

November 26, 2007

Mr. Richard Karney
Energy Star Product Manager
U.S. Department of Energy
1000 Independence Ave S.W.
Washington, D.C. 20585

Re: Electric tankless whole house water heaters.

Dear Mr. Karney,

Again, I want to express our appreciation for the opportunity to participate in the International Coordination Meeting held on October 18, 2007. Microtherm's First Round response to DOE in June 2007, is incorporated by reference in this set of comments.

Microtherm supports the opinion of the Southern Company, the CEC, Edison Electric Institute, A.O. Smith and Lawrence Berkeley National Laboratories in urging the Energy Star Program to reconsider its position regarding the inclusion of a limited number of advanced technologies, and urges DOE to include improved versions of all tank and tankless water heaters, both gas and electric.

We have several issues to address in this set of comments/

Issue 1: Question of a level playing field:

Hearing the keynote speaker selected by the DOE to speak on Advanced Water Heating Technologies, the representative of an Asian manufacturer of gas tankless water heaters suggest doing away with electric resistance water heating entirely was extremely disturbing. Is the Energy Star program being used to eliminate competition?

Microtherm shares some of the same concerns that other stakeholders have expressed regarding this entire process. Many justifiably feel that their comments and technologies have not been appropriately considered and that the results of the process to date, including the selection as well as the exclusion of certain water heating products for Energy Star, appear in great part to have been preconceived. Microtherm's concerns are highlighted both by the unfounded allegations as well as the failure to recognize the unique benefits of advanced, temperature based **electric water heating technologies that provide clear opportunities** for significantly

increasing the efficiency of water heating on their own and when combined with solar, geothermal, or other dual source systems.

Issue 2: Deception is never right and cannot be rewarded.

The concern regarding a level playing field is understandably elevated when the DOE persists in ignoring the obvious **enhancement of deception** to consumers and the willingness to use the good name of Energy Star in addition to unwarranted tax credits to promote products the DOE has known, based on valid testing and good engineering reports since 1998, do not meet their rated, advertised, and required qualifying energy efficiencies. This issue is compounded by the apparent unwillingness of the DOE not only to address the majority of stakeholders urging but also their willingness to cooperate in resolving the inadequacy of current test procedures to provide efficiency ratings that are at the very least close to actual efficiencies.

Issue 3: Unsupported allegations of issues of increased peak, inadequacy, and power quality.

Neither the DOE nor D&R have provided any actual test data or study supported by reliable testing that supports the principal allegations used as the justification for excluding **advanced** electric tankless from Energy Star. We recognize that for years there were issues with some of the older tankless electric systems. Much of this was based on the deceptive representations that early low wattage units had the capability to satisfy a whole house and well as inadequate power switching control. Today it is just as appropriate to distinguish between these early technologies as it is to distinguish any newer more reliable heat pump water heater technology from past versions.

In Appendix A and supporting exhibits Microtherm addresses each of these issues by providing information not previously considered in these proceedings.

We at Microtherm are respectfully expressing our deepest and sincerest concerns regarding these matters and other equally serious issues are addressed later in this response.

Sincerely,
Microtherm, Inc.
SEISCO
DAVID E. SEITZ

David E. Seitz, Pres/CEO

APPENDIX A
Microtherm's Comments November 27, 2007

THERE IS A SIGNIFICANT LACK OF EDUCATION AS TO THIS TECHNOLOGY AND AN OVERABUNDANCE OF PREJUDICED AND UNSUPPORTED ALLEGATIONS.

It was suggested in responses to questions in the opening address at this last meeting, that there is more opposition than support to the inclusion of **electric tankless** in the Energy Star Program for Advanced Water Heating Technologies. I've reviewed each and every response shown on your web site. First, I don't believe that is either a correct reflection of the opinions of the majority of stakeholders with respect to electric tankless or for that matter their opinions regarding many of the other important issues seemingly gleaned over in the process. Secondly I don't believe that anyone including the DOE has sufficient knowledge of performance of the technology, in fact doesn't even know how many electric tankless are sold each year. A recent inquiry from GAMA responded to a request from the DOE for shipments of water heaters. The gas tankless was included in the request, the electric tankless was not. Although we are a recognized manufacturer of advanced electric tankless technology, we were not notified of previous meetings or workshops, therefore not present when anyone was asked their opinion on the use of electric tankless. It is obvious, however from some of the "first responses" that some respondents had early discussions with the DOE regarding this products acceptance.

The great majority of all those who have responded with clear opposition to electric tankless have a much stronger relationship with gas, including those electric utilities that also market gas over electric for reasons that are obvious. Then there are some, including the Florida Solar Center, who are tied financially to the DOE. The latter is a response that gives me particular concern as the Florida Solar Center and particularly the highest level of DOE representatives associated with the Center, for whom I have a significant respect, and who have been provided previously, by me personally, specific information on projects including the Crane Creek 127 unit apartment project in Melbourne, Florida, "Crane Creek", dispelling the very the peak demand issue the response argues. Furthermore the significant merits provided by the SEISCO electric tankless used as a best backup and enabling technology for solar as demonstrated in a growing number of studies were completely ignored. While it is quite possible that information I am referring to was not channeled to those responding, it is nevertheless quite disappointing, for those of us at Microtherm who have so strongly supported solar.

Finally it should be obvious that the electric tankless with virtually infinite capability for modulation of power, so important to temperature control, even with the largest models are much better suited as a backup for advanced residential domestic hot water application than the gas

models. The very same electric tankless, which are installed as whole house heaters today will likely be the same enabling technology that will be utilized in these same homes to support and back up newer advanced technologies such as solar thermal and heat pump water heaters.

I was deliberately specific when, at the October meeting, I asked whether the DOE, in particular, the Energy Star program, **had received a single report based on reliable testing that supports any of these allegations used as a basis to exclude advanced tankless electric.** Based on the response it is further my understanding that the belief was that they have and that the test reports are included on the website along with the comments for consideration from the stakeholders.

As will be shown below, there are no such reports, merely assumptions coupled with prejudiced, self serving and completely unsupported allegations.

The information we are providing with this response should be more than sufficient to support the use of Energy Star for electric tankless. It is not our intention to oppose the inclusion of gas tankless from Energy Star or any other high efficiency product but as with all products that would carry the Energy Star marking, a proper disclosure of the products energy performance is essential.

ISSUES AND ALLEGATIONS:

By now, most, if not all of us are aware that the arguments against the electric tankless are predicated solely on the considerations brought forth in the EPRI Competitive Assessment of 2005 prepared by Global Energy Partners, (Global Energy) which report is cited as the authority for statements contained in D&R's Energy Star-Second Draft Criteria Analysis. A careful read of the report shows that Global Energy was identifying *potential* issues that needed to be studied rather than **making statements of fact** related to the use of electric tankless. As to the issues identified, the answer to these questions were neither provided by Global Partners nor has the DOE or D&R provided any actual test data or studies supported by valid and reliable test data that supports the principal allegations which are now being used to support the exclusion of advanced electric tankless from Energy Star.

The following section addresses the four principal questions raised by Global Energy's report. (See Exhibit A) The responses show that SEISCO water heaters have addressed each of these concerns and that there are no technical reasons why they should not be included in the Energy Star water heater program.

ISSUES AND ANSWERS:

1. Tankless electric water heaters CAN create power quality issues including voltage drop at the residence and/or transformer.

ANSWER

Although there has been some genuine concern as to some older electric tankless water heater technologies creating power quality issues, that is certainly not the case with the newer advanced control technologies including the SEISCO electric tankless and that of others that have properly addressed these issues. The truth is the very few times the power quality issue has arisen it was often attributed to the home being underserved in its electric service. Sometimes homes are built or in rural areas where large manufactured homes with 200 amp service replace a home with 100 amp service and the power company has not been notified of the increase. I am providing in addition to the TVA study, additional reports and studies that clearly and convincingly overcome the unsupported and unfounded allegations related to power quality issues with the advanced technology used by products such as the SEISCO electric tankless water heater.

It should also be considered that individual products by manufacturers in any category that don't comply with reasonable standards, whether they be gas or electric are governed by local codes and those that don't comply are not approved at the local level.

- a. Global Energy cites the TVA study of the SEISCO electric tankless (1997) and confirm on pg 4-2, the new technology overcame voltage drop and power quality issues. In July 1997 the TVA conducted a seminar at the ASHRAE Technical Conference in Boston on July 1997. The Global Energy report confirms the TVA conclusion that the product performed as manufacturer claims. Test results from the TVA report can be found at www.seisco.com
- b. Delmarva Power performance study 1996-1999 involving cooperation of DuPont Engineering Polymers. This proprietary study was performed almost 10 years ago and focused on the questions of satisfying the normal requirements for residential hot water requirements for Delaware, Maryland, Pennsylvania and New Jersey Markets and any barriers to early introduction of advanced echnology. This is the only proprietary study offered and cannot be included as an exhibit. The data from the study will be made available to appropriate parties upon request. (Contact David Seitz, 3510 Ryoak, San Antonio, TX 78217 or call 832-515-3204, or email deseitz@attglobal.net)

The study also focused on development of new technology to eliminate power quality potential in the use of electric tankless particularly in rural installations. This advanced

control technology was the same as tested by the TVA. The SEISCO was installed in the homes of employees of Delmarva Power and monitored during the three years period. Initially there were two primary issues including:

- (1) A sandwich type effect at initial activation of the heater resulting in a slug of hot water followed by cooler water before stabilizing. This problem is experienced today in most gas tankless.
- (2) Light flicker that resulted from the early technique used for switching the loads during the modulation of power. Both issues were completely satisfactorily addressed with improvement to the SEISCO technology which resulted in a final and fourth U.S. patent 6,246,831 specifically related to power quality issues and control. The link to this patent can be obtained on the web site www.seisco.com/pages/tankless-patent.html

This patent, the TVA report and the following report by Florida Power, provides proof that the power quality issue was resolved.

- c. Residential subdivision of 100 homes proposed in Coco, Florida resulted in a request for testing done by Florida Power to confirm whether or not a 28kW SEISCO electric tankless could be used on the typical service configuration. Florida Power agreed to monitor a 75kVA transformer serving 11 homes including one SEISCO RA-28 with the agreement that Microtherm would install an additional 6 RA 28 kW electric tankless in the remaining homes leaving only 4 out of the original 11 homes using standard electric storage tank heaters adding the potential load of 196kW (7 SEISCO RA 28's) to this transformer. The test results, clearly demonstrated no peak demand/ voltage drop issue or power quality issue resulted from these installations, and the notes to this report are included in this response as Exhibit B.
- d. Duke Power testing. Clearly confirming no power quality issues. See Exhibit C

2. **The installation of tankless electric water heaters CAN require the upgrade of electrical service to the building. (See the concern raised in the Global Partners report, pgs. 3-4 “Newer homes with 200 amp service may need an upgrade too as these homes will only have 40-80amps remaining.”)**

ANSWER:

Whether an electrical service upgrade is needed depends on the size of the existing service, whether there is a significant electrical resistance load such as for space heating and on the number of remaining breakers in the distribution panel. This concern is more for existing buildings than for new buildings, particularly for residences with less than 200 amp service panels.

According to the National Electrical Code, the load for a tankless electric water heater is calculated at 40 percent of its nameplate rating *after deducting the electrical load attributable to the storage tank heater* as shown in the following example.

- A 28 kW, 220-240 VAC heater draws 116 amps
- The contribution to load is 46 amps

In typical homes with 200 amp service, it is not necessary to increase the size of the distribution panel. In homes with electrical resistance heating (direct or as back-up to a heat pump) it may be necessary to increase the panel (roughly 50 amps for 28 kW). Some units, in particular those manufactured by SEISCO, provide an interlock to prevent the operation of electrical resistance heating during the time when domestic hot water is being drawn.

The size of the electrical service is not strictly a function of the age of the building, since it is certainly possible that the original distribution panel has already been upgraded. The issue is that smaller service panels, say less than 100 amps, cannot absorb the capacity of a large electric tankless water heater. Smaller electric tankless water heaters can be installed on building with smaller distribution panels. According to Thomas Harman Ph.D. (serving on NEC Panel 2 for 25 years and author of 10 separate editions to his textbook “Guide to the National Electric Code”) the great majority of homes having 125-200 amp electric service will accommodate a whole house electric tankless water heater of adequate size to satisfactorily provide the hot water requirements.

The selection of an appropriately sized tankless electric water heater is also a function of incoming water temperature and expected simultaneous demand for hot water. For example, a 14kW unit in a warmer climate will typically take care of the requirements for a couple or small family. In addition using the “load shedding” technology utilized by advanced control systems

even larger electric tankless can be used by shedding electric resistance space heating in the winter for the short time hot water is used. This feature combined with the diversity reflected in results of the studies demonstrate that peak demand is reduced not increased and completely overcomes the issue of “morning peak.

What has not yet been said is that ***there are virtually identical issues when adding a tankless gas water heater to an existing building***. If the existing building has no gas service, one must be added to install any form a gas water heater. If the existing service is based on a small meter, say ½ inch, then it will be necessary to upgrade the meter to at least ¾ inch and it may also be necessary to increase the gas line serving the building. Separate from the possible need to increase the gas service, there are the costs of bringing larger diameter gas pipe to the water heater, increasing the size of the combustion air supply, increasing the size of the exhaust flue, changing the flue pipe to a different material (stainless steel for the mid-range, near condensing efficiencies of the units generally discussed in these proceedings), and the installation of a condensate drain to remove the slightly acidic by products of combustion. To avoid some of these costs, the tankless gas water heaters are sometimes mounted on the inside of an external wall or on the outside of the building, which, when the new water heater location is different from the original, results in an additional cost of rerouting the plumbing, both hot and cold.

3. The installation of a tankless electric water heater CAN increase system peak demand or for that matter even localized transformer demand for the electric utilities distribution system.

ANSWER:

This has been a concern for electrical utilities for many years. Several studies undertaken by different organizations have shown that at least one manufacturer, Seisco, has control technology for its electric tankless water heaters that fully addresses these concerns.

- a. The Crane Creek Project contains 135,000 sq. ft. of conditioned space having 127 individual apartments, each with a SEISCO as the only water heater, plus a dining facility and laundry for the entire project all served by a single meter. There are four years of historical data on electrical usage and peak demand. The data show that the maximum peak demand at any time for the entire project is less than 1kW per apartment (total demand for the entire facility divided by the number of apartments). This data dispels any assumption or allegation that the use of the electric tankless adds appreciably to peak demand. (See Exhibit D)

In addition, according to the study done by the NAHB Research Center, an electric tankless, when replacing a storage tank is in all likelihood 19% more efficient and will substantially reduce kWh. Reducing kWh while maintaining the huge diversity of use results in an overall reduction in demand as well as kWh.

- b. A new residential subdivision of 100 homes proposed in Coco, Florida resulted in a request for testing done by Florida Power to confirm whether or not 28kW SEISCO electric tankless water heaters could be used in several homes on the typical service configuration. Florida Power selected a location with a 75kVA transformer serving 11 homes, one of which already had a SEISCO RA-28 kW water heater. Additional RA-28 kW units were installed in 6 more homes, leaving only 4 out of the original 11 homes using standard electric storage tank heaters. The potential increased in peak demand for this transformer due to the 7 SEISCO RA 28s was 196kW. As documented by Florida Power, the test results clearly demonstrated no peak demand, voltage drop issue or power quality issues resulted from these installations and they gave the go ahead to the developer to allow the installation of the SEISCO tankless electric water heaters in this development without requiring an increase in transformer sizing. Since there is no issue at the transformer level, it is unlikely that there will be an issue at the system level. (See Exhibit B.)
- c. According to Thomas Harman Ph.D. (serving on NEC Panel 2 for 25 years and author of 10 separate editions to his textbook “Guide to the National Electric Code”), ...in addition using the “load shedding” technology utilized by advanced control systems even larger electric tankless can be used by shedding electric resistance space heating in the winter for the short time hot water is used. This feature, combined with the diversity reflected in results of several studies, demonstrates that peak demand is reduced not increased and completely overcomes the issue of “morning peak”.
- d. On page 4-2 of the EPRI report by Global Energy refers to a specific study done by the TVA that was reported on in a seminar in July 2007 at the ASHRAE Technical Conference in Boston. The study provided proof that the SEISCO technology had in fact overcome earlier power quality issues and that the SEISCO electric tankless water heater performed in accordance with the manufacturer’s claims. One of the claims was that the product did not increase peak demand. (Exhibit A)

4. **A tankless electric water heater MAY not satisfy the expectations of some consumers for whole house applications.**

ANSWER:

How much hot water is required simultaneously? How long is the duration of each draw? What is the time delay between draws? No one actually knows the answer to these questions since there are an infinite number of variations.

One of the measures of performance of a storage water heater is the first hour rating. (A study by Hiller and Lowenstein, reported on in ASHRAE transactions found that the peak residential hot water consumption was in a much shorter period than one hour.) Another is the recovery rate. Tankless water heaters have no stored hot water, so the first hour rating is a function of the flow rates and the temperature rise and there is no recovery rate.

- a. The Global Energy report, to date used by DOE to exclude tankless electric water heaters from the Energy Star water heater program, states that: **“Although there is no evidence of this has occurred ...”**)
- b. The NAHB Performance Comparison Of Residential Water Systems study conducted by NREL. This study, using SEISCO RA-28 tankless water heaters, demonstrated energy savings of 14% in the high hot water use home and 24% in the low hot water use home and concluded that a single RA-28 satisfied 99% of all of the homes’ hot water use requirements and that a simple reduction in flow or number of fixtures at these times would have overcome this 1%. One of the key observations of this study was that the maximum flow rate rarely exceeded 2.5-3 gpm in any of the homes studied.(See the link below)
www.toolbase.org/ToolbaseResources/level4CaseStudies.aspx?ContentDetailID=43&BucketID=1&CategoryID=9
- c. In one of their responses to this proceeding, the manufacturers of gas tankless water heaters confirm that a tankless water heater that can provide 2.5 -3 gpm at 120F is sufficient to satisfy the majority of homes. (Exhibit E) As discussed above, this was demonstrated in the NAHB Research Center study by the SEISCO electric tankless water heater and with 40 F cold inlet water temperatures. This same SEISCO provides over 4 gpm in climates with warmer inlet water temperatures. (See reference to pg 3-4 of Global Energy report in Exhibit A.)
- d. (See Exhibit G for a testimonial concerning the use of a 28 kW unit for a family of five including 3 highly athletic teenagers.)

- e. PATH CONCEPT HOUSE: The SEISCO is the water heater selected for the first ever HUD/PATH CONCEPT HOUSE recently opened in Omaha. (Exhibit F)

- f. “Towards Development of an Algorithm for Mains Water Temperature.” This report provided by the Florida Solar Center supports the low flow rates required for satisfying the homes hot water requirements. See the link below:
www.energystar.gov/ia/partners/prod_development/new_specs/downloads/water_heaters/AlgorithmForMainsWaterTemperature.pdf

EXHIBIT A

EPRI ELECTRIC TANKLESS WATER HEATING COMPETITIVE ASSESSMENT

Prepared by Global Energy Partners and published March 2005

EXCERPTS AND COMMENTS (In *italics*):

INTRODUCTION: (Pg v) Tankless electric water heaters have the potential to displace gas water heaters in some markets. Electric tankless can potentially increase electricity demand---

Background (Pg 1.1) Electric Utilities have found it difficult to compete in the water heating market--- (*primarily because gas was cheaper*)

Fig 1. Hot water fixture – *Required flow rate is misleading as the volume of water required for these fixtures includes the cold water. (In most areas the ratio is about 50/50 cold to hot.)*

Whole House Installation: Most houses have electric services between 100-150 amps. Older homes tend to have services of 100 amps or lower.

This is not nearly the case in the majority of homes as stated by Energy Star, nor does the report say so. Furthermore newer homes typically have 200amp or larger electric services so the trend is for larger electric services more compatible with electric tankless.

Pg 2-4 Field Test Comparison of a Potable Hot Water Recirculating-Loop System vs Point of Use Electric Resistance Water Heaters--- demonstrated a 91% reduced energy Consumption compared to a gas recirculating loop.

Pg 3-2 Assumption: In residential applications one might be limited to a tankless water heater with a maximum rated flow rate of 4 gpm. If the household is a large family – then it is easy to see that a single electric tankless could not adequately meet the family’s demand,--- (

This is pure assumption and is completely dispelled by the NAHB Comparison of Residential Water Heating Systems done in 2002 See pg 3.6 footnote 22 referring to this report in which the SEISCO was the tankless heater used. Furthermore consider as well as the very statements of gas and electric tankless manufacturers when responding to lowering the gpm requirement used in testing EF for tankless water heaters. “

Pg. 3-4 Assumption: Newer homes with 200 amp service may need an upgrade too as these Homes will only have 40-80amps remaining.---

*(First the manufacturer cited is anything but an authority in this matter. Furthermore this comment **shows that the writer did not know or otherwise consider the proper way to calculate the electric tankless load at 40% of the nameplate rating after deducting the electrical load attributable to the storage tank heater)***

Pg 3-6 Energy Efficiency: See Pg. 3.6 NAHB Report referred to in references for pg. 3.2 above.

Pg. 3-9 Table 3-1 Comparison between Electric Tankless and Gas Storage and Gas Tankless. *Electric tankless fair better and the SEISCO has no minimum flow.*

Pg. 4.1 Barriers: Refers to a study of a SEISCO RA-28 performed by TVA which concludes the heater performed as the manufacturer claimed. One of the claims referred to in this study was that the SEISCO electric tankless reduces peak demand. This clearly addresses the allegation that smaller electric utilities are concerned that the electric tankless can potentially create increased demand.

*(This is déjà vu considering the very same concern in the early 1900's over electric double ovens. This concern was overcome in studies done using the SEISCO in several projects including the Crane Creek Project of 127 apartments in Melbourne, Fla. each with a SEISCO electric tankless which experienced **less than 1kW per apartment in peak demand measured over a 4 year period.***

Pg 4-2 POWER QUALITY: TVA study of the SEISCO in 1997 proved that Seisco's new control technology resulted in a resolution of power quality issues in services adequately sized for their original and normal intended load. (Not even contemplating an electric tankless water heater.) (See Excerpts from Report on www.SEISCO.com)

Pg. 4.2 Cost of upgrading electrical can run thousands.

This is only true in homes served by newer underground service and most of these have electric services of at least 150 amps. Most homes do not need an electrical upgrade particularly since SEISCO technology includes load shedding capabilities for example to avoid coincident demand from back up electric resistant space heating for heat pumps. Typical upgrade to a residential overhead service is less than \$1,000 and definitely adds to the value of the home. This comment disregards that each and every gas service is required to be upgraded in order to adequately accommodate a gas tankless, often along with expensive venting requirements.

Exhibit B:
Florida Power Correspondence Test Results.

From: C_J_Macias@fpl.com
Sent: Friday, August 25, 2006 10:04 AM
To: TomHarman
Cc: David E. Seitz; Rebbie_Benoit@fpl.com; Cliff Singleton
Subject: RE: Power Quality Report

Tom and company,

Please let me reiterate a couple points made earlier regarding your product.

1. I do not believe from what we have seen thus far and what we are further doing in the development itself with our PQ folks that we will encounter an unacceptable voltage flicker problem. It may yet happen, but we haven't seen that as I have communicated. I think your product design does a good job of limiting that.
2. As a utility we must plan for the calculated load, and your product can add simultaneous large loads for unknown (short or intermediate) usage periods which we cannot control. We are mandated to properly size our delivery system to meet this demand.

Therefore, it is load and voltage flicker issues which are the main subjects for the FPL designers on this project. We are not concerned with how hot the water comes out or for how long. That is a home product issue for the developer and homeowner, and not at all in the realm of the utility designer's concern.

The terminations were very tight, circuits were paralleled reducing amperage through the conductors plus they were in air (not conduit). Not the terminations but the breakers themselves were very hot. We only mentioned that for your information as a consideration for safety in the home since one of your documents states to use 75 amp breakers instead of 60. But again, in the end this also does not come under the utility designer's role.

I understand that PQ has already started capturing data at various homes on a transformer as was discussed when we met in June at the service center.
When they provide the results, we will share these.

For everyone's information, my job responsibilities have changed and I will transition out of Power Quality by early next year. But I will stay on with this project as long as needed.

If there are any other questions, please let me know. I trust this helps.

Carlos J. Macias
Operations Support
305/552-2043 Office
305/205-5740 Cell

-----Original Message-----

From: Rebbie_Benoit@fpl.com [mailto:Rebbie_Benoit@fpl.com]
Sent: Wednesday, August 30, 2006 2:10 PM

To: deseitz@attglobal.net
Subject: Re: Final RVMs / Tankless Waterheaters

Good afternoon David,

This will be just a quick note to let you know we have completed our testing and the results are great news for everyone. I've contacted Cliff to let him know that we are proceeding with the normal underground design at this time.

I want to say thank you for providing FPL with all the necessary equipment to test against our system.

Rebbie ----- Forwarded by Rebbie Benoit/PS/FPL on 08/30/2006 02:24 PM -----

Robert B. McCormick

To: Rebbie Benoit/PS/FPL@FPL
cc: C J Macias/PS/FPL@FPL, David L Smith/PS/FPL@FPL, Lee Weaver/CS/FPL@FPL

08/29/2006 04:03 PM

Subject: Re: Final RVMs /Tankless Waterheaters(Document link: Rebbie Benoit)

Yes that is correct. I wanted to see this last chart from the tx to see if we overloaded the tx at any time, which from the recording we do not.

Thanks
Bobby

Rebbie Benoit

To: Robert B McCormick/PS/FPL@FP
cc: C J Macias/PS/FPL@FPL, David L Smith/PS/FPL@FPL, Lee Weaver/CS/FPL@FPL

08/29/2006 03:31 PM

Subject: Re: Final RVMs / Tankless Waterheaters(Document link: Robert B McCormick)

Robert,

According to Dave Didgen results of the testing indicated that we did not have a flicker problem or a drop at the tx either. Do you agree?

Rebbie

Robert B McCormick

To: Lee Weaver/CS/FPL@FPL,

cc: C J Macias/PS/FPL@FPL, Rebbie Benoit/PS/FPL@FPL, David L Smith/PS/FPL@FPL

08/29/2006 09:14 AM

Subject: Final RVMs /Tankless Waterheaters

Total power chart from tx recording

(Embedded image moved to file: pic01881.jpg)

----- Forwarded by Robert B McCormick/PS/FPL on 08/29/2006 09:11 AM

Dave A Didgen

To: Robert B McCormick/PS/FPL@FPL

cc:

08/29/2006 08:15 AM

Subject: Final RVMs /Tankless Waterheaters

75 kva w 11 custs....6 w/ tankless water heaters (See attached file:
2349317.isf)

@2744: Socket RVM set - 150' 4/0 urd to H/H w/ 2 custs, 45' additional 4/0

Svc to mtr 3.5t A-C no pool. Family

(See attached file: 2349325a.isf)

@2743: Socket RVM set - 180' 4/0 urd to H/H w 2 custs 40 something couple 3.5t A-C w/pool
(2nd cust on same H/H is double wide security trailer @school) (See attached file: 2349328a.isf)

EXHIBIT C
1 OF 6
DUKE POWER MEASUREMENTS

002

Wm. T. Royster Assoc.

03/23/06 THU 16:55 FAX 704 889 8800

Seisco Test #1 - Voltage & Full Load Amps

Water was turned on at a rate of about one gallon per minute for about 20 seconds then turned all the way on, approximately, two gallons per minute, the off. The water temperature ranged from approximately 122 degrees F to 125 degrees F.

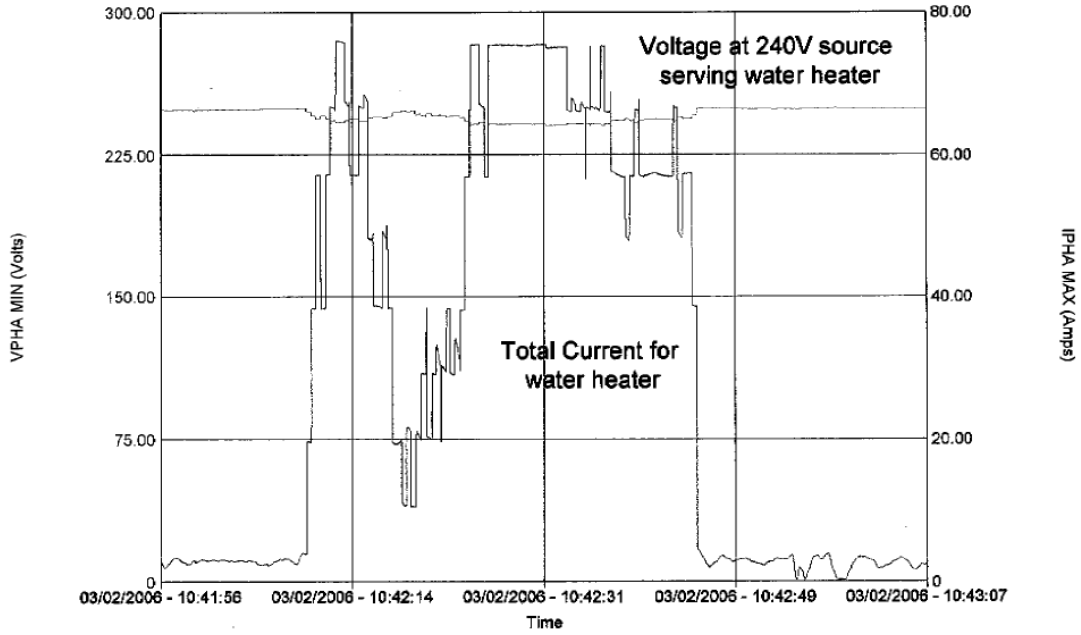


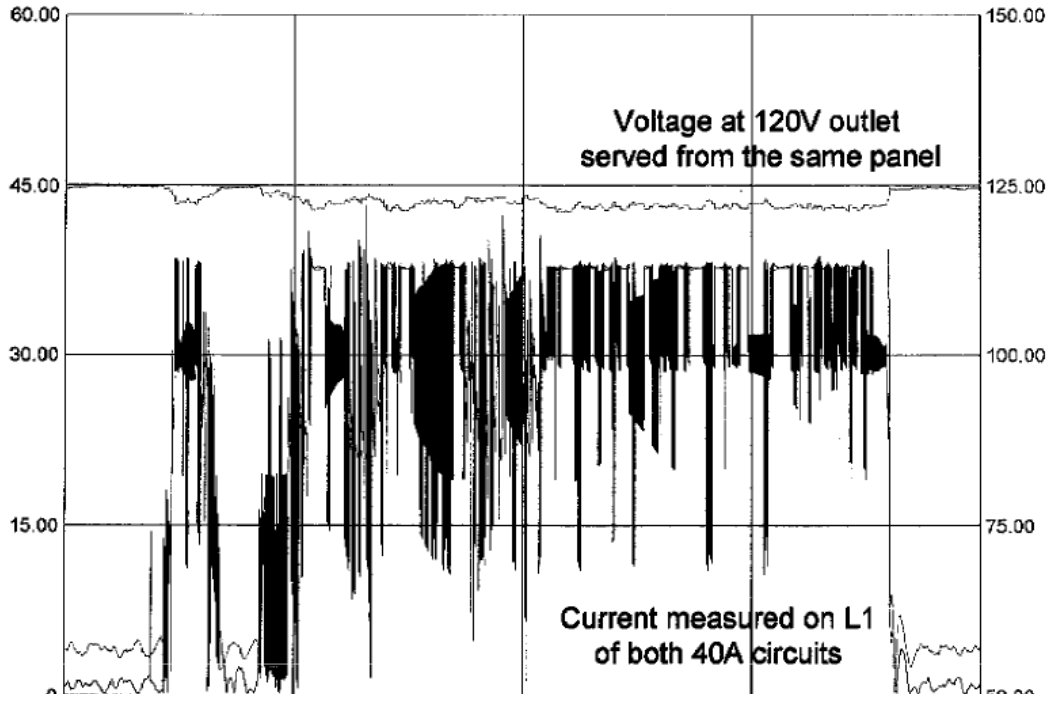
EXHIBIT C
2 OF 6

003

Seisco Test #3 - 120v Outlet - Unit Load Current

6:55 FAX 704 889 8800
Wm. T. Royster Assoc.

IPHA MAX (Amps)



VPHB MIN (Volts)

EXHIBIT C
3 OF 6

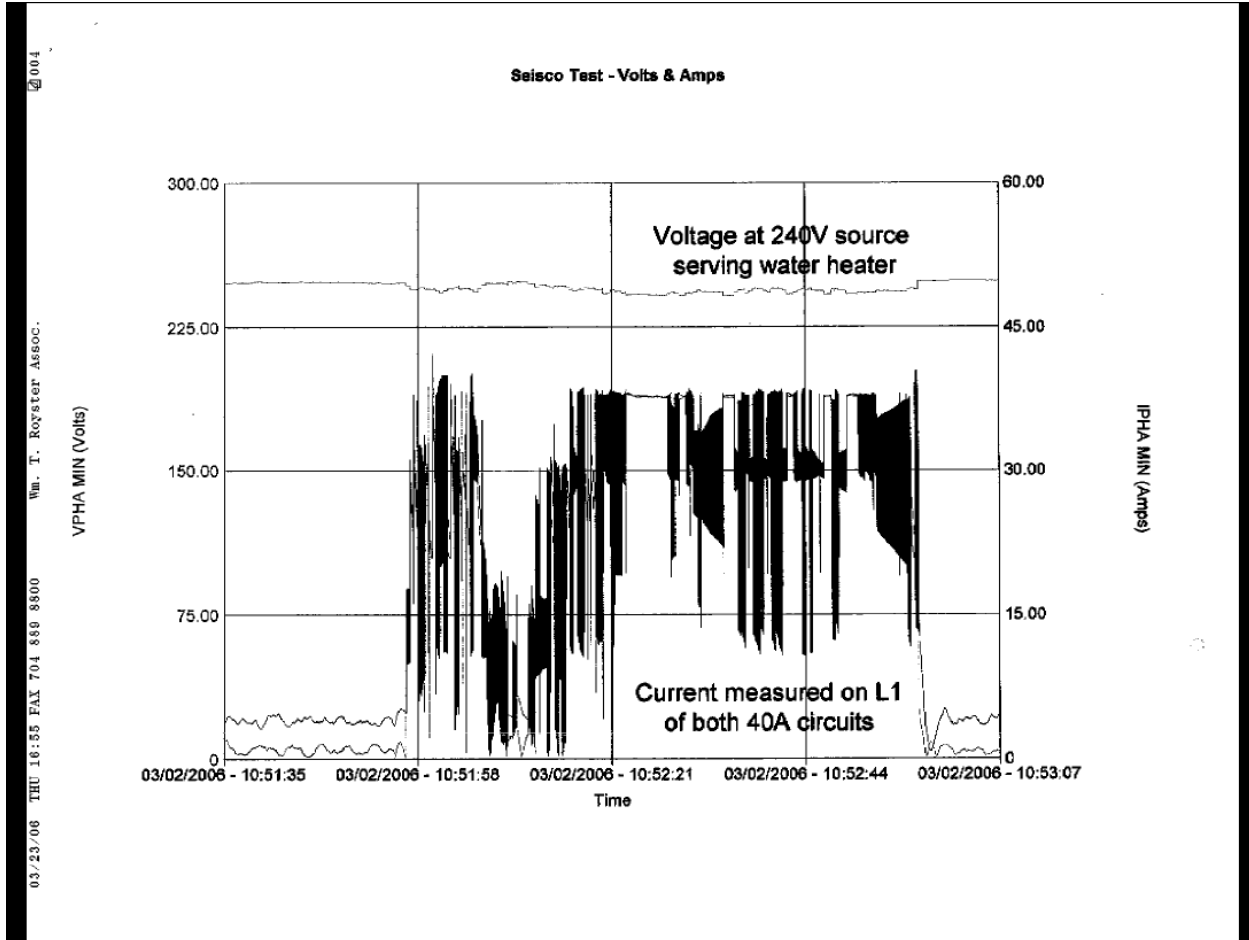


EXHIBIT C
4 OF 6

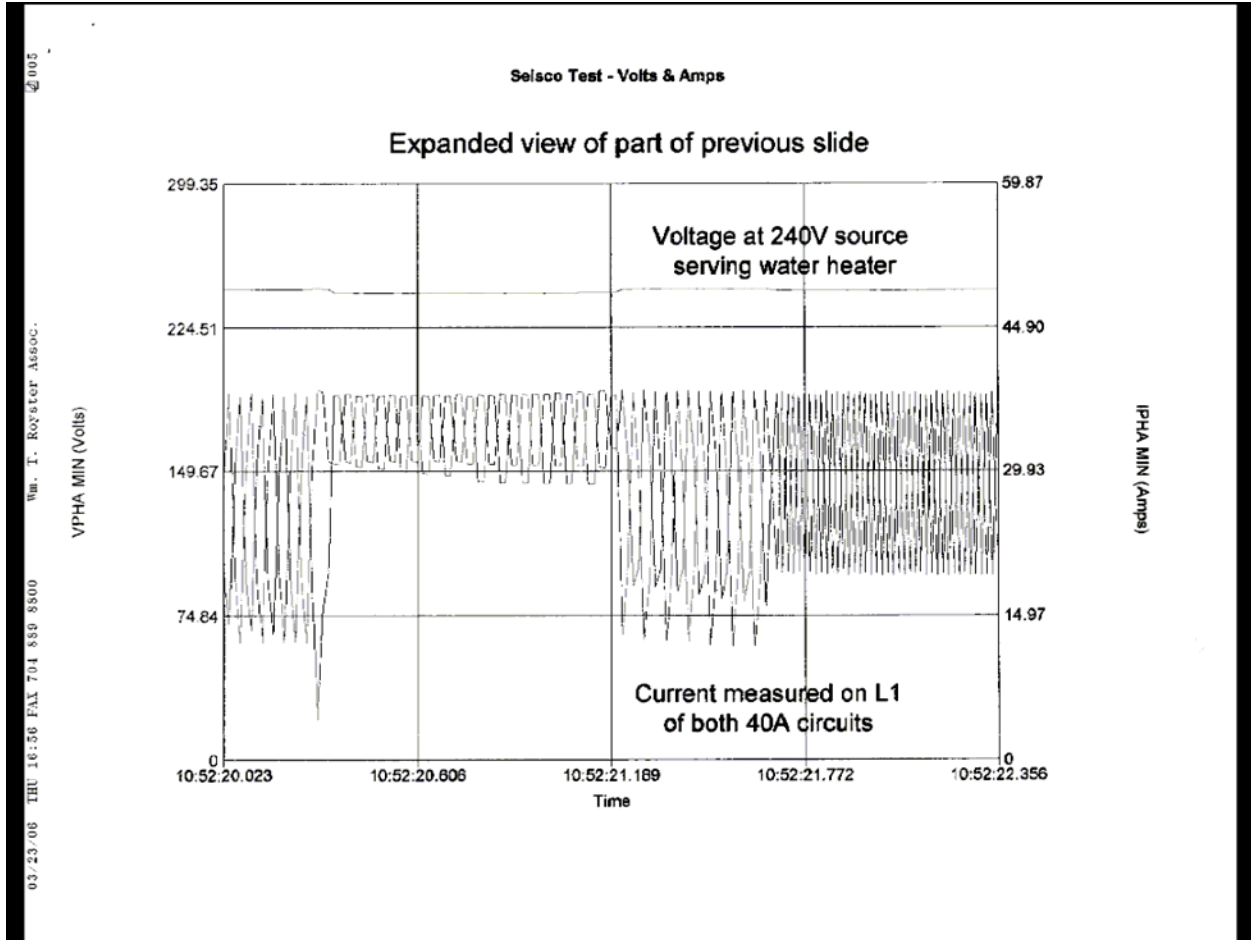
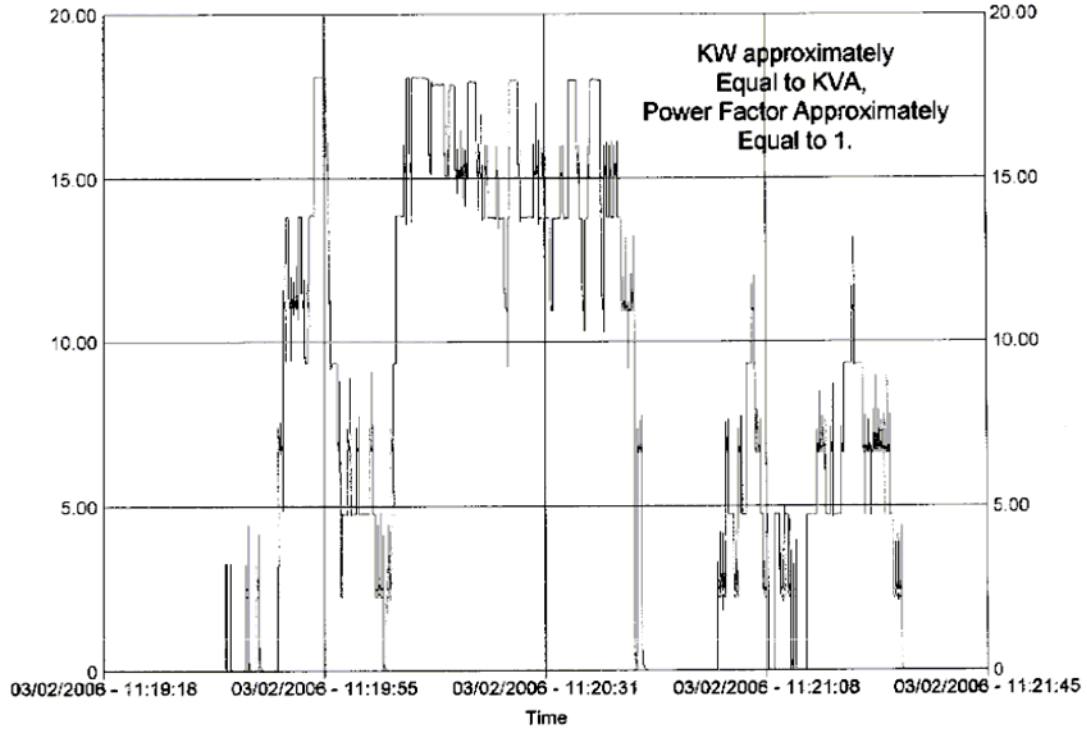


EXHIBIT C
5 OF 6

Seisco Test - KW & KVA

Full load of Water heater— KW & KVA



0000

MR. I. ROYSTER ASSOC.

00/49/00 1111 10:00 P.M. / 04 000 0000

EXHIBIT C

6 OF 6

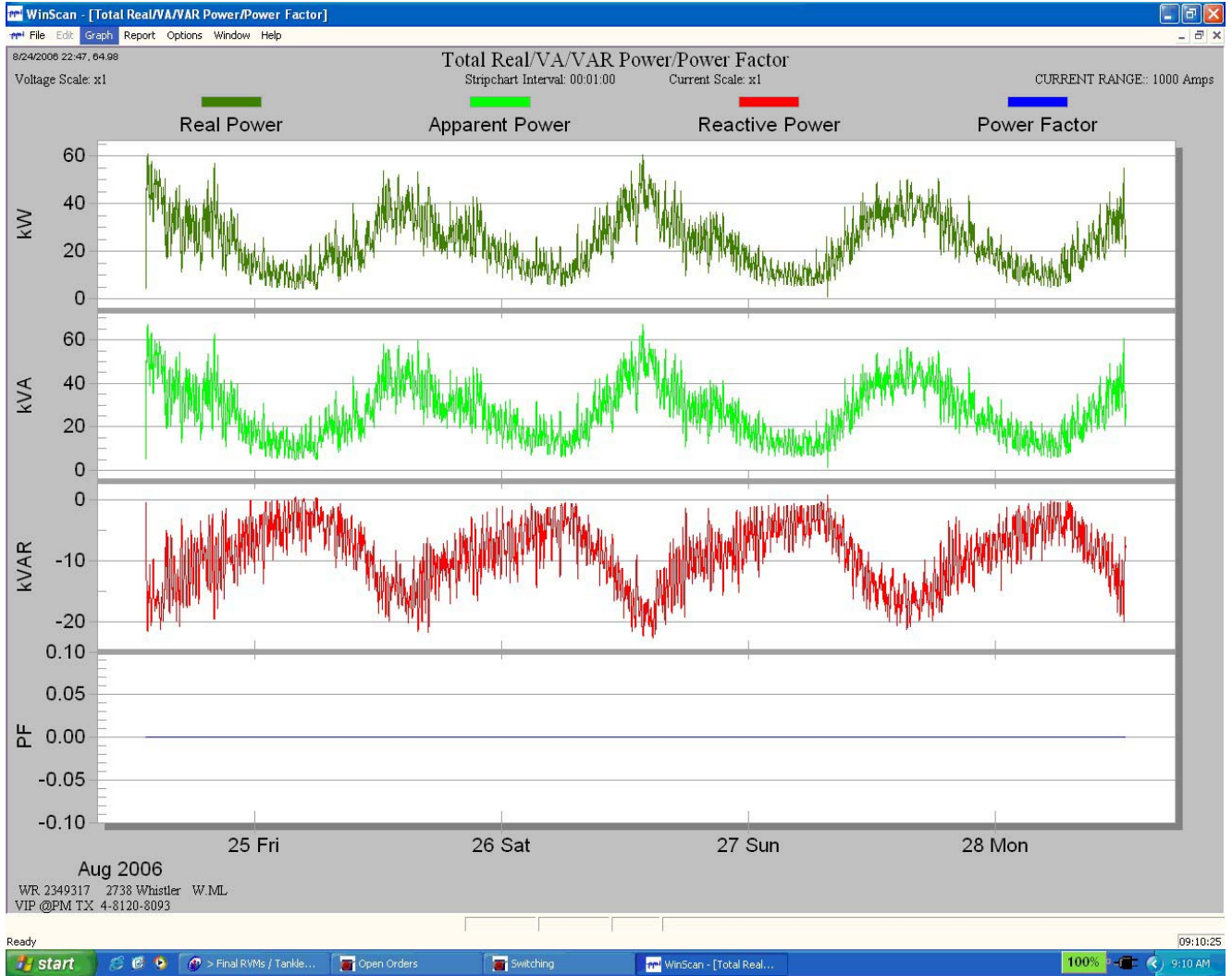


Exhibit D Crane Creek Project

Crane Creek demand report for period 2/18/02-1/20/04

See 09/16/2003 for PEAK DEMAND for 127 apartments including dining and laundry.

Billing History Commercial

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FPL Account Number: 0228609152

Please note, the Electric Charge does not include miscellaneous charges such as, duct test, late payment charge, field collection charge, etc.

Bill to Date	Service Days	Energy Usage (KWH)	On- Peak KWH	Off- Peak KWH	On- Peak Demand	Maximum Demand
01/20/2004	35	36480	0	0	0	78
12/16/2003	33	35880	0	0	0	79
11/13/2003	29	38520	0	0	0	90
10/15/2003	30	43440	0	0	0	107
09/16/2003	31	47180	0	0	0	108
08/15/2003	30	44400	0	0	0	104
07/17/2003	29	43080	0	0	0	104
06/17/2003	32	46200	0	0	0	102
05/16/2003	29	38040	0	0	0	101
04/17/2003	29	32880	0	0	0	97
03/19/2003	29	33480	0	0	0	84
02/18/2003	33	33840	0	0	0	94
01/16/2003	33	32520	0	0	0	70
12/14/2002	31	30600	0	0	0	77
11/13/2002	29	36000	0	0	0	92
10/15/2002	29	42120	0	0	0	107
09/16/2002	32	47040	0	0	0	101
08/15/2002	29	41880	0	0	0	106
07/17/2002	30	38880	0	0	0	98
06/17/2002	32	42380	0	0	0	91
05/16/2002	29	39480	0	0	0	96
04/17/2002	29	33380	0	0	0	80

file://A:\Florida%20Power%20and%20Light\Billing%20History%20Commercial.htm

2/9/2004

Billing History Commercial

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03/19/2002	29	29880	0	0	0	74
02/18/2002	32	31800	0	0	0	70

Crane Creek Apartments Demand History 2/2005-1/2007
See 8/2006 for Peak Demand 122 kW.

Florida Power & Light

Page 1 of 2

Billing / Charges History

Visit these sections for helpful tips on energy savings:

- [For Your Business.](#)
- [For Your Home.](#)

Please [add your e-mail address](#) to your FPL account.

Note: This page may include some debits that were billed after the last statement was issued. Some miscellaneous debits may not be displayed.

[Access Another Account](#)

FPL Account Number: 0228609152

Date	Service Days	KWH Used	Maximum Demand	Debit Amount	Description of Charges
01/23/2007	35	41280	85	\$4,403.88	Electric Bill
12/19/2006	34	38780	84	\$4,412.42	Electric Bill
11/16/2006	28	36240	102	\$4,333.44	Electric Bill
10/18/2006	29	41280	102	\$4,806.34	Electric Bill
09/19/2006	32	51480	114	\$5,868.40	Electric Bill
08/18/2006	29	50400	122	\$5,837.03	Electric Bill
07/20/2006	30	48720	113	\$5,800.68	Electric Bill
06/20/2006	32	50400	114	\$5,767.05	Electric Bill
05/19/2006	29	39480	102	\$4,831.91	Electric Bill
04/20/2006	29	34320	97	\$4,104.62	Electric Bill
03/22/2006	29	32400	86	\$3,828.57	Electric Bill
02/21/2006	29	30720	94	\$3,741.03	Electric Bill
01/23/2006	35	37080	77	\$4,188.54	Electric Bill
12/19/2005	33	35760	78	\$3,162.15	Electric Bill
11/16/2005	29	35760	98	\$3,370.30	Electric Bill
10/18/2005	29	45000	107	\$4,087.66	Electric Bill
09/19/2005	32	52440	122	\$4,745.95	Electric Bill
08/18/2005	29	48960	118	\$4,488.43	Electric Bill
07/20/2005	30	49560	118	\$4,529.15	Electric Bill
06/20/2005	32	47280	116	\$4,353.53	Electric Bill
05/19/2005	29	35760	98	\$3,384.15	Electric Bill
04/20/2005	29	33840	89	\$3,160.18	Electric Bill
03/22/2005	29	29880	79	\$2,787.28	Electric Bill
02/21/2005	32	33600	82	\$3,071.03	Electric Bill

Exhibit E
Excerpts from responses to the Energy Star Water Heater Proceeding by
Gas Water Heater Manufacturers

BOSCH 340 Mad River Park Waitsfield, VT 05673 Tel: 866-642-3197 Fax: 802-496-6924
www.boschhotwater.com May 29, 2007 (First Round Kyle Murray)

2. We strongly recommend that the requirement of a water heater to produce 3.5 gallons per minute at a 77°F rise be eliminated altogether for the following reasons:

- a. *A 77°F rise is far more than most U.S. homes need* This number comes from DOE’s analysis of storage tanks and in no way pertains to tankless models. It has simply been carried over to an alternative technology for which it is not suited.
- b. *c. This requirement will price most Americans out of the tankless market.* A tankless water heater that can deliver 3.5gpm at a 77°F rise has an MSRP of approximately \$1,200 or higher, not including installation. This water heater is overkill for a majority of American homes that are either 1-bathroom homes or 2-person households. As such, it unnecessarily pushes the market toward wasting energy by burning more BTUs than are necessary. The largest market segment for tankless water heaters are the empty nesters, i.e. a 2-person household after the children have grown and moved away. There is no reason for this couple to purchase a \$1,200 water heater when a tankless model with an MSRP of \$599 would satisfy all of their domestic hot water requirements.

GAMA-*An Association of Appliance & Equipment Manufacturers* 2107 Wilson Boulevard • Suite 600 • Arlington, VA 22201 • Phone: (703) 525-7060 • Fax: (703) 525-6790 •
www.gamanet.org May 29, 2007 (First Round)

Whole-Home Tankless Water Heaters: We agree with the EF criterion but recommend that the minimum gallon per minute (GPM) requirement be lowered to 3.0

Rinnai Comments to the DOE Re. Energy Star Label for Residential Water Heaters July 13, 2007

Rinnai does not agree with the DOE proposal that places a minimum “gallons per minute” requirement on the tankless water heater of 3.5gpmgpm at a 77 degree rise. Whole-house tankless water heaters should qualify for the Energy Star rating if the minimum gpm was reduced to 2.5gpm (or one showerhead’s level of flow). Smaller homes that need smaller water heaters should be able to be “right-sized” and have access to an Energy Star-rated water heater.

EXHIBIT F
Microtherm, Inc. Joins PATH's Concept Home Partners

PATH
D&R International
1300 Spring Street, Suite 500
Silver Spring, MD 20910
Contact: Greg Erickson
E-mail: gerickson@drintl.com
Phone: 301-588-0854

Microtherm, Inc. has joined an elite group of residential housing products innovators as an inaugural partner with the Partnership for Advancing Technology in Housing (PATH) in developing PATH's Concept Home.

PATH is a voluntary partnership between leaders in the product manufacturing, homebuilding, insurance, and financial industries as well as representatives of Federal agencies concerned with housing. PATH and its partners work to improve new and existing homes and to strengthen the U.S. technology infrastructure.

The PATH Concept Home demonstrates advanced technologies and building practices with the goal of making home design and construction more efficient, predictable, and affordable.

As PATH's Concept Home illustrates, the home of the future will combine functions that make optimal use of labor, material, time, and money. Innovations include the flexibility to accommodate family changes, designs that give the home the quality and curb appeal of a custom-built house without high cost, and improved production methods that speed construction and raise durability.

SEISCO®, truly the first proven Whole House Tankless Water Heater, was introduced in conjunction with DuPont in 1997 at the ASHRAE Conference in Atlanta. Since then, SEISCO® has been evaluated in many PATH projects and was the basis for PATH's decision to focus on Tankless Water as one of the TOP TEN TECHNOLOGIES IN HOUSING. SEISCO® has been the subject of thirteen (13) separate projects and/or reports by the NAHB Research Center including, "Performance Comparison of Residential Hot Water Systems", "Water Heaters with Space Heating Capability", and "Tucson's Zero Energy Home". Go to NAHB Research Center / PATH online at "www.toolbase.org" and search for "SEISCO" to review more of these important projects and studies.

SEISCO® continues to be the enabling technology enhancing the performance and efficiency of passive and active renewable energy heating systems not only for potable hot water but for space heating systems as well. SEISCO® is the perfect replacement for expensive and inefficient boilers and tank-type heaters. SEISCO® does it all and the features that have made the SEISCO® so popular are demonstrated here in the "Next Gen" Home.

“PATH is dedicated to accelerating the development and use of technologies that radically improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing,” says David Seitz, CEO. “All of us at Microtherm, Inc. share this vision and are proud to be a part of the exciting Concept Home project.”

For more information about the PATH Concept Home, visit www.pathnet.org. For more information about Microtherm, Inc., and its exciting Seisco tankless electric water heater,

Visit www.seisco.com for more information. [contact information for partner company---Bill Walsh, COO bill@seisco.com & David Seitz, CEO deseitz@attglobal.net)]

About PATH:

The Partnership for Advancing Technology in Housing (PATH) is a public –private initiative dedicated to accelerating the development and use of technologies that radically improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing. Administered by the U.S.

Department of Housing and Urban Development (HUD), PATH offers a wealth of information and other tools for builders, developers, housing providers, and homeowners primarily through the PATH Web site, www.pathnet.org.

EXHIBIT F
HUD-PATH LETTERS OF RECOGNITION 1 OF 2



On behalf of the Partnership for Advancing Technology in Housing, we are pleased to offer this

Certificate of Commendation
to
SEISCO

in recognition of its leadership in homebuilding innovation.
We applaud your commitment to improving the comfort,
durability, and value of the American home.

Signed this 11th day of January, 2006

Dave Engel
Director, Policy Development and Research
U.S. Department of Housing and
Urban Development

Mike Chapman
Chair, PATH Industry Committee
and PATH Concept Home Advisory Board

EXHIBIT F
HUD-PATH LETTERS OF RECOGNITION 2 OF 2



Jan. 18, 2006

Mr. Dave Seitz, President/CEO
Microtherm, Inc.
233 W. Airtex
Houston, TX 77090

Dear Mr. Seitz:

On behalf of all of us at PATH, I want to express my gratitude for your participation as a sponsor in the NextGen Home project and your presence at the NextGen breakfast during the International Builders Show.

I also want to take this opportunity to congratulate you on the "PATH Innovator Recognition." Your work with PATH in the development of the NextGen Home has been most valuable. In addition, as you know, Seisco sponsored early efforts with the Concept Home and is now one of the first Concept Home manufacturer partners.

The strength of PATH lies in the creative energy of our many partners. Again, I thank you for the work you have done and are continuing to do to improve the quality of America's homes. We look forward to partnering with you on many future endeavors.

Sincerely,


Carlos Martin, Ph.D.
US Department of Housing and Urban Development
Office of Policy Development & Research
Partnership for Advancing Technology in Housing

1300 SPRING STREET, SUITE 500 • SILVER SPRING, MARYLAND • 20910
PHONE: 301.588.9387 • FAX: 301.588.0854 • www.pathnet.org

