

-BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH-

SPECIAL REPORT ON PACIFICORP ALLOCATIONS
(UTAH DIVISION OF PUBLIC UTILITIES)

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DPU EXHIBIT 2.2DIR-COS

DOCKET No.11-035-200

DIVISION OF PUBLIC UTILITIES

June 22, 2012

Utah Division of Public Utilities
ELECTRIC SECTION
SPECIAL REPORT ON PACIFICORP ALLOCATIONS

ISSUE

The Utah Public Service Commission has previously requested that the Division of Public Utilities re-examine the appropriateness of two factors used as a part of allocation procedures, 1) using the 12 monthly peaks in the demand allocation factor, and 2) using a weighting of 75% demand and 25% energy in deriving the System Generation (SG) allocation factor. These factors have been applied to all three allocation systems recently considered, Consensus, Accord and Roll-in. The decisions on these factors were first made at the time of the Pacificorp merger when little data was available about the merged company, so a new examination is desirable. This report contains a somewhat in-depth analysis of the 12 CP factor, a more subjective analysis of the 75-25 factor and a sensitivity study evaluating the impact of alternative decisions on Utah rates.

CONCLUSIONS AND RECOMMENDATIONS

The Division of Public Utilities finds that there is no evidence to suggest that 12 CP is not an appropriate allocation period. In fact, the evidence that is available indicates that all 12 months could impact capacity allocation. We also find that the 75%/25% peak to energy ratio in the capacity allocation factor reasonably represents actual capacity expansion decisions. We find that Utah expenses are quite insensitive to changes in these allocation tools and therefore more refined analysis and study is not warranted. Therefore, the Division recommends that the Public Service Commission continue to use these factors as they are presently applied. While the evidence that leads to this recommendation is not clear cut, there is substantial evidence that the factors are correct and no evidence at this time that they are incorrect.

ANALYSIS

A. ANALYSIS OF 12 CP

The issue here is, "For which months of the year could peak load or peak load growth cause additional investment in generation and transmission capacity?" If peak load or peak load growth in a particular month has some potential responsibility for new investment then generation costs ought to be assigned to that time period. Table 1 on the following page is monthly peak data for the merged Pacificorp (PC) for the past ten years. The data for the time periods before the merger represent the coincident peaks of the independent utilities. **What we have called "peak load" is the native customer firm peak load.** At the first stage of our analysis, we used sophisticated three-variable curve fitting techniques to see if data from all twelve months could be fitted to the same equation.

We found a number of equations that related peak load to a seasonal pattern of months and a time trend over the years. Figure 1 attached shows the three-dimensional curve-fit for one of these equations, one that the Division believes shows a good balance between accuracy, predictability and simplicity. As shown, the correlation coefficient (r^2) of this case is 0.75 or 75%.

FIGURE 1-Pacificorp Peak Load Patterns
 Rank 42 Eqn 20 $z=a+bx+cx^2+dy+ey^2+fy^3+gy^4+hy^5$
 $r^2=0.75219803$ DF Adj $r^2=0.73433843$ FitStdErr=291.12113 Fstat=48.567687
 $a=5470.5535$ $b=67.032197$ $c=5.2695/07$ $d=930.8397$
 $e=-691.16125$ $f=157.82523$ $g=-14.671989$ $h=0.4839885$

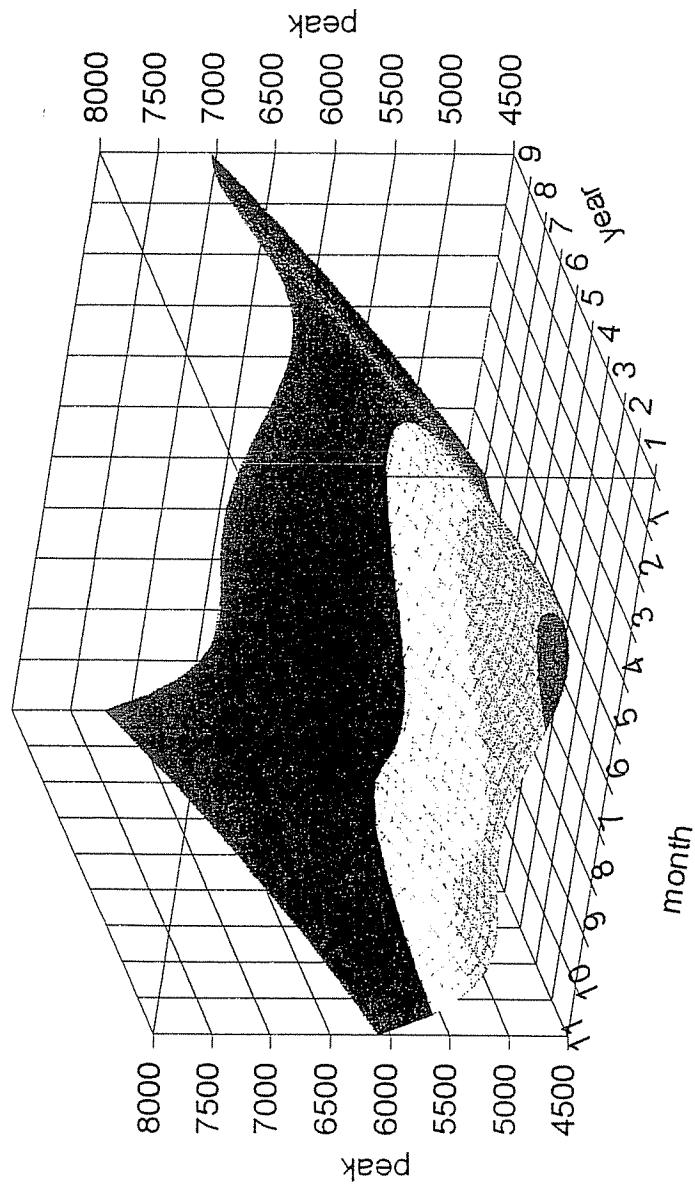


FIGURE 2-PacifiCorp Seasonal Peak Load Patterns
Rank 42 Econ 20 $z = a + bx + cx^2 + dy + ey^2 + fy^3 + gy^4 + hy^5$
 $r^2 = 0.75219803$ DF Adj $r^2 = 0.73439843$ FitStdErr = 291.12113 Fstat = 48.567687
 $a = 5470.5535$ $b = 67.032197$ $c = 5.2695707$ $d = 930.8397$
 $e = -691.16125$ $f = 157.82523$ $g = -14.671989$ $h = 0.4839885$

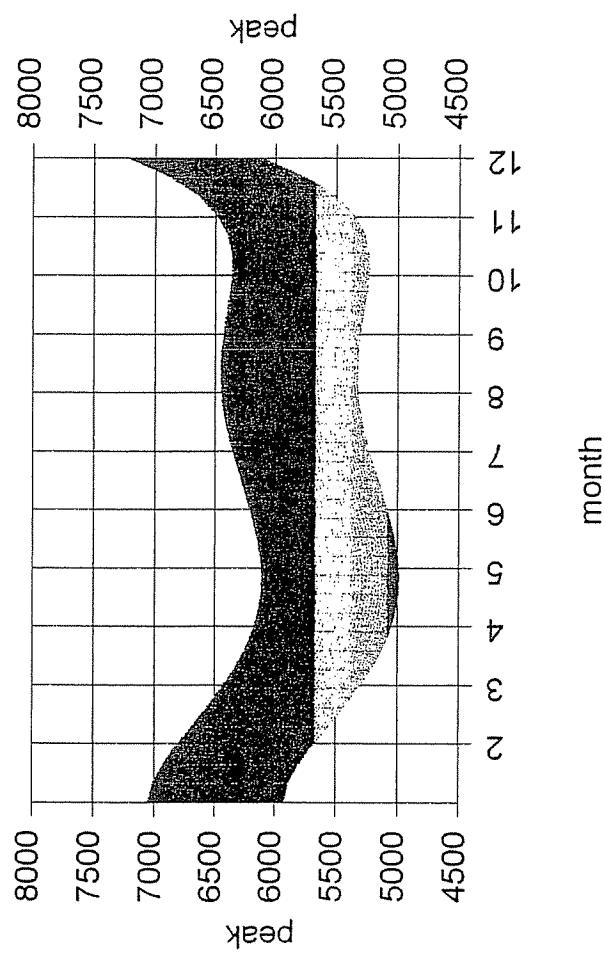
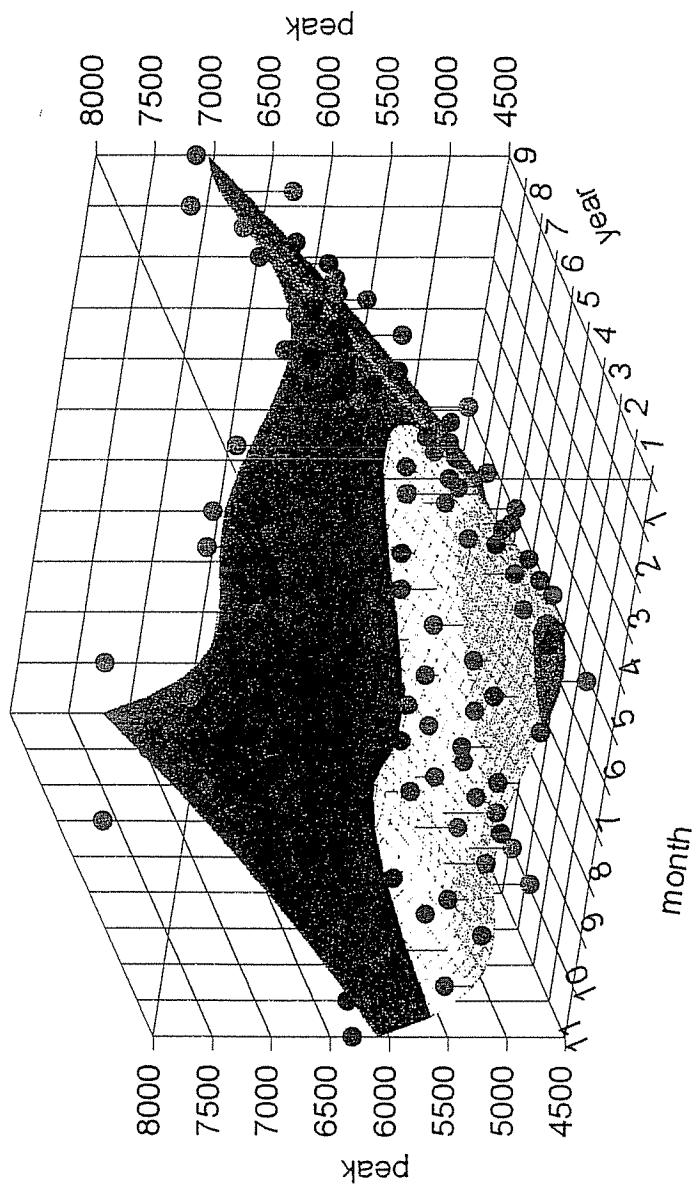


FIGURE 4-PacifiCorp Peak Load Patterns
Rank 42 Eqn 20 $z=a+bx+cx^2+dy+ey^2+f y^3+gy^4+hy^5$
 $r^2=0.75219803$ DF Adj $r^2=0.73433843$ FitStd Err=291.12113 Fstat=48.567687
 $a=5470.5535$ $b=67.032197$ $c=5.2695707$ $d=930.8397$
 $e=-691.16125$ $f=157.82523$ $g=-14.671989$ $h=0.4839885$



identical curve fit data, providing some support that the model results are robust statistically. We have included backup data on the Census X-11 runs in Appendix 2 as well.

Note that the monthly weighting factors with either method are all within plus or minus 9%. This small range of variation indicates that none of the months are unimportant to the pattern. The next question is whether this much variation is statistically significant.

The Appendix also shows plotted residual (difference between model and actual) data. A consistent pattern of error for the same month of the year in the same direction and of the same or growing magnitude would indicate that one month was less valid to the model than the other months. Such a pattern is not apparent. To verify that, we used the error autocorrelation function as shown in the Appendix to test if lagging the data for various numbers of months would show an autocorrelation function between a particular month and subsequent months. The twelve month lag showed no more autocorrelation than any other lag period. We conclude that there is no pattern of months that are less important to the model.

We then did some statistical analysis of the raw data to include the impacts of random variation on the possibility of contribution to peak load. Table 2 shows that analysis. Section I is the raw data from Table 1. Section II shows the mean, standard deviation and confidence intervals for the twelve months data within each year. If all the month's peaks fall within 2 standard deviations (2SD), then we are justified in concluding that there is no statistically significant difference between any of the months within the year.

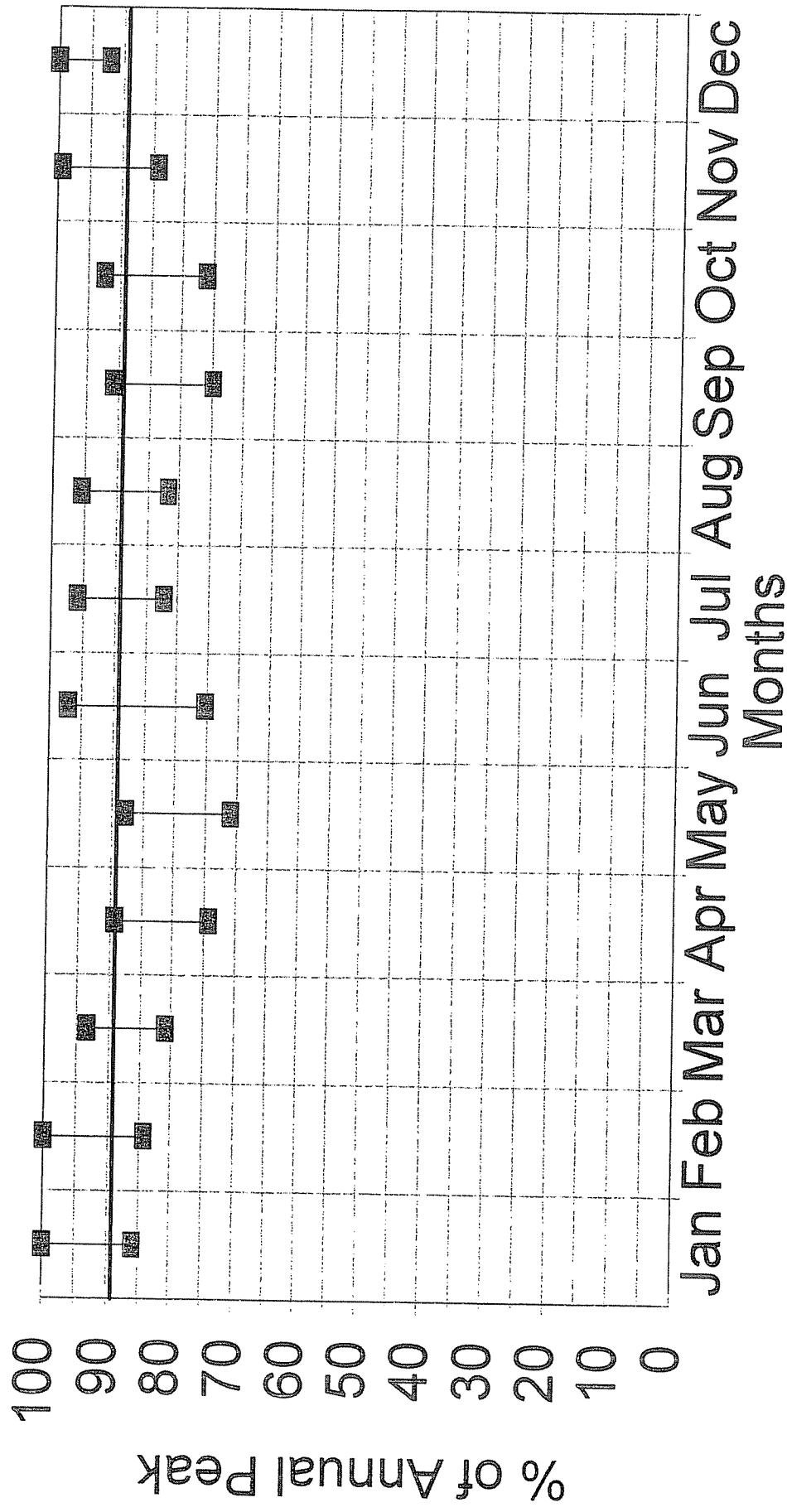
Statistical note: Similar events can have values that vary randomly, but if those events are truly similar, their values should fall within a reasonable range from the mean. Some 95.5% of the values should fall within $\pm 2\text{SD}$ of the mean. If a value falls outside of that range, we have reason to suspect that the data are not really similar. If we want to be really sure, we use a range of $\pm 3\text{SD}$, which includes 99.7% of the normal variation.

Of the 120 pieces of monthly data, all but 4 fall within 2 standard deviations, and three of those four are very close to 2 standard deviations. The remaining month, December 1990, was the month of extreme weather conditions called "the Arctic Express," and so that variation (as well as the following month, January 1991) could well be caused by extreme weather conditions.

More importantly, the four cases of variation that we have are all on the high side. We found no cases where the lower peak months (typically April, May, September, October) fell outside of 2 standard deviations. Once again we are forced to conclude that none of the month's peaks are statistically insignificant and therefore each might be important in causing capacity costs.

Section III of the table examines the data in the opposite direction. For example, we look at all the January's in the last ten years and look at their standard deviation. Again the only cases where the maximums and minimums of actual data fall outside of 2 standard deviations seem to be weather related. We believe an even more useful statistic is also included in Section III, where we look at the minimum and maximum value that has occurred for each month over the ten year period. We note that the maximum value for any of the four "off-peak" months has at times exceeded the lowest peak value for the peak months. For example, May has the lowest range of peak values in the table. However, the largest May peak of 5906 MW exceeds some actually

FIGURE 6- PACIFICORP PEAK LOAD RANGES
Mean Monthly Peak +/- 2 SD



experienced peaks in November, December, January and February, the usual peak months.

We have taken this analysis one more step--We have determined the mean monthly peak for each month and the statistical range of possible values assuming the possible values could be the mean \pm 2 standard deviations (SD). We have compared these monthly values in Figure 6. The heavy line indicates the maximum value of the lowest month, May. Note that this maximum possible value exceeds the minimum possible values of all the peak months except December. If we compare the mean monthly values \pm 3 SD, as shown in Figure 7, we note that the May maximum could exceed all the high load peak month's values. Remember that 3 SD includes 99.7% of the expected values of the variable.

This is one way of looking at the probability of contribution to peak load. From this analysis we must conclude that there is a reasonable possibility of contribution to peak for each of the months. Therefore, we must consider each month in allocating the costs of capacity added to meet those peak loads.

PacifiCorp has provided data looking at probability of contribution to peak in a different way. That data is shown in Table 3. Their probability of contribution to peak is defined as the number of hours each month that exceed 72% of the annual peak load. The 72% represents the available energy of all resources (less WSCC spinning reserve requirements) as a percent of the peak capability of those same resources. We have charted the ranges of the values in Figure 8. Once again this chart shows that the maximum of the low months can exceed the minimum of the high months, except for December. For the last six years, the annual peak has been in February, December, January, December, November, December (but July was only 6 MW less.) With each of the 12 months having a probability of at least 42% of contributing to the system peak, we can't conclude that any month is unimportant.

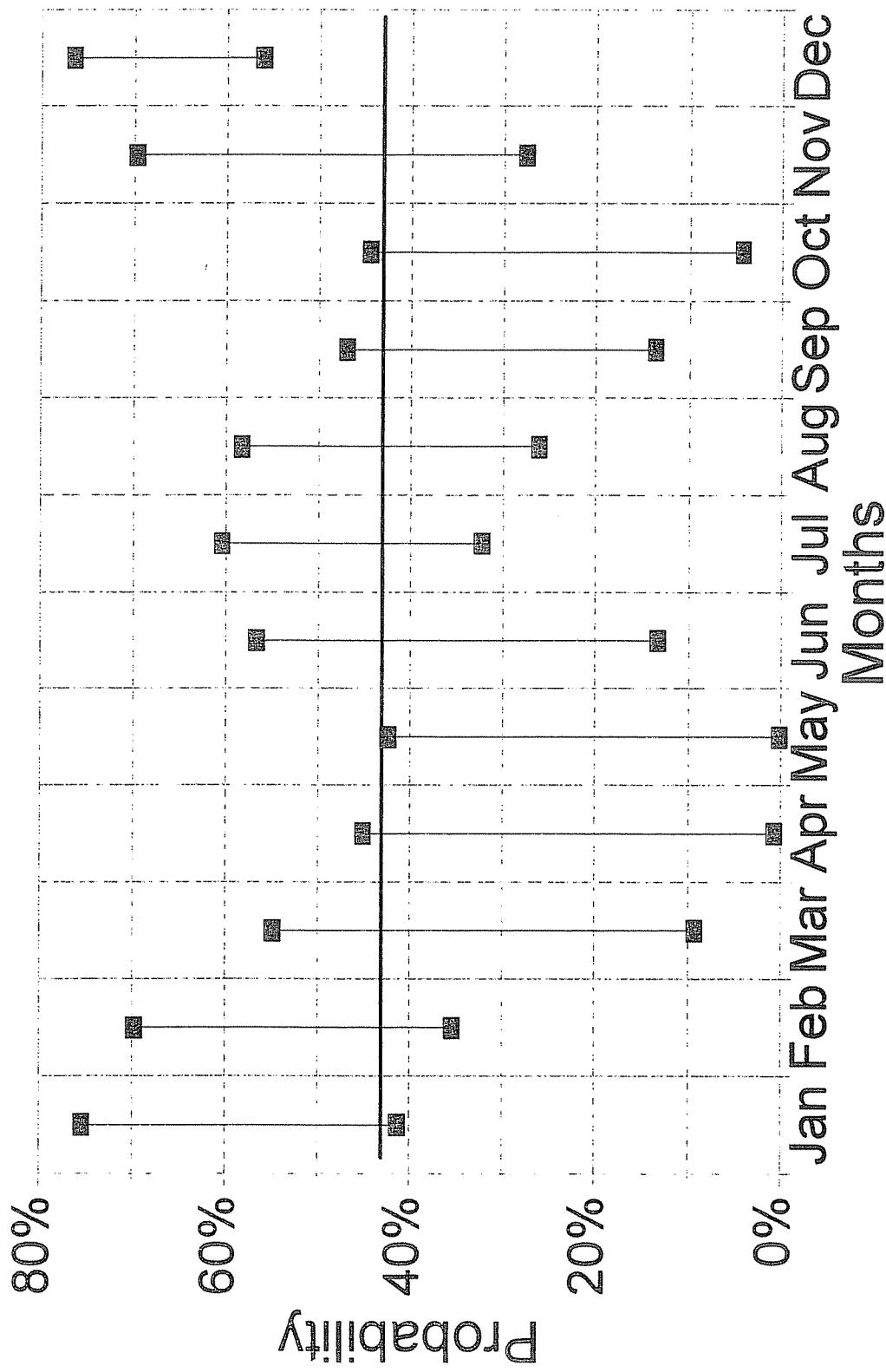
We emphasize once again that none of these studies takes into account the need of PacifiCorp to provide maintenance for generating units. With a peak load in excess of 7000 MW, the company can only spare about 10% of its generating units down for repair each Spring and Fall. This means that about 20% of the generating units can be down for major maintenance each year or about a five year cycle for major maintenance. This is a longer interval than is recommended for these units.

We also note here that when the concept of stress factors was first developed by Utah regulators many years ago, we looked at a number of factors, not just peak load and contribution to peak. However, PacifiCorp has stated that these two factors are the only ones that their planners use in planning capacity expansions for peak. Mr. Alt, the Chief Engineer for the Division of Public Utilities, has testified consistently that we should base our allocation factors on those factors that the utilities use to make real world decisions. We still believe that is the appropriate policy, so we have narrowed our examination to only those two factors. We don't believe that adding other factors would increase the accuracy of our determination.

AN ANALYSIS OF CAPACITY/ENERGY RATIOS IN CAPACITY ALLOCATION FACTORS

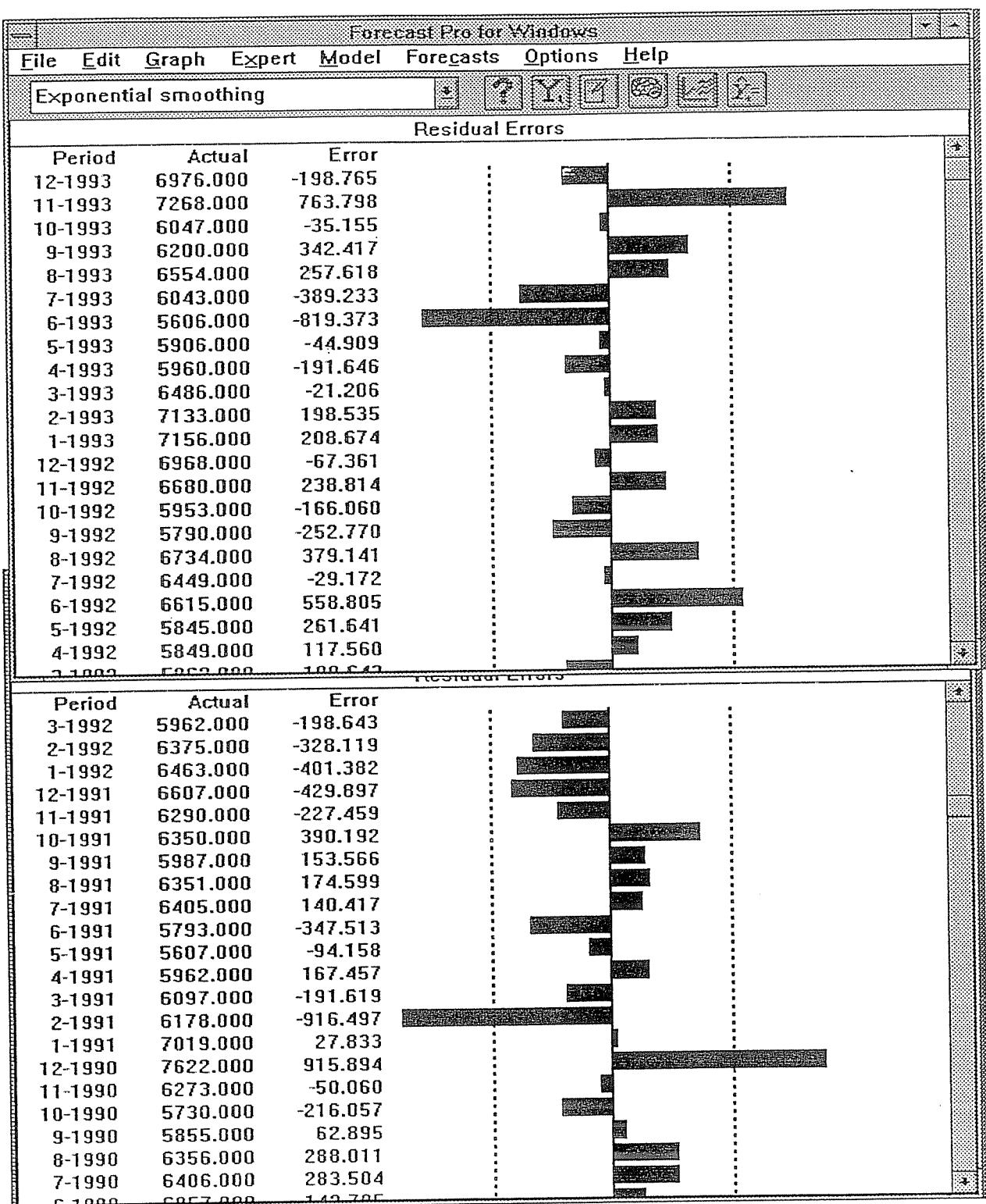
Operating experience, particularly with PacifiCorp, indicates that often capacity expansions are required to provide for the energy needs of the customers. To the degree that this

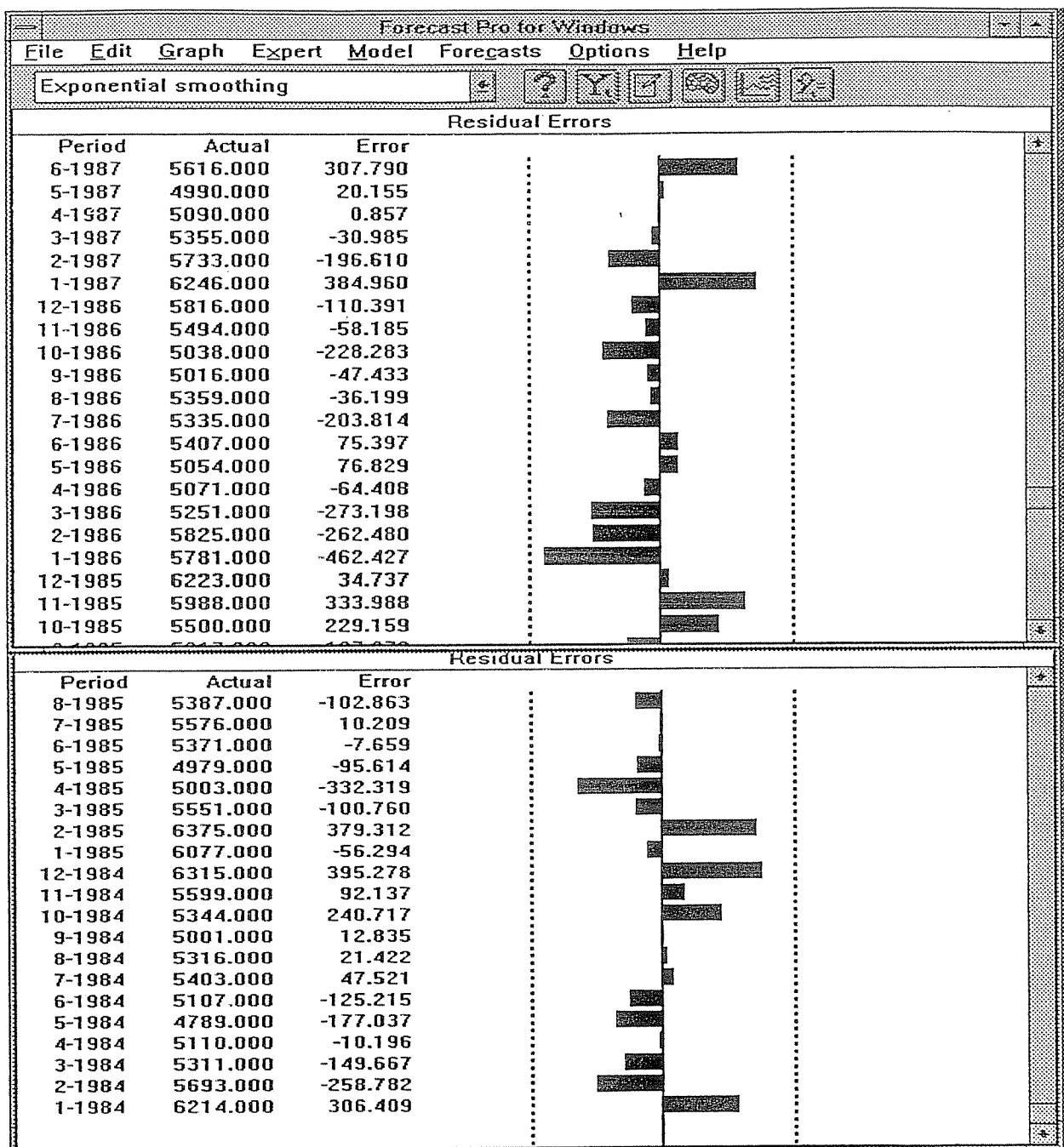
**Figure 8-Pacificorp Peak Loads
Probability of Contribution to Peak**



APPENDIX 1
COMPUTER MODEL OF PACIFICORP PEAK LOAD

APPENDIX 2
TIME SERIES MODEL OF
PACIFICORP PEAK LOAD DATA





Forecast Pro for Windows

File Edit Graph Expert Model Forecasts Options Help

Census X-11

Audit Trail

Forecast Pro for Windows Extended Edition Version 2.00
Wed Feb 08 13:03:27 1995

Forecast Model for PEAKLD6
Automatic model selection
Multiplicative Winters: Linear trend, Multiplicative seasonality
Confidence limits proportional to indexes and level

Component	Smoothing Weight	Final Value
Level	0.22595	6525.5
Trend	0.00786	8.7499
Seasonal	0.22281	1.0874

Seasonal Indexes

January - March	1.08718	1.07610	0.99642
April - June	0.93676	0.91513	0.96731
July - September	1.00820	1.01726	0.93938
October - December	0.95108	1.03828	1.08737

Standard Diagnostics

Sample size 120	Number of parameters 3
Mean 5882	Standard deviation 567.4
R-square 0.7871	Adjusted R-square 0.7834
Durbin-Watson 1.678	Ljung-Box(18)=25.77 P=0.8949
Forecast error 264	BIC 276.8
MAPE 0.03209	RMSE 260.7
MAD 193.5	

Forecast Model For PEAKLD6
Census X-11 Parts B, C and D multiplicative
23-term Henderson trend-cycle weights
Trading day adjustment: off

APPENDIX THREE
UTAH REVENUE REQUIREMENT SENSITIVITY
TO ALLOCATION FACTORS SHOWN

ACCORD ALLOCATION METHOD
112 CP 100% DEMAND

UNADJUSTED RESULTS OF OPERATIONS
METHOD: STEP 2-HYDROTRANS
YEAR ENDED DECEMBER 1993
FILED FINAL 06/28/94

ACCT	CONSENSUS FACTOR	CALIFORNIA	OREGON	WASHINGTON	IDAHO-EPL	MONTANA	WYOMING-PPUTAH	IDAHO-UPL	WYOMING-UPFERC	OTHER	STATE TOTAL	REPORT TOTAL	NON-UTIL DIFFERENTIAL		
175	Operating Revenues	65,799,769	779,333,766	211,575,571	16,506,324	43,266,556	313,942,785	862,549,738	104,054,861	105,001,150	3,849,090	0	2,505,881,531	0	
176	Operating Expenses:														
177	Production	19,476,909	294,458,364	77,777,105	4,752,434	16,500,299	149,690,544	347,746,895	28,434,901	50,252,040	2,076,359	0	992,176,649	992,176,649	
178	Transmission	1,143,648	5,156,118	351,153	1,007,895	7,860,937	21,705,978	2,966,649	2,857,372	130,969	0	61,644,505	61,644,505		
179	Customer Accounts	2,637,479	27,430,659	912,729	1,947,313	5,252,249	33,576,043	5,037,132	1,510,372	0	0	64,040,876	64,040,876		
180	Customer Service	1,621,269	19,515,618	4,690,294	474,173	1,090,162	4,671,803	18,807,904	2,874,036	967,395	0	0	17,374	17,374	
181	Sales	1,320,843	4,947,708	6,723,244	30,646	175,598	237,868	5,215,130	588,414	147,615	0	0	19,386,266	19,386,266	
182	Administrative & General	181,458	2,568,892	43,260,802	11,220,170	958,822	2,748,955	16,041,942	275,162	2,089,112	93,175	0	5,998,028	5,998,028	
183	Total O & M Expenses	30,147,133	410,373,753	111,901,368	7,515,363	23,752,704	183,953,771	460,867,748	49,942,086	61,107,069	2,392,663	0	1,361,155,277	1,361,155,277	
184	Depreciation	6,505,859	72,109,751	18,240,245	1,607,139	3,913,619	25,415,689	95,902,770	13,283,451	9,051,112	338,406	0	236,397,488	236,397,488	
185	Amortization Expenses	437,660	5,753,501	2,627,911	1,049,746	3,322,851	2,897,158	5,100,815	737,122	1,761,654	21,650	0	19,777,897	19,777,897	
186	Taxes Other Than Income	2,986,807	39,216,747	7,902,204	587,748	1,517,760	11,298,667	32,151,551	4,659,283	3,748,360	140,037	(1B)	104,122,156	104,122,156	
187	Income Taxes - Federal	442,427	42,404,896	12,983,338	1,505,256	2,170,961	46,565,897	40,061,938	3,846,308	71,581	(14,236)	0	116,033,535	116,033,535	
188	Income Taxes - State	590,330	5,699,945	1,767,935	165,955	2,667,961	1,752,723	3,654,991	470,750	8,761	(552)	0	14,256,560	14,256,560	
189	Income Taxes - Fed Net	2,228,009	16,339,885	4,780,207	1,117,500	1,117,500	7,957,914	32,352,766	4,781,726	3,440,303	138,411	0	73,544,654	73,542,650	
190	Investment Tax Credit Adjustment	0	0	0	0	0	0	0	0	0	(700,359)	(32,722)	0	(6,893,095)	2,003
191	Misc Revenue & Expenses	809	16,530	3,659	716	5,740	1,471,129	12,884	1,998	1,998	(189,241)	0	189,241	(0)	
192	Total Operating Expenses	47,635,533	592,105,054	158,915,727	11,243,063	33,084,073	247,677,559	664,625,867	76,245,997	82,727,713	3,078,713	(14,807)	1,918,529,712	1,918,527,709	
193	Operating Revenue for Return	18,164,256	187,228,712	5,169,844	5,263,061	10,184,283	66,064,226	197,19,851	27,804,964	22,273,437	770,377	14,807	507,351,819	507,353,822	
194												0	12,003	0	
200	Rate Base:														
201	Electric Plant in Service	246,077,218	2,813,331,885	744,694,379	60,407,955	161,092,877	1,073,566,747	3,366,915,200	497,454,860	377,080,438	14,697,900	0	9,365,291,456	9,365,291,456	
202	Plant Held for Future Use	113,616	1,730,328	457,444	31,079	68,946	728,302	2,522,456	345,241	2,049,308	3,206,313	0	6,317,790	6,317,790	
203	Misc Deferred Debits	1,232,568	18,783,722	6,170,800	357,714	1,341,393	11,631,119	17,915,272	2,704,312	126,352	0	63,738,522	63,738,522		
204	Electric Plant Acq Actif	17,361,91	21,957,152	8,112,916	532,732	1,525,46	15,641,354	20,902,360	2,883,433	0	81,823,149	81,823,149			
205	Nuclear Fuel	0	1	0	0	0	0	1	0	0	0	0	0	(0)	
206	Prepayments	20,289,441	3,072,113	214,036	610,969	4,792,983	9,644,553	1,355,541	1,437,432	48,802	0	42,207,980	42,207,980		
207	Fuel Stock	131,950	16,541,546	5,201,622	350,199	1,023,651	4,585,594	16,917,477	6,665,811	117,682	0	61,509,417	61,509,417		
208	Material & Supplies	2,807,794	35,248,598	8,643,086	74,465	2,147,344	15,55,886	43,655,297	6,344,726	5,436,736	227,979	0	122,812,677	122,812,677	
209	Working Capital	2,906,657	5,485,250	2,044,615	9,745,901	9,747,431	1,895,629	7,775,978	15,447,762	2,140,332	26,757	0	67,570,947	67,570,947	
210	Authorization Loans	944,090	13,891,995	3,805,856	1,266,459	9,167,726	16,838,383	4,451,986	3,865,947	158	0	67,325,069	67,325,069		
211	Miscellaneous Rate Base	0	0	0	0	0	0	0	642,980	28,248	0	31,372,460	31,372,460		
212	Total Electric Plant	259,901,901	3,025,759,663	790,786,112	64,764,643	17,1352,666	1,145,330,011	3,506,082,959	521,577,574	396,038,946	15,372,602	0	9,899,989,479	9,899,989,479	
213	Rate Base Deductions:														
214	Accum Prov For Dep	(69,343,866)	(81,193,366)	(228,290,067)	(17,0,065)	(48,913,660)	(331,233,404)	(987,356,087)	(108,699,555)	(154,008,886)	(4,366,993)	0	(2,782,162,884)	(2,782,162,884)	
215	Accum Prov For Amort	(14,410,671)	(47,631)	(37,777)	(4,357,395)	(9,66,182)	(9,97,6,444)	(17,719,208)	(2,986,640)	(1,981,237)	(58,734,073)	0	(58,734,073)	(58,734,073)	
216	Accum Del Income Taxes	(7,662,267)	(58,434,951)	(25,002,774)	(3,714)	(659,477)	(63,746,527)	(320,66,201)	(19,20,872)	(3,437,433)	(1,495,028)	0	(64,407,682)	(64,407,682)	
217	Unauthorized ITC	(2,224,047)	(35,560,751)	(1,182,730)	(1,14,773)	(32,749)	(1,81,570)	(68,186,155)	(18,186,155)	(1,186,155)	(1,679)	0	(53,251,138)	(53,251,138)	
218	Customer Adv for Const	(7,33,079)	(902,230)	(0)	(0)	(0)	(0)	(68,85,709)	(8,77,312)	(67,280)	(1,65,120)	0	(13,400,993)	(13,400,993)	
219	Customer Service Deposits	0	(408,236)	(6,606,056)	(1,847,151)	(351,220)	(2,648,943)	(1,81,4,372)	(2,55,722)	(38,424)	0	0	(2,946,766)	(2,946,766)	
220	Total Rate Base Deductions	(62,015,170)	(912,854,114)	(268,311,868)	(21,907,735)	(56,509,957)	(41,436,259)	(1,347,911,410)	(207,717,977)	(165,273,510)	(5,935,307)	0	(14,541,901)	(14,541,901)	
221	Total Rate Base	177,886,732	2,055,905,549	52,247,644	42,856,908	114,842,799	790,933,73	2,158,171,549	31,385,597	230,765,436	9,427,295	0	(3,562,843,377)	(3,569,485,366)	
222											0	6,337,126,132	6,330,474,114		
223	Return on Rate Base	10,21%	9,20%	9,89%	12,26%	8,87%	9,0-1%	10,441%	10,819%	9,17%	8,88%	8,17%	0,00%	9,28%	
224															
225	Return on Equity	13,426%	11,170%	12,706%	16,024%	10,441%	10,819%	11,114%	11,114%	10,424%	12,185%	8,894%	-9,266%	11,35%	
226	100 Basis Points in Equity, Revenue Requirement Impact	1,288,205	14,743,442	3,783,626	3,10,357	831,658	5,283,212	15,628,857	2,272,881	1,671,137	68,220	(23,826)	45,843,472		
227	Rate Base Decrease	(7,508,490)	(94,974,663)	(22,743,859)	(1,5,14,909)	(5,546,154)	(34,665,747)	(100,9,96,425)	(15,169,921)	(10,279,612)	(492,0,43)	3,240,404	(292,830,575)		

ACCORD ALLOCATION METHOD
8 CP 75% DEMAND 25% ENERGY

UNADJUSTED RESULTS OF OPERATIONS									
		STEP 2-HYDRO/TRANS							
		METHOD:		YEAR ENDED DECEMBER 1993					
		FILED FINAL						06/29/94	
175		WYOMING-PPUTAH						REPORT TOTAL	
176		IDAHO-UPL						2,505,881,531	
177		WYOMING-UPPERC						0	
178		STATE TOTAL						DIFFERENCE NON-UTIL	
179		105,612,292						(0)	
180		104,242,693						0	
181		3,843,077						0	
182		105,613,029						0	
183		313,132,703						0	
184		853,113,029						0	
185		3,202,349						0	
186		16,507,320						0	
187		212,393,293						0	
188		16,568,922						0	
189		777,772,477						0	
190		65,964,169						0	
191		CALIFORNIA OREGON WASHINGTON IDAHO-PPL MONTANA						0	
192		WYOMING-PPUTAH						0	
193		104,242,693						0	
194		3,843,077						0	
195		105,612,292						0	
196		104,242,693						0	
197		3,843,077						0	
198		105,612,292						0	
199		104,242,693						0	
200		3,843,077						0	
201		105,612,292						0	
202		104,242,693						0	
203		3,843,077						0	
204		105,612,292						0	
205		3,843,077						0	
206		105,612,292						0	
207		3,843,077						0	
208		105,612,292						0	
209		3,843,077						0	
210		105,612,292						0	
211		3,843,077						0	
212		105,612,292						0	
213		3,843,077						0	
214		105,612,292						0	
215		3,843,077						0	
216		105,612,292						0	
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260		3,843,077						0	
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262		3,843,077						0	
263		3,843,077						0	
264									