AGENDA

UNIFORM BUILDING CODE COMMISSION
PLUMBING/HEALTH ADVISORY COMMITTEE
MECHANICAL ADVISORY COMMITTEE

Wednesday, January 13, 2015

9:00 AM
Sandy City Hall, 10000 Centennial Pkwy Sandy, UT
Room 341

This agenda is subject to change up to 24 hours prior to the meeting.

Administrative Business:
Call meeting to order
Swear in new members
Elect a chair and vice chair for the Plumbing Health Advisory Committee
Appoint liaisons for Plumbing and Mechanical Advisory Committees
Sign per diem sheet

Discussion Items:
1. Approve minutes from October 7, 2015, Commission meeting, August 4, 2015, Mechanical Advisory Committee and June 4, 2015, Plumbing Advisory Committee
2. Review the Division of Air Quality proposed rule for NOx gas fired water heaters and make a recommendation
3. Advisory Committee reports -
    a. Architectural Advisory Committee – no meeting
    c. Education Advisory Committee – no meeting
    d. Electrical Advisory Committee – no meeting
    e. Unified Code Analysis Council – no meeting
    f. International Mechanical Advisory Committee – no meeting
    g. Plumbing /Health Advisory Committee – no meeting
    h. Structural Advisory Committee – no meeting
4. Info Items
    a. IBC Amendment status log
    b. IRC Amendment status log
    c. IPC Amendment status log
    d. IECC Amendment status log
    e. NEC Amendment status log
    f. IEBC Amendment status log
    g. Education Committee Combined Balance & Income Sheet

Next Scheduled Meeting: to be determined

In compliance with the Americans with Disabilities Act, individuals needing special accommodations (including auxiliary communicative aids and services) during this meeting should notify Dave Taylor, ADA Coordinator, at least three working days prior to the meeting. Division of Occupational and Professional Licensing, 160 East 300 South, Salt Lake City UT 84115, 801-530-6628 or toll-free in Utah only 866-275-3675.

Please call Sharon at 530-6163, email at ssmalley@utah.gov or dansjones@utah.gov if you do not plan on attending the meeting.

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MINUTES

UTAH
UNIFORM BUILDING CODE COMMISSION
MEETING

October 7, 2015

Sandy City Hall – 9:00 am
Room 341
Sandy, UT

STAFF:
Masuda Medcalf, Administrative Law Judge
Mark Steinagel, Division Director
Dan S. Jones, Bureau Manager
Sharon Smalley, Board Secretary

COMMISSIONERS:

Ron McArthur	Christopher Jensen
+ Justin Naser	Richard Butz
Bryant Pankratz (absent)	Chris Joyal
Alex Butwinski (excused)	Casey Vorwaller
Patrick Tomasino	Kevin Emerson

VISITORS:

Rep Fred Cox	Ross Ford, UHBA
Brent Ursenbach SLCO	Don Jarves, Provo Mayor, UT Valley C of C
Mitch Richardson, STS	Jennifer Gardner, Gov Office of Energy Dev
Kerry Cramer, SLCOHD	Justin Stewart, Chemistry Council
Tim Wagner,UPHE	Linda Johnson, Breathe Utah
Gilbert Gonzales, Murray City	Bryan Romney
Marjorie McCloy	Kelly Francone, Utah Assoc of Energy Users
Damian Moore, Garbett Homes	Jeff Williams
Chad Nay	Meghan Dutton, UCE
Ingrid Griffen, UT Moms for Clean Air	Ashley Miller

PUBLIC HEARING — Masuda Medcalf conducted a public hearing for the proposed changes to Title 15A.

MINUTES — A motion was made by Casey Vorwaller to approve the minutes from the August 12, 2015 meeting as written. The motion was seconded by Ron McArthur and passed unanimously.

REVIEW PUBLIC COMMENTS — Those present discussed the comments that were

received during the public hearing. Justin Naser pointed out that the Commission's recommendation will be made at the Business and Labor Interim Committee on October 21st.

Following a discussion on the proposal for recommended changes for the energy code, a motion was made by Ron McArthur to adopt the recommendations as presented but to modify the IRC Section N1101.13 (IECC Section R401.2) for the fifth compliance path by changing the compliance to show an increase in energy efficiency from 10 percent to 5 percent. The motion died due to a lack of a second.

Following further discussion, a motion was made by Chris Jensen to approve the original proposal for the fifth compliance as presented with the 10% increase. The motion was seconded by Richard Butz and passed with a vote of seven in favor and Ron McArthur voting in opposition.

The Commission discussed the duct air leakage numbers and agreed not to make any changes to their recommendation.

The Commission discussed the numbers in the Energy Rating Index in IRC, Section N1106.4 (IRC, Section R406.4) and whether or not they should be adjusted. Following the discussion, a motion was made by Chris Joyal to change the values for the ERI in climate zone 5 to 69, in climate zone 3 to 65 and in climate zone 6 to 68. The motion was seconded by Casey Vorwaller and passed with a vote of seven in favor and Kevin Emerson voting in opposition.

MAKE A FINAL RECOMMENDATION FOR THE BUSINESS AND LABOR INTERIM COMMITTEE

A motion was made by Casey Vorwaller to accept all of the provisions that went to public hearing today along with the recommended changes just voted on and forward them on as the Commission's recommendation to the Business and Labor Interim Committee. The motion was seconded by Kevin Emerson and passed with a vote of seven in favor and Ron McArthur voting in opposition.

A motion was made by Kevin Emerson to accept

the language in the Summary of Recommended Changes to Construction Codes under Title 15A and forward it on to the Business and Labor Interim Committee. The motion was seconded by Chris Joyal and passed unanimously.

The meeting adjourned at 11:45.

UNIFORM BUILDING CODE COMMISSION

MECHANICAL ADVISORY COMMITTEE
ARCHITECTURAL ADVISORY COMMITTEE
JOINT MEETING

August 4, 2015
Sandy City Hall Room 341
10000 Centennial Pkwy Sandy UT

MINUTES

STAFF:
Dan Jones, Bureau Manager
Sharon Smalley, Board Secretary

MECHANICAL ADVISORY COMMITTEE:
David Wilson
Trent Hunt
Dennis Thatcher (absent)
Dave Halverson
Tyler Lewis
Brent Ursenbach
Roger Hamlet

ARCHITECTURAL ADVISORY COMMITTEE
David Triplett (excused)
Scott Marsell
Kenny Nichols
Gary Payne
Jerry Jensen (excused)
James Sullivan (excused)
Chris Jensen

VISITORS:
Mitch Richardson
Ron McArthur, McArthur Homes
Kevin Emerson, Utah Clean Energy

SWEAR IN NEW MEMBER	Dave Halverson, new member of the Mechanical Advisory Committee, was sworn in.
MINUTES	A motion was made by Trent Hunt to approve the minutes from the July 16, 2015 joint meeting. The motion was seconded by Scott Marsell and passed unanimously.
REVIEW 2015 IECC AND CURRENT AMENDMENTS	The Uniform Building Code Commission asked the committees to look at the 2015 energy code to consider possible amendments for the residential portion. Those present discussed various ways of amending the 2015 and still moving forward with energy conservation.

The committees reviewed the current amendments and the following recommendations were made.

A motion was made by Scott Marsell to keep the current amendment for Section R103.2. The motion was seconded by Kenny Nichols and passed unanimously.

A motion was made by Dave Halverson to keep the current amendment for Section R303.3. The motion was seconded by David Wilson and passed unanimously.

A motion was made by Dave Wilson to delete the current amendment for Table R402.1.1 and Table R402.1.3. The motion was seconded by Trent Hunt and passed unanimously.

A motion was made by Dave Wilson to add a new amendment for Table R402.1.2 to add the current amendment for footnote j. The motion was seconded by Chris Jensen and passed unanimously.

A motion was made by Dave Wilson to delete the current amendments for Sections R402.2.1, R402.2.2, R402.3.3 and R402.3.4. The motion was seconded by Kenny Nichols and passed unanimously.

A motion was made by Trent Hunt to keep the current amendment for Section R402.4.1. The motion was seconded Chris Jensen and passed unanimously.

A motion was made by Dave Halverson to keep the current amendment for Section R402.4.1.1. The motion was seconded by Trent Hunt. During the discussion the motion was amended to keep the amendment but modify the word "building" and change it to "code". The amended motion passed unanimously.

A motion was made by Dave Halverson to modify the current amendment for Section R402.4.1.2 by

modifying the word "building" and changing it to "code". The motion was seconded by Trent Hunt and passed unanimously.

A motion was made by Gary Payne to delete the current amendment for Section R402.4.4. The motion was seconded by Trent Hunt and passed unanimously.

A motion was made by Trent Hunt to add an amendment for Section R403.3.4 that would change the total leakage for the rough-in test from 4 to 6 cfm and 113.3 L/min to 170 L/min, change 3 to 5 cfm and 85 L/min to 141.6 L/min and change the post construction test from 4 to 8 cfm and 113.3 L/min to 226.5 L/min. The motion was seconded by Scott Marsell and passed unanimously.

A motion was made by Dave Wilson to add and amendment for Section R403.3.3 that would add a sentence to the end stating "The following parties shall be approved to conduct testing: Parties certified by BPI or RESNET, or licensed contractors who have completed training provided by Duct Test equipment manufacturers or other comparable training." The motion was seconded by Scott Marsell and passed unanimously.

A motion was made by Dave Wilson to modify the current amendment for Section R403.2.2 by changing the section number to R403.3.3 and 50 percent to 65 percent. The motion was seconded Kenny Nichols and passed unanimously.

A motion was made by Scott Marsell to modify the current amendment for Section R403.2.3 by changing the section number to 403.3.5. The motion was seconded by Kenny Nichols and passed with a vote of nine in favor and Dave Wilson voting in opposition.

A motion was made by Dave Wilson to add a new amendment for Section 406.2 that would delete the last sentence including the exception. The motion

was seconded by Dave Halverson and passed unanimously.

A motion was made by Dave Wilson to add a new amendment for Table 406.4 that would change the energy rating index for all eight climate zones. The ratings would change to 59, 59, 59, 63, 63, 62, 60 and 60. The motion was seconded by Gary Payne and passed unanimously.

A motion was made by Trent Hunt to add a new amendment for Section R401.2 and in Section N1101.13 of the IRC stating "Compliance may be shown by using the RESCheck "2012 Utah Energy Conservation Code" and showing compliance 10 percent better than code as shown by the above referenced software." The motion was seconded by Dave Wilson and passed unanimously.

A motion was made by Chris Jensen to take all of the recommended changes to the residential energy code and make the comparable changes in the IRC. The motion was seconded by Trent Hunt and passed unanimously.

The meeting adjourned at 12:24.

Note: These minutes are not intended to be a verbatim transcript but are intended to record the significant features of the business conducted in this meeting. Discussed items are not necessarily shown in the chronological order they occurred.

MINUTES

UNIFORM BUILDING CODE COMMISSION
PLUMBING /HEALTH ADVISORY COMMITTEE
MEETING

June 4, 2015

North Conference Room – 9:00 am
Heber M Wells Building
160 E 300 S
Salt Lake City, Utah

STAFF:
Sharon Smalley, Secretary

COMMITTEE MEMBERS:
Kerry Cramer
Jody Hilton
Robert Patterson (absent)
Michael Moss
Nelson Hooton
Jeffrey Park
Ray Moore
Kevin Bell (absent)

VISITORS: Linda Egbert

MINUTES	A motion was made by Kerry Cramer to approve the minutes from the May 7, 2015 meeting. The motion was seconded by Michael Moss and passed unanimously.
DISCUSS SECTION 312.10.3	During the review of this section it was noted that the wording "in accordance with Utah Administrative Code, R309-305" and the wording from the exception in 303.4 needs to be added to the current amendment for IRC, Section 2902.1.1 as a new paragraph. Following the discussion, a motion was made by Michael Moss to make this change to the current amendment. The motion was seconded by Kerry Cramer and passed unanimously.
REVIEW PROPOSED CHANGES TO CHAPTER 13 & 14	Kerry Cramer gave his review of the proposal for Chapters 13 and 14 to add six new amendments to Section P2910 of the IRC and Section 1301 of the IPC and to delete the current amendments for these sections. Following the review, a motion was made by Kerry Cramer to approve the changes. The motion was seconded by Jeff Park and passed unanimously. At this point in the meeting Jody Hilton came in.

REVIEW PROPOSED AMENDMENT FOR TABLE [P] 2902.1	The committee reviewed the proposed amendment. Following the discussion, a motion was made by Kerry Cramer to take no action on this proposal as it is already covered in the code by the use of the word "family". The motion was seconded by Jeff Park. During the discussion, the motion was changed to deny the proposal. The second concurred with the change and the modified motion passed unanimously.
COMPLETE REVIEW OF 2015 IPC AND PLUMBING SECTION OF IRC	Michael Moss gave a review of his proposal for Section 608.16.7 and 608.16.8. During the discussion on the proposal, Ray Moore recommended that the wording be changed to read, "Installation shall be in accordance with 608.1.2." Following the review and discussion, a motion was made by Ray Moore to approve the recommendation for the modified 608.16.7. The motion was seconded by Michael Moss and passed unanimously. A motion was made by Michael Moss to approve the modification to 608.16.8 by deleting the words "Section 608.13.8. The motion was seconded by Kerry Cramer and passed unanimously.
REVIEW ALL PLUMBING RECOMMENDATIONS MADE TO TITLE 15A	A motion was made by Jody Hilton to make a recommendation to the Uniform Building Code Commission to adopt the 2015 plumbing code, the plumbing provisions in the 2015 IRC and IBC, along with all recommended and approved amendments. The motion was seconded by Jeff Park and passed unanimously.

The meeting adjourned at 11:05.

Note: These minutes are not intended to be a verbatim transcript but are intended to record the significant features of the business conducted in this meeting. Discussed items are not necessarily shown in the chronological order they occurred.

Utah State Legislature

Senate • Utah State Capitol Complex • 320 State Capitol
PO BOX 145115 • Salt Lake City, Utah 84114-5115
(801) 538-1035 • fax (801) 538-1414

House of Representatives • Utah State Capitol Complex • 350 State Capitol
PO BOX 145030 • Salt Lake City, Utah 84114-5030
(801) 538-1029 • fax (801) 538-1908

http://le.utah.gov

December 10, 2015

Chair Justin D. Naser
Uniform Building Code Commission
ARW Engineers
1594 Park Circle
Ogden, Utah 84044

Chair Naser,

As chairs of the Natural Resources, Agriculture, and Environment Interim Committee of the Utah Legislature, we write to request input from the Uniform Building Code Commission on an important issue relating to ultra-low NOx gas fired water heaters.

The Division of Air Quality recently proposed an administrative rule (please see attached memorandum) requiring the installation of ultra-low NOx gas fired water heaters beginning in 2017. As our committee discussed this proposal, we felt that policy on this issue should be determined by elected officials and as a result, legislation is being considered for the 2106 general session. The committee also determined that it would be beneficial to have the recommendations of the Uniform Building Code Commission as we prepare and consider this legislation. For this reason, we request that you review and provide recommendations on this proposal as soon as possible, hopefully by mid-January.

For your information, we have learned, after contact with manufacturers, that the increase in cost for ultra-low NOx gas fired water heaters is $139 dollars or more.

Thank you for your consideration of this important issue. We appreciate your expertise and assistance in determining good public policy.

Sincerely,

Scott Jenkins FL
Sen. Scott K. Jenkins, Chair
Natural Resources, Agriculture, and
Environment Interim Committee

Lee Perry FL
Rep. Lee B. Perry, Chair
Natural Resources, Agriculture, and
Environment Interim Committee

Enclosure

cc: Sen. Howard A. Stephenson, Rep. Curtis Oda, and Mr. Dan Jones.

State of Utah
GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-043-15

MEMORANDUM

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Joel Karmazyn, Environmental Scientist

DATE: August 18, 2015

SUBJECT: FINAL ADOPTION: R307-230. NOx Emission Limits for Natural Gas-Fired Water Heaters.

On May 6, 2015, the Board approved for public comment new rule R307-230. The intent of the rule is to reduce NOx emissions from natural gas-fired water heaters. The public comment period was held from June 1 to July 1, 2015.

Advanced notice of rulemaking was sent to the Air-Conditioning, Heating, and Refrigeration Institute (ACHRI) and to the Association of General Contractors for distribution to their membership, and to Sears, Home Depot, and Lowe's corporate offices.

Public Comment Summaries

1. Air-Conditioning, Heating, and Refrigeration Institute (ACHRI).

   Comment: The ACHRI and Bradford White recommended the removal of the power assist water heater category since it would be covered under the 75,000 BTU/hr category.

   DAQ response: We concur. The power assist category has been removed.

   Comment: The NOx limit for residential storage models with input rates less than 75,000 Btu/h is specified only in terms of ng/J. For all the other categories of water heating equipment the NOx emission limits in the regulations of both the California South Coast and Bay Area Air Quality Management Districts are in terms of ng/J and ppm. We recommend that the same be done in this proposed rule. The equivalent ppm limits should be added to the requirements proposed for larger input storage water heaters, mobile home water heaters, and pool heaters.

DAQ response: Testing for the NOx level in the larger appliances is an easier test method. Therefore, we concur with the request.

Comment: ACHRI and A.O. Smith made the same comment. - The proposed rule should specify the procedure for determining NOx emissions. We recommended that a provision be added to reference the South Coast Air Quality Management District (SCAQMD) Method 100-1. We understand that it is not the intent of this proposed rule to establish burdensome and redundant certification and compliance requirements. Therefore, we recommend that existing programs be recognized and the proposal rule be amended to state that a listing of compliance to the SCAQMD, or comparable NOx rule of some other jurisdiction, is an acceptable means of establishing compliance with this rule.

DAQ response: SCAQMD Method 100-1 has been added to the rule. DAQ will recognize appliances certified by SCAQMD as meeting this rule.

Comment: ACHRI and A.O. Smith made the same comment. - The proposed requirement that the manufacturer display the NOx emission rate of the water heater on the shipping carton and rating plate can be misinterpreted to require the display of the precise emission rate of the model. The marking requirements of existing NOx rules such as the Bay Area Air Quality Management District (BAAQMD) require that the manufacturer display the certification status of the model, e.g. the model complies with a NOx emission limit. To avoid requiring a special marking for units sold in Utah, we recommend that the marking requirement be modified to parallel the marking requirement of the BAAQMD or SCAQMD.

DAQ response: The proposed rule has been amended by removing the box labeling requirement.

The labeling requirement on the appliance is intended to confirm that the appliance complies with the appropriate standard. The current commonly used labeling statement, "complies with the 10 ng/Joule rule" is sufficient. The rule wording has been amended for clarity that we do not wish to have the actual rating printed.

Comment: ACHRI, A.O. Smith, and Bradford White Corporation made similar comments. - Although the NOx rules in many California jurisdictions address the "sale, installation or offer for sale" of water heaters covered by the rule, the actual result is that these rules are applied based on the date of manufacture. This is the most practical and effective way to implement these NOx emission rules with minimum disruption to the marketplace and to the wholesalers, distributors, retailers, and plumbers who all are involved in some aspect of providing these units to consumers. This recognizes that some units which were produced and shipped prior to the effective date will remain in the distribution chain until they have been depleted from distributor and wholesaler stocks. But this is a relatively short period. To do otherwise forces wholesalers, distributors, and retailers to somehow guess their needs for stocking water heaters and risk either having significant units that they can no longer sell or running out of units and not having product to sell. This task of maintaining an adequate stock is complicated for these businesses by the fact that most water heater purchases are for replacement installations where the need is immediate but unpredictable.

DAQ response: All appliances manufactured before the implementation date may be sold in Utah. The rule has been amended to explicitly state this fact.

2. A. O. Smith.

Comment: We support Utah's decision to base its proposed rule on SCAQMD Rule 1121 and Rule 1146.2, depending on the water heater and pool heater types and sizes. However, there are slight differences between the proposed Utah rule and the SCAQMD rules that conflict and would cause Utah to manage their own certification program and impose testing on manufacturers. To avoid this, we recommend that Utah align its proposed water heater size ranges and NOx limits to reflect the applicable SCAQMD rules currently in place.

DAQ response: Our rule is modeled after the Bay Area Regulation 9 Rule 6 and not SCAQMD Rule 1121. The BAAQMD Regulation 9 Rule 6 requires the lowest available NOx burners for water heaters, and it draws its requirements from the SCAQMD product testing. The SCAQMD has a certification process for approved water heaters and has certified many water heaters at the ultra-low NOx level of 10 ng/Joule. The differences between SCAQMD and the Bay Area rules are the way the heater ranges are described. For example, one range is stated as "up to 75,000 BTU/hr." versus "less than 75,000 BTU/hr." However, we did change the range for pool/spa heaters to include heaters that are equal to 400,000 BTU/hr by adding "less than or equal to 400,000 BTU/hr." Both rules have been in place for some time, so we do not foresee that this minor wording would require us to create our own certification program. UDAQ has communicated with A.O. Smith that appliances approved in the Bay Area will be acceptable in Utah.

Comment: Although the scope of SCAQMD Rule 1146.2 includes pool/spa heaters having inputs less than 400,000 kBtuh, currently SCAQMD excludes these products from their certification requirements (Rule 1146.2 c.8.). As a result, manufacturers have discontinued testing their products for certification, although the SCAQMD directory still contains some pool/spa heaters in that size range. We recommend that Utah delete this category from its proposed rule to be consistent.

DAQ response: We have confirmed with SCAQMD that A.O. Smith has misinterpreted the rule requirement, and we have relayed that information to A.O. Smith. A.O. Smith has verified that they have misunderstood the issue based on a policy memo and are now aware that their comment is moot.

3. Bradford White Corporation (BWC).

Bradford White supports "the use of higher efficiency products, as well as those that produce lower NOx emissions." Bradford White submitted the following specific comments.

Comment: Regarding the recommended implementation dates, as shown in Table 1 of the proposed rule, BWC recommends that all counties transition to these new requirements at the same time. This would alleviate confusion in the distribution channels where a distributor may operate in one or more counties that do not have to meet the new requirements, as well as in one or more counties that do have to meet the new requirements.

DAQ response: We agree with Bradford White. The proposed rule has been amended to become effective state-wide in two years.

Comment: In the memorandum summarizing the new rule, the following was stated: "The costs of these limited units are currently comparable to conventional units." BWC strongly disagrees with this statement. We estimate that pricing can differ by 18-20 percent, to the homeowner, when comparing low versus ultra-low NOx products in California, and we believe this difference would be similar in Utah. While performing some pricing research on the internet (at a big box store) on these products in California, we found two similar residential products, except their NOx emissions, to vary in price by

approximately 19 percent. Even though this is only one example, this is far closer to the norm that their pricing is not comparable. Price difference must be further considered when contemplating this proposed rule.

DAQ response: On February 12, 2015, we issued a letter to the major box stores and plumbing supply houses and the major Utah home and industrial construction companies to request prospective costing information for ultra-low NOx water heaters. No one responded to our request; consequently, our cost assessment for these water heaters is based on data we were able to retrieve from box store web sites. In all, we compared the price of 100 models across varied manufacturers that are available for purchase in Utah. Of these 100 units, 36 met ultra-low NOx specifications. On average, ultra-low NOx units were $9.89 (1.6%) more than conventional units. However, when other factors such as capacity in gallons, length of warranty, and thermal efficiency were held constant, ultra-low NOx capability had no statistically significant impact on prices. Seventy-eight percent of ultra-low NOx units and 80% of conventional units were certified for operation at altitudes of 5,400 feet or higher, with several units being capable of operation up to 10,100 feet.

Type	Count	Average Price	Median Price	Min Price	Max Price	% High-altitude
Ultra-low NOx	36	$ 626.64	$ 598.25	$ 477.00	$ 1,169.00	78%
Conventional	64	$ 616.75	$ 582.00	$ 389.00	$ 1,044.99	80%

4. Questar Gas.

Comment: Potentially higher initial cost of water heaters may result in fuel switching to electric water heaters which would have the unintended consequences of higher emissions at the source of generation. Our initial research indicates a potential incremental cost of $150 to $400 compared to regular gas water heaters.

DAQ response: We inquired how the additional cost was derived and were told that the higher cost was quoted by a vendor Questar Gas uses to offer its employees appliance discounts. As explained in the response to comment 9, we are able to order an ultra-low NOx appliance today delivered to box stores in the valley at a comparable cost to conventional units. We question how the Questar Gas vendor has estimated such a high mark-up when the major manufacturers like A.O. Smith already have established channels of distribution in Utah. Further, the additional demand on these units will be small compared to the California market place, so we do not anticipate a need to increase manufacturing such that it would drive cost upwards.

Testing of Ultra-low NOx Products at High Altitude

Staff questioned early on whether high elevation would hamper the operation of ultra-low NOx burners. We requested insight on this matter from the ACHRI. Consequently, we received comments from Bradford White, Questar Gas, and the ACHRI encouraging the need for such testing. Questar Gas also questions whether these units will be more sensitive to gas quality changes. The following is the response from ACHRI:

> We are aware that a question has been raised regarding the NOx emission rate of water heaters installed at high elevations. We are not aware of any specific studies that looked at this particular issue. However, with the exception of residential storage models with input rates less than 75,000 Btu/h, the burners used on the other types of water heating equipment which will be provided to

comply with the applicable proposed NOx emission limits are not significantly different than the burners used on comparable models of those water heaters that do not meet the NOx limits. There is significant field experience with these non-low NOx models installed at high elevations. That experience does not indicate any particular issues with these models. Since the low NOx models have similar burners and designs, we question whether there is an issue here that warrants further investigation.

In the case of residential storage models with input rates less than 75,000 Btu/h, the burners used on those 10 ng/J models are different than the burners used on other residential gas storage models. There is less field experience with these 10 ng/J models installed at high elevations. We are unaware of any issues that have been identified in the field regarding the operation of these models at high elevations. However, as noted above, we are not aware of any studies that have examined the operation of these models at high elevations. In view of this situation, it may be appropriate to conduct some testing before the proposed NOx limit is put into effect.

Seventy-eight percent of the 36 ultra-low NOx appliances we were able to price are suitable to 5,400 feet or higher. A. O. Smith has certified some of their units to 10,100 feet, yet they acknowledge that other manufactures may not have performed such testing and that there are certain types of burners that may not be suitable for high elevation.

Questar Gas has requested a delay on the decision of the rule to permit Questar Gas to conduct its research.

Staff has taken into consideration all of the comments and is recommending that the Board approve the following amendments to the rule:

1. Replace the phased-in implementation schedule for a fixed date state-wide implementation. This would relieve the need for the box cover labeling to assure proper water heater destination delivery within the state.

2. The state-wide implementation date would be November 1, 2017: two years from the anticipated rule effective date. This delayed implementation should provide the industry sufficient time to test or conduct the appropriate research.

Staff Recommendation: Staff recommends that the Board adopt new rule R307-230, NOx Emissions Limits for Natural Gas-Fired Water Heaters, as amended.

R307. Environmental Quality, Air Quality.
R307-230. NO_x Emission Limits for Natural Gas-Fired Water Heaters.

R307-230-1. Purpose.

The purpose of R307-230 is to reduce emissions of nitrogen oxides (NO_x) from natural gas-fired water heaters.

R307-230-2. Applicability.

R307-230 applies to the sale and installation of natural gas-fired water heaters beginning November 1, 2017.[~~on the implementation schedule as outlined in Table 1:~~

~~Table 1~~
~~Statewide Implementation Schedule of R307-230~~

~~Location~~	~~Rule Implementation Date~~
~~Box Elder, Cache, Davis, Salt Lake, Tooele, Utah and Weber Counties~~	~~January 1, 2017~~
~~Washington, Duchesne and Uintah Counties~~	~~January 1, 2018~~
~~Remaining portions of Utah~~	~~January 1, 2019~~]

R307-230-3. Exemptions.

The requirements of R307-230 shall not apply to:

(1) [~~units~~]water heaters using a fuel other than natural gas;

(2) [~~units~~]water heaters used in recreational vehicles; [~~and~~]

(3) [~~units~~]water heaters manufactured in Utah for shipment and use outside of Utah[~~.~~]; and

(4) water heaters manufactured before November 1, 2017.

R307-230-4. Definitions.

The following additional definitions apply to R307-[~~370~~]230:

"Heat output" means the enthalpy of the working fluid output of the unit.

[~~"Heat input" means the heat of combustion released by fuels burned in a unit based on the higher heating value of fuel. This does not include the enthalpy of incoming combustion air.~~]

"Recreational vehicle" means a motor home, travel trailer, truck camper, or camping trailer, with or without motive power, designed for human habitation for recreational, emergency, or other occupancy.

"Natural gas-fired water heater" means a device that heats water by the combustion of natural gas to a thermostatically-controlled temperature not exceeding 210°F (99°C) for use external to the vessel at pressures not exceeding 160 psig.

R307-230-5. Standards.

(1) [~~Beginning on the rule implementation date specified in Table 1 for each area of the state, n~~]No person shall sell or install any natural gas-fired water heater with an emission rate exceeding the limits [~~in Table 2~~]described in R307-230-5(1)(a). [~~The NO_x limits are expressed in nanograms of nitrogen oxides (calculated as NO_2) per Joule of heat output.~~]

[~~TABLE [2]~~]1

~~NO_x Emission Rate for Natural Gas-Fired Water Heaters~~

~~Category~~	~~Limits (ng/Joule)~~
~~Water heater up to 75,000 BTU/hr, excluding those installed in mobile homes~~	~~10~~
~~Water heater 75,001- 2,000,000 BTU/hr~~	~~14 or 20 ppm~~
~~Any tank with power assist~~	~~10~~
~~Mobile home water heater~~	~~40 or 55 ppm~~
~~Pool/spa heater less than 400,000 BTU/hr~~	~~40 or 55 ppm~~
~~Pool/spa heater 400,001-2,000,000 BTU/hr~~	~~14 or 20 ppm~~]

(a) Subsections R307-230-5(1)(i)-(v) provide the NO_x emission limits for natural gas-fired water heaters.

(i) Water heaters up to 75,000 BTU/hr, excluding those in mobile homes: 10 ng/Joule of heat output or 15 ppm at 3% O_2.

(ii) Water heaters 75,001-2,000,000 BTU/hr: 14 ng/Joule of heat output or 20 pmm at 3% O_2.

(iii) Mobile home water heaters: 40 ng/Joule of heat output or 55 ppm at 3% O_2.

(iv) Pool/spa heaters less than or equal to 400,000 BTU/hr: 40 ng/Joule of heat output or 55 ppm at 3% O_2.

(v) Pool/spa heaters 400,001-2,000,000 BTU/hr: 14 ng/Joule of heat output or 20 pmm at 3% O_2.

(2) The water heater manufacturer shall display the model number and the appropriate NO_x emission rating[~~e of a water heater complying with this rule on the shipping carton and~~]on the permanent rating plate of each unit.

(3) Manufacturers shall use SCAQMD Method 100-1 to comply with the NOx standards in R307-230-5(1)(a).

KEY: Water heaters, natural gas, NO_x, air quality
Date of Enactment or Last Substantive Amendment: 2015
Authorizing, and Implemented or Interpreted Law: 19-2-101; 19-2-104

IBC AMENDMENT STATUS LOG
PENDING
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Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	Published	Public Hearing	Commission Appr/Deny Amendment	Effective Date
307.1	Architectural - Unified	10-7-14			10-7-15		
308.2	Architectural - Unified	10-7-14			10-7-15		
(F)908.7	Scott Marsell	2-3-15 approved			10-7-15		
Wasatch Fire District local amendment	Wasatch County	2-3-15 tabled					
907.2.3	Deanne Mousley	2-3-15 approved			10-7-15		

IRC AMENDMENT STATUS LOG
PENDING

Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	Published	Public Hearing	Commission Appr/Deny Amendment
E3901.9	Electrical Committee	4-9-15			10-7-15	

IPC AMENDMENT STATUS LOG
PENDING
G:\Commission\plumbhlth\009

Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	PUBLIC HEARING	BUSINESS & LABOR INTERIM		Effective Date
312	Jeff Park	5-1-14 approved	6-11-14 approved	10-7-15			
307.5		8-7-14 committee approved the deletion of new section					
403.1		9-4-14 modify		10-7-15			
412.5		9-4-14 modify		10-7-15			
502.4		9-4-14 modify		10-7-15			
608.1.2 & 608.1.3	Michael Moss	12-4-14 approved		10-7-15			
314.2.4.1 and .2	Ray Moore	Tabled No changes recommended 5-7-15					
1002.1, .3 and .4 15A-3-314	Plumb-Tech Design	1-8-15 tabled 2-5-15 denied	7-8-15 no action taken				
705.11.2	Kevin Bell	5-7-15 denied Stay with current wording	7-8-15 no action taken				
802.1.1	Committee	4-2-15 approved		10-7-15			
608.16.7	Ron Lord	Denied 5-7-15	7-8-15 no action taken				
IBC Table [P] 2902.1	Alithia Zamantakis	denied	7-18-15 no action taken				

IEBC AMENDMENT STATUS LOG
PENDING

Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	Published	Public Hearing	Commission Appr/Deny Amendment	Effective Date
Section 202 - existing building	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
301.1	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
403.5	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
705.1	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
707.3.1	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
1007.3.1	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
1012.7.3	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by Architectural and Unified			10-7-15		
1012.8.2	Structural Advisory Committee	Approved 5-7-15 Approved 6-2-15 by			10-7-15		

Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	Published	Public Hearing	Commission Appr/Deny Amendment	Effective Date
		Architectural and Unified					

FY July 1, 2015 - June 30, 2016 UBC
COMBINED BALANCE SHEET & INCOME STATEMENT
For July 1-31, 2016 (Period 13)

REVENUE	BUDGET	RECEIVED	ACTUAL YTD	
Surcharge Fees Projected (estimated only)	$ 419,323.17	$ 105,744.51	$ 105,744.51	
Carryover Credit from Previous Years (after all payments)	$ 1,081,524.00			
Total	$ 1,500,847.17			
ADMINISTRATIVE ENCUMBRANCES	**BUDGET**	**PAID**	**ACTUAL YTD**	**BALANCE**
Salary and Benefits	$63,705.86	$ -	$ 3,210.47	$60,495.39
Communication Services	$500.00	$ -	$ 39.10	$460.90
Miscellaneous/Office Supplies & Printing/Library	$50.00	$ -	$ -	$50.00
Total	**$64,255.86**	**$ -**	**$ 3,249.57**	**$61,006.29**
EDUCATIONAL GRANTS TO SCHOOLS		**PAID**	**ACTUAL YTD**	**BALANCE**
Bridgerland Applied Tech College		$ -	$ -	$ -
Davis Applied Tech College	$ -	$ -	$ -	$ -
Dixie State College (Dixie Applied Tech College)	$ -	$ -	$ -	$ -
Salt Lake Community College	$ 11,124.00	$ -	$ -	$ 11,124.00
Southwest Applied Technology College	$ -	$ -	$ -	$ -
Uintah Basin ATC	$ -	$ -	$ -	$ -
Utah Electrical JATC/IBEW	$ -	$ -	$ -	$ -
TOTAL	**$ 11,124.00**	**$ -**	**$ -**	**$ 11,124.00**
ASSOCIATION FUNDING GRANTS		**PAID**	**ACTUAL YTD**	
ACI Intermountain Chapter	$ 3,000.00	$ -	$ -	$ 3,000.00
AIA Utah Chapter	$ -	$ -	$ -	$ -
ASHRAE	$ -	$ -	$ -	$ -
Associated General Contractors - Utah / AGC-Utah	$ -	$ -	$ -	$ -
Associated Builders & Contractors of Utah	$ -	$ -	$ -	$ -
Beehive Chapter ICC	$ -	$ -	$ -	$ -
Bonneville Chapter ICC	$ 73,343.84	$ -	$ -	$ 73,343.84
Construction Specifications Institute Inc / CSI	$ -	$ -	$ -	$ -
Fire Marshal's Association of Utah	$ 7,400.00	$ -	$ -	$ 7,400.00
IEC of Utah (Independent Electrical Contractors)	$ 13,357.69	$ -	$ -	$ 13,357.69
Iron County Home Builders Association	$ 7,600.00	$ -	$ -	$ 7,600.00
Northern Utah Building Inspectors	$ -	$ -	$ -	$ -
Park City Area Home Builders Associaiton/PCAHBA	$ -	$ -	$ -	$ -
Rocky Mountain Gas Association	$ 51,048.00	$ -	$ -	$ 51,048.00
Salt Lake Home Builders Association / SLHBA	$ -	$ -	$ -	$ -
SEAU (Structural Engineers Association)	$ 38,054.00	$ -	$ -	$ 38,054.00
Southern Utah Home Builders Association / SUHBA	$ 43,985.00	$ -	$ -	$ 43,985.00
Southern Utah Division IAEI	$ 5,200.00	$ -	$ -	$ 5,200.00
UAPMO	$ 27,600.00	$ -	$ -	$ 27,600.00
Utah Chapter IAEI	$ 33,825.00	$ -	$ -	$ 33,825.00
Utah Chapter ICC	$ 83,000.00	$ -	$ -	$ 83,000.00
Utah Construction Suppliers Association	$ -	$ -	$ -	$ -
Utah Plumbing & Heating Contractors Association	$ 22,000.00	$ -	$ -	$ 22,000.00
Utah Homebuilders Association	$ -	$ -	$ -	$ -

Utah Division of Occupational and Professional Licensing	$ -	$ -	$ -	$ -
Utah Valley Homebuilders Association	$ -	$ -	$ -	$ -
TOTAL	**$ 409,413.53**	**$ -**	**$ -**	**$ 409,413.53**
TOTAL ENCUMBRANCES	**$ 484,793.39**	**$ 54.00**	**$ 3,249.57**	**$481,543.82**

REVENUES (LESS ACTUAL EXPENDITURES)		**PAID**	**ACTUAL YTD**	
Total Revenue (Surcharges plus carryovers)			$ 1,187,268.51	
Less Actual Expenditures			$ 3,249.57	
SUBTOTAL (ACTUAL)			**$ 1,184,018.94**	
Less Approved Unpaid Encumbrances			$481,543.82	
TOTAL RESERVES			**$ 702,475.12**	

AIR QUALITY

DRAFT (12-28-2015)Ultra-Low NO_x Water Heaters: Area Source NO_x Emission Reduction Strategy to Control $PM_{2.5}$

December 2015

Table of Contents

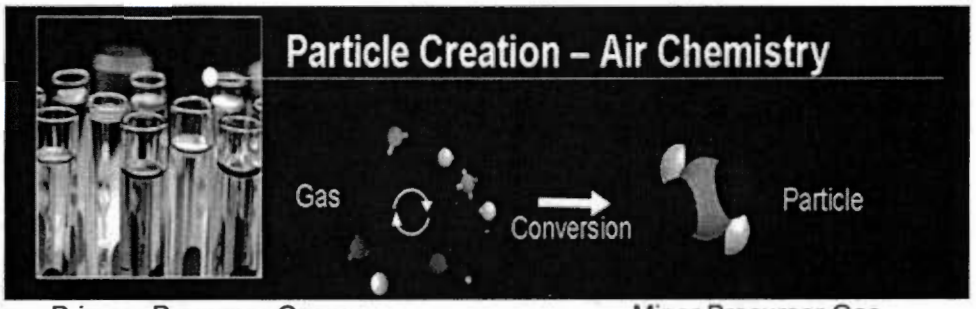
Introduction

During high temperature combustion, nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or NO_x, a reddish-brown gas. One of the oxides of nitrogen, NO_2, is a criteria pollutant regulated by EPA[i].

Oxides of nitrogen react with other air contaminants to form other criteria pollutants. In the summer along the Wasatch Front, and in the winter in the Uinta Basin, photochemical reactions between NO_x and volatile organic compounds (VOCs) lead to the formation of ground-level ozone. In the winter, NO_x reacts with ammonia to form secondary fine particulate matter ($PM_{2.5}$). Both of these seasonal scenarios can result in increased pollution. Utah continues to struggle with both the ozone and particulate matter standards; and because of this, the Division of Air Quality (DAQ) is mindful of the trend in NO_2 emissions.

Winter Inversion Fine Particulate Formation

Precursor gases trapped beneath the winter-time inversion react to form secondary $PM_{2.5}$.

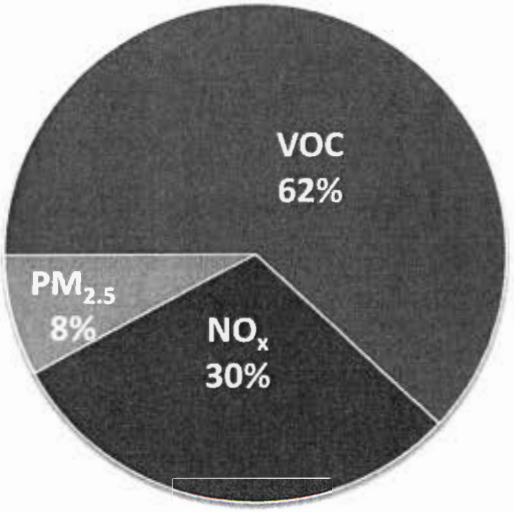


Primary Precursor Gases
Volatile Organic Compounds-VOCs
Nitrogen Oxides-NO_x
Ammonia-NH_3

Minor Precursor Gas
Sulfur Oxides-SO_x

Based on our research, the State Implementation Plan (SIP) area source strategy is to first develop control measures for VOCs because they have been determined to be the primary driver for secondary $PM_{2.5}$ formation. The area source inventory distribution for the Salt Lake Nonattainment Area is composed of 62% VOCs, 30% NO_x and only 8% primary $PM_{2.5}$ (direct emission of fine particles).[ii]

Area Source Inventory Distribution: Salt Lake Nonattainment Area - 2014



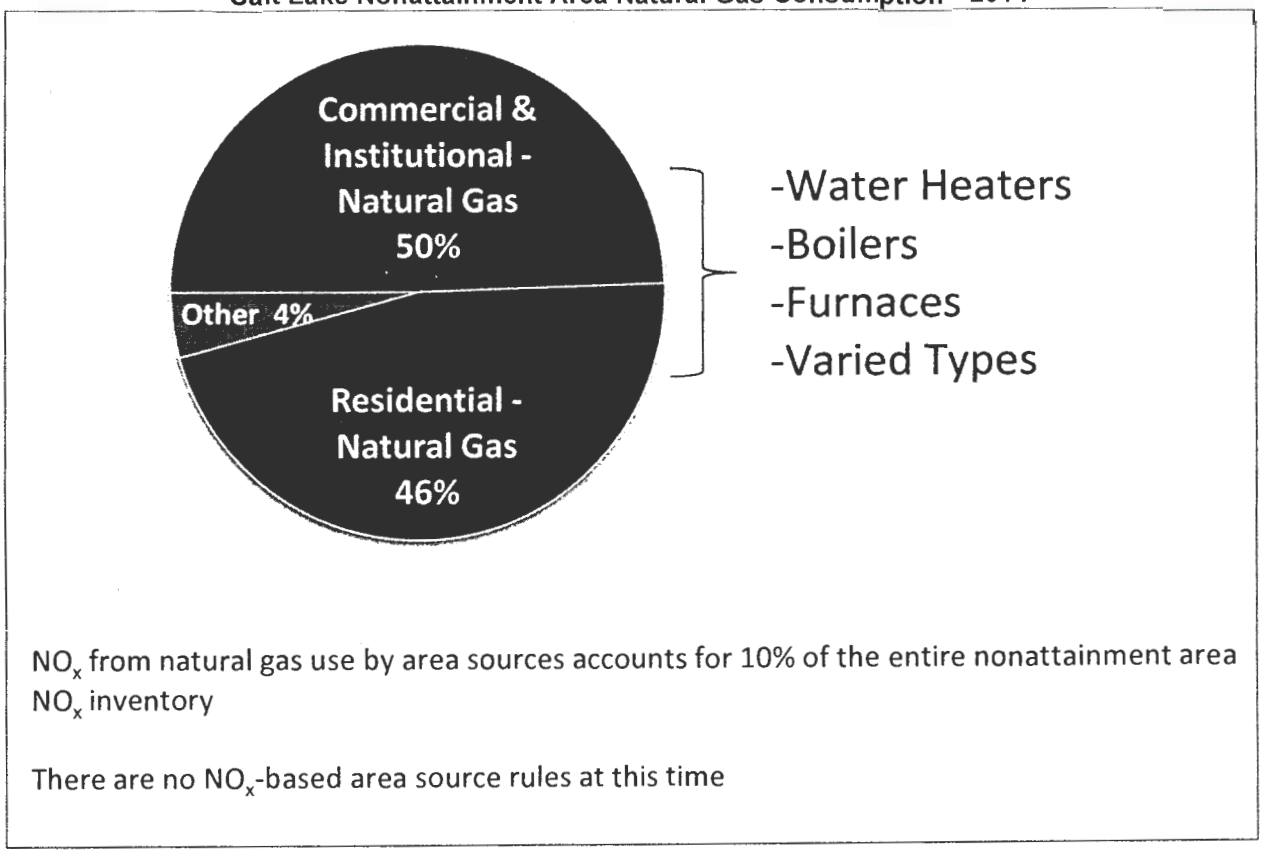
The Air Quality Board has approved 22 rules to control VOCs, all of which are currently in effect. The next step in the SIP development process for area sources is to identify and implement available and cost effective NO_x controls.

The Air Quality Board adopted administrative rule language to require the sale and installation of Water Heaters meeting an Ultra-low NOx emissions performance standard in Utah beginning on November 1st 2017. On October 30, 2015, the Legislature's Administrative Rules Review Committee voted to add the rule to the sunset list for the 2016 legislative session.

NO_x Sources and Area Source Inventory

Combustion of all fuels results in NO_x emissions. The predominate combustion sources within area sources are water heaters, furnaces, and boilers.

Salt Lake Nonattainment Area Natural Gas Consumption - 2014



NO_x from natural gas use by area sources accounts for 10% of the entire nonattainment area NO_x inventory

There are no NO_x-based area source rules at this time

NO_x Inventory for All $PM_{2.5}$ Nonattainment Areas

NO_x emissions from natural gas combustion is calculated from actual gas usage and thermal data provided by Questar Gas on an annual basis for both residential and commercial customers. To derive the NO_x emissions, the usage and thermal data is multiplied by the respective EPA emissions factor for either the residential or commercial users.

	Combustion, Natural Gas, Commercial & Institutional	Combustion, Natural Gas, Residential	
County	**NO_x**	**NO_x**	
Box Elder	146	51	
Cache	175	113	
Davis	364	314	
Salt Lake	810	1263	
Tooele	234	50	
Utah	869	451	
Weber	371	268	
TOTAL (tons/year)	**2,969**	**2,510**	**5,479**

NOx Reduction Technologies

Combustion modification systems reduce thermal NO_x formation by reducing peak flame temperature.[iii] Such controls include low excess air operation, staged combustion, overfire air ports, biased firing, and placing selected burners out of service. Combustion modification is also achieved through ultra-low NOx burners, including staged air burners, staged fuel burners, pre-mix burners, internal recirculation, and radiant burners.

Combustion control systems may be used alone or in combination with flue gas recirculation (FGR). FGR recycles a portion of the exhaust stream back into the burner windbox, mixing low oxygen air with combustion air before it enters the combustion chamber. Reducing peak temperature and oxygen in the combustion zone reduces thermal NO_x formation.

Ultra-Low NO_x Water Heaters as a Reduction Strategy

- Ultra-low NO_x burner technology for water heaters is a proven technology.
- Ultra-low NO_x water heaters are commercially available from major manufacturers such as A.O. Smith, Bradford White and Rheem.
- Ultra-low NO_x burner technology for furnaces and boilers is just an emerging technology and may become a viable NO_x reduction strategy in the future.

Ultra-low NOx Water Heater Research

The Air-Conditioning, Heating, and Refrigeration Institute (ACHRI) has been actively engaged with a California initiative to bring forth commercially available ultra-low NOx appliances. Mr. Frank Stanonik, chief technical advisor at the ACHRI, provided the DAQ with technical consultation and was a conduit to the industry during the rulemaking stakeholder process.

Two California Air Districts (SCAQMD and BAAQMD) first required ultra-low NO_x water heaters eight years ago. Ultra-low NO_x water heaters in these air districts must be certified as ultra-low NO_x by an independent testing laboratory. SCAQMD publishes a list of units that have been approved. Both of the California air districts reported the successful implementation of their ultra-low NO_x water heater rules, and the DAQ received extensive input from them throughout the rulemaking process. Ultimately, the ultra-low NO_x water heater rule proposed by the Utah Air Quality Board was modeled after the BAAQMD rule.

Ultra-low NO_x Water Heater Emissions Reductions

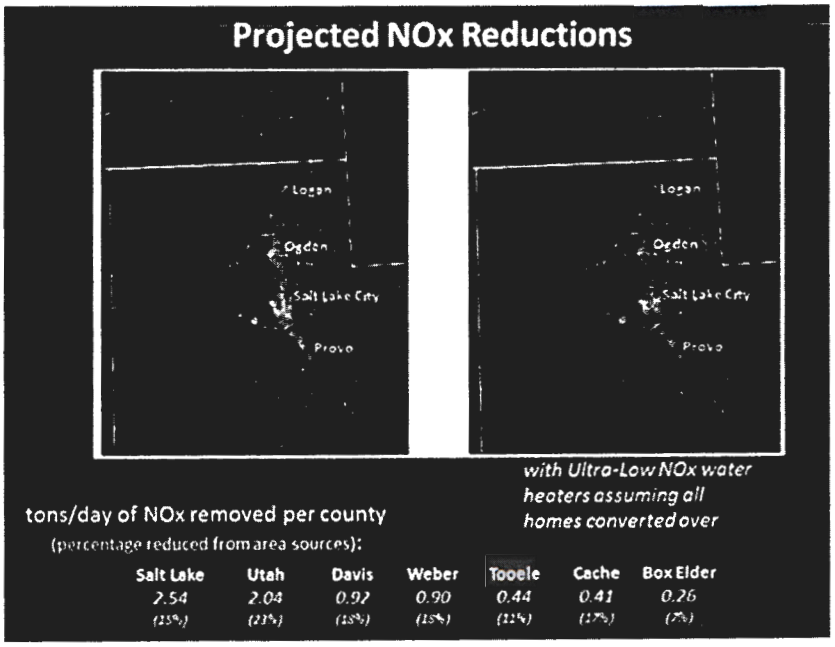
- Residential: from current 40 to 10 ng/Joule = 75% reduction
- Commercial: from current 40 to 14 ng/Joule = 65% reduction

The expected lifetime of a water heater exposed to the natural hard water found in the Wasatch Front is seven years. The NO_x area source inventory reduction of 35% or 1,918 tons/year is based on a seven-year water heater replacement period.

Air Quality Benefit

Winter-time Inversion

Air quality modeling indicates a 1 $\mu g/m^3$ improvement would be realized if all existing water heaters could be replaced. If these emission reduction levels would have been available in the past the Wasatch Front would have experienced 6 fewer $PM_{2.5}$ exceedances days from 2012-2014.[iv]



Summer-time Ozone

Ozone is a clear, colorless gas composed of molecules of three oxygen atoms. Ground level ozone can be inhaled and is considered a criteria pollutant. Ground-level ozone should not be confused with the stratospheric ozone layer that is located approximately 15 miles above the earth's surface. It is that upper layer that shields the earth from cancer-causing ultraviolet radiation. Ground level ozone is formed by a complex chemical reaction involving VOCs and NOx in the presence of sunlight.

Ozone production is a year-round phenomenon. However, the highest ozone levels generally occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions combine to drive the chemical reactions and trap the air within a region for several days.

Reducing NO_x by requiring ultra-low NO_x water heaters is anticipated to contribute to ozone control.

Ultra-low NO_x Water Heater Cost Analysis

In early 2015, the DAQ sent out information request letters to local major home and commercial developers, the major plumbing houses and the three major box stores. The letter informed these stakeholders of the intent to develop a rule to require ultra-low NO_x water heaters. As part of our analysis, we requested information on the availability of ultra-low NO_x water heaters and prospective pricing of these units. No stakeholder responded to our request for information. Subsequently, we conducted an internet price survey of the major box stores in June, 2015. The difference in price between standard models and ultra-low NO_x models with similar features was comparable. As with any consumer product, prices are influenced by many factors.

Type	Count	Average Price	Median Price	Min Price	Max Price	% High-altitude
Conventional	64	$ 616.75	$ 582.00	$ 389.00	$ 1,044.99	80%
Ultra-low NO_x	36	$ 626.64	$ 598.25	$ 477.00	$ 1,169.00	78%

The DAQ conducted a multivariate regression analysis of the survey data. This analysis found that water heater capacity and warranty length were both positively correlated with unit price and that these relationships were statistically significant. The analysis also found that ultra-low NO_x capability was negatively correlated with unit price, but that this relationship was not statistically significant. Put differently, ultra-low NO_x capability was not found to have a statistically significant effect on unit price, but – for the 100-unit sample – ultra-low NO_x capability was correlated with lower unit prices when other factors were held constant.

Manufacturers have identified various techniques to achieve the ultra-low NOx certification and in some cases have reduced the capacity of the water heaters. When comparing models factors such as capacity, burner heat output and recovery periods must be included.

Projected 2017 Pricing

The 2017 implementation date of the Air Quality Board's final rule should provide sufficient time to clear the standard water heater inventory, while providing a long lead time to order ultra-low NOx units, thereby avoiding a price spike due to inventory shortages. Consequently, the future price projection for ultra-low NOx units should be based on the observed current cost found in the direct

consumer sales survey plus inflation. Local plumbing wholesalers were also contacted and pricing information was requested but projections were not provided. For this analysis, the average price of $626.64 and the current projected 2015 Consumer Price Index of 0.5% (Bureau of Labor Statistics) for the future inflation rate. The inflation rate is being held constant out to 2017 because the rate has been steadily declining since 2011.

The formula for projecting future price equals the current price times the inflation rate for every year into the future:

2017 price = current price x (1 + inflation rate year 2016) x (1 + inflation rate year 2017)

2017 price = $626.64 x (1 + 0.005) x (1 + 0.005)

2017 price = $626.64 x 1.005 x 1.005

2017 price = $632.92

This projected pricing cannot account for potential future steel price increases and Department of Energy rulemaking that may influence pricing for all water heaters. It is anticipated that the wholesale price and ultra-low NOx cost premium will be in line with the current retail analysis.

Altitude Certification Analysis

The DAQ staff questioned early on whether high elevation would hamper the operation of ultra-low NO_x water heaters. Taking the same units that were used in the cost analysis, the DAQ also conducted an altitude certification analysis. The DAQ found that 78% of the 36 ultra-low NO_x units were certified for operation at altitudes of 5,400 feet or higher, with several units being capable of operation above 10,000 feet.

Natural Gas Quality Impact

Questar Gas questioned whether ultra-low NOx water heaters will be more sensitive to gas quality changes existing in the Utah natural gas supply. The Air Quality Board adopted a two year rule implementation schedule that should provide the industry sufficient time to test or conduct the appropriate research on gas quality.

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[i] Oxides of nitrogen or NOx describe an air pollutant that is the subject of a National Ambient Air Quality Standard under the Clean Air Act and regulated in Utah under the Air Conservation Act.

[ii] http://www.deq.utah.gov/Pollutants/P/pm/pm25/dataexplorer/index.htm

[iii] NOx is a product of combustion in atmospheric air. Flame temperatures above 2,800 F and fuel to air ratios of 25-45% excess air increase the formation of NOx

[iv] In the last 4 years there were 19 air monitoring filters with concentrations between 35.4 and 36.5 ug/m3 that represented 6 monitoring days when a 1 microgram change in concentrations would have resulted in that day remaining as a "moderate" day rather than a "unhealthy for sensitive groups" on the EPA air quality index for the entire county. The concentration benefit used modeling for 2019 that projected that all water heaters were replaced with Ultra-low NOx heaters with a modeled benefit at the Hawthorne Monitor. Since there will be a considerable phase in period before the heaters are prevalent the benefit will not be seen until beyond 2025 with a November 2017 start date. 6/4=1.5 simplified to 1 to 2 fewer days per year of air defined as unhealthy.

The new degree of comfort.™

The Fury® ultra low NOx gas water heater line is SCAQMD rule 1121 compliant with 10ng/J NOx emissions

Efficiency

- .56 - .62 EF
- More hot water at a low operating cost

Performance

- FHR: 53 - 107 gallons for natural gas
- Recovery rate is 30.3 - 45.5 gallons for natural gas at a 90 degree rise

Guardian System™ & Sensor

- Exclusive air/fuel shut-off device for double protection
- Maintenance free – no filter to clean

Combustion Shut-off System

Flame Arrestor Plate

Low Emissions

- Ultra Low NOx radiant burner design
- Stainless steel construction
- SCAQMD Rule 1121 compliant
- Meets 10 ng/J NOx requirements

Self-Cleaning

- EverKleen™ patented system fights sediment build-up
- Reduces fuel costs
- Provides more hot water

Easy to Light

- No matches required

Longer Life

- Patented magnesium anode rod with resistor protects the tank from rust

High Altitude Compliant

- Certified to 10,200 ft. above sea level

Plus...

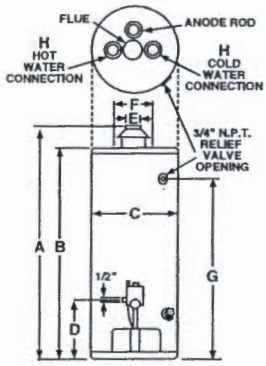
- Brass drain valve and temperature and pressure relief valve are included
- Exclusive Rheemglas® lining

Warranty

- 6-Year limited tank and parts warranty*
- With ProtectionPlus™ the 6-year limited tank warranty becomes 10-year

*See Residential Warranty Certificate for complete information

Units meet or exceed ANSI requirements and have been tested according to D.O.E. procedures. Units meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria.



Fury Ultra Low NOx

28, 38, 40, 48, 50 and 60-Gallon Capacities
Up to 45,000 Btu/h
Natural Gas

AHRI CERTIFIED
Formerly GAMA

†LEED Point = 1

DESCRIPTION			FEATURES			ROUGHING IN DIMENSIONS (SHOWN IN INCHES)									ENERGY INFO.	
TYPE	GAL. CAP.	MODEL NUMBER	GAS INPUT IN THOUS. BTU/H NAT.	RECOVERY IN G.P.H. 90° RISE NAT.	FIRST HOUR DEL. G.P.H. NAT.	HT. TO VENT A	TANK HT. B	DIAM. C	HT. TO GAS CONN. D	VENT SIZE E	WATER CONN. CNTR. F	HT. TO SIDE T&P G	WATER CONN. H	SHIP. WT. (LBS)	ENERGY FACTOR NAT.	AVG. ANN. OPER. COST NAT.
TALL	28	22V30FN	30	30.3	53	59	56-1/4	16-1/8	17-3/8	3 or 4	8	50	3/4	105	0.62	$294
	38	22V40FN	38	38.4	72	60-5/8	57-3/4	18-1/8	17-3/8	3 or 4	8	51-5/8	3/4	125	0.60	$304
	40	22VR40FN†	38	38.4	73	63	60-1/8	21	17-3/8	3 or 4	8	54	3/4	140	0.62	$294
	48	22V50FN	40	40.4	91	60-5/8	57-7/8	20-1/8	17-3/8	3 or 4	8	51-3/4	3/4	135	0.58	$315
	50	22VR50FN†	36	36.4	91	62-5/8	59-7/8	23	17-3/8	3 or 4	8	53-5/8	3/4	170	0.62	$294
	60	42V60FN	45	45.5	107	63-1/4	59-3/4	23	17-3/8	4	8	53	3/4	205	0.56	$326
SHORT	38	22V40SFN	36	36.4	68	51-7/8	49-1/8	20-1/8	17-3/8	3 or 4	8	43	3/4	135	0.60	$304

Energy Factor and Average Annual Operating Costs based on D.O.E. (Department of Energy) test procedures. D.O.E. national average fuel rate natural gas $1.218/therm; LP $1.87/gallon.

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

Rheem Water Heating • 101 Bell Road
Montgomery, Alabama 36117-4305 • www.rheem.com

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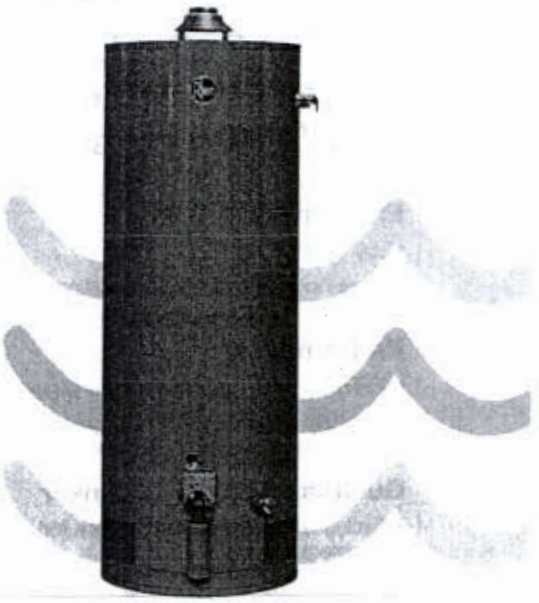
Rheem

The new degree of comfort.™

Fury® gas water heaters feature the Guardian System – engineered to exceed ANSI standards for flammable vapor ignition resistance



Efficiency

- .58 - .62 EF
- More hot water at a low operating cost

Performance

- FHR: 50 to 90 gallons for natural gas
- Recovery: 30.3 to 50.5 gallons at a 90 degree rise, based on model

Guardian System™ & Sensor

- Exclusive air/fuel shut-off device
- Maintenance free – no filter to clean

Low Emissions

- Eco-friendly burner, low NOx design
- Meets 40 ng/J NOx requirements

Longer Life

- Patented magnesium anode rod with resistor protects the tank from rust

High Altitude Compliant

- All models certified up to 6,000 ft. above sea level
- Some models certified up to 10,200 ft. above sea level, check factory for listings

Plus...

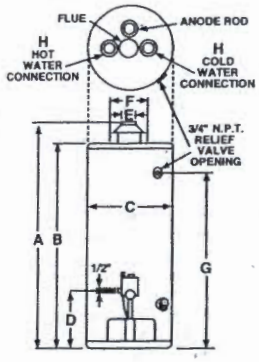
- Easy to light – no matches required
- EverKleen™ patented system fights sediment build-up
- Brass drain valve and temperature and pressure relief valve are included
- Standard replacement parts

Warranty

- 6-Year limited tank and parts warranty*
- With ProtectionPlus™ the 6-year limited tank warranty becomes 10-year

*See Residential Warranty Certificate for complete information

Units meet or exceed ANSI requirements and have been tested according to D.O.E. procedures. Units meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria.



Fury

29, 30, 38, 40 and 50-Gallon Capacities
Up to 50,000 Btu/h
Natural and LP Gas

*LEED Point = 1

DESCRIPTION			FEATURES					ROUGHING IN DIMENSIONS (SHOWN IN INCHES)									ENERGY INFO.	
TYPE	GAL. CAP.	MODEL NUMBER	GAS INPUT IN THOUS. BTU/H NAT.	GAS INPUT IN THOUS. BTU/H LP	RECOVERY IN G.P.H. 90° RISE NAT.	RECOVERY IN G.P.H. 90° RISE LP	FIRST HOUR DEL. G.P.H. NAT.	HT. TO VENT A	TANK HT. B	DIAM. C	HT. TO GAS CONN. D	VENT SIZE E	WATER CONN. CNTR. F	HT. TO SIDE T&P G	WATER CONN. H	SHIP. WT. (LBS)	ENERGY FACTOR NAT.	AVG. ANN. OPER. COST NAT.
TALL	29	22V30F	32	30	32.3	30.3	50	59-3/4	56-3/8	16-1/8	14-1/2	3	8	50-3/4	3/4	100	0.62	$294
	40	22V40-36F1	36	–	36.4	–	67	61-1/2	58	17-3/4	14-1/2	3 or 4	8	53	3/4	120	0.59	$309
	40	22V40F1	38	32	38.4	32.3	73	61-3/4	58-3/8	18-1/8	14-1/2	3 or 4	8	52-1/4	3/4	120	0.59	$309
	38	42V40F	40	34	40.4	34.3	68	61-1/2	57-3/4	19-3/4	14-1/2	3 or 4	8	52-1/4	3/4	125	0.60	$304
	40	42VR40-40F*	40	34	40.4	34.3	68	63-1/4	59-3/4	21	14-1/2	3 or 4	8	53-1/2	3/4	135	0.62	$294
	50	42VR50-40F*	40	36	40.4	36.4	83	62-1/4	58-3/4	23	14-1/2	3 or 4	8	52-1/2	3/4	165	0.62	$294
	50	22V50F1	38	36	38.4	36.4	90	61-1/2	58-1/4	20-1/8	14-1/2	3 or 4	8	51-3/8	3/4	130	0.58	$315
	50	42V50-40F	40	36	40.4	36.4	82	61-1/2	58	21-3/4	14-1/2	3 or 4	8	52-1/2	3/4	150	0.58	$315
	50	42V50-50F	50	–	50.5	–	81	62	58	21-3/4	14-1/2	3 or 4	8	52-1/2	3/4	150	0.58	$315
SHORT	30	22V30S-30F	30	–	30.3	–	50	49-3/4	46-1/4	19-3/4	14-1/2	3	8	40-1/4	3/4	98	0.61	$299
	40	42VR40S-40F*	40	36	40.4	36.4	72	53-7/8	50-1/2	23	14-1/2	3	8	44	3/4	135	0.62	$294
	40	22V40SF	36	34	36.4	34.3	72	52-3/4	49-3/8	20-1/8	14-1/2	3	8	42-3/4	3/4	130	0.59	$309
	40	42V40SF	40	36	40.4	36.4	72	53-7/8	50-1/2	20-1/8	14-1/2	3 or 4	8	44	3/4	130	0.59	$309
	50	42V50SF	40	36	40.4	36.4	84	54-1/4	49-3/4	22-1/4	14-1/2	3	8	44	3/4	158	0.59	$309

Specify LP gas when ordering. Add "P" suffix to the model number. Example: 42VR40-40PF.
Energy Factor and Average Annual Operating Costs based on D.O.E. (Department of Energy) test procedures. D.O.E. national average fuel rate natural gas $1.218/therm; LP $1.87/gallon.

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

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