

1 **Q. Please state your name, business address and present position with**
2 **PacifiCorp (the Company).**

3 A. My name is Reed C. Davis, my business address is 825 N.E. Multnomah, Suite
4 1700, Portland, Oregon 97232, and my present position is Director of Planning.

5 **Qualifications**

6 **Q. Briefly describe your education and business experience.**

7 A. I received an undergraduate degree in Business Administration from Brigham
8 Young University. I have worked for PacifiCorp since 1979 and have held
9 various positions dealing with the forecasting, budgeting and planning areas of the
10 Company. I was promoted to my present level in 2003.

11 **Q. Please describe your current duties.**

12 A. I am responsible for the development of the forecasts of kWh sales, number of
13 customers, system loads, and system peaks for the Company's six retail
14 jurisdictions. I am also responsible for the accounting of revenues and sales for
15 the Company at state level.

16 **Q. Have you testified previously?**

17 A. Yes. I have submitted testimony to the Idaho, California, Utah, and Oregon
18 Commissions.

19 **Purpose of Testimony**

20 **Q. What is the purpose of your testimony?**

21 A. I describe how the forecasts of the numbers of customers, kWh sales, system
22 loads and system peaks for the twelve-month period ending March 31, 2006 are
23 developed for the Company. These forecasts are produced for all six states in

1 which the Company serves retail customers and are necessary to develop
2 interjurisdictional allocation factors.

3 **Q. Are these same forecasting methodologies used for other purposes?**

4 A. Yes. For example, these are the methodologies used to produce the forecasts
5 driving the Integrated Resource Plan (IRP) of the Company. The staff of the Utah
6 Public Service Commission is an active participant in the public input process of
7 the IRP. These forecasts are regularly reviewed in that process. The Company
8 has also used the forecasts produced using these methodologies in regulatory
9 proceedings in Oregon and California for several years.

10 **Q. Has the Company done any analysis on the accuracy level of the Utah state
11 forecast that you regularly produce?**

12 A. Yes, several years ago we undertook a project to review the accuracy of forecasts
13 produced for the next year. Since that time, we have regularly reviewed the
14 forecast for accuracy and to determine ways in which to improve our accuracy.
15 From 1991 through fiscal year 2004 we have had an average difference of 0.5
16 percent between the weather normalized actual and forecasted sales values.

17 **Sales Forecast**

18 **Residential, Commercial, Public Street & Highway Lighting, and Irrigation**
19 **Forecasts**

20 **Q. How is the kWh sales forecast developed for the Residential, Commercial,
21 Public Street & Highway Lighting and Irrigation customer classes?**

22 A. The forecast of kWh sales for each customer class is the product of two separate
23 forecasts: number of customers, and use per customer.

1 **Q. Please describe how the number of customers is forecasted in this**
2 **proceeding.**

3 A. The forecast of the number of customers relies on weighted exponential
4 smoothing statistical techniques and is based on a twelve-month moving average
5 of the historical number of customers. By applying additional weight to more
6 current data and utilizing exponential smoothing, the transition from actual data to
7 forecast periods is as smooth as possible. This technique also ensures that the
8 December to January change from year to year is reflective of the same linear
9 pattern. These forecasts are produced at the class level for each of the states in
10 which the Company has retail service territory.

11 **Q. Why is it important to apply weights to the historical data for forecasting**
12 **customers?**

13 A. The Company believes that the recent past is most reflective of the near future.
14 Using weights applies greater importance to the recent historical periods than the
15 more distant historical periods and improves the reliability of the final forecast.
16 The forecasts are reviewed for reasonableness.

17 **Q. How is average use per customer for these classes forecast?**

18 A. The Company performs a regression analysis on the average use per customer to
19 determine if there is any material change in the trend over time. The forecasts are
20 reviewed for reasonableness.

21 **Q. What assumptions has the Company made on the impact of the new summer**
22 **price signals approved by the Commission and effective April 1, 2004?**

23 A. Based on the work that we have done, the price changes are expected to have little

1 if any impact on usage levels. We estimate that currently customers use on
2 average over 200 kWh per summer month for space conditioning. At this level of
3 consumption and applying the tariffs in place prior to April 1, 2004 resulted in a
4 cost to the average customer of about \$20 per month specifically related to air
5 conditioning. With the introduction of the new tariff structure on April 1, 2004
6 we expect this cost to increase by less than \$5 per month on average. While this
7 does create a pricing signal for the customer, and builds awareness that high
8 summer users are more expensive to serve, the average price increase relative to
9 what customers are already paying, means that we expect the incremental cost
10 impact to have little or no effect on usage levels.

11 **Q. How are these two forecasts then used to forecast energy sales for each**
12 **customer class?**

13 A. The forecast of the number of customers is multiplied by the forecast of average
14 use per customer to produce annual forecasts of energy sales for each of the four
15 classes of service.

16 **Industrial and Other Sales to Public Authorities Forecasts**

17 **Q. How does the Company forecast the Industrial and Other Sales to Public**
18 **Authorities customer classes?**

19 A. These customers are classified based on Standard Industrial Classification (SIC)
20 codes, numerical codes that represent different types of businesses. Customers
21 are further separated into large power users and smaller power users. We consult
22 with the account managers assigned to each of the large power users regarding
23 that customer's projected energy consumption. The account managers have

1 ongoing direct contact with large customers and are in the best position to know
2 about the customer's plans for changes in business processes, which might impact
3 their energy consumption. In addition, we review industry trends and monitor the
4 activities of the customers in SIC code groupings that account for the bulk of the
5 industry sales. Sales forecasts are then developed for each SIC code group and
6 aggregated to produce a forecast for each class. The forecasts are reviewed for
7 reasonableness and adjusted if appropriate.

8 **Q. Why are these classes forecasted by a different methodology than the other**
9 **customer classes?**

10 A. These classes are forecasted differently because of the diverse make up of the
11 customers within the class. In the Industrial class, there is no "typical" customer.
12 Large customers have very diverse usage patterns and sizes. It is not unusual for
13 the entire class to be strongly influenced by the behavior of one customer or a
14 small group of customers.

15 In contrast, customer classes that are made up of mostly smaller,
16 homogeneous customers are best forecasted with the methodology described
17 previously in my testimony. Those customer classes are generally composed of
18 many smaller customers that have similar behaviors and usage patterns. No small
19 group of customers, or single customer, influences the movement of the entire
20 class. This difference requires the different processes for sales forecasting.

21 **Q. How is the monthly forecast of sales and consumers developed?**

22 A. The consumers forecast is developed using the monthly distribution of customer
23 growth over the past 5 years. The distributions are reviewed by looking at the

1 year over year growth of the customers to make sure they reflect reasonable
2 values. If they do not, then the forecasts will be adjusted by the forecaster.
3 Developing monthly forecasts of sales is a little more involved because we are
4 trying to make the distribution and connection of values from month to month as
5 seamless and reasonable as possible. The annual forecasted values are increased
6 to system load levels by including line losses. Once this is done, they are
7 distributed to hourly values using the regression model I will describe later in my
8 testimony. These hourly values are then summed to monthly totals. Line losses
9 are then subtracted from this monthly value and the total state value at sales level
10 is established. Then for each state and customer class an average monthly shape
11 is developed using the most recent five years of history. This process captures
12 any changing trends in usage on a monthly basis. This average monthly shape is
13 then applied to the annual forecasts by state and class to arrive at monthly
14 numbers by class and state. The sum of these class total are compared to and
15 adjusted to iterate to the total state level established earlier using the sum of the
16 hourly values.

17 **Summary of Results of Sales Forecast**

18 **Q. Please summarize the results of the sales forecast used in this filing.**

19 A. PacifiCorp's Utah retail sales for all classes are forecast to increase by 5.9 percent
20 for the 12 months ending March 31, 2006 from the twelve months normalized
21 sales ending March 31, 2004. This gives approximately an average growth rate of
22 3 percent per year for the next two years. The class level detail is presented as
23 Exhibit UP&L___(RCD-1).

1 **Q. Why are adjustments to the actual sales for the twelve months ending March**
2 **31, 2004 made?**

3 A. The adjustments are done to bring the historical values into alignment with the
4 assumptions for the future test period. The first adjustment is to remove the
5 impact of warmer or colder weather during the historical period. The forecast is
6 based on the NOAA normal weather values, a 30 year average of temperatures.
7 The weather adjustment brings the historical period to this same weather
8 condition. An adjustment is also made to reflect a correction to the estimate of
9 unbilled revenue the Company books into revenues. During 2003, the Company
10 completed research that indicated that the amounts booked were not as accurate as
11 needed. In that year we improved the process for this estimate and made an
12 accounting adjustment in order to reflect the correction of past estimates.

13 **Historical Growth by State**

14 **Q. How would you summarize the sales growth the Company has seen?**

15 A. Exhibit UP&L___(RCD-2) shows the average annual growth for each of the six
16 jurisdictions the Company currently serves. This exhibit shows that for the
17 calendar years from 1994 to 2003 the east portion of the service territory, except
18 Wyoming, has shown more growth than the west portion of the service territory.
19 It also shows that, of the six states, Utah has experienced the largest growth. We
20 expect Utah to continue to have greater growth on average than the other states
21 we serve.

22 **Q. Is this higher growth rate new to Utah?**

23 A. No. From 1984 to 1993, (the prior 10 years) Utah experienced a 3.4 percent

1 average annual growth rate for energy.

2 **Q. What else can you tell from this exhibit?**

3 A.. There are two causes that have impacted Utah that are not impacting the other
4 states in the same way. First, with the exception of Idaho, Utah has had faster
5 customer growth than all states. We expect Utah to continue to have faster
6 customer growth than the other states in the future. Secondly, on average each
7 customer appears to be using more energy each year. We expect Utah to continue
8 to have faster energy growth than customer growth for the next several years.

9 **Q. What makes you say that each year the average customer is using more
10 energy than they did the year before?**

11 A. If the average growth rate for the energy is equal to the average growth rate for
12 the customer additions, on average new customer additions are the cause of the
13 growth. When the energy growth rate is lower than the average customer growth
14 rate, the average customer must be using less each year. When the energy growth
15 rate is greater than the customer growth rate, the average customer must be using
16 more each year to push up the energy growth rate. This latter set of facts is
17 currently true in the Company's Utah service territory so it appears that the
18 average customer is using more energy than they did before.

19 **Q. What has happened in the last few years in the states you serve?**

20 A. The states have had rather different economic climates over the past few years
21 that have created some differences in the growth rates we have seen. Economic
22 climate in the west, and particularly in Oregon, has been suffering more than
23 surrounding states. Oregon has been facing a weaker economy as demonstrated

1 in the higher unemployment rate for the state.

2 **Q. How has this impacted the growth rates?**

3 A. On the bottom of Exhibit UP&L___(RCD-2), I have shown the customer and
4 energy growth rates each state has experienced from calendar year 2000 to
5 calendar year 2003. Oregon, Washington, and Wyoming have seen over a 20
6 percent drop in customer growth rates from historical average where the customer
7 growth rate for Utah has stayed nearly constant. Utah still remains the fastest
8 growing state in terms of customer numbers during this period. Additionally, the
9 energy growth in Oregon and Washington have decreased dramatically from the
10 average over several years, while in other states they have remained the same or
11 increased. Exhibit UP&L___(RCD-2) shows that the Utah energy growth rate in
12 the last couple of years has slowed somewhat while the customer growth rate has
13 not shown a similar size change. This seems different than the other eastern
14 states.

15 **Q. Why is that the case?**

16 A. Geneva Steel, a major steel producer in the state, greatly reduced its purchases
17 from the Company starting in 2001. After adjusting for this change, Utah would
18 show an energy growth of about 1.5 percent over this time period.

19 **Q. What is the impact of different long-term growth rates in each state and the
20 diverging growth rates between states during the recent years?**

21 A. The allocation factors developed to distribute costs to the jurisdictions in which
22 the Company has service territories are impacted. The states with the generally
23 long-term faster growth rates should see an increase in their allocation factors

1 over time as more and more of the growth is assigned to them. However, in the
2 last few years that impact has been compounded due to the different economic
3 climates in each state. The more rapid declines in some states will create
4 additional growth in the allocation factors in the states that are declining more
5 slowly or growing. However, on a cost per kWh basis, allocations should remain
6 somewhat stable between states.

7 **Q. What is the impact to Utah in this rate case?**

8 A. I believe that this impact is two-fold. Utah has been the fastest growing state in
9 terms of customers and energy used per customer in the last 10 years. This
10 resulted in an increase in system allocation factors. Secondly, while there has
11 been a slowing of growth in customer numbers and a reversal in energy demand
12 growth over the last few years in some states, Utah has continued to show
13 underlying growth which has had the effect of compounding the impact of the
14 change in allocation factors. The allocation factors are also impacted by the
15 growth in system peak. Over the past years, Utah's growth in the system peak has
16 been greater than the other states. From 1994 through 2003, while the energy
17 growth in Utah averaged 3.2 percent per year, the summer peak average growth
18 rate was 5.3 percent. This faster growth in system peak further results in more
19 costs being allocated to Utah.

20 **Utah Growth by Class of Service**

21 **Q. How do you group customers?**

22 A. The Company typically groups customers by the type of service they receive. The
23 Company groups customers into Residential, Commercial, Industrial, Public

1 Street and Highway Lighting, Other Sales to Public Authorities, and Irrigation
2 categories.

3 **Q. How does each category of customers contribute to the total energy**
4 **consumed in the state?**

5 A. Exhibit UP&L___(RCD-3) shows two pie charts. One pie chart shows what
6 percent of the total energy sales in Utah is attributable to each customer category.
7 The other chart shows what percent of the total customers in the state each
8 category has. These charts show that the residential, commercial, and industrial
9 categories consume the bulk of the energy in Utah. They also show that the
10 residential customer class is by far the largest customer class in the state.

11 If you were to do the quick calculation of dividing the energy consumed
12 by the number of customers in each category, you would see that, on average, the
13 residential customers use the least energy per customer and the industrial
14 customers use the most. You would also see that, on average, the industrial
15 customers use much more energy per customer than either the residential or
16 commercial customers.

17 **Q. Given the wide difference in use per average customer for each category,**
18 **how does each category impact the state overall growth?**

19 A. Exhibit UP&L___(RCD-4) was prepared to help show how the growth has
20 occurred from 1994 to 2003. This exhibit shows that the residential and
21 commercial customers have grown the fastest over this time period. It also shows
22 that on average they are using more each year than the year before

1 **Q. Does the decrease in the industrial customers shown on this exhibit**
2 **demonstrate that the state is losing its industrial base?**

3 A. No. This exhibit shows the effects of a change in billing systems not a loss in
4 industrial base. The Company instituted a new billing system, called CSS, in
5 approximately 1997. At that time, they reclassified some billing types from one
6 category to another. Prior to 1997, temporary electricity service accounts, those
7 used by builders for electricity during the construction phase of buildings or
8 homes, were all assigned to the industrial category. After the change to CSS,
9 each was assigned to a category based on the final use of the building under
10 construction. So, for example, temporary service accounts for homebuilders are
11 now put into the residential category where previously they were included in the
12 industrial category. This change had a sizable impact on the count of industrial
13 customer but little noticeable impact on the count of residential customers.

14 **Q. Is the growth occurring equally across the state?**

15 A. It depends on the customer class. Exhibit UP&L___(RCD-5) shows the growth
16 seen in geographic locations across the state by customer category. A review of
17 the growth by geographic locations indicates that the bulk of the residential
18 growth has happened along the Wasatch Front, from Ogden in the north to
19 Orem/Provo in the south, east into Park City, and west into Tooele. Additionally,
20 the Cedar City and St.George areas of the state show the greatest residential
21 growth. The commercial and industrial growth has been a little more uniform
22 across the state.

1 **Q. Earlier you implied that current economic conditions help drive the growth**
2 **rate. What has the growth rate been in recent years in Utah based on this**
3 **state's economic climate?**

4 A. I have prepared Exhibit UP&L___(RCD-6) to help explain this. This exhibit
5 shows the long-term average growth rate from 1994-2003 next to the recent years
6 (2000-2003) average growth rates and the percent change in the two growth rates.
7 It shows this for both energy and customers. For the residential class, this exhibit
8 shows that the energy growth rate drops by approximately 20 percent, from 4.1
9 percent over the long-term to 3.3 percent in the near term. The customer growth
10 rate drops by approximately 27 percent, from 2.94 percent over the long term to
11 2.16 percent in the near-term. This very similar change in the energy and
12 customer growth rates indicate that most of the slowing in energy growth is from
13 a slow down in customer growth but that the average growth in use per residential
14 customer continues growing.

15 However, for the commercial and industrial classes, this exhibit shows a
16 very different effect. In both of these classes, the average energy growth rate
17 from long-term to near term has declined a far greater amount than the customer
18 growth rate over the same period. This is an indication that these customers are
19 using less energy on average in the current period than in past periods. The
20 impact in the industrial class is further enlarged by the large decline in the sales to
21 Geneva steel.

22 **Q. What impacts has the Company faced with the differing growth rates by**
23 **customer category?**

1 A. The cost associated with serving the different customer categories is not the same.
2 There is a much higher distribution cost associated with supplying residential and
3 commercial customers than with supplying industrial customers. As such, with
4 more rapid residential and commercial customer growth in the long-term, the
5 Company would face greater distribution costs associated with this type of
6 growth. The slight short-term decreases in growth somewhat mask this
7 continuing trend. While the residential and commercial growth has slowed, each
8 class is still growing, adding pressure to the distribution costs. Also, the decrease
9 in the Geneva load further hides impacts from the growth when you only look at
10 the total energy change. For example, if the Company loses 50 MW of industrial
11 load, the Company could add approximately 50,000 homes and see no load
12 growth. However, the Company would have experienced sizable increases in
13 distribution costs during the same time period as it adds distribution systems to
14 serve the 50,000 new homes.

15 **Q. Earlier, you stated that you expect the growth in Utah to continue at a higher**
16 **rate than other states. Can you now explain how that will happen by**
17 **customer category?**

18 A. Yes.

19 **Residential Growth**

20 **Q. Why do you expect Utah to see a continuing high residential customer**
21 **growth compared to surrounding states?**

22 A. One reason is that Utah has a higher birth rate than surrounding states. Also, as
23 people age they have a tendency, all other things remaining equal, to locate where

1 they grew up. As such, Utah has a fundamental difference from surrounding
2 states that will result in a higher customer growth.

3 **Q. What other factors may drive residential load growth in Utah?**

4 A. Utah also tends to have a more educated labor pool and lower average living
5 costs. This larger population of educated workers and lower wages tends to be a
6 draw for businesses. Additionally, Utah offers a different culture from many
7 locations. Many people seek to move to the state to enjoy the cultural differences
8 in Utah. Utah also appears to enjoy a strategic location in the West. Utah is
9 somewhat centrally located in the west between population centers in Colorado,
10 California and the Pacific Northwest. This makes it a prime location to establish
11 businesses and have equal access to major western population centers.

12 **Q. On average Utah residential customers tend to use more each year. Do you
13 expect that to continue?**

14 A. Yes.

15 **Q. Please explain.**

16 A. Some of the changes in Utah that have led to higher residential usage in Utah are
17 expected to continue. During the last decade, Utah homes on average have
18 increased in size. As the growth continues, the Company expects the average size
19 of homes to further increase. Additionally, the Company is seeing more homes
20 that have Central Air Conditioners (CAC). Customers across our Utah service
21 territory are seeking more comfortable living conditions and seem to be willing to
22 pay for them. CAC are becoming the norm for space conditioning on hot summer
23 days. More new homes require CAC as a selling point. Customers with

1 Evaporative Air Conditioners (EAC) are changing their equipment to keep up
2 with the norm.

3 **Q. Does the CAC increase have any other impact on the Company?**

4 A. Yes. Exhibit UP&L___(RCD-7) shows the residential customers' average use
5 aggregated for the winter months (October through May) and summer months
6 (June through September) from 1992 to 2003. This shows that the use during the
7 four summer months is growing much faster than the remaining eight months of
8 the year. This appears to be having a big impact on the growth of the system
9 peak. Prior to 1999, the system as a whole peaked during the winter months.
10 Because of the growth in Utah, the Company has started to experience summer
11 peaks and expects this pattern to continue in the future. This is evident in Utah
12 state growth rates. From 1994 through 2003, while the energy growth in Utah
13 averaged 3.2 percent per year, the summer peak average growth rate was 5.3
14 percent.

15 **Commercial Growth**

16 **Q. Do you expect the commercial customer growth to continue?**

17 A. Yes, however, it appears to be more widely distributed across the state. Exhibit
18 UP&L___(RCD-5) shows that commercial customer growth is higher in many
19 more areas than residential customer growth. This appears to us to be due to a
20 few different reasons. The state in general will experience higher growth to
21 supply the services needed for the greater residential growth. That service-related
22 growth does not have to be concentrated in the same areas that are experiencing
23 rapid residential growth. In addition, Utah has seen growth in what I refer to as

1 “exporting service businesses.” For example, a number of phone centers have
2 been built in Utah in the past years. These are phone centers that either handle
3 incoming calls or telemarket with outgoing calls across the nation. They have
4 provided many service jobs that do not supply the needs of local customers. They
5 are capitalizing on the labor pool benefits mentioned earlier. This is a benefit that
6 Utah enjoys that other states may not have.

7 **Q. Did the 2002 Winter Olympics impact the growth rate of the commercial**
8 **category?**

9 A. The Company had expected the Winter Olympics to impact the commercial
10 growth rate, however, we cannot see as many changes as we expected. Exhibit
11 UP&L____(RCD-5) shows that the commercial growth was fairly widely
12 distributed across the state. We would not expect that to be the case if the
13 Olympics were a major factor in the growth. If the growth was solely due to the
14 Olympics, we would expect it to be more centralized. Exhibit UP&L____(RCD-8)
15 shows the commercial growth year by year. There are major growth periods all
16 across the ten-year horizon. We see some slightly higher years in 1999 and 2000,
17 but the increase is not that much greater than the prior years. While the Olympics
18 may have had some effect, it appears that it was not as great as some expected and
19 that the bulk of the increase over the past years has not been directly related to the
20 Olympics.

21 The Company has seen another very positive benefit to the state from the
22 Olympics. Utah has been a tourist center, and taken advantage of the many
23 conventions and business meetings held annually. The positive coverage of the

1 Olympics has further identified Utah as a desirable location for a convention or
2 business meeting and tourism should continue to benefit the businesses in Utah
3 that support it.

4 **Q. What is happening to the commercial average customer use?**

5 A. Exhibit UP&L___(RCD-9) shows commercial customers' average use aggregated
6 for the winter months and summer months from 1992 to 2003. This exhibit shows
7 that customer use for the four summer months is growing faster than the
8 remaining eight months of the year. This also appears to be having a big impact
9 on the growth of the system peak and contributing to the summer peak growth.
10 However, this exhibit also shows that the commercial category is seeing growth
11 across the winter sector; summer growth is just faster.

12 **Industrial Class Growth**

13 **Q. What can you tell us about the growth in the industrial category?**

14 A. Prior to the last decade, Utah's industries appeared to be heavily concentrated in
15 industries that depended on the natural resource supplies in the state, such as coal,
16 uranium, oil, gas and copper. While these industries are still very important
17 contributors to the state overall, they have started to play a less important role.
18 During the last decade, the Company has seen a trend to a more diversified
19 economy. Various manufacturing companies have moved into the state for the
20 reasons mentioned earlier in my testimony. Additionally, the exporting service
21 businesses in the commercial sector have contributed greatly to providing a
22 diversified economic base for the state. The state now seems to have an economic
23 base that will be more stable during economic cycles. As business in the state

1 becomes more diverse, the state may have more stability in a variety of economic
2 conditions, i.e. when some sectors of the business community are experiencing
3 contracting cycles others may offset with expanding cycles.

4 **Q. How do you see the past causes of growth continuing in the industrial**
5 **category?**

6 A. Many of the things that have helped the State in the past we see continuing. Utah
7 will continue to have a highly educated workforce. Many people will continue to
8 desire to locate in the state, and the state will likely continue to have a higher birth
9 rate than the nation so there will be a sizable and affordable labor pool. Utah's
10 location as the crossroads of the West will keep it ideally located near major
11 western population centers and business markets. With the changes coming in
12 information technologies and the world markets being opened more easily
13 through the Internet, Utah may have additional advantages that we have not seen
14 that will help diversify and grow the economy more.

15 **Load Shape**

16 **Q. You expect each class to be growing quite differently. Are there additional**
17 **impacts this is having on the system that may change the system in the**
18 **future?**

19 A. I believe that there are additional impacts on the system that must be watched.
20 Exhibit UP&L____(RCD-10) shows how the Utah summer average weekday load
21 shape has changed over time. To create this exhibit, I averaged the weekday
22 loads from July and August of 1993 and 2003 by hour. I then indexed each year's
23 hourly values to the minimum for that year, to remove growth. This gives the

1 hourly shape for each year on a comparable basis with each hour being a ratio to
2 the minimum. This graph shows that the shape is changing and is now higher in
3 the daytime hours. This exhibit corroborates the analysis earlier in my testimony
4 that showed the increasing summer usage from the residential and commercial
5 customers.

6 **Q. What does the changing load shape mean?**

7 A. It is certainly something for the Company to review further and watch. It will
8 require continued additions to the distribution system to increase the capacity.
9 Because customers are using more, the existing system may not have the capacity
10 to handle the increased demand. Also, it may appear to some that the increases to
11 the system are excessive because the increased system demand is for a shorter
12 period during the day. However, there is a need to make sure that the system can
13 handle the maximum demand placed on it. This has been compared to needing an
14 eight lane freeway during the rush hours and a four lane freeway during the
15 remaining portion of the day.

16 **System Load Forecasts**

17 **Q. Please explain the difference between the sales forecast that was just**
18 **described and the system load forecast?**

19 A. The sales forecast for each state is increased by estimates of system line losses to
20 create the system load forecast. Line loss percentages represent the additional
21 electricity requirements to move the electricity from the generating plant to each
22 end-use customer.

23 **Q. How are the loads distributed to hourly levels.**

1 A. The Company has developed a regression based tool that models hourly load
2 against several independent variables. This model has a large number of
3 independent variables. Many of these represent spatial conditions over the year,
4 such as the time of day, the week of the year or day of the week. Additionally
5 hourly temperature for weather stations where the bulk of the load in the state
6 resides is used in the model. A variable representing the humidity levels in the
7 state is also used. With this model loads relative to the many different factors are
8 developed.

9 **Q. When using a model of this type the independent variables require a starting**
10 **value for the calculation. What values does the Company use?**

11 A. For the spatial variables the date and time in the future is used. Typically the load
12 on a weekend is lower than on a weekday because the industrial and some
13 commercial customers use less. So a variable used to identify a weekend would
14 have a lower contribution to the forecasted load than a weekday and just using the
15 calendar date in future identifies these spatial conditions. For the weather values
16 we use the equivalent of the 30-year average temperature for the weather stations
17 at the appropriate day and time in the future. This is also what is used for the
18 humidity measure. We also review the growth of the hourly load over time
19 against historical growth rates to make sure that the loads are growing at the
20 appropriate times. State loads are aggregated by month by time of day and future
21 growth rates are compared with historical growth rates. This allows us to review
22 the night time growth rates verses daytime growth rates. Growth in the winter

1 months may differ from the growth in the spring and fall. All of this is reviewed
2 and trends are incorporated to reflect the historical patterns observed.

3 **System Peak Forecasts**

4 **Q. Please describe the system peak forecast.**

5 A. The system peaks are the maximum load required on the system in any hourly
6 period. Forecasts of the system peak for each month are prepared based on the
7 load forecast produced using the methodologies described above. From these
8 hourly forecasted values, forecast peaks for the maximum usage on the entire
9 system during each month (the coincidental system peak) and the maximum usage
10 within each state during each month are extracted.

11 **Rate Schedule Forecasts**

12 **Q. Are there any additional forecasts that you created for this proceeding?**

13 A. Yes. To develop forecasted billing determinants, Mr. Griffith requires two
14 additional forecasts that are based on the kWh sales forecast and the number of
15 customers forecast. Once the kWh sales forecast is complete, it must be applied
16 to individual rate schedules to forecast kWh sales by rate schedule. In addition,
17 the forecast of number of customers must be expressed in number of bills.

18 **Q. How are rate schedule level forecasts produced for the Company's service
19 territory in Utah?**

20 A. Growth rates of sales to the customers on each rate schedule are calculated to
21 determine how the different schedules are changing within the state. For the
22 schedules that are very slow growing or have no growth, an average monthly
23 energy usage from the last three years is used to determine the forecasted sales for

1 this schedule. For schedules that are represented by single customers, or a few
2 very large customers, a review of the information from the account managers
3 helps determine the appropriate growth rate for this schedule. Adjustments are
4 made to historical consumption levels to reflect anticipated customers changes.
5 For schedules that are growing or declining the average monthly energy usage is
6 adjusted by a factor reflecting the level of change to calculate the forecasted sales
7 for the schedule. The forecasts are then calibrated to make sure that the sum of
8 the rate level forecasts equals the class level forecasts.

9 **Q. How are the number of bills for each schedule forecasted?**

10 A. Growth rates based on customers change for each rate schedule are calculated to
11 determine how the different schedules are changing within the state. These
12 growth rates are then used to forecast each rate schedule into the future. Growth
13 rates by rate schedule are adjusted to reflect the overall trend in customer growth
14 established by the total class forecast. The forecasts are then calibrated to make
15 sure that the sum of the rate level forecasts equals the class level forecasts.

16 **Q. Does this conclude your direct testimony?**

17 A. Yes.