BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI
REBUTTAL TESTIMONY OF DR. RONALD E. WHITE
ON BEHALF OF AQUILA, INC.
D/B/A AQUILA NETWORKS–MPS AND AQUILA NETWORKS–L&P
CASE NOS. ER-2004–0034 and HR–2004–0024

Q. Would you please state your name and business address?

A. My name is Ronald E. White. My business address is 17595 S. Tamiami Trail, Suite 212, Fort Myers, Florida 33908.

Q. Are you the same Ronald E. White who filed direct testimony on behalf of Aquila Networks (“Aquila” or “Company”) in this proceeding before the Missouri Public Service Commission (“Commission”)?

A. Yes, I am.

PURPOSE OF TESTIMONY

Q. What is the purpose of your rebuttal testimony?

A. I was asked by Aquila to respond to the pre–filed direct testimony of Commission Staff (“Staff”) Witness Rosella L. Schad. In particular, I was asked to review and comment on adjustments advocated by Witness Schad to the depreciation rates recommended by Foster Associates for electric, industrial steam and common utility properties owned and operated by Aquila Networks—MPS and Aquila Networks—L&P. I will also comment on rates advocated by Staff for Aquila Corporate Assets shared with other business units, including MPS and L&P.

RESPONSE TO STAFF WITNESS SCHAD

Q. What is the difference in the annual depreciation rates and accruals requested by the Company and those advocated by Staff ?

A. Table 1 provides a summary of the difference in annual depreciation rates and accruals requested by the Company and those advocated by Staff. With the exception of Corporate Assets, this comparison is based on December 31, 2001 plant and reserves reported in the 2002 Depreciation Rate Studies.[1]

	Accrual Rate			2002 Annualized Accrual		
Business Unit	Company	Staff	Difference	Company	Staff	Difference
A	B	C	D=C–B	E	F	G=F–E
MPS						
Electric	3.41%	2.38%	-1.03%	$36,855,198	$25,662,385	$-11,192,813
Corporate	11.86%	9.42%	-2.44%	6,256,676	4,970,471	-1,286,205
Total MPS	3.81%	2.70%	-1.11%	$43,111,874	$30,632,856	$-12,479,018
L&P						
Electric	3.31%	2.68%	-0.63%	$11,261,577	$9,135,763	$-2,125,814
Steam	6.16%	2.46%	-3.70%	194,924	77,754	-117,170
Corporate	11.97%	9.37%	-2.60%	2,046,124	1,601,228	-444,896
Total L&P	3.75%	3.00%	-0.75%	$13,502,625	$10,814,745	$-2,687,880
Total	3.79%	2.78%	-1.01%	$56,614,499	$41,447,601	$-15,166,898

TABLE 1. COMPANY VS STAFF RATES AND ACCRUALS

It can be observed from Table 1 that Staff is advocating a composite depreciation rate reduction of 1.01 percentage points from that requested by the Company. The reduction in depreciation rates advocated by Staff reduces the Company’s requested 2002 annualized depreciation expense by $15,166,889, or more than 26 percent.

The currently prescribed composite accrual rate of 2.92 percent provides an annualized accrual of $43,663,996. The reduction in depreciation rates advocated by Staff reduces currently approved annualized depreciation expense by $2,216,395 ($43,663,996 – $41,447,601), or more than five percent.

Q. What is the difference in the annual depreciation rates and accruals requested by the Company and those advocated by Staff for MPS operations?

[1] The comparison for Corporate Assets is based on forecasted December 31, 2002 plant and reserves reported in the 2003 Depreciation Rate Study.

A. Table 2 provides a summary of the difference in annual depreciation rates and accruals requested by the Company and those advocated by Staff for MPS operations.

	Accrual Rate			2002 Annualized Accrual		
Function	Company	Staff	Difference	Company	Staff	Difference
A	B	C	D=C–B	E	F	G=F–E
Steam Production	4.28%	2.25%	-2.03%	$14,910,910	$7,847,909	$-7,063,001
Other Production	4.05%	3.10%	-0.95%	1,199,677	918,611	-281,066
Transmission	2.04%	1.84%	-0.20%	3,087,251	2,776,780	-310,471
Distribution	3.16%	2.37%	-0.79%	16,015,491	12,006,600	-4,008,891
General Plant	4.20%	4.43%	0.23%	1,059,085	1,116,973	57,888
Common Plant	3.06%	5.22%	2.16%	582,784	995,512	412,728
Corporate	11.86%	9.42%	-2.44%	6,256,676	4,970,471	-1,286,205
Total	3.81%	2.70%	-1.11%	$43,111,874	$30,632,856	$-12,479,018

TABLE 2. COMPANY VS STAFF RATES AND ACCRUALS – MPS OPERATIONS

It can be observed from Table 2 that Staff is advocating a composite depreciation rate reduction for MPS operations of 1.11 percentage points from that requested by the Company. The reduction in depreciation rates advocated by Staff reduces the Company's requested 2002 annualized depreciation expense by $12,479,018, or nearly 29 percent. The currently prescribed composite accrual rate of 2.71 percent provides an annualized accrual of $30,697,758. The reduction in depreciation rates advocated by Staff reduces currently approved annualized depreciation expense by $64,902 ($30,697,758 – $30,632,856), or approximately 0.20 percent.

Q. What is the difference in the annual depreciation rates and accruals requested by the Company and those advocated by Staff for L&P operations?

A. Table 3 provides a summary of the difference in annual depreciation rates and accruals requested by the Company and those advocated by Staff for L&P operations.

It can be observed from Table 3 that Staff is advocating a composite depreciation rate reduction for L&P operations of 0.75 percentage points from that requested by the Company. The reduction in depreciation rates advocated by Staff reduces the Company's requested 2002 annualized depreciation expense by $2,687,880, or nearly 20 percent. The currently prescribed composite accrual rate of 3.60 percent provides an annualized accrual of $12,966,238. The reduction in depreciation rates advocated by Staff reduces currently approved annualized depreciation expense by $2,151,493 ($12,966,238 – $10,814,745), or more than 16 percent.

	Accrual Rate			2002 Annualized Accrual		
Function	Company	Staff	Difference	Company	Staff	Difference
A	B	C	D=C–B	E	F	G=F–E
Steam Production	4.56%	2.34%	-2.22%	$6,069,973	$3,109,505	$-2,960,468
Other Production	1.37%	3.13%	1.76%	222,546	507,974	285,428
Transmission	1.59%	1.81%	0.22%	396,668	451,942	55,274
Distribution	2.72%	2.28%	-0.44%	3,716,828	3,114,354	-602,474
General Plant	2.26%	4.85%	2.59%	17,891	38,424	20,533
Common Plant	2.95%	6.73%	3.78%	837,671	1,913,564	1,075,893
Industrial Steam	6.16%	2.46%	-3.70%	194,924	77,754	-117,170
Corporate	11.97%	9.37%	-2.60%	2,046,124	1,601,228	-444,896
Total	3.75%	3.00%	-0.75%	$13,502,625	$10,814,745	$-2,687,880

TABLE 3. COMPANY VS STAFF RATES AND ACCRUALS – L&P OPERATIONS

Q. Why are the depreciation rates and accruals advocated by Staff significantly different from those requested by Aquila?

A. The differences in depreciation rates and accruals advocated by Staff and those requested by Aquila are largely attributable to:

a) The depreciation *procedure* used to develop accrual rates;
b) The depreciation *technique* used to develop accrual rates;
c) Modification of service life statistics; and
d) Elimination of net salvage accruals.

DEPRECIATION PROCEDURE

Q. What is a depreciation procedure?

A. As discussed in my direct testimony, a depreciation procedure identifies the level of grouping or sub–grouping of assets within a plant category. Both MPS and L&P are currently using a broad–group procedure which Staff retained. Depreciation rates requested by Aquila were developed using a vintage–group procedure.

The level of asset grouping identified in the broad–group procedure is the total plant in service from all vintages in an account. Each vintage is estimated to have the same average service life. The level of asset grouping identified in the vintage–group procedure is the plant in service from each vintage. Average service lives (or remaining lives) are estimated for each vintage and composite life statistics are computed for a plant account.

Q. Why did you recommend a vintage–group procedure for both MPS and L&P?

A. The matching and expense recognition principles of accounting provide that the cost of an asset (or group of assets) should be allocated to operations over an estimate of the economic life of the asset in proportion to the consumption of service potential. It is the opinion of Foster Associates that the objectives of depreciation accounting can be more nearly achieved using the vintage–group procedure (combined with the remaining–life technique). Unlike the broad–group procedure in which each vintage is estimated to have the same average service life, the vintage–group procedure distinguishes average service lives among vintages and provides cost apportionment over the estimated weighted-average remaining life or average life of a rate category.

Q. Has the vintage–group procedure been approved for Aquila in other jurisdictions?

A. Yes, it has. Foster Associates has conducted depreciation studies for Aquila in Minnesota, Michigan and Kansas. Each of these jurisdictions has approved depreciation rates derived from a vintage–group procedure. Depreciation rates are also being developed for Aquila in Colorado and Iowa using the vintage–group procedure. It is not unreasonable, therefore, to request that Missouri also approve depreciation rates derived from a vintage–group procedure to more nearly achieve the goals of depreciation accounting and to maintain consistency in the procedure used by Aquila in all jurisdictions.

Q. What is the difference in depreciation rates and accruals for MPS and L&P resulting from a use of the vintage–group procedure rather than the broad–group procedure?

A. Table 4 provides a comparison of depreciation rates and accruals using the vintage–group procedure, remaining–life technique and the broad–group procedure, remaining–life technique combined with the parameters and redistribution of reserves requested by Aquila.

	Accrual Rate			2002 Annualized Accrual		
Business Unit	VG	BG	Difference	VG	BG	Difference
A	B	C	D=C–B	E	F	G=F–E
MPS						
Electric	3.41%	3.41%	0.00%	$36,855,198	$36,865,997	$10,799
Corporate	11.86%	11.85%	-0.01%	6,256,676	6,253,148	-3,528
Total MPS	3.81%	3.81%	0.00%	$43,111,874	$43,119,145	$7,271
L&P						
Electric	3.31%	3.33%	0.02%	$11,261,577	$11,336,653	$75,076
Steam	6.16%	6.17%	0.01%	194,924	194,959	35
Corporate	11.97%	11.96%	-0.01%	2,046,124	2,044,281	-1,843
Total L&P	3.75%	3.77%	0.02%	$13,502,625	$13,575,893	$73,268
Total	3.79%	3.80%	0.01%	$56,614,499	$56,695,038	$80,539

TABLE 4. VINTAGE–GROUP VS BROAD–GROUP RATES AND ACCRUALS

It can be observed from Table 4 that marginally higher depreciation rates and accruals result from an application of the broad–group procedure. By comparison, depreciation accruals derived from an application of the parameters and whole–life technique advocated by Staff would be reduced by $196,385 ($41,447,601–$41,251,216) by adoption of the vintage–group procedure. Clearly, the procedure requested by Aquila and approved for the Company in other jurisdictions was not selected to maximize depreciation expense. It was selected to more nearly achieve the goals and objectives of depreciation accounting.

DEPRECIATION TECHNIQUE

Q. What is a depreciation technique?

A. As discussed in my direct testimony, a depreciation technique describes the life statistic used in the formulation of a depreciation rate. Both MPS and L&P are currently using a whole–life technique. Depreciation rates requested by Aquila were developed using a remaining–life technique. The whole–life technique was retained by Staff.

The principal distinction between a whole-life rate and a remaining-life rate is the treatment of depreciation reserve imbalances caused largely by imprecise estimates of service life statistics and net salvage rates. A reserve imbalance is measured as the difference between a theoretical or computed reserve and the corresponding recorded reserve for a rate category.

A remaining-life rate is equivalent to the sum of two components: a) a whole-life rate; and b) an amortization of any reserve imbalance over the composite weighted average remaining life of a rate category. Stated as an equation, a whole–life rate is given by

$$Accrual\ Rate = \frac{1.0 - Average\ Net\ Salvage\ Rate}{Average\ Life}.$$

The formulation of an account accrual rate using the remaining-life technique is given by

$$Accrual\ Rate = \frac{1.0 - Reserve\ Ratio - Future\ Net\ Salvage\ Rate}{Remaining\ Life}$$

which is equivalent to

$$Accrual\ Rate = \frac{1.0 - Average\ Net\ Savage\ Rate}{Average\ Life} + \frac{Computed\ Reserve - Recorded\ Reserve}{Remaining\ Life}$$

where both the computed reserve and the recorded reserve are expressed as ratios to the plant in service.

Q. Why did you recommend remaining–life depreciation rates for both MPS and L&P?

A. Unlike the currently prescribed whole-life rates in which reserve imbalances are addressed by the presence of compensating deviations in the estimated average service life of each vintage, the remaining-life technique provides a systematic amortization of these imbalances over the composite weighted average remaining life of a rate category. A permanent excess or deficiency will be created in the depreciation reserve by a continued application of the whole-life technique if service life deviations are not exactly offsetting. The likelihood of a permanent reserve imbalance is eliminated by an application of the remaining-life technique.

Q. Has the remaining–life technique been approved for Aquila in other jurisdictions?

A. Yes, it has. Foster Associates has conducted depreciation studies for Aquila in Minnesota, Michigan and Kansas. Each of these jurisdictions has approved remaining–life depreciation rates. Depreciation rates are also being developed for Aquila in Colorado and Iowa using the remaining–life technique. It is not unreasonable, therefore, to request that Missouri also approve remaining–life depreciation rates to more nearly achieve the goals of depreciation accounting and to maintain consistency in the technique used by Aquila in all jurisdictions.

Q. What is the difference in depreciation rates and accruals for MPS and L&P resulting from a use of the remaining–life technique rather than the whole–life technique?

A. Table 5 provides a comparison of depreciation rates and accruals using the vintage–group procedure, remaining–life technique and the vintage–group procedure, whole–life technique combined with the parameters and redistribution of reserves requested by Aquila.

	Accrual Rate			2002 Annualized Accrual		
Business Unit	R/L	W/L	Difference	R/L	W/L	Difference
A	B	C	D=C–B	E	F	G=F–E
MPS						
Electric	3.41%	3.59%	0.18%	$36,855,198	$38,784,074	$1,928,876
Corporate	11.86%	8.09%	-3.77%	6,256,676	4,270,881	-1,985,795
Total MPS	3.81%	3.80%	-0.01%	$43,111,874	$43,054,955	$-56,919
L&P						
Electric	3.31%	3.70%	0.39%	$11,261,577	$12,589,065	$1,327,488
Steam	6.16%	4.27%	-1.89%	194,924	135,145	-59,779
Corporate	11.97%	8.09%	-3.88%	2,046,124	1,382,613	-663,511
Total L&P	3.75%	3.91%	0.16%	$13,502,625	$14,106,823	$604,198
Total	3.79%	3.83%	0.04%	$56,614,499	$57,161,778	$547,279

TABLE 5. REMAINING–LIFE VS WHOLE–LIFE RATES AND ACCRUALS

It can be observed from Table 5 that marginally higher depreciation rates and accruals result from an application of the whole–life technique. By comparison, depreciation accruals derived from an application of the parameters and broad–group procedure advocated by Staff would be reduced by $5,699,051 ($41,447,601–$35,748,550) by adoption of the remaining–life technique. Clearly, the technique requested by Aquila and approved for the Company in other jurisdictions was not selected to maximize depreciation expense. It was selected to more nearly achieve the goals and objectives of depreciation accounting.

Q. Why is the difference between remaining–life accruals and whole–life accruals based on parameters advocated by Staff significantly larger than the difference obtained from parameters requested by Aquila?

A. Apart from a relatively small difference attributable to the broad–group procedure, the reserve imbalance derived from Staff parameters (*i.e.*, service life and net salvage statistics) is significantly larger than the imbalance derived from parameters estimated by Foster Associates. It can be observed from Table 6 that the reserve imbalance derived from Staff parameters is $227,135,660 compared with an imbalance of $45,313,716 derived from parameters requested by Aquila.

		Company		Staff	
Business Unit	Recorded	Computed	Imbalance	Computed	Imbalance
A	B	C	D=B–C	E	F=B–E
MPS					
Electric	$464,379,209	$427,919,935	$36,459,274	$295,974,496	$168,404,713
Corporate	2,051,206	14,280,435	-12,229,229	15,510,562	-13,459,356
Total MPS	$466,430,415	$442,200,370	$24,230,045	$311,485,058	$154,945,357
L&P					
Electric	$190,145,285	$164,429,414	$25,715,871	$113,693,154	$76,452,131
Steam	1,359,211	1,970,810	-611,599	1,207,167	152,044
Corporate	697,985	4,718,586	-4,020,601	5,111,857	-4,413,872
Total L&P	$192,202,481	$171,118,810	$21,083,671	$120,012,178	$72,190,303
Total	$658,632,896	$613,319,180	$45,313,716	$431,497,236	$227,135,660

TABLE 6. COMPANY VS STAFF RESERVE IMBALANCES

As noted earlier, the difference between a remaining–life accrual and a whole–life accrual is the amortization of a reserve imbalance. The amortization derived from Staff parameters would be $5,699,051 compared with an amortization of $547,279 derived from the parameters requested by Aquila. It is understandable, therefore, why Staff recommended that "… the net over–recovery not be reduced at this time."[2] The drastic reduction in depreciation expense advocated by Staff would be even further reduced by adoption of the remaining–life technique.

SERVICE LIFE STATISTICS

Q. What is the difference in depreciation rates and accruals for MPS and L&P resulting from the modification of service life statistics advocated by Staff?

A. Table 7 provides a comparison of depreciation rates and accruals using service life statistics (*i.e.*, projection life and projection curve) requested by Aquila and service life statistics advocated by Staff. The procedure, technique, net salvage rates and redistribution of reserves requested by Aquila were retained in the comparison to isolate differences solely attributable to the changes in service life statistics advocated by Staff.

[2] Schad Direct Testimony, Page 16, Lines 7–8.

	Accrual Rate			2002 Annualized Accrual		
Business Unit	Company	Staff	Difference	Company	Staff	Difference
A	B	C	D=C–B	E	F	G=F–E
MPS						
Electric	3.41%	2.53%	-0.88%	$36,855,198	$27,307,004	$-9,548,194
Corporate	11.86%	15.67%	3.81%	6,256,676	8,269,416	2,012,740
Total MPS	3.81%	3.14%	-0.67%	$43,111,874	$35,576,420	$-7,535,454
L&P						
Electric	3.31%	2.11%	-1.20%	$11,261,577	$7,183,005	$-4,078,572
Steam	6.16%	2.47%	-3.69%	194,924	78,262	-116,662
Corporate	11.97%	15.91%	3.94%	2,046,124	2,720,248	674,124
Total L&P	3.75%	2.77%	-0.98%	$13,502,625	$9,981,515	$-3,521,110
Total	3.79%	3.05%	-0.74%	$56,614,499	$45,557,935	$-11,056,564

TABLE 7. COMPANY VS STAFF SERVICE LIFE STATISTICS

It can be observed from Table 7 that service life statistics advocated by Staff produce a composite depreciation rate reduction of 0.74 percentage points from that requested by the Company. The reduction in depreciation rates reduces the Company's requested 2002 annualized depreciation expense by $11,056,564, or more than 19 percent.

1. STAFF DATA CONCERNS

Q. According to Witness Schad, Staff recommends that service life statistics advocated for the MPS Sibley production station should be applied to all L&P steam production facilities because of "… Staff's concerns with L&P Electric data."[3] What is your understanding of these data concerns?

A. According to Witness Schad, "… Staff's concerns with L&P Electric data are: 1) Placements of vintages prior to 1979, in the data file, are not recorded until 1979; and 2) There are no retirements, from those vintages, recorded until 1979. This results in some plant being almost 80 years with no retirements occurring."[4]

Q. Is this an accurate description of the L&P steam production database?

[3] Schad Direct Testimony, Page 9.
[4] Schad Direct Testimony, Page 9. Lines 7–10.

A. No, it is not. The L&P steam production database contains plant transactions (*i.e.*, additions, retirements, transfers and adjustments) recorded over the period 1979–2001. Vintage years recorded during this band of activity years are dated as early as 1951 for Lake Road and 1980 for Iatan. The first unit of the Lake Road plant was installed in 1951 and the Iatan plant was placed in service in 1980. The opening balance reported in 1979 (by vintage year of placement) for Lake Road is net of all retirements prior to 1979. It is incorrect to assert that no retirements were recorded prior to 1979. Moreover, it is unrealistic to expect that retirements would be recorded for the Iatan plant before it was placed in service. The database for L&P steam production facilities accurately reflects all activity with vintage–year identification recorded over the period 1979–2001. Contrary to the opinion of Staff, the database contains no "data gaps".

Q. What is your understanding of the "data gaps" claimed by Staff for L&P other production, transmission, distribution and general plant accounts?

A. According to Witness Schad, Staff has the same data concerns as claimed for the L&P steam production accounts.

Q. Do you agree with these concerns?

A. No, I do not. The L&P database for other production, transmission, distribution and general plant accounts contains all plant transactions recorded over the period 1979–2001. Vintage years recorded during this band of activity years are dated as early as 1900, depending upon the inception date of an account. The opening balances reported in 1979 (by vintage year of placement) for accounts classified in these functions are net of all retirements prior to 1979. Contrary to the opinion of Staff, the number of activity years included in the database provides sufficient retirement experience to conduct a statistical analysis of most L&P plant accounts. It is neither necessary nor appropriate to apply MPS parameters to the L&P accounts.

2. LIFE–SPAN CATEGORIES

Q. What is a life–span category?

A. Life–span categories are plant categories composed of major items of plant that will most likely be retired as a single unit. A power production unit, for example, is a life–span category in which all associated plant and equipment will eventually be retired at the same date, regardless of the age of the equipment.

Plant retirements from an integrated system prior to the retirement of the entire system are properly viewed as interim retirements that will be replaced in order to maintain the integrity of the facility. Additionally, plant and equipment may be added to the existing system (*i.e.*, interim additions) in order to expand or enhance its productive capacity without extending the service life of the present system. A proper depreciation rate can be developed for an integrated system using a life–span method.

Q. What is a life–span method?

A. The life-span method requires the estimation of a coterminous retirement date for all plant additions to a specific facility. A composite depreciation rate is calculated for the facility using the technique of harmonic weighting of the expected life span of each vintage addition. The resulting accrual rate must be adjusted for interim retirements to the extent that such retirements can be reasonably predicted. Absent this adjustment, the depreciation accumulated over the life–span of the facility will be deficient by an amount equal to a portion of the interim retirements. Properly implemented, the life-span method does not include plant additions or replacements of interim retirements until such activity is reported. All plant accounts classified in the steam, industrial steam and other production functions were identified by location and treated as life-span categories in both the MPS and L&P depreciation studies.

Q. How did Staff estimate service lives for plant classified in the production functions?

A. Staff treated production functions as open–ended plant categories in which additions and retirements are envisioned to be recorded in perpetuity. Service lives for production plant were estimated in the same manner as, for example, poles or line transformers in which life indications were derived from a statistical analysis of recorded retirements. The same average service life was assigned to each vintage of a plant account. No consideration was given to the expectation that each vintage will be retired at a coterminous date, irrespective of age, and therefore will exhibit a unique average service life.

Q. How do the service lives requested by Aquila for production plant compare with those advocated by Staff?

A. Table 8 provides a comparison of composite average and remaining services lives requested by Aquila using the vintage–group procedure with those advocated by Staff using the broad–group procedure.

	Company			Staff	
Plant	AYFR	ASL	R/L	ASL	R/L
A	B	C	D	E	F
MPS					
Jeffery	2020–2024	36.53	19.97	44.38	29.44
Sibley	2012–2015	23.04	12.45	44.42	31.78
Other Production	2010–2024	21.15	15.57	32.21	25.58
L&P					
Lake Road	2012	20.95	10.39	42.07	26.91
Iatan	2015	31.73	13.29	43.68	26.57
Industrial Steam	2012	25.08	10.23	40.67	24.15
Other Production	2017	29.89	14.81	31.93	18.41

Table 8. Company vs Staff Production Plant Statistics

The procedure, net salvage treatment and rebalancing of reserves adopted by Aquila and Staff were retained in the comparison to properly derive the weighted statistics used in developing depreciation rates. It can be observed from Table 8 that service life statistics advocated by Staff are considerably longer than those obtained from a life–span treatment in which a year of final retirement was estimated for each generating unit.

Q. How was the year of final retirement estimated for each station?

A. A year of final retirement was estimated by Aquila for each unit at each generating station. The estimated retirement dates for each unit were composited by Foster Associates to obtain an estimated average year of final retirement (AYFR) for each station by plant account.

Q. Did Staff explain why a life–span treatment was not applied to production facilities?

A. No, they did not. No explanation was offered for abandoning the life–span treatment employed by both Company and Staff in a recent Missouri Public Service Case No. ER–97–394. Apparently Staff is now of the opinion that a life–span treatment is no longer appropriate for production facilities. It is disconcerting that Staff is abandoning a life–span treatment for no apparent reason other than to reduce depreciation expense.

3. Full–Mortality Categories

Q. What is a full–mortality category?

A. Full–mortality categories are plant categories in which additions, retirements and replacements are anticipated to continue with no foreseeable date at which all plant will be retired irrespective of age. A pole–line account, for example, is a full mortality category in which poles will most likely be added, retired and replaced indefinitely.

Q. How are service lives estimated for a full–mortality category?

A. Statistical methods of life analysis combined with engineering judgment are used to examine and describe the forces of retirement acting upon a full–mortality category. The descriptors most often used are survival functions expressed as probability distributions. The objective of a life analysis is to quantify the attributes of the parent population from which observed retirements were extracted as a random sample. Life indications obtained from an analysis of observed retirement activity must be tempered with informed judgment to the extent that future forces of retirement or failure rates are anticipated to be different from those observed in the past. The tempering of observed life indications is called *life estimation*. A variety of statistical techniques have been developed for estimating service lives of physical property, some of which are more robust than others.

Q. How would you describe the life analysis technique used by Staff?

A. It is a mechanized version of a visual curve–fitting technique employed long before the advent of computers. Prior to the availability of mechanized systems, a series of survivor proportions obtained from an observed life table was typically plotted on graph paper and overlaid with correspondingly scaled graphs of survivor curves such as the Iowa–type curves. The type–curves were drawn with various average service lives such that both the dispersion and average service life of the observed proportion surviving could be selected from a visual inspection of which curve appeared to best "fit" the data.

A mechanized version of the same technique merely replaces the visual inspection with a fit criterion, such as a minimum sum of squared differences between the observed proportion surviving and the theoretical proportion surviving obtained from a table of the points displayed in a graphical representation of a type–curve. The type–curves used in such an analysis can be scaled to any average service life, thereby providing a description of both the dispersion and average service life of the fitted data.

Q. How do the life analysis techniques used by Foster Associates in conducting depreciation studies for Aquila differ from those used by Staff?

A. Based upon extensive independent research and development of life analysis techniques, Foster Associates uses a multi–step procedure in which various estimators of the observed hazard rates (*i.e.*, conditional probabilities of retirement) obtained from an observed life table are first graduated without regard to the observed proportion surviving. A survivorship function is then derived from a transformation of a parametric form of the hazard function and numerically integrated to obtain an estimate of the expected or mean service life of the population from which the retirements displayed in the observed life table are viewed as a random sample. The transformed survivorship function is then fitted by a weighted least-squares procedure to type–curves (*e.g.*, Iowa) to obtain a mathematical description or classification of the dispersion characteristics of the data.

Q. Will the life analysis technique used by Foster Associates produce the same dispersion and service–life indications as the technique used by Staff?

A. Not necessarily. The techniques used by Foster Associates were designed to overcome a serious limitation in the technique used by Staff. Each successive measurement of the proportion surviving developed in an observed life table is dependent upon the proportion surviving in prior age–intervals. One or more anomalous retirements, therefore, will dictate the proportion surviving in subsequent age–intervals. Fitting a survivor curve to the observed proportion surviving will seldom produce an accurate description of the underlying forces of mortality.

The techniques used by Foster Associates maximize the informational content of the data and minimize the influence of extraneous events by extracting the underlying forces of mortality from an analysis of the hazard rates.[5] This is not to suggest that an analyst must be highly trained in actuarial statistics to conduct a depreciation study. Absent this knowledge, however, life analysis becomes an exercise in curve–fitting rather than an attempt to quantify the attributes of the parent population from which observed retirements were extracted as a sample. It is not surprising therefore that Witness Schad would find different curve fits and service lives than Foster Associates identified from a more rigorous analysis of the underlying forces of mortality.

NET SALVAGE ACCRUALS

Q. What is the difference in depreciation rates and accruals for MPS and L&P resulting from the elimination of net salvage rates advocated by Staff?

A. Table 9 provides a comparison of depreciation rates and accruals using net salvage rates requested by Aquila and the elimination of net salvage advocated by Staff.

	Accrual Rate			2002 Annualized Accrual		
Business Unit	With NS	W/O NS	Difference	With NS	W/O NS	Difference
A	B	C	D=C–B	E	F	G=F–E
MPS						
Electric	3.41%	2.52%	-0.89%	$36,855,198	$27,250,947	$-9,604,251
Corporate	11.86%	11.84%	-0.02%	6,256,676	6,250,191	-6,485
Total MPS	3.81%	2.96%	-0.85%	$43,111,874	$33,501,138	$-9,610,736
L&P						
Electric	3.31%	2.44%	-0.87%	$11,261,577	$8,307,070	$-2,954,507
Steam	6.16%	5.57%	-0.59%	194,924	176,215	-18,709
Corporate	11.97%	11.95%	-0.02%	2,046,124	2,043,388	-2,736
Total L&P	3.75%	2.92%	-0.83%	$13,502,625	$10,526,673	$-2,975,952
Total	3.79%	2.95%	-0.84%	$56,614,499	$44,027,811	$-12,586,688

TABLE 9. COMPANY VS STAFF NET SALVAGE RATES

[5] Although some correlation can be found in the conditional proportion retired, the covariance between the hazard rates in two age–intervals is asymptotically zero. This property has permitted the development of various methods of weighting that reflect serial independence of the disturbance term.

The procedure, technique and service life statistics requested by Aquila were retained in the comparison to isolate differences solely attributable to the elimination of net salvage rates advocated by Staff. It can be observed from Table 9 that the elimination of net salvage advocated by Staff produce a composite depreciation rate reduction of 0.84 percentage points from that requested by the Company. This reduction in depreciation rates reduces the Company's requested 2002 annualized depreciation expense by $12,586,688, or more than 22 percent.

Q. What is your understanding of the treatment of net salvage advocated by Staff?

A. It is my understanding that Staff is advocating a disallowance of an accrual for net salvage as a component of depreciation rates. The treatment advocated by Staff is a cost of service allowance equal to an average of the annual net salvage realized over the most recent five years. This treatment is equivalent to a current period recognition of net salvage with a revenue allowance intended to approximate net salvage associated with current retirements.

Q. What is the theoretical basis for including net salvage in depreciation rates?

A. Depreciation is a measurement of the service potential of an asset that is consumed during an accounting interval. The cost of obtaining a bundle of service units (*i.e.*, a future net revenue stream) is represented by an initial capital expenditure which creates a revenue requirement for return and depreciation, and a future expenditure which creates a revenue requirement for cost of removal reduced by salvage proceeds. The matching principle of accounting provides that both the initial and future expenditures should be allocated to the accounting periods in which the service potential of an asset is consumed. The standard or criterion that should be used to determine a proper net salvage rate is, therefore, cost allocation over economic life in proportion to the consumption of service potential. If some other standard (such as cash flow or revenue requirements) is considered more important in setting depreciation rates, then cost allocation theory must be abandoned as the foundation for depreciation accounting.

The need to include cost of removal in the development of depreciation rates is widely recognized and accepted by a substantial majority of state regulatory commissions as a standard ratemaking principle. The FERC Uniform System of Accounts, for example, describes depreciation as the "… loss in service value" where service value is defined as "… the difference between original cost and net salvage value of electric plant." Net salvage value means "the salvage value of property retired less the cost of removal."

The economic principle underlying both the accounting and ratemaking treatment of cost of removal is that in addition to return *of* and return *on* invested capital and taxes, a revenue requirement for cost of removal (or a reduction in the revenue requirement attributable to gross salvage) is created when an asset is placed in service. It is appropriate, therefore, to include a net salvage component in depreciation rates to more nearly achieve the goals of depreciation accounting and to equitably distribute the revenue requirement for net salvage over the period in which the assets that created the requirement are used to provide utility service.

Q. What is your understanding of the evolution of the treatment of net salvage advocated by Staff in this proceeding?

A. To my knowledge, the earliest attempt by Staff to deliberately reduce depreciation expense by adjusting net salvage rates was introduced with a novel formulation of a whole-life depreciation rate designed to provide an allowance for net salvage equal to the average *realized* net salvage observed over a recent band of years.[6] The adjustment advocated by Staff was derived by replacing the average net salvage rate in a whole–life formulation of the accrual rate by the product of a realized net salvage rate and the ratio of the average service life to a quotient obtained by dividing the plant balance by average annual retirements.

It can be easily demonstrated that this formulation of the accrual rate is equivalent to a two–part rate in which the first term is the reciprocal of the estimated average service life and the second term is the ratio of average net salvage realized during a specified band of years and the balance recorded in a plant account. The application of this adjusted rate to a plant account yields the sum of a whole–life accrual without net salvage and a net salvage allowance equal the average net salvage realized over the selected band of years.

Although this formulation of an allowance for net salvage advocated by Staff was significantly less than the average of realized and future net salvage, it is important to note that the allowance was treated as a component of depreciation expense and posted to the depreciation reserve.

While the "net salvage allowance" advocated by Staff did not provide cost allocation of net salvage over the service lives of the assets that created a salvage or cost of removal requirement, the reserve treatment minimally provided an opportunity for eventual recovery of the capital costs incurred to remove earlier retirements. Preservation of the opportunity for capital recovery was subsequently viewed by Staff as an obligation that ratepayers should not be required to assume.

[6] Direct Testimony of Paul W. Adam in Laclede Gas Company Case No. GR–98–324.

It was apparently realized that ratepayers could be relieved of the obligation for full capital recovery by removing net salvage from the depreciation rate and granting the corresponding amount as a cost of service allowance. This modified treatment of net salvage was advanced by Staff in recent rate applications and is again advocated by Staff in this proceeding.

Q. What is your assessment of the cost of service treatment of net salvage now advocated by Staff?

In my opinion, it is both wrong in theory and inequitable in its application. As noted earlier, the theory of including a net salvage allowance in depreciation rates is predicated on the proposition that, in addition to return *of* and return *on* invested capital and taxes, a revenue requirement for cost of removal (or a reduction in the revenue requirement attributable to gross salvage) is created when an asset is placed in service. It is appropriate, therefore, to include net salvage as a component of a depreciation rate to equitably distribute the revenue requirement for net salvage over the period in which the assets that created the requirement are used to provide utility service. This objective will not be achieved if the net salvage rate included in a whole–life depreciation rate produces less than the average of both realized and future net salvage requirements.

The treatment of net salvage as a cost of service allowance is inequitable to the extent that realized cost of removal in excess of the cost allowance is non–recoverable. The opportunity for capital recovery, albeit untimely, was preserved when the allowance and realized amounts were posted to the depreciation reserve.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.