GDS Associates, Inc.
Engineers and Consultants

ENERGY STAR® Home Certification Report

Sponsored by

Public Service of New Hampshire

For the property located at:

1155 Elm Street, Suite 702, Manchester, New Hampshire 03101
Telephone: 603.656.0336 www.gdsassociates.com/services/rees.html Fax: 866.611.3791

1155 Elm Street, Suite 702
Manchester, New Hampshire 03101

GDS Associates, Inc.
Engineers and Consultants

Phone: 603.656.0336
Fax: 603.656.0301

ENERGY STAR® Homes Certification Report

Date:
To:
Project ID:
Project Address:

Congratulations...I have completed the energy performance review of this new home and have determined that the building meets the standards required to be labeled as an ENERGY STAR® Home.

As you review this report, please remember that the results are not a precise prediction of overall energy consumption or utility bills, but rather a guide to compare energy costs between a number of house configurations, similar to the "miles per gallon" guide for automobiles. The program includes numerous factors that can affect home energy usage such as weather patterns, number and living habits of the occupants, hot water usage, lights and appliance usage, thermostat settings, and certain details of construction. In a particular house, any of these factors can vary significantly from the assumptions made.

This home was evaluated using state of the art software used to rate home energy performance. The software, REM/Rate™, has become the standard medium for determining a home's energy performance using the nationally recognized *Home Energy Ratings System* (HERS)[1]. This software is also used as the basis for determining whether a home meets the minimum performance standards for the EPA ENERGY STAR Home label, federal energy tax credit qualification and compliance with various energy codes.

For each home modeled in the software an energy rating known as a HERS Index is produced. This HERS index will typically be a number between 0–100 and represents the energy usage as compared to a home of similar size and shape built to minimum energy code (reference home)[2]. For example, a home with a HERS index of 100 means that the home uses the same amount of energy (100%) that a home constructed to minimum energy code, and a home with a HERS Index of 80 uses only 80% of the energy consumed by the home built only to code. Therefore, a lower HERS Index represents a better home energy performance. The HERS Index produced for this home was **47**.

Important Comments & Suggestions:
A "Blower Door" diagnostic test was performed on this home to measure the level of air leakage and the number of times it expels and replaces its internal air volume. Over the past 10 years the blower door has become the national and international standard method of evaluating and measuring the air infiltration characteristics of a dwelling. As a general rule, we use the *American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc.* (ASHRAE) target measurement of 0.35 (or about 1/3) Natural Air Changes per Hour (ACH_n) for a residential dwelling.

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[1] The REM/Rate™ software was developed by *Architectural Energy Corporation* of Boulder, Colorado.
[2] The reference home represents a home built to minimum energy code requirements based on International Energy Conservation Code

It is critically important that you develop a strategy to properly ventilate this home for both indoor-air-quality and long term building durability (moisture) reasons.

Important:

- If you have, or will install combustion appliances in this home or have an adjoined garage, hard wired or plug-in carbon monoxide Alarms should be installed on each floor as per manufacturers' instructions.

- The HVAC equipment specifications used in the REM/Rate model are based on the designed performance factors of that equipment. Any deviations in actual performance from those design specifications in your home are warranty issues that are the sole responsibility of your heating/cooling design and installation contractors.

- It is strongly suggested that the occupants of this home install one or two layers of simple window coverings to the full height of the window units and any patio doors. A strategy of covering as much of the window glazing as possible on cold winter nights and hot summer days will significantly increase both winter and summer comfort and reduce energy usage.

Enclosed, please find your official ENERGY STAR Home certificate that can be framed or filed with your other important documents. Also enclosed is an ENERGY STAR Home peel-and-stick label that should be attached in a permanent location of the home such as the cover to the electrical panel.

Thank You for participating in EPA's ENERGY STAR Homes program and for using *GDS Associates, Inc.* as your Home Energy Rating Provider and ENERGY STAR Homes Partner. Please feel free to contact me with any questions.

Very Sincerely,

Bruce Bennett
Senior Project Manager, Residential Energy Efficiency

ATTACHMENTS:

- Air Leakage Report
- ENERGY STAR® Home Verification Summary
- EPA ENERGY STAR® Homes Certificate
- RESNET Home Energy Rating – Standard Disclosure
- EPA ENERGY STAR® Homes Label (to be attached to electrical box)

AIR LEAKAGE REPORT

Date:	February 24, 2014	Rating No.:	GDS-PS-NH-ES-5203
Building Name:		Rating Org.:	GDS Associates
Owner's Name:		Phone No.:	
Property:		Rater's Name:	Joe Rando
Address:		Rater's No.:	4348719
Builder's Name:			
Weather Site:		Rating Type:	Confirmed
File Name:	Sandhill-5-FINAL.blg	Rating Date:	February 4, 2014

Whole House Infiltration

	Blower door test	
	Heating	*Cooling*
Natural ACH:	0.06	0.04
ACH @ 50 Pascals:	0.89	0.89
CFM @ 25 Pascals:	168	168
CFM @ 50 Pascals:	264	264
Eff. Leakage Area: [sq.in]	14.5	14.5
Specific Leakage Area:	0.00005	0.00005
ELA/100 sf shell: [sq.in]	0.32	0.32

Duct Leakage

Leakage to Outside Units
CFM @ 25 Pascals:
CFM25 / CFMfan:
CFM25 / CFA:
CFM per Std 152:
CFM per Std 152 / CFA:
CFM @ 50 Pascals:
Eff. Leakage Area: [sq.in]
Thermal Efficiency:
Total Duct Leakage Units
Total Duct Leakage:

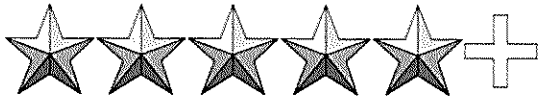
Ventilation

Mechanical:	Balanced
Sensible Recovery Eff. (%):	72.0
Total Recovery Eff. (%):	68.0
Rate (cfm):	84
Hours/Day:	12.0
Fan Watts:	25.0
Cooling Ventilation:	Natural Ventilation

ASHRAE 62.2 - 2010 Ventilation Requirements

For this home to comply with ASHRAE Standard 62.2 - 2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, a minimum of 42 cfm of mechanical ventilation must be provided continuously, 24 hours per day. Alternatively, an intermittently operating mechanical ventilation system may be used if the ventilation rate is adjusted accordingly. For example, a 83 cfm mechanical ventilation system would need to operate 12 hours per day, as long as the system operates to provide required average ventilation once each hour.

Home Energy Rating Certificate



5 Stars Plus
Confirmed

Uniform Energy Rating System — **Energy Efficient**

1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-401	400-301	300-251	250-201	200-151	150-101	100-91	90-86	85-71	70 or Less

HERS Index: 47

General Information

Conditioned Area:	1920 sq. ft.	HouseType:	Single-family detached
Conditioned Volume:	17700 cubic ft.	Foundation:	Conditioned basement
Bedrooms:	2		

Mechanical Systems Features

Heating:	Fuel-fired hydronic distribution, Propane, 96.0 AFUE.
Water Heating:	Conventional, Propane, 0.80 EF, 50.0 Gal.
Duct Leakage to Outside:	NA
Ventilation System:	Balanced: ERV, 84 cfm, 25.0 watts.
Programmable Thermostat:	Heating: Yes Cooling: Yes

Building Shell Features

Ceiling Flat:	R-49.6	Slab:	R-24.0 Edge, R-10.0 Under
Sealed Attic:	NA	Exposed Floor:	NA
Vaulted Ceiling:	NA	Window Type:	U-Value: 0.290, SHGC: 0.310
Above Grade Walls:	R-6.0	Infiltration Rate:	Htg: 168 Clg: 168 CFM25
Foundation Walls:	R-24.0	Method:	Blower door test

Lights and Appliance Features

Percent Interior Lighting:	100.00	Range/Oven Fuel:	Electric
Percent Garage Lighting:	0.00	Clothes Dryer Fuel:	Electric
Refrigerator (kWh/yr):	450.00	Clothes Dryer EF:	3.01
Dishwasher Energy Factor:	0.68	Ceiling Fan (cfm/Watt):	250.00

The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

REM/Rate - Residential Energy Analysis and Rating Software v14.4.1

Registry ID: 970379876
Rating Number: GDS-PS-NH-ES-5203
Certified Energy Rater: Joe Rando
Rating Date: February 4, 2014
Rating Ordered For:

Estimated Annual Energy Cost
Confirmed

Use	MMBtu	Cost	Percent
Heating	37.2	$1117	1%
Cooling	0	$0	0%
Hot Water	15.1	$135	0%
Lights/Appliances	16.2	$76439	98%
Photovoltaics	-0.0	$-0	-0%
Service Charges		$192	0%
Total	**70.0**	**$77882**	**100%**

This home meets or exceeds the minimum criteria for all of the following:

GDS Associates Inc
1155 Elm Street, #702
Manchester, NH 03101
603.656.0336

2005 EPACT ENERGY EFFICIENT HOME TAX CREDIT (13-001)

Date:	February 24, 2014	Rating No.:	GDS-PS-NH-ES-5203
Building Name:		Rating Org.:	GDS Associates
Owner's Name:		Phone No.:	
Property:		Rater's Name:	Joe Rando
Address:		Rater's No.:	4348719
Builder's Name:			
Weather Site:		Rating Type:	Confirmed
File Name:	Sandhill-5-FINAL.blg	Rating Date:	February 4, 2014

Normalized, Modified End-Use Loads (MMBtu/year)

	2006 IECC 50% Target	*As Designed*
Heating:	25.1	21.2
Cooling:	3.8	4.4
Total:	28.9	25.6

Envelope Loads (MMBtu/year)

	2006 IECC 90% Target	*As Designed*
Heating:	45.1	36.1
Cooling:	6.9	5.5
Total:	52.0	41.7

This home MEETS the requirements for the residential energy efficiency tax credits under Section 1332, Credit for Construction of New Energy Efficient Homes, of the Energy Policy Act of 2005 extended to December 31, 2013.

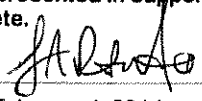
As demonstrated above, this dwelling unit has a projected level of annual heating and cooling energy consumption that is at least 50% below the annual level of heating cooling energy consumption of a 2006 IECC reference dwelling in the same climate zone, and the building envelope components improvements alone account for at least 10% of those savings. The projected heating and cooling energy savings above have been calculated in the manner prescribed in Appendix A of the RESNET Publication No. 13-001. Field inspections of the dwelling unit performed by the undersigned eligible certifier during and after the completion of construction have confirmed that all features of the home affecting such heating and cooling energy consumption comply with the design specifications provided to the undersigned certifier.

Building Features

Ceiling Flat:	R-49.6
Sealed Attic:	NA
Vaulted Ceiling:	NA
Above Grade Walls:	R-6.0
Foundation Walls:	R-24.0
Exposed Floor:	NA
Slab:	R-24.0 Edge, R-10.0 Under
Duct:	NA
Window:	U-Value: 0.290, SHGC: 0.310
Heating	Fuel-fired hydronic distribution, Propane, 96.0 AFUE.
Cooling	N/A

Under penalties of perjury, I declare that I have examined this certification, including accompanying documents, and to the best of my knowledge and belief, the facts presented in support of this certification are true, correct, and complete.

Name: Joe Rando

Signature: 

Company: GDS Associates

Date: February 4, 2014

Address: 1155 Elm Street Suite 702, Manchester, NH 03101

ENERGY STAR

ENERGY STAR VERSION 3 HOME VERIFICATION SUMMARY

Date:	February 24, 2014	Rating No.:	GDS-PS-NH-ES-5203
Property:		Rating Org.:	GDS Associates
		Rater's Name:	Joe Rando
Builder's Name:		Rater's ID:	4348719
File Name:	Sandhill-5-FINAL.blg	Rating Date:	February 4, 2014

Building Information

Conditioned Area (sq ft):	1920
Conditioned Volume (cubic ft):	17700
Insulated Shell Area (sq ft):	4466
Number of Bedrooms:	2
Housing Type:	Single-family detached
Foundation Type:	Conditioned basement

Ratings

HERS Index:	47
HERS Index w/o PV:	47
HERS Index Target (SAF Adjusted):	62
HERS Index of Reference Design Home:	65
Size Adjustment Factor:	0.96

Building Shell

Ceiling w/Attic:	R49,HDF1,10-16 U=0.031	Window/Wall Ratio:	0.16
Sealed Attic:	None	Window Type:	U:0.29, SHGC:0.31*
Vaulted Ceiling:	None	Window U-Value:	0.290
Above Grade Walls:	6" Log* U=0.108	Window SHGC:	0.310
Found. Walls (Cond):	R24, ICF R=24.0	Infiltration:	Htg: 168 Clg: 168 CFM25
Found. Walls (Uncond):	None	Duct Leakage to Outside:	NA
Frame Floors:	None	Total Duct Leakage:	NA
Slab Floors:	R24P-ICF,R10U,24W,R* U=0.027		

Mechanical Systems

Heating	Fuel-fired hydronic distribution, 100.0 kBtuh, 96.0 AFUE.
Water Heating	Conventional, Prop, 0.80 EF.
Programmable Thermostat:	Heat=Yes; Cool=Yes
Ventilation System:	Balanced: ERV, 84 cfm, 25.0 watts.

Lights and Appliances

Percent Interior Lighting:	100.00	Clothes Dryer Fuel:	Electric
Percent Garage Lighting:	0.00	Clothes Dryer EF:	3.01
Refrigerator (kWh/yr):	450.00	Clothes Washer LER:	96.00
Dishwasher Energy Factor:	0.68	Clothes Washer Capacity:	3.81
Ceiling Fan (cfm/Watt):	250.00	Range/Oven Fuel:	Electric

Note: Where feature level varies in home, the dominant value is shown.

This home MEETS OR EXCEEDS the EPA's requirements for an ENERGY STAR Home.
HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

ENERGY STAR® CERTIFIED NEW HOME

Builder Name:
Permit Date/Number:
Home Address:

Rating Company: GDS Associates
Rater Identification Number: 4348719
Rating Date: February 4, 2014
Version: 3.0

Standard Features of an ENERGY STAR Certified New Home

Your ENERGY STAR certified new home has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

Thermal Enclosure System

A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation and high-performing windows to deliver improved comfort and lower utility bills.

Air Infiltration Test: **Htg: 168 Clg: 168 CFM25**

Primary Insulation Levels:

Ceiling: R-49.6 **FndWall: R-24.0**
AGWall: R-6.0 **Slab: R-34.0**

Primary Window Efficiency:

U-Value: 0.290, SHGC: 0.310

Water Management System

A comprehensive water management system to protect roofs, walls, and foundations.

Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home.

Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering into the home.

Management of moisture levels in building materials during construction.

Heating, Cooling, and Ventilation System

A high-efficiency heating, cooling system, and ventilation system that is designed and installed for optimal performance.

Total Duct Leakage:

NA

Duct Leakage to Outdoors:

NA

Primary Heating (System Type • Fuel Type • Efficiency):

Fuel-fired hydronic distribution, Propane, 96.0 AFUE.

Primary Cooling (System Type • Fuel Type • Efficiency):

None

Energy Efficient Lighting and Appliances

Energy efficient products to help reduce utility bills, while providing high-quality performance.

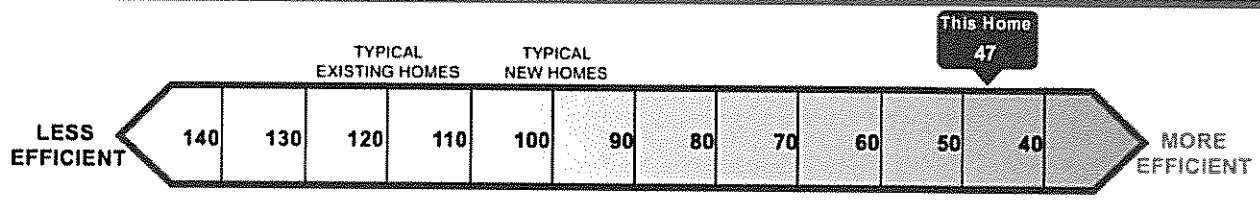
ENERGY STAR Qualified Lighting: **100%**

ENERGY STAR Qualified Appliances and Fans:

Refrigerators: 1 **Dishwashers: 1**
Ceiling Fans: 0 **Exhaust Fans: 1**

Primary Water Heater (System Type • Fuel Type • Efficiency):

Conventional, Propane, 0.80 EF, 50.0 Gal.



HERS® Index

The certificate provides a summary of the major energy efficiency and other construction features that contribute to this home earning the ENERGY STAR, including its Home Energy Rating System(HERS) score, as determined through independent inspection and verification performed by a trained professional. The home Energy Rating System is a nationally-recognized uniform measurement of the energy efficiency of homes.

Note that when a home contains multiple performance levels for a particular feature (e.g., window efficiency or insulation levels), the predominant value is shown. Also, homes may be certified to earn the ENERGY STAR using a sampling protocol, whereby one home is randomly selected from a set of homes for representative inspections and testing. In such cases, the features found in each home within the set are intended to meet or exceed the values presented on this certificate. The actual values for your home may differ, but offer equivalent or better performance.

Learn more at www.energystargov/homefeatures

HOME CERTIFIED TO MEET THE PROVISIONS OF THE 2009 INTERNATIONAL ENERGY CONSERVATION CODE

This home built at

exceeds the minimum requirements for the 2009 International Energy Conservation Code

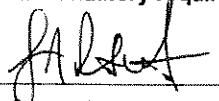
February 4, 2014

Building Features

Ceiling Flat:	R-49.6	Duct Leakage to Outside:	NA
Sealed Attic:	NA	Total Duct Leakage:	NA
Vaulted Ceiling:	NA	Infiltration:	Htg: 168 Clg: 168 CFM25
Above Grade Walls:	R-6.0	Window:	U-Value: 0.290, SHGC: 0.310
Foundation Walls:	R-24.0	Heating	Fuel-fired hydronic distribution, Propane, 96.0 AFUE.
Exposed Floor:	NA	Cooling	N/A
Slab:	R-24.0 Edge, R-10.0 Under	Water Heating	Conventional, Propane, 0.80 EF, 50.0 Gal.
Duct:	NA		

The organization below certifies that the proposed building design described herein is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2009 IECC requirements in compliance with Chapter 4 based on Climate Zone 6A and with all mandatory requirements.

Name: Joe Rando

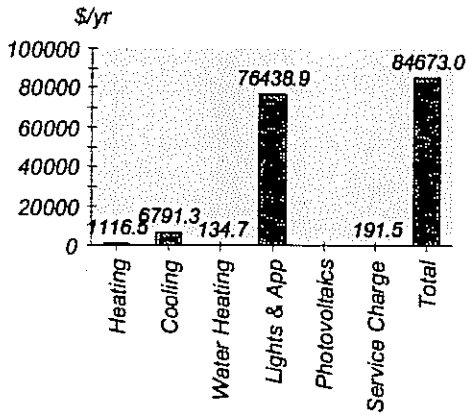
Signature: 

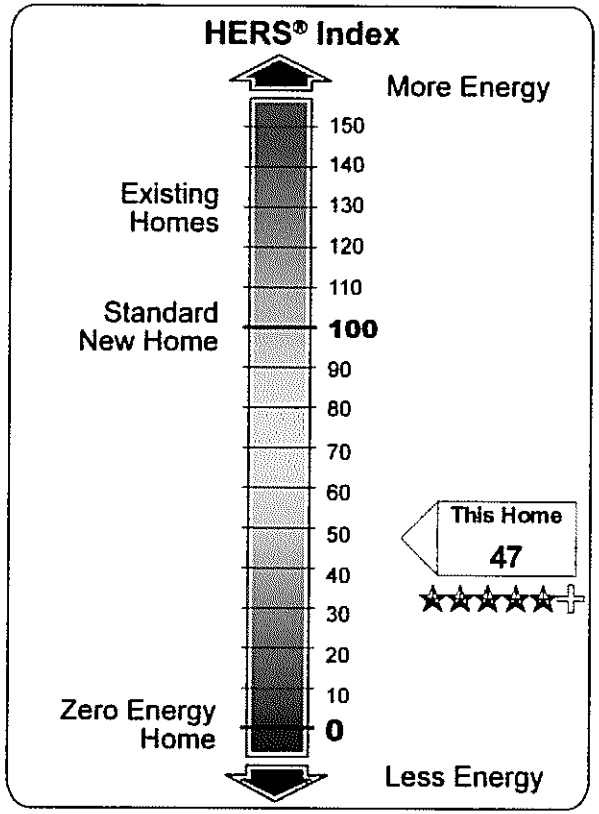
Organization: GDS Associates

Date: February 24, 2014

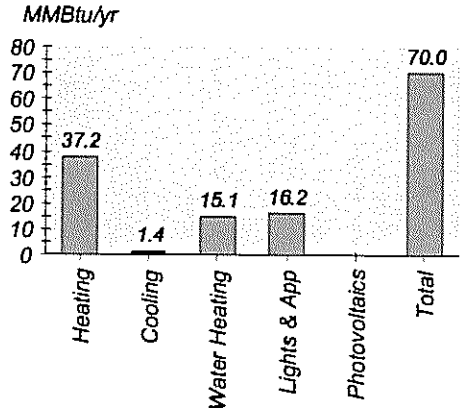
HOME PERFORMANCE WITH ENERGY STAR
ENERGY RATING CERTIFICATE

Estimated Annual Energy Cost





Estimated Annual Energy Consumption



Address:

House Type Single-family detached
Cond. Area: 1920 sq. ft.
Rating No.: GDS-PS-NH-ES-5203
Issue Date: February 24, 2014
Certification Verified

Annual Estimates*:
Electric(kWh): 5220
Propane(Gallons): 571
C02 emissions(Tons): 5
Annual Savings**: $92156

** Based on standard operating condition*
*** Based on a HERS 130 Index Home*

GDS Associates Inc
1155 Elm Street, #702

Certified Rater: Joe Rando
Rater ID: 4348719
Registry ID: 970379876
Rating Date: February 4, 2014

RESNET HOME ENERGY RATING
Standard Disclosure

For home located at: _____

City: _____ **State:** _____

1. [X] The Rater or the Rater's employer is receiving a fee for providing the rating on this home.

2. [ ] In addition to the rating, the Rater or Rater's employer has also provided the following consulting services for this home:

   - [ ] A. Mechanical system design
   - [ ] B. Moisture control or indoor air quality consulting
   - [ ] C. Performance testing and/or commissioning other than required for the rating itself
   - [ ] D. Training for sales or construction personnel
   - [ ] E. Other (specify below)

   _____

3. [X] The Rater or Rater's employer is:

   - [ ] A. The seller of this home or their agent
   - [ ] B. The mortgagor for some portion of the financed payments on this home
   - [X] C. An employee, contractor or consultant of the electric and/or natural gas utility serving this home

4. [ ] The Rater or Rater's employer is a supplier or installer of products, which may include:

	Installed in this home by:		OR	Is in the business of:	
HVAC systems	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Thermal insulation systems	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Air sealing of envelope or duct systems	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Windows or window shading systems	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Energy efficient appliances	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Construction (builder, developer, construction contractor, etc.)	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer
Other (specify below):	[ ] Rater	[ ] Employer		[ ] Rater	[ ] Employer

_____

I attest that the above information is true and correct to the best of my knowledge. As a Rater or Rating Provider I abide by the rating quality control provisions of the Mortgage Industry National Home Energy Rating Standard as set forth by the Residential Energy Services Network (RESNET). The national rating quality control provisions of the rating standard are contained in Chapter One 4.C.8 of the standard and are posted at http://www.natresnet.org/accred/standards.pdf. This home may have been verified under the provisions of Chapter Six, Section 603, "Technical Requirements for Sampling" of the Standard.

Joe Rando
Rater's Printed Name

Rater's Signature

4348719
Certification #

February 24, 2014
Date