

Health and Safety Audit Design Manual, Rev. 1



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Energy and Transportation Science Division

HEALTH AND SAFETY AUDIT DESIGN MANUAL, REV. 1

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ACRONYMS

ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
CAZ	combustion appliance zone
cfm	cubic feet per minute
CO	carbon monoxide
DOE	US Department of Energy
EPA	US Environmental Protection Agency
ppm	parts per million
VOC	volatile organic compound
WAP	Weatherization Assistance Program

1. INTRODUCTION

The Health and Safety Audit is an electronic audit tool developed by the Oak Ridge National Laboratory to assist in the identification and selection of health and safety measures when a home is being weatherized (i.e., receiving home energy upgrades), especially as part of the US Department of Energy (DOE) Weatherization Assistance Program, or during home energy-efficiency retrofit or remodeling jobs. The audit is specifically applicable to existing single-family homes (including mobile homes), and is generally applicable to individual dwelling units in low-rise multifamily buildings. The health and safety issues covered in the audit are grouped in nine categories: mold and moisture, lead, radon, asbestos, formaldehyde and volatile organic compounds (VOCs), combustion, pest infestation, safety, and ventilation. Development of the audit was supported by the US Department of Housing and Urban Development Office of Healthy Homes and Lead Hazard Control and the DOE Weatherization Assistance Program.

1.1 PURPOSE

The goals of the Health and Safety Audit are to ensure that weatherization and energy-related activities do not cause or exacerbate health and safety problems for workers and occupants and to identify other existing health and safety issues that could be addressed in conjunction with the weatherization or other energy-related work. The integration of a health and safety audit into weatherization and energy-related programs can make the evaluation of dwelling units more comprehensive and could encourage programs to adopt a comprehensive approach to address important health and safety issues.

The audit assesses the impacts existing conditions may have on planned weatherization and energy-efficiency work, and the impacts planned weatherization and energy-related work may have on the health and safety of the occupants and workers. Based on these assessments, the audit recommends actions to address existing health and safety problems, prevent potential problems, and perform weatherization and energy-related work in a healthy and safe manner.

1.2 DOCUMENT OVERVIEW

The Health and Safety Audit allows users to enter information for a dwelling on a series of forms and then generate a comprehensive list of recommendations for that dwelling. A checklist accompanying the recommendations allows the auditor to indicate if the recommendation needs to be performed before or during weatherization or other energy-related work. The checklist also identifies the organization or party responsible for carrying out each recommendation. Accompanying the recommendations is additional guidance relevant to the implementation of recommended measures. The audit's overall design, along with the detailed information entered on each of the General Survey forms, is presented in Section 2. Section 3 presents the detailed information entered on each of the Detailed Survey forms and the program logic used for generating recommendations within the audit.

1.3 DEVELOPMENT RESOURCES

The Health and Safety Audit is based primarily on the document "Healthy Indoor Environment Protocols for Home Energy Upgrades," prepared by the US Environmental Protection Agency (EPA) (EPA 2011). The audit can be viewed as a computerized version of the protocols provided in the body of this document, with modifications based on guidance applicable to the DOE Weatherization Assistance Program. The assessment protocols provided in the EPA document form the basis for the information requested on the audit's General Survey and Detailed Survey forms, and the recommendations provided on the Detailed Survey Form Guidance form. The minimum and expanded actions identified in the EPA document are reflected in the audit's comprehensive list of recommendations (see Section 3) or in the

guidance sections that accompany each of the recommendation sections on the Audit Recommendations form.

EPA released a document in 2016 entitled “Energy Savings Plus Health: Indoor Air Quality Guidelines for Multifamily Building Upgrades” that specifically addresses multifamily buildings (EPA 2016). The Health and Safety Audit can be thought of as generally applying to individual dwelling units within multifamily buildings because of their similarity to single-family homes, but the Health and Safety Audit does not include this latest EPA guidance and does not address the entire multifamily building or common systems found in multifamily buildings (e.g., central heating systems, central ventilation systems) as this latest EPA guidance does.

The Health and Safety Audit includes the guidance provided in Weatherization Program Notice 17-7: Weatherization Health and Safety Guidance (DOE 2017) to make the audit more applicable to the DOE Weatherization Assistance Program. This DOE guidance is included primarily in guidance sections that accompany each of the recommendation sections on the Audit Recommendations form, although some of the program logic used to generate recommendations for the Detailed Survey Form Guidance form and the Audit Recommendations form is also based on this DOE guidance.

1.4 IMPLEMENTATION RESOURCES

Several resources in addition to those identified in Section 1.3 may be useful in the implementation and use of the Health and Safety Audit:

- EPA– EPA’s website (<https://www.epa.gov/>) provides access to information on many of the health issues addressed by the Health and Safety Audit. Under the Environmental Topics tab, useful information can be found on several subtabs, including Air (Indoor Air/Asbestos, Indoor Air Quality, and Volatile Organic Compounds), Chemicals and Toxins (Formaldehyde), Health, Lead, Mold, Pesticides, and Radon.
- HUD Office of Healthy Homes and Lead Hazard Control – This website (https://www.hud.gov/program_offices/healthy_homes) provides a Quick Link to What is a Healthy Home? (https://www.hud.gov/program_offices/healthy_homes/healthyhomes) that provides access to direct information on pest management, lead, mold, and radon as well as more general information on healthy housing and homes. The same or similar information can be accessed from the HUD Healthy Homes Program website (https://www.hud.gov/program_offices/healthy_homes/hhi).
- National Association for State Community Services Programs – A section of this website on Health and Safety Resources (<https://nascsp.org/health-and-safety-resources/>) provides specific resources relevant to the Health and Safety Audit such as lead paint, mold and moisture, and radon, and more general information on topics such as combustion gases, electrical knob and tube wiring, and healthy homes.

2. AUDIT DESIGN

The Health and Safety Audit is organized into four groups of user input forms and audit outputs: General Survey, Detailed Form Guidance, Detailed Survey, and Audit Recommendations (Figure 2.1). A user initially enters audit and dwelling information and answers preliminary screening questions on health and safety issues for a dwelling under the General Survey set of forms. The Detailed Form Guidance form then uses this information to indicate which of the Detailed Survey forms need to be completed to investigate specific health and safety issues in the dwelling. Once the user enters information on the appropriate Detailed Survey form(s), the Audit Recommendations form can be generated for the dwelling.



Figure 2.1. Schematic of the Health and Safety Audit.

2.1 GENERAL SURVEY

The group of General Survey forms consists of three data input forms. The Audit form (Figure 2.2) allows the user to enter general audit information and details about the house or dwelling unit, including the location of the house and the weather file needed to run the audit, characteristics of the dwelling, characteristics of the occupants, and housing type and weatherization funding sources.

The screenshot shows the 'Health and Safety Audit' form with the following sections and data:

- Audit:**
 - Agency: Oak Ridge National Laboratory
 - Account Name: WPN 17-7 Testing
 - Account Number: 17-7
 - Audit Name: Combustion test case 3 - Boiler Vente
 - Audit Date: 08-03-2018
 - Auditor: Mini Malhotra
 - City: [Empty]
 - State: TN
 - Audit Number: 1288
- Dwelling Location:**
 - State: TN
 - County: Anderson
 - Weather State: TN
 - Weather Station: Knoxville Mcghee Tyson Ap
- Dwelling Characteristics:**
 - Conditioned Floor Area (sq ft): 1800
 - Average Ceiling Height (ft): 8
 - Attached Garage:
 - Number of Floors: 1
 - Number of Bedrooms: 2
 - Number of Bathrooms: 2
 - Year Built: 1992
- Dwelling Occupancy:**
 - Number of Daytime Occupants: 0
 - Number of Nighttime Occupants: 1
 - Number of Elderly (over 65 years): 0
 - Number of Disabled: 0
 - Number of Children (under 6 years): 0
- Housing Type and Weatherization Funding Sources:**
 - Check all that apply:
 - Housing unit is a HUD program home (i.e., federally owned or assisted housing, including HUD Section 8 vouchered housing)
 - Housing unit will be weatherized with HUD funds
 - Housing unit will be weatherized under the DOE Weatherization Assistance Program
- Comments:**
 - [Empty text area]

Buttons at the bottom: New, Copy, Delete, OK, Apply, Cancel.

Figure 2.2. General Survey: Audit form.

The Health Concerns form (Figure 2.3) allows the user to identify specific occupant health symptoms as reported by the occupants that may indicate the presence of existing health and safety issues in the dwelling.

The screenshot shows a software window titled "Health Concerns". Inside, there is a sub-section titled "Occupant Feedback" containing a table with the following columns: "Symptom is Present", "Symptoms", "Long-term Illness", "Children/Elderly", "Worse at Home", "Worse in Winter", and "Comments". The "Symptom is Present" column contains checkboxes for each symptom listed in the "Symptoms" column. The symptoms listed are: Allergic skin reactions, Allergy-type symptoms, Asthma/bronchitis-type symptoms, Breathing difficulties, Burning or watery eyes, Dizziness, Eye, nose, or throat irritations, Fatigue, Headaches, Irritability, and Nausea. The "Long-term Illness", "Children/Elderly", "Worse at Home", and "Worse in Winter" columns are currently empty. At the bottom right of the window, there are three buttons: "OK", "Apply", and "Cancel".

Symptom is Present	Symptoms	Long-term Illness	Children/Elderly	Worse at Home	Worse in Winter	Comments
<input type="checkbox"/>	Allergic skin reactions					
<input type="checkbox"/>	Allergy-type symptoms					
<input type="checkbox"/>	Asthma/bronchitis-type symptoms					
<input type="checkbox"/>	Breathing difficulties					
<input type="checkbox"/>	Burning or watery eyes					
<input type="checkbox"/>	Dizziness					
<input type="checkbox"/>	Eye, nose, or throat irritations					
<input type="checkbox"/>	Fatigue					
<input type="checkbox"/>	Headaches					
<input type="checkbox"/>	Irritability					
<input type="checkbox"/>	Nausea					

Figure 2.3. General Survey: Health Concerns form.

The Observations form (Figure 2.4) allows the user to record general observations regarding the dwelling that may indicate the presence of existing or potential health and safety problems. Observations related to mold and moisture, lead, radon, formaldehyde and VOCs, combustion appliances, pest infestation, and planned weatherization work can be identified on the form.

2.2 DETAILED FORM GUIDANCE

Based on user input on the General Survey forms, the audit generates the Detailed Survey Form Guidance form to provide the user with the status of existing or potential health and safety issues and recommendations regarding which issues warrant a detailed survey (see Figure 2.5). This is a read-only form that provides the audit’s recommendations regarding which of the Detailed Survey forms are recommended, optional, or not applicable, and the audit’s explanation of why the guidance is presented. The audit will always recommend completion of the Safety and Ventilation forms. Note that a user may choose to follow the recommendations provided on the Detailed Survey Form Guidance form and complete only the recommended Detailed Survey forms, or the user may complete any of the optional forms to further investigate those health and safety areas.

The program logic used for generating the Detailed Survey Form Guidance form for each health and safety issue is discussed in Section 3. Table 2.1 summarizes which data from the General Survey forms are used to generate the Detailed Survey Form Guidance form for various health and safety issues. Table 2.1 also lists reference figures showing the program logic for the health and safety issues.

Observations

Mold and Moisture

- Evidence of indoor mold, dampness, water damage, or any moisture-related problem
- Detection or occupant reports of musty odor inside the home
- Evidence or occupant reports of high indoor humidity
- Evidence of exterior mold or moisture problems or drainage issues

Lead

- Planned weatherization work will disturb paint on interior or exterior surfaces
- Housing unit is designated for elderly or disabled persons (unless children under age 6 live there or are expected to live there)
- Housing unit is a zero-bedroom dwelling (e.g., studio apartment, dormitory)

Radon

- Radon detected in the neighborhood
- Radon previously detected in the house

Formaldehyde and VOCs

- Evidence of smoking inside the house (cigarette butts or ashes, tobacco odor)
- Odors or occupant complaints indicate possible presence of formaldehyde or VOCs
- Remodeling within last year involving possible VOC sources such as composite wood products, plywood, paints and finishes, carpeting, flooring, furniture, or cabinets
- Evidence of unsafe use or storage of VOC-emitting products such as paints, fuel and automotive products, pesticides, and cleaning supplies

Combustion

- Combustion space heating, water heating, or cooking appliance present

Pest Infestation

- Evidence or occupant reports of pest infestation (rodents, birds, bats, cockroaches, termites, bedbugs, fleas, or other pests)
- Evidence of pest harborage conditions, food or water sources, or entryways

Planned Weatherization Work

- Planned weatherization work will decrease house infiltration rate
- Planned weatherization work could use or install VOC-emitting products such as spray polyurethane foam insulation, sealants, plywood or composite wood products, or paints and finishes

Comments

OK Apply Cancel

Figure 2.4. General Survey: Observations form.

Detailed Survey Form Guidance

Recommendations		
Detailed Survey Form	Recommendation	Description
Mold and Moisture	Optional	There is no evidence of existing or future mold or moisture problems.
Lead	Not Applicable	The house can be assumed to be free of lead-based paint because it was built on or after 1978.
Radon	Recommended	The house is located in Radon Zone 1 (highest radon potential), which increases the likelihood that elevated radon levels are present in the house.
Asbestos	Recommended	Asbestos may be present in insulation or other building materials, either from the original construction of the house in 1930-1989 or renovations performed between 1930 and 1989.
Formaldehyde and VOCs	Optional	There is no evidence of existing or future formaldehyde or VOC.
Combustion	Not Applicable	There are no combustion appliances present.
Pest Infestation	Optional	There is no evidence of existing or future pest infestations.
Safety	Recommended	Completion of the Safety form is always recommended.
Ventilation	Recommended	Completion of the Ventilation form is always recommended.

OK Apply

Figure 2.5. Detailed Survey Form Guidance form (example).

Table 2.1. General Survey data used for generating Detailed Survey Form Guidance form

General Survey: Audit form	General Survey: Health Concerns form	General Survey: Observations form	Guidance generated for	Program logic
Presence of elderly or children	Presence of certain symptoms	Evidence of mold or moisture; Potential decrease in house infiltration rate from planned weatherization work	Mold and Moisture	Figure 3.1
Year of construction	–	Housing unit exception for addressing lead-based paint; Potential decrease in house infiltration rate from planned weatherization work	Lead	Figure 3.4
County	–	Likelihood of presence of radon	Radon	Figure 3.7
Year of construction	–	–	Asbestos	Figure 3.10
Presence of attached garage	Presence of certain symptoms	–	Formaldehyde and VOCs	Figure 3.13
–	–	Presence of combustion appliances	Combustion	Figure 3.16
–	Presence of certain symptoms	Evidence of pests	Pest Infestation	Figure 3.19

2.3 DETAILED SURVEY

The group of Detailed Survey forms consists of data input forms corresponding to the nine health and safety issues addressed in the audit: mold and moisture, lead, radon, asbestos, formaldehyde and VOCs, combustion appliances, pest infestation, safety, and ventilation. These forms allow the user to visually determine the existence and severity of problems, make quantifying measurements, and pinpoint the sources of existing or potential problems. Although the Health and Safety Audit allows quantifying measurements from diagnostic tests to be entered, it does not specify how these tests are performed. Such test procedures must be obtained from other sources, including the References section of EPA (2011) and “Test Methods and Protocols for Environmental and Safety Hazards Associated with Home Energy Retrofits” (Cautley et al. 2012).

Each of the nine forms is discussed and shown in Section 3. As previously noted, a user may choose to follow the recommendations provided on the Detailed Survey Form Guidance form and complete only the recommended Detailed Survey forms, or the user may complete any of the optional forms to further investigate those health and safety areas.

2.4 AUDIT RECOMMENDATIONS

The Audit Recommendations form (see Figure 2.6) is generated based on user input on the General Survey and Detailed Survey forms. This form’s purpose is to recommend remedial actions for existing health and safety issues and preventive measures for potential issues, and to provide notification when weatherization work should be delayed until corrective actions are taken. The Audit Recommendations form also allows the user to identify measures that need to be performed before or during weatherization or other energy-related work and the organization or party responsible for carrying out each recommendation. The program logic used for generating the audit recommendations for each health and safety issue is shown in Section 3.

Audit recommendations are provided on tabs (i.e., subforms) corresponding to each of the nine health and safety issues. Each tab shows a list of recommendations for each Detailed Survey form completed. For each recommendation, checkboxes are provided to allow the user to (1) indicate if the action must be performed before or during weatherization or other energy-related work, and (2) select if the intended action is to implement the recommendation under the weatherization or other energy-related program, refer the recommendation to another organization, recommend to the client that they need to address the issue, or defer the recommendation.

Guidance specific to the implementation of health and safety measures under the DOE Weatherization Assistance Program is provided below the list of recommendations on all nine of the Audit Recommendation subforms. This guidance is based on DOE Weatherization Program Notice 17-7: Weatherization Health and Safety Guidance (DOE 2017).

Three additional sets of guidance are provided on the Mold and Moisture Audit Recommendation subform. First, guidance is provided to help the user determine if a mold and moisture recommendation should be implemented before or during weatherization or other energy-related work. This guidance is provided in a section called “Factors to Consider in Determining if Recommendation Required Before or as Part of Weatherization.” Second, guidance regarding the potential interaction of mold and moisture health and safety measures with weatherization and energy-related measures is provided in a section called “General Notes Regarding Interaction with Weatherization.” Finally, guidance on mold cleanup is provided in a section called “Mold Cleanup Guidance.”

Guidance in addition to the DOE Weatherization Assistance Program guidance is provided on the Radon Audit Recommendation form in a section called “Radon Mitigation Guidance.”

The screenshot shows the 'Health and Safety Audit Recommendations' interface. The 'Mold and Moisture (4)' tab is selected. Below the tab are several sub-sections with expandable arrows: 'Factors to Consider in Determining if Recommendation Required Before or as Part of Weatherization', 'General Notes Regarding Interaction with Weatherization Measures', 'Mold Cleanup Guidance', and 'Notes Applicable to the Weatherization Assistance Program'. The main content area contains a table titled 'Recommendations' with the following data:

Recommendation	Must be Performed Before Weatherization	Intended Action			
		Implement	Refer	Recommend to Client	Defer
Repair the moisture damage or address the water issues in the other interior space.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repair the moisture damage or address the water issues on the house exterior.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remediate the visible mold in the attic following the guidance in the Mold Cleanup table.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Revent bathroom, kitchen, and dryer exhaust fans from the attic to directly to the outside.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2.6. Audit Recommendations form (example).

3. PROGRAM LOGIC

This section presents the program logic for generating the guidance provided on the Detailed Survey Form Guidance form and the Audit Recommendations form. The program logic is presented for each of the nine health and safety issues as flowcharts organized in the following order:

Program logic for the Detailed Survey Form Guidance form — On this flowchart, relevant questions from the General Survey forms are shown on the left, and subsequent recommendations that appear on the Detailed Survey Form Guidance form are shown on the right. The arrows indicate user inputs. Note that for Safety and Ventilation, the associated Detailed Survey form is always recommended; therefore, program logic for how the Safety and Ventilation guidance is generated for the Detailed Survey Form Guidance form is unnecessary and is not provided.

Detailed Survey form — The content of the nine Detailed Survey forms is shown.

Program Logic for the Audit Recommendations form — On this flowchart, survey questions from the Detailed Survey form are shown on the left, and subsequent recommendations are shown on the right. The arrows indicate the user input. A solid arrow indicates Yes (i.e., a checkbox is checked or the condition is met), unless noted otherwise. A dashed arrow indicates No (i.e., a checkbox or a set of checkboxes is unchecked, or a condition or a set of conditions is not met).

3.1 MOLD AND MOISTURE

DOE Weatherization Program Notice 17-7 (DOE 2017) and EPA (2011) provide specific guidance for addressing mold and moisture that was used in developing the Health and Safety Audit. Information entered on the three General Survey forms is used to determine if completion of the Mold and Moisture form is recommended or optional. Figure 3.1 shows the program logic used for generating this guidance. Figure 3.2 shows the content of the Mold and Moisture form. Figure 3.3 shows the program logic used for generating recommendations for addressing mold and moisture issues. With the list of recommendations, the audit provides guidance on how to address mold and moisture issues in conjunction with weatherization and other energy-related activities, including factors to consider in determining if recommendations should be performed before or during these activities, and general notes regarding the interaction of mold and moisture measures with these activities. In addition, guidance adopted from EPA (2011) regarding mold cleanup is provided along with notes specifically applicable to the DOE Weatherization Assistance Program.

General Survey

Detailed Survey Guidance

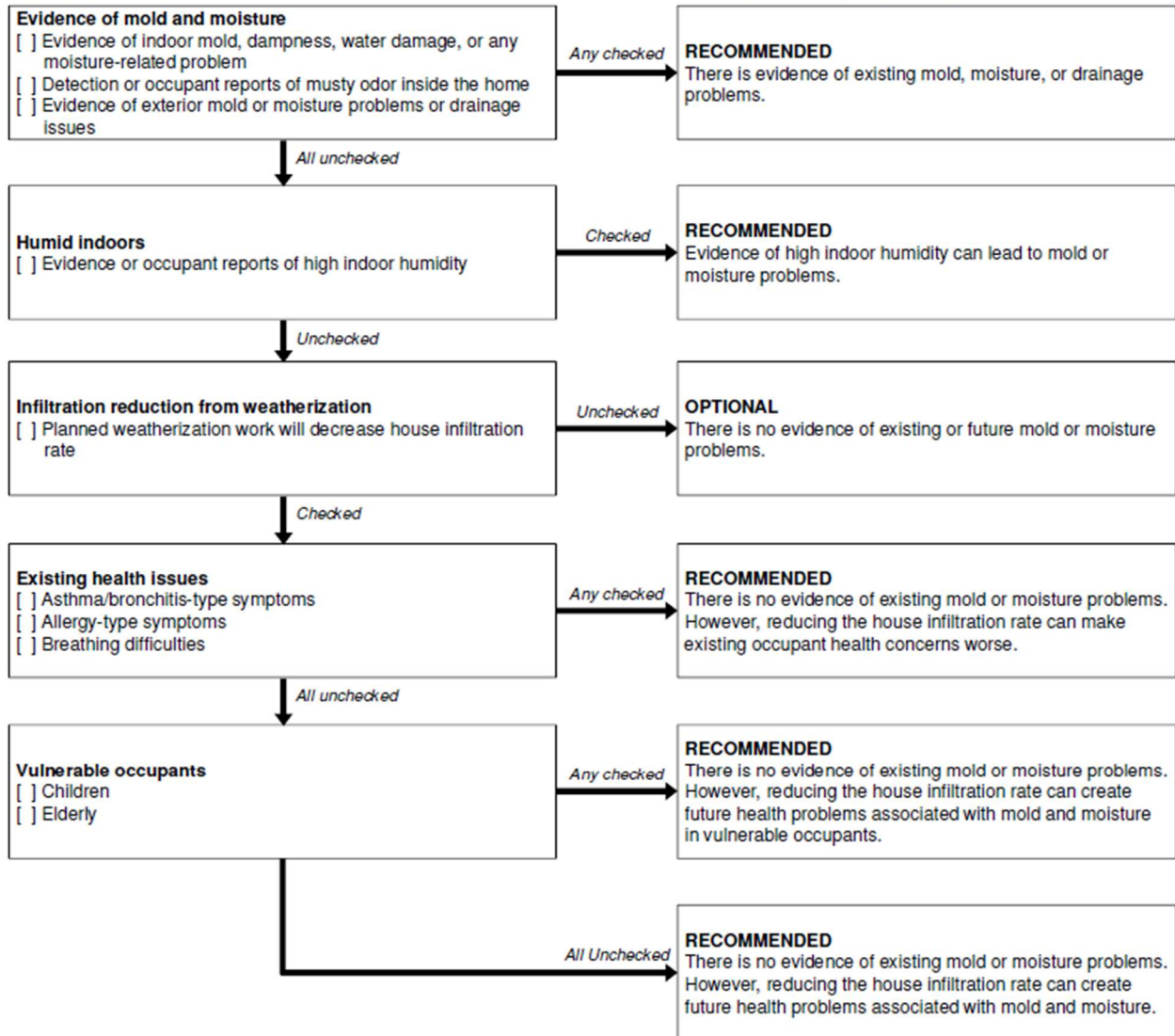


Figure 3.1. Mold and Moisture: Program logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

Observations						
Space/Component	Visible Mold ¹	Moisture Damage, Water, or Dampness ²	Condensation or High Humidity	Musty Odor	All Sources Identified on Source Identification Form ³	Comments
Attic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bathrooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Kitchen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Laundry Room	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Mechanical Room	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other Interior Spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Crawlspace/Basement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
House Exterior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site Drainage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Heating System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooling System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Forced-Air Ducts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Dehumidifier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Appliances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Humidifier/Vaporizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

¹ Mold testing is not an allowable cost under the Weatherization Assistance Program.

² Diagnostics such as moisture meters are recommended under the Weatherization Assistance Program.

³ Source Identification Warning: If unchecked for one or more spaces or components where visible mold, moisture damage, water issues, high humidity, condensation, or musty odor was found, additional moisture sources need to be identified on the Source Identification form that are causing the mold or moisture issues in those space or components.

Source Identification

Attic

- Roof leaks
- Ice dams occur during winter
- Voids present in attic insulation
- Exhaust fans (e.g., bathroom, kitchen, dryer) vented into attic
- Air leakage through attic access door and other attic bypasses
- Recessed lighting fixtures present
- Attic ventilation inadequate
- Other: _____

Bathrooms

- Exhaust fan not present in each bathroom
- Bathroom exhaust fan not operating properly
- Bathroom exhaust fan not used while showering
- Tub or shower enclosure not properly caulked
- Tile grouting around tub or shower enclosure deteriorated
- Other: _____

Kitchen

- Kitchen exhaust fan not present or is a recirculating model
- Kitchen exhaust fan not operating properly
- Kitchen exhaust fan not used while cooking
- Lids not used while cooking
- Kitchen sink or splash plate not properly sealed or caulked
- Tile grouting around kitchen sink deteriorated
- Sink and garbage disposal unclean
- Dishwasher unclean
- Refrigerator drip tray dirty
- Other: _____

Indoor Elements

- Single-pane window(s) with significant condensate runoff during winter
- Firewood stored indoors (including basement)
- Clothes dried indoors
- Clothes dryer vented indoors
- Clothes dryer exhaust duct plugged
- Indoor plants excessive
- Aquariums present
- Other: _____

Comments

Plumbing

- Plumbing leaks present
- Plumbing leaks fixed in past
- Plumbing insulation deteriorated
- Condensation on plumbing
- Plumbing fixture broken or connection improper
- Other: _____

Systems and Equipment

- Unvented combustion space heater used for space heating
- Gas stove or oven used for space heating
- Air conditioner significantly oversized
- Air conditioner condensate not draining properly
- Leaks in forced-air return duct system
- Humidifier or vaporizer used frequently
- Humidifier not operating properly
- Dehumidifier not operating properly
- Other: _____

Basement or Crawlspace

- Crawlspace ventilation inadequate
- Earthen floor not covered
- Cracks in foundation walls
- Exposed dirt or hole(s) through concrete floor or foundation wall
- Cores in concrete block foundation walls open or unfilled
- Sump pump crotch or collecting basin not covered
- Other: _____

House Exterior

- Shingles on roof missing
- Pipe flashing on roof deteriorated
- Wall or window drainage planes and flashings inadequate
- Landscaping too close to house
- Other: _____

Site Drainage

- Gutters or downspouts not present
- Gutters or downspouts not working effectively
- Downspouts not connected to sewer or drain, or do not adequately direct water away from house
- Grading around house is poor, allowing water to drain back toward house or pool near house
- Other: _____

Figure 3.2. Mold and Moisture: Detailed Survey form.

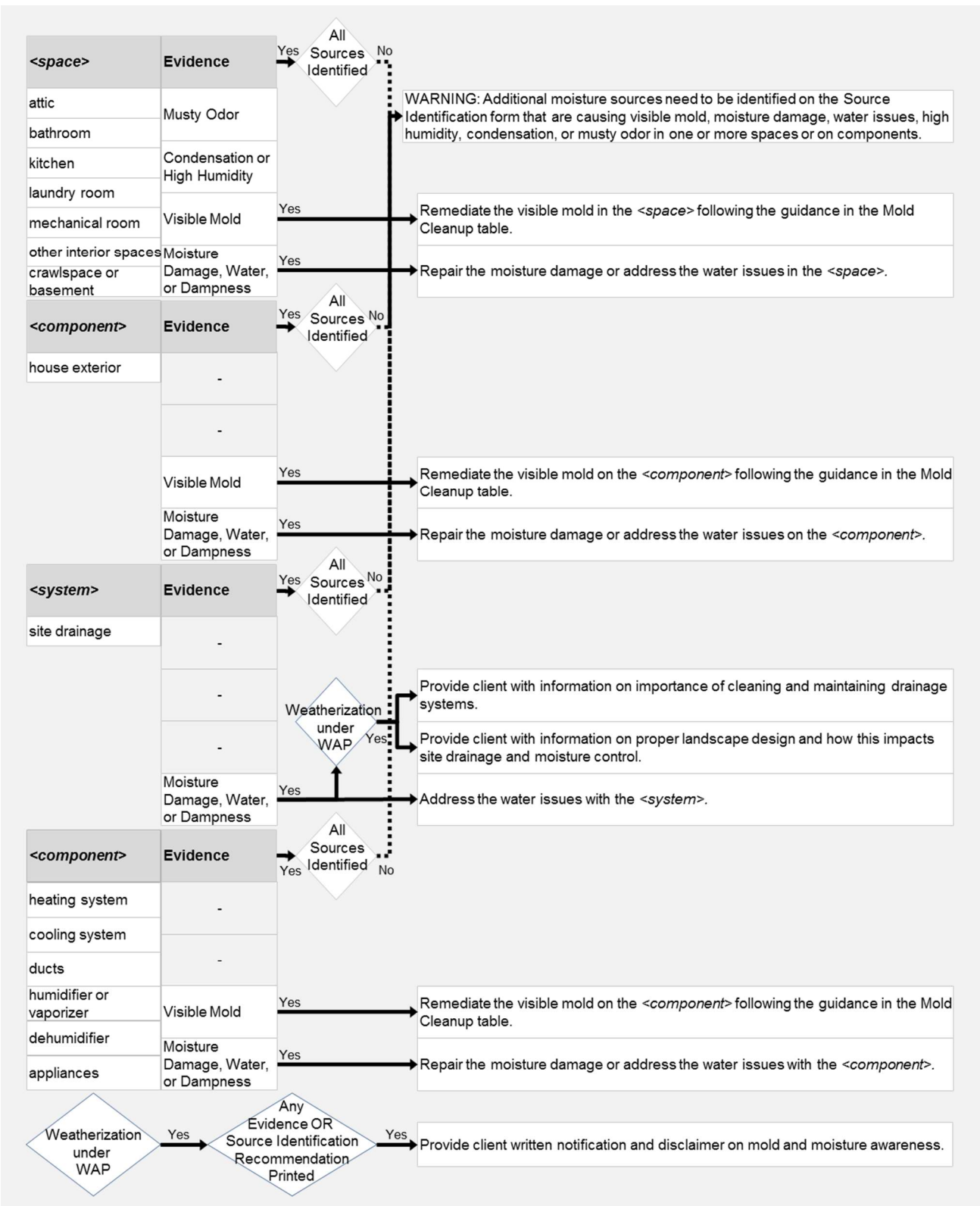


Figure 3.3. Mold and Moisture: Program Logic for the Audit Recommendations form.

Attic	
Roof leaks	Repair roof leaks.
Ice dams occur during winter	Reduce heat gains from house into the attic (e.g., add attic insulation, seal air leaks) to prevent snow melting and formation of ice dams.
Voids present in attic insulation	Add insulation or rake existing insulation to ensure that insulation is installed uniformly in attic.
Exhaust fans (e.g., bathroom, kitchen, dryer) vented into attic	Revent bathroom, kitchen, and dryer exhaust fans from the attic to directly to the outside.
Air leakage through attic access door and other attic bypasses	Seal attic access door, attic bypasses, and other air leaks from house into attic.
Recessed lighting fixtures present	If possible, seal air leaks through recessed lighting fixtures using approved methods.
Attic ventilation inadequate	Provide adequate ventilation in the attic if it is not sealed or conditioned.
Other _____	Fix the other mold and moisture source found in the attic.
Bathrooms	
Exhaust fan not present in each bathroom	Install exhaust fans vented to outdoors in each bathroom where none currently exists.
Bathroom exhaust fan not operating properly	Fix existing bathroom exhaust fans that are not operating properly.
Bathroom exhaust fan not used while showering	Discuss with the client the need to use bathroom fans while showering.
Tub or shower enclosure not properly caulked	Caulk bathroom tubs and shower enclosures that are improperly caulked.
Tile grouting around tub or shower enclosure deteriorated	RegROUT tile around bathroom tubs and shower enclosures where the existing grout is deteriorated.
Other _____	Fix the other mold and moisture source found in the bathroom.
Kitchen	
Kitchen exhaust fan not present or is a recirculating model	Install a kitchen exhaust fan that is vented to outdoors.
Kitchen exhaust fan not operating properly	Fix existing kitchen exhaust fan that is not operating properly.
Kitchen exhaust fan not used while cooking	Discuss with the client the need to use the kitchen exhaust fan while cooking.
Lids not used while cooking	Discuss with the client the need to use lids on pots and pans while cooking.
Kitchen sink or splash plate not properly sealed or caulked	Seal or caulk kitchen sink and splash plate.
Tile grouting around kitchen sink deteriorated	RegROUT tile around kitchen sink.
Sink and garbage disposal unclean	Clean sink and garbage disposal. Discuss with the client the need to keep the sink and garbage disposal clean.
Dishwasher unclean	Clean dishwasher. Discuss with the client the need to keep the dishwasher clean.
Refrigerator drip tray dirty	Clean refrigerator drip tray. Discuss with the client the need to keep the refrigerator drip tray clean.
Other _____	Fix the other mold and moisture source found in the kitchen.
Indoor Elements	
Single-pane window(s) with significant condensate runoff during winter	Replace single-pane window(s) experiencing significant condensate runoff during winter with energy-efficient models.
Firewood stored indoors (including basement)	Remove firewood from inside the house. Discuss with the client the need to store firewood outside.
Clothes dried indoors	Discuss with the client the need to dry clothes outside.
Clothes dryer vented indoors	Vent clothes dryer outside.
Clothes dryer exhaust duct plugged	Unplug the dryer exhaust duct.
Indoor plants excessive	Discuss with the client the need to reduce the number of plants in the house.
Aquarium present	Discuss with the client the need to use covers over aquariums and/or reduce the number of aquariums in the house.
Other _____	Fix the other mold and moisture source found inside the house.

Figure 3.3. Mold and Moisture: Program Logic for the Audit Recommendations form (continued).



Figure 3.3. Mold and Moisture: Program Logic for the Audit Recommendations form (continued).

3.2 LEAD

DOE Weatherization Program Notice 17-7 (DOE 2017) and EPA (2011) provide specific guidance for addressing lead that was used in developing the Health and Safety Audit. Information entered on the Audit form for the year of construction of the dwelling is used to determine the potential presence of lead-based paint and if completion of the Lead form is recommended or not applicable. Figure 3.4 shows the program logic used for generating this guidance. Figure 3.5 shows the content of the Lead form. Figure 3.6 shows the program logic used for generating recommendations for addressing lead issues. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

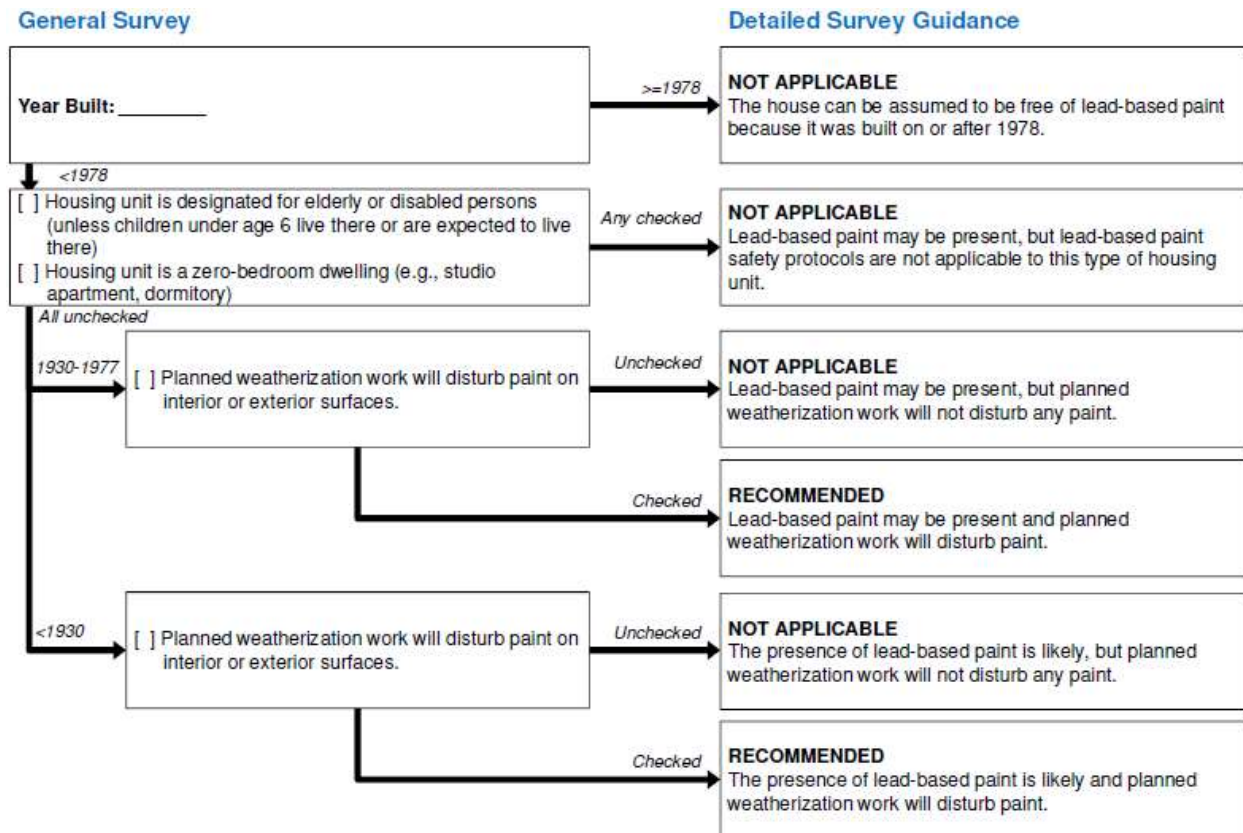


Figure 3.4. Lead: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

Painted Surfaces Disturbed by Weatherization or Assessment							Comments
Surface	Will be Disturbed	Disturbance Exceeds Area Limits ¹	Involves Demolition or Window Replacement	Involves Prohibited Paint Removal Practices ²	Lead Testing Results (Select One) ^{3,4,5}		
					Not conducted	Any positive	All negative
Interior	[]	[]	[]	[]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exterior	[]	[]	[]	[]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

¹ Area limits (applies to area being disturbed, not total painted surface area):
 Interior room: > 6 sq ft for any interior room, or, for HUD only, > 2 sq ft for any interior room
 Exterior: > 20 sq ft
 Component: > 10% of a small building component (e.g., window) (HUD only)

² Prohibited paint removal practices:
 Open flame burning or torching
 Use of heat guns at temperatures greater than 1,100 degrees Fahrenheit
 Use of heat guns that char paint (HUD only)
 Use of power tools without high-efficiency particulate air (HEPA) exhaust control to collect dust
 Abrasive blasting or sandblasting without HEPA local exhaust control (HUD only)
 Dry sanding or dry scraping unless done with heat guns, within 1 ft of electrical outlets, or to treat < 2 sq ft in any one interior room or < 20 sq ft on exterior surfaces (HUD only)
 Paint stripping in a poorly ventilated space using a volatile paint stripper (HUD only)

³ Testing methods (positive test indicates that lead is present):
 EPA-recognized on-site test kit (not recognized by HUD)
 X-Ray Fluorescence (XRF) testing
 Laboratory analysis of paint samples

⁴ Determining if lead testing should be performed:
 Compare the cost of lead testing to the cost of implementing lead protocols. The expense of testing may be greater than the cost of implementing lead protocols when only small areas of paint will be disturbed.
 In houses built before 1930, it is logical and usually more cost effective to assume lead-based paint is present.
 NOTE: Lead testing and evaluation may already have been done on HUD Program housing.

⁵ For homes to be weatherized under the Weatherization Assistance Program:
 Testing to determine the presence of lead in paint that will be disturbed by the installation of a WAP measure is allowed with EPA-approved testing methods.
 Testing methods must be economically feasible and justified.

Comments

Figure 3.5. Lead: Detailed Survey form.

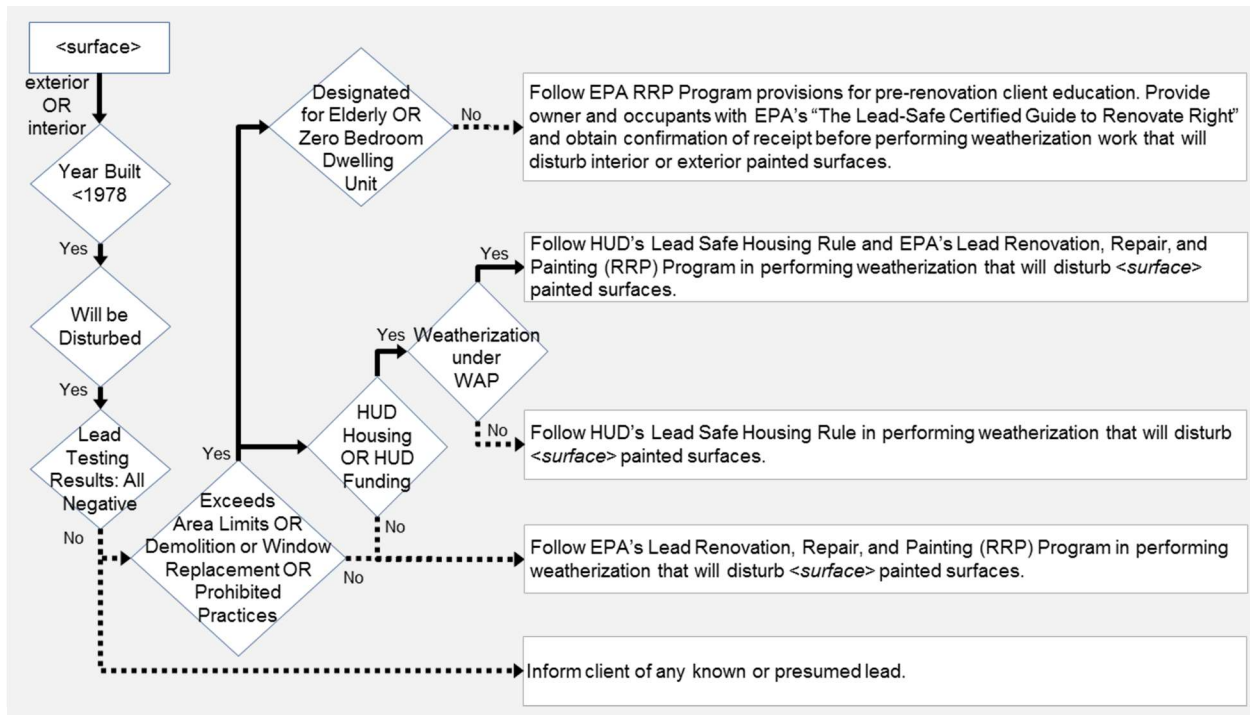


Figure 3.6. Lead: Program Logic for the Audit Recommendations form.

3.3 RADON

DOE Weatherization Program Notice 17-7 (DOE 2017) and EPA (2011) provide specific guidance for addressing radon that was used in developing the Health and Safety Audit. Information entered on the Audit and Observations forms is used to determine the potential presence of radon and if completion of the Radon form is recommended or optional. Figure 3.7 shows the program logic used for generating this guidance. Figure 3.8 shows the content of the Radon form. Figure 3.9 shows the program logic used for generating recommendations for addressing radon issues. With the list of recommendations, the audit provides radon mitigation guidance adopted from EPA (2011) and notes specifically applicable to the DOE Weatherization Assistance Program.

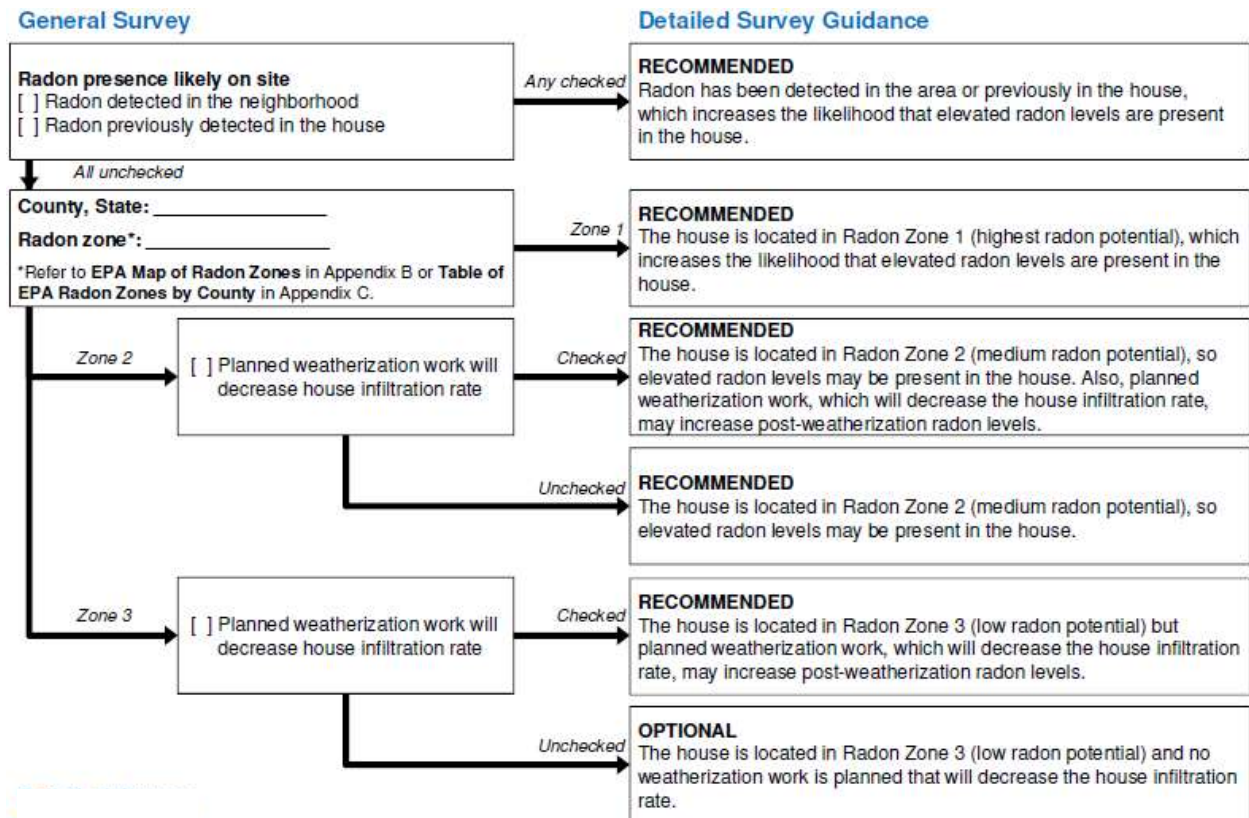


Figure 3.7. Radon: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

Radon Assessment Approach (Select One):

- Test in/test out (i.e., before and after weatherization)
 Post-weatherization test only (i.e., also appropriate if the house is not being weatherized)
 None

Note: For homes to be weatherized under the Weatherization Assistance Program, Grantees may allow testing at their discretion in areas with high radon potential.

Testing

Indoor Radon Measurements					
	Testing Performed	Radon level [pCi/L]	Sampling Device ²	Date Installed	Sampling Duration [Days]
Pre-weatherization ¹	[]				
Post-weatherization	[]				

Existing radon reduction system (select one): None Active Passive

¹ Pre-weatherization measurement, if available, should be within last 2 years.

² Select Sampling Device:

- A. Charcoal canister
- B. Alpha-track detector
- C. Continuous radon monitor
- D. Charcoal scintillation
- E. Evacuated scintillation cell
- F. Pump/collapsible bag device
- G. Grab radon sampling
- H. Unfiltered track detector
- I. Continuous working level monitor
- J. Radon progeny integrating sampling unit
- K. Grab-sampling – working level
- L. Unknown
- M. Other

Source Identification

- Earthen floor not covered in basement or crawlspace
- Covers on sump pump crock or collecting basin not airtight
- Foundation floor drain traps not present or are dry
- Penetrations, openings, or cracks in foundation walls
- Penetrations, openings, or cracks in concrete foundation floor
- Top course of hollow foundation block walls not capped
- Pores in face of hollow foundation block wall or along mortar joints
- Other _____

Comments

Figure 3.8. Radon: Detailed Survey form.

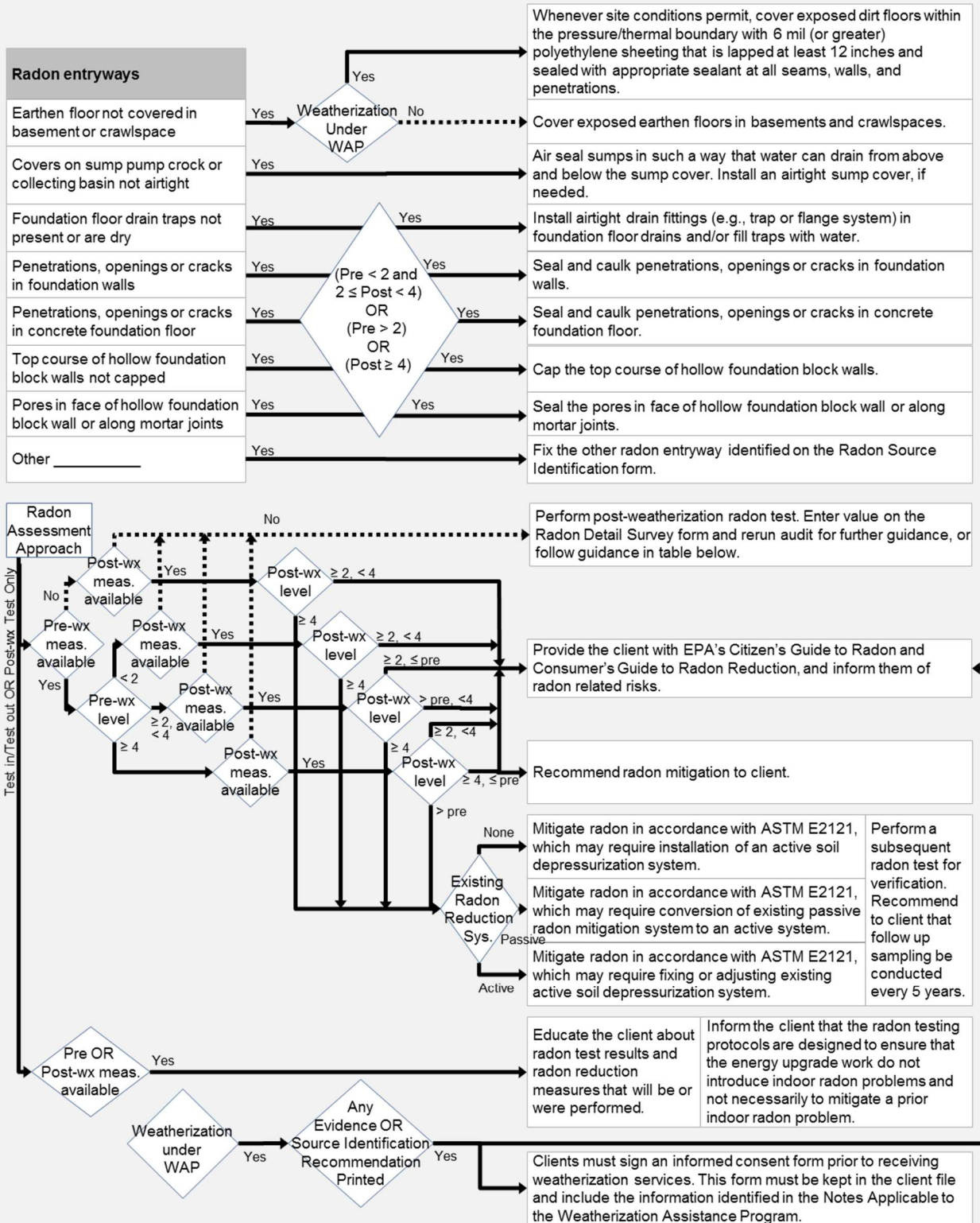


Figure 3.9. Radon: Program Logic for the Audit Recommendations form.

3.4 ASBESTOS

Weatherization Program Notice 17-7 (DOE 2017) provides asbestos-related guidance under several categories of potential asbestos-containing materials. EPA (2011) provides comprehensive guidance for addressing asbestos under one consolidated category. Guidance from both documents was used in developing the Health and Safety Audit. Information entered on the Audit form for the year of construction of the dwelling is used to determine if completion of the Asbestos form is recommended or not applicable (Figure 3.10). Figure 3.11 shows the content of the Asbestos form. Figure 3.12 shows the program logic used for generating recommendations for addressing asbestos-related issues. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

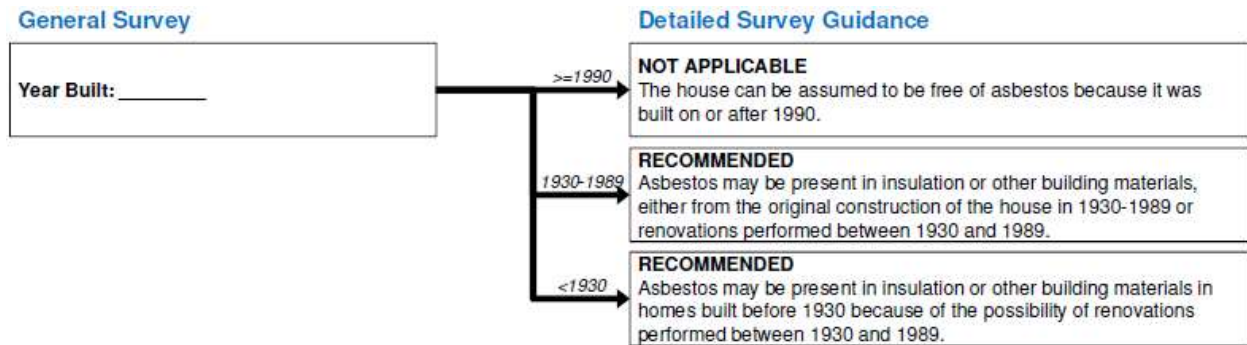


Figure 3.10. Asbestos: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

Observations						
Source of Asbestos	Presence of Asbestos ^{3,4} (Select One)			Condition of Asbestos Containing Material		Comments
	Yes	Unsure	No	Damaged ⁵	Will be Disturbed During Weatherization or Other Activity	
Attic and Walls						
Attic insulation ¹	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wall insulation ¹	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wall siding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Heating System Components²						
Insulation around heating equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Heating equipment door gaskets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Insulation on steam pipes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Insulation on boiler and furnace ducts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Transite (cement and asbestos) combustion vent or flue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Artificial ashes and embers in fireplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Building Materials						
Roofing and shingles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Plaster	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Materials sprayed on walls and ceilings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Textured paint on walls and ceilings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Patching and joint compounds on walls and ceilings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vinyl floors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	

¹ Assume that any vermiculite insulation found in attics or walls contains asbestos unless testing determines otherwise.

² For homes to be weatherized under the Weatherization Assistance Program, assume asbestos is present in suspect covering materials unless testing determines otherwise. Costs directly associated with testing is an allowable health and safety cost.

³ For all sources currently identified as Unsure, the presence of asbestos will be assumed to be Yes in homes built prior to 1990 because of the original construction of the house or possible renovations performed between 1930 and 1989. If these sources are also damaged or will be disturbed during weatherization or other activity, testing or assessment by a qualified asbestos professional to verify that asbestos is not present can be less expensive than abatement.

⁴ For homes to be weatherized under the Weatherization Assistance Program, Asbestos Hazard Emergency Response Act of 1986 (AHERA) sample collection and testing must be conducted by a certified tester.

⁵ Unraveling, frayed, breaking apart, etc.

Comments

Figure 3.11. Asbestos: Detailed Survey form.

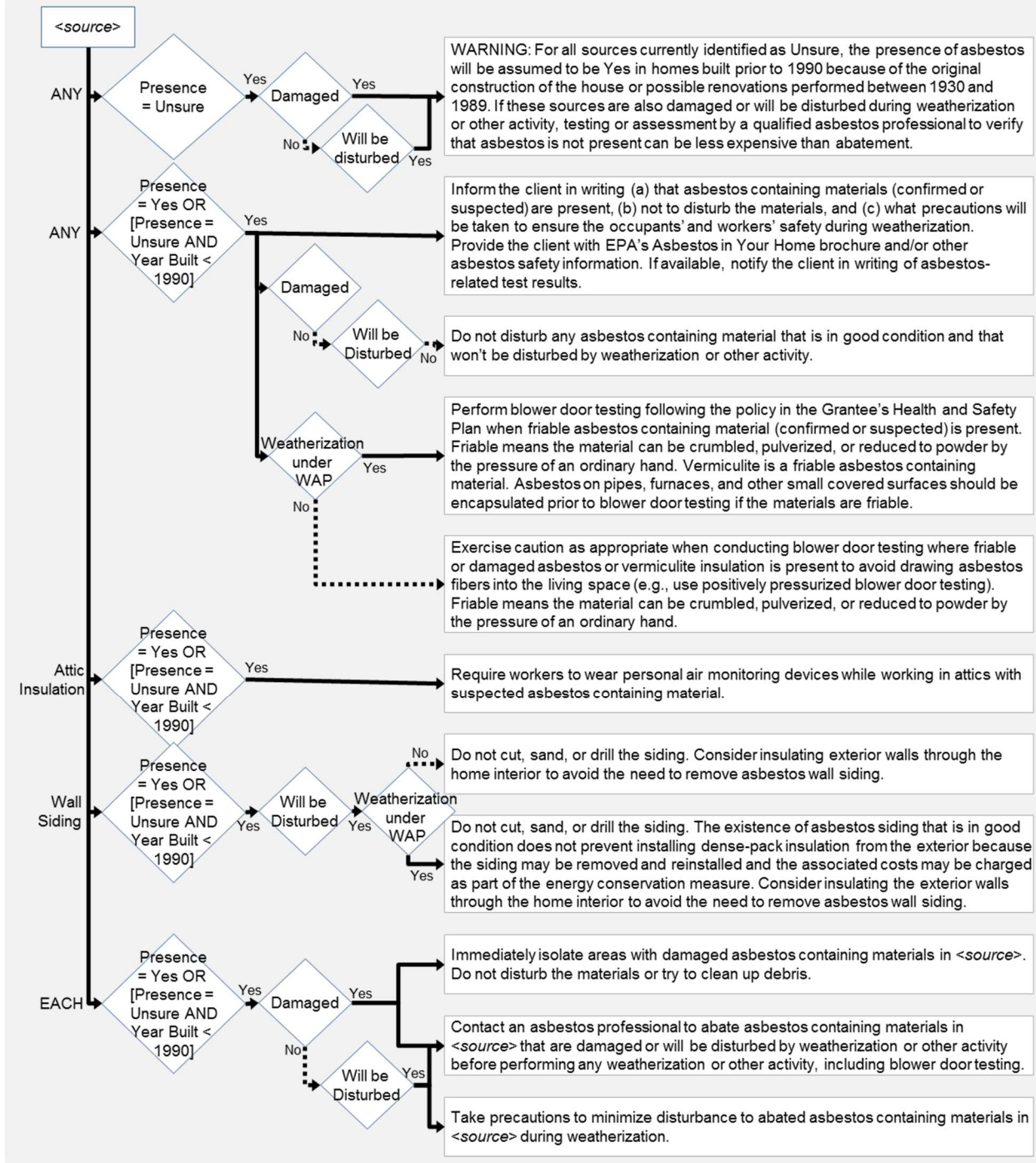


Figure 3.12. Asbestos: Program Logic for the Audit Recommendations form.

3.5 FORMALDEHYDE AND VOCs

Weatherization Program Notice 17-7 (DOE 2017) provides specific guidance related to formaldehyde and VOCs. EPA (2011) covers this issue under multiple categories. Guidance from both documents was used in developing the Health and Safety Audit. Information entered on the Health Concerns and Observations forms is used to determine if completion of the Formaldehyde and VOCs form is recommended or optional (Figure 3.13). Figure 3.14 shows the content of the Formaldehyde and VOCs form. Figure 3.15 shows the program logic used for generating recommendations for addressing formaldehyde- and VOCs-related issues. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

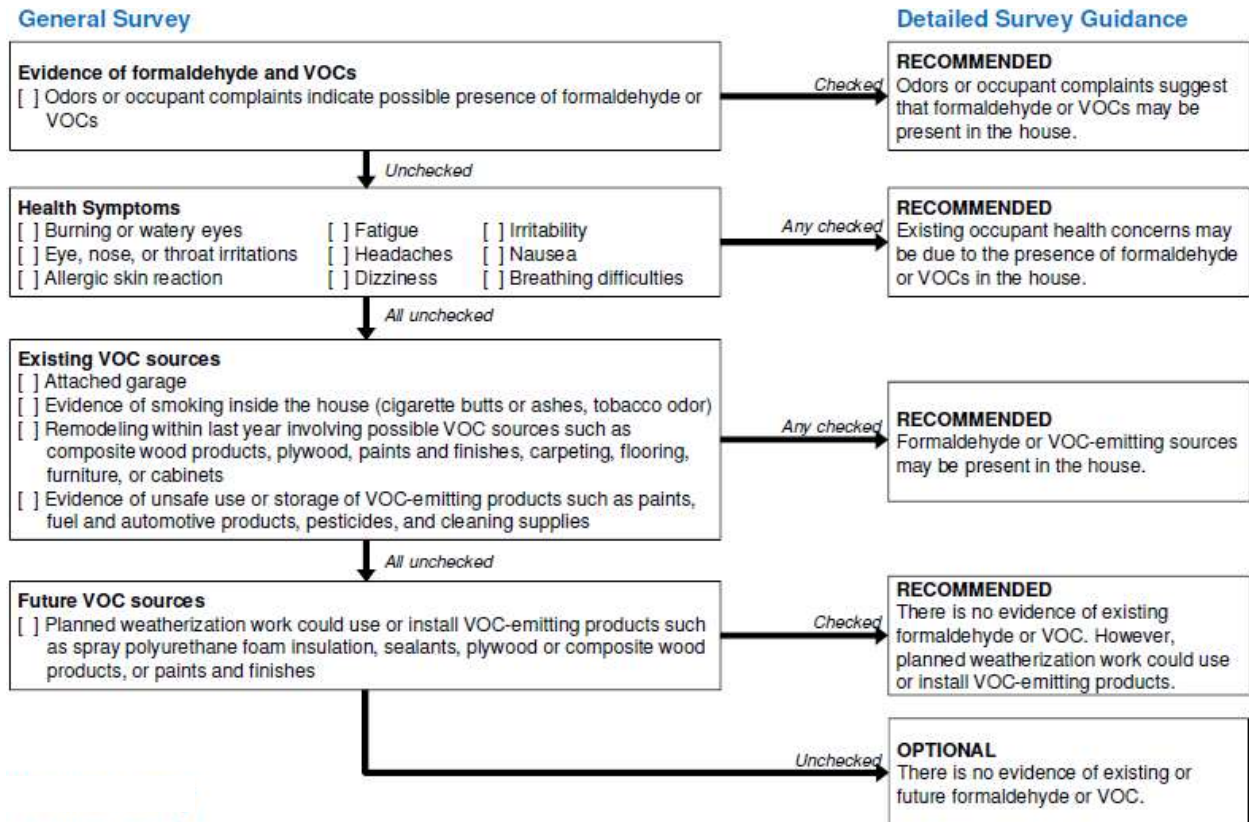


Figure 3.13. Formaldehyde and VOCs: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

- Formaldehyde sampling has been performed
If checked, Measured Formaldehyde Concentration [ppm]: _____

Source Identification

VOC Sources in House or Attached Garage

Identify products that are stored incorrectly and/or may be contributing to the presence of formaldehyde or other VOCs:

- Paints, varnishes or lacquers
- Wood preservatives
- Paint strippers or other solvents
- Glue or adhesives
- Hobby or craft materials
- Fuel or automotive products
- Pesticides
- Air-fresheners, potpourri, incense, candles, etc.
- Cleaners, disinfectants and degreasers
- Other: _____

Other VOC Sources or Conditions

- Composite or engineered wood products installed during remodeling within last year are not low VOC-emitting and were not sealed to reduce VOC emissions
- Evidence of smoking inside the house
- Air cleaning equipment designed to produce ozone in the house.

Existing Conditions in Attached Garage

- Leaks in HVAC system return ducts or air handler in garage
- Supply diffusers or return grilles in garage
- Leaks through the shared walls, doors, floor, or ceiling between garage and living space
- Vehicle left idling in garage

Weatherization Related VOC-Emitting Sources

Identify products that will be used or installed during weatherization that emit formaldehyde or other VOCs:

- Spray polyurethane foam insulation
- Other insulation
- Sealants
- Plywood or composite wood products
- Paints and finishes
- Cleaning supplies
- Other: _____

Comments

Figure 3.14. Formaldehyde and VOCs: Detailed Survey form.

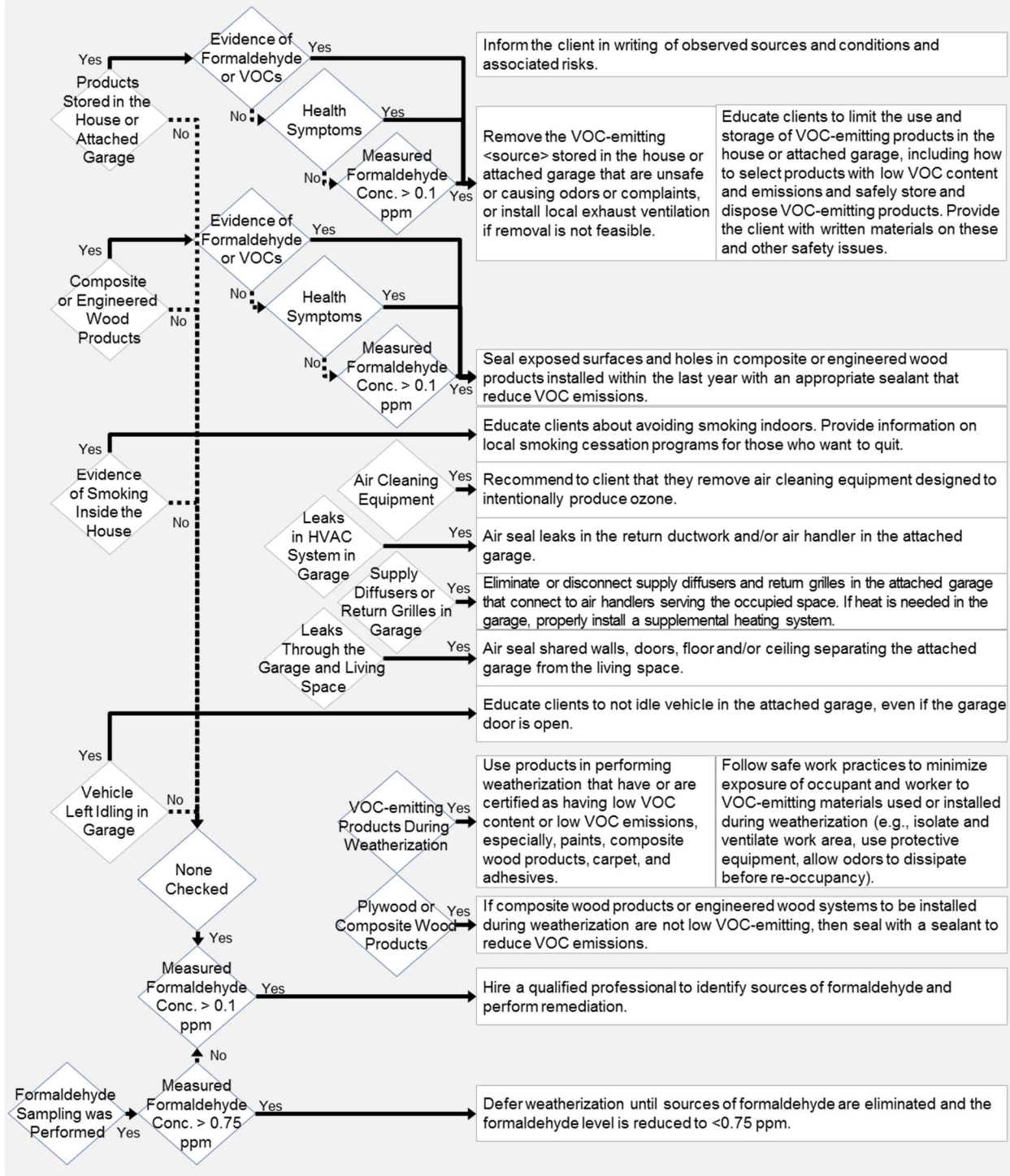


Figure 3.15. Formaldehyde and VOCs: Program Logic for the Audit Recommendations form.

3.6 COMBUSTION

Weatherization Program Notice 17-7 (DOE 2017) provides combustion-related guidance under several categories, mainly regarding combustion gases and various combustion appliances. EPA (2011) provides combustion safety guidance under unvented and vented appliance-specific categories. Guidance from both documents was used in developing the Health and Safety Audit. Information entered on the Observations form for the presence of combustion equipment is used to determine if completion of the Combustion form is recommended or not applicable (Figure 3.16). Figure 3.17 shows the content of the Combustion form, which includes both a safety inspection and performance testing. Figure 3.18 shows the program logic used for generating recommendations for addressing combustion safety issues. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

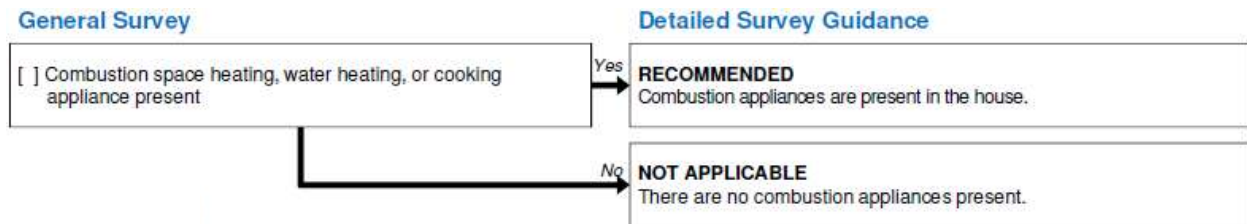


Figure 3.16. Combustion: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Safety Inspection

Observations						
1	Appliance (Options: Furnace, Boiler, Space Heater1, Space Heater 2, Space Heater 3, Fireplace, Water Heater, Stove1, Stove2, Clothes Dryer)					
2	Fuel (Options: Natural Gas, Propane, Oil, Kerosene, Wood, Coal, Other)					
3	Vented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Expected Post-Retrofit Status ^{1,2} (Options: Remain, Removed, Replaced)					
General Safety						
5	Not compliant with applicable codes or standards ^{3,4}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Proper clearance to combustibles not maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Fuel leaks, especially at fuel line connections ^{5,6}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Electrical connections unsafe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Other general safety problem :	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vented Combustion Appliance <i>Complete this section if Vented (line 3) is checked</i>						
10	Venting system damaged or has leaks, cracks or faulty connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Venting system inadequately sized, not venting to outside or otherwise inadequate ⁷	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Other venting problem :	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solid Fuel Combustion Appliance <i>Complete this section if Fuel (line 2) is Wood, Coal, or Other</i>						
13	Soot on walls, ceiling or mantel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Creosote staining near flue pipe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Inside of house smells like wood or coal smoke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Occupant reports of regular (i.e., daily) wood or coal smoke smell indoors during heating season	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Opacity of smoke leaving chimney > 20% (if being used) ⁸	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Size or materials of floor protection inadequate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Not EPA-certified ⁹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	Is or will be oversized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unvented or Vent-Free Combustion Appliance <i>Complete this section if Vented (line 3) is unchecked</i>						
21	Primary source of heating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stove <i>Complete this section if Appliance (line 1) is Stove1 or Stove2</i>						
22	Burner nonoperational or operating improperly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Flame quality poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹ Only appliances with an "Expected post-retrofit status" of "Remain" require further inspection or testing. Inspection and testing of appliances that will be removed or replaced is optional. Select "Remain" if unknown or unsure.

² For homes to be weatherized under the Weatherization Assistance Program, replacement is an allowable health and safety measure, if unsafe conditions whose remediation is necessary to perform weatherization, cannot be remedied by repair or tuning, unless replacement is prevented by other WAP guidance. Use a DOE-approved audit to determine if the appliance can be replaced as an energy conservation measure prior to replacing it as a health and safety measure.

³ For unvented space heaters, does not have ANSI Z21.11.2 label.

⁴ For mobile homes, all fuel-burning, heat-producing appliances, except ranges and ovens must be vented to outside.

⁵ WARNING: If the fuel leak is severe, discontinue the audit and correct the leak before continuing with the audit.

⁶ Test exposed gas lines from the utility coupling into, and throughout, the house. Conduct sensory inspection on bulk fuels.

⁷ Masonry chimneys used by vented space heaters should be properly lined.

⁸ 100% opacity means nothing can be seen through the smoke. At 20% opacity, there is very little smoke and you can see almost completely through it.

⁹ Per EPA "Burn Wise Guides: Burn Wise Guide for Best Burn Practices for Wood Stoves" and "Burn Wise Tips" (www.epa.gov/burnwise/pdfs/BurnWiseTips.pdf).

Comments

Figure 3.17. Combustion: Detailed Survey form.

Detailed Survey (cont.)

Performance Testing

Background Measurements

Outdoor temperature [°F] : _____

CO outside the house [ppm]¹ : _____

CO in living space [ppm]² : _____

¹Avoid testing near obvious sources of CO (e.g., motor vehicles, lawn equipment).

²Avoid testing near combustion equipment that has already undergone CO testing.

Oven Measurements

CO in undiluted flue gases in the oven vent¹:

Measurement type (select one): As measured Air-free

Stove 1 [ppm] : _____

Stove 2 [ppm] : _____

¹For homes to be weatherized under the Weatherization Assistance Program, testing is required.

CAZ Measurements

Measurements ¹					
24	Vented Combustion Appliance (Copy from line 1 if line 1 is furnace, boiler, space heater, fireplace, or water heater, and line 3 is checked)				
25	Fuel (Copy from line 2 if line 1 is furnace, boiler, space heater, fireplace, or water heater, and line 3 is checked)				
CAZ Measurements		Copy CAZ measurements if multiple appliances are located in the same CAZ			
26	Combustion appliance zone (Options: Basement, Garage, Living Space, Closet 1, Closet 2, Other)				
27	CAZ depressurization limit [Pa] ²				
28	CAZ baseline pressure with reference to outdoors [Pa]				
29	CAZ worst-case pressure with reference to outdoors [Pa] ³				
30	CAZ net worst-case depressurization [Pa] (line 29 minus line 28)				
31	CO in the CAZ [ppm] ⁴				
Appliance Measurements		Complete this section if line 24 is furnace, boiler, space heater, or water heater			
32	Spillage time under worst-case depressurization [sec] ⁵				
33	Draft in the flue under worst-case depressurization [Pa]				
34	Minimum draft pressure [Pa] ⁶				
35	CO in undiluted flue gases under worst-case depressurization [ppm]. Measurement type (select one): <input type="radio"/> As measured <input type="radio"/> Air-free				

¹For homes to be weatherized under the Weatherization Assistance Program, combustion safety testing is required when combustion appliances are present, including vented space heaters and solid fuel fireplaces. This includes testing for spillage and CO in naturally drafting appliances during CAZ depressurization.

²Refer to CAZ Depressurization Limit Table below.

CAZ Depressurization Limit

Venting Condition	CAZ Depressurization Limit [Pa]
Orphan natural draft water heater (including outside chimneys)	-2
Natural draft boiler or furnace commonly vented with water heater	-3
Natural draft boiler or furnace with vent damper commonly vented with water heater	-5
Individual natural draft boiler or furnace	-5
Mechanically assisted draft boiler or furnace commonly vented with water heater	-5
Mechanically assisted draft boiler or furnace alone	-15
Fan assisted DHW alone	-15
Exhausto chimney-top draft inducer (fan at chimney top)	-50
High static pressure flame retention head oil burner	-50
Sealed combustion appliances	-50
Wood-burning combustion appliances, including fireplaces	Grantee-approved limit

Comments

³Create maximum negative pressure in the CAZ by activating exhaust fans, clothes dryer, and/or the air handler (but not whole-house fans designed for night cooling); opening and closing interior doors; etc. For homes to be weatherized under the Weatherization Assistance Program, a fireplace may be simulated by running a blower door at 300 cfm depressurized, or other Grantee-approved flow.

⁴Monitor CAZ CO continuously during combustion testing and record highest value. Discontinue testing if CO levels exceed 35 ppm.

⁵At draft diverter, barometric draft control, or burner inlet for fan-assisted appliances.

⁶The minimum draft pressure is based on the outdoor temperature, i.e., -2.5 Pa if outdoor temperature < 10°F; (outdoor temperature/40 - 2.75) Pa if 10°F ≤ outdoor temperature ≤ 90°F; -0.5 Pa if outdoor temperature > 90°F.

Figure 3.17. Combustion: Detailed Survey form (continued).

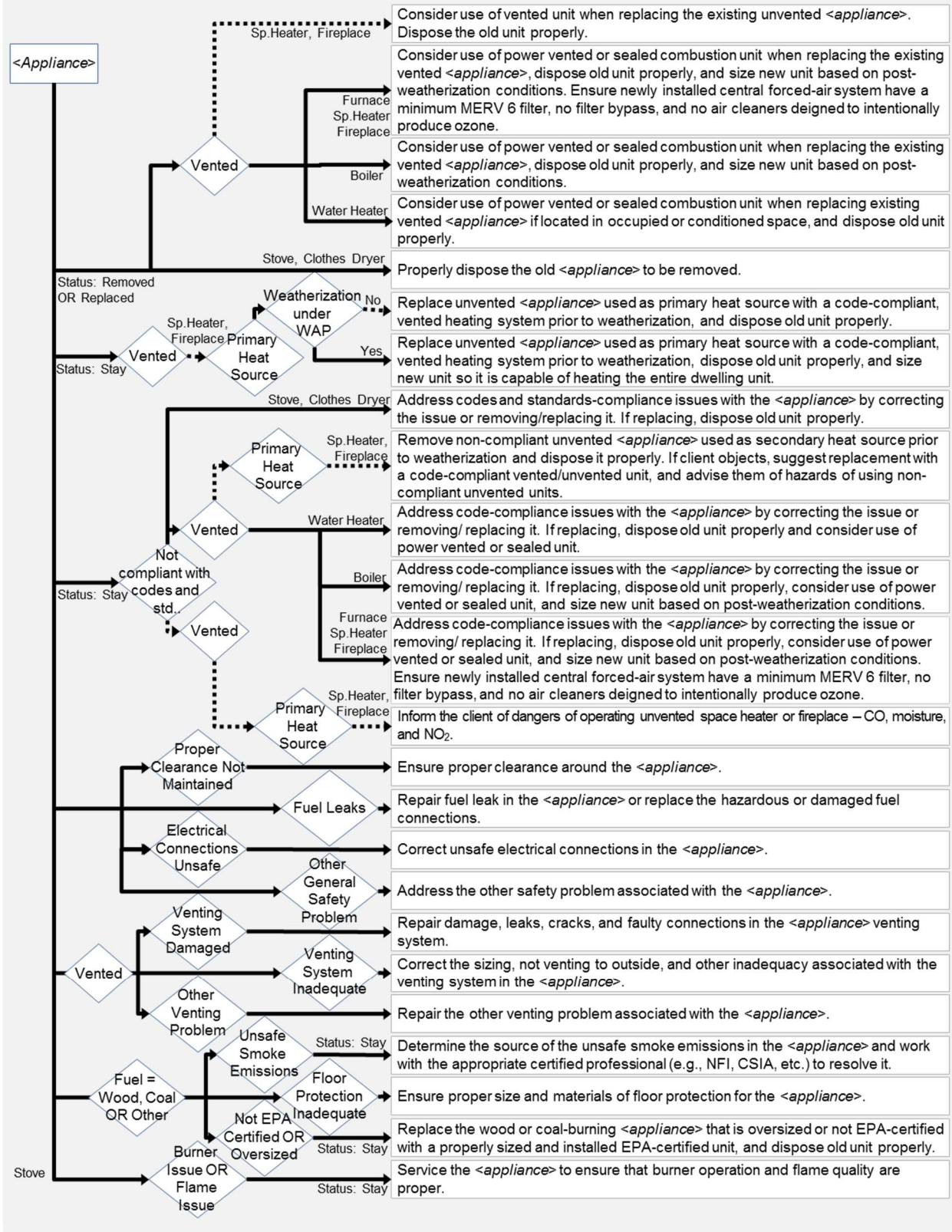


Figure 3.18. Combustion: Program Logic for the Audit Recommendations form.

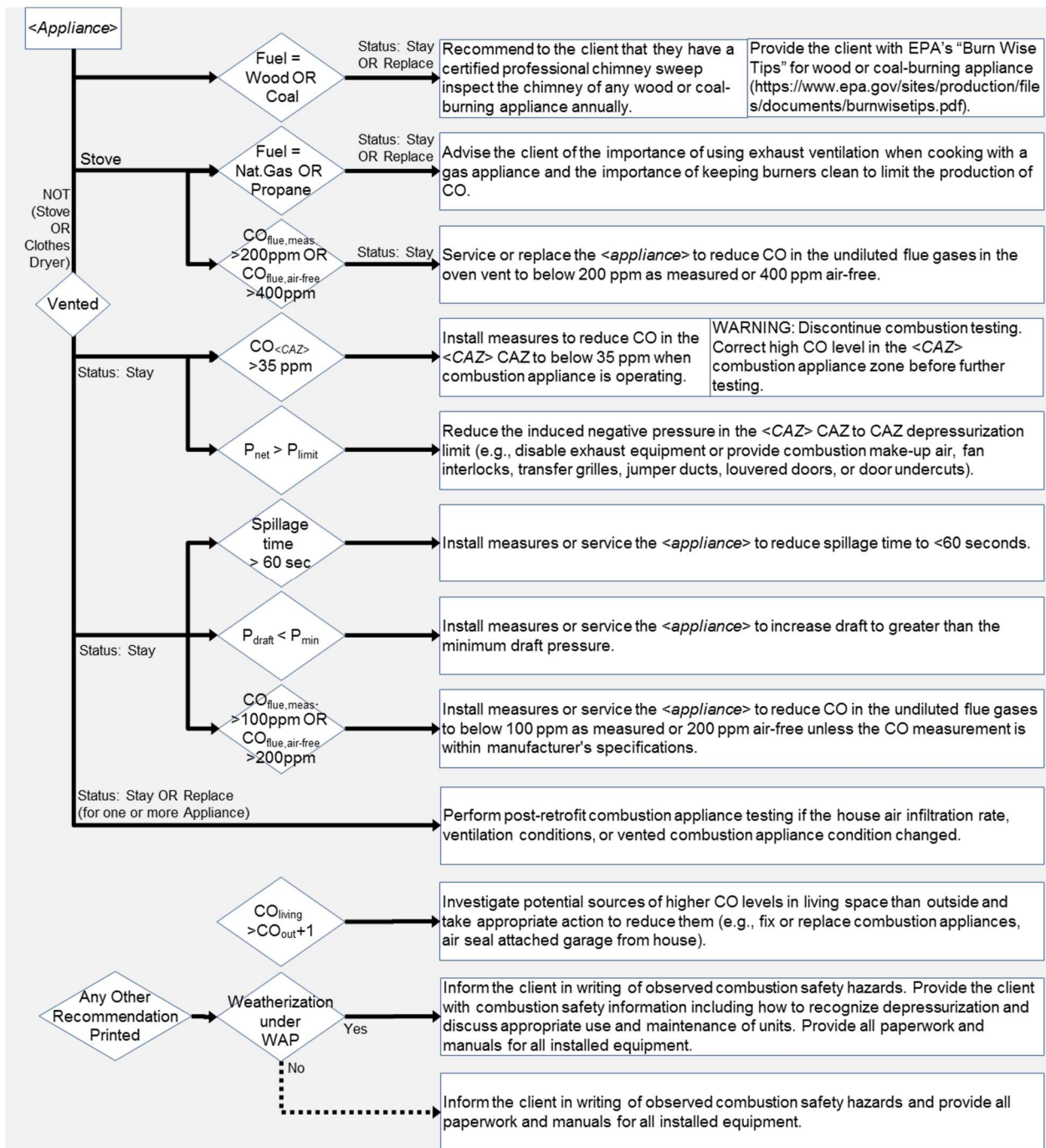


Figure 3.18. Combustion: Program Logic for the Audit Recommendations form (continued).

3.7 PEST INFESTATION

Weatherization Program Notice 17-7 (DOE 2017) and EPA (2011) provide specific guidance for addressing pest infestation that was used in developing the Health and Safety Audit. Information entered on the Observations form for pest infestation is used to determine if completion of the Pest Infestation form is recommended or optional. Figure 3.19 shows the program logic used for generating this guidance. Figure 3.20 shows the content of the Pest infestation form. Figure 3.21 shows the program logic used for generating recommendations for addressing pest infestation issues. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

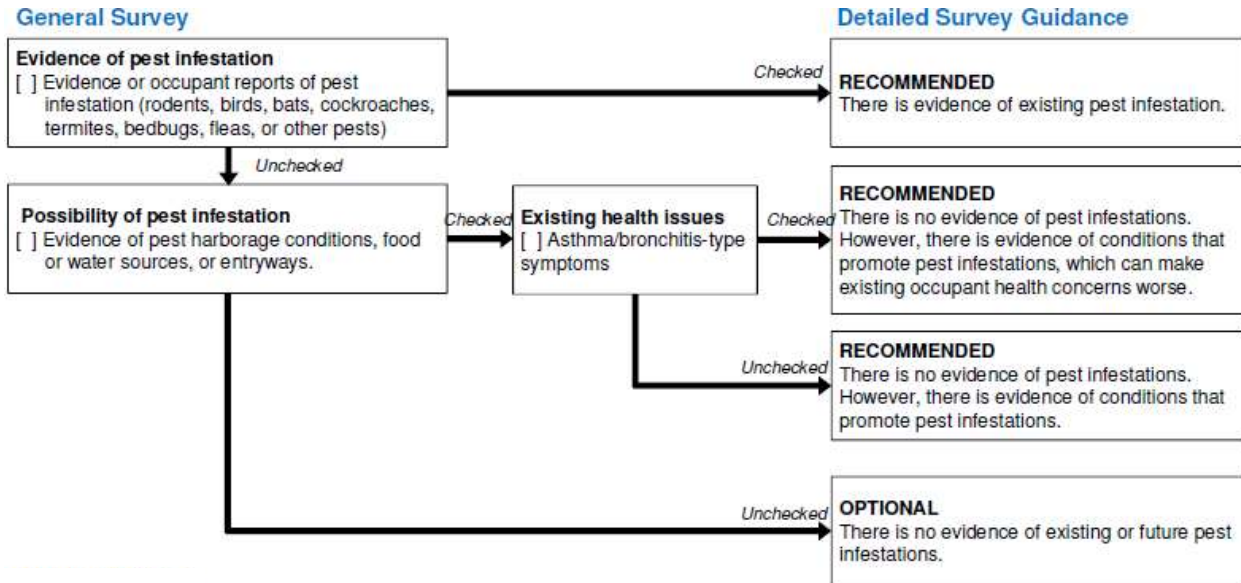


Figure 3.19. Pest Infestation: Program Logic for the Detailed Survey Form Guidance form.

Detailed Survey

Evidence of Issue

Observations									
Pest	Degree of Infestation ¹ (Select One)			Degree of Pest Contaminated Materials ² (Select One)			All Sources Identified on the Source Identification Form ^{3,4}	Harmful Rodenticides or Pesticides Being Used ⁵	Comments
	None	Occasional /Moderate	Persistent /Severe	None	Moderate	Severe			
Rodents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Termites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Birds or Bats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Cockroaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Bedbugs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Fleas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Other Insects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	
Other Animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[]	[]	

¹ Occupant reported, live or dead pests, body parts, droppings (feces), nests, or other indications.

² Droppings (feces), nests, dead pests, body parts, and the harborage materials listed on the Source Identification form.

³ Sources of pest harborages, food and water, and entryways.

⁴ If unchecked for one or more pests for which degree of infestation or degree of pest contaminated materials is other than None, additional sources of pest harborage, food and water, and entryways that encourage pest infestation need to be identified on the Source Identification form for those pests.

⁵ Sprays, foggers, bombs, Chinese Chalk, Tres Pasitos, Tempo®, or other harmful chemicals

Source Identification

Pest Harborage

- Appliances (e.g., toaster, microwave, countertop grilles, clocks) not clean
- Indoor clutter (clothes, boxes, paper, bottles, etc.)
- Bushes, trees or other vegetation closer than two feet from the home
- Wood piles near house
- Other: _____

Pest Entryways

- Large exterior holes and gaps in areas with evidence of rodent infestations
- Window or door screens loose, torn or missing
- Air intake screens or dampers missing, broken, or dirty
- Exhaust vent screens or dampers missing, broken, or dirty
- Other: _____

Food and Water Sources

- Boxed, loose, or pet food not properly stored
- Open food packages, pet food, food debris or dirty dishes left out overnight
- Indoor waste containers not tightly closed or not emptied every night
- Outside garbage cans not sealable or not used properly by occupants
- Leaky faucets or water pipes
- Other: _____

Comments

Figure 3.20. Pest Infestation: Detailed Survey form.

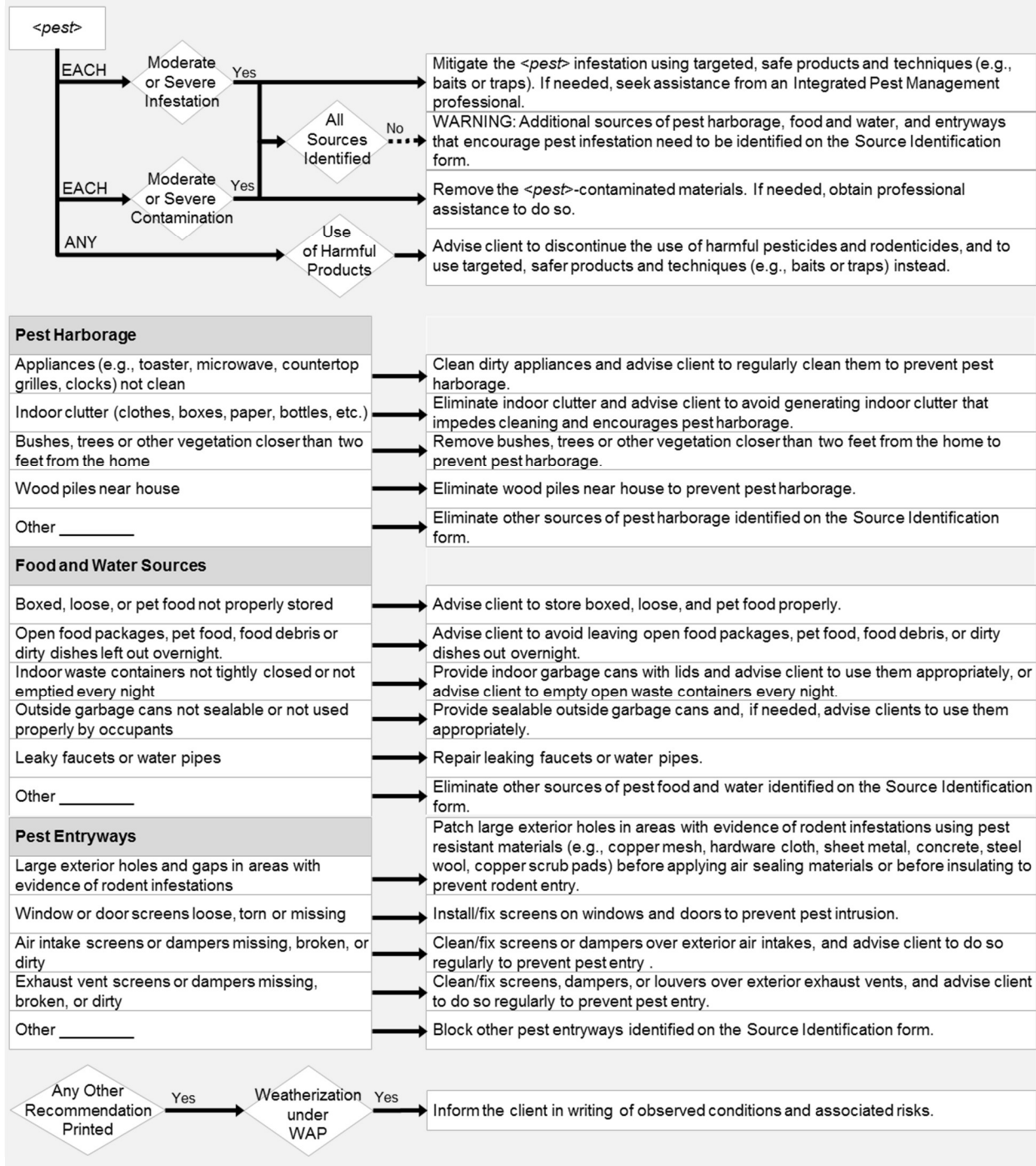


Figure 3.21. Pest Infestation: Program Logic for the Audit Recommendations form.

3.8 SAFETY

Weatherization Program Notice 17-7 (DOE 2017) and EPA (2011) provide safety-related guidance under multiple health and safety issues that was used in developing the Health and Safety Audit. Safety issues are grouped in four categories on the Safety form: general safety, structural safety, fire safety, and electrical safety. Figure 3.22 shows the content of the Safety form divided into these four categories.

Completion of the Safety form is always recommended, unlike most of the Detailed Survey forms, for which information entered on the General Survey forms determines if completion of the respective Detailed Survey form is recommended, optional, or not applicable.

Figure 3.23 through Figure 3.26 show the program logic used for generating recommendations for addressing safety issues under the four safety categories. With the list of recommendations, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

Detailed Survey

General Safety

Observations – Presence of Hazard	Comments
Injury Prevention	
<input type="checkbox"/> Clutter on the floor, stairs, or landings	
<input type="checkbox"/> Cables or cords lying in the traffic area	
<input type="checkbox"/> Flooring, carpet or rugs damaged or worn-out	
<input type="checkbox"/> Throw-rugs without non-skid backing	
<input type="checkbox"/> Hazardous chemicals (e.g., strong cleaners and pesticides) not stored in appropriate and controlled locations.	
<input type="checkbox"/> Hot water supply temperature >120°F	
Hazards for Elderly and Disabled	
<input type="checkbox"/> Door thresholds raised or deteriorated	
<input type="checkbox"/> Bathroom wall fittings loose	
<input type="checkbox"/> Grab bars by the bathtub and toilet not present	
<input type="checkbox"/> Non-skid mat or strips on tub bottom not present	
<input type="checkbox"/> Night lamps in hallway and stair not present or burned out	
<input type="checkbox"/> Lighting level in hallway and stair inadequate	
<input type="checkbox"/> Light switches in hallway and stair improperly located (e.g., not present at the top and bottom of stairs)	
Child Safety Hazards	
<input type="checkbox"/> Window guards missing	
<input type="checkbox"/> Window blinds with looped cords present	
<input type="checkbox"/> Infant sleep environment unsafe	
<input type="checkbox"/> Necessary safety gates missing at the top of stairs	
<input type="checkbox"/> Flammable products or igniters within children's reach	
<input type="checkbox"/> Medicines and vitamins within children's reach	
<input type="checkbox"/> Cleaning supplies within children's reach	

Structural Safety

Observations ¹ – Presence of Hazard	Comments
Roof (if not a multifamily intermediate unit)	
<input type="checkbox"/> Sagging or damaged	
Walls	
<input type="checkbox"/> Bulging, buckling or sagging	
<input type="checkbox"/> Surface finish damaged or missing	
Windows	
<input type="checkbox"/> Window pane broken or missing	
<input type="checkbox"/> Window sill damaged	
<input type="checkbox"/> Window frame loose or damaged	
<input type="checkbox"/> Hardware or lock loose, damaged, or jammed (window inoperable or not lockable)	
<input type="checkbox"/> Security bars prevent egress (for windows designed for fire exist)	
Doors	
<input type="checkbox"/> Door panel damaged or missing	
<input type="checkbox"/> Threshold or frame loose or damaged	
<input type="checkbox"/> Hardware or lock loose, damaged, or jammed (door inoperable or not lockable)	
<input type="checkbox"/> Necessary security door damaged or missing	
Stairs	
<input type="checkbox"/> Stair treads damaged	
<input type="checkbox"/> Stair nosing loose, damaged or missing	
<input type="checkbox"/> Stair stringer damaged or missing	
Ceiling	
<input type="checkbox"/> Bulging, buckling or sagging	
<input type="checkbox"/> Tiles or panels damaged or missing	
Floor	
<input type="checkbox"/> Bulging, buckling or sagging	
<input type="checkbox"/> Subfloor damaged or cracked	
<input type="checkbox"/> Floor covering or tiles damaged or missing	
Porch, Patio or Balcony	
<input type="checkbox"/> Baluster or side rail loose, damaged or missing	

¹ Especially inspect the portions of the home where weatherization will occur for issues that could impact entry to these areas or the performance of assessments, work, and inspections in these areas.

Fire Safety

Observations – Presence of Hazard	Comments
Smoke Alarms	
<input type="checkbox"/> Not installed on all floors and in vicinity of all bedroom doors	
<input type="checkbox"/> Not working – broken	
<input type="checkbox"/> Not working – dead battery	
CO Alarms	
<input type="checkbox"/> Not installed on all floors and in vicinity of all bedroom doors	
<input type="checkbox"/> Not working – broken	
<input type="checkbox"/> Not working – dead battery	
Fire Extinguisher	
<input type="checkbox"/> Fire extinguisher inaccessible or improperly located	
<input type="checkbox"/> Fire extinguisher not present or not working	
<input type="checkbox"/> Fire extinguisher operation unfamiliar to occupants	
Fire Hazards (See Electrical Safety for specific electricity-related hazards)	
<input type="checkbox"/> Flammable products improperly stored or stored near ignition sources	
<input type="checkbox"/> Insufficient clearance around heating systems	
<input type="checkbox"/> Any other fire hazard/code-compliance issue present	

Electrical Safety

Knob and Tube Wiring

Present	Unsafe ^{1,2}	Installation of Insulation Planned	Code Allows Insulating Over Knob and Tube Wiring	Comments
<input type="checkbox"/> Attic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Basement/Crawlspace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Exterior walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

¹ Damaged wiring insulation, inadequately sized, alterations performed that may have created an electrical hazard, circuits overloaded, or otherwise unsafe.

² For homes to be weatherized under the Weatherization Assistance Program, voltage drop and voltage detection testing are allowed.

Other Electrical Hazards

Observations – Presence of Hazard ^{1,2}	Comments
<input type="checkbox"/> Electric space heater present	
<input type="checkbox"/> Electrical wiring or components damaged or exposed	
<input type="checkbox"/> Extension cords used unsafely	
<input type="checkbox"/> Electrical circuits overloaded (especially with electric space heater)	
<input type="checkbox"/> Nonpolarized cords or plugs used for polarized appliances	
<input type="checkbox"/> Electrical outlet or switch cover plates missing or broken	
<input type="checkbox"/> Working GFI's in kitchen, bathrooms, or laundry not present	
<input type="checkbox"/> Water leaks or puddling near electrical equipment	
<input type="checkbox"/> Wiring in attic unsafe	
<input type="checkbox"/> Voltage drop detected at electrical outlets	
<input type="checkbox"/> Faulty wiring	
<input type="checkbox"/> Other hazards/code compliance issues	

¹ Especially check for alterations performed that may have created an electrical hazard.

² For homes to be weatherized under the Weatherization Assistance Program, voltage drop and voltage detection testing are allowed.

Comments

Figure 3.22. Safety: Detailed Survey form.

Injury Prevention		
Clutter on the floor, stairs, or landings	→	Remove clutter from the floor, stairs, and landing. Educate client about maintaining clutter free indoor environment.
Cables or cords lying in the traffic area	→	Remove cables and cords from the traffic area. Educate client about securing cables and cords, appropriately.
Flooring, carpet or rugs damaged or worn-out	→	Replace damaged or worn-out flooring, carpet or rugs.
Throw-rugs without non-skid backing	→	Install non-skid backing underneath throw-rugs.
Hazardous chemicals (e.g., strong cleaners and pesticides) not stored in appropriate and controlled locations.	→	Educate client about appropriate and controlled storage of cleaning supplies, pesticides, and other harmful chemicals.
Hot water supply temperature >120°F	→	Set water heater thermostats to 120 °F. Educate client about lowering water temperature to prevent scalding.
Hazards for Elderly and Disabled		
Door thresholds raised or deteriorated	→	Replace raised or deteriorated door thresholds with low or beveled type door thresholds.
Bathroom wall fittings loose	→	Fix bathroom wall fittings.
Grab bars by the bathtub and toilet not present	→	Install grab bars by the bathtub and toilet.
Non-skid mat or strips on tub bottom not present	→	Provide non-skid mat or strips on tub bottom.
Night lamps in hallway and stair not present or burned out	→	Install missing or burned out lamps in hallway and stairs.
Lighting level in hallway and stair inadequate	→	Provide more lighting in hallways and stairs.
Light switches in hallway and stair improperly located (e.g., not present at the top and bottom of stairs)	→	Relocate light switches to appropriate locations. Install light switches at the top and bottom of stairs, if not present.
Child Safety Hazards		
Window guards missing	→	Install missing window guards.
Window blinds with looped cords present	→	Replace looped cords of window blinds.
Infant sleep environment unsafe	→	Educate client about safe infant sleep environment.
Necessary safety gates missing at the top of stairs	→	Provide safety gates at the top of stairs.
Flammable products or igniters within children's reach	→	Educate client about appropriate and controlled storage of flammable products and igniters out of reach of children.
Medicines and vitamins within children's reach	→	Educate client about appropriate and controlled storage of medicines and vitamins out of reach of children.
Cleaning supplies within children's reach	→	Educate client about appropriate and controlled storage of cleaning supplies out of reach of children.

Figure 3.23. General Safety: Program Logic for the Audit Recommendations form.

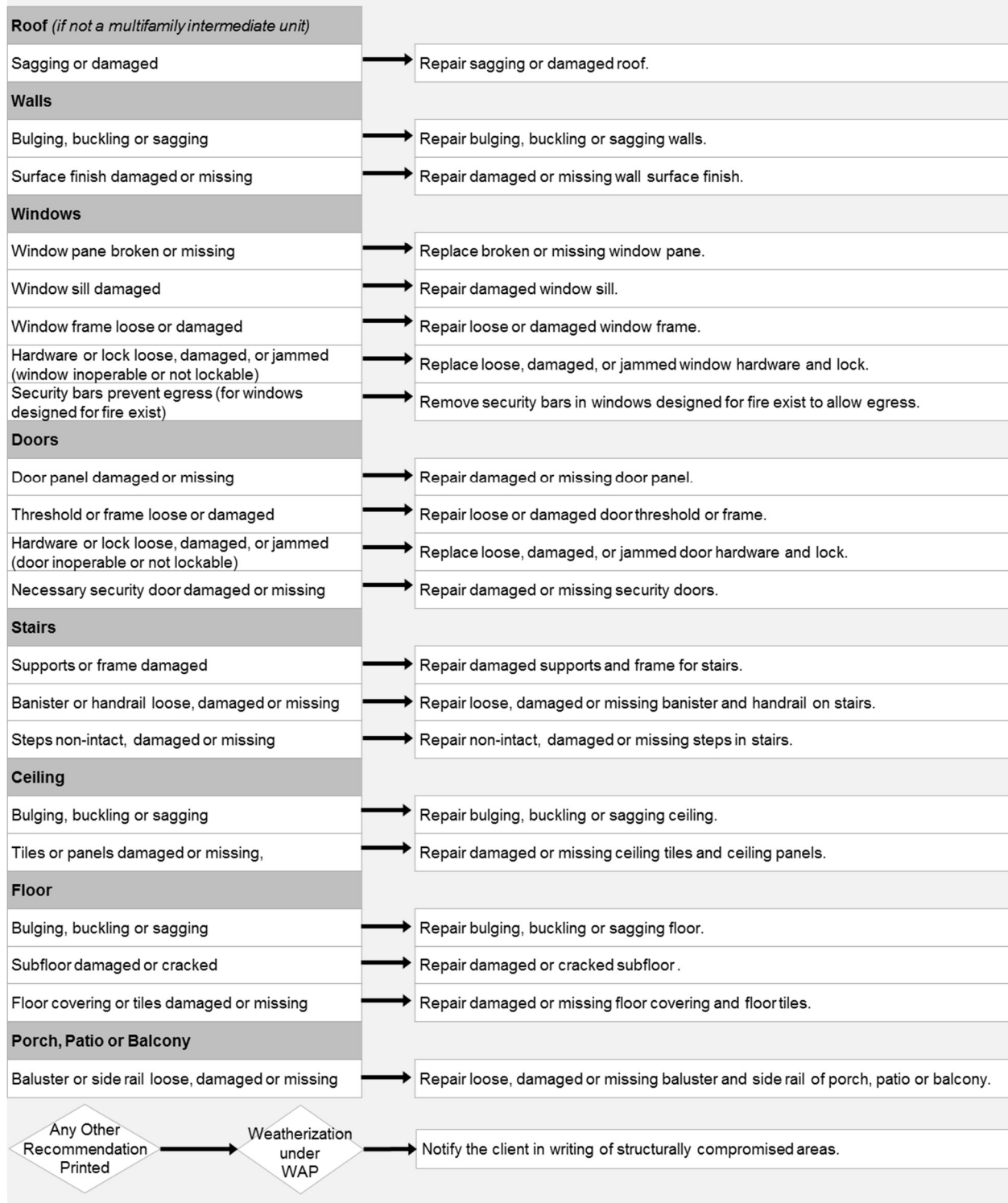


Figure 3.24. Structural Safety: Program Logic for the Audit Recommendations form.

Smoke alarms		
Not installed on all floors and in vicinity of all bedroom doors	Install new smoke alarms and/or replace broken alarms so that an operating alarm is located on all floors and in the vicinity of all bedroom doors.	Provide client with verbal or written information on use of smoke alarms.
Not working -- broken		
Not working -- dead battery	Replace dead batteries in existing smoke alarms, preferably with 10-year lithium batteries.	
CO alarms		
Not installed on all floors and in vicinity of all bedroom doors	Install new CO alarms and/or replace broken alarms so that an operating alarm is located on all floors and in the vicinity of all bedroom doors, preferably with alarms that have digital display, provide peak level readings, and can detect and store peak CO levels of less than 30 ppm.	Provide client with verbal or written information on use of CO alarms.
Not working -- broken		
Not working -- dead battery	Replace dead batteries in existing CO alarms, preferably with 10-year lithium batteries.	
Fire extinguisher		
Fire extinguisher inaccessible or improperly located	Relocate existing fire extinguisher(s) in appropriate location(s).	
Fire extinguisher not present or not working	Install new fire extinguisher(s) to an appropriate location(s).	Provide client with verbal or written information on use of fire extinguishers.
Fire extinguisher operation unfamiliar to occupants	---	
Fire hazards		
Flammable products improperly stored or stored near ignition sources	Store flammable products properly and away from ignition sources.	Provide client with verbal or written information on the proper storage of flammable products.
Insufficient clearance around heating systems	Provide sufficient clearance around heating systems.	Provide client with verbal or written information on the need to maintain proper clearance around heating systems.
Any other fire hazard/code-compliance issue present	Mitigate other fire hazard/code-compliance issue present.	

Figure 3.25. Fire Safety: Program Logic for the Audit Recommendations form.

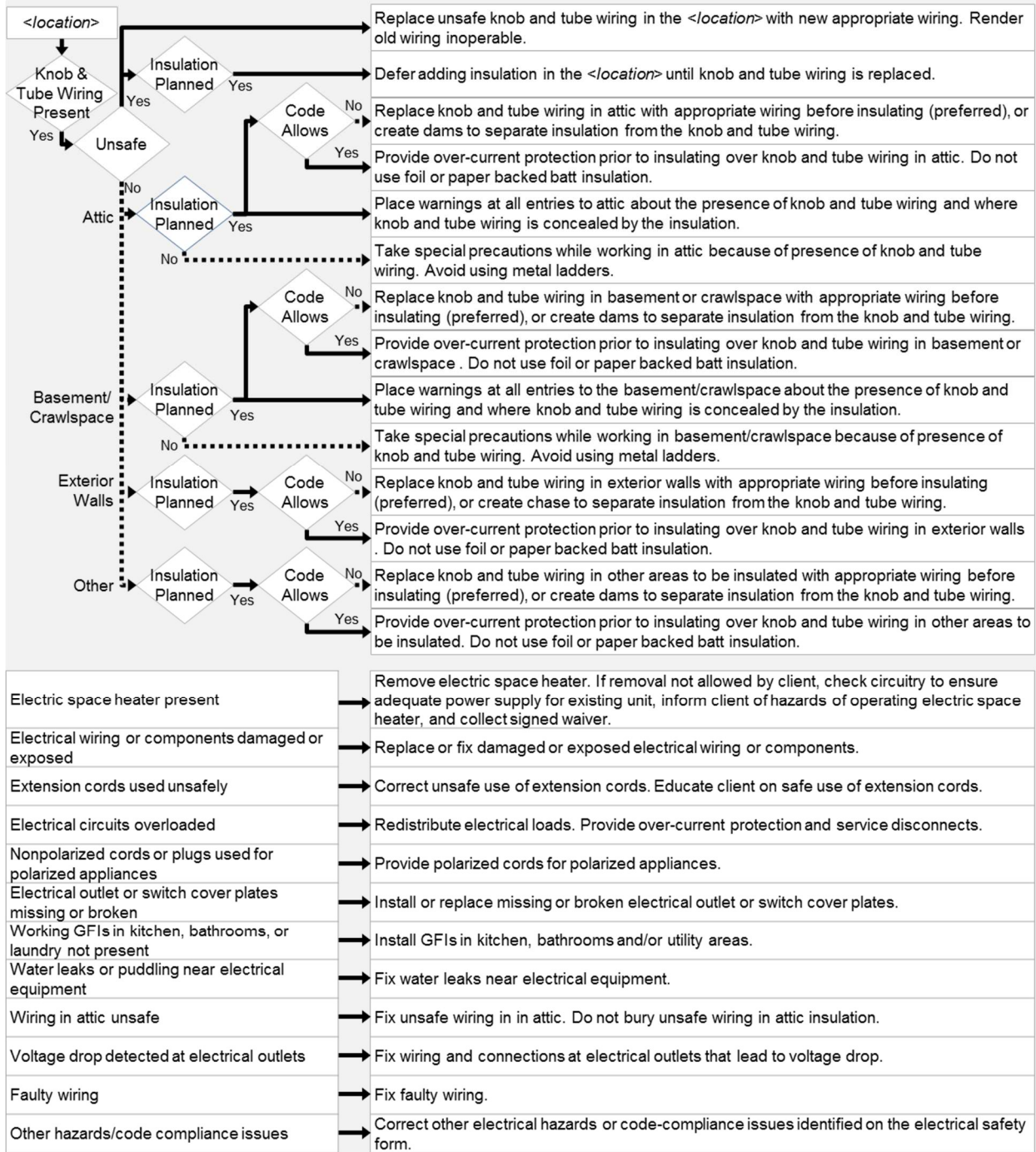


Figure 3.26. Electrical Safety: Program Logic for the Audit Recommendations form.

3.9 VENTILATION

Weatherization Program Notice 17-7 (DOE 2017) requires that American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62.2-2016 (ASHRAE 2016) (or most current) be met to the fullest extent possible when performing weatherization activities, unless acceptable indoor air quality already exists as defined by ASHRAE Standard 62.2. EPA (2011) provides ventilation assessment protocols and actions under multiple categories and points to ASHRAE Standard 62.2-2010 (ASHRAE 2010). In the Health and Safety Audit, compliance with ASHRAE Standard 62.2-2010, ASHRAE Standard 62.2-2013 (ASHRAE 2013) and ASHRAE Standard 62.2-2016 can be assessed.

Figure 3.27 shows the content of the Ventilation form. Like the Safety form, completion of the Ventilation form is always recommended. All other Detailed Survey forms use information entered on the General Survey forms to determine if completion of the respective Detailed Survey form is recommended, optional, or not applicable.

Figure 3.28 shows the program logic used for calculating the required mechanical ventilation rate and generating audit recommendations for ventilation issues. With the audit recommendation, the audit provides notes specifically applicable to the DOE Weatherization Assistance Program.

Note that the energy impact of providing mechanical ventilation is not calculated by the Health and Safety Audit.

Detailed Survey

General Information

Exception to ASHRAE Standard 62.2 whole-building mechanical system requirement applies. If checked, select one of the following:

For a housing unit that will not be weatherized under the DOE Weatherization Assistance Program: If the authority having jurisdiction determines that window operation is a locally permissible method of providing ventilation and at least one of the following conditions is met: (a) the building has no mechanical cooling and is in zone 1 or zone 2 of the ASHRAE Climate Zone Map, or (b) the building is thermally conditioned for human occupancy for less than 876 h per year.

For a housing unit that will be weatherized under the DOE Weatherization Assistance Program: If (a) the housing unit is in Climate Zone 1 of the ASHRAE Climate Zone Map, (b) the housing unit is designed to have free movement of air between the indoors and outdoors where no effect will be made through weatherization to establish an air barrier, and (c) there is no room that may be enclosed and contains a source of water or combustion.

ASHRAE Standard 62.2 version (select one)¹: 2010 2013 2016 Not Applicable

¹2010 and 2013 versions are not approved if the housing unit will be weatherized under the DOE Weatherization Assistance Program.

Exception to ASHRAE Standard 62.2 occupant density calculation applies if the authority having jurisdiction approves. In this case, the density will be equal to the number of occupants when this is less than the number of bedrooms plus one.

Fields pertinent to ASHRAE Standard 62.2-2013 or 2016:

Dwelling Unit Type (select one): Detached Horizontally Attached (Duplex, Triplex, or Row House) Vertically Attached (Stacked)

If ASHRAE Standard 62.2 version is 2016 and dwelling unit type is horizontally attached:

Exterior Envelope Surface Area [sq ft]: _____
Horizontally Attached Common Wall Area [sq ft]: _____

Clothes Dryer Exhaust Information

Clothes dryer present

Clothes dryer does not vent to outdoors (i.e., vents into crawlspace, attic, or within a wall) (condensing dryers are exempt)

Clothes dryer vent has restrictions and/or lint build up

Kitchen and Bath Exhaust Information

Observations and Measurements								
Space ¹	Present	Operable Window ²	Exhaust Fan			Compliance Option (Select One) ⁵		Comments
			Present	Vented to Outdoors ³	Flow Rate [cfm] ⁴	Replace/Install	Include in Ventilation Requirement	
Bathroom 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Bathroom 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Bathroom 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Bathroom 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Bathroom 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Kitchen 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	
Kitchen 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="radio"/>	<input type="radio"/>	

¹Bathrooms should not include half-baths (i.e. bathrooms without a shower and/or tub).

²Check only if the authority having jurisdiction determines that window operation is a locally permissible method of providing local exhaust.

³Not vented into crawlspace, attic, or within a wall.

⁴Measured using a flow hood, flow grid, or other airflow measuring device. Alternatively, if the duct sizing meets the criteria specified in ASHRAE 62.2 and the housing unit will NOT be weatherized under the DOE Weatherization Assistance Program, (a) the air flow rating of the fan at a pressure of 0.25 in. w.c. (62.5 Pa) or (b) 75% of the air flow rating of the fan at a pressure of 0.1 in. w.c. (25 Pa). Enter zero if the flow rate cannot be measured or assumed based on the nameplate air flow rating of the fan.

⁵Select "Replace/Install" if a new fan compliant with ASHRAE 62.2 will be installed if the audit finds the existing fan to be deficient (preferred method). Select "Include in Ventilation Requirement" only if the authority having jurisdiction determines that the whole-building ventilation requirement can be increased if the audit finds the existing fan to be deficient.

Infiltration Information

Comments

Note: Infiltration information is not required if one of the following applies: (a) exception to ASHRAE Standard 62.2 whole-building mechanical system requirement applies, (b) ASHRAE Standard 62.2 version is 2013 and dwelling unit type is horizontally attached or vertically attached, or (c) ASHRAE Standard 62.2 version is 2016 and dwelling unit type is vertically attached (i.e., when an infiltration credit cannot be taken).

Blower Door Measurements	Pre-Weatherization	Target ¹	Post-Weatherization
Air Leakage Rate [cfm]			
House Pressure Difference [Pa]			

¹Estimated or anticipated values if performing the audit before the building is weatherized.

Blower door measurements to use in calculating the required whole-building mechanical ventilation rate (select one): Pre-weatherization Target Post-weatherization

Figure 3.27. Ventilation: Detailed Survey form.

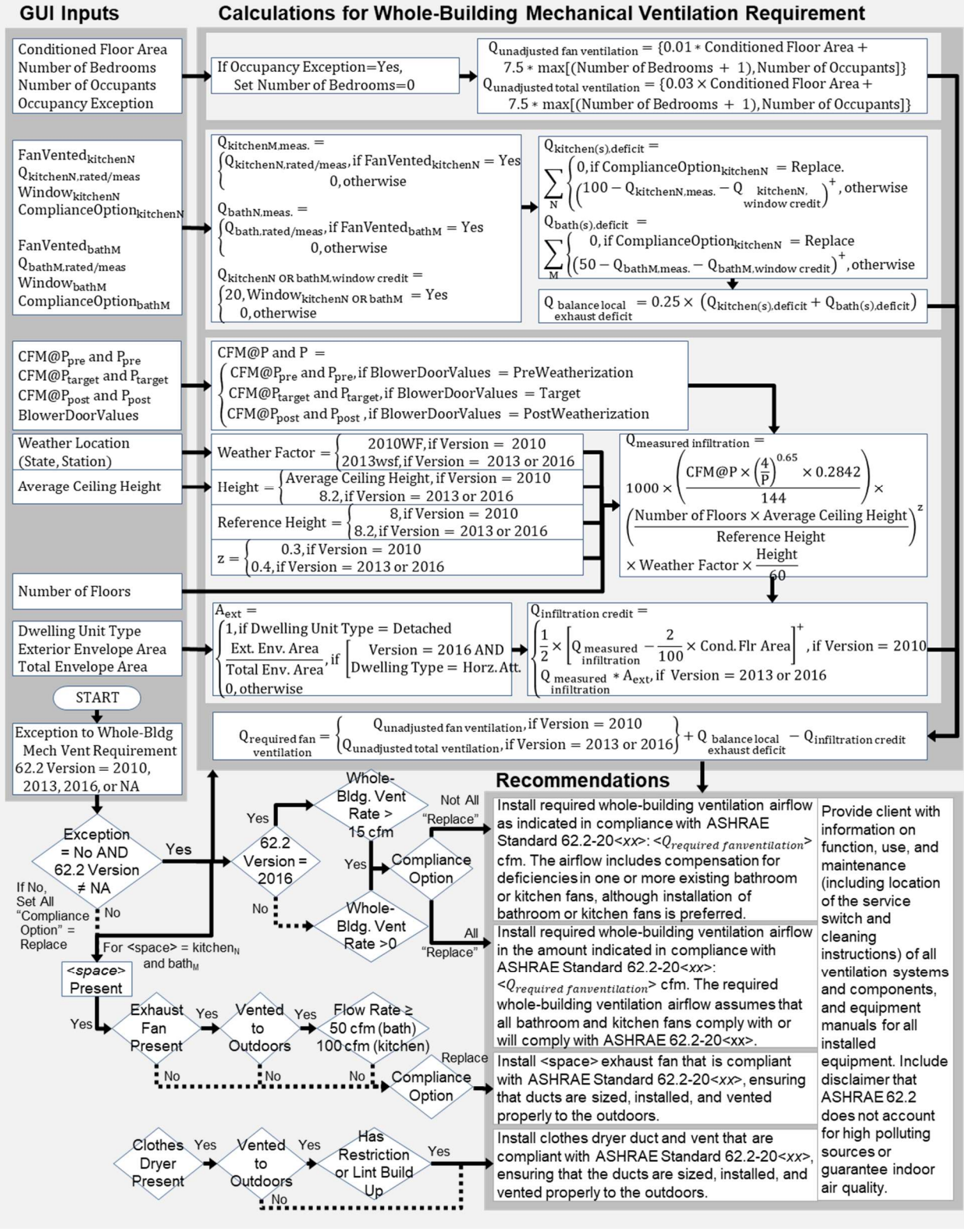


Figure 3.28. Ventilation: Program Logic for the Audit Recommendations form.

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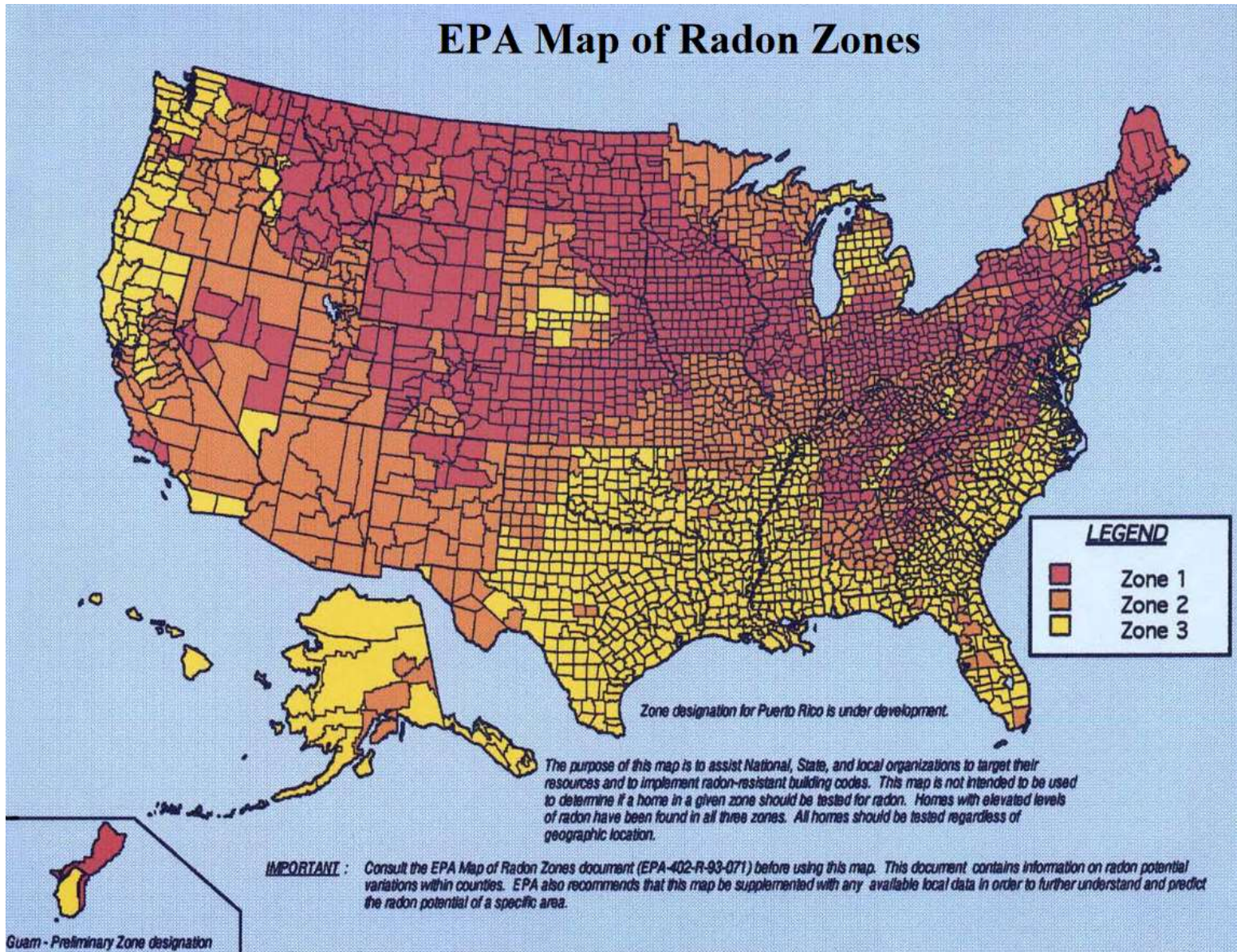
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APPENDIX A. EPA RADON ZONES



(Source: EPA 2017)

Table of EPA Radon Zones by County
(Source: EPA 2017)

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Fairbanks-North Star	AK	2	Marshall	AL	2	Desha	AR	3	Calaveras	CA	2
Kenai Peninsula	AK	2	Montgomery	AL	2	Drew	AR	3	Contra Costa	CA	2
Ketchikan Gateway	AK	2	Perry	AL	2	Faulkner	AR	3	El Dorado	CA	2
Matanuska-Susitna	AK	2	Pickens	AL	2	Franklin	AR	3	Fresno	CA	2
Southeast Fairbanks	AK	2	Randolph	AL	2	Grant	AR	3	Inyo	CA	2
Aleutians East	AK	3	Russell	AL	2	Greene	AR	3	Kern	CA	2
Aleutians West	AK	3	Shelby	AL	2	Hempstead	AR	3	Los Angeles	CA	2
Anchorage Municipality	AK	3	St. Clair	AL	2	Hot Spring	AR	3	Madera	CA	2
Bethel	AK	3	Sumter	AL	2	Howard	AR	3	Mariposa	CA	2
Bristol Bay	AK	3	Tuscaloosa	AL	2	Jackson	AR	3	Mono	CA	2
Denali	AK	3	Walker	AL	2	Jefferson	AR	3	Monterey	CA	2
Dillingham	AK	3	Winston	AL	2	Johnson	AR	3	Nevada	CA	2
Haines	AK	3	Baldwin	AL	3	Lafayette	AR	3	Placer	CA	2
Juneau	AK	3	Butler	AL	3	Lawrence	AR	3	Plumas	CA	2
Kodiak Island	AK	3	Chambers	AL	3	Lee	AR	3	Riverside	CA	2
Lake and Peninsula	AK	3	Choctaw	AL	3	Lincoln	AR	3	San Benito	CA	2
Nome	AK	3	Clarke	AL	3	Little River	AR	3	San Bernardino	CA	2
North Slope	AK	3	Coffee	AL	3	Logan	AR	3	San Francisco	CA	2
Northwest Artic	AK	3	Conecuh	AL	3	Lonoke	AR	3	San Luis Obispo	CA	2
Prince Of Wales-Outer Ketchikan	AK	3	Covington	AL	3	Madison	AR	3	San Mateo	CA	2
Sitka	AK	3	Crenshaw	AL	3	Miller	AR	3	Santa Clara	CA	2
Skagway-Yakutat-Angoon	AK	3	Dale	AL	3	Mississippi	AR	3	Santa Cruz	CA	2
Valdez-Cordova	AK	3	Escambia	AL	3	Monroe	AR	3	Sierra	CA	2
Wade Hampton	AK	3	Geneva	AL	3	Nevada	AR	3	Tulare	CA	2
Wrangell-Petersburg	AK	3	Henry	AL	3	Newton	AR	3	Tuolumne	CA	2
Yakutat City and Borough	AK	3	Houston	AL	3	Ouachita	AR	3	Yuba	CA	2
Yukon-Koyukuk	AK	3	Marengo	AL	3	Perry	AR	3	Butte	CA	3
Calhoun	AL	1	Mobile	AL	3	Phillips	AR	3	Colusa	CA	3
Clay	AL	1	Monroe	AL	3	Pike	AR	3	Del Norte	CA	3
Cleburne	AL	1	Pike	AL	3	Poinsett	AR	3	Glenn	CA	3
Colbert	AL	1	Tallapoosa	AL	3	Polk	AR	3	Humboldt	CA	3
Coosa	AL	1	Washington	AL	3	Pope	AR	3	Imperial	CA	3
Franklin	AL	1	Wilcox	AL	3	Prairie	AR	3	Kings	CA	3
Jackson	AL	1	Baxter	AR	2	Pulaski	AR	3	Lake	CA	3
Lauderdale	AL	1	Benton	AR	2	Saline	AR	3	Lassen	CA	3
Lawrence	AL	1	Boone	AR	2	Scott	AR	3	Marin	CA	3
Limestone	AL	1	Carroll	AR	2	Sebastian	AR	3	Mendocino	CA	3
Madison	AL	1	Fulton	AR	2	Sevier	AR	3	Merced	CA	3
Morgan	AL	1	Garland	AR	2	St. Francis	AR	3	Modoc	CA	3
Talladega	AL	1	Independence	AR	2	Union	AR	3	Napa	CA	3
Autauga	AL	2	Izard	AR	2	Washington	AR	3	Orange	CA	3
Barbour	AL	2	Marion	AR	2	White	AR	3	Sacramento	CA	3
Bibb	AL	2	Montgomery	AR	2	Woodruff	AR	3	San Diego	CA	3
Blount	AL	2	Randolph	AR	2	Yell	AR	3	San Joaquin	CA	3
Bullock	AL	2	Searcy	AR	2	Apache	AZ	2	Shasta	CA	3
Cherokee	AL	2	Sharp	AR	2	Cochise	AZ	2	Siskiyou	CA	3
Chilton	AL	2	Stone	AR	2	Coconino	AZ	2	Solano	CA	3
Cullman	AL	2	an Buren	AR	3	Gila	AZ	2	Sonoma	CA	3
Dallas	AL	2	Arkansas	AR	3	Graham	AZ	2	Stanislaus	CA	3
De Kalb	AL	2	Ashley	AR	3	Greenlee	AZ	2	Sutter	CA	3
Elmore	AL	2	Bradley	AR	3	La Paz	AZ	2	Tehama	CA	3
Etowah	AL	2	Calhoun	AR	3	Maricopa	AZ	2	Trinity	CA	3
Fayette	AL	2	Chicot	AR	3	Mohave	AZ	2	Yolo	CA	3
Greene	AL	2	Clark	AR	3	Navajo	AZ	2	Adams	CO	1
Hale	AL	2	Clay	AR	3	Pima	AZ	2	Arapahoe	CO	1
Jefferson	AL	2	Cleburne	AR	3	Pinal	AZ	2	Baca	CO	1
Lamar	AL	2	Cleveland	AR	3	Santa Cruz	AZ	2	Bent	CO	1
Lee	AL	2	Columbia	AR	3	Yavapai	AZ	2	Boulder	CO	1
Lowndes	AL	2	Conway	AR	3	Yuma	AZ	2	Broomfield	CO	1
Macon	AL	2	Craighead	AR	3	Ventura	CA	1	Chaffee	CO	1
Marion	AL	2	Crawford	AR	3	Santa Barbara	CA	1	Cheyenne	CO	1
			Crittenden	AR	3	Alameda	CA	2	Clear Creek	CO	1
			Cross	AR	3	Alpine	CA	2	Crowley	CO	1
			Dallas	AR	3	Amador	CA	2	Custer	CO	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Delta	CO	1	Dade	FL	2	Banks	GA	2	Calhoun	GA	3
Denver	CO	1	Hillsborough	FL	2	Barrow	GA	2	Camden	GA	3
Dolores	CO	1	Leon	FL	2	Bartow	GA	2	Candler	GA	3
Douglas	CO	1	Marion	FL	2	Butts	GA	2	Charlton	GA	3
El Paso	CO	1	Polk	FL	2	Carroll	GA	2	Chatham	GA	3
Elbert	CO	1	Union	FL	2	Catoosa	GA	2	Chattahoochee	GA	3
Fremont	CO	1	Baker	FL	3	Cherokee	GA	2	Chattooga	GA	3
Garfield	CO	1	Bay	FL	3	Clarke	GA	2	Clay	GA	3
Gilpin	CO	1	Bradford	FL	3	Clayton	GA	2	Clinch	GA	3
Grand	CO	1	Brevard	FL	3	Coweta	GA	2	Coffee	GA	3
Gunnison	CO	1	Broward	FL	3	Dawson	GA	2	Colquitt	GA	3
Huerfano	CO	1	Calhoun	FL	3	Douglas	GA	2	Columbia	GA	3
Jackson	CO	1	Charlotte	FL	3	Elbert	GA	2	Cook	GA	3
Jefferson	CO	1	Clay	FL	3	Fannin	GA	2	Crawford	GA	3
Kiowa	CO	1	Collier	FL	3	Fayette	GA	2	Crisp	GA	3
Kit Carson	CO	1	De Soto	FL	3	Floyd	GA	2	Dade	GA	3
Lake	CO	1	Dixie	FL	3	Forsyth	GA	2	Decatur	GA	3
La Plata	CO	1	Duval	FL	3	Franklin	GA	2	Dodge	GA	3
Larimer	CO	1	Escambia	FL	3	Gilmer	GA	2	Dooley	GA	3
Las Animas	CO	1	Flagler	FL	3	Greene	GA	2	Dougherty	GA	3
Lincoln	CO	1	Franklin	FL	3	Habersham	GA	2	Early	GA	3
Logan	CO	1	Gadsden	FL	3	Hall	GA	2	Echols	GA	3
Mesa	CO	1	Gilchrist	FL	3	Haralson	GA	2	Effingham	GA	3
Moffat	CO	1	Glades	FL	3	Harris	GA	2	Emanuel	GA	3
Montezuma	CO	1	Gulf	FL	3	Hart	GA	2	Evans	GA	3
Montrose	CO	1	Hamilton	FL	3	Heard	GA	2	Glascocock	GA	3
Morgan	CO	1	Hardee	FL	3	Henry	GA	2	Glynn	GA	3
Otero	CO	1	Hendry	FL	3	Jackson	GA	2	Gordon	GA	3
Ouray	CO	1	Hernando	FL	3	Jasper	GA	2	Grady	GA	3
Park	CO	1	Highlands	FL	3	Lamar	GA	2	Hancock	GA	3
Phillips	CO	1	Holmes	FL	3	Lumpkin	GA	2	Houston	GA	3
Pitkin	CO	1	Indian River	FL	3	Madison	GA	2	Irwin	GA	3
Prowers	CO	1	Jackson	FL	3	Meriwether	GA	2	Jeff Davis	GA	3
Pueblo	CO	1	Jefferson	FL	3	Monroe	GA	2	Jefferson	GA	3
Rio Blanco	CO	1	Lafayette	FL	3	Morgan	GA	2	Jenkins	GA	3
San Miguel	CO	1	Lake	FL	3	Newton	GA	2	Johnson	GA	3
Summit	CO	1	Lee	FL	3	Oconee	GA	2	Jones	GA	3
Teller	CO	1	Levy	FL	3	Oglethorpe	GA	2	Lanier	GA	3
Washington	CO	1	Liberty	FL	3	Paulding	GA	2	Laurens	GA	3
Weld	CO	1	Madison	FL	3	Pickens	GA	2	Lee	GA	3
Yuma	CO	1	Manatee	FL	3	Pike	GA	2	Liberty	GA	3
Alamosa	CO	2	Martin	FL	3	Rabun	GA	2	Lincoln	GA	3
Archuleta	CO	2	Monroe	FL	3	Richmond	GA	2	Long	GA	3
Conejos	CO	2	Nassau	FL	3	Rockdale	GA	2	Lowndes	GA	3
Costilla	CO	2	Okaloosa	FL	3	Spalding	GA	2	Macon	GA	3
Eagle	CO	2	Okeechobee	FL	3	Stephens	GA	2	Marion	GA	3
Hinsdale	CO	2	Orange	FL	3	Talbot	GA	2	McDuffie	GA	3
La Plata	CO	2	Osceola	FL	3	Towns	GA	2	McIntosh	GA	3
Mineral	CO	2	Palm Beach	FL	3	Troup	GA	2	Miller	GA	3
Rio Grande	CO	2	Pasco	FL	3	Union	GA	2	Mitchell	GA	3
Routt	CO	2	Pinellas	FL	3	Upson	GA	2	Montgomery	GA	3
Saguache	CO	2	Putnam	FL	3	Walker	GA	2	Murray	GA	3
San Juan	CO	2	Santa Rosa	FL	3	Walton	GA	2	Muscogee	GA	3
Fairfield	CT	1	Sarasota	FL	3	White	GA	2	Peach	GA	3
Middlesex	CT	1	Seminole	FL	3	Whitfield	GA	2	Pierce	GA	3
New Haven	CT	1	St. Johns	FL	3	Atkinson	GA	3	Polk	GA	3
New London	CT	1	St. Lucie	FL	3	Bacon	GA	3	Pulaski	GA	3
Litchfield	CT	2	Sumter	FL	3	Baker	GA	3	Putnam	GA	3
Tolland	CT	2	Suwannee	FL	3	Baldwin	GA	3	Quitman	GA	3
Windham	CT	2	Taylor	FL	3	Ben Hill	GA	3	Randolph	GA	3
Hartford	CT	3	Volusia	FL	3	Berrien	GA	3	Schley	GA	3
District of Columbia	DC	3	Wakulla	FL	3	Bibb	GA	3	Screven	GA	3
New Castle	DE	2	Walton	FL	3	Bleckley	GA	3	Seminole	GA	3
Kent	DE	3	Washington	FL	3	Brantley	GA	3	Stewart	GA	3
Sussex	DE	3	Cobb	GA	1	Brooks	GA	3	Sumter	GA	3
Alachua	FL	2	De Kalb	GA	1	Bryan	GA	3	Taliaferro	GA	3
Citrus	FL	2	Fulton	GA	1	Bulloch	GA	3	Tattnall	GA	3
Columbia	FL	2	Gwinnett	GA	1	Burke	GA	3	Taylor	GA	3

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Telfair	GA	3	Humboldt	IA	1	Kootenai	ID	1	Moultrie	IL	1
Terrell	GA	3	Ida	IA	1	Latah	ID	1	Ogle	IL	1
Thomas	GA	3	Iowa	IA	1	Lemhi	ID	1	Peoria	IL	1
Tift	GA	3	Jackson	IA	1	Shoshone	ID	1	Piatt	IL	1
Toombs	GA	3	Jasper	IA	1	Valley	ID	1	Pike	IL	1
Treutlen	GA	3	Jefferson	IA	1	Ada	ID	2	Putnam	IL	1
Turner	GA	3	Johnson	IA	1	Bannock	ID	2	Rock Island	IL	1
Twiggs	GA	3	Jones	IA	1	Bear Lake	ID	2	Sangamon	IL	1
Ware	GA	3	Keokuk	IA	1	Bingham	ID	2	Schuyler	IL	1
Warren	GA	3	Kossuth	IA	1	Bonneville	ID	2	Scott	IL	1
Washington	GA	3	Lee	IA	1	Canyon	ID	2	Stark	IL	1
Wayne	GA	3	Linn	IA	1	Caribou	ID	2	Stephenson	IL	1
Webster	GA	3	Louisa	IA	1	Cassia	ID	2	Tazewell	IL	1
Wheeler	GA	3	Lucas	IA	1	Franklin	ID	2	Vermilion	IL	1
Wilcox	GA	3	Lyon	IA	1	Jefferson	ID	2	Warren	IL	1
Wilkes	GA	3	Madison	IA	1	Jerome	ID	2	Whiteside	IL	1
Wilkinson	GA	3	Mahaska	IA	1	Lincoln	ID	2	Winnebago	IL	1
Worth	GA	3	Marion	IA	1	Madison	ID	2	Woodford	IL	1
Hawaii	HI	3	Marshall	IA	1	Minidoka	ID	2	Bond	IL	2
Honolulu	HI	3	Mills	IA	1	Oneida	ID	2	Christian	IL	2
Kalawao	HI	3	Mitchell	IA	1	Owyhee	ID	2	Clark	IL	2
Kauai	HI	3	Monona	IA	1	Payette	ID	2	Clay	IL	2
Maui	HI	3	Monroe	IA	1	Power	ID	2	Clinton	IL	2
Adair	IA	1	Montgomery	IA	1	Teton	ID	2	Cook	IL	2
Adams	IA	1	Muscatine	IA	1	Twin Falls	ID	2	Crawford	IL	2
Allamakee	IA	1	O'Brien	IA	1	Adams	ID	3	Cumberland	IL	2
Appanoose	IA	1	Osceola	IA	1	Gem	ID	3	Du Page	IL	2
Audubon	IA	1	Page	IA	1	Lewis	ID	3	Edwards	IL	2
Benton	IA	1	Palo Alto	IA	1	Nez Perce	ID	3	Effingham	IL	2
Black Hawk	IA	1	Plymouth	IA	1	Washington	ID	3	Fayette	IL	2
Boone	IA	1	Pocahontas	IA	1	Adams	IL	1	Franklin	IL	2
Bremer	IA	1	Polk	IA	1	Boone	IL	1	Gallatin	IL	2
Buchanan	IA	1	Pottawattamie	IA	1	Brown	IL	1	Hamilton	IL	2
Buena Vista	IA	1	Poweshiek	IA	1	Bureau	IL	1	Hardin	IL	2
Butler	IA	1	Ringgold	IA	1	Calhoun	IL	1	Jackson	IL	2
Calhoun	IA	1	Sac	IA	1	Carroll	IL	1	Jasper	IL	2
Carroll	IA	1	Scott	IA	1	Cass	IL	1	Jefferson	IL	2
Cass	IA	1	Shelby	IA	1	Champaign	IL	1	Johnson	IL	2
Cedar	IA	1	Sioux	IA	1	Coles	IL	1	Kankakee	IL	2
Cerro Gordo	IA	1	Story	IA	1	De Kalb	IL	1	Lake	IL	2
Cherokee	IA	1	Tama	IA	1	De Witt	IL	1	Lawrence	IL	2
Chickasaw	IA	1	Taylor	IA	1	Douglas	IL	1	Macoupin	IL	2
Clarke	IA	1	Union	IA	1	Edgar	IL	1	Madison	IL	2
Clay	IA	1	Van Buren	IA	1	Ford	IL	1	Marion	IL	2
Clayton	IA	1	Wapello	IA	1	Fulton	IL	1	McHenry	IL	2
Clinton	IA	1	Warren	IA	1	Greene	IL	1	Monroe	IL	2
Crawford	IA	1	Washington	IA	1	Grundy	IL	1	Montgomery	IL	2
Dallas	IA	1	Wayne	IA	1	Hancock	IL	1	Perry	IL	2
Davis	IA	1	Webster	IA	1	Henderson	IL	1	Pope	IL	2
Decatur	IA	1	Winnebago	IA	1	Henry	IL	1	Randolph	IL	2
Delaware	IA	1	Winneshiek	IA	1	Iroquois	IL	1	Richland	IL	2
Des Moines	IA	1	Woodbury	IA	1	Jersey	IL	1	Saline	IL	2
Dickinson	IA	1	Worth	IA	1	Jo Daviess	IL	1	Shelby	IL	2
Dubuque	IA	1	Wright	IA	1	Kane	IL	1	St. Clair	IL	2
Emmet	IA	1	Benewah	ID	1	Kendall	IL	1	Union	IL	2
Fayette	IA	1	Blaine	ID	1	Knox	IL	1	Wabash	IL	2
Floyd	IA	1	Boise	ID	1	La Salle	IL	1	Washington	IL	2
Franklin	IA	1	Bonner	ID	1	Lee	IL	1	Wayne	IL	2
Fremont	IA	1	Boundary	ID	1	Livingston	IL	1	White	IL	2
Greene	IA	1	Butte	ID	1	Logan	IL	1	Will	IL	2
Grundy	IA	1	Camas	ID	1	Macon	IL	1	Williamson	IL	2
Guthrie	IA	1	Clark	ID	1	Marshall	IL	1	Alexander	IL	3
Hamilton	IA	1	Clearwater	ID	1	Mason	IL	1	Massac	IL	3
Hancock	IA	1	Custer	ID	1	McDonough	IL	1	Pulaski	IL	3
Hardin	IA	1	Elmore	ID	1	McLean	IL	1	Adams	IN	1
Harrison	IA	1	Fremont	ID	1	Menard	IL	1	Allen	IN	1
Henry	IA	1	Gooding	ID	1	Mercer	IL	1	Bartholomew	IN	1
Howard	IA	1	Idaho	ID	1	Morgan	IL	1	Benton	IN	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Blackford	IN	1	Lake	IN	2	Rice	KS	1	Green	KY	1
Boone	IN	1	Martin	IN	2	Riley	KS	1	Harrison	KY	1
Carroll	IN	1	Morgan	IN	2	Rooks	KS	1	Hart	KY	1
Cass	IN	1	Newton	IN	2	Rush	KS	1	Jefferson	KY	1
Clark	IN	1	Ohio	IN	2	Russell	KS	1	Jessamine	KY	1
Clinton	IN	1	Owen	IN	2	Saline	KS	1	Lincoln	KY	1
De Kalb	IN	1	Parke	IN	2	Scott	KS	1	Marion	KY	1
Decatur	IN	1	Perry	IN	2	Sheridan	KS	1	Mercer	KY	1
Delaware	IN	1	Pike	IN	2	Sherman	KS	1	Metcalfe	KY	1
Elkhart	IN	1	Porter	IN	2	Smith	KS	1	Monroe	KY	1
Fayette	IN	1	Posey	IN	2	Stanton	KS	1	Nelson	KY	1
Fountain	IN	1	Pulaski	IN	2	Thomas	KS	1	Pendleton	KY	1
Fulton	IN	1	Ripley	IN	2	Trego	KS	1	Pulaski	KY	1
Grant	IN	1	Spencer	IN	2	Wallace	KS	1	Robertson	KY	1
Hamilton	IN	1	Starke	IN	2	Washington	KS	1	Russell	KY	1
Hancock	IN	1	Sullivan	IN	2	Wichita	KS	1	Scott	KY	1
Harrison	IN	1	Switzerland	IN	2	Wyandotte	KS	1	Taylor	KY	1
Hendricks	IN	1	Vanderburgh	IN	2	Allen	KS	2	Warren	KY	1
Henry	IN	1	Vigo	IN	2	Anderson	KS	2	Woodford	KY	1
Howard	IN	1	Warrick	IN	2	Barber	KS	2	Anderson	KY	2
Huntington	IN	1	Atchison	KS	1	Bourbon	KS	2	Bath	KY	2
Jay	IN	1	Barton	KS	1	Butler	KS	2	Bell	KY	2
Jennings	IN	1	Brown	KS	1	Chase	KS	2	Boone	KY	2
Johnson	IN	1	Cheyenne	KS	1	Chautauqua	KS	2	Boyd	KY	2
Kosciusko	IN	1	Clay	KS	1	Cherokee	KS	2	Bracken	KY	2
Lagrange	IN	1	Cloud	KS	1	Clark	KS	2	Breathitt	KY	2
Lawrence	IN	1	Decatur	KS	1	Coffey	KS	2	Breckinridge	KY	2
Madison	IN	1	Dickinson	KS	1	Comanche	KS	2	Butler	KY	2
Marion	IN	1	Douglas	KS	1	Cowley	KS	2	Caldwell	KY	2
Marshall	IN	1	Ellis	KS	1	Crawford	KS	2	Campbell	KY	2
Miami	IN	1	Ellsworth	KS	1	Doniphan	KS	2	Carroll	KY	2
Monroe	IN	1	Finney	KS	1	Edwards	KS	2	Carter	KY	2
Montgomery	IN	1	Ford	KS	1	Elk	KS	2	Christian	KY	2
Noble	IN	1	Geary	KS	1	Franklin	KS	2	Clay	KY	2
Orange	IN	1	Gove	KS	1	Greenwood	KS	2	Clinton	KY	2
Putnam	IN	1	Graham	KS	1	Harper	KS	2	Crittenden	KY	2
Randolph	IN	1	Grant	KS	1	Harvey	KS	2	Daviess	KY	2
Rush	IN	1	Gray	KS	1	Jefferson	KS	2	Edmonson	KY	2
Scott	IN	1	Greeley	KS	1	Labette	KS	2	Elliott	KY	2
Shelby	IN	1	Hamilton	KS	1	Linn	KS	2	Estill	KY	2
Steuben	IN	1	Haskell	KS	1	Lyon	KS	2	Fleming	KY	2
St. Joseph	IN	1	Hodgeman	KS	1	Miami	KS	2	Floyd	KY	2
Tippecanoe	IN	1	Jackson	KS	1	Montgomery	KS	2	Gallatin	KY	2
Tipton	IN	1	Jewell	KS	1	Morris	KS	2	Garrard	KY	2
Union	IN	1	Johnson	KS	1	Morton	KS	2	Grant	KY	2
Vermillion	IN	1	Kearny	KS	1	Neosho	KS	2	Grayson	KY	2
Wabash	IN	1	Kingman	KS	1	Osage	KS	2	Greenup	KY	2
Warren	IN	1	Kiowa	KS	1	Reno	KS	2	Hancock	KY	2
Washington	IN	1	Lane	KS	1	Sedgwick	KS	2	Hardin	KY	2
Wayne	IN	1	Leavenworth	KS	1	Seward	KS	2	Harlan	KY	2
Wells	IN	1	Lincoln	KS	1	Shawnee	KS	2	Henderson	KY	2
White	IN	1	Logan	KS	1	Stafford	KS	2	Henry	KY	2
Whitley	IN	1	Marion	KS	1	Stevens	KS	2	Hopkins	KY	2
Brown	IN	2	Marshall	KS	1	Sumner	KS	2	Jackson	KY	2
Clay	IN	2	McPherson	KS	1	Wabaunsee	KS	2	Johnson	KY	2
Crawford	IN	2	Meade	KS	1	Wilson	KS	2	Kenton	KY	2
Daviess	IN	2	Mitchell	KS	1	Woodson	KS	2	Knott	KY	2
Dearborn	IN	2	Nemaha	KS	1	Adair	KY	1	Knox	KY	2
Dubois	IN	2	Ness	KS	1	Allen	KY	1	Larue	KY	2
Floyd	IN	2	Norton	KS	1	Barren	KY	1	Laurel	KY	2
Franklin	IN	2	Osborne	KS	1	Bourbon	KY	1	Lawrence	KY	2
Gibson	IN	2	Ottawa	KS	1	Boyle	KY	1	Lee	KY	2
Greene	IN	2	Pawnee	KS	1	Bullitt	KY	1	Leslie	KY	2
Jackson	IN	2	Phillips	KS	1	Casey	KY	1	Letcher	KY	2
Jasper	IN	2	Pottawatomie	KS	1	Clark	KY	1	Lewis	KY	2
Jefferson	IN	2	Pratt	KS	1	Cumberland	KY	1	Livingston	KY	2
Knox	IN	2	Rawlins	KS	1	Fayette	KY	1	Logan	KY	2
La Porte	IN	2	Republic	KS	1	Franklin	KY	1	Lyon	KY	2

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Madison	KY	2	La Salle	LA	3	Dorchester	MD	3	Berrien	MI	3
Magoffin	KY	2	Lafayette	LA	3	Kent	MD	3	Cheboygan	MI	3
Martin	KY	2	Lafourche	LA	3	Queen Anne's	MD	3	Chippewa	MI	3
Mason	KY	2	Lincoln	LA	3	Somerset	MD	3	Clare	MI	3
McCreary	KY	2	Livingston	LA	3	Talbot	MD	3	Crawford	MI	3
McLean	KY	2	Madison	LA	3	Wicomico	MD	3	Delta	MI	3
Meade	KY	2	Morehouse	LA	3	Worcester	MD	3	Gladwin	MI	3
Menifee	KY	2	Natchitoches	LA	3	Androscoggin	ME	1	Grand Traverse	MI	3
Montgomery	KY	2	Orleans	LA	3	Aroostook	ME	1	Gratiot	MI	3
Morgan	KY	2	Ouachita	LA	3	Cumberland	ME	1	Huron	MI	3
Muhlenberg	KY	2	Plaquemines	LA	3	Franklin	ME	1	Iosco	MI	3
Nicholas	KY	2	Pointe Coupee	LA	3	Hancock	ME	1	Isabella	MI	3
Ohio	KY	2	Rapides	LA	3	Kennebec	ME	1	Kalkaska	MI	3
Oldham	KY	2	Red River	LA	3	Lincoln	ME	1	Lake	MI	3
Owen	KY	2	Richland	LA	3	Oxford	ME	1	Luce	MI	3
Owsley	KY	2	Sabine	LA	3	Penobscot	ME	1	Mackinac	MI	3
Perry	KY	2	St. Bernard	LA	3	Piscataquis	ME	1	Macomb	MI	3
Pike	KY	2	St. Charles	LA	3	Somerset	ME	1	Manistee	MI	3
Powell	KY	2	St. Helena	LA	3	York	ME	1	Mason	MI	3
Rockcastle	KY	2	St. James	LA	3	Knox	ME	2	Mecosta	MI	3
Rowan	KY	2	St. John the Baptist	LA	3	Sagadahoc	ME	2	Midland	MI	3
Shelby	KY	2	St. Landry	LA	3	Waldo	ME	2	Missaukee	MI	3
Simpson	KY	2	St. Martin	LA	3	Washington	ME	2	Muskegon	MI	3
Spencer	KY	2	St. Mary	LA	3	Branch	MI	1	Newaygo	MI	3
Todd	KY	2	St. Tammany	LA	3	Calhoun	MI	1	Oceana	MI	3
Trigg	KY	2	Tangipahoa	LA	3	Cass	MI	1	Ogemaw	MI	3
Trimble	KY	2	Tensas	LA	3	Hillsdale	MI	1	Ontonagon	MI	3
Union	KY	2	Terrebonne	LA	3	Jackson	MI	1	Osceola	MI	3
Washington	KY	2	Union	LA	3	Kalamazoo	MI	1	Oscoda	MI	3
Wayne	KY	2	Vermilion	LA	3	Lenawee	MI	1	Ottawa	MI	3
Webster	KY	2	Vernon	LA	3	St. Joseph	MI	1	Roscommon	MI	3
Whitley	KY	2	Washington	LA	3	Washtenaw	MI	1	Saginaw	MI	3
Wolfe	KY	2	Webster	LA	3	Alcona	MI	2	Schoolcraft	MI	3
Ballard	KY	3	West Baton Rouge	LA	3	Alger	MI	2	St. Clair	MI	3
Calloway	KY	3	West Carroll	LA	3	Alpena	MI	2	Tuscola	MI	3
Carlisle	KY	3	West Feliciana	LA	3	Antrim	MI	2	Van Buren	MI	3
Fulton	KY	3	Winn	LA	3	Baraga	MI	2	Wayne	MI	3
Graves	KY	3	Essex	MA	1	Barry	MI	2	Wexford	MI	3
Hickman	KY	3	Middlesex	MA	1	Charlevoix	MI	2	Becker	MN	1
Marshall	KY	3	Worcester	MA	1	Clinton	MI	2	Big Stone	MN	1
McCracken	KY	3	Barnstable	MA	2	Dickinson	MI	2	Blue Earth	MN	1
Acadia	LA	3	Berkshire	MA	2	Eaton	MI	2	Brown	MN	1
Allen	LA	3	Bristol	MA	2	Emmet	MI	2	Carver	MN	1
Ascension	LA	3	Dukes	MA	2	Genesee	MI	2	Chippewa	MN	1
Assumption	LA	3	Franklin	MA	2	Gogebic	MI	2	Clay	MN	1
Avoyelles	LA	3	Hampden	MA	2	Houghton	MI	2	Cottonwood	MN	1
Beauregard	LA	3	Hampshire	MA	2	Ingham	MI	2	Dakota	MN	1
Bienville	LA	3	Nantucket	MA	2	Ionia	MI	2	Dodge	MN	1
Bossier	LA	3	Norfolk	MA	2	Iron	MI	2	Douglas	MN	1
Caddo	LA	3	Plymouth	MA	2	Kent	MI	2	Faribault	MN	1
Calcasieu	LA	3	Suffolk	MA	3	Keweenaw	MI	2	Fillmore	MN	1
Caldwell	LA	3	Baltimore	MD	1	Lapeer	MI	2	Freeborn	MN	1
Cameron	LA	3	Calvert	MD	1	Leelanau	MI	2	Goodhue	MN	1
Catahoula	LA	3	Carroll	MD	1	Livingston	MI	2	Grant	MN	1
Claiborne	LA	3	Frederick	MD	1	Marquette	MI	2	Hennepin	MN	1
Concordia	LA	3	Harford	MD	1	Menominee	MI	2	Houston	MN	1
De Soto	LA	3	Howard	MD	1	Monroe	MI	2	Hubbard	MN	1
East Baton Rouge	LA	3	Montgomery	MD	1	Montcalm	MI	2	Jackson	MN	1
East Carroll	LA	3	Washington	MD	1	Montmorency	MI	2	Kanabec	MN	1
East Feliciana	LA	3	Allegany	MD	2	Oakland	MI	2	Kandiyohi	MN	1
Angeline	LA	3	Anne Arundel	MD	2	Otsego	MI	2	Kittson	MN	1
Franklin	LA	3	Baltimore City	MD	2	Presque Isle	MI	2	Lac Qui Parle	MN	1
Grant	LA	3	Cecil	MD	2	Sanilac	MI	2	Le Sueur	MN	1
Iberia	LA	3	Charles	MD	2	Shiawassee	MI	2	Lincoln	MN	1
Iberville	LA	3	Garrett	MD	2	Allegan	MI	3	Lyon	MN	1
Jackson	LA	3	Prince George's	MD	2	Arenac	MI	3	Mahnomen	MN	1
Jefferson	LA	3	St. Mary's	MD	2	Bay	MI	3	Marshall	MN	1
Jefferson Davis	LA	3	Caroline	MD	3	Benzie	MI	3	Martin	MN	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
McLeod	MN	1	Adair	MO	2	Pulaski	MO	2	Issaquena	MS	3
Meeker	MN	1	Audrain	MO	2	Putnam	MO	2	Itawamba	MS	3
Mower	MN	1	Barry	MO	2	Ralls	MO	2	Jackson	MS	3
Murray	MN	1	Barton	MO	2	Randolph	MO	2	Jasper	MS	3
Nicollet	MN	1	Bates	MO	2	Ray	MO	2	Jefferson	MS	3
Nobles	MN	1	Benton	MO	2	Reynolds	MO	2	Jefferson Davis	MS	3
Norman	MN	1	Bollinger	MO	2	Ripley	MO	2	Jones	MS	3
Olmsted	MN	1	Boone	MO	2	Saline	MO	2	Kemper	MS	3
Otter Tail	MN	1	Caldwell	MO	2	Schuyler	MO	2	Lafayette	MS	3
Pennington	MN	1	Callaway	MO	2	Scotland	MO	2	Lamar	MS	3
Pipestone	MN	1	Camden	MO	2	Shannon	MO	2	Lauderdale	MS	3
Polk	MN	1	Cape Girardeau	MO	2	Shelby	MO	2	Lawrence	MS	3
Pope	MN	1	Carroll	MO	2	Ste. Genevieve	MO	2	Leake	MS	3
Ramsey	MN	1	Carter	MO	2	Stone	MO	2	Leflore	MS	3
Red Lake	MN	1	Cedar	MO	2	St. Charles	MO	2	Lincoln	MS	3
Redwood	MN	1	Chariton	MO	2	St. Clair	MO	2	Madison	MS	3
Renville	MN	1	Christian	MO	2	St. Francois	MO	2	Marion	MS	3
Rice	MN	1	Clark	MO	2	St. Louis	MO	2	Marshall	MS	3
Rock	MN	1	Cole	MO	2	St. Louis City	MO	2	Monroe	MS	3
Roseau	MN	1	Cooper	MO	2	Sullivan	MO	2	Montgomery	MS	3
Scott	MN	1	Crawford	MO	2	Taney	MO	2	Neshoba	MS	3
Sherburne	MN	1	Dade	MO	2	Texas	MO	2	Newton	MS	3
Sibley	MN	1	Dallas	MO	2	Vernon	MO	2	Oktibbeha	MS	3
Stearns	MN	1	Daviess	MO	2	Warren	MO	2	Panola	MS	3
Steele	MN	1	De Kalb	MO	2	Washington	MO	2	Pearl River	MS	3
Stevens	MN	1	Dent	MO	2	Wayne	MO	2	Perry	MS	3
Swift	MN	1	Douglas	MO	2	Webster	MO	2	Pike	MS	3
Todd	MN	1	Franklin	MO	2	Worth	MO	2	Prentiss	MS	3
Traverse	MN	1	Gasconade	MO	2	Wright	MO	2	Quitman	MS	3
Wabasha	MN	1	Gentry	MO	2	Butler	MO	3	Rankin	MS	3
Wadena	MN	1	Greene	MO	2	Dunklin	MO	3	Scott	MS	3
Waseca	MN	1	Grundy	MO	2	Mississippi	MO	3	Sharkey	MS	3
Washington	MN	1	Harrison	MO	2	New Madrid	MO	3	Simpson	MS	3
Watonwan	MN	1	Henry	MO	2	Pemiscot	MO	3	Smith	MS	3
Wilkin	MN	1	Hickory	MO	2	Scott	MO	3	Stone	MS	3
Winona	MN	1	Howard	MO	2	Stoddard	MO	3	Sunflower	MS	3
Wright	MN	1	Howell	MO	2	Alcorn	MS	2	Tallahatchie	MS	3
Yellow Medicine	MN	1	Jasper	MO	2	Chickasaw	MS	2	Tate	MS	3
Aitkin	MN	2	Jefferson	MO	2	Clay	MS	2	Tippah	MS	3
Anoka	MN	2	Johnson	MO	2	Lee	MS	2	Tishomingo	MS	3
Beltrami	MN	2	Knox	MO	2	Lowndes	MS	2	Tunica	MS	3
Benton	MN	2	Laclede	MO	2	Noxubee	MS	2	Walthall	MS	3
Carlton	MN	2	Lafayette	MO	2	Pontotoc	MS	2	Warren	MS	3
Cass	MN	2	Lawrence	MO	2	Union	MS	2	Washington	MS	3
Chisago	MN	2	Lewis	MO	2	Adams	MS	3	Wayne	MS	3
Cleanwater	MN	2	Lincoln	MO	2	Amite	MS	3	Webster	MS	3
Cook	MN	2	Linn	MO	2	Attala	MS	3	Wilkinson	MS	3
Crow Wing	MN	2	Livingston	MO	2	Benton	MS	3	Winston	MS	3
Isanti	MN	2	Macon	MO	2	Bolivar	MS	3	Yalobusha	MS	3
Itasca	MN	2	Madison	MO	2	Calhoun	MS	3	Yazoo	MS	3
Koochiching	MN	2	Maries	MO	2	Carroll	MS	3	Beaverhead	MT	1
Lake	MN	2	Marion	MO	2	Choctaw	MS	3	Big Horn	MT	1
Lake of the Woods	MN	2	McDonald	MO	2	Claiborne	MS	3	Blaine	MT	1
Mille Lacs	MN	2	Mercer	MO	2	Clarke	MS	3	Broadwater	MT	1
Morrison	MN	2	Miller	MO	2	Coahoma	MS	3	Carbon	MT	1
Pine	MN	2	Moniteau	MO	2	Copiah	MS	3	Carter	MT	1
St. Louis	MN	2	Monroe	MO	2	Covington	MS	3	Cascade	MT	1
Andrew	MO	1	Montgomery	MO	2	De Soto	MS	3	Chouteau	MT	1
Atchison	MO	1	Morgan	MO	2	Forrest	MS	3	Custer	MT	1
Buchanan	MO	1	Newton	MO	2	Franklin	MS	3	Daniels	MT	1
Cass	MO	1	Oregon	MO	2	George	MS	3	Dawson	MT	1
Clay	MO	1	Osage	MO	2	Greene	MS	3	Deer Lodge	MT	1
Clinton	MO	1	Ozark	MO	2	Grenada	MS	3	Fallon	MT	1
Holt	MO	1	Perry	MO	2	Hancock	MS	3	Fergus	MT	1
Iron	MO	1	Pettis	MO	2	Harrison	MS	3	Flathead	MT	1
Jackson	MO	1	Phelps	MO	2	Hinds	MS	3	Gallatin	MT	1
Nodaway	MO	1	Pike	MO	2	Holmes	MS	3	Garfield	MT	1
Platte	MO	1	Polk	MO	2	Humphreys	MS	3	Glacier	MT	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Granite	MT	1	McDowell	NC	2	Union	NC	3	Dixon	NE	1
Hill	MT	1	Polk	NC	2	Washington	NC	3	Dodge	NE	1
Jefferson	MT	1	Rutherford	NC	2	Wayne	NC	3	Douglas	NE	1
Judith Basin	MT	1	Stokes	NC	2	Wilson	NC	3	Fillmore	NE	1
Lake	MT	1	Surry	NC	2	Adams	ND	1	Franklin	NE	1
Lewis and Clark	MT	1	Swain	NC	2	Barnes	ND	1	Frontier	NE	1
Liberty	MT	1	Wake	NC	2	Benson	ND	1	Furnas	NE	1
Lincoln	MT	1	Warren	NC	2	Billings	ND	1	Gage	NE	1
Madison	MT	1	Wilkes	NC	2	Bottineau	ND	1	Gosper	NE	1
McCone	MT	1	Yadkin	NC	2	Bowman	ND	1	Greeley	NE	1
Meagher	MT	1	Yancey	NC	2	Burke	ND	1	Hamilton	NE	1
Mineral	MT	1	Alamance	NC	3	Burleigh	ND	1	Harlan	NE	1
Missoula	MT	1	Anson	NC	3	Cass	ND	1	Hayes	NE	1
Park	MT	1	Beaufort	NC	3	Cavalier	ND	1	Hitchcock	NE	1
Phillips	MT	1	Bertie	NC	3	Dickey	ND	1	hurston	NE	1
Pondera	MT	1	Bladen	NC	3	Divide	ND	1	Jefferson	NE	1
Powder River	MT	1	Brunswick	NC	3	Dunn	ND	1	Johnson	NE	1
Powell	MT	1	Cabarrus	NC	3	Eddy	ND	1	Kearney	NE	1
Prairie	MT	1	Camden	NC	3	Emmons	ND	1	Knox	NE	1
Ravalli	MT	1	Carteret	NC	3	Foster	ND	1	Lancaster	NE	1
Richland	MT	1	Chatham	NC	3	Golden Valley	ND	1	Madison	NE	1
Roosevelt	MT	1	Chowan	NC	3	Grand Forks	ND	1	Nance	NE	1
Rosebud	MT	1	Columbus	NC	3	Grant	ND	1	Nemaha	NE	1
Sanders	MT	1	Craven	NC	3	Griggs	ND	1	Nuckolls	NE	1
Sheridan	MT	1	Cumberland	NC	3	Hettinger	ND	1	Otoe	NE	1
Silver Bow	MT	1	Currituck	NC	3	Kidder	ND	1	Pawnee	NE	1
Stillwater	MT	1	Dare	NC	3	La Moure	ND	1	Phelps	NE	1
Teton	MT	1	Davidson	NC	3	Logan	ND	1	Pierce	NE	1
Toole	MT	1	Davie	NC	3	McHenry	ND	1	Platte	NE	1
Valley	MT	1	Duplin	NC	3	McIntosh	ND	1	Polk	NE	1
Wibaux	MT	1	Durham	NC	3	McKenzie	ND	1	Red Willow	NE	1
Yellowstone National Park	MT	1	Edgecombe	NC	3	McLean	ND	1	Richardson	NE	1
Golden Valley	MT	2	Gates	NC	3	Mercer	ND	1	Saline	NE	1
Musselshell	MT	2	Granville	NC	3	Morton	ND	1	Sarpy	NE	1
Petroleum	MT	2	Greene	NC	3	Mountrail	ND	1	Saunders	NE	1
Sweet Grass	MT	2	Guilford	NC	3	Nelson	ND	1	Seward	NE	1
Treasure	MT	2	Halifax	NC	3	Oliver	ND	1	Stanton	NE	1
Wheatland	MT	2	Harnett	NC	3	Pembina	ND	1	Thayer	NE	1
Yellowstone	MT	2	Hertford	NC	3	Pierce	ND	1	Washington	NE	1
Alleghany	NC	1	Hoke	NC	3	Ramsey	ND	1	Wayne	NE	1
Buncombe	NC	1	Hyde	NC	3	Ransom	ND	1	Webster	NE	1
Cherokee	NC	1	Johnston	NC	3	Renville	ND	1	York	NE	1
Henderson	NC	1	Jones	NC	3	Richland	ND	1	Antelope	NE	2
Mitchell	NC	1	Lee	NC	3	Rolette	ND	1	Banner	NE	2
Rockingham	NC	1	Lenoir	NC	3	Sargent	ND	1	Box Butte	NE	2
Transylvania	NC	1	Martin	NC	3	Sheridan	ND	1	Buffalo	NE	2
Watauga	NC	1	Mecklenburg	NC	3	Sioux	ND	1	Chase	NE	2
Alexander	NC	2	Montgomery	NC	3	Slope	ND	1	Cheyenne	NE	2
Vance	NC	2	Moore	NC	3	Stark	ND	1	Custer	NE	2
Ashe	NC	2	Nash	NC	3	Steele	ND	1	Dawes	NE	2
Avery	NC	2	New Hanover	NC	3	Stutsman	ND	1	Dawson	NE	2
Burke	NC	2	Northampton	NC	3	Towner	ND	1	Deuel	NE	2
Caldwell	NC	2	Onslow	NC	3	Trail	ND	1	Dundy	NE	2
Caswell	NC	2	Orange	NC	3	Walsh	ND	1	Hall	NE	2
Catawba	NC	2	Pamlico	NC	3	Ward	ND	1	Howard	NE	2
Clay	NC	2	Pasquotank	NC	3	Wells	ND	1	Keith	NE	2
Cleveland	NC	2	Pender	NC	3	Williams	ND	1	Keya Paha	NE	2
Forsyth	NC	2	Perquimans	NC	3	Adams	NE	1	Kimball	NE	2
Franklin	NC	2	Person	NC	3	Boone	NE	1	Merrick	NE	2
Gaston	NC	2	Pitt	NC	3	Boyd	NE	1	Morrill	NE	2
Graham	NC	2	Randolph	NC	3	Burt	NE	1	Perkins	NE	2
Haywood	NC	2	Richmond	NC	3	Butler	NE	1	Scotts Bluff	NE	2
Iredell	NC	2	Robeson	NC	3	Cass	NE	1	Sheridan	NE	2
Jackson	NC	2	Rowan	NC	3	Cedar	NE	1	Sherman	NE	2
Lincoln	NC	2	Sampson	NC	3	Clay	NE	1	Sioux	NE	2
Macon	NC	2	Scotland	NC	3	Colfax	NE	1	Valley	NE	2
Madison	NC	2	Stanly	NC	3	Cuming	NE	1	Arthur	NE	3
			Tyrrell	NC	3	Dakota	NE	1	Blaine	NE	3

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Brown	NE	3	Otero	NM	2	Orleans	NY	2	Tuscarawas	OH	1
Cherry	NE	3	Quay	NM	2	Oswego	NY	2	Union	OH	1
Garden	NE	3	Roosevelt	NM	2	Saratoga	NY	2	Van Wert	OH	1
Garfield	NE	3	San Juan	NM	2	Schenectady	NY	2	Warren	OH	1
Grant	NE	3	Sandoval	NM	2	St. Lawrence	NY	2	Wayne	OH	1
Holt	NE	3	Sierra	NM	2	Wayne	NY	2	Wyandot	OH	1
Hooker	NE	3	Socorro	NM	2	Bronx	NY	3	Ashtabula	OH	2
Lincoln	NE	3	Torrance	NM	2	Essex	NY	3	Athens	OH	2
Logan	NE	3	Union	NM	2	Franklin	NY	3	Brown	OH	2
Loup	NE	3	Valencia	NM	2	Fulton	NY	3	Clermont	OH	2
McPherson	NE	3	Carson City	NV	1	Hamilton	NY	3	Cuyahoga	OH	2
Rock	NE	3	Douglas	NV	1	Herkimer	NY	3	Defiance	OH	2
Thomas	NE	3	Eureka	NV	1	Kings	NY	3	Erie	OH	2
Wheeler	NE	3	Lander	NV	1	Nassau	NY	3	Fulton	OH	2
Carroll	NH	1	Lincoln	NV	1	New York	NY	3	Gallia	OH	2
Belknap	NH	2	Lyon	NV	1	Queens	NY	3	Geauga	OH	2
Cheshire	NH	2	Mineral	NV	1	Richmond	NY	3	Henry	OH	2
Coos	NH	2	Pershing	NV	1	Rockland	NY	3	Highland	OH	2
Grafton	NH	2	White Pine	NV	1	Suffolk	NY	3	Hocking	OH	2
Hillsborough	NH	2	Churchill	NV	2	Warren	NY	3	Jackson	OH	2
Merrimack	NH	2	Elko	NV	2	Westchester	NY	3	Lake	OH	2
Rockingham	NH	2	Esmeralda	NV	2	Adams	OH	1	Lawrence	OH	2
Strafford	NH	2	Humboldt	NV	2	Allen	OH	1	Lorain	OH	2
Sullivan	NH	2	Nye	NV	2	Ashland	OH	1	Lucas	OH	2
Hunterdon	NJ	1	Storey	NV	2	Auglaize	OH	1	Mahoning	OH	2
Mercer	NJ	1	Washoe	NV	2	Belmont	OH	1	Medina	OH	2
Monmouth	NJ	1	Clark	NV	3	Butler	OH	1	Meigs	OH	2
Morris	NJ	1	Albany	NY	1	Carroll	OH	1	Monroe	OH	2
Somerset	NJ	1	Allegany	NY	1	Champaign	OH	1	Morgan	OH	2
Sussex	NJ	1	Broome	NY	1	Clark	OH	1	Noble	OH	2
Warren	NJ	1	Cattaraugus	NY	1	Clinton	OH	1	Ottawa	OH	2
Bergen	NJ	2	Cayuga	NY	1	Columbiana	OH	1	Paulding	OH	2
Burlington	NJ	2	Chautauqua	NY	1	Coshocton	OH	1	Portage	OH	2
Camden	NJ	2	Chemung	NY	1	Crawford	OH	1	Putnam	OH	2
Cumberland	NJ	2	Chenango	NY	1	Darke	OH	1	Sandusky	OH	2
Essex	NJ	2	Columbia	NY	1	Delaware	OH	1	Scioto	OH	2
Gloucester	NJ	2	Cortland	NY	1	Fairfield	OH	1	Trumbull	OH	2
Hudson	NJ	2	Delaware	NY	1	Fayette	OH	1	Vinton	OH	2
Middlesex	NJ	2	Dutchess	NY	1	Franklin	OH	1	Washington	OH	2
Passaic	NJ	2	Erie	NY	1	Greene	OH	1	Williams	OH	2
Salem	NJ	2	Genesee	NY	1	Guernsey	OH	1	Wood	OH	2
Union	NJ	2	Greene	NY	1	Hamilton	OH	1	Adair	OK	2
Atlantic	NJ	3	Livingston	NY	1	Hancock	OH	1	Beaver	OK	2
Cape May	NJ	3	Madison	NY	1	Hardin	OH	1	Cherokee	OK	2
Ocean	NJ	3	Onondaga	NY	1	Harrison	OH	1	Cimarron	OK	2
Grant	NM		Ontario	NY	1	Holmes	OH	1	Delaware	OK	2
Bernalillo	NM	1	Orange	NY	1	Huron	OH	1	Ellis	OK	2
Cofax	NM	1	Otsego	NY	1	Jefferson	OH	1	Mayes	OK	2
Mora	NM	1	Putnam	NY	1	Knox	OH	1	Sequoayah	OK	2
Rio Arriba	NM	1	Rensselaer	NY	1	Licking	OH	1	Texas	OK	2
San Miguel	NM	1	Schoharie	NY	1	Logan	OH	1	Alfalfa	OK	3
Santa Fe	NM	1	Schuyler	NY	1	Madison	OH	1	Atoka	OK	3
Taos	NM	1	Seneca	NY	1	Marion	OH	1	Beckham	OK	3
Catron	NM	2	Steuben	NY	1	Mercer	OH	1	Blaine	OK	3
Chaves	NM	2	Sullivan	NY	1	Miami	OH	1	Bryan	OK	3
Cibola	NM	2	Tioga	NY	1	Montgomery	OH	1	Caddo	OK	3
Curry	NM	2	Tompkins	NY	1	Morrow	OH	1	Canadian	OK	3
De Baca	NM	2	Ulster	NY	1	Muskingum	OH	1	Carter	OK	3
Dona Ana	NM	2	Washington	NY	1	Perry	OH	1	Choctaw	OK	3
Eddy	NM	2	Wyoming	NY	1	Pickaway	OH	1	Cleveland	OK	3
Guadalupe	NM	2	Yates	NY	1	Pike	OH	1	Coal	OK	3
Harding	NM	2	Clinton	NY	2	Preble	OH	1	Comanche	OK	3
Hidalgo	NM	2	Jefferson	NY	2	Richland	OH	1	Cotton	OK	3
Lea	NM	2	Lewis	NY	2	Ross	OH	1	Craig	OK	3
Lincoln	NM	2	Monroe	NY	2	Seneca	OH	1	Creek	OK	3
Los Alamos	NM	2	Montgomery	NY	2	Shelby	OH	1	Custer	OK	3
Luna	NM	2	Niagara	NY	2	Stark	OH	1	Dewey	OK	3
McKinley	NM	2	Oneida	NY	2	Summit	OH	1	Garfield	OK	3

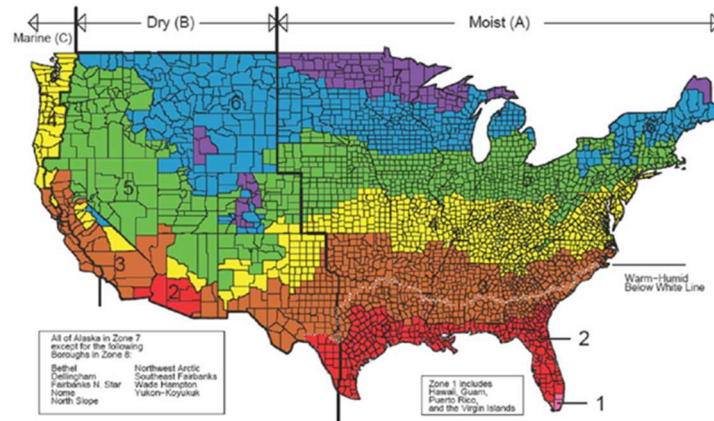
County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Garvin	OK	3	Washington	OR	2	Crawford	PA	2	Aurora	SD	1
Grady	OK	3	Wheeler	OR	2	Elk	PA	2	Beadle	SD	1
Grant	OK	3	Yamhill	OR	2	Erie	PA	2	Bon Homme	SD	1
Greer	OK	3	Benton	OR	3	Fayette	PA	2	Brookings	SD	1
Harmon	OK	3	Clackamas	OR	3	Forest	PA	2	Brown	SD	1
Harper	OK	3	Coos	OR	3	Greene	PA	2	Brule	SD	1
Haskell	OK	3	Curry	OR	3	Jefferson	PA	2	Buffalo	SD	1
Hughes	OK	3	Deschutes	OR	3	Lawrence	PA	2	Campbell	SD	1
Jackson	OK	3	Douglas	OR	3	McKean	PA	2	Charles Mix	SD	1
Jefferson	OK	3	Jefferson	OR	3	Mercer	PA	2	Clark	SD	1
Johnston	OK	3	Josephine	OR	3	Pike	PA	2	Clay	SD	1
Kay	OK	3	Lane	OR	3	Potter	PA	2	Codington	SD	1
Kingfisher	OK	3	Lincoln	OR	3	Somerset	PA	2	Corson	SD	1
Kiowa	OK	3	Linn	OR	3	Warren	PA	2	Davison	SD	1
Latimer	OK	3	Marion	OR	3	Washington	PA	2	Day	SD	1
Le Flore	OK	3	Polk	OR	3	Wayne	PA	2	Deuel	SD	1
Lincoln	OK	3	Tillamook	OR	3	Philadelphia	PA	3	Douglas	SD	1
Logan	OK	3	Wallowa	OR	3	Kent	RI	1	Edmunds	SD	1
Love	OK	3	Adams	PA	1	Washington	RI	1	Faulk	SD	1
Major	OK	3	Allegheny	PA	1	Newport	RI	2	Grant	SD	1
Marshall	OK	3	Armstrong	PA	1	Providence	RI	2	Hamlin	SD	1
McClain	OK	3	Beaver	PA	1	Bristol	RI	3	Hand	SD	1
McCurtain	OK	3	Bedford	PA	1	Greenville	SC	1	Hanson	SD	1
McIntosh	OK	3	Berks	PA	1	Abbeville	SC	2	Hughes	SD	1
Murray	OK	3	Blair	PA	1	Anderson	SC	2	Hutchinson	SD	1
Muskogee	OK	3	Bradford	PA	1	Cherokee	SC	2	Hyde	SD	1
Noble	OK	3	Bucks	PA	1	Laurens	SC	2	Jerauld	SD	1
Nowata	OK	3	Butler	PA	1	Oconee	SC	2	Kingsbury	SD	1
Okfuskee	OK	3	Cameron	PA	1	Pickens	SC	2	Lake	SD	1
Oklahoma	OK	3	Carbon	PA	1	Spartanburg	SC	2	Lincoln	SD	1
Okmulgee	OK	3	Centre	PA	1	York	SC	2	Lyman	SD	1
Osage	OK	3	Chester	PA	1	Aiken	SC	3	Marshall	SD	1
Ottawa	OK	3	Clarion	PA	1	Allendale	SC	3	McCook	SD	1
Pawnee	OK	3	Clearfield	PA	1	Bamberg	SC	3	McPherson	SD	1
Payne	OK	3	Clinton	PA	1	Barnwell	SC	3	Miner	SD	1
Pittsburg	OK	3	Columbia	PA	1	Beaufort	SC	3	Minnehaha	SD	1
Pontotoc	OK	3	Cumberland	PA	1	Berkeley	SC	3	Moody	SD	1
Pottawatomie	OK	3	Dauphin	PA	1	Calhoun	SC	3	Perkins	SD	1
Pushmataha	OK	3	Delaware	PA	1	Charleston	SC	3	Potter	SD	1
Roger Mills	OK	3	Franklin	PA	1	Chester	SC	3	Roberts	SD	1
Rogers	OK	3	Fulton	PA	1	Chesterfield	SC	3	Sanborn	SD	1
Seminole	OK	3	Huntingdon	PA	1	Clarendon	SC	3	Spink	SD	1
Stephens	OK	3	Indiana	PA	1	Colleton	SC	3	Stanley	SD	1
Tillman	OK	3	Juniata	PA	1	Darlington	SC	3	Sully	SD	1
Tulsa	OK	3	Lackawanna	PA	1	Dillon	SC	3	Turner	SD	1
Wagoner	OK	3	Lancaster	PA	1	Dorchester	SC	3	Union	SD	1
Washington	OK	3	Lebanon	PA	1	Edgefield	SC	3	Walworth	SD	1
Washita	OK	3	Lehigh	PA	1	Fairfield	SC	3	Yankton	SD	1
Woods	OK	3	Luzerne	PA	1	Florence	SC	3	Bennett	SD	2
Woodward	OK	3	Lycoming	PA	1	Georgetown	SC	3	Butte	SD	2
Baker	OR	2	Mifflin	PA	1	Greenwood	SC	3	Custer	SD	2
Clatsop	OR	2	Monroe	PA	1	Hampton	SC	3	Dewey	SD	2
Columbia	OR	2	Montgomery	PA	1	Horry	SC	3	Fall River	SD	2
Crook	OR	2	Montour	PA	1	Jasper	SC	3	Gregory	SD	2
Gilliam	OR	2	Northampton	PA	1	Kershaw	SC	3	Haakon	SD	2
Grant	OR	2	Northumberland	PA	1	Lancaster	SC	3	Harding	SD	2
Harney	OR	2	Perry	PA	1	Lee	SC	3	Jackson	SD	2
Hood River	OR	2	Schuylkill	PA	1	Lexington	SC	3	Jones	SD	2
Jefferson	OR	2	Snyder	PA	1	Marion	SC	3	Lawrence	SD	2
Klamath	OR	2	Sullivan	PA	1	Marlboro	SC	3	Meade	SD	2
Lake	OR	2	Susquehanna	PA	1	McCormick	SC	3	Mellette	SD	2
Malheur	OR	2	Tioga	PA	1	Newberry	SC	3	Pennington	SD	2
Morrow	OR	2	Union	PA	1	Orangeburg	SC	3	Shannon	SD	2
Multnomah	OR	2	Venango	PA	1	Richland	SC	3	Todd	SD	2
Sherman	OR	2	Westmoreland	PA	1	Saluda	SC	3	Tripp	SD	2
Umatilla	OR	2	Wyoming	PA	1	Sumter	SC	3	Ziebach	SD	2
Union	OR	2	York	PA	1	Union	SC	3	Anderson	TN	1
Wasco	OR	2	Cambria	PA	2	Williamsburg	SC	3	Bedford	TN	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Blount	TN	1	White	TN	2	Archer	TX	3	Galveston	TX	3
Bradley	TN	1	Bledsoe	TN	3	Atascosa	TX	3	Gillespie	TX	3
Claiborne	TN	1	Campbell	TN	3	Austin	TX	3	Glasscock	TX	3
Davidson	TN	1	Carroll	TN	3	Bandera	TX	3	Goliad	TX	3
Giles	TN	1	Crockett	TN	3	Bastrop	TX	3	Gonzales	TX	3
Grainger	TN	1	Cumberland	TN	3	Baylor	TX	3	Grayson	TX	3
Greene	TN	1	Dyer	TN	3	Bee	TX	3	Gregg	TX	3
Hamblen	TN	1	Fayette	TN	3	Bell	TX	3	Grimes	TX	3
Hancock	TN	1	Franklin	TN	3	Bexar	TX	3	Guadalupe	TX	3
Hawkins	TN	1	Gibson	TN	3	Blanco	TX	3	Hall	TX	3
Hickman	TN	1	Grundy	TN	3	Borden	TX	3	Hamilton	TX	3
Humphreys	TN	1	Hardeman	TN	3	Bosque	TX	3	Hardeman	TX	3
Jackson	TN	1	Haywood	TN	3	Bowie	TX	3	Hardin	TX	3
Jefferson	TN	1	Henry	TN	3	Brazoria	TX	3	Harris	TX	3
Knox	TN	1	Lake	TN	3	Brazos	TX	3	Harrison	TX	3
Lawrence	TN	1	Lauderdale	TN	3	Briscoe	TX	3	Haskell	TX	3
Lewis	TN	1	Mauzy	TN	3	Brooks	TX	3	Hays	TX	3
Lincoln	TN	1	Morgan	TN	3	Brown	TX	3	Henderson	TX	3
Loudon	TN	1	Obion	TN	3	Burleson	TX	3	Hidalgo	TX	3
Macon	TN	1	Rhea	TN	3	Burnet	TX	3	Hill	TX	3
Madison	TN	1	Scott	TN	3	Caldwell	TX	3	Hood	TX	3
Marshall	TN	1	Sequatchie	TN	3	Calhoun	TX	3	Hopkins	TX	3
McMinn	TN	1	Shelby	TN	3	Callahan	TX	3	Houston	TX	3
Meigs	TN	1	Tipton	TN	3	Cameron	TX	3	Howard	TX	3
Monroe	TN	1	Weakley	TN	3	Camp	TX	3	Hunt	TX	3
Moore	TN	1	Armstrong	TX	2	Cass	TX	3	Irion	TX	3
Perry	TN	1	Bailey	TX	2	Chambers	TX	3	Jack	TX	3
Roane	TN	1	Brewster	TX	2	Cherokee	TX	3	Jackson	TX	3
Rutherford	TN	1	Carson	TX	2	Childress	TX	3	Jasper	TX	3
Smith	TN	1	Castro	TX	2	Clay	TX	3	Jefferson	TX	3
Sullivan	TN	1	Crosby	TX	2	Cochran	TX	3	Jim Hogg	TX	3
Trousdale	TN	1	Culberson	TX	2	Coke	TX	3	Jim Wells	TX	3
Union	TN	1	Dallam	TX	2	Coleman	TX	3	Johnson	TX	3
Washington	TN	1	Deaf Smith	TX	2	Collin	TX	3	Jones	TX	3
Wayne	TN	1	Donley	TX	2	Collingsworth	TX	3	Kames	TX	3
Williamson	TN	1	Floyd	TX	2	Colorado	TX	3	Kaufman	TX	3
Wilson	TN	1	Garza	TX	2	Comal	TX	3	Kendall	TX	3
Benton	TN	2	Gray	TX	2	Comanche	TX	3	Kenedy	TX	3
Cannon	TN	2	Hale	TX	2	Concho	TX	3	Kent	TX	3
Carter	TN	2	Hansford	TX	2	Cooke	TX	3	Kerr	TX	3
Cheatham	TN	2	Hartley	TX	2	Coryell	TX	3	Kimble	TX	3
Chester	TN	2	Hemphill	TX	2	Cottle	TX	3	King	TX	3
Clay	TN	2	Hockley	TX	2	Crane	TX	3	Kinney	TX	3
Cocke	TN	2	Hudspeth	TX	2	Crockett	TX	3	Kleberg	TX	3
Coffee	TN	2	Hutchinson	TX	2	Dallas	TX	3	Knox	TX	3
De Kalb	TN	2	Jeff Davis	TX	2	Dawson	TX	3	La Salle	TX	3
Decatur	TN	2	Lamb	TX	2	De Witt	TX	3	Lamar	TX	3
Dickson	TN	2	Lipscomb	TX	2	Delta	TX	3	Lampasas	TX	3
Fentress	TN	2	Llano	TX	2	Denton	TX	3	Lavaca	TX	3
Hamilton	TN	2	Lubbock	TX	2	Dickens	TX	3	Lee	TX	3
Hardin	TN	2	Lynn	TX	2	Dimmit	TX	3	Leon	TX	3
Henderson	TN	2	Mason	TX	2	Duval	TX	3	Liberty	TX	3
Houston	TN	2	Moore	TX	2	Eastland	TX	3	Limestone	TX	3
Johnson	TN	2	Ochiltree	TX	2	Ector	TX	3	Live Oak	TX	3
Marion	TN	2	Oldham	TX	2	Edwards	TX	3	Loving	TX	3
McNairy	TN	2	Parmer	TX	2	El Paso	TX	3	Madison	TX	3
Montgomery	TN	2	Potter	TX	2	Ellis	TX	3	Marion	TX	3
Overton	TN	2	Presidio	TX	2	Erath	TX	3	Martin	TX	3
Pickett	TN	2	Randall	TX	2	Falls	TX	3	Matagorda	TX	3
Polk	TN	2	Reeves	TX	2	Fannin	TX	3	Maverick	TX	3
Putnam	TN	2	Roberts	TX	2	Fayette	TX	3	McCulloch	TX	3
Robertson	TN	2	Sherman	TX	2	Fisher	TX	3	McLennan	TX	3
Sevier	TN	2	Swisher	TX	2	Foard	TX	3	McMullen	TX	3
Stewart	TN	2	Terrell	TX	2	Fort Bend	TX	3	Medina	TX	3
Sumner	TN	2	Anderson	TX	3	Franklin	TX	3	Menard	TX	3
Unicoi	TN	2	Andrews	TX	3	Freestone	TX	3	Midland	TX	3
Van Buren	TN	2	Angelina	TX	3	Frio	TX	3	Milam	TX	3
Warren	TN	2	Aransas	TX	3	Gaines	TX	3	Mills	TX	3

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Mitchell	TX	3	Winkler	TX	3	Lexington	VA	1	Colonial Heights	VA	3
Montague	TX	3	Wise	TX	3	Louisa	VA	1	Emporia	VA	3
Montgomery	TX	3	Wood	TX	3	Martinsville	VA	1	Essex	VA	3
Morris	TX	3	Yoakum	TX	3	Montgomery	VA	1	Gloucester	VA	3
Motley	TX	3	Young	TX	3	Nottoway	VA	1	Greensville	VA	3
Nacogdoches	TX	3	Zapata	TX	3	Orange	VA	1	Hampton	VA	3
Navarro	TX	3	Zavala	TX	3	Page	VA	1	Hanover	VA	3
Newton	TX	3	Carbon	UT	1	Patrick	VA	1	Henrico	VA	3
Nolan	TX	3	Duchesne	UT	1	Pittsylvania	VA	1	Hopewell	VA	3
Nueces	TX	3	Grand	UT	1	Powhatan	VA	1	Isle Of Wight	VA	3
Orange	TX	3	Piute	UT	1	Pulaski	VA	1	James City	VA	3
Palo Pinto	TX	3	Sanpete	UT	1	Radford	VA	1	King And Queen	VA	3
Panola	TX	3	Sevier	UT	1	Roanoke	VA	1	King George	VA	3
Parker	TX	3	Uintah	UT	1	Roanoke	VA	1	King William	VA	3
Pecos	TX	3	Beaver	UT	2	Rockbridge	VA	1	Lancaster	VA	3
Polk	TX	3	Box Elder	UT	2	Rockingham	VA	1	Mathews	VA	3
Rains	TX	3	Cache	UT	2	Russell	VA	1	Middlesex	VA	3
Reagan	TX	3	Daggett	UT	2	Salem	VA	1	New Kent	VA	3
Real	TX	3	Davis	UT	2	Scott	VA	1	Newport News	VA	3
Red River	TX	3	Emery	UT	2	Shenandoah	VA	1	Norfolk	VA	3
Refugio	TX	3	Garfield	UT	2	Smyth	VA	1	Northampton	VA	3
Robertson	TX	3	Iron	UT	2	Spotsylvania	VA	1	Northumberland	VA	3
Rockwall	TX	3	Juab	UT	2	Stafford	VA	1	Petersburg	VA	3
Runnels	TX	3	Kane	UT	2	Staunton	VA	1	Poquoson	VA	3
Rusk	TX	3	Millard	UT	2	Tazewell	VA	1	Portsmouth	VA	3
Sabine	TX	3	Morgan	UT	2	Warren	VA	1	Prince George	VA	3
San Augustine	TX	3	Rich	UT	2	Washington	VA	1	Richmond	VA	3
San Jacinto	TX	3	Salt Lake	UT	2	Waynesboro	VA	1	Richmond	VA	3
San Patricio	TX	3	San Juan	UT	2	Winchester	VA	1	Southampton	VA	3
San Saba	TX	3	Summit	UT	2	Wythe	VA	1	Suffolk	VA	3
Schleicher	TX	3	Tooele	UT	2	Albemarle	VA	2	Surry	VA	3
Scurry	TX	3	Utah	UT	2	Amherst	VA	2	Sussex	VA	3
Shackelford	TX	3	Wasatch	UT	2	Arlington	VA	2	Virginia Beach	VA	3
Shelby	TX	3	Washington	UT	2	Bedford	VA	2	Westmoreland	VA	3
Smith	TX	3	Wayne	UT	2	Bedford	VA	2	Williamsburg	VA	3
Somervell	TX	3	Weber	UT	2	Buchanan	VA	2	York	VA	3
Starr	TX	3	Alleghany	VA	1	Carroll	VA	2	Addison	VT	2
Stephens	TX	3	Amelia	VA	1	Charlotte	VA	2	Bennington	VT	2
Sterling	TX	3	Appomattox	VA	1	Charlottesville	VA	2	Caledonia	VT	2
Stonewall	TX	3	Augusta	VA	1	Culpeper	VA	2	Essex	VT	2
Sutton	TX	3	Bath	VA	1	Dickenson	VA	2	Franklin	VT	2
Tarrant	TX	3	Bland	VA	1	Fauquier	VA	2	Lamoille	VT	2
Taylor	TX	3	Botetourt	VA	1	Floyd	VA	2	Orange	VT	2
Terry	TX	3	Bristol	VA	1	Franklin	VA	2	Orleans	VT	2
Throckmorton	TX	3	Brunswick	VA	1	Franklin	VA	2	Rutland	VT	2
Titus	TX	3	Buckingham	VA	1	Galax	VA	2	Washington	VT	2
Tom Green	TX	3	Buena Vista	VA	1	Grayson	VA	2	Windham	VT	2
Travis	TX	3	Campbell	VA	1	Greene	VA	2	Windsor	VT	2
Trinity	TX	3	Chesterfield	VA	1	Halifax	VA	2	Chittenden	VT	3
Tyler	TX	3	Clarke	VA	1	Loudoun	VA	2	Grand Isle	VT	3
Upshur	TX	3	Clifton Forge	VA	1	Lunenburg	VA	2	Berkeley	WA	1
Upton	TX	3	Covington	VA	1	Lynchburg	VA	2	Brooke	WA	1
Uvalde	TX	3	Craig	VA	1	Madison	VA	2	Clark	WA	1
Val Verde	TX	3	Cumberland	VA	1	Manassas	VA	2	Ferry	WA	1
Van Zandt	TX	3	Danville	VA	1	Manassas Park	VA	2	Grant	WA	1
Victoria	TX	3	Dinwiddie	VA	1	Mecklenburg	VA	2	Greenbrier	WA	1
Walker	TX	3	Fairfax	VA	1	Nelson	VA	2	Hampshire	WA	1
Waller	TX	3	Fairfax	VA	1	Norton	VA	2	Hancock	WA	1
Ward	TX	3	Falls Church	VA	1	Prince Edward	VA	2	Hardy	WA	1
Washington	TX	3	Fluvanna	VA	1	Prince William	VA	2	Jefferson	WA	1
Webb	TX	3	Frederick	VA	1	Rappahannock	VA	2	Marshall	WA	1
Wharton	TX	3	Fredericksburg	VA	1	South Boston	VA	2	Mercer	WA	1
Wheeler	TX	3	Giles	VA	1	Wise	VA	2	Mineral	WA	1
Wichita	TX	3	Goochland	VA	1	Accomack	VA	3	Monongalia	WA	1
Wilbarger	TX	3	Harrisonburg	VA	1	Alexandria	VA	3	Monroe	WA	1
Willacy	TX	3	Henry	VA	1	Caroline	VA	3	Morgan	WA	1
Williamson	TX	3	Highland	VA	1	Charles City	VA	3	Ohio	WA	1
Wilson	TX	3	Lee	VA	1	Chesapeake	VA	3	Okanogan	WA	1

County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone	County Name	State	Radon Zone
Pend Oreille	WA	1	Pierce	WA	3	Price	WI	2	Big Horn	WY	1
Pendleton	WA	1	San Juan	WA	3	Racine	WI	2	Campbell	WY	1
Pocahontas	WA	1	Skagit	WA	3	Rusk	WI	2	Carbon	WY	1
Preston	WA	1	Snohomish	WA	3	Sauk	WI	2	Converse	WY	1
Skamania	WA	1	Thurston	WA	3	Sawyer	WI	2	Crook	WY	1
Spokane	WA	1	Wahkiakum	WA	3	Sheboygan	WI	2	Fremont	WY	1
Stevens	WA	1	Whatcom	WA	3	Taylor	WI	2	Goshen	WY	1
Summers	WA	1	Wyoming	WA	3	Trempealeau	WI	2	Hot Springs	WY	1
Wetzel	WA	1	Buffalo	WI	1	Vilas	WI	2	Johnson	WY	1
Adams	WA	2	Crawford	WI	1	Washburn	WI	2	Laramie	WY	1
Asotin	WA	2	Dane	WI	1	Waushara	WI	2	Lincoln	WY	1
Barbour	WA	2	Dodge	WI	1	Winnebago	WI	2	Natrona	WY	1
Benton	WA	2	Door	WI	1	Berkeley	WV	1	Niobrara	WY	1
Braxton	WA	2	Fond du Lac	WI	1	Brooke	WV	1	Park	WY	1
Cabell	WA	2	Grant	WI	1	Grant	WV	1	Sheridan	WY	1
Calhoun	WA	2	Green	WI	1	Greenbrier	WV	1	Sublette	WY	1
Clay	WA	2	Green Lake	WI	1	Hampshire	WV	1	Sweetwater	WY	1
Columbia	WA	2	Iowa	WI	1	Hancock	WV	1	Teton	WY	1
Doddridge	WA	2	Jefferson	WI	1	Hardy	WV	1	Uinta	WY	1
Douglas	WA	2	Lafayette	WI	1	Jefferson	WV	1	Washakie	WY	1
Fayette	WA	2	Langlade	WI	1	Marshall	WV	1	Platte	WY	2
Franklin	WA	2	Marathon	WI	1	Mercer	WV	1	Weston	WY	2
Garfield	WA	2	Menominee	WI	1	Mineral	WV	1			
Gilmer	WA	2	Pepin	WI	1	Monongalia	WV	1			
Grant	WA	2	Pierce	WI	1	Monroe	WV	1			
Harrison	WA	2	Portage	WI	1	Morgan	WV	1			
Jackson	WA	2	Richland	WI	1	Ohio	WV	1			
Kittitas	WA	2	Rock	WI	1	Pendleton	WV	1			
Klickitat	WA	2	Shawano	WI	1	Pocahontas	WV	1			
Lewis	WA	2	St. Croix	WI	1	Preston	WV	1			
Lincoln	WA	2	Vernon	WI	1	Summers	WV	1			
Lincoln	WA	2	Walworth	WI	1	Wetzel	WV	1			
Marion	WA	2	Washington	WI	1	Barbour	WV	2			
Mason	WA	2	Waukesha	WI	1	Braxton	WV	2			
Nicholas	WA	2	Waupaca	WI	1	Cabell	WV	2			
Pleasants	WA	2	Wood	WI	1	Calhoun	WV	2			
Putnam	WA	2	Adams	WI	2	Clay	WV	2			
Raleigh	WA	2	Ashland	WI	2	Doddridge	WV	2			
Randolph	WA	2	Barron	WI	2	Fayette	WV	2			
Ritchie	WA	2	Bayfield	WI	2	Gilmer	WV	2			
Roane	WA	2	Brown	WI	2	Harrison	WV	2			
Taylor	WA	2	Burnett	WI	2	Jackson	WV	2			
Tucker	WA	2	Calumet	WI	2	Lewis	WV	2			
Tyler	WA	2	Chippewa	WI	2	Lincoln	WV	2			
Upshur	WA	2	Clark	WI	2	Marion	WV	2			
Walla Walla	WA	2	Columbia	WI	2	Mason	WV	2			
Wayne	WA	2	Douglas	WI	2	Nicholas	WV	2			
Webster	WA	2	Dunn	WI	2	Pleasants	WV	2			
Whitman	WA	2	Eau Claire	WI	2	Putnam	WV	2			
Wirt	WA	2	Florence	WI	2	Raleigh	WV	2			
Wood	WA	2	Forest	WI	2	Randolph	WV	2			
Yakima	WA	2	Iron	WI	2	Ritchie	WV	2			
Boone	WA	3	Jackson	WI	2	Roane	WV	2			
Chelan	WA	3	Juneau	WI	2	Taylor	WV	2			
Clallam	WA	3	Kenosha	WI	2	Tucker	WV	2			
Cowlitz	WA	3	Kewaunee	WI	2	Tyler	WV	2			
Grays Harbor	WA	3	La Crosse	WI	2	Upshur	WV	2			
Island	WA	3	Lincoln	WI	2	Wayne	WV	2			
Jefferson	WA	3	Manitowoc	WI	2	Webster	WV	2			
Kanawha	WA	3	Marinette	WI	2	Wirt	WV	2			
King	WA	3	Marquette	WI	2	Wood	WV	2			
Kitsap	WA	3	Milwaukee	WI	2	Boone	WV	3			
Lewis	WA	3	Monroe	WI	2	Kanawha	WV	3			
Logan	WA	3	Oconto	WI	2	Logan	WV	3			
Mason	WA	3	Oneida	WI	2	McDowell	WV	3			
McDowell	WA	3	Outagamie	WI	2	Mingo	WV	3			
Mingo	WA	3	Ozaukee	WI	2	Wyoming	WV	3			
Pacific	WA	3	Polk	WI	2	Albany	WY	1			

**APPENDIX B. US COUNTIES LOCATED IN
CLIMATE ZONES 1 AND 2**



U.S. Counties Located in Climate Zones 1 and 2

State, County			
Alabama	Georgia (cont.)	Texas	Texas (cont.)
• Baldwin	• Ware	• Anderson	• Jim Wells
• Mobile	• Wayne	• Angelina	• Karnes
Arizona	Louisiana	• Aransas	• Kenedy
• La Paz	• Acadia	• Atascosa	• Kinney
• Maricopa	• Allen	• Austin	• Kleberg
• Pima	• Ascension	• Bandera	• La Salle
• Pinal	• Assumption	• Bastrop	• Lavaca
• Yuma	• Avoyelles	• Bee	• Lee
California	• Beauregard	• Bell	• Leon
• Imperial	• Calcasieu	• Bexar	• Liberty
Florida	• Cameron	• Bosque	• Limestone
• All counties	• East Baton Rouge	• Brazoria	• Live Oak
Georgia	• East Feliciana	• Brazos	• Madison
• Appling	• Evangeline	• Brooks	• Matagorda
• Atkinson	• Iberia	• Burleson	• Maverick
• Bacon	• Iberville	• Caldwell	• McLennan
• Baker	• Jefferson	• Calhoun	• McMullen
• Berrien	• Jefferson Davis	• Cameron	• Medina
• Brantley	• Lafayette	• Chambers	• Milam
• Brooks	• Lafourche	• Cherokee	• Montgomery
• Bryan	• Livingston	• Colorado	• Newton
• Camden	• Orleans	• Comal	• Nueces
• Charlton	• Plaquemines	• Coryell	• Orange
• Chatham	• Pointe Coupee	• DeWitt	• Polk
• Clinch	• Rapides	• Dimmit	• Real
• Colquitt	• St. Bernard	• Duval	• Refugio
• Cook	• St. Charles	• Edwards	• Robertson
• Decatur	• St. Helena	• Falls	• San Jacinto
• Echols	• St. James	• Fayette	• San Patricio
• Effingham	• St. John the Baptist	• Fort Bend	• Starr
• Evans	• St. Landry	• Freestone	• Travis
• Glynn	• St. Martin	• Frio	• Trinity
• Grady	• St. Mary	• Galveston	• Tyler
• Jeff Davis	• St. Tammany	• Goliad	• Uvalde
• Lanier	• Tangipahoa	• Gonzales	• Val Verde
• Liberty	• Terrebonne	• Grimes	• Victoria
• Long	• Vermillion	• Guadalupe	• Walker
• Lowndes	• Washington	• Hardin	• Waller
• McIntosh	• West Baton Rouge	• Harris	• Washington
• Miller	• West Feliciana	• Hays	• Webb
• Mitchell	Mississippi	• Hidalgo	• Wharton
• Pierce	• Hancock	• Hill	• Willacy
• Seminole	• Harrison	• Houston	• Williamson
• Tattnall	• Jackson	• Jackson	• Wilson
• Thomas	• Jackson	• Jasper	• Zapata
• Toombs	• Pearl River	• Jefferson	• Zavala
	• Stone	• Jim Hogg	

Source: ANSI/ASHRAE Standard 62.2 User's Manual