"The History of the Operating Ratio"

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THE HISTORY OF THE OPERATING RATIO

by Edward J. Nikula

The Commission has used the operating ratio method to regulate garbage companies (you are now called solid waste companies) since I came to the Commission almost 25 years ago. What is the history of the operating ratio, the purpose of the operating ratio and what does it mean?

First, looking at the history of the operating ratio one will find that the Commission has used different operating ratio percentages for different industries. The Commission used an operating ratio of 93-94 percent for all of the transportation industries when I first came to the Commission in 1967. In 1969 a study was conducted on the use of the 93-94 percent operating ratio for selected transportation companies. Based on hearings related to those studies, the 93-94 percent operating ratio was changed for the general freight carriers, the bulk commodity carriers and the local cartage/short line carriers. The result was that for companies with low investments, the Commission started to use a higher operating ratio than for companies with higher investments. After the hearings were completed in the various cases and based on the Commission orders the staff started to use an operating ratio range of 91 percent for the long haul general freight carriers such as Consolidated Freightways and 95 percent for carriers operating in local cartage within the City of Seattle.

You may notice, investment impacted the operating ratios that the Commission used, much the same as the existing Lurito/Gallagher formula does today for the solid waste companies. The studies were done for the Commission in 1969 by David Kosh. Dick Lurito, an employee of David Kosh, was involved in the development of the Lurito/Gallagher formula for the solid waste industry. This should give you a brief history of the operating ratio and how the use of the operating ratio over time has changed for several of the industries that the Commission regulates.

Now that you know some history of the operating ratio, I will try to explain what the purpose of the operating ratio is and what it means.

First, the purpose of the operating ratio is to allow you to recover your allowed operating expenses,to recover your federal income taxes, interest expense and still give you a return on your equity investment. At this point most of you are thinking: "THE OPERATING RATIO IS BEFORE FEDERAL INCOME TAXES AND INTEREST EXPENSE." I would agree with you that the

operating ratio is calculated before federal income taxes and interest expense. However, I would not agree with you that the use of the operating ratio does not consider federal income taxes and interest expense. In Docket Nos. TG-900657 and TG-900658 the Commission is revisiting the Lurito/Gallagher formula. While the order is not out yet, I will give an example using the new formula to show how the staff would propose to regulate the solid waste industry in the future "if" the Commission adopts the new formula.

I have prepared a handout with four scenarios to show how the new formula would work. Starting with the first page of the handout, I have marked certain items with an asterisk and certain items with different colors. The items with asterisks are the inputs for the new curve. In about the middle of the page the first asterisk is for expenses. I have also marked the asterisk in blue to help you find the correct line. These expenses would be the pro forma present operating expenses based on the pro forma income statement. Next, average investment is shown with an asterisk and is also in blue. This amount could be made up of three items. First, your net operating property for the beginning of the test period and end of the test period would be added together and then divided by 2 to arrive at a beginning and an end of year average. If you have the ability to show monthly balances one could do the calculation based on monthly averages. The second item for the net investment calculation would be the addition of investor working capital. Because of advanced billing and lags in when you incur your operating expenses and when you pay your expenses, most solid waste companies do not have an investor supplied working capital requirement. The final item is deferred federal income taxes. As most of you know, for rate making purposes, we use straight line depreciation with salvage values. However, for federal income tax purposes, you are able to use ACRS lives and no salvage values. The difference between book and tax depreciation results in deferred taxes. For rate making purposes this Commission has determined that it is proper to deduct the end of period deferred taxes from net investment. The Uniform System of Accounts requires that deferred taxes be shown in account 2400.

The next step in the new curve is to enter the conversion factor data for revenue sensitive items. The conversion factor data is shown in the lower right hand portion of the page. Again there are asterisks and I have marked the items in blue. For this example I have only shown B & O Tax (Excise Tax) and the WUTC regulatory fee. However, some of you may have city taxes or a bad debt percentage that would need to be included in the conversion factor.

Those of you that are familiar with the old curve realize that this is all the information that you would enter into the old curve. The proposed new curve utilizes additional inputs. In the middle of the page and circled in red you will see an average capital structure. This is the capital structure that was used in the old formula. However, because of concerns from the industry, the

staff proposed that the curve be updated in Docket Nos. TG-900657 and TG-900658. We now propose to include the company's actual capital structure and cost of debt. Again this section is marked with asterisks and is shown in the lower left hand corner of the page. I have also circled this section in yellow. You will note that you need to supply additional data. First you will have to supply the actual debt and equity structure of your company. Next, you will have to determine your weighted cost of debt. Also, if your company stock is publicly traded you would add a 25 basis points adjustment for the marketability of your stock. There is a separate lotus program for a publicly traded company and a for non-publicly traded company, these disks are made available upon request. Most of the companies are non-publicly traded. Finally, you need to enter your actual federal income tax rate. For rate making purposes, staff has proposed using corporate rates with the following exception. If the company is a corporation, the maximum rate that we use is 34 percent (there is a surcharge on taxable income between $100,000 and $335,000). If the company is a sole proprietor, a partnership or an "S" corporation, the maximum rate staff uses is 28 percent (again there is a surcharge to consider).

The above items are the inputs that you need to enter into the new Lurito/Gallagher formula in order to solve the equation. Therefore, your company's revenue requirement is based on YOUR COMPANY'S pro forma operating results, average investment, capital structure and cost of debt.

The formula that is in the curve does the actual determination of your company's revenue requirement. As the curve uses a Lotus spread sheet you will need to do the following to solve the equation. First, you need to enter the pro forma operating results, average investment, the capital structure, the cost of debt and the federal income tax rate and conversion factor into the appropriate places in the formula. Next, you will also need to put your pro forma revenue on the fourth line from the bottom of the page. The reason you need your pro forma revenue on this line is that the formula will determine your new revenue requirement and because of revenue sensitive items (conversion factor) you will need to determine your additional pro forma operating expenses. At this point in the determination of your pro forma revenue requirement you now have all of the inputs necessary to start to determine your revenue requirement.

The next step in determining your pro forma revenue requirement requires you to solve the formula. First, you would push the F9 key to recalculate the spread sheet. If increased dollars or increased taxes are shown on the last two lines (circled in green) you would do the following: First, you would need to change the pro forma revenue line to the same revenue that is shown on the new curve revenue line. Next, you would need to go to the expense line half way up the spread sheet and press the F2 key and add the increased taxes from the last line. You would then push the F9 key again and if increased dollars or increased taxes are again shown, you would need to

repeat the same steps again until the increased dollars and the increased taxes are $0 as I show on this page. If the increased taxes are shown with brackets than you would subtract these dollars rather than add them to the expenses. Turning now to the top of the page, you will note operating revenues and operating expenses. When you divide the operating expenses by the operating revenues you will note on line eight (in pink) that the operating ratio is 93.44 percent. You will also note on line three that the 93.44 percent operating ratio results in a net operating income of $162,981. This $162,981 is now available to cover your interest expense and your federal income taxes. Based on this example there is a net income of $95,687 left after paying both of these items. Therefore, you can see that the use of the operating ratio does cover interest and federal income taxes even though the operating ratio is expressed before these two items.

Turning to page 2 of the handout, I have changed one of the inputs. That is, I have changed the interest expense to 10 percent. You will note that the interest expense on the fourth line is now shown as $20,000. Therefore, by increasing the rate of interest the new curve will cover your additional interest expense of $2,000 ($18,000 in the first example and $20,000 in this example).

The third page shows that by changing your debt and equity percentages, your operating revenues will also change. As your debt percentage becomes higher and higher your net income would become smaller and smaller. In Docket Nos. TG-900657 and TG-900658 the staff witness recommended that an equity ratio for rate making purposes should not exceed 60 percent. However, no minimum on the debt percentage was recommended. Therefore, your company could have 100 percent debt financing and there would be no requirement for any net income.

The last page of the handout shows what happens if a company needs to increase its investment. In this example, I have increased the investment from $500,000 to $2,000,000. Because of this, if the capital structure and the cost of debt remained unchanged the operating ratio would be lowered to 85.09 percent. You will also note that the net operating income would increase approximately $245,000 (page 1 shows $162,981 and page 4 shows $407,949) to cover your increased interest expense, federal income taxes and net income.

I know that this topic about the operating ratio and the new Lurito/Gallagher curve is very complex. Therefore, because of this I am now open for questions or if you need time to talk to your accountant please feel free to call me at (206) 586-6589.

OPERATING REVENUES	2,485,031
OPERATING EXPENSES	2,322,050
NET OPERATING INCOME	162,981
INTEREST EXPENSE	18,000
FEDERAL INCOME TAXES	49,294
NET INCOME	95,687
NET INVESTMENT	500,000
OPERATING RATIO	93.44%
RETURN ON INVESTMENT	22.74%
RETURN ON EQUITY	31.90%

NEW IMPROVED LURITO - GALLAGHER FORMULA

Revenue	$2,485,031	(calculated)
* Expenses -	$2,322,050	*
* Avg. Investment -	$500,000	*
curve turnover	580.51	(calculated)
final turnover	497.01	(calculated)
curve No. used	4	(calculated)

Avg. Capital structure	
Debt Ratio	56.20%
Pfd. Ratio	9.40%
Equity Ratio	34.40%
Cost of Debt	6.38%
Cost of Pfd.	6.59%

Company actual capital structure	
* Actual Debt Ratio	40%
* Actual Equity Ratio	60%
* Actual Cost of Debt	9%
* 25 basis pts. adj?	0%
* Tax Rate	34%

OPERATING RATIO - 93.44 !!!

Conversion factor data	
B & O Tax	0.015 *
WUTC Fee	0.008 *
City Tax	*
Bad Debts	*
Total Revenue Sensitive ~~Conversion Factor~~	0.023
Conversion Factor	91.14
Pro forma Revenue	2,485,031
New Curve Revenue	2,485,031
Increased Dollars	0
Increased Taxes	0

OPERATING REVENUES	2,487,131
OPERATING EXPENSES	2,322,100
NET OPERATING INCOME	165,031
INTEREST EXPENSE	20,000
FEDERAL INCOME TAXES	49,311
NET INCOME	95,720
NET INVESTMENT	500,000
OPERATING RATIO	93.36%
RETURN ON INVESTMENT	23.14%
RETURN ON EQUITY	31.91%

NEW IMPROVED LURITO - GALLAGHER FORMULA

Revenue	$2,487,131	(calculated)
* Expenses -	$2,322,100	*
* Avg. Investment -	$500,000	*
curve turnover	580.53	(calculated)
final turnover	497.43	(calculated)
curve No. used	4	(calculated)

Avg. Capital structure

Debt Ratio	56.20%
Pfd. Ratio	9.40%
Equity Ratio	34.40%
Cost of Debt	6.38%
Cost of Pfd.	6.59%

Company actual capital structure	
* Actual Debt Ratio	40%
* Actual Equity Ratio	60%
* Actual Cost of Debt	10%
* 25 basis pts. adj?	0%
* Tax Rate	34%

OPERATING RATIO - 93.36 !!!

Conversion factor data		
B & O Tax	0.015	*
WUTC Fee	0.008	*
City Tax		*
Bad Debts		*
~~Conversion Factor~~ Total Revenue Sensitive	0.023	
Conversion Factor	91.06	

Pro forma Revenue	2,487,131
New Curve Revenue	2,487,131
Increased Dollars	0
Increased Taxes	0

OPERATING REVENUES	2,444,121
OPERATING EXPENSES	2,321,110
NET OPERATING INCOME	123,011
INTEREST EXPENSE	27,000
FEDERAL INCOME TAXES	32,644
NET INCOME	63,367
NET INVESTMENT	500,000
OPERATING RATIO	94.97%
RETURN ON INVESTMENT	18.07%
RETURN ON EQUITY	31.68%

NEW IMPROVED LURITO - GALLAGHER FORMULA

Revenue	$2,444,121	(calculated)
* Expenses -	$2,321,110	*
* Avg. Investment -	$500,000	*
curve turnover	580.28	(calculated)
final turnover	488.82	(calculated)
curve No. used	4	(calculated)

Avg. Capital structure

Debt Ratio	56.20%
Pfd. Ratio	9.40%
Equity Ratio	34.40%
Cost of Debt	6.38%
Cost of Pfd.	6.59%

Company actual capital structure

* Actual Debt Ratio	60%
* Actual Equity Ratio	40%
* Actual Cost of Debt	9%
* 25 basis pts. adj?	0%
* Tax Rate	34%

OPERATING RATIO - 94.97 !!!

Conversion factor data		
B & O Tax	0.015	*
WUTC Fee	0.008	*
City Tax		*
Bad Debts		*
Total Revenue Sensitive		
~~Conversion Factor~~	0.023	
Conversion Factor	92.67	
Pro forma Revenue	2,444,121	
New Curve Revenue	2,444,121	
Increased Dollars	0	
Increased Taxes	0	

OPERATING REVENUES	2,735,766
OPERATING EXPENSES	2,327,817
NET OPERATING INCOME	407,949
INTEREST EXPENSE	72,000
FEDERAL INCOME TAXES	114,223
NET INCOME	221,726
NET INVESTMENT	2,000,000
OPERATING RATIO	85.09%
RETURN ON INVESTMENT	14.69%
RETURN ON EQUITY	18.48%

NEW IMPROVED LURITO - GALLAGHER FORMULA

	Revenue	$2,735,766	(calculated)
*	Expenses -	$2,327,817	*
*	Avg. Investment -	$2,000,000	*
	curve turnover	145.49	(calculated)
	final turnover	136.79	(calculated)
	curve No. used	3	(calculated)

Company actual capital structure

*	Actual Debt Ratio	40%
*	Actual Equity Ratio	60%
*	Actual Cost of Debt	9%
*	25 basis pts. adj?	0%
*	Tax Rate	34%

OPERATING RATIO - 85.09 !!!

	Conversion factor data	
	B & O Tax	0.015 *
	WUTC Fee	0.008 *
	City Tax	*
	Bad Debts	*
	Total Revenue Sensitive ~~Conversion Factor~~	0.023
	Conversion Factor	82.79
	Pro forma Revenue	2,735,766
	New Curve Revenue	2,735,766
	Increased Dollars	0
	Increased Taxes	0

Avg. Capital structure

Debt Ratio	56.20%
Pfd. Ratio	9.40%
Equity Ratio	34.40%
Cost of Debt	6.38%
Cost of Pfd.	6.59%

WUTC OPERATING RATIO

The Commission has used the operating ratio method to determine the revenue needs of solid waste companies since the companies first became regulated in 1961. The operating ratio applied to solid waste companies, in the past, was based on what was deemed an appropriate ratio for trucking companies. This operating ratio was based on Commission hearings in the 1960's and 70's to determine a fair level of earnings for these trucking companies. In the 1970's the ratio was established at 93 percent specifically for solid waste companies. Later in the 1980's disposal fees began increasing at an unprecedented rate. The Commission increased the operating ratio to 95 percent to tone down "windfall profits" due to this major expense increase.

The need became clear that the operating ratio should not be an arbitrary percentage but one that reflects an individual company's performance. Performance being the level of investment in relation to the revenues and expenses of the individual company. The Commission conducted a hearing known unofficially as the "Generic Garbage Case" in Cause Number TG-2016, et al. From this hearing came the first Lurito/Gallagher operating ratio formula. The purpose of this new operating ratio methodology was to establish a curve whereby solid waste companies with higher investment levels would receive a return on this investment by achieving a lower operating ratio. Conversely, a company with older, fully depreciated equipment and higher operating expenses would receive a higher operating ratio and a lower return on investment.

The Commission revisited the Lurito/Gallagher operating ratio in 1990 in Dockets TG-900657 and TG-900658. The operating ratio methodology was modified to include company specific capital structure, cost of debt, and Federal income tax rate. This revised formula calculates an operating ratio based on an overall return on investment. The two components of this rate of return are the return on equity and the cost of debt.

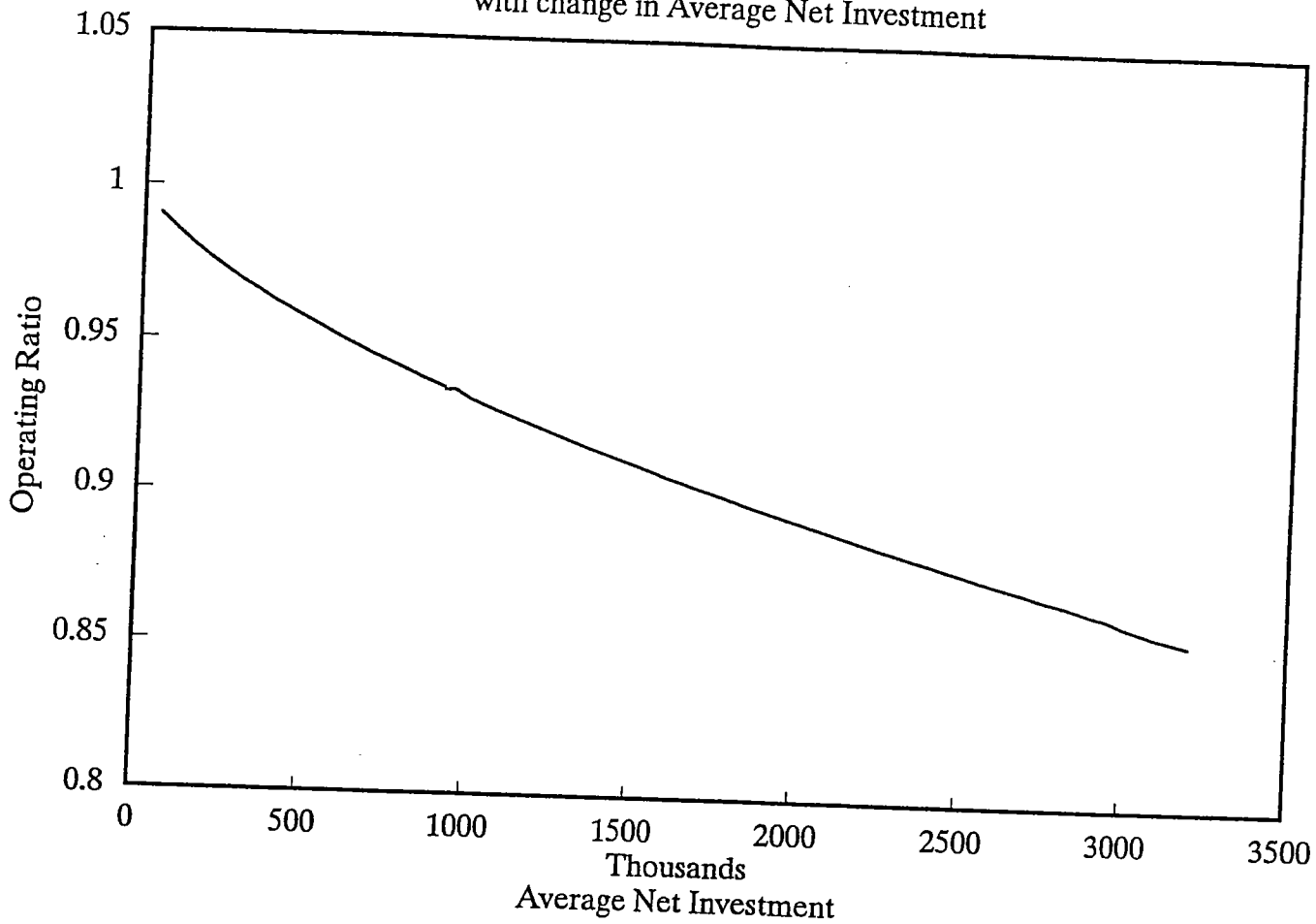
The operating ratio formula can be used as a tool to determine an optimum investment level and capital structure. The formula allows the operating ratio to be plotted as a curve on a graph. The effect is to show the change in operating ratio for a given dollar change in investment. Actually, the operating ratio changes with any change in the various inputs. The process can be refined to further reflect the operating ratio effect with an investment change by also taking into consideration changes in depreciation and other expense, interest rate, and capital structure. Attachment 1 shows a simple curve based on a change in investment. No other factors are changed in this curve such as depreciation and method of purchase of investment (i.e., the debt/equity ratio remains unchanged).

The Lurito/Gallagher formula is available from the Commission for Lotus 1.2.3. version 2.1 and higher. Attachment 2 shows the display screen when the file is brought up. Input items are shown with an asterisk. Calculated operating ratio and revenues are shown with exclamation marks. The revenue sensitive/conversion factor data are used in the revenue requirement calculation.

Prepared by: Layne Demas

Lurito/Gallager Curve

with change in Average Net Investment



Hypothetical company statistics:

Revenues	$2,750,000
Expenses	$2,950,000
Debt	40.00%
Equity	60.00%
Cost of Debt	9.00%
Federal Tax Rate	34.00%

Revenues and expenses at pro forma before rates.

Cause T-9974 Motor Carrier General Freight

Case ran from September, 1967 - June, 1970.

Earlier the Commission had expressed concern over the continued use of the traditional "93" Operating Ratio without a "financial study or logical substantiation" to justify its continued use.

The "93" appeared to have come from the Interstate Commerce Commission (ICC) in the regulation of rail as well as truck rates, starting as early as August, 1943, and before. Many states followed suit, with the operating ratio approach and the same actual "93" or something similar. The Commission recognized that use of the traditional fair rate of return on rate base (utility) method was unworkable as applied to motor carriers, but was also dissatisfied with further acceptance of the operating ratio, since it appeared based on no coherent theory and was unsupported by any in-depth analysis.

Commission/Staff retained David A. Kosh and Associates to come up with an objective, quantifiable, rational method of setting revenue requirement levels for long line motor carriers.

Mr. Kosh recognized that as to utilities, investors invest primarily in "plant", and that the earnings of their securities, their market prices, anticipated growth in earnings and dividends from which a cost of capital and fair rate of return could be derived was easily accessible. Such was not the case with (Washington) motor carriers. Their investors invest more in operating expenses than revenue equipment; turnover (revenues / fixed assets (plant) was much higher. Also market data for their securities did not exist.

For motor carriers, having a relatively low investment per dollar of revenue, and operating in a competitive environment, Mr. Kosh believed the focus or regulation should be on giving the carriers an opportunity to realize a reasonable margin over a given expense level, and protection against adverse fluctuations in earnings, not return on investment per se. Hence, he used the operating ratio approach. The only remaining question was what value to place on it.

In an attempt to capture the essence of the US free market economy in "equilibrium", he surveyed financial data of 900 corporations in 110 industries for the ten year period covering 1957 - 1966. He ended up using data from 635 of the 900 companies. He first attempted to find a relationship between revenue margin (revenues less operating expenses)and earnings fluctuation. There was none.

Then he tried comparing revenue margin to earnings fluctuation plus turnover (as a "structural" factor). There was some correlation, but not very much. Finally he tried just revenue margin to turnover, and he found a high degree of correlation. BINGO !!!! As a check on the stability of his results for the turnover/margin relationship, he did a similar analysis for the 635 companies for the three year period of 1964-1966. The original relationship still held true. This is what the Lurito/Gallagher process is still about to this day. It is all premised on the approach originally offered by Mr. Kosh in Cause T-9974 in 1970. For a given rate of return, the higher the turnover, the lower the revenue margin, and the higher the operating ratio.

Mathematically:

Turnover = Revenue/Rate Base (plant)

Margin = Net Op Income/Revenue

Rate of Return = Turnover x Margin -or-

$$\text{Rate of Return} = \frac{\text{Revenue}}{\text{RateBase}} \times \frac{\text{Net Op Income}}{\text{Revenue}}$$

$$\text{Rate of Return} = \frac{\text{Net Op Income}}{\text{RateBase}}$$

Kosh's approach worked like this:

1. Determine the composite 10 year turnover ratio for your selected sample carrier or carriers.

2. Calculate the composite 10 year working capital provision (if appropriate) and revise the above turnover ratio for your carrier or carriers.

3. Knowing the revised turnover ratio from 2 above, compute the "target" revenue margin using the curve from the 635 corporations for the period 1957-1966.

4. Add in a "fluctuation in earning factor" to the above margin from 3 above (increase the margin), based on the standard deviation of earnings fluctuations for your carrier or carriers over the last 10 years.

5. Convert the above after tax revenue margin to a before tax margin.

6. Calculate the resulting operating ratio revenue target by subtracting the above before tax margin in 5 above from 1.

The Commission issued its order adopting the Kosh approach on June 19, 1970. A separate operating ratio target was established for each of four groups of sample carriers: Short Line carriers (Puget Sound area), Long Line carriers (Cross state carriers), Local Cartage Carriers (local hauls within different local areas), and Household Goods carriers.

Cause T-290 Motor Carrier General Freight

Final order issued August 31, 1972.

The basic studies in Cause T-9974 were re-done for 650 companies in 110 industries. The ten year studies were done for both 1957 to 1966 and updated for 1960 to 1969. Three year studies were also done for 1964-1966 and updated to 1967-1969. The basic findings remained valid: Turnover was a good correlator of reasonable earnings levels. Target operating ratios were again established for the same four motor carrier general freight groups.

Causes TV-1751/1814 Motor Carrier Bulk Commodities

In 1984, an issue came up as to the proper operating ratio target for bulk commodity carriers hauling petroleum and chemicals in Washington. It had been 12 years since the last Kosh turnover study for general freight carriers, and nothing had ever been done regarding bulk commodity carriers. Bob Dameron of the Commission's Transportation Section undertook a three pronged effort to address the problem. 1) He had to see if he could duplicate the earlier Kosh study using in-house spreadsheets and materials 2) update the master curve to a more recent time frame and 3) apply those results to the ten year composite data of a representative sample of bulk commodity carriers. He succeeded on all three counts.

He duplicated the earlier Kosh study using the same 650 companies for the same 1960 - 1969 ten year period to obtain the same "master" curve. He then applied the averaged, same ten year composite financial statistics for the short line carrier group against the master curve and got comparable operating ratio revenue targets. Then he applied more recent 10 year composite financial data for the bulk commodity sample against this old 1969 era curve and obtained a target operating ratio for the group of 94.25%. Then he developed an entirely new "Master Turnover/Margin Curve" using Compustat data from 500 individual corporations in 250 different industry groups (synthesized down to 338 companies in 119 industries) for the ten year period from 1974 - 1983. This updated "Master Curve" was almost identical to the old one. He then applied the same composite ten year statistics from the bulk commodity sample carriers against the new "Master Curve" to arrive at the same target operating ratio of 94.25% indicated earlier. The Commission accepted the underlying methodologies and conclusions of the staff's recommendations in its final order issued May 8, 1985. The Kosh method had been successfully updated and applied to a new sample group of carriers, the bulk commodity haulers operating in Washington.

The Garbage Story

What does all this have to do with garbage?

On the solid waste side, the staff had been setting rates based on the "93" operating ratio for many years. The Commission began expressing similar concerns as had been raised earlier regarding motor carriers. As tip fees began to rise, as companies began to be acquired at high P/E ratios, as we continued to use a straight "93" operating ratio, the Commission wondered if perhaps it might be a good time to re-assess the propriety of using operating ratio in general, and the "93" operating ratio in particular for this industry group.

Cause TG-2016 Consolidated Garbage Hearings - I
Order issued January, 1988

The issue was brought to bear for garbage haulers in Cause TG-2016, coincident with increased tip fees in King County. The Commission/Staff retained the services of Richard Lurito and Kenneth Gallagher of Commonwealth Consulting Group, successors to David Kosh. For the same reasons that traditional rate of return regulation wouldn't work for motor carriers, it didn't work for solid waste haulers either. Both sides recommended the continued use of some form of operating ratio as the basis of determining revenue need. And again, the remaining issue centered on what specific operating ratio to use, the "fixed 93", or something different.

Lurito and Gallagher (L/G) again based their approach on the fundamental relationship between turnover and revenue margin. To develop their newly updated "master curve", however, L/G studied 198 regulated companies in seven regulated industries. In their opinion it would have been improper to study the entire "competitive" economy. Truckers, even though regulated, still faced competition, even if it was only from other regulated truckers, therefore there was some relevance. Regulated garbage carriers do not face completion, however. Also, even for the 10 year period of 1968-1977 that they studied, there was considerable evidence that the aggregate American economy was not in competitive equilibrium. Several industries were exerting market power, over earnings. Market to book ratios (as a risk measure) for the 198 regulated companies in the 10 year indicated period were a healthy 1.26. The inflation rate was 6%, similar to the rate year in which proposed rates were to be in effect. Hyperinflation and increased merger activity of subsequent years had not yet happened. Utility cost of debt was 7.8%, compared with 7.78% for the garbage haulers in Washington. Turnovers were adjusted for working capital (if appropriate) and after tax margins were again converted to a before tax basis giving effect to then current Federal Income Tax rates.

The other major modification to the Kosh approach was to divide their 198 utilities into 4 different turnover/risk groups based on the degree of risk as measured by turnover. They developed 4 "master" curves instead of just one. There was greater correlation between turnover and margin for each separate curve than if there had been one "super" curve.

Although the margin/operating ratio outputs of all 4 new curves were dependant on the one composite of 80 Class A&B 1985 Washington solid waste carrier capital structure (and related fixed costs of debt (and equity), individual margin/operating ratio outputs could be developed depending on each carrier's specific turnover. Whereas before the "93" ratio was fixed across entire the solid waste industry, now there would be a company specific determination based on each individual carrier's turnover ratio and the specific curve which would apply. This "modified" operating ratio approach would encourage carriers with above average turnover ratios (low investment) to invest in new equipment, since the resulting investment would lower their turnover ratios and therefore increase the target operating margin requirement and lower the operating ratio. Similarly, if tip fees increased with no other changes, turnover would increase and therefore target operating margins requirements would fall, and the resulting operating ratio would increase, thereby mitigating the additional return on higher tip fees that would have ensued under the earlier approach.

Further questions arose in 1991, in lieu of the massive investment required regarding the startup of all the curbside recycle programs in King in Snohomish Counties. The Commission again suspended the filings and set the matter of revenue requirements and rate base for all aspects of solid waste activities.

Lurito/Gallagher were again retained to update their earlier study. Again they reiterated that the small amounts of invested capital in the solid waste business in Washington precluded the use of rate base regulation to determine revenue requirement. And, again, no capital markets existed for Washington solid waste operators to discern the return requirements of investors in order to induce them to take on the risk of the investment, plus the aspect of other non-capital investment by individual entrepreneur/owners. Again, the issue was to measure the turnover of specific solid waste companies against the standard "master" scale of a "base" of companies operating as closely as possible in competitive equilibrium regarding turnover, cost of capital, and profit margin to discern the target revenue requirement. This was again found to be the 198 regulated utilities in seven industries, and again adjusted turnover ratio and an adjusted before tax profit margin was computed using current Federal Income Tax rates. And again, four curves were developed depending on similar turnover ratios amongst the companies. The difference between this case and the prior one is that the curves were further adjusted for cost of common equity increases between 1968-1977 and 1990 based on Moody's public utility bond yields and market to book ratios, and provisions were made allowing for each individual carrier's capital structure and actual weighted cost of debt [the equity component was capped at 60%]. One additional concession to Waste Management was the addition of a 25 basis point bonus allowing for their increased costs regarding the issuance of its common stock and for market pressure. Presumably this 25 basis point adjustment would apply to any solid waste company whose stock is traded on a stock exchange. Regulated solid waste rates in Washington have been set on the basis of the L/G curve(s) established in Cause TG-900657/658 ever since.