BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

IN THE MATTER OF THE APPLICATION OF )
BLACK HILLS/COLORADO ELECTRIC )
UTILITY COMPANY, L.P., DOING BUSINESS )
AS BLACK HILLS ENERGY, FOR APPROVAL )
OF ITS ELECTRIC DEMAND SIDE )
MANAGEMENT (DSM) PLAN FOR )
AND FOR APPROVAL OF AN ELECTRIC )
DSM COST ADJUSTMENT CLAUSE. )

Answer Testimony of

Howard Geller

on behalf of

Southwest Energy Efficiency Project (SWEEP) and
Western Resource Advocates (WRA)

March 16, 2009
Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Howard Geller. I am the Executive Director of SWEEP, the Southwest Energy Efficiency Project. My business address is 2260 Baseline Rd. Suite 212, Boulder, Colorado 80302.

Q. FOR WHOM ARE YOU TESTIFYING?

A. I am testifying on behalf of the Southwest Energy Efficiency Project (SWEEP) and Western Resource Advocates (WRA).

Q. PLEASE DESCRIBE SWEEP.

A. SWEEP is a private not-for-profit organization dedicated to advancing energy efficiency in six states in the Southwest including Colorado. It receives the majority of its funding from charitable foundations and the Federal government.

Q. PLEASE DESCRIBE WRA.

A. WRA is a private not-for-profit organization that uses law, economics and policy analysis to protect land, water resources, and environmental quality in the Interior West.

Q. WHAT ARE YOUR PROFESSIONAL QUALIFICATIONS?

A. I have 27 years of experience working on energy efficiency policy and program design, analysis, evaluation and advocacy. Prior to founding SWEEP in 2001, I served as Executive Director of the American Council for an Energy-Efficient Economy (ACEEE) in Washington, DC. I have authored or co-authored four books on energy efficiency and energy policy, and published dozens of reports and articles on these topics. I have testified previously before the public utility commissions of
Colorado, Illinois, Maryland, Nevada, New Mexico, Utah, Wyoming and the District of Columbia. Exhibit HG-1 summarizes my professional qualifications.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In my testimony I will comment on the 2009-2011 demand-side management (DSM) plan submitted by Black Hills Energy (BHE) in this docket, along with the issues of appropriate energy savings goals, incentive mechanism, and related issues.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. First, I recommend that the Commission adopt the same energy savings goals in percentage terms that it did for PSCO in its decision in Docket No. 07A-420E. These are about twice the energy savings goals proposed by BHE over a ten-year period. Second, I recommend adopting the same shareholder incentive mechanism for BHE as the Commission adopted for PSCO, consistent with BHE’s proposal in this area. Third, I support the DSM program cost recovery policies proposed by BHE, including prospective recovery of DSM program costs and a uniform DSMCA surcharge in percentage terms applied to all customer classes.

Turning to the details of the DSM programs proposed for 2009-2010, I recommend that the Commission direct BHE to expand a number of its proposed programs, namely the residential lighting and cooling programs and the commercial and industrial prescriptive and custom rebate programs. In addition, I recommend that the Commission direct BHE to implement a second refrigerator recycling program, an ENERGY STAR new homes program, and an air conditioner load control program. Doing so will increase participation levels, energy savings, and the net economic benefits resulting from the DSM programs.
In total, I recommend a DSM budget of about $2.7 million in 2009 (for the first 12 months of program activity), $4.4 million in 2010, and $4.5 million in 2011. These values are about 55% higher than the total DSM budget proposed by BHE. I estimate that the SWEEP/WRA alternative DSM plan will result in about 12.4 GWh per year of savings from 2009 programs, and 18 GWh per year of savings from 2010 and 2011 programs. The energy savings levels are more than adequate to meet the savings goals I recommend.

Q. WHAT IS THE POLICY OF THE STATE OF COLORADO REGARDING ENERGY SAVINGS AND PEAK DEMAND REDUCTION GOALS FOR INVESTOR-OWNED ELECTRIC UTILITIES IN THE STATE?

A. House Bill 07-1037, adopted by the Colorado General Assembly and approved by Governor Ritter, directs the Public Utilities Commission to establish energy savings and peak demand reduction goals for investor-owned electric utilities (see section 40-3.2-104, paragraph 2 of that law). The statute states, “The energy savings and peak demand reduction goals shall be at least five percent of the utility’s retail system peak demand measured in megawatts in the base year and at least five percent of the utility’s retail energy sales measured in megawatt-hours in the base year. The base year shall be 2006. The goals shall be met in 2018, counting savings in 2018 from DSM measures installed starting in 2006. The Commission may establish interim goals and may revise the goals as it deems appropriate.”

Q. WHAT ENERGY SAVINGS AND PEAK DEMAND REDUCTION GOALS HAS BLACK HILLS ENERGY PROPOSED?

A. Black Hills Energy (BHE) witness Daunis indicated that the company’s 2009-2011 DSM plan is consistent with meeting the minimum requirements of HB 07-1037,
namely a five percent reduction from 2006 peak demand and energy by 2018.

Regarding the specific energy savings levels in the plan, the goal of saving 8.12 GWh in 2009 (assuming 12 months of program activity) is equivalent to about 0.41% of the 2006 energy sales and the goals of savings 12.4 GWh in both 2010 and 2011 are equivalent to saving about 0.60% of 2006 energy sales. Furthermore, in response to CPUC Data Request 1-7, BHE indicates it intends to save a total of 93.9 GWh in 2018 as a result of DSM programs implemented during 2009-2018. This is equivalent to 5.15% of the utility’s retail energy sales in 2006. This is slightly greater than the statutory minimum of 5% savings that year.

Q. WHAT ENERGY SAVINGS GOALS DID THE COMMISSION ADOPT FOR PUBLIC SERVICE COMPANY OF COLORADO (PSCO)?

A. In Decision No. C08-0560 in Docket No. 07A-420E, the Commission adopted energy savings goals for PSCO each year for 2009-2020. The goals start at saving 0.53% of sales in 2009 and then increase to 0.76% of sales in 2010, 0.80% of sales in 2011, 0.85% in 2012, 0.90% in 2013, 0.95% in 2014, 1.00% in 2015, 1.05% in 2016, 1.10% in 2017, 1.15% in 2018, and 1.20% in 2019 and 2020. The goals are expressed as a percent of actual sales each year, not of sales in the base year (2006). Furthermore, the shareholder incentive structure adopted by the Commission for PSCO is tied to achievement of these energy savings goals. The incentive structure encourages PSCO to exceed these energy savings goals by increasing the amount of the incentive as energy savings increases. The maximum incentive is provided if PSCO achieves 150% of the energy savings goal in any particular year.
Q. **DID THE COMMISSION ESTABLISH ENERGY SAVINGS GOALS FOR PSCO THAT EXCEEDED THE MINIMUM ENERGY SAVINGS REQUIREMENTS SPECIFIED IN HOUSE BILL 07-1037?**

A. Yes it did. The total energy savings in 2018 if PSCO exactly meets the goals established by the Commission during 2009-2018 is 2,834 GWh. This is equivalent to 10.4% of PSCO’s retail energy sales in 2006.

Q. **DO YOU RECOMMEND THAT THE COMMISSION ESTABLISH ENERGY SAVINGS GOALS FOR BHE THAT ARE EQUIVALENT TO THE GOALS IT ESTABLISHED FOR PSCO?**

A. Yes I do. BHE has determined through its market potential study that there is a very large potential for cost-effective energy savings in its Colorado service area. In particular, the market potential study found an economic potential to save 457.2 GWh in 2017 (see Appendix A to the 2009-2011 DSM Plan submitted by BHE). This is equivalent to 25% of the Company’s retail electricity sales as of 2006. House Bill 07-1037 states that, “It is the policy of the State of Colorado that a primary goal of electric utility least-cost resource planning is to minimize the net present value of revenue requirements.” Maximizing the implementation of cost-effective energy efficiency measures and programs, i.e., those with benefit-cost ratio of greater than 1.0 using the Total Resource Cost test, will contribute to achievement of this policy objective.

I recommend the Commission adopt the same energy savings goals in percentage terms for BHE as the Commission adopted for PSCO in Docket No. 07A-420E. Using the same cumulative goal of saving 10.4% of 2006 sales through DSM
programs implemented in 2009-2018, BHE’s cumulative goal would be to save about
190 GWh in 2018.

Q. WHAT HAS PSCO OFFERED TO PURSUE IN TERMS OF ENERGY
SAVINGS GOALS AND HOW DOES THAT RELATE TO THE GOALS YOU
RECOMMEND FOR BHE?

A. In the rebuttal testimony of PSCO witness Debra Sundin in Docket No. 07A-420E,
PSCO offered to attempt to achieve 50% of the economic potential identified in its
market potential study over a 10 year period. This level of savings was the basis for
the Company’s Enhanced DSM plan. The level of savings that PSCO said it is willing
to strive to achieve over 10 years, 50% of the economic potential, is more than the
savings goal I recommend for BHE which is only about 40% of the economic savings
potential identified in BHE’s market potential study. Thus the savings goals I am
suggesting are conservative as a fraction of BHE’s economic savings potential,
relative to what PSCO believes it can achieve as a fraction of its savings potential.

Q. IS IT REASONABLE TO SET THE SAME ENERGY SAVINGS GOALS FOR
BHE AS FOR PSCO GIVEN THAT THE TWO UTILITIES HAVE A
DIFFERENT LEVEL OF HISTORICAL EXPERIENCE IMPLEMENTING
DSM PROGRAMS?

A. Yes I believe it is reasonable to set the same energy savings goals for the two utilities
in spite of differing level of experience with DSM. First, as noted by BHE witness
Arnall, the Company operating as Aquila, Inc. had active DSM programs during
1996-2004. The fact that the Company did not operate DSM programs during 2005-
2008 suggests that there is less awareness and use of energy efficiency measures
among its customers, which in turn implies greater energy efficiency potential in the
future relative to a service area such as PSCO’s where DSM programs were operated continuously and were ramped up, not down, in recent years. While it may take more time for BHE to introduce and grow DSM programs from a “zero base” compared to PSCO which had a broad base of program prior to 2009, this is compensated for by the point above which suggests greater remaining energy savings potential in the BHE service area. Furthermore, BHE points out in the testimony of witness Stone that it has considerable experience implementing comprehensive DSM programs in Iowa, and this experience should help the company as it reintroduces DSM programs in its Colorado electric service area.

Q. **PLEASE COMMENT ON THE LEVEL OF ENERGY SAVINGS THAT OTHER UTILITIES WITH COMPREHENSIVE, WELL-FUNDED, AND EFFECTIVE DSM PROGRAMS ARE ACHIEVING?**

A. First, the 2006 report of the Energy Efficiency Task Force convened by the Western Governors’ Association states, “Leading electric utilities in the country are investing 2-3 percent of their revenues on DSM programs. These programs in turn save the equivalent of around 0.8-1.0 percent of electricity sales each year.” The report also states that “DSM programs typically save electricity at a total cost of $0.02-0.03/kWh (utility plus participant costs), meaning that improving end-use efficiency is the least expensive electricity resource.”¹

Second, there are examples of utilities in the southwest region that have ramped up their DSM programs in recent years and are achieving energy savings close to or within this range. For example, Arizona Public Service Company saved about 274 GWh per year from its DSM programs in 2007, nearly 1.0 percent of the
utility’s retail electric sales as of 2006. Nevada Power Company estimates it saved about 155 GWh per year (about 0.75 percent of 2006 retail electricity sales) from DSM programs implemented in 2007. Nevada Power also exceeded its goal of saving 183 GWh per year (about 0.89 percent of 2006 sales) from DSM programs in 2008. Sierra Pacific Power Company, another utility in Nevada, set a goal of saving 76.6 GWh per year from DSM programs in 2008, about 0.85 percent of 2006 sales, and also exceeded this goal by a wide margin.

Third, the American Council for an Energy-Efficient Economy (ACEEE) recently reported on energy efficiency achievements of DSM programs in leading states. ACEEE’s summary, presented in Exhibit HG-2, shows that a number of utilities (or third party administered DSM programs) are now achieving 1 percent or greater energy savings from DSM programs implemented annually. For example, investor-owned utilities in California saved over 1.5 percent of electricity sales from programs implemented in 2007. In Vermont, the organization Efficiency Vermont, which receives ratepayer funds to implement DSM programs statewide, is in the process of reducing electricity use by 3.5 percent from programs in 2007-08, a savings of 1.75 percent annually.

Fourth, a number of states have set energy savings goals or requirements for utility DSM programs well above the level of savings proposed by Black Hills. In New Mexico, amendments adopted in 2008 to the Efficient Use of Energy Act require

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utilities to achieve energy savings of 5% of 2005 sales by 2014 and 10% of 2005 sales by 2020, from DSM programs implemented starting in 2007. Minnesota is requiring its electric utilities to save 1.5% of retail sales each year; Illinois has adopted energy savings goals that ramp up to 2.0% savings per year by 2015; and New York has set a goal of reducing projected electricity use in 2015 by 15%. California also adopted a goal of savings 10% of electricity sales over a ten-year period.

Q. **HAS BHE PROPOSED SHAREHOLDER INCENTIVES FOR ITS DSM PROGRAMS AND IF SO WHAT INCENTIVES HAS THE UTILITY PROPOSED?**

A. BHE witness Arnall has proposed that BHE be given the same incentives that the Commission approved for PSCO in Docket No. 07A-420E. This incentive structure includes a fixed bonus if the utility achieves at least 80% of its energy savings goal in any year along with a sliding scale bonus based on the level of energy savings achieved. The maximum bonus is provided if the utility achieves 150% of its energy savings goal. The bonus is also capped at 20% of the expenditures on DSM programs in any one year.

Q. **DO YOU SUPPORT ADOPTING THIS INCENTIVE STRUCTURE FOR BHE?**

A. Yes I do. I believe this incentive structure is sound in that it provides the utility a reasonable opportunity to profit from its DSM investments, while at the same time tying the amount of incentive to the achievement of energy savings and net economic benefits for customers. I believe the incentive cap balances the interest of consumers.

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and the utility in a reasonable manner. Also, I believe it is logical to provide both investor-owned electric utilities in the state with the same incentive structure, as well as other DSM policies such as energy savings goals and cost recovery procedures that are the same. Therefore, I support BHE’s proposal regarding shareholder incentives.

Q. WHAT DOES ADOPTING THE INCENTIVE STRUCTURE PROPOSED BY BHE IMPLY FOR ENERGY SAVINGS GOALS?

A. I believe that adopting the incentive structure supported by BHE, namely the incentive structure the Commission adopted for PSCO, suggests that the Commission should adopt the same energy savings goals in percentage terms for the two utilities given that a utility’s actual incentive level is tied to its actual energy savings relative to its savings goal. It would be unfair to PSCO to set lower energy savings goals in percentage terms for BHE but then use the same incentive structure for the two utilities. Doing so would make it easier for BHE to obtain the same level of incentive in percentage terms as PSCO. Likewise it would be unfair to BHE to set higher energy savings goals in percentage terms for BHE but then use the same incentive structure for the two utilities as it would make it harder for BHE to obtain the same level of incentive as PSCO. In other words, adopting the same incentive structure (as BHE recommends) is further rationale for adopting the same energy savings goals for the two utilities in percentage terms.

Q. HAS BHE PROPOSED A COST RECOVERY POLICY FOR ITS DSM PROGRAMS AND IF SO WHAT COST RECOVERY POLICY HAS THE UTILITY PROPOSED?

A. BHE witness Arnall recommends adopting the same DSM cost recovery policy, namely prospective recovery of projected DSM program expenses along with
asymmetric application of interest to any deferred balance in the DSM account, which
the Commission approved for PSCO.

Q. **DO YOU SUPPORT THIS PROPOSAL?**

A. Yes I do. First, I think it is a fair policy. Second, as I noted above, I think it makes
sense to adopt the same basic DSM policies for both investor-owned electric utilities
in the state. Also, I support adopting the same policy on payment of any shareholder
incentive that BHE earns as the Commission adopted for PSCO in Docket No. 07A-
840E.

Q. **HAS BHE PROPOSED A TARIFF DETERMINATION AND COLLECTION**
**POLICY FOR ITS DSM PROGRAMS AND IF SO WHAT TARIFF POLICY**
**HAS THE UTILITY PROPOSED?**

A. BHE witness Arnall proposes using the same DSMCA tariff mechanism that was in
place previously for the company. Tariff determination and recovery would be
updated to reflect prospective recovery of DSM costs once the 2009-2011 DSM plan
is approved by the Commission. The same tariff amount in percentage terms would
be applied to all customer classes.

Q. **DO YOU SUPPORT THIS PROPOSAL?**

A. Yes I do. As I understand it, this is the same DSM tariff policy that PSCO uses
following review and approval by the Commission. As I noted above, I think it makes
sense to adopt the same basic DSM policies for both investor-owned electric utilities
in the state. Also, I think it is fair for all customer classes to pay the same DSM
surcharge in percentage terms as all customers benefit from the avoided energy costs,
avoided capital costs, and avoided emissions from DSM programs. As long as BHE is
implementing a diverse and comprehensive set of DSM programs that give all
customers an opportunity to participate, it is reasonable to ask all customers to pay
the same amount in percentage terms; i.e., low-income households and large
industrial customers would be treated equally and would pay the same percentage
increase in their utility bills for the purposes of DSM cost recovery and payment of
any shareholder incentive that the Company earns.

Q. **TURNING TO THE DETAILS OF BHE’S 2008-2011 DSM PLAN, WHAT IS
YOUR OVERALL ASSESSMENT OF THE ELECTRIC DSM PROGRAMS
PROPOSED BY BHE?**

A. I think BHE has made a good start at developing a comprehensive set of DSM
programs and I support all of the programs proposed by company. All the programs
are likely to achieve energy savings and peak load reductions, and do so cost
effectively, in my view. However, I think that a number of the programs can and
should be expanded upon in ways that I explain below. Furthermore, I think there are
additional cost-effective DSM programs that BHE should implement in order to take
advantage of cost-effective energy efficiency opportunities that exist in its service
area, in order to maximize program participation, energy savings, and net economic
benefits for its customers. Note that all of my comments on specific programs assume
three full years of program activity; i.e., implementation of the 2009-2011 plan
starting in mid-2009 and continuing through mid-2012.

Q. **WOULD BHE NEED TO EXPAND ITS DSM PROGRAMS, RELATIVE TO
THE PLAN IT SUBMITTED, IN ORDER TO MEET THE ENERGY
SAVINGS GOALS YOU RECOMMEND?**

A. Yes it would. The level of energy savings indicated by the goals depends
on future electricity sales. Based on the sales forecast BHE provided in response to
staff data request CPUC 1-7, the goal for 2009 would represent total energy savings of 10.2 GWh per year, the goal for 2010 would represent total energy savings of 15.2 GWh per year, and the goal for 2011 would represent total energy savings of 16.5 GWh per year. Thus, BHE would need to increase the total amount of energy savings during 2009-2011 by 23-33%, relative to the savings estimated for its proposed DSM plan, in order to achieve the energy savings goals I recommend.

Q. TURNING TO SPECIFIC DSM PROGRAMS, DO YOU HAVE COMMENTS ON THE PROPOSED RESIDENTIAL HIGH EFFICIENCY LIGHTING PROGRAM?

A. CFLs are a very cost effective energy efficiency measure at this time. However, the CFL program proposed BHE is too modest in my view. This type of DSM program, featuring manufacturer and retailer incentives so that the customer is offered a discounted CFL at the point of sale, has been very effective in other jurisdictions.\(^5\) Other utilities in the region that have successfully implemented this type of program include Nevada Power Company and Arizona Public Service (APS). In March 2007, APS won an ENERGY STAR Partner of the Year award from the U.S. EPA and Department of Energy for its CFL buydown program. APS, which serves about 1.0 million households, projects that its customers purchased 3.5 million CFLs through its home lighting program by the end 2007, less than three years after the program began.\(^6\) This is about 3.5 lamps per household on average. Nevada Power Company distributed over 1.5 million CFLs through its program in 2007 alone, equivalent to over 2 lamps per household. Likewise Public Service Company of New


\(^6\) See Geller and Schlegel, Reference 2.
Mexico is planning to stimulate the adoption of about two CFLs per household on average through its 2009 CFL incentive program; i.e., in just one year of program activity.

In contrast, BHE is proposing to stimulate the adoption of only about 0.7 CFLs per household per year through its home lighting program during 2009-2011, or about 2 CFLs on average over a three-year period. This is much less than what other utilities in the region have achieved or are planning to achieve. I recommend that this value be increased to at least 1.2 CFLs per household per year, meaning a target of disseminating at least 100,000 CFLs per year. Doing so would significantly increase the total energy savings achieved by BHE’s overall DSM portfolio given that this program provides more savings than any other single program. Higher CFL sales and customer participation could be achieved through increased marketing, involving more retailers in the program, and removing restrictions in the program. Regarding the latter, the program design presented by BHE states that households would be prohibited from obtaining more than one rebate per year. This restriction could be eliminated, as is the case in other CFL incentive programs such as the program being implemented by PSCO.

I estimate that the budget for the home lighting program would need to be increased by about $80,000 per year to accommodate this higher level of participation and CFL sales. Scaling up the program in this manner would provide more energy savings and should also improve the benefit-cost ratio by spreading the marketing and administration costs over a greater number of participants.

Q. **DO YOU HAVE COMMENTS ON THE SCHOOL-BASED EDUCATION PROGRAM?**
A. This type of DSM program, involving education as well as distribution of low-cost energy efficiency measures to fifth or sixth grade students, has been successfully implemented by many other utilities. The contractor that most utilities use has considerable experience in program implementation and evaluation, and the program is implemented on a turn-key basis with this contractor.

I have two comments on the proposed program. First, I recommend using the experience of other utilities to estimate an energy savings impact from the program, rather than assuming zero savings as BHE had done in its DSM plan. Xcel Energy, for example, is assuming average savings of about 315 kWh per year per student/kit in its school-based education program in New Mexico. I recommend that BHE use a similar savings assumption in its DSM plan, with post-implementation program evaluation carried out to revise this value once actual energy savings results are obtained. Second, I recommend expanding the program if possible by involving more classes and students. BHE is proposing to serve only 750 students per year. Xcel Energy, for comparison, is planning to serve about 3,000 students per year in its 2009 program in New Mexico—four times the number that BHE is targeting. To place these figures in perspective, Xcel Energy serves 20% more total customers in New Mexico than does BHE. Thus Xcel expects much greater participation in its school education program than does BHE. Once again increasing program scale should reduce the cost per participant and increase the benefit-cost ratio by spreading management and administrative costs over more participants. While I believe it should be possible to scale up the program, I do not have a specific recommendation for doing so at this time.
Q. DO YOU HAVE COMMENTS ON THE HIGH EFFICIENCY COOLING PROGRAM?

A. The basic program design involving rebates for high efficiency air conditioners, heat pumps, and evaporative cooling equipment, along with incentives to contractors for following quality installation procedures, is sound in my view. However, I recommend adoption of additional incentives and higher incentives in some cases.

First, I recommend adding an incentive of $600 for central air conditioners and heat pumps with an SEER rating of 16 or greater and an EER of 13 or greater. Right now the program only has a $400 incentive for units with a SEER=15 and EER=12.5, or greater. Second, I recommend paying higher incentives for evaporative cooling equipment, namely a rebate of $300 for a basic evaporative cooler and $750 for a whole house system with an effectiveness rating of at least 85%. There is considerable energy and peak demand savings from using evaporative cooling rather than central air conditioning, and consequently more generous incentives should be offered to promote greater reliance on this cooling technology. Third, I recommend allowing builders to participate in the program, not just residential customers.

Installing a high efficiency air conditioning system or evaporative cooler in new homes is just as valuable as doing so on a replacement basis in existing homes.

In order to accommodate these changes, I recommend increasing the overall budget for the program by about 20% or $50,000 in 2009 and $100,000 in 2010 and 2011. Total energy savings and peak demand reduction should increase by a proportionate amount in particular by stimulating purchase of more evaporative coolers. Evaporative coolers offer greater energy savings per unit than do high efficiency central air conditioners.
Q. **DO YOU HAVE COMMENTS ON THE PROPOSED BUSINESS PROGRAMS?**

A. Apart from CFLs, commercial and industrial sector incentive programs are the “bread and butter” for utility DSM programs these days. BHE’s DSM potential study showed that the commercial sector offers higher economic savings potential in percentage terms, compared to the residential or industrial sectors. The business programs proposed by BHE are consistent with what other leading utilities are offering in some respects. However, I recommend increasing the participation level and impact of both the prescriptive and custom incentive programs proposed by BHE. This can be accomplished through increased marketing, increased technical assistance for businesses, and if necessary paying higher rebate levels.

In terms of specific recommendation, I recommend that BHE offer discounted energy audits and other technical support to all business customers, not just to non-profit organizations as is currently stated in the DSM plan. This would increase the understanding of energy efficiency opportunities by all customers, and thus program participation. Second, business customers should be directly contacted to encourage program participation. Third, many smaller businesses have a difficult time participating in traditional utility rebate programs due to lack of time, lack of know-how, and lack of money available for undertaking energy efficiency projects. Consequently, some utilities include a direct installation component or separate program for small businesses as part of their suite of business energy efficiency programs. This means hiring a contractor (or multiple contractors) to conduct marketing, provide free audits, and install energy efficiency measures for free or at a deep discount (e.g., paying an incentive of 70-80% of the installed cost) for small
businesses. In addition, some utilities offer to finance the remainder of the project cost with a low interest or zero-interest loan. This type of program minimizes the “hassle” and upfront monetary cost for small businesses, resulting in much greater program participation by small businesses compared to rebates alone. Programs along these lines have been successfully implemented by Xcel Energy and by utilities in Arizona, New England and California.\footnote{APS, for example, has proposed a small business direct installation program to reduce barriers and increase participation of small businesses in its DSM programs. See Arizona Public Service Company, APS Non-Residential DSM Programs, 13 Month Filing. March 23, 2007, http://images.edocket.azcc.gov/docketpdf/0000069201.pdf} In addition, I recommend offering the prescriptive rebate program to industrial customers, not just to commercial customers. The DSM plan suggests it is only available to commercial sector customers, although I understand that this was not BHE’s intention.

In order to accommodate these modifications, I recommend that the Commission direct BHE to increase the budget for the commercial prescriptive rebate program, the commercial custom rebate program, and the industrial efficiency program by 30%, meaning a total budget increase of $225,000 in 2009, $442,000 in 2010, and $455,000 in 2011, relative to the budgets proposed by BHE for these three programs. The amount of energy savings should increase by at least 30% as a result of more outreach and technical assistance, and through economies of scale and spreading management and administrative costs over more participants.

Q. **ARE THERE ADDITIONAL ENERGY EFFICIENCY PROGRAMS THAT YOU RECOMMEND BHE IMPLEMENT?**

A. Yes there are. I recommend that the Commission direct BHE to implement a refrigerator recycling program, an ENERGY STAR new homes program, and an air conditioning load control program for its residential customers.
Q. PLEASE PROVE THE RATIONALE FOR AND YOUR SPECIFIC
RECOMMENDATIONS REGARDING A REFRIGERATOR RECYCLING
PROGRAM.

A. This type of DSM program, involving a utility funding the pickup and recycling of
older, inefficient refrigerators that are in working condition, is being successfully
implemented by other electric utilities in the region including Public Service
Company of New Mexico (PNM), Nevada Power Company, Rocky Mountain Power
(Utah), and the municipal utility in Fort Collins, CO. The program is implemented
through a turn-key contractor who has many years of experience running this type of
program. Payments to the contractor are tied to the contractor’s performance and
energy savings achieved. For PNM’s 2009 program, the estimated benefit-cost ratio
under the total resource cost (TRC) test is 3.36.\(^8\) PSCO included a refrigerator
recycling program in its 2009-2010 DSM plan. Using more conservative assumptions
than PNM, PSCO estimates the benefit-cost ratio under the TRC test will be 2.17 in
2009 and 2.21 in 2010.\(^9\) While lower than PNM’s benefit-cost ratio, the program is
still very cost effective with benefits exceeding total costs by more than a factor of
two. A refrigerator recycling facility has been installed in Albuquerque, New Mexico
as a result of PNM beginning its program. BHE could make use of this facility for its
program, or use a recycling facility in the Denver area if one is opened there as a
result of PSCO’s new program.

Based on the experience of other utilities, I recommend a target of having the
contractor pickup and recycle 1,000 refrigerators per year during 2009-2011. With

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\(^8\) Supplemental testimony of Steven M. Bean, Public Service Company of New Mexico, Case No. 08-

\(^9\) 2009/2010 Demand-Side Management Biennial Plan – Electric and Natural Gas. Xcel Energy, Denver,
this level of participation, I estimate an annual program budget of about $200,000.

Using the same unit energy savings value assumed by other utilities such as PSCO or PNM, a program of this size should result in about 620,000 kWh of electricity savings per year from each year of program activity.

Q. PLEASE PROVE THE RATIONALE FOR AND YOUR SPECIFIC RECOMMENDATIONS REGARDING AN ENERGY STAR NEW HOMES PROGRAM.

A. Homes can remain in use for 100 years or more, and it is more cost effective to “build them right” than to try to go back and retrofit energy efficiency measures after a home has been constructed; e.g. it is much easier to install insulation correctly in walls during construction than to try to do so in an existing, poorly insulated home. In Pueblo, new home construction is occurring and expected to continue in the future due to factors such as the expansion of the Fort Carson military base and new industries coming into the area such as the Vestas wind tower manufacturing facility. Furthermore, constructing ENERGY STAR or better new homes is cost effective and is a common component of DSM portfolios today. For example, both PSCO and PNM will be implementing ENERGY STAR new homes program in 2009. Rocky Mountain Power has been implementing a very successful ENERGY STAR new homes program in Utah for a number of years.

This type of program provides incentives to builders for constructing new homes that meet or exceed the ENERGY STAR new homes performance criteria. ENERGY STAR homes programs also provide training to builders and contractors, and promotion to the home-buying public. I recommend that BHE use the approach that PNM is taking in its 2009 program, namely a three tier incentive structure with
incentives of say $500 for just meeting the ENERGY STAR requirements (a HERS score of 85 or lower), an incentive of $1,000 for twice the energy savings (a HERS score of 70 or lower), and an incentive of $1,500 for a highly efficient new home with a HERS score of 50 or lower. These incentives would apply to single family homes; lower incentives would be offered for multi-family housing. Note homes just meeting the 2006 model energy code get a HERS score of 100, and the HERS score declines as energy efficiency improves relative to this benchmark. The program would be offered to new homes that include central air conditioning or a whole house evaporative cooling system in lieu of central air conditioning. The program also could be implemented and marketed jointly with the ENERGY STAR new homes program implemented by the gas utility in the Pueblo area, which I understand is PSCO. While it is difficult to estimate participation level given the downturn in housing construction, I recommend a modest target of 100 new homes in 2009 and 200 homes per year in 2010 and 2011. Both single family and multi-family units would be eligible to participate. Including administration, marketing, training and incentives, I estimate an overall program budget of $120,000 in 2009 and $240,000 per year in 2010 and 2011. Energy savings should be around 120,000 kWh per year from the 2009 program and 240,000 kWh per year from the 2010 and 2011 programs.

Q. PLEASE PROVE THE RATIONALE FOR AND YOUR SPECIFIC RECOMMENDATIONS REGARDING AN AIR CONDITIONER LOAD CONTROL PROGRAM.

A. This type of DSM program is also very common within comprehensive DSM portfolios these days, e.g., it is part of PSCO’s current DSM program portfolio and has been for years. BHE indicates in Appendix A of its Electric DSM Plan that 28%
of its residential customers have central air conditioning. These roughly 24,000 households provide an opportunity for the utility to reduce its summer afternoon peak demand through air conditioner control and cycling. Furthermore, the fact that the utility is in the process of installing AMI equipment on a large scale increases the potential for two-way communication and air conditioner control.

I recommend that BHE implement an air conditioner load control program along the line of PSCO’s at a minimum. It may be possible to implement a more sophisticated program using the AMI equipment at least in homes in Pueblo, and this possibility should be investigated. But the installation of AMI equipment should not be used as an excuse for delaying implementation of this important and cost-effective DSM strategy. Given that BHE serves about 5.8% as many households with central air conditioning compared to PSCO (i.e., 24,000 vs. 410,000 housing units), I recommend that BHE scale up to installing controls on the same fraction of air conditioners that PSCO is planning to install controls on during 2009-2010, by the second year of this effort. This implies installing 1,130 controls in 2010 and the same number in 2011. I further recommend installing half as many controls, 565, in the first year of the program. This would mean a goal of controls on 2,825 central air conditioners by the end of 2011 or about 12% of all central air conditioners found in homes in the BHE service area today.

Based on costs for the air conditioner load control program in PSCO’s 2009-2010 DSM plan including planning, program delivery, marketing, customer incentives, equipment and installation, and M&V activities, I estimate a total program budget for BHE of $300,000 in 2009, $490,000 in 2010, and $540,000 in 2011 given the participation levels proposed above. And using PSCO’s peak reduction value 1.06
kW per air conditioner at the customer level, the total peak demand savings would be 599 kW in year one, 1.80 MW in year two, and 2.99 MW in year three (reductions from controls installed cumulatively). Thus addition of this program would significantly increase the peak demand reduction achieved by BHE’s overall portfolio of DSM programs. For example, with the assumptions above the total peak reduction at the end of the three-year DSM effort would increase from about 3.85 MW as stated in the BHE plan to 6.84 MW.

The energy savings would be minimal as this is a peak demand reduction rather than energy savings initiative. But the program should be very cost effective nonetheless; e.g., PSCO estimates its 2009 Savers Switch air conditioning load control program will have a benefit-cost ratio of 4.21 under the modified TRC test.

Q. DO YOU HAVE COMMENTS ON OTHER ASPECTS OF THE DSM PLAN SUBMITTED BY BHE?

A. Yes I do. First I have some comments on the cost effectiveness methodology used by BHE for evaluating DSM programs. As explained in its Energy Efficiency Plan, BHE has included a value for avoided environmental externalities in its determination of program benefits, specifically a value of $0.005 per kWh saved. This is appropriate given House Bill 07-1037 and I believe the specific value used by BHE is reasonable. However, apart from this proxy for environmental externalities, BHE has not included a non-energy benefits adder in its benefit-cost analysis. I recommend that the Commission direct BHE to do so in the future, and to use the same adder as the Commission approved for PSCO in its decision in Docket No. 07A-420E, namely an adder of 10% to the energy system benefits in general along with allowing inclusion of specific non-energy benefits where appropriate on a program-by-program basis.
Second, BHE has requested that Commission allow it to shift budgets among programs as necessary to achieve maximum impacts and meet energy savings goals. I support this request with the caveat that the utility still be held responsible for implementing cost effective programs. In addition, I support the policy adopted for PSCO that low-income customers be given special attention and that BHE like PSCO be allowed to implement programs for low-income customers in the future that do not necessarily have a benefit-cost ratio in excess of 1.0 using the TRC test.

As in the case of PSCO and gas utilities in the state, I also recommend that the Commission allow BHE to incur costs in excess of its approved DSM portfolio budget without seeking further Commission approval as long as the portfolio as a whole is cost effective. Given that BHE will be reinitiating DSM programs, there is uncertainty about customer interest and what level of participation to expect. BHE should have the ability to expand programs if customer interest exceeds what is anticipated. I recommend that this budget flexibility be up to 125% of the annual budget for the portfolio of programs. This is the level of budget flexibility allowed for gas DSM programs in Colorado.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. First, I recommend that the Commission adopt the same energy savings goals in percentage terms that it did for PSCO in its decision in Docket No. 07A-420E. These are about twice the energy savings goals proposed by BHE over a ten-year period.

Second, I recommend adopting the same shareholder incentive mechanism for BHE as the Commission adopted for PSCO, consistent with BHE’s proposal in this area.

Third, I support the DSM program cost recovery policies proposed by BHE, including
prospective recovery of DSM program costs and a uniform DSMCA surcharge in percentage terms applied to all customer classes.

Turning to the details of the DSM programs proposed for 2009-2010, I recommend that the Commission direct BHE to expand a number of its proposed programs, namely the residential lighting and cooling programs and the commercial and industrial prescriptive and custom rebate programs. In addition, I recommend that the Commission direct BHE to implement a second refrigerator recycling program, an ENERGY STAR new homes program, and an air conditioner load control program. Doing so will increase participation levels, energy savings, and the net economic benefits resulting from the DSM programs.

Exhibit HG-3 compares the budgets by program for BHE’s proposed 2009-2011 DSM plan and the SWEEP/WRA alternative plan. In total, we recommend a budget of about $2.7 million in 2009 (for the first 12 months of program activity), $4.4 million in 2010, and $4.5 million in 2011. These values are about 55% higher than the total DSM budget proposed by BHE. Considering the 2009 projected sales revenue of $167.9 million (see testimony of BHE witness Arnall), the DSM budget I am recommending for 2009 represents 1.6% of the projected revenues. Assuming sales revenues increase 2% per year in 2010 and 2011, the DSM budget I am recommending in 2010 and 2011 represents about 2.6% of projected revenues. For comparison, PSCO is planning to spend $50.8 million or about 2.2% of projected revenues on electric DSM programs in 2009 and $63.6 million or about 2.7% of projected revenues on electric DSM programs in 2010.10

Exhibit HG-4 compares the estimated energy savings by program for BHE’s proposed 2009-2011 DSM plan and the SWEEP/WRA alternative plan. Energy savings are first year savings only, by program year. In total, I estimate that the SWEEP/WRA alternative plan will result in about 12.4 GWh per year of savings from 2009 programs, and 18 GWh per year of savings from 2010 and 2011 programs. These values are 45-53% higher than the savings BHE estimates its proposed DSM plan will achieve. Furthermore, the savings levels are more than adequate to meet the savings goals recommended above. If these savings levels were achieved, BHE would exceed the energy savings goals I recommend by about 21% in 2009, 18% in 2010, and 9% in 2011.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes it does.
Dr. Howard S. Geller is the Executive Director of the Southwest Energy Efficiency Project (SWEEP), a public interest venture he founded in 2001. Based in Boulder, Colorado, SWEEP promotes policies and programs to advance energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming.

Dr. Geller is the former Executive Director of the American Council for an Energy-Efficient Economy (ACEEE). He established ACEEE’s Washington, D.C. office in 1981, stepping down as Executive Director in February 2001. He built ACEEE’s reputation and influence through technical and policy assessments, advice to policy makers, development of energy efficiency programs, consumer guides, and conferences.

Dr. Geller has advised and conducted energy efficiency studies for utilities, governmental organizations, and international agencies. He has testified before the U.S. Congress on energy issues many times and has influenced energy legislation including the National Appliance Energy Conservation Act of 1987 and the Energy Policy Act of 1992. He has served as an expert witness on energy efficiency and resource planning issues before the utility commissions of Colorado, Illinois, Maryland, and the District of Columbia.

Dr. Geller is author or co-author of four books. His most recent book, *Energy Revolution: Policies for a Sustainable Future*, was published in 2003 by Island Press. In addition to his work in the United States, Dr. Geller has spent over three years working on energy efficiency issues in Brazil. He helped to establish Brazil's National Electricity Conservation Program (PROCEL).

Dr. Geller was awarded the 1998 Leo Szilard Award for Physics in the Public Interest by the American Physical Society in recognition of his contributions to national appliance efficiency standards and more efficient energy use in general. Dr. Geller also received the 2007 Mary Kilmarx award for his work on energy and utility policy from NARUC. Dr. Geller is a member of the editorial advisory board for the journal *Energy Policy*.

Dr. Geller received his PhD in Energy Policy from the University of Sao Paulo in Brazil in 2002. He holds a Masters degree in Mechanical and Aerospace Engineering from Princeton University (1979) and he received a Bachelors degree from Clark University (1977) where he majored in Physics and Science, Technology, and Society.
Exhibit HG-2

Energy Efficiency Policies in Leading States (ACEEE)

Connecticut: Connecticut has operated utility-administered energy efficiency programs for many years. In 2005, the Connecticut legislature modified its Renewable Portfolio Standard to include efficiency. Starting in 2007, the state’s utilities must procure a minimum 1% of electricity sales from “Class III” resources such as energy efficiency and combined heat and power, rising by 1% per year to 4% in 2010. In 2007, the Connecticut legislature substantially increased efficiency efforts in the state still further, requiring the state’s utilities to acquire “all available energy efficiency and demand reduction resources that are cost-effective, reliable and feasible.” Initial proposals by the state’s utilities to meet this mandate call for tripling energy efficiency spending in the state over a five-year period, and reducing sales below current levels by 2017 (Sosland 2008).

Massachusetts, New York and New Jersey: Massachusetts is in the process of adopting legislation similar to a draft bill in Connecticut requiring utilities to acquire all cost-effective efficiency (as of this writing, the bill has passed both houses of the legislature and a conference committee hopes to soon work out a final bill). State officials, utilities and others are discussing programs and policies that would immediately double energy efficiency spending and savings, reducing electricity use by 1.5% per year by 2010, and continued increases thereafter that could exceed 2% per year (Sherman 2008). In New York, the Public Service Commission is midway through a docket that will direct how the state and its utilities will meet Governor Spitzer’s goal to reduce electricity use by 15% in 2015 from forecasted levels. Draft strategies involve a combination of state and utility programs, building codes, and equipment efficiency standards. In New Jersey, the legislature authorized the Board of Public Utilities to set energy savings targets for utilities that will require reducing electricity use by 20% by 2020 from forecasted levels. In all three states, these recent policy initiatives are expected to help meet targets established in the multi-state Regional Greenhouse Gas Initiative.

California: California has been pursuing efficiency policies for many years, using efficiency to reduce electricity use approximately 15% over the 1973-2003 period. About half of these savings came from utility energy efficiency programs and the balance from state energy codes and equipment efficiency standards (Rosenfeld 2007). In 2004 the state Public Utilities Commission set energy savings goals for investor-owned utilities for 2004 through 2013, which are expected to save more than 1% of total forecast electricity sales per year. Savings from efficiency measures installed in 2007 under investor-owned utility efficiency programs totaled 3,703 million kWh, which is over 1.5% of electricity sales by these utilities (CPUC 2008). In the next few years California will need to further expand their energy use reduction efforts to meet climate change goals enacted into law in 2006 which calls for reducing greenhouse gas emissions to 1990 levels by 2020.

Minnesota and Illinois: In 2007, these two states both set mandatory energy savings targets for utilities. The Minnesota legislation, which was championed by Governor Pawlenty, calls for electric and gas utilities to reduce consumption by 1.5% per year with efficiency. At least 1% per year must come from efficiency programs, the balance can come from codes, standards, education programs and other measures. The Illinois legislation establishes steadily increasing targets, starting at 0.2% of electricity sales in 2008 (utilities previously had no significant programs) and ramping up to 2% per year in 2015 and beyond.

Vermont: The state Public Service Commission established Efficiency Vermont (EV), an independent “efficiency utility” that delivers efficiency programs statewide. Efficiency Vermont is administered by a very experienced local non-profit organization that is contractually required to achieve energy and demand goals. Over the 2000-2007 period, EV efficiency program savings were equal to about 7% of Vermont’s 2007 electricity requirements. For 2007–2008, EV ramped up its program to reduce consumption over two years by 3.5% of sales, an average of 1.75% annually (VEIC 2007). These savings are being achieved entirely by EV programs, without taking credit for savings from codes and standards.

Exhibit HG-3

Estimate of DSM Program Budgets: BHE Plan vs. SWEEP/WRA Alternative
(1000 $)

<table>
<thead>
<tr>
<th>Program</th>
<th>BHE Plan</th>
<th>SWEEP/WRA Alternative</th>
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<tr>
<td>Low-income assistance</td>
<td>341.4</td>
<td>351.7</td>
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<td>School energy education</td>
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<td>Res. high efficiency lighting</td>
<td>172.6</td>
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<td>Res. high efficiency cooling</td>
<td>273.1</td>
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<td>Comm. prescriptive rebate</td>
<td>327.0</td>
<td>654.0</td>
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<tr>
<td>Comm. custom rebate</td>
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<td>Comm. commissioning</td>
<td>40.2</td>
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<td>Comm. new construction</td>
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<td>Industrial energy efficiency</td>
<td>221.6</td>
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<tr>
<td>Refrigerator recycling</td>
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<td>--</td>
</tr>
<tr>
<td>ENERGY STAR new homes</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Air conditioner load control</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>TOTAL PORTFOLIO</strong></td>
<td><strong>1,704.1</strong></td>
<td><strong>2,824.8</strong></td>
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</table>
**Exhibit HG-4**

**Estimate of Energy Savings: BHE DSM Plan vs. SWEEP/WRA Alternative**  
(GWh per year)

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<tr>
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<td>Low-income assistance</td>
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<td>0.50</td>
<td>0.50</td>
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<td>School energy education (1)</td>
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<td>--</td>
<td>0.24</td>
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<tr>
<td>Res. high efficiency lighting</td>
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<td>3.35</td>
<td>5.58</td>
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<tr>
<td>Res. high efficiency cooling</td>
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<td>0.95</td>
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<td>Comm. prescriptive rebate</td>
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<td>Comm. custom rebate</td>
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<td>Comm. commissioning</td>
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<td>Comm. new construction</td>
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<td>Industrial energy efficiency</td>
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<td>Refrigerator recycling</td>
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<td>0.62</td>
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<tr>
<td>ENERGY STAR new homes</td>
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<td>--</td>
<td>0.12</td>
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<tr>
<td>Air conditioner load control</td>
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<td><strong>TOTAL PORTFOLIO</strong></td>
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<td><strong>12.45</strong></td>
<td><strong>17.99</strong></td>
<td><strong>17.99</strong></td>
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</tbody>
</table>

(1) BHE does not assume any energy savings from the school education program while SWEEP/WRA recommends assuming some savings for the program.
BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO

DOCKET NO. 08A-518E


AFFIDAVIT OF HOWARD GELLER

COMES NOW Howard Geller, of proper age and duly sworn, and states that the attached Testimony in the above-captioned matter was prepared by him or under his supervision and control and that it is true and correct to the best of his knowledge and belief, and would be the same if given orally under oath.

Howard Geller

STATE OF COLORADO )
COUNTY OF BOULDER ) ss.

SUBSCRIBED AND SWORN to before me this 16th day of March 2009. Witness my hand and official seal.

My commission expires: 10/3/2011

Notary Public
CERTIFICATE OF SERVICE

I hereby certify that on this 16th day of March 2009, the original and 7 copies of the Answer Testimony of Howard Geller on Behalf of SWEEP and WRA were sent to Doug Dean, Director, Colorado Public Utilities Commission, 1560 Broadway Suite 250, Denver CO 80202 and a copy was e-mailed to each of the following:

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