Fuel Distribution System Inspection
Home Efficiency – Income Qualified Offering

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AGENDA:

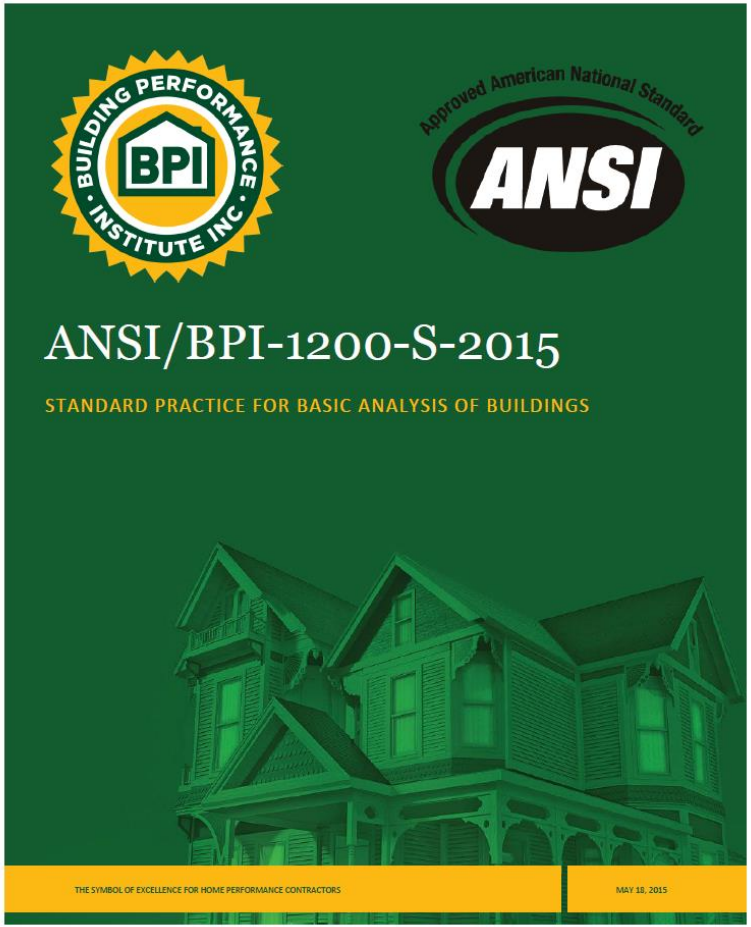
- This refresher training is being provided to ensure the safety of everyone involved in the program
- Provide clarification regarding equipment and process surrounding Fuel Distribution System Inspections and the Ameren Illinois Energy Efficiency Program

GUIDELINES

- For performing Fuel Distribution System Inspections within the Ameren Illinois Residential Energy Efficiency Program use ANSI/BPI-1200-S-2015 Standard Practice for Basic Analysis of Buildings
- This is the standard that we use with an additional procedure where Ameren Illinois supplied natural gas is present and a program energy audit or project test out is being performed

SECTION 1

EQUIPMENT



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ANSI/BPI-1200-S-2015: Section 7.1.1

- Within the Standard, Section 7 covers combustion appliance and fuel distribution system inspection. Our focus for this portion is on the **equipment requirements** for the combustible gas detector (CGD)
- Selections from the Standard (located on pages 2 and 3 within the Standard) are reprinted on the next slide for convenience

7.1.1 Combustible gas detector (CGD)

CGD equipment used for testing shall:

7.1.1.1 Be classified to *UL 913 Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations* or equivalent.

7.1.1.2 Have a variable tick rate or changing tone based on gas concentration levels. Note: The tick rate provides the indication of concentration but only accounts for relative concentration changes, not necessarily identifying hazardous concentration thresholds.

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7.1.1 Combustible gas detector (CGD)

7.1.1.3 Be capable of providing a digital display of percentage of Lower Explosive Limit (LEL) and/or provide an alarm when detecting combustible gas concentrations exceeding 10% Lower Explosive Limit (LEL).

7.1.1.4 Be calibrated and/or operation checked in accordance with the manufacturer's recommendations with available documentation traceable to the individual device.

7.1.1.5 Have the ability to zero ambient conditions.

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EQUIPMENT THAT MEETS THE CRITERIA

SENSIT Technologies makes a range of combustible gas detectors that are recognized by BPI to meet or exceed their standards

Program field staff utilize the HXG-2d model with the display set to read the percentage of the Lower Explosive Limit (%LEL) as it is referenced in the BPI 1200-S-2015 Standard, instead of the equipment's default setting of parts per million (PPM)

This is not a specific program endorsement of the product or SENSIT Technologies

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REMINDER

- Always start the combustible gas detector in a gas free environment to ensure a proper zero
- Follow manufacturer's guidance regarding cleaning, battery replacement, and sensor calibration

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CGD SENSOR CROSS SENSITIVIES

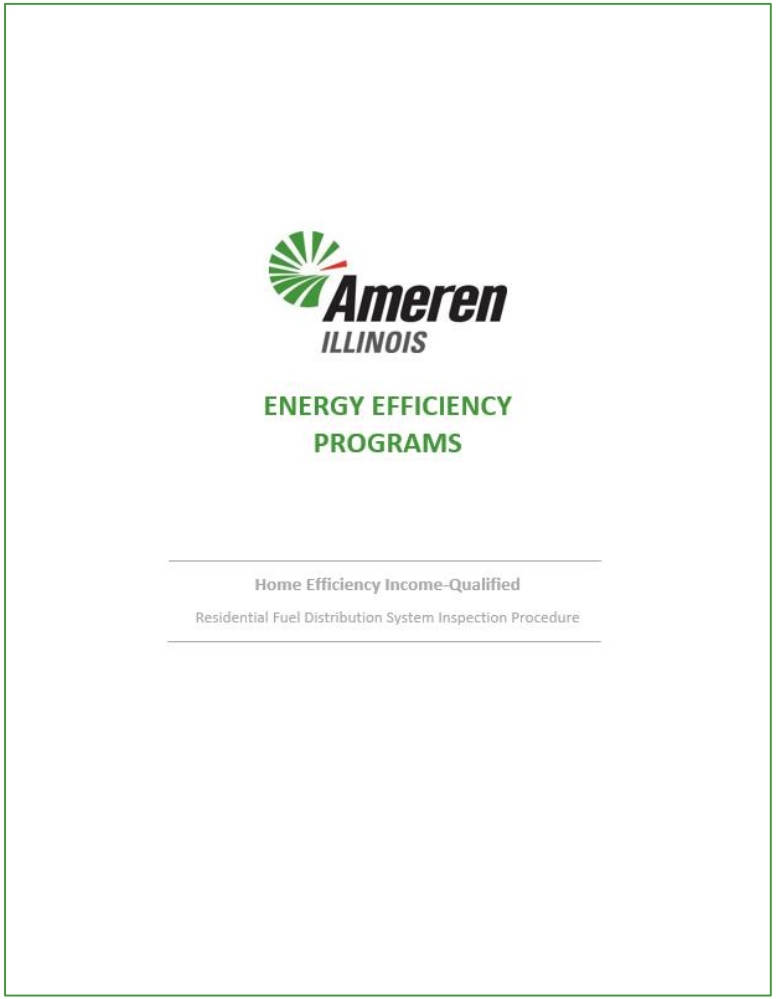
The combustible gas detectors used in the program are calibrated to respond with accurate readings to methane gas.

NOTE: These instruments have cross sensitivities to a variety of gases. This is where procedure comes into the equation.

SECTION 2

PROCEDURE

This section reviews the *Residential Fuel Distribution System Inspection Procedure* white paper located at ***AmerenIllinois****Savings.com* and takes ANSI/BPI 1200-S-2015 into account while adding increased awareness to all potential combustible fuel gas leak occurrences



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PREFACE

- The following procedure was developed for Fuel Distribution System Inspections by Auditors assessing residential homes in association with the Ameren Illinois Energy Efficiency Program.
- These assessments are conducted per BPI (Building Performance Institute) guidelines except as amended here.
- The AIC Energy Efficiency department, in partnership with AIC operations leadership, developed the procedure in response to safety and operational concerns. Notation: The term Auditor refers to both Program Allies and Program Staff that are BPI certified.
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INITIAL STEPS

1. The Auditor shall sample the indoor ambient air, upon entering the home, in at least one location per floor of occupied space, using both the sense of smell and Combustible Gas Detection (CGD) equipment;

2. Conduct testing for potential gas leakage on the customer's fuel distribution system (i.e. gas piping) at connections of natural gas piping starting after the union on the right side of the Ameren Illinois gas meter (see Image 1, below);

INITIAL STEPS

3. When the ambient air combustible fuel gas levels exceed 10% of the lower explosive limit, or upon discovery of a potential leak at a gas piping connection, the Auditor shall cease all further activity and immediately inform the homeowner/occupants that there is potentially a gas leak (If a potential leak is identified on gas piping, please stop all further activity immediately, *do not attempt to identify additional gas leaks*);

ACTION ITEMS

4. Request that the homeowner/occupants leave the building immediately, and exit the building with them, without using a phone or other electrical device while in the home;

5. From outside of the home, the Auditor will call the Ameren Illinois Call Center at **800.755.5000**, report the possibility of a gas leak at the home, and provide the service representative with the customer's immediate contact information (e.g. cell phone number, address or phone number of neighbor where customer intends to wait during investigation by AIC gas operations);

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ACTION ITEMS

6. One call to the Ameren Illinois Call Center per location is preferred. Multiple potential leak calls from the same address may result in resources being unnecessarily routed;

7. The Auditor will remain on-site, but outside of the building, until qualified AIC gas operations personnel arrive and render the home safe to re-enter.

FINAL ACTION ITEM

8. When the ambient air combustible fuel gas levels are at 0.1% or greater and less than 10% of the lower explosive limit and there are no potential gas leaks identified the Auditor will call the Ameren Illinois Call Center and report the possibility of a gas leak in the residence and follow steps 4 through 7, above.

Notation: The discovery of a potential gas leak by program staff is considered anything the sets off an alarm or registers a displayed concentration of .1% lower explosive limit (LEL) or greater

A suspect leak is not confirmed with leak detection solution by program staff

CUSTOMER SIDE OF THE GAS METER

The Auditor should only be checking the fittings of the customers piping, not the Ameren Illinois piping side of the meter.

ADDENDUM (PART 1)

- The Ameren Illinois Call Center has recently implemented a new process when handling a call due to a blowing gas situation. The intent of this new process is to determine whether or not there is a blowing gas situation which is the direct result of digging, excavation, boring, etc. so that AIC gas operations can dispatch two people to the scene for a more effective response when the likelihood for migrating gas is greater

- Energy Efficiency Auditors may have noticed that the Ameren Illinois Call Center is asking two additional questions at the beginning of the call to determine whether or not a two person response is necessary

ADDENDUM (PART 1 CON'T)

When a customer calls to report a potential leak

- Please advise them to apply the following definition when they answer the question "is there blowing gas?":
    - "Blowing Gas is when natural gas is forcefully escaping through an opening in a pipe or fitting that has been ***broken, cracked or damaged***."
    - For instance, if an Auditor smells gas at the meter and hears the normal operation of the meter and regulator, the blowing gas question should be answered "no". However, in the unlikely event that an Auditor comes across a gas service that has been cut and is blowing due to excavation or boring, they should answer "yes".

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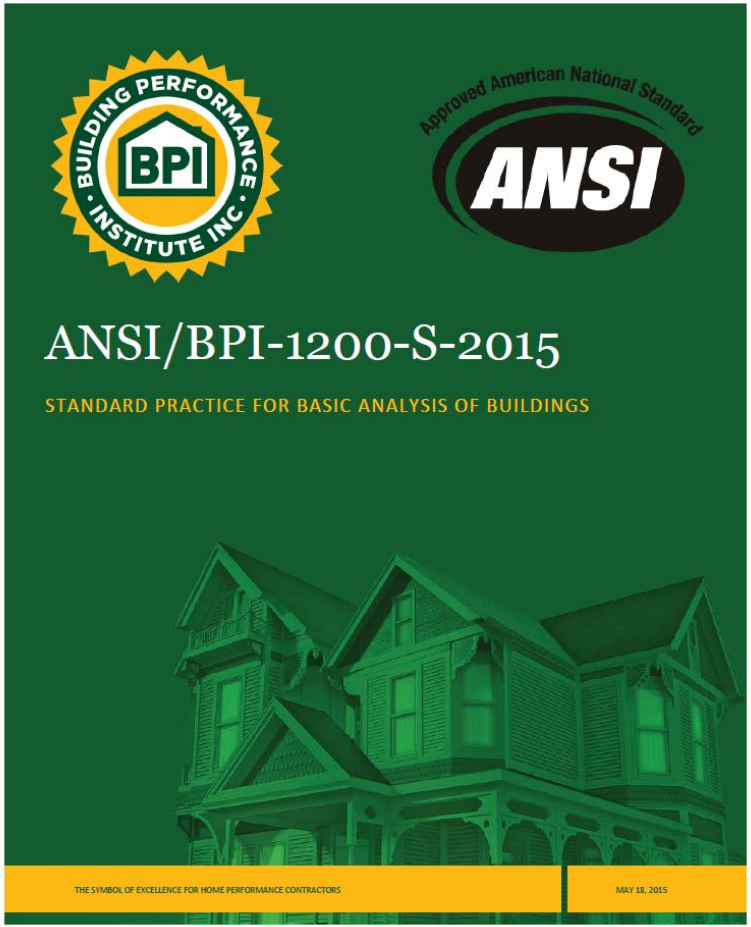
ADDENDUM (PART 2)

- As of November 2017, the Contact Center is no longer asking if the odor is faint or strong, Ameren Illinois Corporation is evacuating on all inside odor complaints
- Going forward, if any Program Staff or Program Ally Staff on site while representing the Ameren Illinois Energy Efficiency Program notices an odor of gas or picks up an indication on their instrument, they should be instructing the customer to leave the premise and the Auditor should leave as well until Ameren personnel arrive and determine the severity of the leak



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ANSI/BPI-1200-S-2015: Section 7

- Within the Standard, Section 7 covers combustion appliance and fuel distribution system inspection. Our focus for this portion is on the **conditions for entry** and **natural gas and LP gas piping system inspection**
- Selections from the Standard (located on pages 4 through 7 within the Standard) are reprinted on the next slides for convenience

CONDITIONS FOR ENTRY (BPI 1200)

7.3 Conditions for entry and working environment associated with indoor air quality

The auditor shall conduct the procedures within Sections 7.3.2 and 7.3.3 to measure carbon monoxide (CO) and combustible gas levels in the indoor air environment and take action, as required. Only after CO and combustible gas levels are found to be below levels calling for evacuation of the home (per Sections 7.3.2.2 and 7.3.3.3.1) shall further work be undertaken.

7.3.1 CGD, ambient CO monitors, and CO measurement

Instruments shall be turned on outside the building away from any combustion outlets and automobile traffic areas, set to zero, and otherwise prepared for use in accordance with manufacturer's instructions.

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CONDITIONS FOR ENTRY (BPI 1200)

7.3.2 Combustible fuel gases

7.3.2.1 Indoor ambient air shall be sampled with the CGD in at least one location per floor of occupied space upon entering the home.

7.3.2.2 If any measured concentrations of combustible fuel gas exceed 10% of the LEL, the auditor shall inform the homeowner/occupants of the unsafe condition and advise evacuation of the home. The auditor shall leave the home and the appropriate emergency services and fuel gas providers shall be notified from outside the home.1

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ALIGNMENT WITH PROGRAM GUIDANCE

- When the indoor ambient air exceeds 10% of the lower explosive limit (LEL) follow steps 3 through 7 of the *Residential Fuel Distribution System Inspection Procedure*
- Once conditions are safe for reentry the audit may continue

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2 Natural gas and LP gas piping system inspection and leakage testing

An inspection of the accessible gas piping and connections, from the natural gas meter or LP gas tank to a point where the supply line connects to the gas valve of all appliances shall be completed.

Program Note: This inspection is on the customer responsibility side of the gas piping, which starts to the right of the gas meter

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.1 Beginning at the natural gas meter or LP gas tank, conduct a test for gas leakage using a CGD. Where a leak is indicated by the CGD, confirm with leak detection solution. Follow manufacturer's instructions for performing gas leak testing.

Program Note: anything referenced in BPI as "confirming" a leak is considered the confirmation of a potential leak when program staff are performing the assessment

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.2 In the absence of manufacturer instructions, perform gas leak testing as follows:

7.5.2.2.1 Hold the CGD wand within an inch of the line, starting at the first joint closest to the outlet of the LP gas tank or natural gas meter outlet.

7.5.2.2.2 Move the CGD wand along the entire gas line at a rate of 1" per second with the tip above the line for natural gas and below for LP gas. Move the CGD wand in a 360-degree circle completely around each joint at a rate of 1" per second.

7.5.2.2.3 All connections thereafter shall be tested in the same manner.

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NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.3 The gas leakage inspection shall include the following components:

7.5.2.3.1 The entire gas line and all accessible gas piping fittings from the outlet of the natural gas meter or LP gas tank to a point where the supply line connects to the gas valve of all appliances. Do not move appliances.

7.5.2.3.2 Appliance gas valve/regulator housing and connections.

Program Note: the oven is a common item that cannot be moved, many test this by getting their CGD as close as they can to the line behind the appliance without moving it.

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NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.4 Where gas leakage is confirmed, the site shall be marked and the homeowner/occupant shall be notified that repairs should be made. The auditor shall recommend that the homeowner/occupant immediately notify the gas company and/or a qualified professional to evaluate and perform all necessary repairs.

Program Note: At this point the potential leak would trigger following steps 3 through 7 on the *Residential Fuel Distribution System Inspection Procedure*

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.5 When the CGD indicates that combustible gas exists in the ambient atmosphere (at any level below 10% of LEL) and a gas leak cannot be confirmed with the use of leak detection solution, the auditor shall inform the homeowner/occupants and advise the homeowner/occupant to notify the gas company and/or a qualified professional.

Program Note: This situation would trigger step 8 on the *Residential Fuel Distribution System Inspection Procedure*

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.6 Inspect fuel lines for visibly worn flexible gas lines and any flexible connectors manufactured prior to 1973. Inspect flexible appliance connectors to determine if they are free of cracks, kinks, corrosion and signs of damage.

Program Note: These items should be noted in writing to the customer with a recommendation, but not a requirement to replace. If they are directly connected to an appliance that is been incentivized for replacement it must be replaced during the installation.

NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.7 Where fuel lines or connectors are determined to be unsafe or where an uncoated brass connector is found, notify the homeowner/occupant and recommend that the appliance shutoff valve be placed in the off position and that the connector be replaced.

Program Note: These items should be noted in writing to the customer with a recommendation, but not a requirement to replace. If they are directly connected to an appliance that is been incentivized for replacement it must be replaced during the installation.

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NATURAL GAS AND LP GAS PIPING SYSTEM INSPECTION (BPI 1200)

7.5.2.8 Inspect piping to determine that it is adequately supported, that there is no undue stress on the piping, and if there are any improperly capped pipe openings.

7.5.2.9 Where the auditor identifies deficiencies in gas piping materials, connections, components, or supports, the deficiencies shall be noted in project documentation along with a recommendation that the homeowner/occupant contact a qualified professional to inspect the system.

Program Note: These items should be noted in writing to the customer with a recommendation, but not a requirement to replace. If they are directly connected to an appliance that is been incentivized for replacement steps should be taken to correct minor deficiencies

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FIELD EXAMPLES

- Loose connections on flex lines to stoves
- Joints, unions, and couplings
- Newly installed sediment traps (drip leg)
- Outside where the line enters the building
- Inside furnaces at the gas control valve
- Copper Flare connections

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NON-AMEREN ILLINOIS GAS PROVIDERS

If there is a customer that has non-Ameren Illinois supplied gas, has qualified for the Offering, and meets any of the criteria outlined in the *Residential Fuel Distribution System Inspection Procedure*, contact the Ameren Illinois Call Center (**800.755.5000)** from outside of the residence. They have access to numbers for other gas providers.

RESOURCES

*AmerenIllinois*Savings.com

For Contractors tab at the top of the page and choose *Existing Residential Program Allies Portal*

Username: programally

Password: saveenergy

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Call Center

800.755.5000

QUESTIONS?

AmerenIllinoisSavings.com