# Load Research Working Group

# Report To The

# Utah Public Service Commission

# 1 July 2002

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# Introduction

In its November 2, 2001 Stipulation Order in PacifiCorp general rate case Docket No. 01-035-01, the Utah Public Service Commission (Commission) established a Utah Load Resource Working Group (Working Group). Membership was to be drawn from PacifiCorp (Company), the Division of Public Utilities (Division), the Committee of Consumers Services (Committee), and other interested parties. The Committee was assigned to chair the group. The Commission directed the Working Group to review PacifiCorp's current and planned load research and studies and submit its report of findings and recommendations by 1 July 2002.

The Load Research Working Group met five times between January 2002 and June 2002. Representatives of the following parties participated at some or all or those meetings: Commission Staff, the Committee, Crossroads Urban Center, the Division, Hill Air Force Base, Salt Lake Community Action Program, PacifiCorp, and the Utah Farm Bureau.

The Load Research Working Group addressed the following issues:

- The techniques used to collect load research data as well as some of the practical problems associated with gathering reliable data.

- The quality and reliability of the load research data as it relates to calibration/adjustments that have been performed on this data.

- The use of the load research data to help design residential rates for customers that use more than 1,000 kWh per month during the summer months.

- The need to develop alternatives to the use of historical irrigation load research data for rate case purposes on a going forward basis.

There was agreement within the Working Group on all issues that were fully reviewed. For those issues that were not fully reviewed, there was general agreement on progress achieved and what the data means that has been reviewed thus far. Although some issues were not fully investigated because of time and other constraints, the Working Group has been able to better define and clarify these issues so as to make future discussions regarding these matters more focused with a clearer point from which to begin.

# Executive Summary

In the Commission's Order of November 2, 2001it adopted a Stipulation that was presented regarding PacifiCorp Docket No. 01-035-01. As a part of that Order and as a part of the Stipulation a Load Research Working group was established to review the current and planned PacifiCorp load research efforts. Although the Stipulation and the Order did not specify concerns to be addressed, the Working Group focused upon many of the concerns that were raised during the rate case that are associated with load research data. The areas reviewed included:

- The quality and reliability of the load research data.

  It was decided that with the addition of a large number of sample points for the Residential Class in early 2000, that the quality and reliability of the load research data has been increased. There is still a question about quality and reliability related to the fact that there is wholesale movement of sample customers between stratum boundaries on a monthly basis. This is not to say that there is a problem, merely a concern that needs further investigation.

- The calibration of load research data in order to match assigned Utah Jurisdictional load with the sum of census data plus load research data.

  It was decided that the Company would no longer calibrate load research data in this manner, thus removing some of the concerns that were raised in the last two rate cases. This agreement only addresses the impact upon load research data, but does not address the jurisdictional question regarding the appropriateness of the assignment of jurisdiction demand and energy values.

- The appropriateness of developing a good sample for the Irrigation Class.

  It was decided that the Company should not establish a new sample for Irrigation Customers. Instead of using load research data, the Irrigation Class should simply be given the jurisdictional average change in rates.

- The use of the load research data for rate design purposes as well as cost allocation purposes.

  It was decided that load research data could be used to better define cost of service boundaries within the Residential Class regarding tailblock pricing during the summer months. More work should be done in this area before specific recommendations are made.

## Description of Load Research Techniques

Techniques used by the Company to develop the load research sample design are appropriate. The load research protocol is designed to produce a sample that is accurate within +/- 10 percent on 90 percent of the observations. Although the sample design is aimed at producing an accurate sample, there are practical problems that require constant review and vigilance in order to insure that the expected level of accuracy is achieved. The Working Group addressed three areas where possible improvements could be made in the load research program:

1. The number of residential load research samples being collected could have been below an acceptable number of samples necessary to produce the desired precision and accuracy of the sample. This potential problem has been corrected with the addition of a number of new residential sample sites during early 2000.

2. Sample customers are grouped according to size (usage) into what are referred to as Strata. Weightings are then assigned to the various Strata in order to reflect the relative percentage of the population as a whole that is represented by customers within that Strata (usage range). A concern has been raised with respect to sample migration with sample customers moving from one stratum to another while the data being collected from that customer continues to be assigned to the original stratum. It is also recognized that the electricity usage of the population as a whole varies from month to month. Much of this sample migration could simply mimic the overall change in usage of the general population. Since the Company is still gathering data on the migration issue, this Working Group has not had an opportunity to review the data prior to the deadline for this report. However, the identification of the concern should help to insure consideration of the issue in future load research efforts.

3. A concern was also raised regarding how the Company checks the accuracy of its load research data against the total population billed energy usage. At present, an initial adjustment is made to the load research data if its derived energy levels differ from the general population by more than +/- 10 percent. The Company is checking to see if each sample stratum is also found to be within +/- 10 percent of its respective portion of the general population, however, the Company has stated that the design precision levels are developed for the whole sample and are not applicable to the individual strata. The identification of the concern should help to insure that future load research efforts will be more aware of possible large discrepancies in usage between the various stratum and the portion of the general population they represent.

## Quality of Load Research Data and Calibration Adjustments

In the last two PacifiCorp general rate cases concern has been raised regarding the impact of calibrations that have been made to the Company's load research data. The

specific calibrations of concern are the ones that come about when the summation of the Company's load research data and the directly measured census data do not equal the Utah Jurisdictional assigned load or "Jurisdictional Border Load" in any given hour. The Working Group has generally agreed that any one of three components (load research data, census data, and/or Utah Border Load data) could have an error that impacted these calibration factors.

The Working Group agreed on several points with respect to these calibrations that had historically been applied to the load research data:

- The general conclusion was that there is something occuring within the Utah Border Load that is more likely the source of the calibration problem than the load research data or the census data. The Working Group agreed that the Company should discontinue the practice of calibrating Utah load research data.

- Although the above agreement solves the problem of the large and biased calibration factors that have been placed upon load research data in recent rate cases, it does not address the source of these high calibration factors or why measured/sampled retail loads in Utah (plus expected losses) do not equal the Utah Border Load. It was concluded that the reason for this discrepency was a result of the losses associated with wholesale and other system transactions that get assigned to the retail jurisdictions. Since this is an important issue, but beyond the scope of this Working Group, it is recommended that these losses be addressed in another forum.

<u>Use of Load Research Data to Develop Residential Rate Design</u>

The review of the Company's load research data resulted in an analysis of the usage characteristics of the sample customers and how that usage fits the definition of the various stratum boundaries. It was observed that during the summer months, residential customers using over 1,000 kWh per month were more coincident with the system peak than were smaller residential customers. This suggested that, during the summer months, generation and transmission costs were higher for the larger customers and could support an inverted rate block pricing structure. At the same time it was noted that the larger customers had higher non-coincident peak load factors than the smaller residential customers. It was recommended that a cost of service study be prepared for the summer months that separated the residential class into customers over 1,000 per month and customers using less than 1,000 kWh per month.
A preliminary study was prepared on an annual basis (not just the 4-summer months) which segregated the residential class between those customers using more than 12,000 kWh per year and those using fewer than 12,000 kWh per year. On an annual basis the study results showed that the generation and transmission component cost of service was higher per kWh for the larger residential customers. However, this difference was more than offset by a lower cost of service per kWh for the distribution and retail components. This suggests that, on an annual basis, an inverted rate was

not supported. It is important to note that the study did not segregate costs by season. Without a detailed cost of service analysis it is impossible to determine how significant the difference in cost of service during the summer months actually is.

While this analysis was discussed, it is agreed by the Working Group that this is a pricing design issue and not a load research issue.

Irrigation Load Research

From a load research perspective the Irrigation Class has historically been a difficult group to sample. The Utah Irrigation Class represents only about one percent of the jurisdiction's total customers and one percent of the jurisdiction's energy requirement. Compared to its size, however, the Irrigation Class is expensive to sample. Furthermore, Irrigation Customers can drastically change usage from one year to the next which could mean that sample meters that are installed one year may not produce results during the next year, or only during a portion of the irrigation season.

The Company recognizes that its irrigation load research data is stale and some alternative needs to be found for future rate cases. The Working Group recommends that the Company not develop a new load research sample for Utah Irrigation Customers. The Working Group also recommends that whenever rates are changed for the Utah Jurisdiction as a whole, the Irrigation Customers should get the jurisdictional average percentage rate change.

# Description of Load Research Techniques

The most significant demand related costs are production and transmission costs, which are related primarily to each rate schedule's demand at the time of the system peak (coincident peak demand). Unfortunately, most customers do not have demand meters. Furthermore, most of the customers that do have demand meters have demand meters that only register the highest 15-minute demand during the month (which may not be at the time of the system peak). Generally, only customers with demands equal to or greater than 1 MW have their loads continuously monitored. Therefore, coincident peak demands for all rate schedules except the very largest must be estimated through the use of load research techniques. The Company does this by placing special load research meters on a random sample of customers from each rate schedule. Data from these samples is used to estimate the coincident peak demands for each rate schedule from which the 12 CP is calculated.

The Company's Load Research Department made presentations and answered questions throughout the course of the Working Group meetings. At the 15 January 2002 meeting, the Company presented an overview of its load research efforts in Utah and other jurisdictions. This presentation is a good point of reference and is included as Appendix A of this Report.

The load research data is gathered from stratified random samples. Customers are grouped by annual energy usage and then a specific number of samples are taken from each of the stratum. The number of samples taken from each stratum is a function of the size of the stratum and the variation in customer usage within the stratum. For example, the Residential Class was divided into four strata along the lines of the following annual usage ranges:

| Stratum | Lower Usage | Upper Usage | Weighting Factor | Sample Points |
|---|---|---|---|---|
| 1 | - | 6,000 | 43.9% | 74 |
| 2 | 6,001 | 12,000 | 41.0% | 60 |
| 3 | 12,001 | 25,000 | 13.8% | 20 |
| 4 | 25,001 | 999,999 | 1.3% | 15 |

The energy consumption data is the only known quantity, and thus, it is the basis for setting the stratum boundaries. Energy consumption is also used as one check on the validity of the load research results within each rate schedule. The load research sample results for each rate schedule are scaled up to the overall population of the rate schedule. The resulting energy values are then compared to the actual energy

readings taken from the rate schedule population as a whole. If the energy levels from the load research program result in values in any given month that deviate from the actual measured energy results for a rate schedule by more than +/- 10 percent, then an adjustment or calibration is made to bring the load research results for that particular rate schedule in line with the actual results. This first level calibration should not be confused with the calibration that is made to all load research data for all customer classes in order to bring the total measured Utah Load in line with the Utah Border Load data. Generally, such first level calibrations have not been required for the residential customers or the small commercial customers taking service under Rate Schedule 23. Occasionally there has been a need to make such an adjustment to Rate Schedule 9, but this adjustment is only made to the sampled group of smaller (under 1 MW) Schedule 9 customers, which represented only about five percent of the total load of that schedule.

Although the load research samples are designed to produce results that were accurate within +/- 10 percent on 90 percent of the observations, there were some practical problems that may have made this data less accurate than theory would suggest. The first problem is the number of valid samples actually taken. As pointed out above, the present design of the residential sample calls for 74 samples to be taken in the first stratum. Actual sampling data between January 1999 and September 2000 showed that the number of samples ranged from 50-69 samples. The low number of samples is typical of the sampling in 1999. In early 2000, the residential sample was revised and new sample customers were added. Since that time, it appears that the number of Residential Customers being sampled is adequate to meet the study protocol.

A second problem that was addressed is a form of sample migration. Stratum boundaries have been set up on the basis of annual consumption. For example, the Residential Stratum 1 Customers are those that have an average monthly usage between 0 and 500 kWh (annual usage between 0 and 6,000 kWh per year). It was found that although the appropriate number of customers may have been sampled, within any give stratum certain customers may have used more or less energy than the range of average usage specified for members of that stratum. In the case of the Residential Stratum 1 Customers a sample customer may have an average monthly usage between 0 and 500 kWh, but usage in one or more months may exceed 500 kWh. Thus, during some months this customer would have usage that is similar to that of a customer in Stratum 2. Likewise, it is possible for a customer from Stratum 2 with average monthly usage between 501 and 1,000 kWh (annual usage between 6,001 kWh and 12,000 kWh) to occasionally use less than 500 kWh per month--usage similar to a customer in Stratum 1.

One concern with sample migration is that the data from each sample is weighted by predetermined values that are based upon annual, not monthly, usage characteristics of the sample customers as they relate to the usage characteristics of the general population. If some sample customers are assigned to one stratum, but the usage characteristics for a given month reflect the usage levels of a different sample stratum, then the weighted sample results may not be reflective of the actual general population

usage pattern. It was noted that there was generally greater usage by all sample customers during the summer months, which contributed to this movement of customers across stratum boundaries. It is possible that this general increase in usage is reflective of shifts within the general population. The Company maintains that this is in fact the case. The Working Group has not come to any conclusions regarding the monthly shifts in usage as they relate to the fixed limits of the stratum boundaries that are based upon annual consumption.

A related question arose regarding the way the Company checks the accuracy of its samples each month by comparing the energy usage of the sampled customers, grossed up to the general population, with the actual energy usage of the general population. As mentioned above, if there is a deviation of greater than +/- 10 percent in the estimated and sampled energy usage of any given month for a given rate schedule, then an adjustment is made. However, this adjustment is based upon the summation of all stratum compared to the rate schedule as a whole. Therefore, it is possible that one or more stratum can be off by more than +/- 10 percent yet the summation of the stratum are within +/- 10 percent of the general population. As with the sample migration problem mentioned above, the Working Group has not come to any conclusions regarding the impact of the accuracy of the sample collection on a stratum-by-stratum basis.

The Company maintains that seasonal usage fluctuations are present throughout the entire residential population and that resulting strata migration is accounted for by using annual energy as the sampling variable. No adjustments should therefore be made to the stratum level load research estimates.

# Quality and Reliability of Load Research Data As It Relates to Calibration Adjustments

The Company's Load Research Group has, as a matter of routine, calibrated hourly load research estimates obtained from all non-census rate groups to the hourly Utah jurisdictional system loads. These calibrations were applied to all load research estimates in an attempt to true up the load research data to the "actual" system loads reported for the State of Utah. This methodology was based on the supposition that the Utah Jurisdictional Loads 1) accurately depict the actual hourly electrical usage for the State of Utah, and 2) were appropriately comparable to the summed Utah Firm Retail Class Loads being estimated by the Load Research Group.

Prior to the Pacific Power – Utah Power merger, class load calibration was performed on all sample load estimates for Utah, Idaho, and Western Wyoming (UP&L) beginning with the 1983 annual load reports. Post-merger, ongoing load studies in Idaho and Wyoming were removed and new load studies were conducted on a cycle basis (each class is monitored for two-years on a five-year rotation). Cycle rotation was implemented for these states in an effort to reduce costs. Residential and small commercial and industrial usage patterns in these jurisdictions did not change materially from one year to the next. Without benefit of ongoing load research sample data to compare to the measured jurisdictional loads, calibration was discontinued for Idaho and Wyoming in 1998.

Load research studies for Oregon, Washington, California and Eastern Wyoming are conducted on a cycle basis and for this reason calibration has not been performed in these states.

In the most recent PacifiCorp rate cases, concern was raised about the quality and reliability of the load research data used in the class cost of service studies. These concerns centered round the calibrations that were applied to the load research data in order to make the summation of the load research data and the Census data equal to the measured Utah Border Loads. There were a number of concerns raised with respect to these calibrations including:

1) In Docket 99-035-10 the calibrations that were used for 10 out of the 12 coincident peaks in the test year were positive, thus adding to the peak load attributed to these customers;

2) The magnitude of these coincident peak calibrations was large, with five out of the 12 months having calibrations in excess of a positive nine percent;

3) In Docket 01-035-01 it was demonstrated that the calibrations averaged a positive seven percent over a two-year period; and

4) In Docket 01-035-01 it was demonstrated that there was a definite seasonal and time-of-day pattern associated with the magnitude of the calibrations.

The cause of the magnitude of the calibrations as well as the seasonality and time-of-day nature of these calibrations was the focus of one portion of the Working Group activities. It was recognized that there were at least four factors that contributed to the magnitude of the calibrations factors on an hourly basis and ultimately the peak demand usage of each rate schedule. Those four factors are as follows:

- Load research uses sampling to define load requirements for the smaller customers—reflecting roughly 75 percent of jurisdictional load.

- Census data from individual large customers that are individually measured as opposed to sampled—reflecting the remaining 25 percent.

- Utah Jurisdictional Border Load—used to define how much energy is consumed (including any losses that take place) in the State of Utah.

- Average losses (developed in 1991) are applied to the load research data. These losses likely change over time and temperature.

If the summation of the load research data and the census data do not equal the Utah Jurisdictional Border Load in any given hour, then a calibration has historically been made to the load research data only, such that the summation of the load research data and the census data do equal the Border Load. Any one of these four components could have an error that resulted in an impact upon these calibration factors.

The review of the calibration data in Docket 01-035-01 was confined to the average percentage calibration of the load research data for each hour of each month. Under the Working Group, a closer look was taken at the level of calibrations that took place during each hour for the months of January and September 2000. It was discovered that not only was there a time-of-day pattern to the level of the calibrations, but that this time-of-day pattern was dependent upon the day of the week, with weekends being distinctively different than weekdays. Appendix B contains a listing of the hourly percentage calibrations that were encountered for each hour in September 2000 with “Sundays and Holidays” highlighted. The “Average” hourly calibration for the month of September 2000 is the same as that used in Exhibit CCS-7.10 page 1 of 3 in Docket 01-035-01 and serves as the basis for the analysis here. The basic findings were:

- Under the first eight hours of the day the “Average” calibration of the same hour in the month, the “Average” calibration is generally over 10 percent. During the middle of the day the “Average” calibration dips to five percent or less, while it generally climbs to six percent or greater during the latter part of the day.

- It was found that the "Sunday/Holiday" calibrations are somewhat higher than "Average" during the first eight hours of the day, significantly higher than the calibrations during the middle of the day, and moderately higher than the calibrations during the last eight hours.

- Saturday's calibrations are actually a little less than "Average" during the first eight hours, more than "Average" but less than Sunday calibrations during the middle of the day, and unlike either set of values during the last eight hours.

- There is a well defined "6 x 16" pattern associated with the calibration data, where the highest calibrations occur during the hours of approximately midnight to 8:00 a.m. and all day on Sundays and Holidays.

- Another observation is that (except for Sundays and Holidays) these calibrations abruptly go from very high during the first eight hours of the day to very low calibrations during the next eight hours with virtually no transition.

- There appears to be a similar, although less dramatic, jump in the opposite direction between the hours of 16:00 and 17:00 (4:00 p.m. and 5:00 p.m.).

Up until this point, the calibration problem had only been measured on the basis of the percentage calibration that was being applied to the load research data. It was suggested that because the loads vary by hour, it would be of value to also review the calibration problem on the basis of the actual magnitude of the calibration. Appendix C lists the actual magnitude of the calibration for each hour of September 2000. Although this provided a different perspective on the problem, it did not drastically alter the results. Most noticeably, the major drop in the level of calibrations still occurs at the 8:00 a.m. hour. Sundays still have a high calibration all day long, and calibrations start a somewhat abrupt increase between the 16:00 and 17:00 hours.

However, the exercise of using actual data as opposed to percentage data brought out another aspect of the calibration problem. The data used by the Company's Load Research Department to equate the census and load research data with the Utah Border Load data includes the use of the peak loss data that has historically been developed for Utah. The shortcoming with this approach is that peak loss factors are only appropriate for use during a few hours during the year. Throughout the course of a day or a month there will be many more hours when the loss factors are closer to the average loss factors and even less than the average losses. Given the magnitude and nature of the loss factors, this means that the percentages and the absolute magnitude of the loss factors listed in Appendix B and C are generally significantly understated.

The Working Group sought to identify the source of the high calibrations that were being added to the load research data used in the Company's rate cases. Because of the dramatic (and well-defined) changes in calibrations, it was presumed that the source of the calibration problem should be detectable by a review of the hourly

differences in data around the 8:00 a.m. hour for the load research data, the census data, and the Utah Border Load data. The hourly load research data and census data for the month of September 2000 around the hour of 8:00 a.m. was reviewed. Generally speaking, there were no hourly changes for any rate schedule or census group data of the magnitude found in the calibration data over this timeframe.

The general conclusion was that there is something occuring within the Utah Border Load that is more likely the source of the calibration problem than the load research data or the census data. The Working Group agreed that the Company should discontinue the practice of calibrating Utah load research data such that the sum of the load research data and census data equate to the Utah Border Load data for the following reasons:

1. The calibration process requires uniform derivation and application of the jurisdictional loads, class load studies, and demand loss factors. Deficiencies in any of these contributing functions could contribute to inappropriate calibration results. The current methodology assumes that all calibration differences are attributable to load study sample error. We no longer believe this assumption to be reasonable.

2. Compilation of the Utah Class loads is delayed by months while the jurisdictional loads are prepared. Jurisdictional loads are input into the calibration process.

3. It is questionable that load research sample estimates are improved in the calibration process, and in fact from a statistical sense, they may be adversely impacted.

4. Significant resources are required to perform hourly calibration with no apparent benefit.

Although the above agreement solves the problem of the large calibration factors that have been placed upon load research data in recent rate cases, it does not address the source of these high calibration factors or why measured retail loads in Utah plus expected losses do not equate to the Utah Border Load. It was concluded that the reason for this discrepancy was the treatment of the losses associated with wholesale and other system transactions in the development of the Border Loads for all states. Given the agreement to remove the calibrations from the load research data, it was concluded that investigation of the impact of this discrepancy between measured Utah Retail Load and Utah Border Load is outside the scope of this forum. The Working Group recommends that the Commission establish or identify another forum and direct the parties to investigate this discrepancy in that forum.

## Use of Load Research Data to Develop Residential Rate Design

When reviewing the residential load research data, an effort was made to determine if a relationship exists between monthly usage and monthly coincident peak demand. For purposes of this analysis, all monthly load research data was combined from all stratas and then ranked by the amount of energy usage. At the upper usage levels (above 1,000 kWh per month), there was a great deal of overlap during the four summer months between customers of various stratum with all four stratum having some customers with usage greater than 1,000 kWh per month.

It was found that there was a decline in the monthly coincident load factor during the four summer months (June through September) which means that the larger usagecustomers had usage more coincident with the monthly system coincident peak than lower usage customers. This indicates that, during the summer, generation and transmission costs are higher for the larger residential customers than smaller residential customers. Although an exact line of demarcation was not established, the decline in monthly coincident load factor was generally believed to occur near 1,000 kWh of usage. A similar relationship between usage level and monthly coincident peak was not found for the other eight months of the year. The above data suggests that an inverted block rate starting at approximately 1,000 kWh may be appropriate for the Residential Class during the summer months. (It is at 400 kWh currently.)

A similar review was made of the monthly non-coincident peak data for the Residential Class. For purposes of this analysis all monthly load research data was combined for all stratum and then ranked by the amount of energy usage. Unlike the monthly coincident peak data, it was found that there was an increase in the monthly non-coincident load factor during the four summer months (June through September) which means that the larger usage customers used their electricity on a more uniform basis when compared to the lower usage residential customers.

The conclusion of the Working Group is that this data was significant enough to warrant further analysis through a cost of service study. It is not only important to identify what type of customer behavior causes increases in costs, but the actual amount of increase in costs needs to be quantified as well. Although the load research data serves as the foundation for much of the data that goes into a cost of service study, it is not a simple matter to incorporate the above findings into such a study. One way to incorporate the above data into a cost of service study is to divide the residential customers into two groups, one that uses over 1,000 kWh during any of the summer months and one that does not. Under this approach there is a need to review the Company's bill frequency data and determine how many customers fit this description and how to get the load research data compiled to properly reflect this bifurcation of the Residential Class. Further work will need to be done in order to break the cost of service study out into one more customer category such that the resulting data simply divides the Residential Class into two groups, but has no impact upon the other rate schedules.

A preliminary study was prepared which segregated the residential class between those customers using more than 12,000 kWh per year and those using fewer than 12,000 kWh per year. As suggested in the review of the load research data, the study showed that the generation and transmission components cost of service were higher, on a cents per kWh basis, for the larger residential customers. However, this difference was more than offset by a lower cost of service per kWh for the distribution and retail components. This suggests that, on an annual basis, an inverted rate was not supported from a cost of service standpoint.

However, the study did not segregate costs by season. Additional analysis that isolates the effect of the cost differences to the summer period is needed to determine if an inverted rate for larger residential customers can be supported during that period.

The above work was completed just prior to the submission of this report to the Commission and has not been thoroughly reviewed by the Working Group. Although additional analysis is needed, the Commission should be aware that there is data available upon which it can assess the price impact of summer usage patterns in the Utah Jurisdiction. Although this information should not be the sole basis for any residential rate design decisions, the information should serve the Commission well in understanding the relationship between certain usage patterns and costs.

The Working Group believes that the residential load research data collected since early 2000 is of sufficient quality to conduct the above described inverted block pricing study.

# Irrigation Load Research

From a load research perspective the Irrigation Class has historically been a difficult group to sample. The Irrigation Class has been a small class within the Utah Jurisdiction with only about one percent of the jurisdiction's total customers and one percent of the jurisdiction's energy requirement. Compared to its size, the Irrigation Class is expensive to sample. The Irrigation Class is highly diversified, and thus, requires more samples per total number of customers in order to get a sample of desired accuracy and precision. In order to adequately sample the Irrigation Class, 100-120 load research meters are required. By comparison, approximately 170 load research meters are required for the Residential Class that is 30-40 times larger than the Irrigation Class. Furthermore, Irrigation Customers can drastically change usage from one year to the next which could mean that sample meters that are installed one year may not produce results during the next year, or only during a portion of the irrigation season.

The cost of gathering good load research data for Irrigation Customers has led to the use of stale load research data in recent rate cases. The Company's cost of service studies have included values for irrigation loads that are taken from data gathered in the 1991-1993 timeframe and then massaged in an attempt to simulate test year results. The resulting cost assignments to the Irrigation Class have been the source of a great deal of contention during these cases. The Company recognizes that its historical irrigation load research data is stale and some alternative needs to be found for future rate cases.

Two alternatives were reviewed. The first alternative was to initiate a new load research sample for irrigators in Utah. The cost of this alternative was explored and it was decided that it was not worth the price—especially considering the fact that Irrigation Customers would continue to change watering requirements and thus usage from year to year.

The second alternative addressed by the Working Group was proposing a stipulation that would allow the Company to avoid designing and gathering a new load research sample for the Irrigation Customers. As a part of this stipulation, it was also agreed that whenever rates are changed for the Utah Jurisdiction as a whole, that the Irrigation Customers get the jurisdictional average rate change.

The specific working of the stipulation is as follows:

> For at least the last decade, the Irrigation Class comprises less than one percent of the total kWh sales in Utah. Due to the relatively small size of the Irrigation Class in Utah, and the potentially high cost of implementing new load research samples to improve load research studies, the parties agree that new load research samples are not necessary for the

> foreseeable future. As a result, the parties also agree that in subsequent cases where rates are changed and where new load research studies have not been employed for the Irrigation Class, that the proposed rate spread for Irrigation Customers will be equal to the overall average jurisdictional percentage change.

It is the intent of all parties that have participated in this Working Group that at the next appropriate opportunity, the above language will be presented to the Commission for its consideration with respect to how the revenue requirement for the Irrigation Class should be calculated in the future without new load research data.

# Appendix

*A1 PacifiCorp's Overview Presentation of its Load Research Program*

*A2 September 2000 Hourly Percentage Calibrations*

*A3 September 2000 Hourly MWH Calibrations*

*A4 Cost of Service by Rate Schedule*