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Center for Energy & Environment Quality Assurance Program Using Picture Phones

Duluth Energy Design Conference and Expo

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Session Outline

- Who is the Center for Energy and Environment
- Authorized Insulation Contractor QA Program
- Lessons learned
- Discussion

The Center for Energy and Environment

CEE is a nonprofit organization that promotes energy efficiency to strengthen the economy while improving the environment.

- CEE conducts research and develops programs so that:
- Businesses operate more efficiently and profitably;
- Government agencies and nonprofits spend less on facilities and functions;
- Utilities achieve their energy-efficiency goals at least-cost; and
- Households save money and improve comfort.

CEE QA Program Using Picture Phones

Collaboration with Minnesota Energy Resources was key to the development of this QA program

- Supports their **Authorized Insulation Contractor** program for residential insulation rebates
- CEE is also applying this QA process in several MN communities on Home Energy Squad referred air seal/insulation work rebated by CenterPoint Energy

A Four Part QA Process Was Designed

1. Contractor work requirements
2. Interactive on-line training module
3. Protocols for virtual – phone QA – inspection
4. On-site inspect 10% of jobs & all complaints

1. Contractor Requirements

- Crew has blower door, manometer, smoke puffer and insulation machine capable of dense pack installation
- Crew leader trains and passes **BPI RBE-WHALCI** cert
- Crew leader passes online combustion safety training
- Crew follows program Combustion Safety protocols and Material and Installation standards
 - Correct non-conforming details no customer charge
- Crew leader verifies work performed and test results on Rebate Form

2. Interactive on-line training module designed

- Successive on-line training and quizzes assess crew leader knowledge and understanding of program combustion safety requirements.
 - Follow-up to program orientation training
- **Crew leader must pass to be considered eligible for rebate programs**
 - **Convenient “as-needed” refresher instruction**

3. Protocols for virtual inspection developed

- Contractor sends work scope to CEE before job
 - CEE ID's typical photos, sends list for crew leader
- After job test-in: CL sends photos, 1st call to confirm:
 - Pass comb safety, photos rec'd, work scope, photo list; job OK to go
- CL sends air seal/ insul. prep photos, 2nd call to confirm:
 - Photos rec'd, prep complete, ready to insulate.
- CL sends insulation photos, tests-out, 3rd call to confirm:
 - Combustion safety, photos rec'd, job finished

4. On-site inspect 10% of jobs & all complaints

- Scoring guide for 35 typical work scope tasks defines Pass, Cond. Pass , Fail 70% of score
 - Also scored:
 - Documentation & Testing 20% of score
 - Customer Service (home owner survey) 10%

4. On-site inspect 10% of jobs & all complaints

- Scoring guide for 35 typical tasks defines Pass, Cond. Pass , Fail
 - Also: Documentation & Testing, Customer Service (survey)
- At site visit custom iPad software calculates the crew leader job score, syncs with program data base, emails contractor a job report with crew leader score and any call back issues w/ photos
- Crew leader to maintain $\geq 80\%$ avg score for site QA's
 - Under 80% avg. score can require crew leader to
 - Resume picture phone QA, and/or
 - More QA site visits, or
 - Program suspension

Benefits of this QA Approach

- BPI RBE-WHALCI cert verifies knowledge, skills, abilities
- Online comb. safety trng. verifies crew leader knowledge
- M&I standards & scoring guide establishes expectations.
- Picture phone QA simplifies scheduling – CAN be at more than one job in a day, that may be 100s of miles apart.
- Picture phone provides real time feedback and promotes continuous improvement
 - Issues quickly become training opportunities
 - Crew leader has a picture phone “shout-out” anytime
- Picture phones can lower trng & admin costs of QA program delivery.

Contractor Requirements Pre-Work

1. Verify no pre-existing combustion safety conditions

Perform “Fans-Off” combustion safety test:

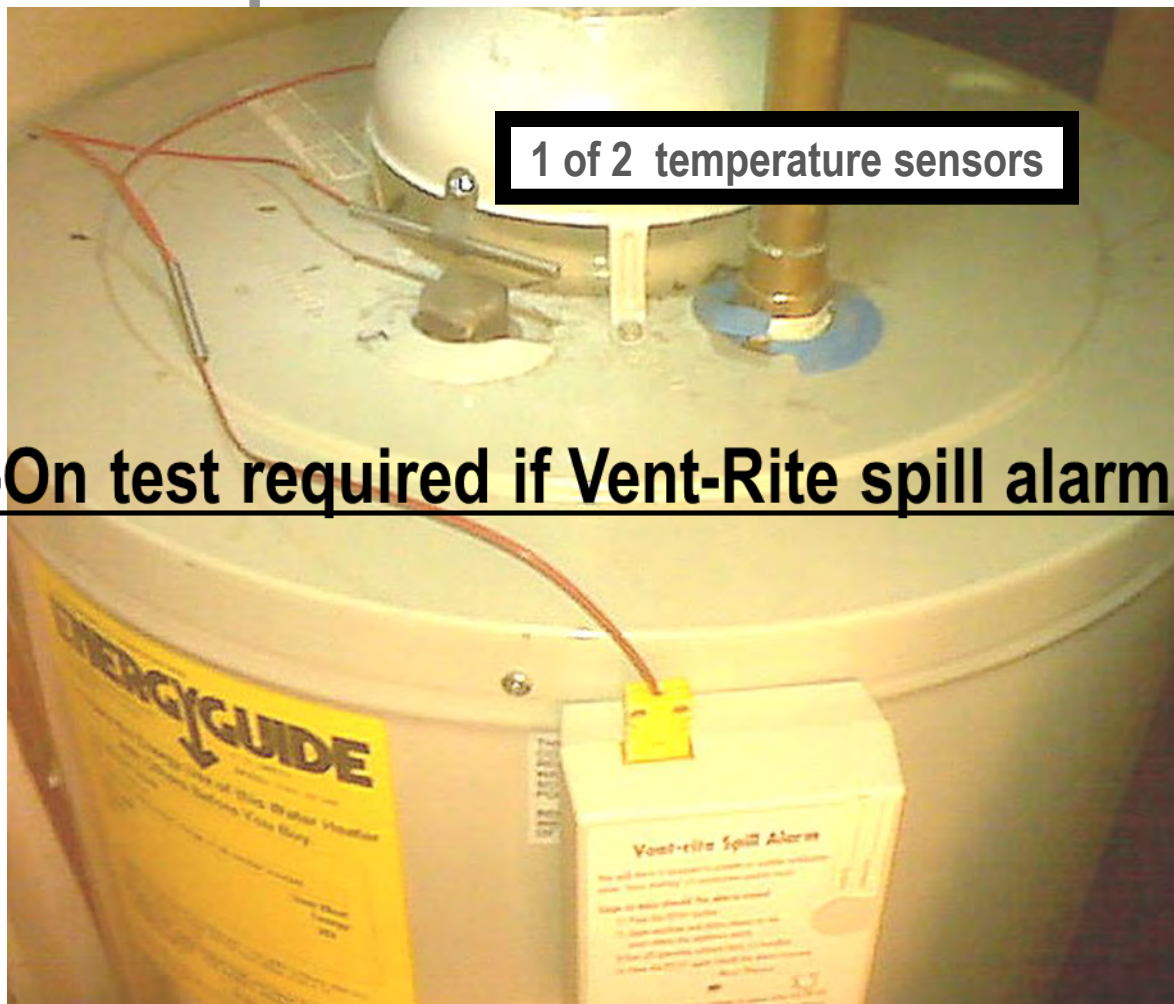
- Air handler and all exhaust fans off,
- All interior doors open (house set up for BD test)
- All appliances pass smoke test or no work till fixed
 - **“Fans Off” Fail = Written homeowner notice**

2. CFM50 blower door test

Contractor Requirements Post-Work

1. CFM50 blower door test
2. If pre-work combustion safety test done
 - Install a VentRite spill alarm
or perform
 - “Fans On” Combustion Safety Test
 - Air handler, dryer, kitchen fan, fans $\geq 150\text{cfm}$
 - Last door into CAZ positioned with smoke
 - All appliances pass smoke test, if not: retest “Fans Off”
 - **“Fans On” Fail = Written home owner notice**
3. Crew leader verifies tests and work on Rebate Form

Vent-Rite Spill Alarm



No Fans-On test required if Vent-Rite spill alarm installed

CEE QA Program Using Picture Phones

Example of typical picture phone QA process

- Contractor is sent a 4-6 photos/page crew leader job report with the captions on following photos

Step 1: CEE Picture Phone QA Process

1. Contractor sends work scope for CEE review

Bill's Insulation BPI Certified DATE 8-22-13
mark's mobile 512-430-3100 Job Address Home

Customer's Phone 512-430-3100 ESTIMATED DELIVERY upon completion

TO Homeowner TERMS upon completion

SALESMAN _____ F.O.B. _____ SHIP VIA _____ FOLLOW UP DATE _____

QUANTITY	DESCRIPTION	PRICE	UNIT	AMOUNT
	Air seal attic (wires, pipes & lights)			175.00
	Air Chutes appear OK			0c
	Box #3 bath fans			75.00
	Box 4 recessed lights			100.00
	Insulate & seal attic recess			0c
	Blow attic to R-50 Fiberglass			961.00
			Total	1311.00

We are doing this job of Monday 9-9-13 at 9:00 am

I am going to have 4 men on this job.
 Crew leader Mark Emond
 DJI # 5046386

We must be notified when attics are ready to blow, notification by fax or a call to our office is acceptable

Any additions may be subject to an increase in billing. This estimate is valid 10 days for acceptance. No oral terms or representations shall be considered a part of this agreement. All invoices are due 30 days from invoice date. Invoices not paid in full within 30 days of the invoice date are past due and the unpaid amount past due from the time to time will bear a 1.0% late payment charge each month or part of the month until paid in full. The late payment charge will begin on the 31st day following the invoice date. If Emond Insulation, Inc. takes any steps to collect a past due invoice, I will pay all cost of collection, including but not limited to reasonable attorney's fees.

ABOVE PRICES GOOD FOR 30 DAYS. SIGNATURE _____

2. CEE sends list of likely photos, confirmed at job

Picture QA Procedure - attic air seal and insulation
 QA Assessor: Kevin Brauer 512-804-0369 text photos to: kbrauer@mncee.org

A. Before any work:

1. Take and text Photo of house view
2. Take and text Photo(s) of Mechanical systems & vents to chimney
 - a. Do fans off combustion safety test: Pass= work can commence, Fail= must fix before work
3. Take and text Photo of Pre-CM 50 reading (no flash on photo)
4. Phone QA assessor to confirm photos received, discuss work scope and photos needed for "B"

B. Do air seal work and all insulation preparation:

1. Take and text One Photo of a completed detail type:
 - a. Photo of chimney seal
 - b. Photo of spill stark seal
 - c. Photo of bath fan seal
 - d. Photo of can light seal
 - e. Photo of exterior wall top plate seal
 - f. Photo of soffit seal
 - g. sealed wiring, electric boxes, etc
 - h. Photo of insulation dams in place
 - i. Chimney
 - ii. Access
 - iii. Etc.
 - i. Photo of several insulation depth markers in place
 1. TIP: On each marker Circle the insu ation level for R-value to be added
 - j. Photo batt insulation added and airtic knee wall or scum wal
 1. Photo house wrap over batt insulation
2. Phone QA assessor to confirm air seal and attic prep work completed.

C. Insulate attics - blown cellulose or blown fiberglass

1. Take and text Five Photos of a completed attic:
 - a. Photo showing several depth markers
 - b. Photo(s) showing chimney dam and can lights
 - c. Photo of completed insulator card AND manufacturers coverage chart
 - d. Photo of attic access treatment
 - i. Insulation (to base or more R value of attic;
 - ii. Weather-stripping and fastener system
 - e. Photo of Post CM 50 reading (no flash on photo)
 - i. Do fans ON combustion safety test - if spill alarm not installed
 1. Fall fans ON test; do fans OFF test
 2. Complete combustion safety notice and give to homeowner
2. Phone QA assessor to verify work completed to standards
 - a. Crew leader can ask about: rebat form, combustion safety issues, etc.

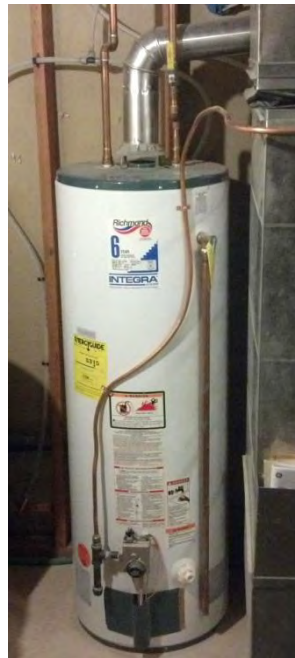
CEE Picture Phone QA Process

**(Photo 1) Job Address, Work: Attic air seal & insulate
28 Phone QA photos (confirmed at job site)**



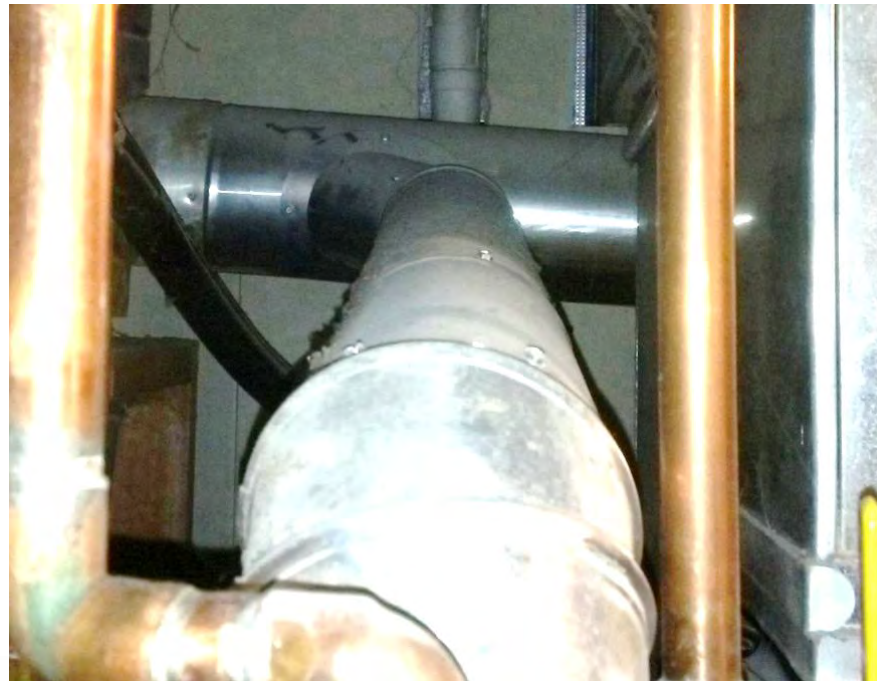
CEE Picture Phone QA Process

(Photos 2,3) Nat Draft Water Heater, ID Furnace
Both Pass: “Fans OFF” test-in
(& Pass “Fans ON” test-out)



CEE Picture Phone QA Process

(Photo 4) Water heater common vent connection



CEE Picture Phone QA Process

(Photo 5) Before work CFM50: 1916

Now:

1st call – crew leader confirms

- Combustion safety
- Work scope details
- Photos to send from list
- Work OK to start



CEE Picture Phone QA Process

(Photo 6) Plumbing vent sealed



CEE Picture Phone QA Process

(Photo 7) Electrical wiring sealed



CEE Picture Phone QA Process

(Photo 8) Bath fan sealed



CEE Picture Phone QA Process

(Photo 9) Bath fan termination connection sealed



CEE Picture Phone QA Process

(Photo 10) Drop soffit sealed



CEE Picture Phone QA Process

(Photo 11) Chimney bypass sealed

✓ proper material



CEE Picture Phone QA Process

(Photo 12) Chimney insulation dam installed

✓ proper clearance



CEE Picture Phone QA Process

(Photos 13,14,15) Vent chute, wind block & top plate seal



CEE Picture Phone QA Process

(Photo 16) Depth markers – 15” install depth circled

✓ 1 marker
per 100
SF of
attic



CEE Picture Phone QA Process

(Photo 17) Non-IC can light boxed and sealed



CEE Picture Phone QA Process

Crew has completed attic prep work,

Now:

2nd call – crew leader confirms

- **All photos sent and received**
- **Prep work done, ready to insulate**

CEE Picture Phone QA Process

Crew has completed attic prep work,

Now:

2nd call – crew leader confirms

- All photos sent and received
- Prep work done, ready to insulate

➤ **Finding: Not ready to insulate**

! Insulating cover above Non-IC can lights Not Allowed

! Remove & replace covers with drywall or equal

CEE Picture Phone QA Process

(Photo 17) Non-IC can light box –

Insulating cover
NOT ALLOWED
above
Non-IC lights
per NEC 410-66



CEE Picture Phone QA Process

Crew leader corrects issue,

- ✓ **texts photos confirming correction**
- ✓ **NOW OK to insulate**

CEE Picture Phone QA Process

Photos 18,19 Non-IC can light correction completed

Foam covers off non-IC can lights



Sealed drywall on top



CEE Picture Phone QA Process

(Photo 20) Insulation added over 15", > R-50 on bid



CEE Picture Phone QA Process

(Photo 21) IC-can box tops above insulation level



CEE Picture Phone QA Process

(Photo 22) Chimney dam above insulation level



CEE Picture Phone QA Process

(Photos 23,24,25,26,27) Access dam, Panel 10" >R25, W/S, Signed Insulation Card and Mfg Coverage Chart



CEE Picture Phone QA Process

Crew has completed work scope,
(Photo 28) Post CFM50 followed by comb safety test

Now:

3rd call – crew leader confirms

- Combustion safety
- Photos rec'd
- Job done

(CFM50 pre: 1916

Post: 1282

Reduction: $643 = 33\%$



Typical QA report with score and crew leader next steps

- ✓ Job score
- ✓ Monthly status
- ✓ Training updates

QA Phone Visit – MER Authorized Insulation Contractor Program

██████████ in QA phone visit #: 2 ██████████

QA Phone Visit Date: 10/29/19 QA Assessor: Kevin Brauer

Address: ██████████

QA Phone Visit Result: Pass

Next Steps: Congratulations the crew leader has successfully completed the required QA phone visits. A QA site visit score of 80 or more will move the crew leader from Probation status to Active status. This visit will be scheduled by CEE with the homeowner and crew leader.

Further Details about this QA phone visit and results follow.

CEE QA Program Using Picture Phones

Lesson Learned

- BPI RBE-WHALCI cert defines job quality norm
- Standards, Scoring Guides set expectations
- Photo take-off from work scope; site confirm to maximize utility with minimum # photos
- Photos can identify training opportunities
- Able to photo QA more than one site/day
- Photo date/time-stamp aid multiple QA jobs/day
- Provides crew leader a job “shout-out” anytime
- Phones, software, on-line trng. aid QA, cut costs

THANK
you!

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