informed in writing of the potential hazard. Clearance statement by Asbestos Hazards Emergency Response Act (AHERA) certified professional must be obtained by Client before weatherization can occur. A copy of the statement/report must be kept in the Client's file.

7. **Asbestos - In Vermiculite**

Action/Allowability: When vermiculite is present, unless testing determines otherwise, take precautionary measures as if it contains asbestos, such as not using blower door tests and utilizing personal air monitoring while in attics. Encapsulation by an appropriately trained asbestos control professional is allowed. Removal is not allowed.

Prohibited: Using DOE WAP H&S funds for general abatement/removal/or replacement of asbestos siding, thermal system insulation (TSI) or Transite, or vermiculite.

Testing: Assess whether vermiculite is present. Asbestos Hazard Emergency Response Act of 1986 (AHERA) certified prescriptive sampling is allowed by a certified tester.

Client Education/Occupant Health Concerns: Clients should be instructed not to disturb suspected asbestos containing material. Provide asbestos safety information to the Client.

Formally notify Client if test results are positive for asbestos and signed by the Client. Precautions' regarding handling asbestos is given to the Client during the initial audit of the home. Documentation of this instruction is maintained in the Client's file (Client Education Checklist WAP 13).

Training: How to identify asbestos containing materials.

Identify Measures:

a) When vermiculite is suspected, unless testing determines otherwise, take precautionary measures as if it contains asbestos, such as not **using** blower door tests and utilizing personal air monitoring while in attics.
b) Removal is **not** allowed.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

8. **Asbestos – On Pipes, Furnaces, Other Small Covered Surfaces**

Action/Allowability: Assume asbestos is present in covering materials. Encapsulation is allowed by an AHERA asbestos control professional and should be conducted prior to blower door testing. Removal may be allowed by an AHERA asbestos control professional on a case-by-case basis.

Testing: AHERA testing is allowed by a certified tester.

Client Education/Occupant Health Concerns: Clients will be instructed not to disturb suspected asbestos containing material. Provide asbestos safety information to the client. Precautions regarding asbestos are provided to the Client during the initial audit of the home. Documentation of the instruction is maintained in the Client's file (Client Education Checklist WAP 13).

Training: How to identify asbestos containing materials.

Identify Measures:

a) Inspect pipe and other coverings for asbestos. If in doubt, treat the material as if it contains asbestos.
b) Do not disturb materials containing asbestos
c) Check state and local codes prior to removal and replacement of asbestos containing materials. All local, state and federal requirements and regulations shall be followed by Arkansas Subgrantees.

Deferral Policy: Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

9. **Biologicals and Unsanitary Conditions – Odors, Mustiness, Bacteria, Viruses, Raw Sewage, Rotting Wood, etc.**

Action/Allowability: Remediation of conditions that may lead to or promote biological concerns and unsanitary conditions is allowed. Addressing bacteria and viruses is not an allowable cost.

Testing: Sensory inspection.

Client Education/Occupant Health Concerns: Inform Client of observed conditions. Provide information on how to maintain a sanitary home and steps to correct deferral conditions.

Safety and preventive measures regarding any observed biological and unsanitary conditions are addressed with the Client during the initial audit of the home. The Client is also given a copy of "*A Brief Guide to Mold, Mildew and Moisture, and Your Home.*" The Client acknowledges receipt of this information and signs off on the Client Education Checklist (WAP 13). Documentation of the instruction is maintained in the client file.

Training: How to recognize conditions and when to defer. Worker safety when coming in contact with these conditions.

Identify Measures:

a) Assess the cost-effectiveness and necessity of remediation of these conditions on a case by case basis with prior approval from AEO;
b) The use of personal protective equipment shall be strictly enforced. Respirators, protective eyewear, and protective clothing will be worn when biological agents are present or suspected in order to eliminate or minimize crew exposure;
c) Caution should be taken when selecting air tightness limits for dwellings with these conditions. Since these conditions are often related to moisture, Arkansas requires local agency crews to assess moisture conditions as part of the initial energy audit procedure;
d) Virus and bacteria remediation is **not** allowable.

Deferral Policy: There will be times when weatherization measures may need to be delayed until the problem can be remedied by the home owner or another qualified agency. Referral to the local Health Department may be warranted.

10. **Formaldehyde, Volatile Organic Compounds (VOC), and Other Air Pollutants**

Action/Allowability: 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.

Testing: Sensory inspection.

Client Education/Occupant Health Concerns: Inform Client of observed condition and associated risks. Provide Client written materials on safety and proper disposal of household pollutants.

Training: Arkansas WAP staff are trained to take all reasonable precautions against performing work on homes that will subject them or occupants to health and safety risks.

Identify Measures: Arkansas WAP crews shall take every precaution necessary to minimize exposure to air pollutants. When using chemicals and products that may contain any of the pollutants within this category, strict adherence to label instructions and precautions shall be required. When possible known pollutants shall be removed safely and disposed of properly.

Deferral Policy: If the pollutant cannot be removed due to Client unwilling to allow its removal, and exposure cannot be safely and adequately minimized, weatherization work may have to be deferred to ensure the safety of the crew. This action will be noted in the Client's Deferral/Denial Letter; a copy will be placed in the Clients' file. Clients must be informed by evaluators and/or workers of observed hazards and associated risks (where applicable).

11. **Mold and Moisture**

Action/Allowability: Limited water damage repairs that can be addressed by weatherization workers and correction of moisture and mold creating conditions are allowed when necessary in order to weatherize the home and to ensure the long term stability and durability of the measures.

Testing: Visual assessment is required and diagnostics such as moisture meters are recommended pre and prior to final inspection. Mold testing is not an allowable cost.

All units must be inspected for problems associated with excess moisture. Identification of potential moisture problems shall be documented in the Client file. If possible, and within the scope of the DOE WAP, repair minor moisture problems that will diminish the effectiveness of weatherization measures.

a) Humidity inside the home should measure less than sixty-five percent (65%).
b) When test shows more than sixty-five (65%) humidity, the weatherization technician should work with the Client to eliminate the source of the excess moisture. A spot or continuous vent fan should be installed when the source of the problem cannot be eliminated.
c) Clothes dryers should be vented to the outside of the dwelling. Venting for dryers must be rigid metal. UL 181 listed flexible duct may be utilized for

transitional ducts from appliance to permanent duct. It may not pass through walls, floors or ceilings.

d) DOE recommended optimum relative humidity level in cold climates = 35 – 50% RH; 40 – 60% RH in hot-humid climates.

Examples of where mold problems may be found in the home:

- Dirty air conditioners
- Dirty humidifiers
- Bathroom without vents or windows
- Kitchen without vents or windows
- Dirty refrigerator drip pans
- Laundry room with unvented dryer
- Unventilated attic
- Carpet on damp basement floor
- Bedding
- Closet on outside wall
- Dirty heating/air conditioning system
- Water damage (around windows, roof, or basement)

Molds can be a problem in mobile homes:

- Small volume – less dilution of relative humidity
- Many cold surfaces for condensation
- Many sources of process wood – mold food
- Roofing – no ventilation or ventilation poor distributed
- Crawlspace – no ventilation or poorly distributed/tight skirting;
    - plumbing leaks

Client Education/Occupant Health Concerns: All local agencies must include some form of notification or disclaimer to the Client upon the discovery to the Client upon the discovery of a mold condition and what was specifically done to the home that is expected to alleviate the condition and/or that the work performed should not promote new mold growth. In addition, educate the Client concerning:

a) Symptoms related to mold exposure:

- Nasal and sinus congestion
- Sore throat, coughing
- Shortness of breath, chest tightness
- Eye irritation
- Headache
- Fatigue
- Rashes
- Known asthma trigger

b) Sources of home moisture:

- Shower (excludes towels and spillage) – 1.0 pint (pt.)/10-minute shower
- Clothes drying (vented indoors) – 5.0 pt/load
- Combustion (unvented space heater) – 7.6 pt/gallon kerosene
- Cooking dinner (family of four) – 1.2 pt (1.6 if gas cooking)
- Floor mopping – 1.5 pt/50 sq. ft.
- Respiration (family of four) – 0.4 pt/hour
- Description of materials: seasonal – 6 to 17 pt/day
- New construction – 10+ pt/day
- Ground moisture migration = Up to 100 pt/day

Training: National curriculum on mold and moisture or equivalent.

Identify Measures: All units must be inspected for problems associated with excess moisture. Identification of potential moisture problems shall be documented in the Client file. Vent dryers to the outside. Gas dryers must be vented with rigid material.

Deferral Policy: Most typically, deferral may be needed.

Where severe Mold and Moisture issues cannot be addressed, deferral is required.

When possible, referral should be made when problems are identified that are beyond the scope of the DOE WAP, such as electrical or other code violations or severe health and safety issues such as severe mold which cannot be adequately addressed within the scope of the DOE WAP.

12. **Pests**

Action/Allowability: Pest removal is allowed only where infestation would prevent weatherization. Infestation of pests may be cause for deferral where it cannot be reasonably removed or poses health and safety concern for workers. Screening of windows and points of access is allowed to prevent intrusion.

Testing: Assessment of presence and degree of infestation and risk to worker.

Client Education/Occupant Health Concerns: Inform Client of observed condition and associated risks.

Training: Training is provided at the WTC regarding how to assess presence and degree of infestation, associated risks, and need for deferral.

Identify Measures:

a) Initial assessment of presence and degree of infestation and risk to workers.
b) Determine whether the pest infestation would prevent or hamper the weatherization work.
    i. If yes, inform Client to take the necessary steps to remove the pest infestation problem so that the weatherization work can proceed. Document the Client file.
    ii. WAP may not use toxic and poisonous chemicals inside the Clients' home.

Deferral Policy: Infestation of pests may be cause for deferral where it cannot be reasonably removed or poses health and safety risks for workers.

13. **Radon**

Action/Allowability:

- Cover exposed dirt floors within the pressure/thermal boundary with a sealed soil gas retarder
- Cover sump wells/pits with airtight covers
- Implement ventilation as required by ASHRAE 62.2-2016
- All measures will be installed in accordance with the SWS.
- In all homes radon may be present, so work scope must 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 conditioned space, and ensuring crawlspace venting is installed and operable. This could include a second fan.

Testing: DOE allows testing in locations with high radon potential. **Arkansas is not currently identified as an area with high radon potential, so testing is not allowed. However, precautionary measures are required and the Radon Informed Consent Form is required for every home..**

Client Education/Occupant Health Concerns: Provide Client with EPA consumer's guide to radon. Safety and preventive measures regarding Radon is provided to the Client during the initial audit of the home. The Client is also given a copy of "*A Citizen's Guide to Radon or A Consumer's Guide to Radon Reduction.*" The Client acknowledges receipt of this information and signs off on the Client Education Checklist (WAP 13). Documentation of the instruction is maintained in the Client file.

Training: What is it, how it occurs. What factors may make radon worse. Weatherization measures that may be helpful; Vapor barrier installation; Training is provided at the WTC.

Identify Measures: Install vapor barrier except in mobile homes.

Deferral Policy: Deferral not applicable.

14. **Lead Based Paint**
(see Lead Safe Work Practices)

See *Policy Regarding WAP Activities and Federal Lead-Based Paint Regulations* (WPN 02-6, Effective July 12, 2002)

See *Policy Regarding Lead Safe Weatherization Guidance (*WPN 08-06, Effective September 22, 2008)

Action/Allowability: Follow EPA's Lead; Renovation, Repair and Painting Program (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.

Testing: Testing is allowed. Job site set up and cleaning verification is required by a Certified Renovator.

Client Education/Occupant Health Concerns: The head of household of every home to be weatherized receives the informational pamphlet: "*Renovating Right*". The inspector also conducts a client education segment as part of the initial inspection to assure that the occupants are fully aware of the hazards posed by Lead Based Paint exposure. 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. This receipt is kept in the Client file.

Training: All weatherization crews working on pre-1978 homes must receive LSW training and be accompanied by an EPA Certified Renovator. Grantee Monitors/Inspectors must be Certified Renovators and receive LSW training.

Identify Measures:

a) Test areas where weatherization work is likely to occur.
b) Follow the proper DOE LSW protocols, OSHA regulations and EPA regulations in all pre-1978 homes.
c) Don't just assume that all mobile homes are categorically exempt. Any home built before 1978, or any mobile home remodeled using paints and varnishes prior to 1978, may contain lead-based paint. These paints should be considered "guilty until proven innocent" by way of testing.

Deferral Policy: When it is determined that the level of lead present in the home is so high that it presents a hazard to workers, the weatherization work should be deferred until a licensed lead abatement professional has eliminated the health hazard. Follow all appropriate Deferral and Referral policies and protocols, if determined to be beyond the scope of the DOE WAP.

Lead Work Safety (LWS) Practices

Presence of lead-based paint associated with dwellings built before 1978. State policy mandates that all personnel working directly on dwellings shall participate in an eight (8) hour Lead Workers Safety class. Moreover, the presence of lead is an inspection issue and current procedures are designed to identify the presence of lead on Work Orders and work safely in those situations.

With respect to Lead Based Paint issues, Arkansas WAP uses an approach that addresses Client safety and awareness, worker safety and awareness, and on-site practices.

The head of household of every home to be weatherized receives the informational pamphlet: "*Renovating Right*". The inspector also conducts a client education segment as part of the initial inspection to assure that the occupants are fully aware of the hazards posed by Lead Based Paint exposure. 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. This receipt is kept in the Client file.

AEO's monitoring staff will have oversight responsibility in this area. While Lead Safe Work practices have long been built into the program, the monitors will focus more directly on this area as they conduct their monitoring visits. Program operators will be required to show that all Lead Based Paint protocols: information sharing, Lead safe work practices, proper equipment, and so forth are up to date and in compliance to all regulations whatever they turn out to be. Those programs that are not in compliance, and fail to comply once identified, will face the most serious sanctions that can be leveled: reduced allocation to start with, loss of contract if necessary. Special attention will be aimed at those programs failing to meet requirements in the area of Lead Safe Work Practices since it poses such tangible consequences for the households that are served.

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.

Arkansas' current status is as follows: all Subgrantees have applied for and received Lead Renovator Firm status. All evaluators (inspectors) have acquired Lead Renovator (RRP) certification as well as select crew leaders. Private contractors must also meet the requirement of having adequate RRP certified employees among their ranks. As new contractors apply to work on weatherization projects the EPA requirements are explained during the application process. No private contractors will be awarded work on any pre-1978 dwellings that don't meet the EPA rules.

Private contractors will be required to furnish proof of RRP and Lead Renovator Firm status as a condition of working for the weatherization programs. The monitoring staff will routinely check that documentation is on file at each agency verifying compliance to the EPA rules.

All weatherization crews working on pre-1978 homes must receive the 8-hour LSW training or a certified renovator must be assigned to the project and be readily available.

State Monitors must be Lead Renovator (RRP) and receive the 8-hour LSW training by July 1, 2018.

The certified renovator must be physically present at the work site while signs are being posted, containment is being established, and the work area is being cleaned after the renovation to ensure that these tasks are performed correctly. Although the certified renovator is not required to be on-site at all times, while the renovation project is ongoing, a certified renovator must nonetheless regularly direct the work being performed by other workers to ensure that the work practices are being followed. When a certified renovator is not physically present at the work site, the workers must be able to contact the renovator immediately by telephone or other mechanism. In addition, the certified renovator must perform the post-renovation cleaning verification.

VII. INCIDENTAL REPAIRS

See 10 CFR 440, Incidental Repairs Page 644

See WPN 19-5: Incidental Repair Measure Guidance Effective Sept. 6, 2019

Incidental repairs may be performed in conjunction with any of the priorities previously listed. Incidental repair costs must be included as part of the total unit cost when determining the maximum and average expenditure per dwelling unit.

An incidental repair is defined as those repairs necessary for the effective performance or preservation of weatherization materials. Such repairs include, but are not limited to framing or repairing 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.

An incidental repair measure is a repair necessary for the effective performance or preservation of newly installed weatherization materials, but not part of a standard installation. IRM installations must be associated with a specific ECM or group of ECMs. IRMs must be justified by written and photo documentation in the client file. IRM costs must be included the SIR calculation of the total package of weatherization measures.

Weatherization Materials—Materials that are purchased for installation in a building that are anticipated to have a direct impact on saving energy. A definition of approved weatherization materials can be found in Federal Regulations 10 CFR §440.3. Weatherization materials must be listed and must comply with the standards in 10 CFR Part 440, Appendix A.

Examples:

Energy Conservation Measure (ECM)	**Ancillary Items** (cost must be included in SIR for associated individual ECM)	**Incidental Repair Measure (IRM)** (Cost must be included in SIR for whole unit package of ECM)	**Health and Safety Measure** (Separate cost justification. Not included in SIR)
Attic insulation	Eave baffles, hatch dam, dams for heat producing devices	Attic vents. Minor roof repair to preserve insulation **not allowed with Weatherization funds**	Minor repair of leaking roof that may create moisture/mold issue in new attic insulation. **not allowed with Weatherization funds**
Wall insulation	Sealing high and low openings in balloon framing	Sealing unusual openings as in void areas between double ceilings. Minor roof repair to preserve insulation. (if identified as IRM in Grantee Plan)	Minor repair of leaking roof that may create moisture/mold issue in new wall insulation**. not allowed with Weatherization funds**
Air Sealing	Fasteners for patches	Unusually large (defined by Grantee), such as more than 1 sheet of sheetrock, patching materials and labor	
Attic hatch – (a required part of the larger air sealing ECM, sealing the access opening with a rigid lid and weatherstripping)	Items to complete proper construction such as: hold down clasps, handles, caulk for ceiling-to hatch frame seal, insulation	Demolition and/or framing for a new hatch, new ceiling trim and stop	

Crawlspace or knee wall access door (a required part of the larger air sealing ECM, sealing the access opening with a rigid door and weatherstripping)	Hinges, latches, insulation	Demolition of deteriorated existing frame, new framing, new trip and stop	
Caulking, weatherstripping existing windows (done as a part of the larger air sealing ECM)	Backer rod, cleaning off old caulk	Primer or sealer, replacing deteriorated framing, other prep repair	
Vinyl replacement windows for double hung sashes	Fasteners, interior and exterior caulk materials & labor	Replace broken stops, replace or repair rotted jambs and wall framing	
Replacement or repair of heating/cooling systems	All typical accessories for proper installation	Flue repair, providing combustion air from outside the CAZ as needed	All, including flue repair and combustion air from outside CAZ as needed, if the system is inoperable, per Grantee H&S plan
Heating/cooling system replacement	Include all associated costs within replacement cost	Construction of separate CAZ per code requirement	Include all associated costs if ASIR disqualifies as ECM, per Grantee H&S plan
CFL		Replace hazardous light socket or fixture. (if identified as IRM in Grantee Plan)	Replace hazardous light socket or fixture. (if identified as H&S measure in Grantee Plan)

See Table 9.2 for the maximum allowable measure lifetimes that can be used in all Department of Energy (DOE) approved energy audits for all Weatherization Assistance Program (WAP) Grantees. DOE will monitor to this effect.

Please note the previous maximum allowable lifetimes for the following measures have been updated. Note that many of the updated allowable defaults apply only when specific requirements are fulfilled. Please check the relevant footnotes before updating any default measure lifetime

Table 9.1 Revised ECM Lifetimes, years

Measure	Previous Default	Updated Allowable Default
Attic Insulation1	20	30
Wall Insulation2	20	30
Floor Insulation3	20	30
Kneewall Insulation3	20	30
Fossil Fuel Furnaces & Boilers4	15 or 18	20
Solar PV	N/A	20

Notes: 1. Applies only to blown-in (e.g., cellulose, fiberglass) and batt insulation
2. Applies only to dense pack insulation, rigid insulation, and full-cavity batt insulation in fully enclosed air-tight cavities
3. Applies to loose-fill and batt insulation installed in fully enclosed air-tight cavities, and rigid Insulation
4. Applies to standard and condensing fossil fuel fired units

SUMMARY OF ALLOWABLE MAXIMUM MEASURE LIFETIMES

Table 9.2 presents the current list of the maximum allowable measure lifetimes, including the increased allowable lifetimes of the measures described above.

Table 9.2
Allowable Default ECM Lifetimes

#	Measure Type	Measure Name	Life (yr.)
1	Building Insulation	Attic insulation: blown in and batt	30
2	Building Insulation	Attic insulation: all other types	20
3	Building Insulation	Sillbox insulation	20
4	Building Insulation	Foundation wall insulation	20
5	Building Insulation	Slab insulation	20
6	Building Insulation	Floor insulation: loose and batt types installed in fully enclosed air-tight cavities, and rigid insulation	30
7	Building Insulation	Floor insulation: all other types including loose and batt not installed in fully enclosed air-tight cavities	20
8	Building Insulation	Wall insulation: dense pack insulation, rigid insulation and full-cavity batt insulation in fully enclosed air-tight cavities	30
9	Building Insulation	Wall insulation: all other types	20
10	Building Insulation	Kneewall insulation: loose and batt types installed in fully enclosed air-tight cavities, and rigid insulation	30
11	Building Insulation	Kneewall insulation: all other types including loose and batt types not installed in fully enclosed air-tight cavities	20
12	Building Insulation	Duct insulation	20
13	Building Insulation	Manufactured home skirting	10
14	Building Insulation	White roof coating	7
15	Building Insulation	Radiant barrier	15
16	Ducts/Infiltration	Whole house air sealing	10
17	Ducts/Infiltration	Duct sealing	10
18	Doors and Windows	Storm window	15
19	Doors and Windows	Window replacement	20
20	Doors and Windows	Door replacement	20
21	Doors and Windows	Storm door	10
22	Doors and Windows	Window shading: awning	10
23	Doors and Windows	Sun screen: fabric or screen	10
24	Doors and Windows	Sun screen: louvered	15
25	Doors and Windows	Window film	15
26	HVAC Systems	Thermal vent damper	10
27	HVAC Systems	Electric vent damper	10
28	HVAC Systems	Intermittent Ignition Device (IID)	10
29	HVAC Systems	Electric vent damper and IID	10
30	HVAC Systems	Flame retention burner	10
31	HVAC Systems	Heating system tune up	3
32	HVAC Systems	Heating system replacement: fossil fuel fired furnaces and boilers, standard and condensing	20
33	HVAC Systems	Heating system replacement: all other heating systems except heat pumps	18
34	HVAC Systems	Smart/programmable thermostat	15
35	HVAC Systems	Air conditioner tune up	3

36	HVAC Systems	Air conditioner replacement	15
37	HVAC Systems	Evaporative cooler	15
38	HVAC Systems	Heat pump replacement	15
39	Baseloads	Lighting retrofit: fluorescent and compact fluorescent	(Note 5)
40	Baseloads	Lighting retrofit: LED	(Note 6)
41	Baseloads	Lighting retrofit: halogen	(Note 7)
42	Baseloads	Refrigerator replacement	15
43	Baseloads	water heating appliance tank insulation	13
44	Baseloads	water heating appliance pipe insulation	13
45	Baseloads	Low flow showerhead	15
46	Baseloads	water heating appliance replacement	13
47	Baseloads	water heating appliance setpoint reduction	13
48	Solar	Solar PV installations	20

Notes:

5. 10,000 hours
6. 30,000 hours
7. 4,000 hours

DOE will consider other changes on a case-by-case basis. A Grantee may request a longer allowable measure lifetime(s) by submitting the request, along with documentation justifying the request with independent third-party verified research, to the appropriate PO(s).

VIII. CAPITAL-INTENSIVE EFFICIENCY

See *10 CFR 440*

LIHEAP funding for Capital Intensive furnace or cooling efficiency modifications includes those major heating and cooling modifications which require a substantial amount of funds, including replacement and major repairs, but excludes such items as tune-ups, minor repairs, and filters.

AEO requires that replacement HVAC systems be required by the ECOS audit as an Energy Conservation Measure (ECM); however, the energy audit cannot determine if there is a cracked heat exchanger, etc.; therefore, in these circumstances, AEO allows LIHEAP funds to be used to address the HVAC system. Please see guidance in the heat and air section of this manual in addressing this measure.

Additionally, the state has chosen to address space heaters not covered by DOE policy in this category. Using LIHEAP funds, a Subgrantee can replace defective space heaters with models meeting ANSI Z21.11.2. Please refer to the heat and air section of this manual for further guidance.

The primary use of LIHEAP Capital Intensive funds is to replace an unvented space heater with a vented one if it is the primary source of heat. The funds can also be used to remove secondary space heaters that are not compliant. If after a clean and tune up of a furnace, it is found to be not repairable, a request can be made to AEO to replace the furnace. On any amount over $2,500 a waiver must be approved with justification provided for the request.

IX. DENIAL/DEFERRAL/REFERRAL

The decision to defer work in a dwelling is difficult but necessary in some cases. This does not mean that assistance will never be available, but that work must be postponed until the problems can be resolved and/or alternative sources of help are found. Note that Subgrantees, which include crews and contractors, are expected to pursue reasonable options on behalf of the Client, including referrals, and to use good judgment in dealing with difficult situations.

The following are reasons for deferrals: Beyond the Scope; Health & Safety; Energy Audit; Client Denials & Referrals.

WAP 23 must be given to the Client with the denial/deferral form. Refer to Health & Safety Plan (Section 7.V.B.) for specific guidance on reasons for denial, deferral/referral, and other special situations.

If vicious or bothersome animals are present and the Client refuses to restrain the animals in a location that will allow the weatherization work to proceed undisturbed, the crew or contractor is advised to leave and report the situation to supervisory personnel. The Subgrantee is advised to send the Client a letter explaining the situation and the need to restrain the animal(s) during the weatherization work and during the final inspection. If the Client fails to comply with this request, the home will not be weatherized.

If the weatherization staff or contractor encounters a situation where drugs are visible in the home, they are advised to leave and report the situation to supervisory personnel. The subgrantee should document in the file and not weatherize the home.

Creating Deferrals in ECOS

If the Auditor has determined that a building must be deferred, he/she must complete the following steps in ECOS:

Step 1: Click on Priority List;
Step 2: Click “Create Audit” on desired client;

In the Building:
Step 3: Click on “Audit Summary”.
Step 4: Check box – “Deferral of Service”.
Step 5: Add comments in the “Deferral of Services Comment” box; and
Step 6: Upload WAP 23 (Fair Hearing form) and WAP 35 (Deferral form) & photographs.

Billing Deferrals in ECOS

Have the Auditor determine how much time was spent in driving to the deferred unit and how much time was spent during the pre-audit and back to agency if no other audit was conducted. If another unit was audited, then the distance from the deferred unit to the next unit can only be counted. The same holds true if the deferred unit was the second unit seen that day. In addition to on-site time spent, the Auditor must determine how much time was spent inputting data into the system at the office. Once the Auditor’s time has been aggregated, the fiscal staff must input the salary/fringe in two (2) places:

Billing Deferrals in ECOS

Have the Auditor determine how much time was spent in driving to the deferred unit and how much time was spent during the pre-audit and back to agency if no other audit was conducted. If another unit was audited, then the distance from the deferred unit to the next unit can only be counted. The same holds true if the deferred unit was the second unit seen that day. In addition to on-site time spent, the Auditor must determine how much time was spent inputting data into the system at the office. Once the Auditor's time has been aggregated, the fiscal staff must input the salary/fringe in two (2) places:

Step 1: Capture all time in Program Support, under
a. On-Site Salary and On-Site Fringe (in the field); and/or b b.
Off-Site Personnel/Fringe (office time).

If multiple Auditors were present for the site visit both salaries/fringe should be captured, however, only one (1) Auditor can account for time in the office inputting the data.

Beyond the Scope:

Under the WAP program there are many reasons to deny a home for being "beyond the scope," of the program. In order to understand what is beyond the scope of the WAP program, assessors must first understand what the actual purpose and scope of WAP is. The official definition of the purpose and scope can be found in the Code of Federal Regulations (CFR) 10 440.1. The CFR reads as follows:

"*This part implements a weatherization assistance program to increase the energy efficiency of dwellings owned or occupied by low-income persons or to provide such persons renewable energy systems or technologies, reduce their total residential expenditures, and improve their health and safety, especially low-income persons who are particularly vulnerable such as the elderly, persons with disabilities, families with children, high residential energy users, and households with high energy burden*."

In some instances, homes need major repairs to improve the health and well-being of the individuals, however these major repairs may not increase the energy efficiency of the dwelling or provide renewable energy systems or technologies. In these cases, the home must be deferred.

Health & Safety:

Under the DOE WAP program there are many reasons to deny a home for Health and Safety Reasons. The AEO has developed Health and Safety Guidance to assist the Subgrantee in the decision-making process.

The Health and Safety Plan provides guidance on how to perform the mechanical, visual, and sensory inspections. When WAP funding cannot alleviate the Health and Safety hazards prior to the installation of Energy Conservation Measures (ECM) the home should be deferred. Documentation for the deferrals may include but are not limited to the following:

- **Appliances -** If a cook stove is deemed a health and safety hazard (i.e., fire hazard or excess carbon monoxide) and the hazard cannot be resolved, the Client should be informed and the home

temporarily deferred for thirty (30) days to allow the Client an opportunity to bring the appliance into compliance. The primary method of inspection will include combustion testing and a visual inspection. If the home fails the combustion tests and visual inspection, the home should be deferred. Documentation for denial should include test results and/or photos supporting the visual inspection. **Asbestos -** Asbestos can be found in many materials of the home. Asbestos can be found in the siding, ceilings, vermiculite, or pipe insulation. When a home has asbestos siding, insulating walls should be accomplished through the inside of the home. Asbestos in vermiculite may be encapsulated but this may be cost prohibitive. Asbestos on pipes may be removed by an AHERA certified professional but this may be cost prohibitive. In cases where extensive asbestos is present, a home should be deferred. Documentation should include cost estimates to remove the asbestos and photographic evidence.

- **Biologicals & Unsanitary Conditions -** Visual and sensory inspection should be performed for the purpose of detection of health and safety hazards such as: bacteria, viruses, raw sewage, rotting wood, garbage and mustiness. Cases where a known biological agent is present and may create a serious risk to occupants or weatherization crews/contractors, the home should be deferred. Documentation should include written notes by the assessor as well as photographic evidence supporting the visual inspection.

Energy Audit

Under the DOE WAP program there are many reasons to deny a home. One of the reasons for denial is that a home may not benefit from WAP services. As described in 10 CFR §440.21 the energy audit must describe the cost effectiveness tests before materials can be installed in an eligible dwelling unit. If a home does not pass the cost effectiveness test of the energy audit the dwelling is not eligible for WAP services. In order to understand the cost effectiveness of a home, an auditor must know how to read the ECOS audit reports.

Reading the ECOS Reports

In order for the home to be eligible to receive WAP services, the whole house **"Cumulative SIR" must have an SIR of 1.0 or greater.**

The report that the auditor is most interested in is the **Energy Saving Measure Economics** table. This table can be divided into three parts:

1) Repairs needed to complete the weatherization measures
2) The Weatherization Measures
3) Health and Safety items

Repairs

Repair items should always appear at the top of the Energy Saving Measure Economics table. Repairs mean those incidental repairs necessary for the effective performance or preservation of weatherization materials. These measures do not provide energy savings and show a Cumulative SIR of 0.

Client Denials and Referrals

There will be some instances where a weatherization applicant is qualified on paper, but after the first visit the applicant has to be denied for home related reasons (for example, home was not structurally sound causing any weatherization to be ineffective). The denied Clients, however, remain in need.

The AEO has attempted to address this issue by including agencies on the Policy Advisory Council (PAC) who address housing related issues and developing a Memorandum of Understanding (MOU) with another federal program that address housing related issues. The biggest challenge will be in finding a match between those in need and those organizations capable of assisting those people. In light of that, it is recommended that "denied files" (based on physical challenges) not be "dead- ended" at the agency/program that denied them. Instead, the essential aspects of the file, and reason for denial, be made into a PDF file and emailed (along with a few photos, if appropriate) to members of the established support network (city, county, non-profits) who may be able to assist the potential client.

The existing community support network can evaluate the case and determine what action is possible and appropriate. This process may also strengthen and reinforce the existing communication paths between these officers and agencies.

Recommendation Summary: Turn files denied for physical reasons into referral *email able* files and send them to sister agencies and other non-profit organizations that possibly may be able to assist.

The following is a model walk-away policy intended to list the more common conditions and situations a Subgrantee may encounter while delivering weatherization services. This list is not intended to be all inclusive of those instances in which a Subgrantee may choose not to weatherize a unit. In some instances, corrective measures by the client may allow program services to proceed. At a minimum, the Subgrantee walk-away policy should contain the following:

A. Documentation

In the event a Subgrantee cannot or chooses not to weatherize a dwelling unit, it must notify the Client and owner/authorized agent in writing and include the following items. It is suggested that Subgrantees develop guidelines and a standardized form for such situations.

The form should include the following:

- Client's name and address, dates of the audit/assessment and when the Client was informed;
- The nature and extent of the problem(s) and how the problem(s) relate to the determination to not weatherize the unit;
- Any corrective action required before weatherization services can be initiated;
- A time limit for correcting problems so that weatherization services may be rescheduled;
- The right of appeal; and
- All correspondence justifying the decision to "walk-away" must be kept in the client file.

B. Withholding of Weatherization Services

See Weatherization Health and Safety Guidance (WPN 11-6, Effective January 12, 2011

A Subgrantee may withhold weatherization services under the following conditions:

- A dwelling unit is vacant.
- A dwelling unit is for sale.
- A dwelling unit is scheduled for demolition.
- A dwelling unit is found to have serious structural problems that would make weatherization impossible or impractical.
- A dwelling unit is deemed by the auditor to pose a threat to the health or safety of the crew or subcontractor.
- A mobile home is improperly installed (for example, inadequate supports).
- A dwelling unit is uninhabitable (for example, such as a burned out apartment).
- When there are minor children in the dwelling but no adult Client or adult agent of the Client, Subgrantee personnel must not enter the dwelling.
- An adult Client or adult agent of the Client need not be present if the estimator or crew foreman feels satisfied with a signed note from an adult Client or adult agent of the Client stating their permission to enter the dwelling occupied by the minor children.
- The Client is uncooperative with the Weatherization Subgrantee, either in demanding that certain work be done and refusing higher priority work which is needed, or by being abusive to the work crew or subcontractor, or by being unreasonable in allowing access to the unit, every attempt should be made to explain the program and the benefits of the work. If this fails, work should be suspended and the State Weatherization Office consulted.
- Obvious discrepancies are found between the information supplied by the Client on the application and observed conditions at the time of weatherization. The Subgrantee must resolve these discrepancies before weatherization work can continue.
- If, at any time prior to the beginning of work (materials installed in unit), the Subgrantee determines that the Client is no longer eligible or Subgrantee personnel believe that circumstances may have changed, the unit shall not be weatherized until updated information can be obtained from the Client.
- There are rats, bats, roaches, reptiles, insects, animals or other vermin that are inappropriately or not properly contained on the premises.
- There is health or safety hazards that must be corrected before weatherization services may begin including, but not limited to:
  - The presence of animal feces and/or other excrement,
  - Disconnected waste water pipe,
  - Hazardous electrical wiring, or
  - Unvented combustion appliances.
- There are illegal drugs or illegal activities occurring on the premises.
- The Client or owner is physically or verbally abusive to Subgrantee personnel.
- The dwelling unit or parts thereof are being remodeled and weatherization work is not coordinated with a housing rehabilitation program.
- The eligible household moves from the dwelling unit where weatherization activities and services are in progress. In such a case, the Subgrantee must determine whether to complete the work and the circumstances must be documented in the Client file.

C. Deferral conditions may include:

- 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 cost-effectively.
- The house has sewage or other sanitary problems that would further endanger the Client and weatherization installers if weatherization work were performed.
- The house has been condemned or electrical, heating, plumbing, or other equipment has been "red tagged" by local or state building officials or utilities.
- Moisture problems are so severe they cannot be resolved under existing health and safety measures and with 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 the crew, subcontractors, auditors, inspectors, or others who must work on or visit the house.
- The extent and condition of lead-based paint in the house would potentially create further health and safety hazards.
- In the judgment of the energy auditor, any condition exits which may endanger the health and/or safety of the work crew or subcontractor, the work should not proceed until the condition is corrected.
- Damming and insulating over Knob-and-Tube Wiring (KTW) is permissible under DOE WAP; however, Arkansas Building Code does not allow the installation of insulation over KTW.

WEATHERIZATION READINESS FUND (WRF) PLAN – PY2024

Arkansas will continue its WRF program with DOE and LIHEAP funds provided for the purpose of addressing the repair needs of homes when such repairs are outside the scope of weatherization and prevent the home from being weatherized until they are completed. WRF can be used only if available funds are adequate to completely resolve all issues that prevent weatherization. Funds may be braided in order to complete necessary repairs.

To be eligible for WRF services, a home must:

- Be eligible and currently waiting for or undergoing Weatherization services;
- Be deferred for weatherization until repairs are complete;
- Require repair services that are beyond the scope of Weatherization and within the scope of WRF services;

Allowable Repairs (if the condition of the house prevents weatherization):

Exterior:

1) Roof repair is defined as flashing, shingle or metal roof repairs of less than 10 square feet.
2) Roof replacement - if leak(s) cannot be repaired, the following protocols apply:
    - Justify the inability to treat as minor repair(s) by fixing leak(s),
    - Use same roof materials to replace part or all of the roof,
    - Provide justification if requesting to use different materials for roof replacement, including cost of proposed materials vs. cost if same materials were used.
3) Wall repair – as necessary to stop air leakage or install wall insulation; allowable repairs include exterior sheathing and framing.
4) Foundation or subspace repair – allowable repairs include floor joists and subfloor.
5) Resolution of drainage issues: allowable work includes landscaping; gutter repair, replacement, or installation; grading in close proximity to the perimeter of the foundation.

Interior:

1) Ceiling repair – as necessary to stop air leakage or install attic insulation.
2) Floor repair – as necessary to stop air leakage or install floor insulation.
3) Plumbing repairs – as necessary to stop water leaks that contribute to mold and moisture problems or negatively affect measures to be installed during weatherization.
4) Electrical repairs - including replacement of knob-and-tube wiring.
5) Health & Safety - cleanup/remediation of:
    - Lead paint,
    - Asbestos, confirmed or suspected, including vermiculite,
    - Mold and moisture,
    - Insect/rodent infestation and other animal nesting, and
    - Standing sewage.

Other repairs will be considered by AEO upon request by a subgrantee, such as restoring utility service needed to conduct the energy audit and complete weatherization work. In this example, LIHEAP, other community resources, and client's ability to pay for part of amount owed to utility must be considered first.

WRF may *not* be used for housing rehabilitation, restoration, remodeling, building additions, accessibility improvements, beautification, or enlarging the pressure boundary. Finish materials on an interior floor, wall, or ceiling will only be allowed if installed in a wet area, such as bathroom or kitchen.

If the homeowner (resident or landlord) has homeowner's insurance, a claim must be filed, if appropriate, prior to any WRF work being considered.

Management of WRF

1) **Allowable Costs**:

- DOE WRF (annual formula grant) – the total spent on one dwelling unit is limited to an average cost per unit (ACPU) of $12,500. AEO will not grant approval if the total cost for a particular dwelling unit will cause the subgrantee's ACPU to be exceeded.

- LIHEAP – minor repairs costing up to $600 for each repair are allowable to enable installation of energy conservation or health and safety measures. There is no limit as to how much may be spent on one dwelling unit as long as the limit for each repair is not exceeded.

- DOE WRF (Infrastructure grant) – no WRF funds are available as part of the Infrastructure grant.

2) **Braiding WRF funds:**

- DOE WRF (annual formula grant):

  - DOE Infrastructure funds - it is allowable to use DOE WRF for dwelling units that will be weatherized with DOE Infrastructure funds. ***This is the only braiding of funds allowed with DOE Infrastructure and DOE annual formula grant funds.***
  - LIHEAP Readiness funds - it is allowable to braid DOE WRF and LIHEAP Readiness funds on one dwelling unit as long as each repair is completed with a separate funding source. Due to different rules for spending DOE WRF and LIHEAP Readiness, these funding sources cannot be braided on a single repair/the same repair.
  - Other funds - it is allowable to braid DOE WRF with funds outside of Weatherization, such as HUD, USDA Rural Development, or non-federal sources to make a dwelling unit weatherization ready.

- LIHEAP Readiness Funds –

  - DOE Infrastructure grant – it is allowable to braid with DOE Infrastructure grant.
  - DOE annual formula grant – it is allowable to braid with DOE annual formula grant.
  - Other funds – it is allowable to braid DOE WRF with funds outside of Weatherization, such as HUD, USDA Rural Development, or non-federal sources to make a dwelling unit weatherization ready.

- Braiding DOE WRF and LIHEAP Readiness funds - When DOE WRF and LIHEAP Readiness funds are braided on the same dwelling unit, during subsequent Weatherization, costs must also be assigned to DOE (annual formula grant or Infrastructure grant) ***and*** LIHEAP. Each funding source must be assigned to one or more whole measures (energy conservation and/or health and safety).

3) **AEO prior approval** is required on all WRF work before a subgrantee accrues any expenses. All requests for prior approval for WRF work should be submitted to the AEO WAP program manager and technical coordinator. Approvals will be based on ~~a~~ description, justification, and the estimated costs of the proposed WRF measure(s). Required documentation includes:
    - Proof of household eligibility (within the last 12 months),
    - Deferral form (WAP 35),
    - Photos, labeled and dated, of all areas needing the proposed repairs,
    - ~~e~~ Itemized estimate(s),
    - Request for a Section 106 Review submitted to the State Historic Preservation Office (SHPO), if necessary, and the response provided to AEO.
    - Homeowners insurance claim and response, if applicable.

4) **Use of Contractors**: it is allowable to use:
    - weatherization contractors,
    - contractors working in other housing programs operated by the subgrantee, or
    - contractors procured for each dwelling unit repaired, which necessitates soliciting three (3) bids if cost is $20,000 or more.

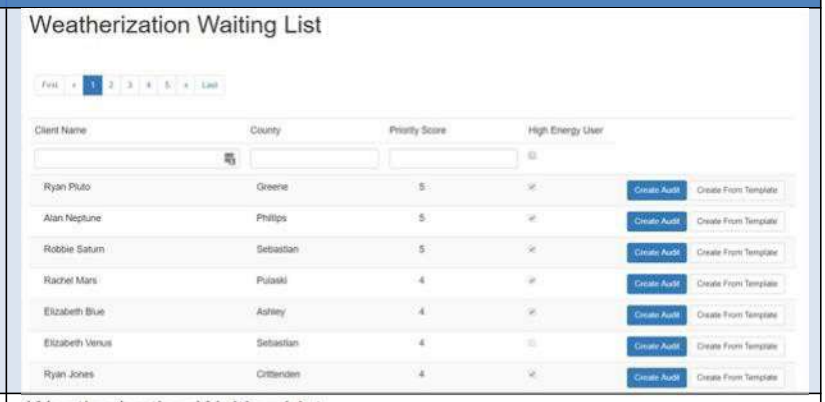
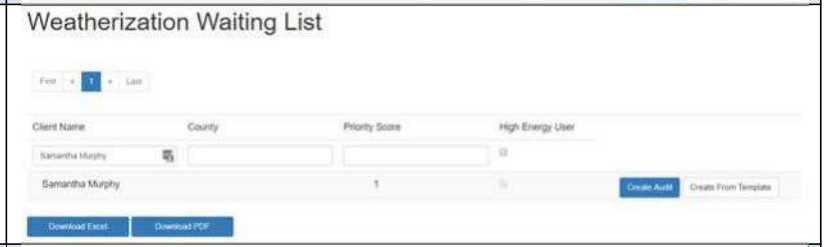
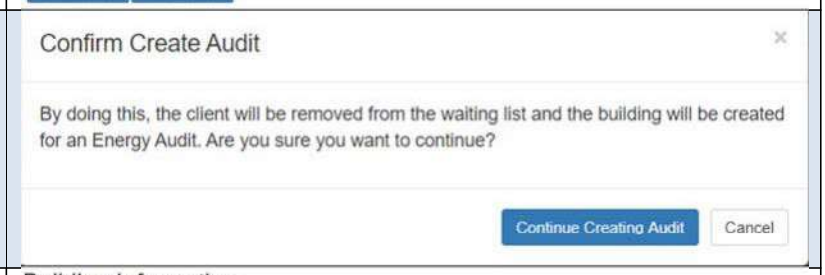
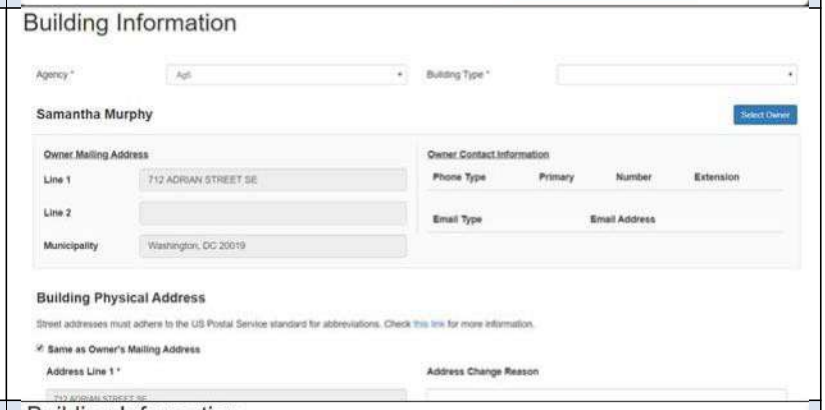
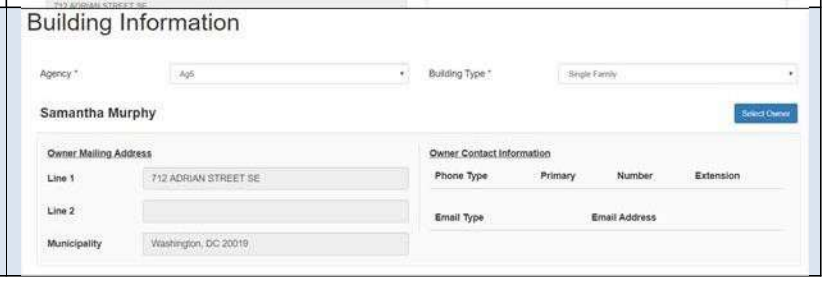
5) Timeframes:
    - Weatherization must begin within sixty (60) days after all allowable WRF repairs are completed and inspected.
    - In PY 2024 (July 1, 2024 to June 30, 2025), all homes repaired with DOE WRF funds and weatherized with DOE PY 2024 annual formula grant funds, must be completed by June 30, 2025, and submitted for billing with the June 2025 invoice, due to the end of the three-year grant cycle on June 30, 2025.

6) **AEO will monitor** by physical inspection and review of case files (desk monitoring). At least one weatherized dwelling unit with WRF work will be inspected each quarter per subgrantee. 100% of case files with WRF will be reviewed (desk monitored) each month during the invoice approval process.

7) **Documentation required**:
In client files:
    - Deferral form (WAP 35).
    - Before and after photos – labeled and dated.
    - Selection of contractor.
    - Estimates (up to 3).
    - Final invoices.
    - Client satisfaction form (WAP 09b).
    - Proof of subgrantee's inspection of WRF work.
    - Homeowners insurance claim and response, if applicable.
    - SHPO review request and response, if applicable.

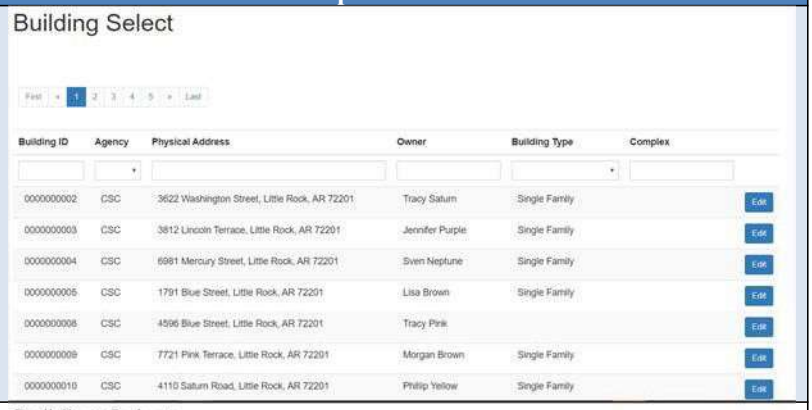
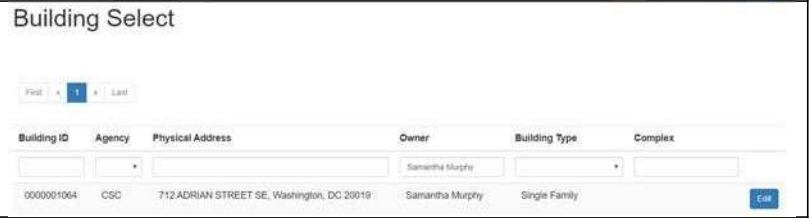
Reporting:
    - WAP 04, monthly
    - Deferral Tracking spreadsheet, submitted monthly with DOE invoice, if the invoice includes WRF expenses, and completed cumulatively for each Program Year. Must be included in Billing Files in ECOS with monthly billing.

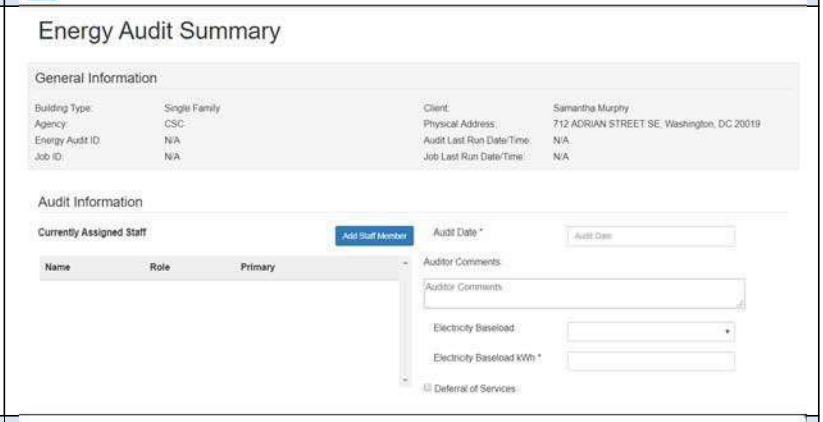
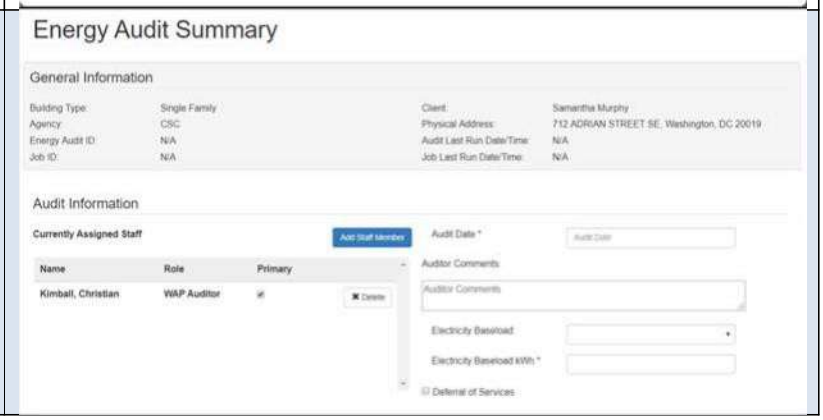
1.1 How to Enter Building Information

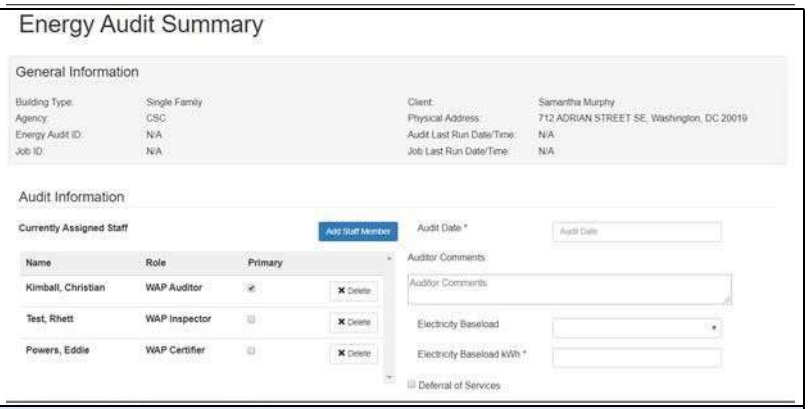
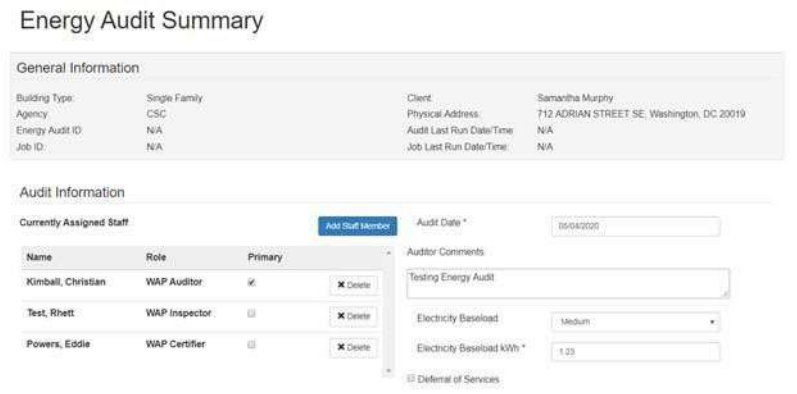
#	Action	
1	Select the **Weatherization > Waiting List** menu item from the **Navigation Menu** on the left.	
2	Enter the name of the client in the **Client Name** filter.	
3	Click the **Create Audit** button.	
4	Click the **Continue Creating Audit** button.	
5	Select the **Building Type** of the dwelling.	

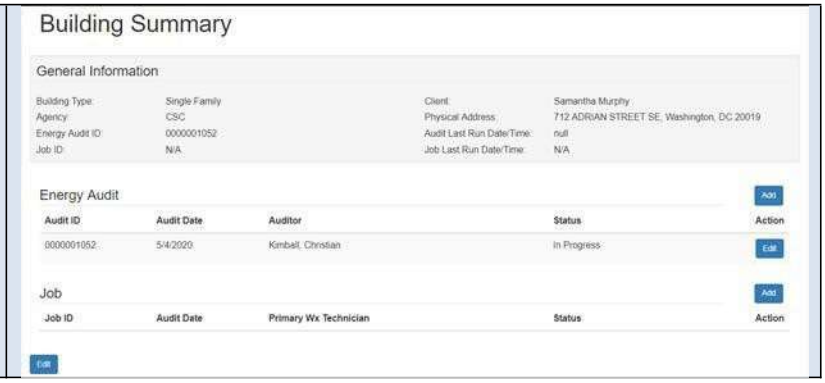
6	Scroll to the bottom of the page and enter the Building Age, Occupant Count, Conditioned Space ft², Building Condition, Number of Stories, Building Volume ft³, Construction Type, and Number of Bedrooms. **Definitions:** Occupant Count – this amount used to determine the amount of ventilation required to meet ASHRAE 62.2 2016 requirements. Conditioned Space ft/2 – is the calculated amount of square footage that is intentionally conditioned by the primary heating system.	
7	Click the **Save** button.	See PG. 37 and 38 of this manual for information regarding determining whether attics, basements, and foundations should be included in the total conditioned floor area of the home. Also refer to IRC 325.6.

1.2 How to Begin an Energy Audit

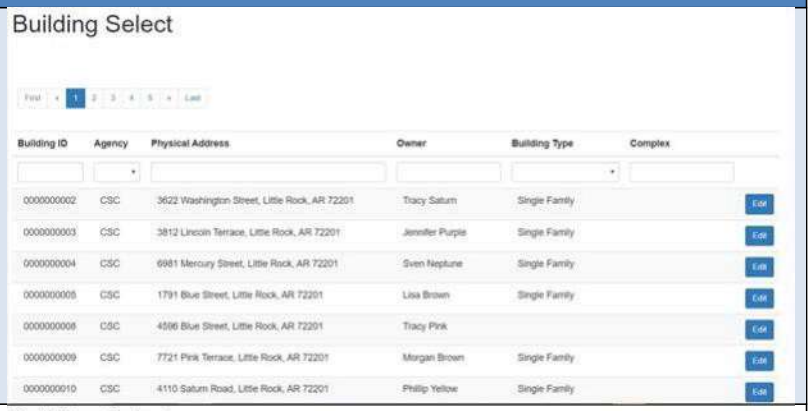
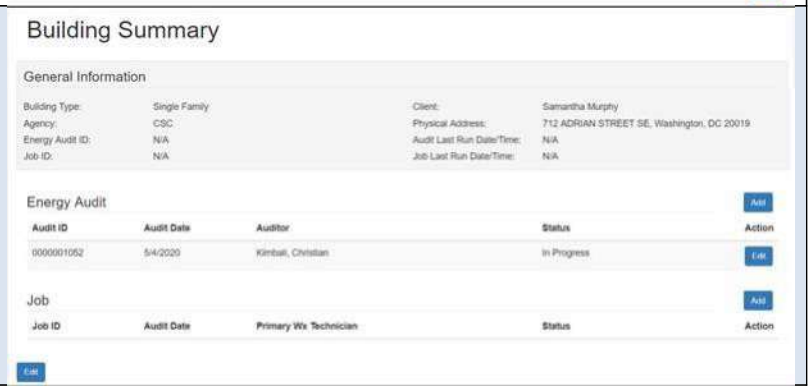
#	Action	Expected Result
1	Select the **Weatherization > Buildings > Building Select** menu item from the **Navigation Menu** on the left.	
2	Enter the name of the client in the **Owner** filter.	

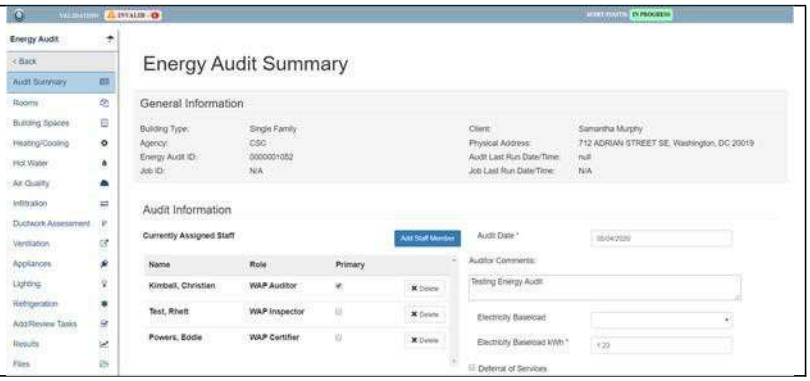
3	Click the **Edit** button.	
4	Click the **Add** button for *Energy Audit*.	
5	Click **Add Staff Member** button.	
6	Select the **Staff Member** from the first drop-down and the **Role** from the second drop-down.	
7	Click the **Add** button.	

8	Repeat steps 5-7 for each staff member to assign to the audit.	
9	Enter the **Audit Date** and any **Auditor Comments**.	
10	Select an **Electricity Baseload.** **Definitions:** **Electricity Base Load** – This value is the energy auditor's estimate of the specific electric base load of the building based on existing conditions observed during the time of the audit. Auditor's must select an electric base load preset value of low, medium or high that is used to calculate the design heating and cooling load of the building. The selected value is used to: Calculate the hourly internal gain from electrical appliances. The higher the electric base load preset, the more internal heat gain from the existing appliances. This will result in an adjusted hourly internal temperature due to increased heat gain which will result in less demand overall. Click the **Save** button at the bottom of the page.	 **This is energy not used for space conditioning** Bill Analysis: Review previous 12 months; average three lowest months to get the monthly baseload (remaining costs of other 9 bills are space-conditioning costs). Multiply by 12 to estimate the annual base load usage. Take the annual baseload usage and divide it by the total annual kwh consumption on all 12 bills. The result will be a percentage used to pick between low(0.72-1.22) medium(1.23-1.70), or high(1.71 or higher).

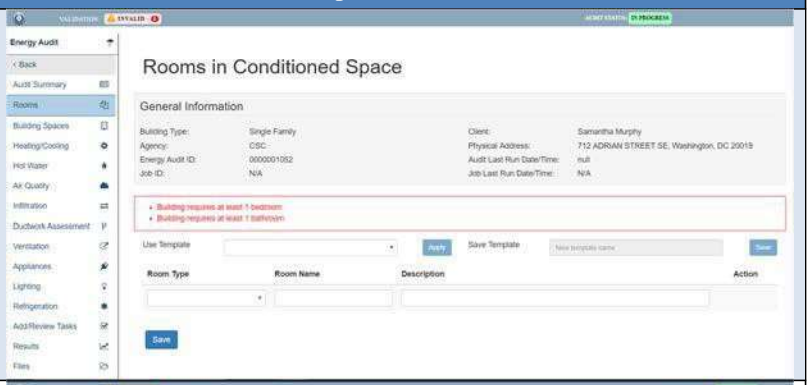
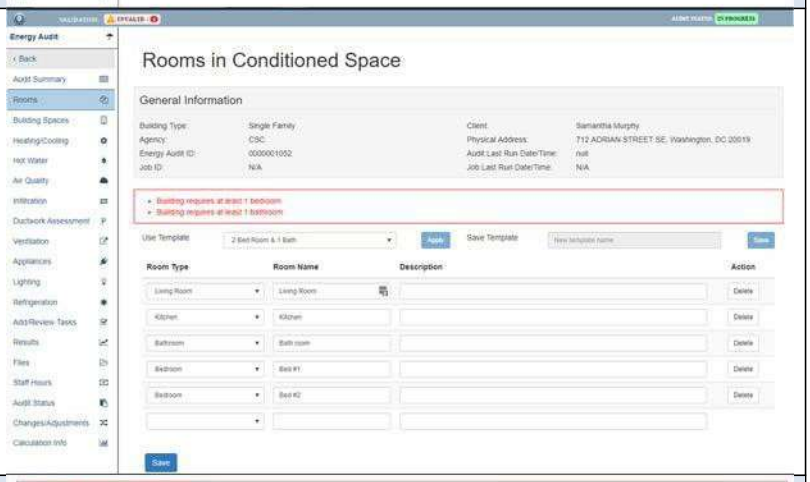
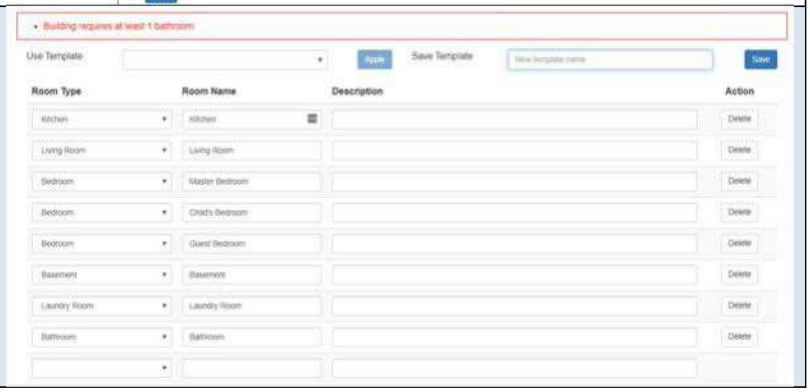
1 1		

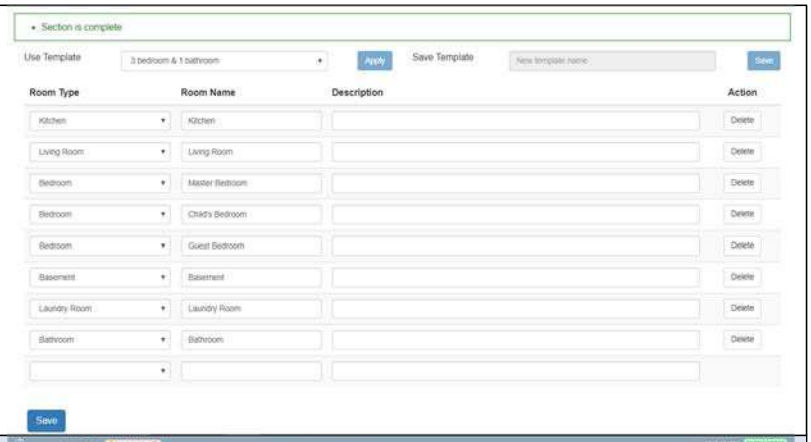
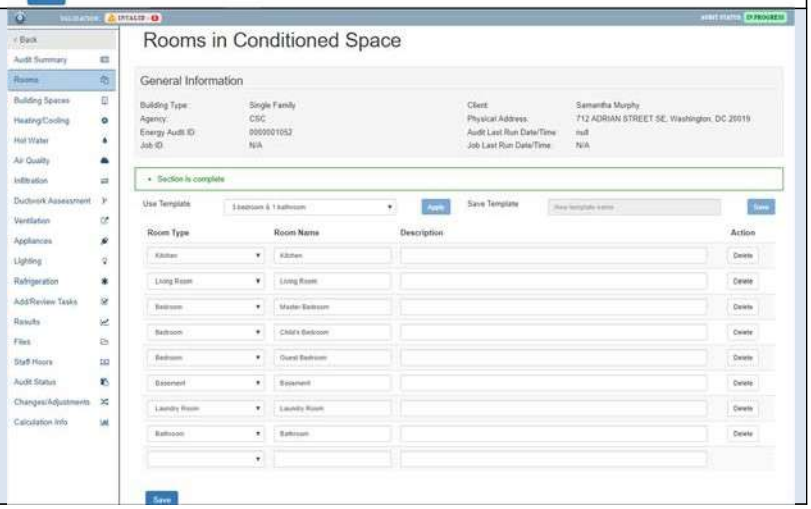
1.3 How to Navigate to An Energy Audit

#	Action	Expected Result
1	Select the **Weatherization > Buildings > Building Select** menu item from the **Navigation Menu** on the left.	
2	Enter the name of the client in the **Owner** filter.	
3	Click the **Edit** button.	

4	Click the **Edit** button for the *Energy Audit*	

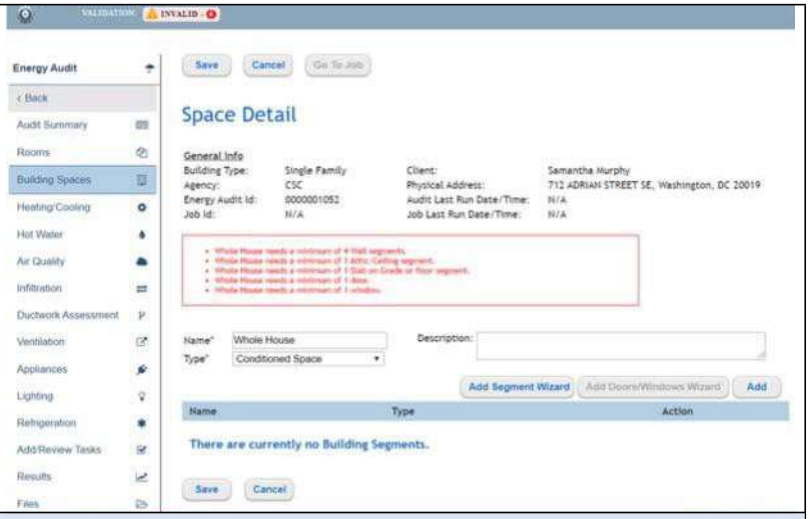
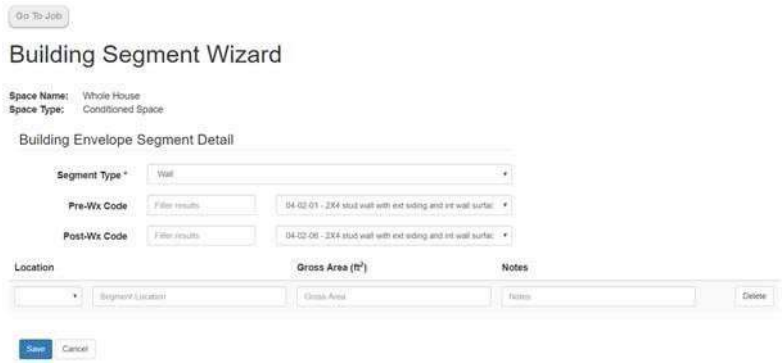
1.4 How to Enter Rooms

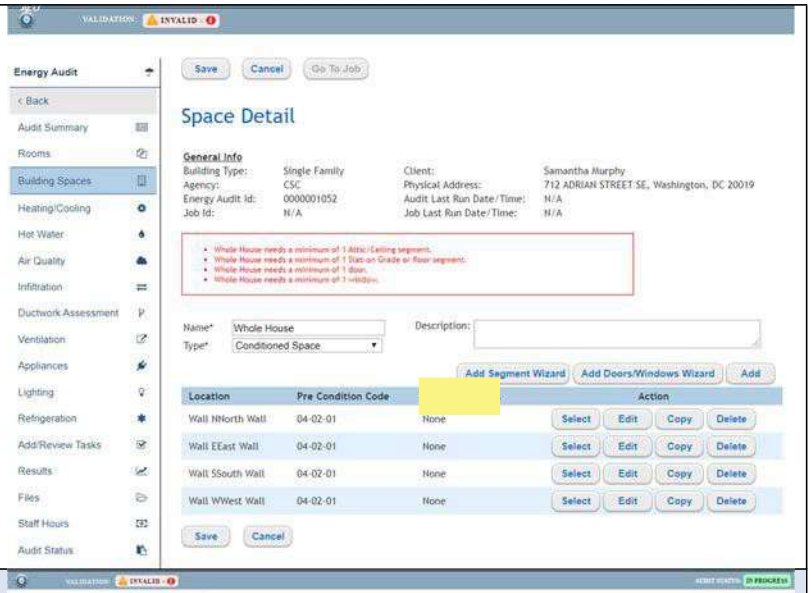
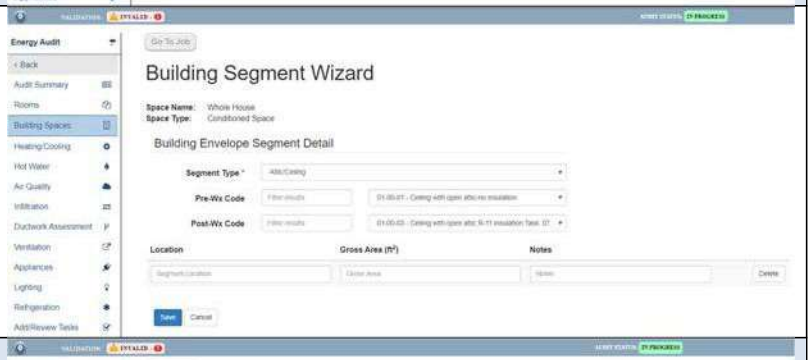
#	Action	Expected Result
1	Select the **Rooms** menu item from the menu item from the **Navigation Menu** on the left.	
2	Select a building room template from the **Use Template** drop-down and click the **Apply** button.	
3	Alternatively, you can individually enter each **Room Type** and **Room Name.**	

4	To save room selections as a template, enter a **New Template Name** and click the **Save** button next to that textbox.	
5	Click the **Save** button at the bottom of the page.	

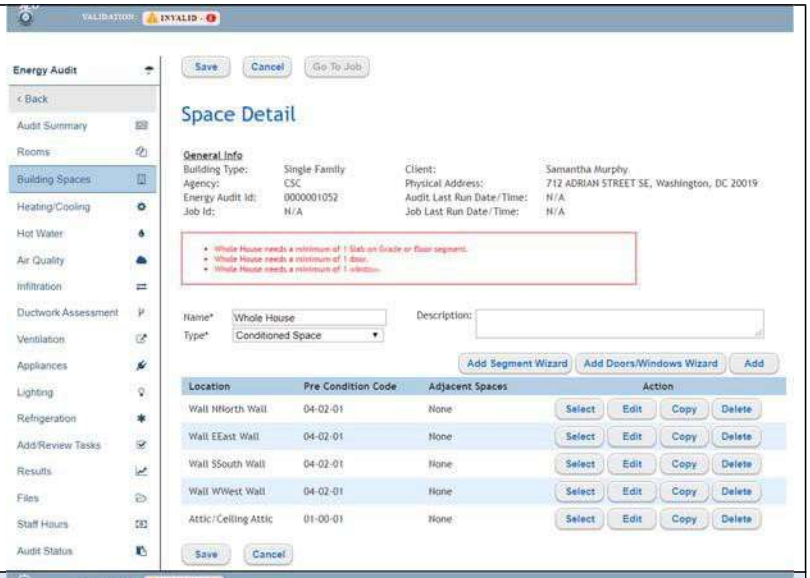
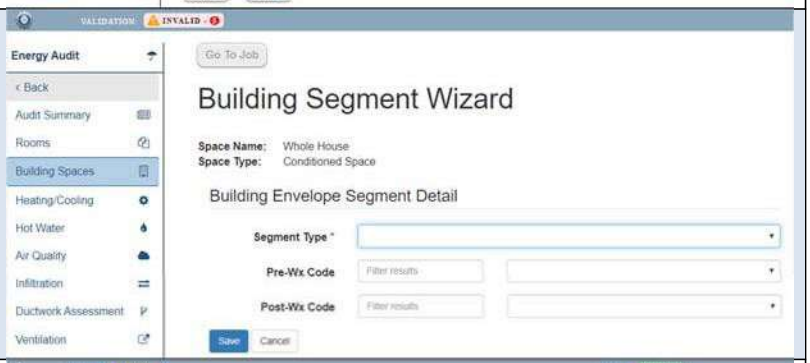
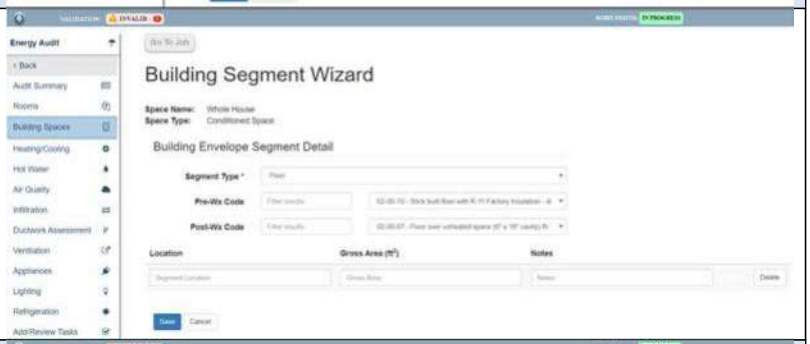
1.5 How to Enter Building Segments

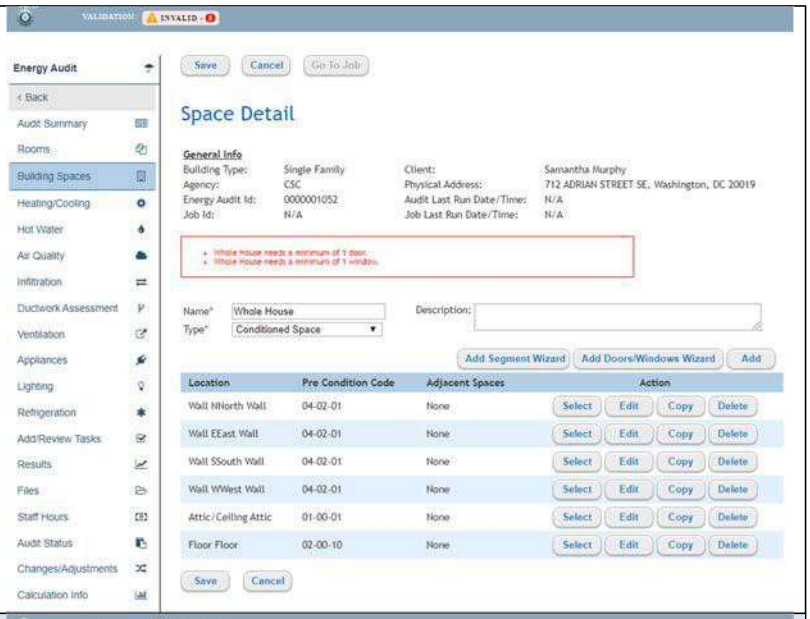
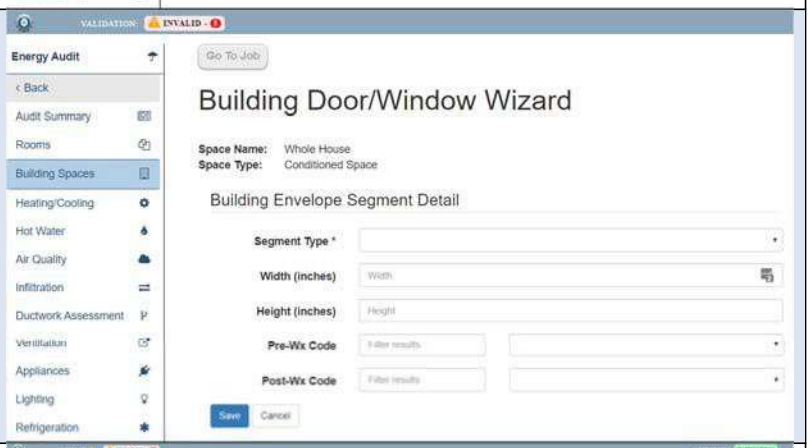
#	Action	Expected Result
1	Select the **Building Spaces** menu item from the **Navigation Menu** on the left	

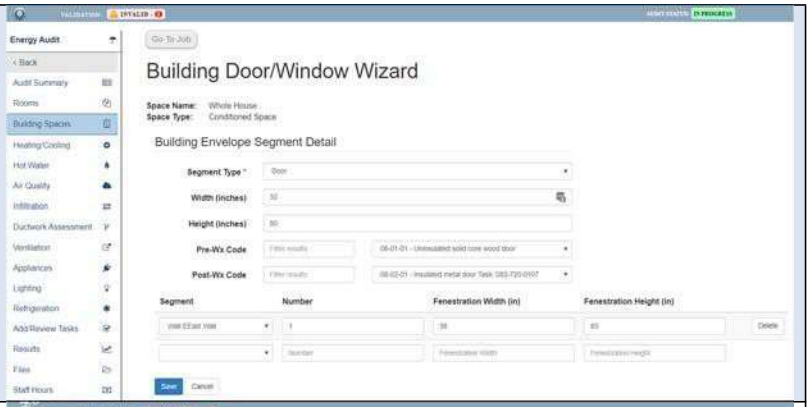
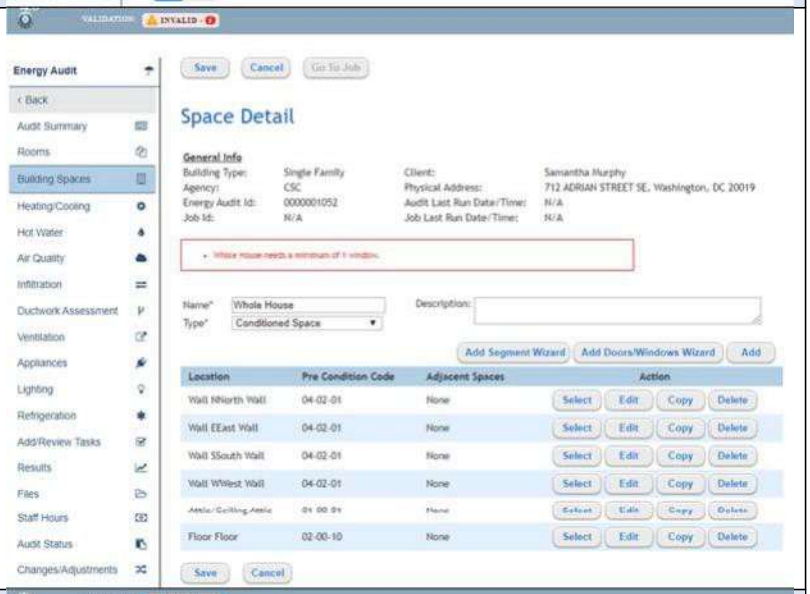
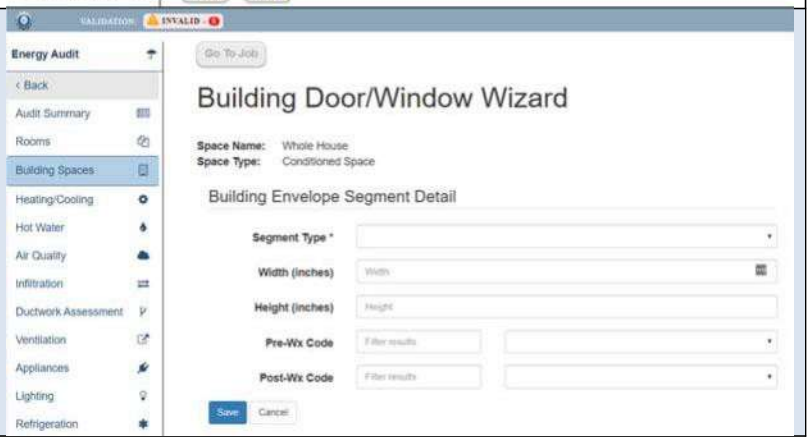
2	Click the **Edit** button for the *Whole House (Conditioned Space)*	
3	Click the **Add Segment Wizard** button.	
4	Select *Wall* for the **Segment Type, Pre-Wx Code,** and **Post-Wx Code** ***Definitions*** ***Pre-Wx Code*** *– Pre-Wx Code is the building segment's existing construction type, insulating properties and R-value.* ***Post-Wx Code*** *– Post-Wx Code is the building segment's estimated post weatherization construction type, insulating properties and R-value.*	
5	Enter the **Location** and **Gross Area (ft²)** of each wall	

	Click the **Save** button at the bottom of the page.	
6	Click the **Add Segment Wizard**	
7	button. Select *Attic/Ceiling* for the	
8	**Segment Type, Pre-Wx Code,** and **Post-Wx Code** Enter the **Location** and **Gross**	
9	**Area (ft²)** of the attic/ceiling	

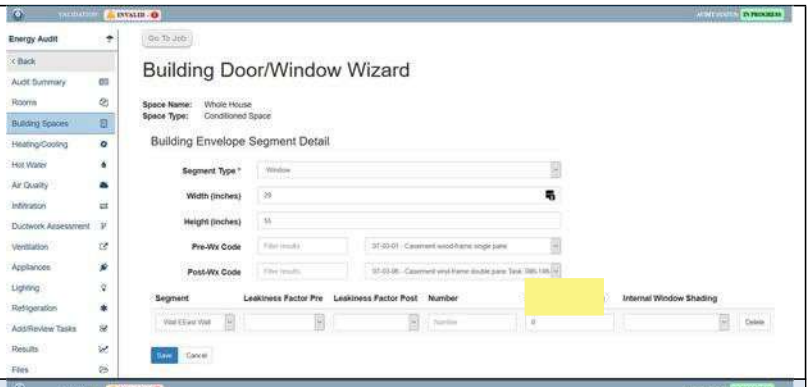
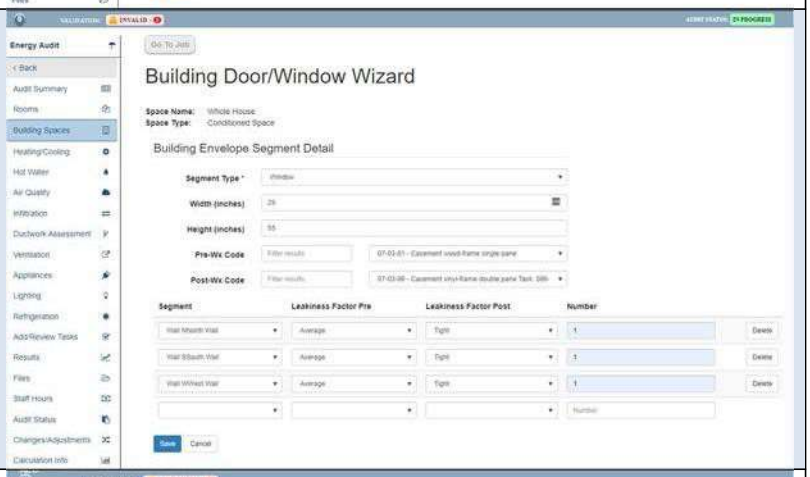
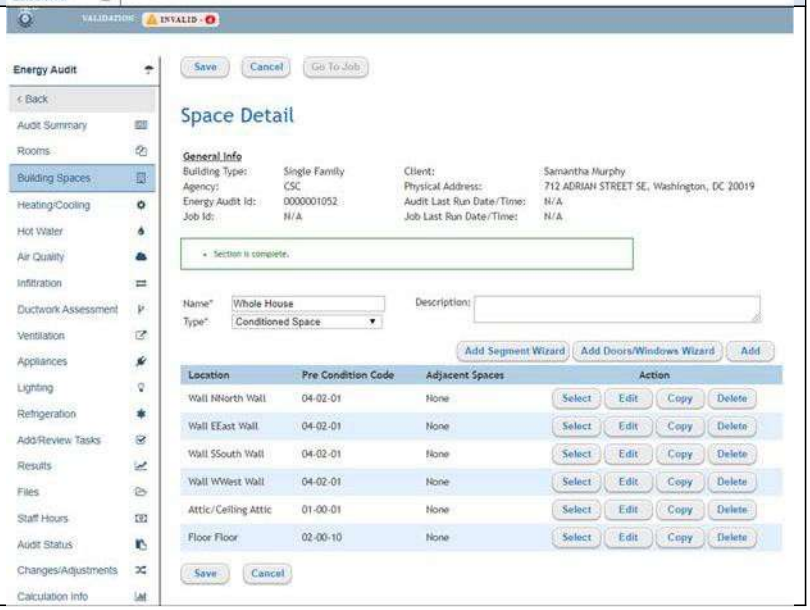
*Adjacent space is an area or room within a building that is not being heated or cooled, that has no fixed opening *directly* into an adjacent conditioned space, or which is outside of the building envelope. The unconditioned adjacent space is connected to the conditioned space by a *shared* segment like a wall or door or a floor.(garage, Must have 6 complete segments- floor roof and 4 walls – at least 1 of the walls will be attached to envelope-.

10	Click the **Save** button at the bottom of the page.	
11	Click the **Add Segment Wizard** Button.	
12	Select *Floor* or *Slab on Grade* for the **Segment Type, Pre-Wx Code,** and **Post-Wx Code**	
13	Enter the **Location** and **Gross Area (ft²)** of the segment.	

14	Click the **Save** button at the bottom of the page.	
15	Click the **Add Doors/Windows Wizard** button.	
16	Select *Door* for the **Segment Type**. Enter the **Width (inches)** and **Height (inches)** of the door(s) Select the **Pre-Wx Code** and **Post-Wx Code** of the door(s)	

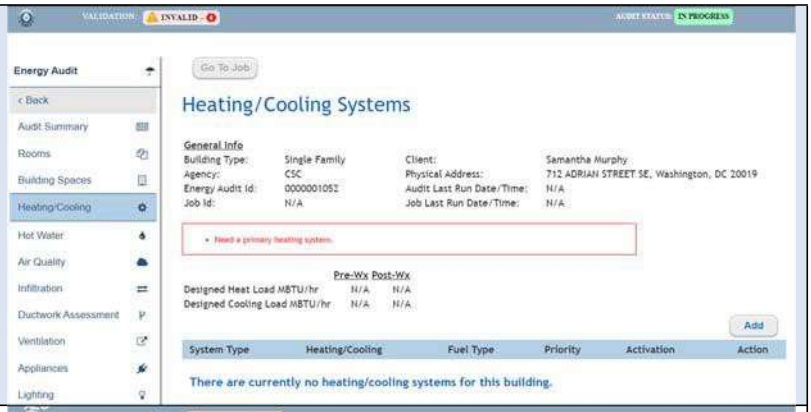
17	Select the wall **Segment** the door(s) is/are on**.** Enter the **Number** of doors on the segment. Enter the **Fenestration Width (in)** and **Fenestration Height (in)** of the door(s). Repeat this for each door segment.	
18	Click the **Save** button.	
19	Click the **Add Doors/Windows Wizard** button.	

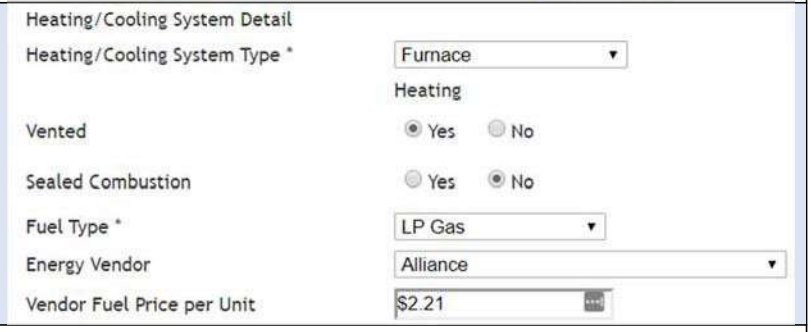
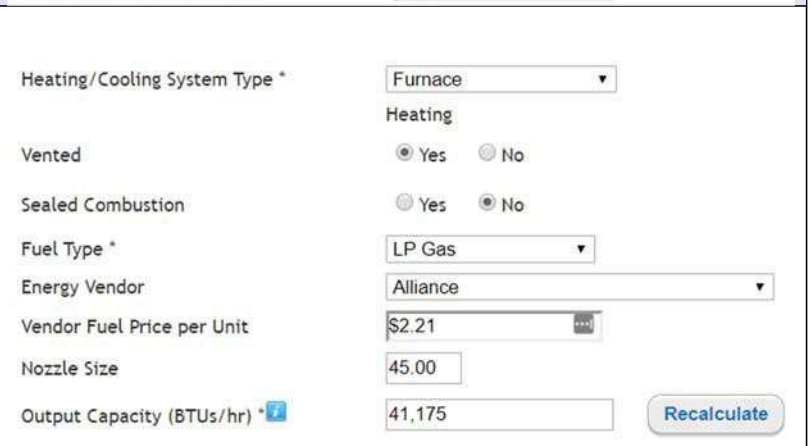
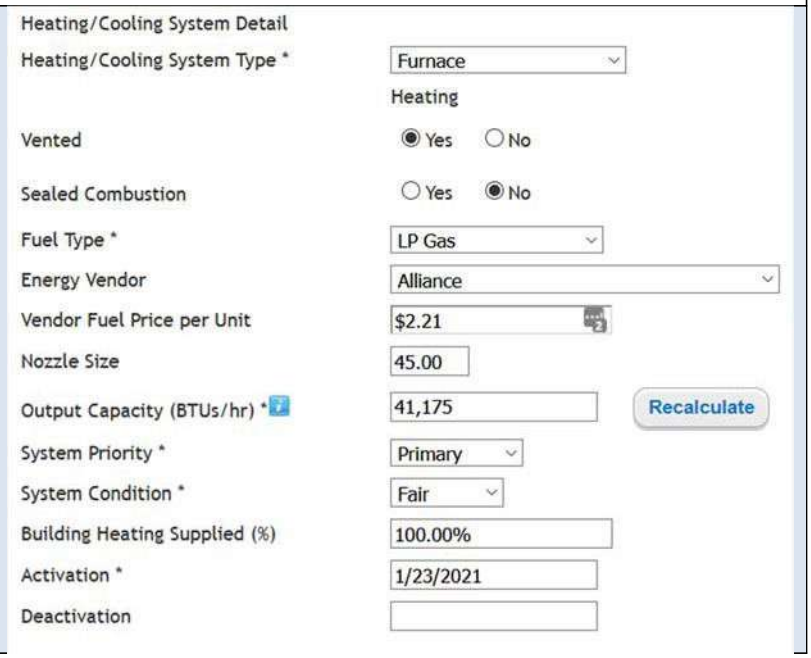
Select *Window* for the **Segment Type**

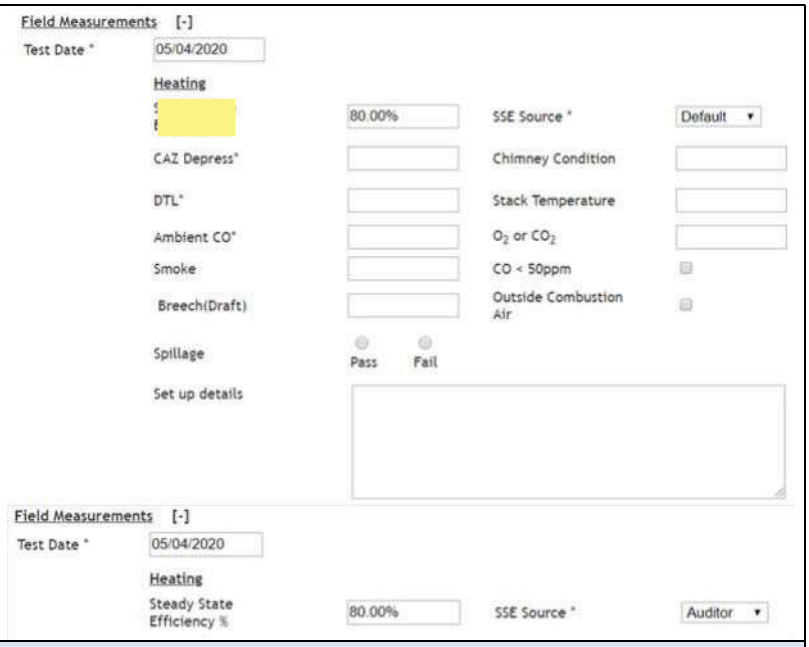
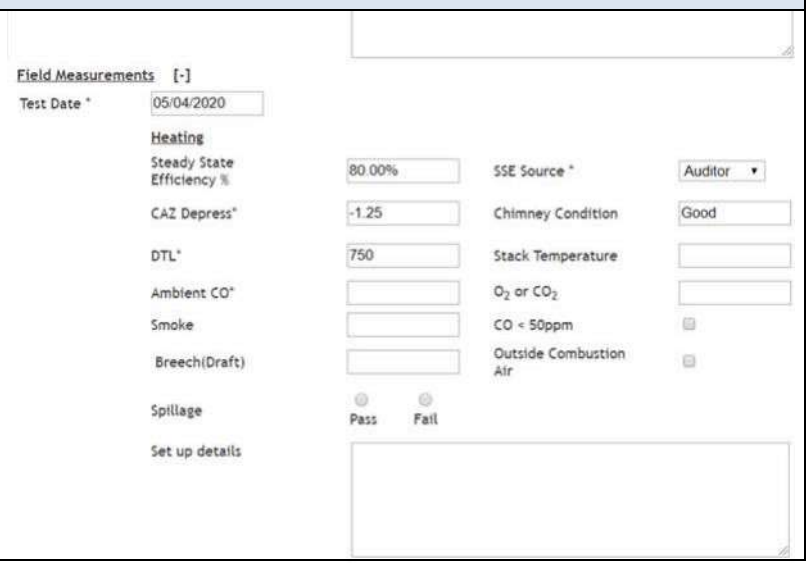
`20	Enter the **Width (inches)** and **Height (inches)** of the window(s) Select the **Pre-Wx Code** and **Post-Wx Code** of the window(s) Select the wall **Segment** the window(s) is/are on**.**	
21	Select the **Leakiness Factor Pre** and **Leakiness Factor Post** of the window(s). Enter the **Number** of windows on the segment. Repeat this for each window segment. Click the **Save** button at the bottom of the page.	
22	SEE page 36 of this manual For determining shading Percentages.	

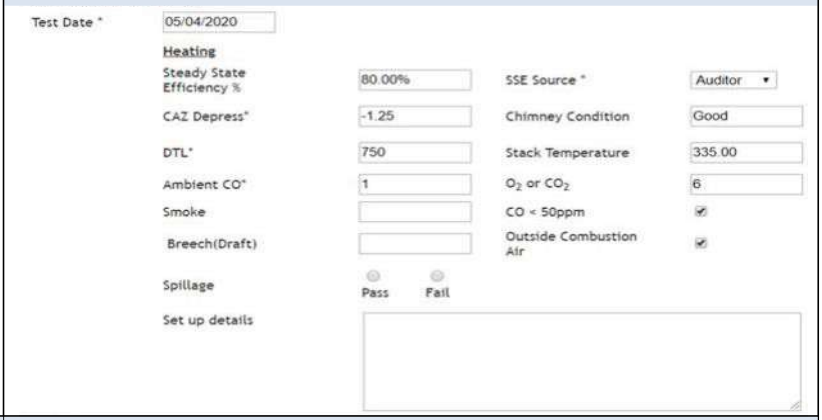
1.6 How to Enter Heating, Cooling, and Hot Water Systems

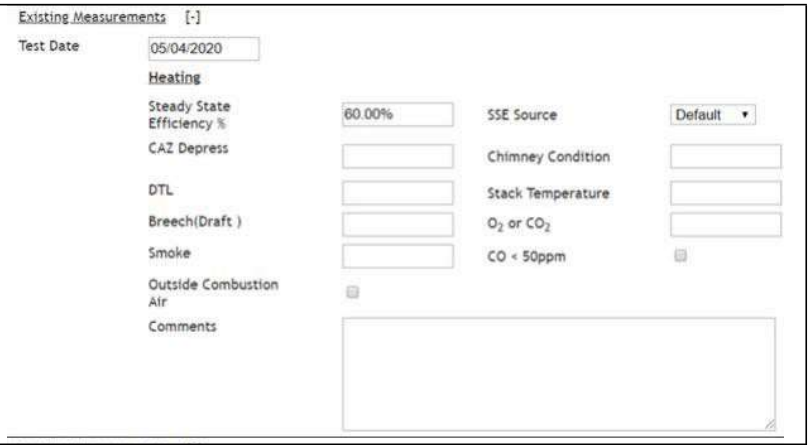
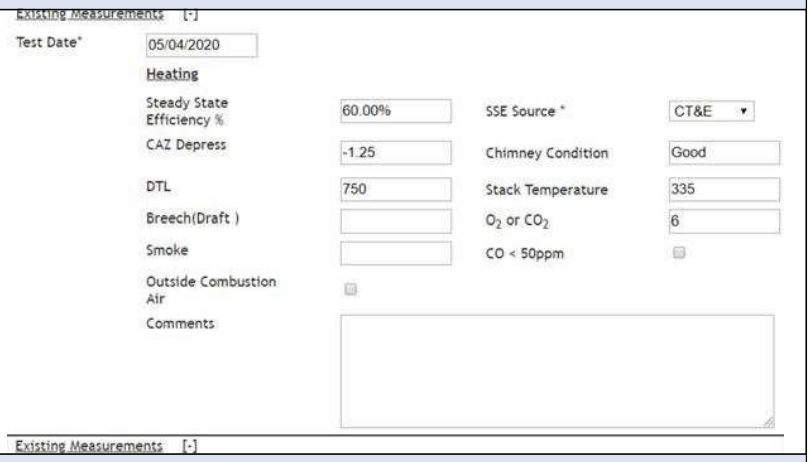
#	Action	Expected Result

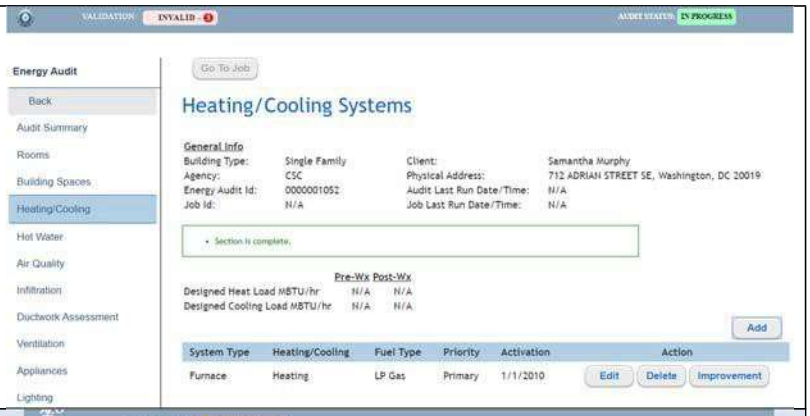
1	Select the **Heating/Cooling** menu item from the **Navigation Menu** on the left.	
2 .	Click the **Add** button. If the Output Capacity is not printed on the manufacturer's tag: Find the BTU input rating (furnace size) and AFUE. Divide the AFUE by 100 to convert it to a percentage. Multiply the AFUE percentage by the BTU input rating = OUTPUT CAPACITY. ***Example:*** **AFUE = 90% and furnace size is 100,000 BTU.** **AFUE 90/100 = 0.90** **0.90 x 100,000 = 90,000 BTU output capacity**	
/	Select the primary heating system **Heating/Cooling System Type**. **AFUE** – Total Heat Output Divided By Total Energy Input 90,000 output/100 = 0.90	

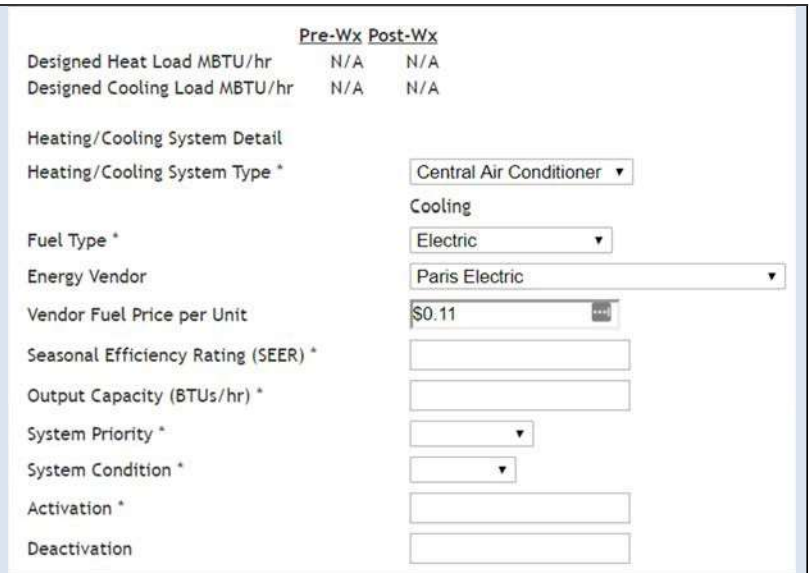
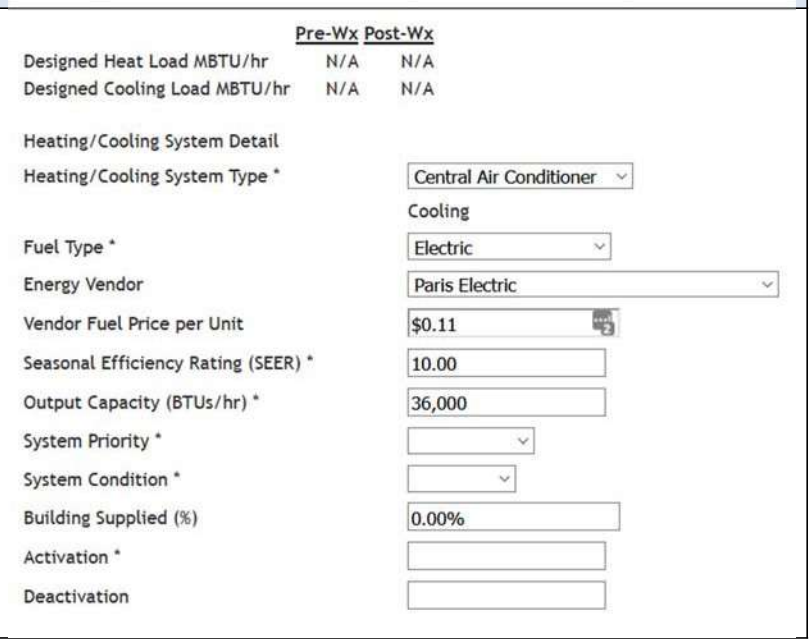
4	Select whether the system is **Vented** to the outside and whether the system has **Sealed Combustion**	
5	Select the system **Fuel Type** and **Energy Vendor**.	
6	Enter the **Nozzle Size** and click the **Recalculate** button (if applicable). *Note... for electric system that provides Kw on the data plate, multiply that number times 3.142 to derive btus to enter **Output Capacity**.* ***Definitions*** ***Nozzle** – A nozzle is a device designed to control the direction or characteristics of a* fluid *flow (especially to increase velocity) as it exits (or enters) an enclosed chamber*	
7	Select the **System Priority, System Condition,** and **Activation** date	

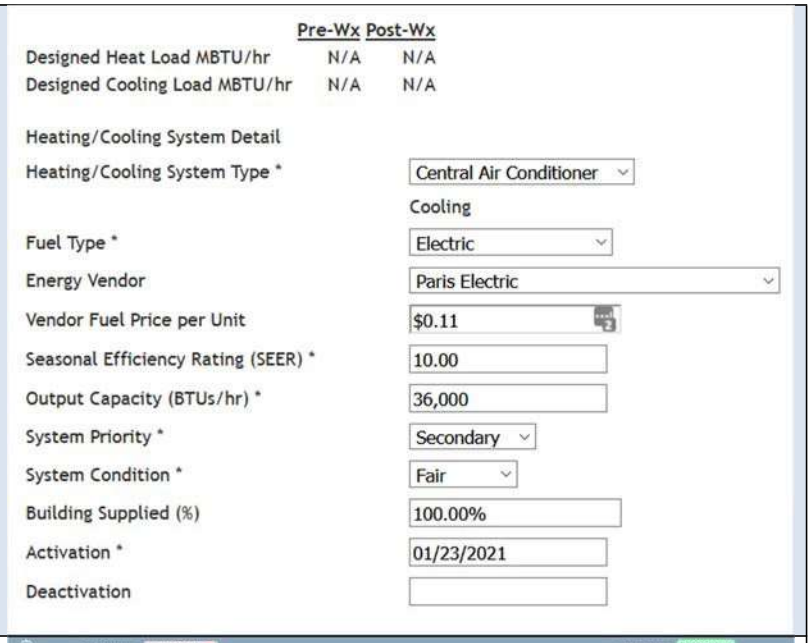
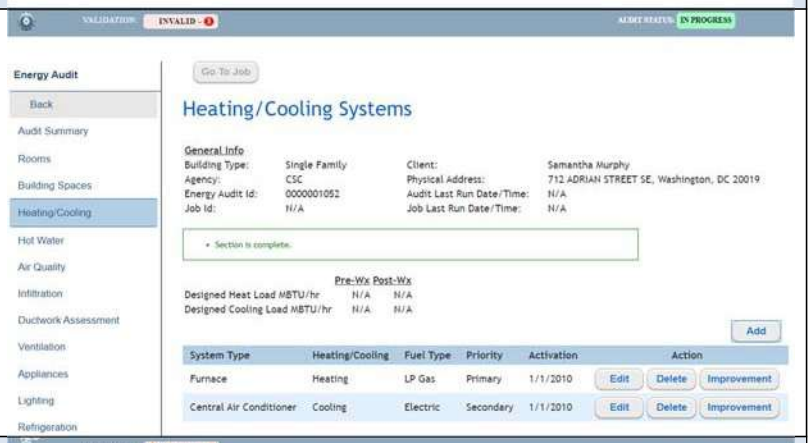
8	Enter the **Test Date** and **Steady State Efficiency** of the unit under *Field Measurements* ***Definitions*** ***Field Measurements*** *– Field Measurements are the atmospheric conditions at the time of the inspection, the specifications of the unit from the data plate when the unit was built, and the readings taken from the equipment by the technician during field testing.* This entry shall be SSE or the original AFUE of the heating system. No other inputs are allowed if using DOE funds, even if the appliance is inoperable (per WPN 23-6, FAQ)	
9	Select the **SSE Source** and enter **CAZ Depress.** ***Definitions*** ***CAZ Depress*** *– Combustion Appliance Zone Depressurization Calculation. (Outside temperature divided by 40, subtract 2.75 from that total)*	
10	Enter the **Chimney Condition** and **DTL** ***Definitions*** ***DTL*** – Depressurization Tightness Limit. This is value calculated by the user outside of ECOS based on the existing combustion appliances in the home. The DTL that is used in this calculation is brought over from the primary heating systems info screen.	

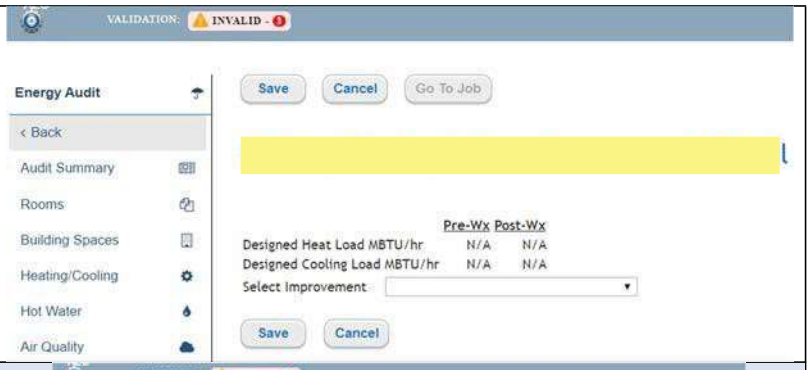
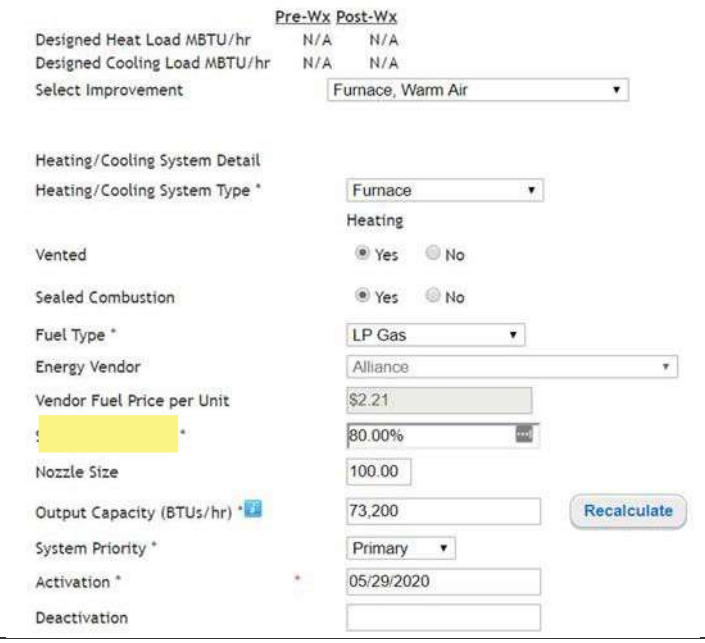
11	Enter the **Stack Temperature** at steady state, **Ambient CO**, and **O_2 or CO_2**	
12	Check the applicable checkboxes for **CO < 50 ppm** and **Outside Combustion Air**	
	Select the radio button for the results of the **Spillage** test.	

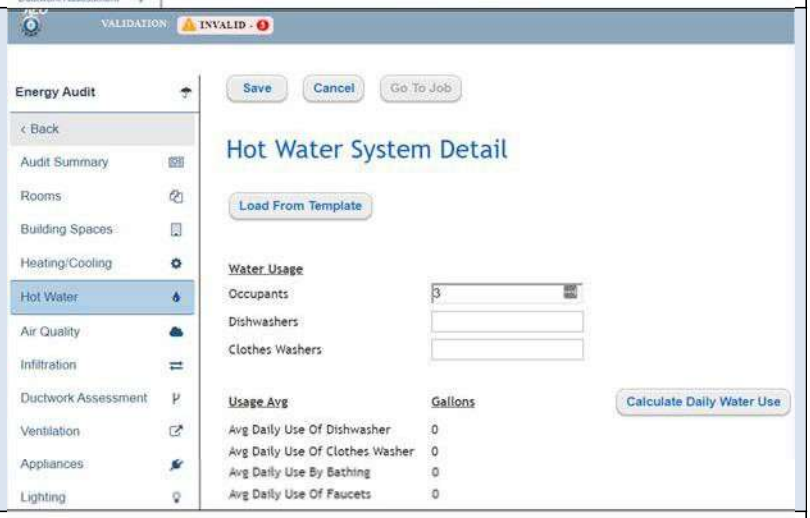
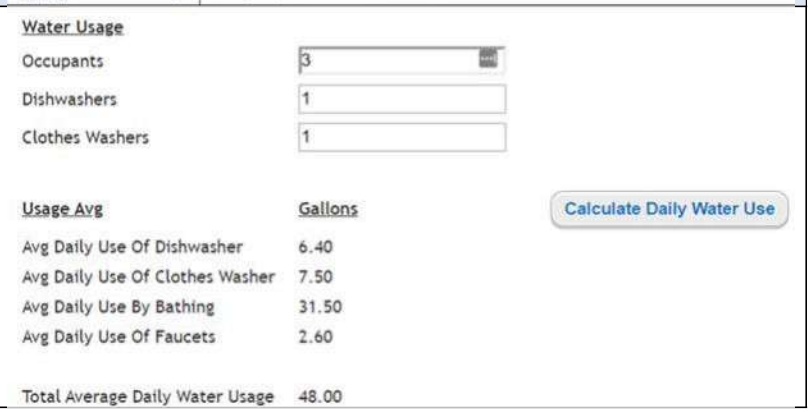
14	Enter the **Test Date** and **Steady State Efficiency** of the unit under *Existing Measurements* ***Definitions*** ***Existing Measurement*** *– Existing Measurements relate to the actual conditions of the unit (specifically SSE%) as noted during testing.*	
15	Select the **SSE Source**. Then enter the **CAZ Depress** and **Chimney Condition**	
16	Enter the **DTL**, **Stack Temperature,** and **O_2 or CO_2**	
17	Check the applicable checkboxes for **CO < 50 ppm** and **Outside Combustion Air**	

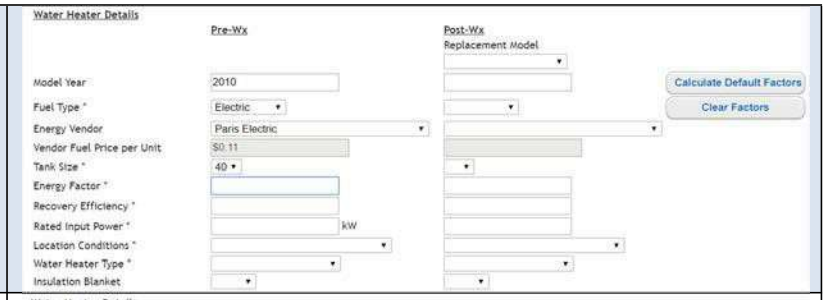
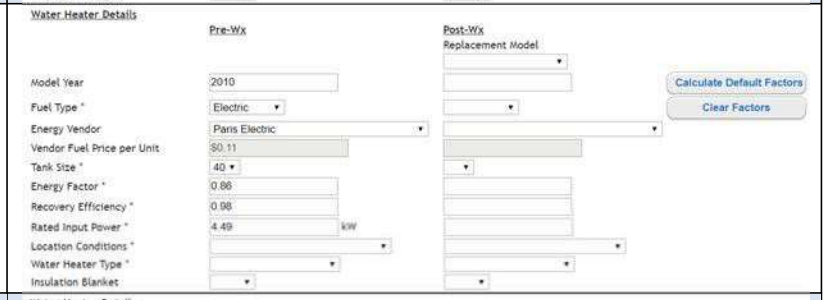
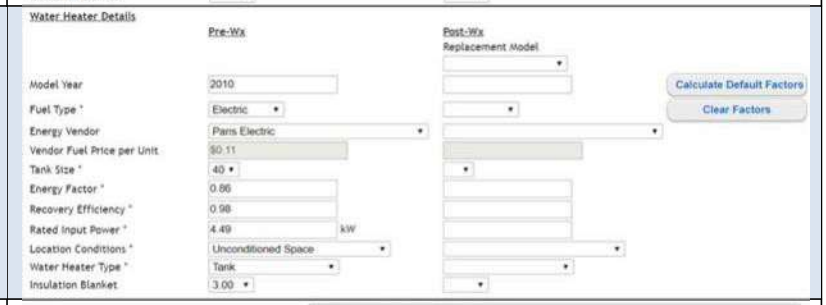
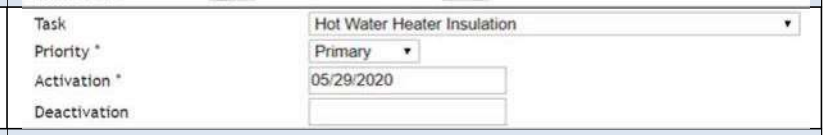
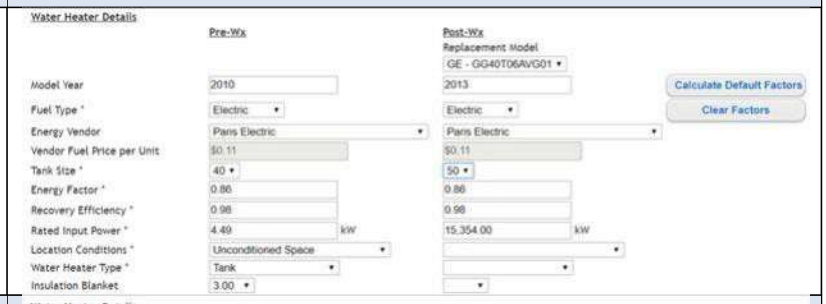
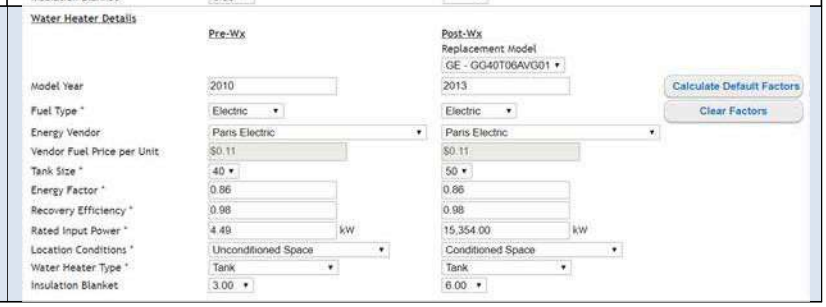
18	Click the **Save** button at the bottom of the page.	
19	If there is a cooling system, click the **Add** button	
20	Select the primary cooling system **Heating/Cooling System Type**.	

21	Select **Fuel Type** and **Energy Vendor**	
21	Enter **Seasonal Efficiency Rating** and **Output Capacity**	

22	Select the **System Priority** and **System Condition** and enter the **Activation** date.	
23	Click the **Save** button at the bottom of the page.	
24	If a Heating/Cooling System requires improvement, click the **Improvement** button for that system.	

25	Click the **Add** button above *Improvement*	
26	Select an improvement from the **Select Improvement** drop-down.	
27	Fill out all required field (indicated by *) See Page 47 of this manual for evaluating heating/cooling.	

	Click the **Save** button at the bottom of the page. *Note: If improvements are required for other Heating/Cooling Systems entered, Select the **Heating/Cooling** menu item from the **Navigation Menu** on the left and repeat steps 24-28.*	
29	Select the **Hot Water** menu item from the **Navigation Menu** on the left.	
30	Click the **Add** button.	
31	Enter the number of **Dishwashers** and **Clothes Washers** and click the **Calculate Daily Water Use** button.	

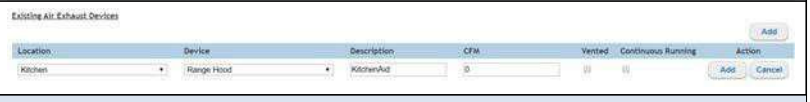
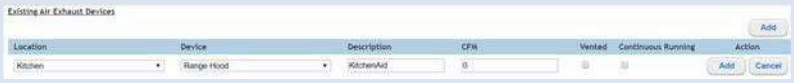
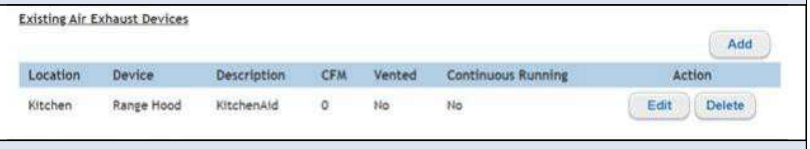
32	Enter the *Pre-Wx* **Model Year, Fuel Type, Energy Vendor,** and **Tank Size** *Note: for tankless water heating appliances select the blank above 30 for **Tank Size**.*	
33	Click the **Calculate Default Factors** button.	
34	Enter the *Pre-Wx* **Location Conditions, water heating appliance Type,** and **Insulation Blanket** R-value	
35	Select the **Task, Priority,** and **Activation** date of the task (if applicable)	
36	If the water heating appliance is gas fired, enter the **Pre-Wx Measurements** Enter the *Post-Wx* **Replacement Model, Model Year, Fuel Type, Energy Vendor,** and **Tank Size**	
37	Select the *Post-Wx* **Location Conditions, water heating appliance Type,** and **Insulation Blanket** R-value	

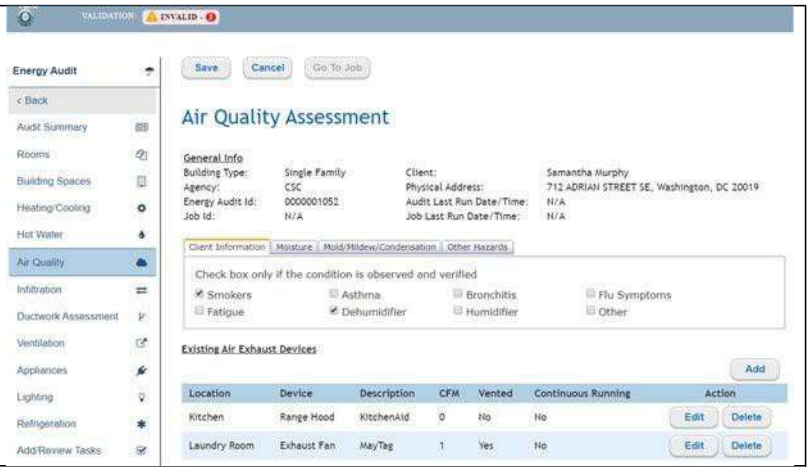
For typical electric storage water heating appliances, energy factors range from 0.89 to 0.93, with a recovery efficiency of about 98%. For gas storage water heating appliances, energy factors range from 0.58 to 0.63, with 0.54 a typical value, with a recovery efficiency of about 75%.

39	Click the **Save** button at the bottom of the page.	

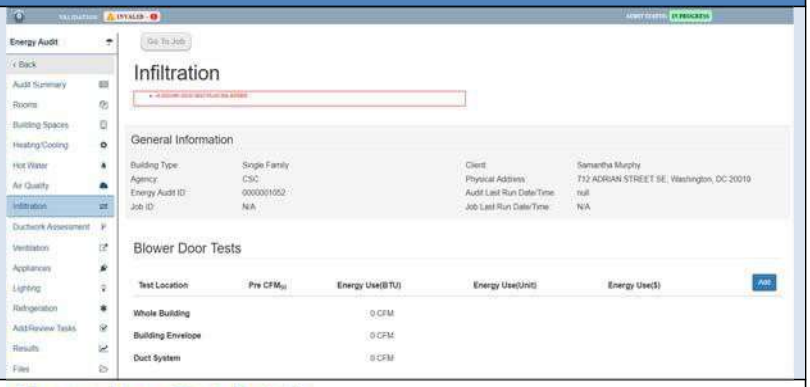
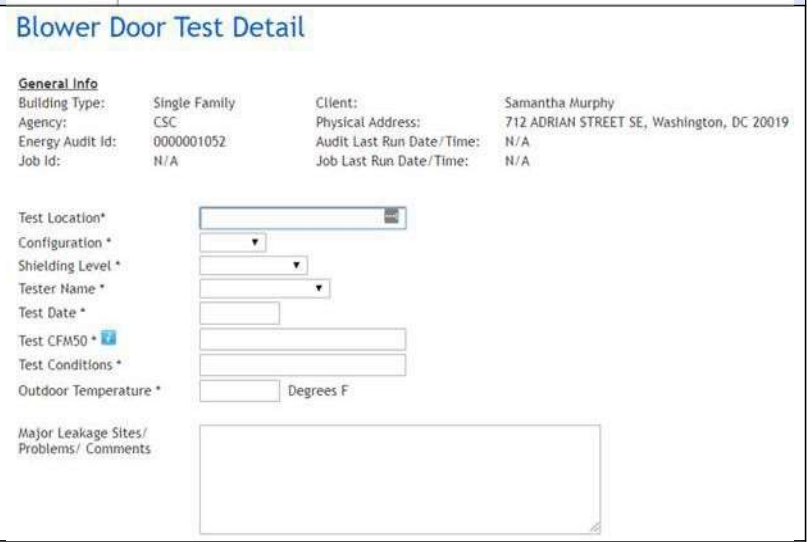
1.7 How to Enter Indoor Air Quality Information

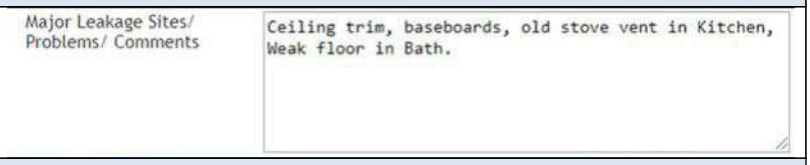
#	Action	Expected Result
1	Select the **Air Quality** menu item from the **Navigation Menu** on the left.	
2	Check the applicable checkboxes under **Client Information**	
3	Select the **Moisture** tab and check the applicable checkboxes	

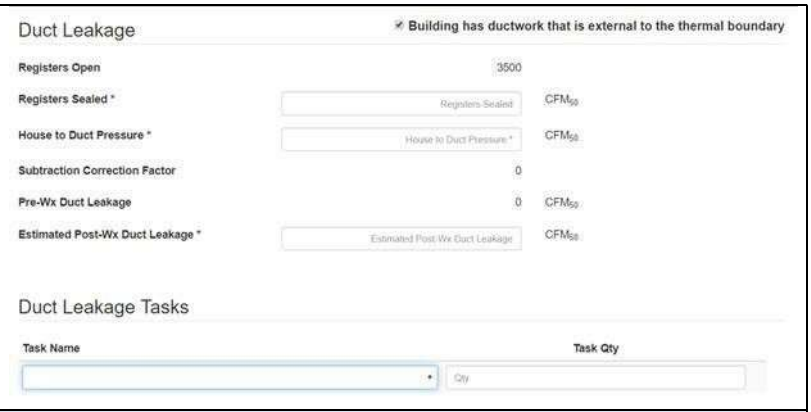
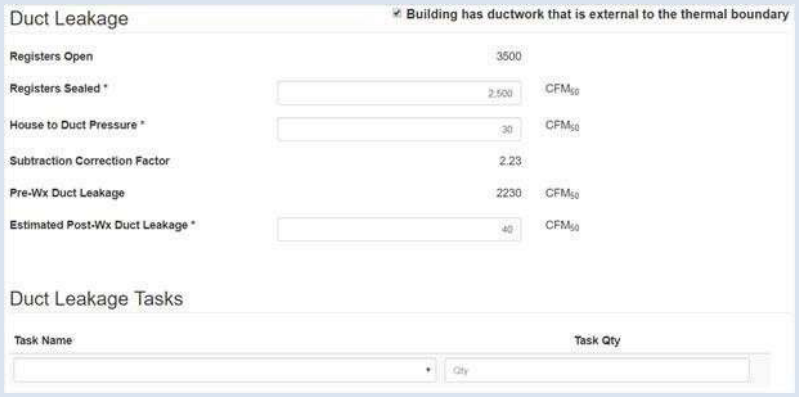
4	Select the **Mold/Mildew/Condensation** tab and check the applicable checkboxes	
5	Select the **Other Hazards** tab and check the applicable checkboxes	
6	Click the **Save** button at the top of the page.	
7	Click the **Add** button under **Existing Air Exhaust Devices**	
8	Enter the **Location, Device** type, **Description,** and **CFM** of the device.	
9	Check the applicable checkboxes for **Vented** and/or **Continuous Running**	
10	Click the **Add** button on the row of the device that was entered.	
11	Repeat steps 79-82	

12	Click the **Save** button at the bottom of the page.	

1.8 How to Enter Blower Door Information

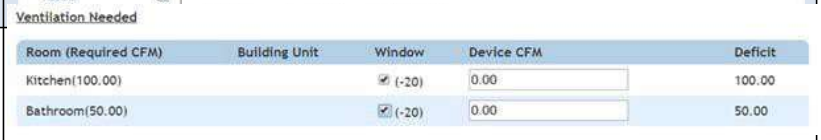
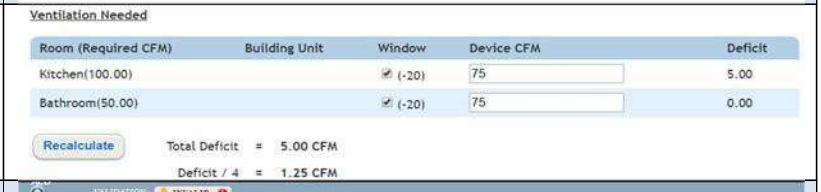
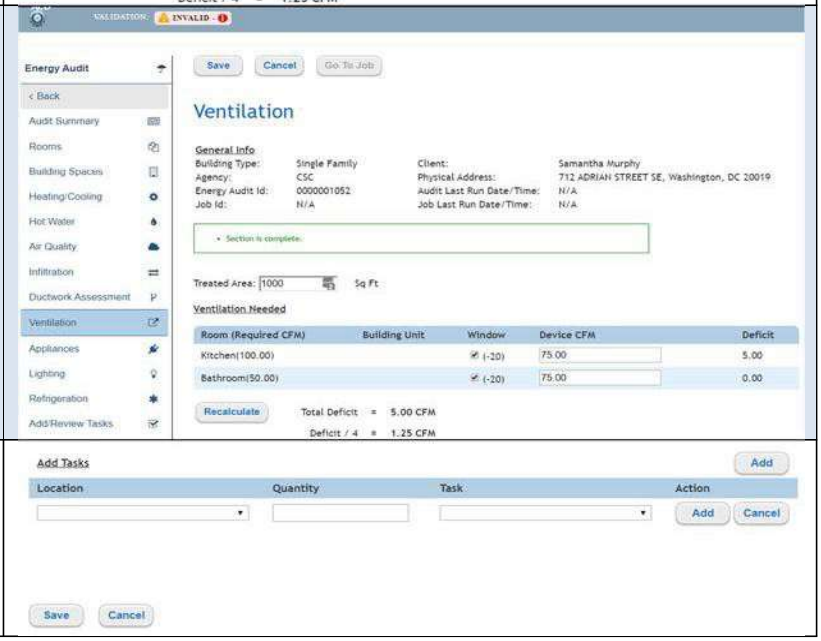
#	Action	Expected Result
	Select the **Infiltration** menu item from the **Navigation Menu** on the left. Click the **Add** button under **Blower Door Tests. Enter Auditor Estimate of post Weatherization Infiltration. This number must be based on the Registers Sealed Blower Door Reading (this separates thermal boundary leakage and Duct Leakage).**	
2	Enter the results of the Pressure Pan Tests.	

3	Enter the **Test Location, Configuration, Shielding Level, Tester Name, Test Date, Test CFM50, Test Condition,** and **Outdoor Temperature** in Fahrenheit	
4	Enter **Major Leakage Sites/Problems/Comments.**	
5	Click the **Save** button at the bottom of the page.	
6	Locate additional areas of leakage and seal	
		Air Leakage/blower door Target Reduction 0 - 3,000 10% 3,000 - 4,000 25% 4,000 - 5,000 30% 5,000 - 7,500 35% 7,500 - or more 40% Condition of some houses may affect the target.

8	If the building has ductwork external to the thermal boundary place a check in the corresponding checkbox.	
9	Enter the **Registers Sealed, House to Duct Pressure,** and **Estimated Post-Wx Duct Leakage** ***Definitions*** ***House to Duct Pressure*** *– House to Duct Pressure determines the Subtraction Correction Factor which is used as the multiplier for the difference between the Registers Open and Registers Sealed readings.* ***Estimated Post-Wx Duct*** *– Estimated Post-Wx Duct Leakage is calculated by dividing the square footage of the unit by 100 and then multiplying the product by 4 (national standard for retrofit duct leakage is 4cfm per 100 ft² of conditioned space).*	
10	Enter *Duct Leakage Tasks* by **Task Name** and **Task Qty** (Quantity)	
11	Click the **Save** button at the bottom of the page.	

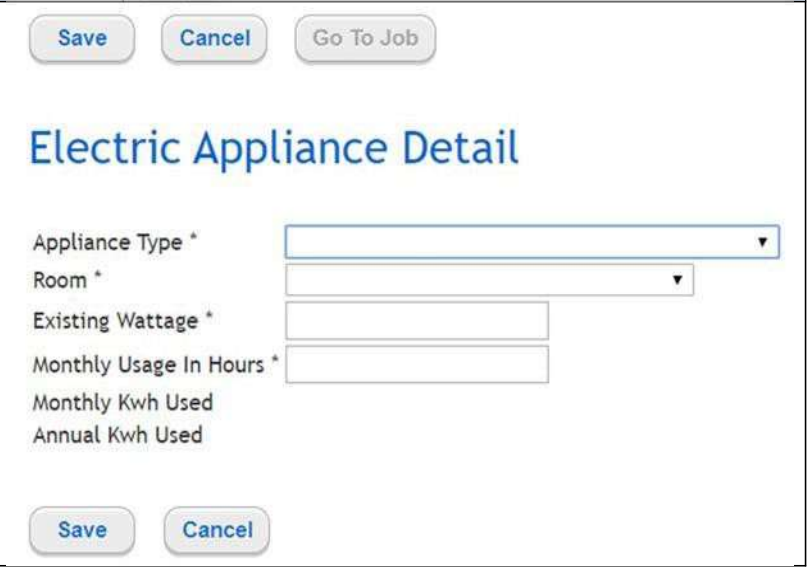
See "I. **Seal and Insulate Ducts"** in this manual for guidance on how to determine the house to duct Pressure, or go to: http://energyconservatory.com

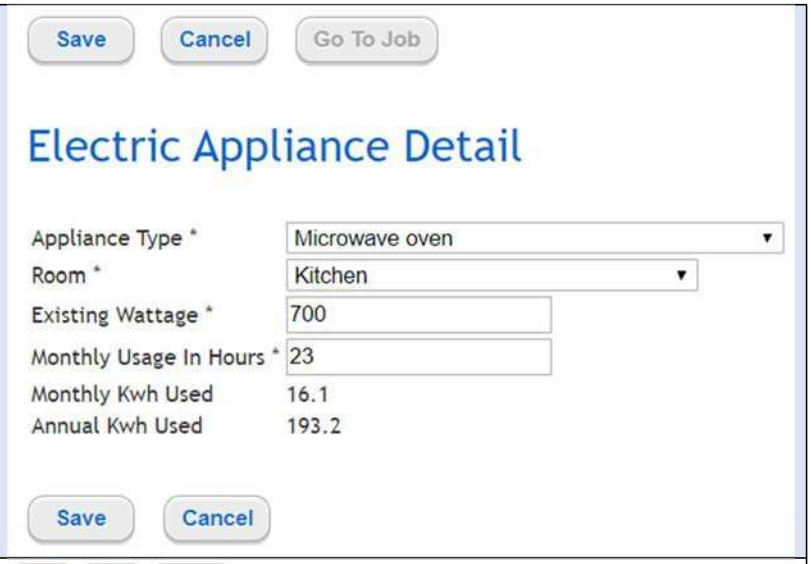
How to Calculate ASHRAE Requirements

2	Select the Ventilation menu item from the Navigation Menu on the left. If the listed room(s) have a **Window** check the Corresponding checkbox(es). *Note: Per the ASHRAE 62.2 standard, it must be an operable window. Fixed windows should not be noted and don't count towards this deficit.	
3	*Note…As indicated by the (-20) this will subtract 20 from the CFM Deficit* Enter the **Device CFM** of any ventilation devices in the room(s)	
4	Click the **Recalculate** button.	
5	Click the **Save** button at either the top or bottom of the page.	
6	If there are any required *Ventilation Tasks,* click the **Add** button under that section at the bottom of the page.	

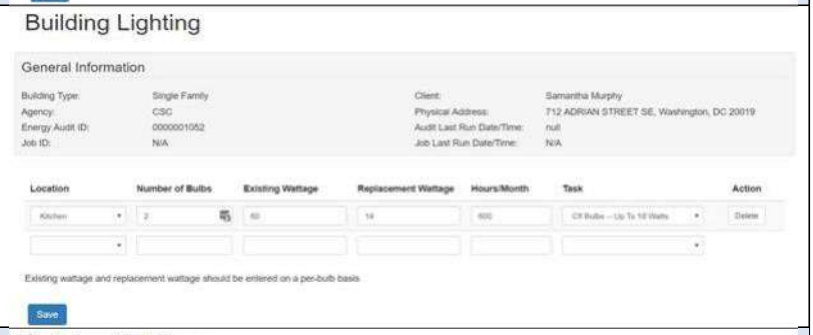
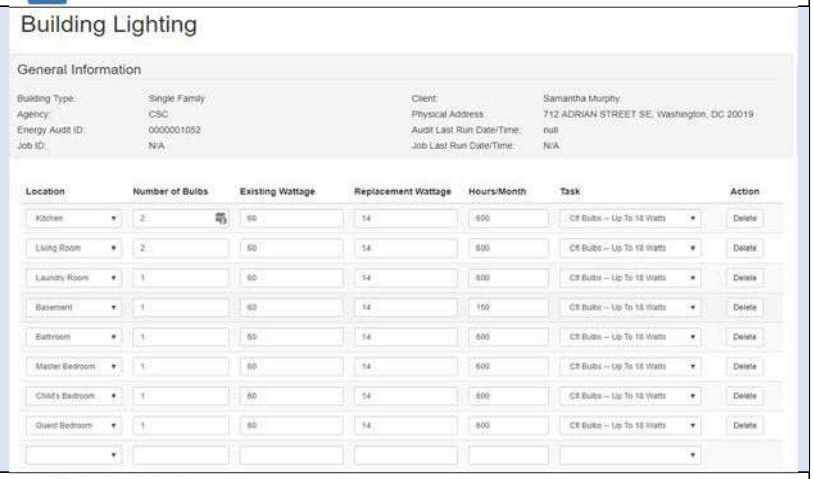
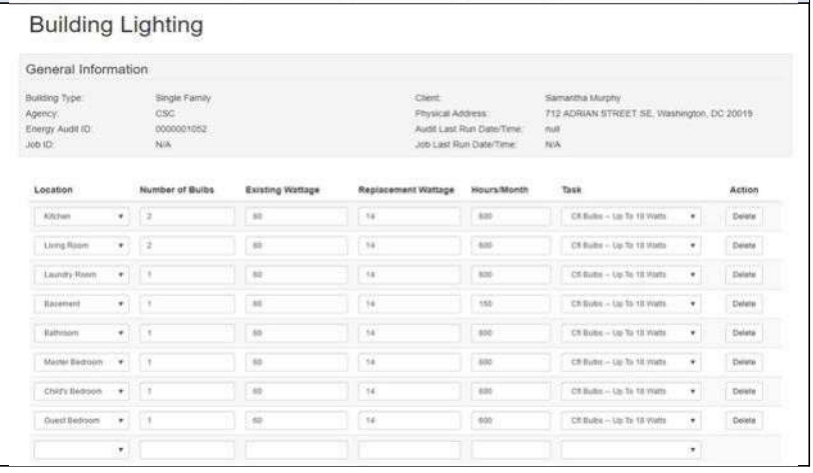
7	Enter **Location, Quantity,** and **Task**	
8	Click the **Add** button on the row that was just added.	
9	Repeat steps 101-103 for each additional required task.	

1.10 How to Enter Electrical Appliances

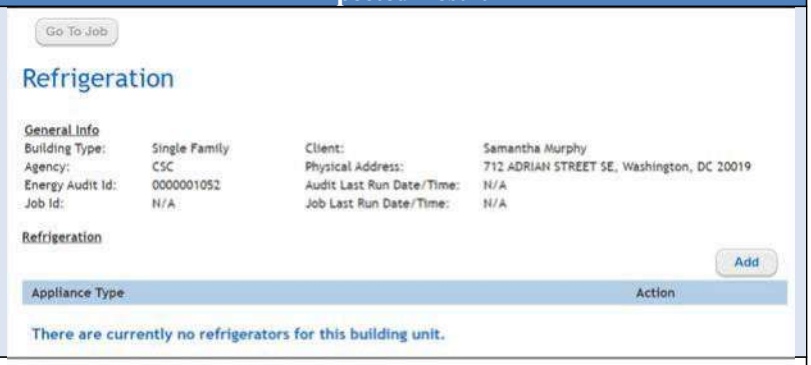
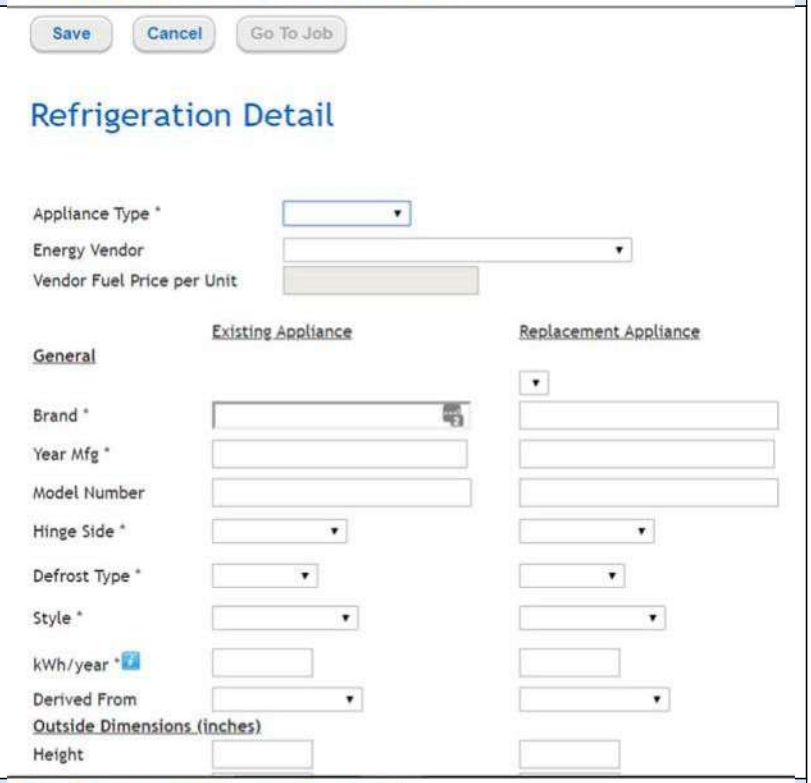
#	Action	Expected Result
1	Click the **Save** button at the bottom of the page. Then select the **Appliances** menu item from the **Navigation Menu** on the left.	
2	Click the **Add** button under *Electric Appliances*.	

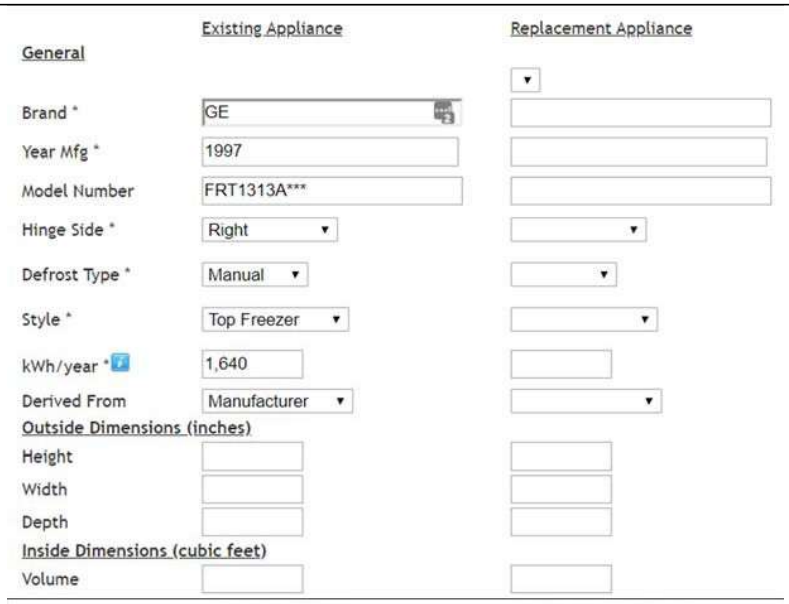
3	Enter the **Appliance Type, Room, Existing Wattage,** and **Monthly Usage In Hours** *Note…**Monthly Kwh Used** and **Annual Kwh Used** will be automatically calculated.*	
4	Click either of the **Save** buttons.	
5	Repeat steps 106-108 for each electrical appliance.	

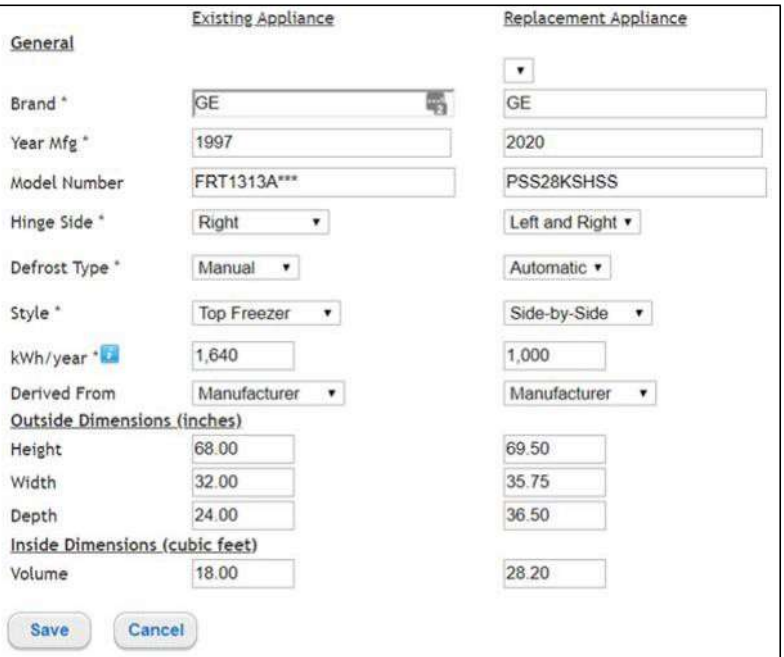
1.11 How to Enter Lighting

	Select the Lighting menu Item from the navigation menu On the left.	
1 2	Select a room from the **Location** drop-down. Then enter the **Number of Bulbs** in that room, the **Existing Wattage** of the bulbs, the **Replacement Wattage**, **Hours/Month,** and **Task**	
3	Repeat step 1 for each room with lighting in it.	
4	Click the **Save** button at the bottom of the page.	

1.12 How to Enter Refrigerators

#	Action	Expected Result
1	Select the **Refrigeration** menu item from the **Navigation Menu** on the left.	
2	Click the **Add** button.	
3	Select the **Appliance Type** and **Energy Vendor**.	

4	Enter the **Brand, Year Mfg., Model Number, Hinge Side, Defrost Type, Style,** and **kWh/year** along with where it was **Derived from** for the *Existing Appliance*.	
5	Enter the **Height, Width, Depth,** and **Volume** of the *Existing Appliance*	

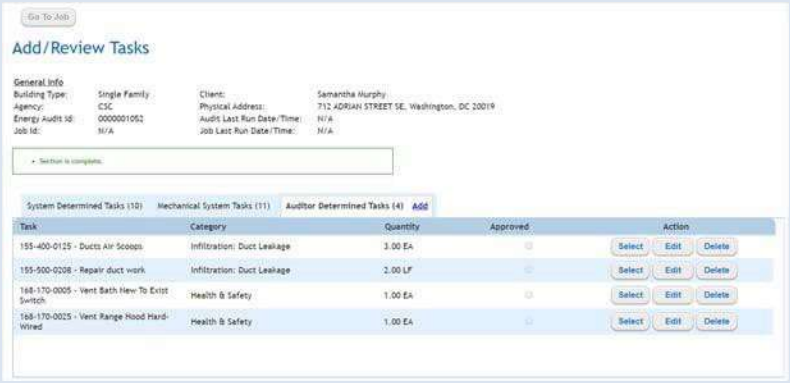
6	If the appliance needs to be replaced, repeat steps 117-118 under *Replacement Appliance*	
7	Click the **Save** button.	

1.13 How to Calculate and Analyze Audit Results

#	Action	Expected Result
10	Select the **Results** menu item from the **Navigation Menu** on the left.	

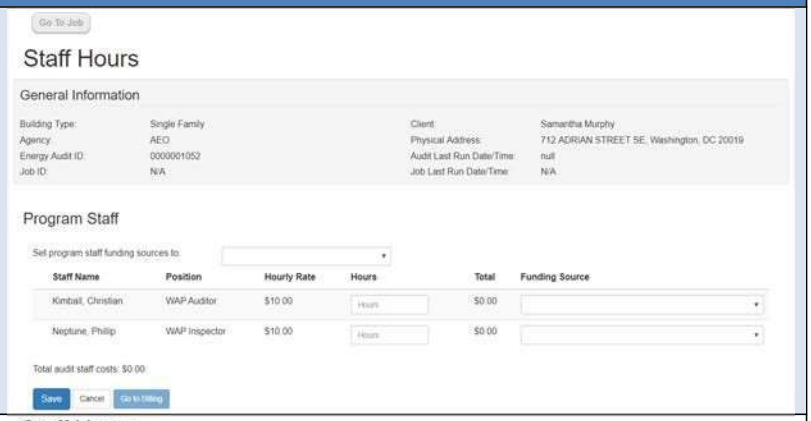
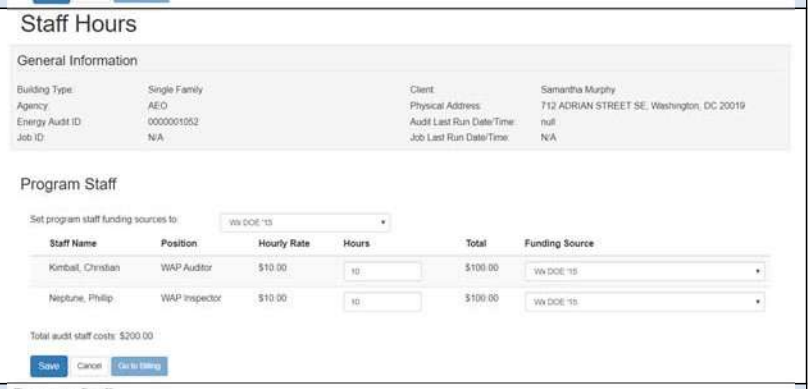
2	Click the **Single Run Calc** button. Once the calculation has been completed, refresh the page by clicking **Refresh**.	

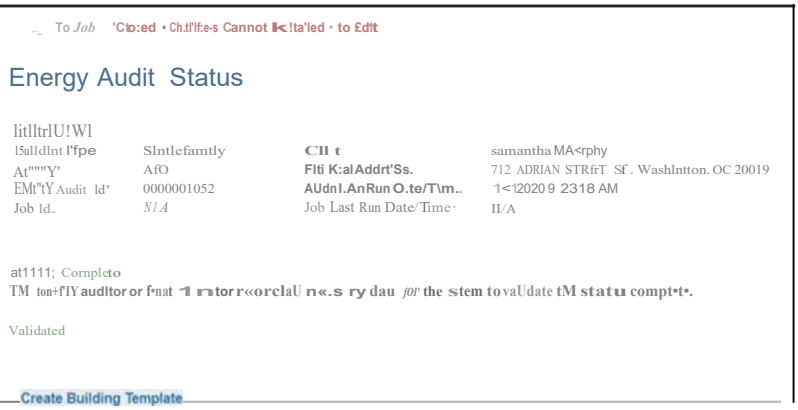
1.14 How to Add/Review Tasks

#	Action	Expected Result
1	Select the **Add/Review Tasks** menu item from the **Navigation Menu** on the left. ***Definitions*** ***System Determined Tasks*** *– The System Determined Tasks tab shows all tasks that were determined based on the auditor's selections of Pre-Wx and Post-Wx Condition Codes entered in the audit. The quantity of the tasks is determined by the auditor's entries in the specific categories* ***Mechanical Systems Tasks*** *– The Mechanical Systems Tasks shows tasks that are not System Determined by choosing a Pre-Wx and Post-Wx Condition Code, but that the user entered throughout the course of entering the audit. These tasks typically are 'mechanical' in nature and include light bulb replacement, heating and or cooling systems, refrigeration replacement, etc* ***Auditor Determined Tasks*** *– The Auditor Determined Tasks tab allows the user to enter additional tasks that could not be determined throughout the course of the audit. Duct leakage and Ventilation tasks will be prepopulated on this screen as a result of information entered earlier in the audit.* *Auditor Determined tasks typically include Incidental Repair,*	

	infiltration, General Heat Waste (GHW) or Health & Safety tasks. *Note… It is required that the user runs the single run calculation, on the results screen, before energy savings will be displayed on the add/review tasks screen. If the single run calculation has not been run, then the energy savings will*	
2	To add a comment to a task click the **Select** button under the *Action* column for the task. *Note… **Basic Instructions** displays the associated SWS procedure and a brief synapsis of the job.*	
3	Click the **Add** button under *Task Comments*.	
4	Enter the **Comment** and click either of the **Save** buttons.	
5	Repeat steps 124-126 for each task to add a comment to. *Note…To add comments for other types of tasks select the appropriate tab at the top of the table.*	

1.15 How to Enter Funding for Staff and Close Audit

#	Action	Expected Result
1	Select the **Staff Hours** menu item from the **Navigation Menu** on the left	
2	Select the **Funding Source** to pay staff wages for the audit with from the drop-down at the top of the table. Alternatively, you can individually select the **Funding Source** for each **Staff Member**. Enter the **Hours** for each **Staff Member.**	
3	Click the **Save** button at the bottom of the page.	
4	Select the **Audit Status** menu item for the **Navigation Menu** on the left	

5	Click the Close Energy Audit button.	

Appendix A: Reference Materials

1. **Forms and Resources** are on a disk that has been distributed to each Subgrantee.

2. **SWS Field Guide for Single-Family Homes.**

3. **10 CFR Part 440:** Weatherization Assistance for Low-Income Persons https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-440

4. **10 CFR Part 600:** Financial Assistance Rules https://www.ecfr.gov/current/title-10/chapter-II/subchapter-H/part-600

5. **Arkansas State Plan** – DOE WAP- https://www.adeq.state.ar.us/energy/pdfs/final-state-plan_7-25-23.pdf

6. **OMB Super Circular**: Audits of States, Local Governments, and Non-Profit Organizations https://obamawhitehouse.archives.gov/omb/circulars_a133-lead

7. **40 CFR 745**: Lead-Based Paint Poisoning Prevention in Certain Residential Structures https://www.ecfr.gov/current/title-40/chapter-I/subchapter-R/part-745?toc=1

8. **36 CFR Part 800**: Protection of Historic Properties https://www.ecfr.gov/current/title-36/chapter-VIII/part-800?toc=1

9. **Weatherization Program Notices (WPN)**: https://www.energy.gov/scep/wap/weatherization-program-notices-and-memorandums

GUIDE TO IDENTIFYING MEASURES THAT WOULD REQUIRE SECTION 106 REVIEW

Below are examples of Weatherization measures that would require Section 106 review (this list is a guide and may not be all-inclusive):

- 90%+ furnace (PVC pipe coming out of the house) if visible from the public right-of-way (replacing a vent with a like vent does not require SHPO review);
- Power vent water heating appliances (PVC pipe coming out of the side wall) if visible from the public right-of way (replacing a vent with a like vent does not require SHPO review)
- Roof jacks (if visible from the public right-of-way) (Replacing a vent with a like vent does not require SHPO review)
- Plumbing/mechanical vents that go through the roof if visible from the public right-of-way) (replacing a vent with a like vent does not require SHPO review)
- Windows (Storm windows don't require review)
- Doors (Storm doors don't require review)
- Caulking and weather-stripping around doors and windows in a manner that harms or obscures historic windows or trim on windows or doors
- New Downspouts (replacement of existing and adding downspout extensions does not require review)

- Installing new underground utilities
- Ground disturbance
- Lead-based paint abatement
- Fuel switches (if you cannot use existing piping)
- Painting
- Installation of new HVAC equipment that are visible from the public right-of-way, such as pumps, motors, boilers, chillers, cooling towers, air handling units, packing units, condensers, compressors, or heat exchangers (replacing equipment with like equipment does not require SHPO review)
- Furnace or hot water tank replacement that requires a visible new supply or venting (replacing a vent with a like vent does not require SHPO review
- Ducting, plumbing, electrical and controls that are visible from any public right of way
- New roofs and major roof repairs
- Siding repair
- Structural alterations, demolition of walls, ceilings, or floors

Additional Guidance: If replacing like-with-like, even when visible from the public right-of-way, a SHPO review is not required. More information available at:

www.energy.gov/scep/articles/arkansas-state-historic-preservation-programmatic-agreement

Appendix B: Arkansas Weatherization Forms

Number	Name	Purpose	Frequency
WAP 02*	Application	New Client intake	As needed
WAP 04	Production Reports	Report unit completion, training and equipment purchases	5th of each month
WAP 06	Vehicles/Equipment Purchases	Request to purchase vehicles and equipment over $5,000	As needed
WAP 07	Monitoring Report	Record observations and findings of compliance monitors	As needed
WAP 07a	File Review Addendum	Record Observations and findings of compliance monitors	As needed
WAP 07b	Home Inspection Addendum	Record observations and findings of compliance monitors	As needed
WAP 08*	Final Inspection Checklist	Record condition of home after weatherization	As needed
WAP 09*	Client Response Form	Allow Clients to confirm completion of work and provide feedback	As needed
WAP 09b	WRF Client Response Form	Allow Clients to confirm completion of WRF work and provide feedback	As needed
WAP 10*	Health and Safety Checklist	Record all health and safety test results before and after weatherization	As needed
WAP 12*	Fair Hearing Withdrawal	Record Client choice to withdraw from the waiting list/weatherization program	As needed
WAP 13*	Client Education Checklist	Verify Client was informed about energy-saving measures and weatherization work	As needed
WAP 14	ECOS Tool	Record unit data for entry into ECOS Audit	As needed
WAP 16*	Building Check and Job Order Sheet	Record work to be done and materials to be used on a unit	As needed
WAP 17*	Lessor/Rental Plan Agreement	Document landlord/property owner agreement with three-year rental/property sale restrictions	As needed
WAP 19	Refrigerator Replacement Agreement	Document procedures for removing and disposing of obsolete refrigerators	As needed
WAP 20	Sample Client Notification Letter re: Income Documentation	Notify Clients of income documentation requirements	As needed
WAP 23*	Fair Hearings Notice and Request	Notifies Clients of Fair Hearing Rights and allows them to request a Fair Hearing	As needed

WAP 25	Grant Agreement	Used to formalize grant terms and conditions with between Subgrantees and AEO	Annually
WAP 26*	Lead Test Kit Documentation Form	Used to document lead tests and results	As needed
WAP 27	Lead-Safety Training Log	Used to document training of non-EPA-certified workers	As needed
WAP 65	Radon Informed Consent Form	Client Notification.	As needed

*Used in Client files.

[i] WPN 22-4 is active as if 6/30/23. See https://www.energy.gov/scep/wap/weatherization-program-notices-and-memorandums