BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268–0001

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POSTAL RATE AND FEE CHANGES, 2000

Docket No. R2000–1

WRITTEN RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS BRADLEY TO ORAL REQUEST OF MPA, ET AL.
(TR. 43/18495-500)

The United States Postal Service hereby provides the response of witness

Bradley to the oral request of counsel for MPA, et al. (Tr. 43/18495-500) at hearings on

August 28, 2000.

The request is paraphrased and is followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

Daniel J. Foucheaux, Jr.
Chief Counsel, Ratemaking

Eric P. Koetting

475 L'Enfant Plaza West, S.W.
Washington, D.C. 20260–1137
(202) 268–2992 Fax –5402
September 5, 2000

Request:

Please compute the alleged "premium" paid by the Postal Service in intra-SCF and
inter-SCF purchased highway transportation by using the estimated "renewal"
coefficients from Table 9 in your testimony. Tr. 43/18495-18500

Response:

As I understand the request, I am to apply the coefficients found in Table 9 of my

testimony to the relevant cost pools to produce a number that is alleged to be the

"premium" the Postal Service pays on renewal contracts in accounts that used to be

classified as intra-SCF or inter-SCF. While I do not endorse this calculation and do not

agree with the characterization of it as a "premium," I will attempt to make the

calculation as accurately as possible.

The coefficients in Table 9 are from dummy variables that take a value of one for

renewal contract. In the translog specification, these coefficients can be interpreted as

estimates of the percentage difference between renewal and non-renewal contracts for

a given cubic foot-miles and route length. Where the coefficient is not significantly

different from zero, there is no difference.

In making the requested calculation, some effort must be applied to derive the

correct formula and to determining the appropriate pools of cost to which the formula

will be applied. It is not as simple as just multiplying the estimated coefficients times a

pool of accrued cost. This is just as true for the accounts I was not asked to analyze

(e.g. intra-BMC and inter-BMC). The simple calculations for those accounts described

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at the hearing contain errors and are not reliable. There are three issues that must be investigated before the calculations proceed.

First, equations are separately estimated for each transportation technology with each account category. This means the there are separate coefficients for each cost pool and it is inappropriate to multiply the coefficient from one equation times the cost for a different account/technology cost pool. There are eight account/technology cost pools within the old intra-SCF account and six account/technology cost pools within the old inter-SCF account. This means the fourteen different cost pools must be formed. These cost pools are listed in Table 1.

Table1 Cost Pools Required for the Requested Calculation			
Old Intra-SCF Account		**Old Inter-SCF Account**	
Account	Type	Account	Type
Intra-CSD	Box	Inter-P&DC	Van
Intra-CSD	Intra-City	Inter-P&DC	Tractor Trailer
Intra-CSD	Van	Inter-Cluster	Van
Intra-CSD	Tractor Trailer	Inter-Cluster	Tractor Trailer
Intra-P&DC	Box	Inter-Area	Van
Intra-P&DC	Intra-City	Inter-Area	Tractor Trailer
Intra-P&DC	Van		
Intra-P&DC	Tractor Trailer		

The second issue that must be addressed is what costs should be included in the cost pool. Care must be taken that the right amount of cost is multiplied by the correct formua. For example, it would not be correct to simply multiply the coefficients by the total accrued costs in the account/technology cost pools. This set of multiplications would double count the premium as they would be assuming that cost savings were

occurring on both renewal and non-renewal contracts. In other words, multiplying the

coefficients by the total accrued costs in the costs pools would be assuming that the

Postal Service would be somehow achieving cost savings on non-renewal contracts that

are already priced at a lower rate. But I follow Mr. Nelson in defining the "premium" as

how much less (or more) purchased highway transportation would cost if all renewal

contracts were priced at the average rate for non-renewal contracts. Calculating the

"premium" thus requires multiplication of the pool of cost for only renewal contracts by a

measure of the percentage reduction (or increase) in cost from applying a non-renewal

rate. It is thus incorrect to multiply the estimated coefficients from my equations times

the total amount of accrued cost in each cost pool. Any "back of the envelope"

calculations that do so will be erroneous and will materially overstate the amount of the

"premium."

To identify the correct formula to use, consider the structure of costs within a

single cost pool. The total accrued cost in a cost pool, C, is the sum of the cost for

renewal contracts, C_R, and non-renewal contracts C_{NR}:

$$C = C_R + C_{NR}$$

Each of the two subpools of contract costs can be expressed as the sum of its cubic

foot-miles (CFM) and rate per cubic foot-mile (θ):

$$C = \sum_{i=1}^{n} CFM_{Ri}\, \theta_{Ri} + \sum_{j=1}^{m} CFM_{NRj}\, \theta_{NRj}$$

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Calculation of the premium requires calculating a *counterfactual* cost, a cost that does not actually exist. This counterfactual cost, C*, is calculated by multiplying the cubic foot-miles for each renewal contract by the rate for the appropriate non-renewal contract:

$$C^* = \sum_{i=1}^{n} CFM_{Ri}\, \theta_{NRi} + \sum_{j=1}^{m} CFM_{NRj}\, \theta_{NRj}$$

The "premium," ρ, can then be directly calculated as:

$$\rho = \frac{C - C^*}{C}$$

Of course, this approach requires that the correct non-renewal rate (θ_{Nri}) be applied to each renewal contract. It is difficult to know which non-renewal rate to apply to each renewal contract. Indeed, there is nothing in either Mr. Nelson's calculation or in the requested calculation that comes close to this actual formula. Either approach is an approximation, perhaps containing serious error. This in itself raises doubts about whether the Commission could use either Mr. Nelson's calculation or the requested calculation as a measure of accrued cost.

The third and final issue that must be examined before the calculation is made applies even if an approximation is used. In the requested calculation, the estimated coefficients are to be used as an approximation of the correct non-renewal rate to apply to the renewal contract costs. As explained above, the coefficients estimate the percentage by which the costs of renewal contracts (in a given cost pool) <u>exceed</u> the

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cost of non-renewal contracts for the same cubic foot-miles and route length. It would thus be wrong to multiply this coefficient times the actual cost of renewal contracts to determine the percentage reduction in cost. Recall that percentages are asymmetric. If a renewal contact costs 15 percent more than a similar non-renewal contract, then the non-renewal contract does not cost 15 percent less. For example, suppose the cost of the renewal contract was $115 and the cost of a non-renewal contract was $100. It would be correct to say that the renewal contract costs 15 percent more than the non-renewal ($115 - $100)/($100). It would not be correct to say that the non-renewal contract costs 15 percent less. The non-renewal contract costs only 13 percent less ($115 - $100)/($115).

This example should make clear that one cannot simply multiply the estimated coefficients (βs) times the accrued renewal contract to obtain the approximation of the "premium." This is another reason why "back of the envelope" calculations would go astray. The last step required before making the requested calculation is therefore the determination of the correct formula to be used in the multiplication.

We can modify our mathematical formulation to apply the approximation required by the requested calculation. Instead of having the correct non-renewal cost per cubic foot-mile to apply to each renewal contract, the approximation approach applies the average non-renewal cost per cubic foot-mile to all renewal contracts. This requires the assumption that all renewal contracts would be bid at the average value for the non-renewal contracts. With this assumption in place, the counterfactual cost can be calculated as:

$$C^* = \overline{\theta}_{NR} \sum_{i=1}^{n} CFM_{Ri} + \sum_{j=1}^{m} CFM_{NRj}\, \theta_{NRj}$$

With this formula, and a little algebra, we can rewrite the premium as:

$$\rho = \frac{(\overline{\theta}_R - \overline{\theta}_{NR})* \sum_{i=1}^{n} CFM_{Ri}}{C}$$

It is easy to show that this can be rewritten as:

$$\rho = \frac{\lambda\, C_R}{C} \text{ , where } \lambda = \frac{\overline{\theta}_R - \overline{\theta}_{NR}}{\overline{\theta}_R}.$$

Note that the numerator of this expression can be used to find the dollar value of the alleged "premium."

The last task is to find an expression for λ in terms of the coefficients (the βs) presented in Table 9 of my testimony. The β coefficients are the percentage amounts by which the renewal contract cost exceed the non-renewal contract cost for a given cubic foot-miles and route length. This can be expressed analytically as:

$$\beta = \frac{\theta_R}{\theta_{NR}} - 1. \text{ or } 1 + \beta = \frac{\theta_R}{\theta_{NR}}.$$

Assuming that the approximation (in terms of the average values for θ_R and θ_{NR}) holds

for the estimated coefficients, it is easy to show that:

$$\lambda = \frac{\beta}{1 + \beta}.$$

The formula for calculating the "premium" under the requested approximation is thus

given by:

$$\rho = \frac{\frac{\beta}{1 + \beta} C_R}{C}.$$

The resulting approximate "premiums" are given in Table 2 below. Note that the

zero values for the β coefficients come from those equations in which the estimated

coefficients are not significantly different from zero.

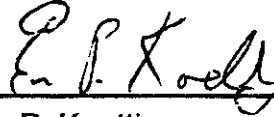| Table 2 Calculation of the Requested "Premiums"						
	C	C_R	β	λ	ρ	Dollars
Intra-PDC						
BOX	$32,705,104	$22,810,551	4.4%	4.2%	2.91%	$950,895
CITY	$29,371,875	$26,553,092	12.3%	11.0%	9.92%	$2,914,623
VAN	$368,160,320	$310,781,884	9.3%	8.5%	7.17%	$26,391,434
TT	$132,018,665	$109,352,388	0.0%	0.0%	0.000%	$0
Intra-CSD						
BOX	$116,928,453	$98,768,377	0.0%	0.0%	0.000%	$0
CITY	$8,254,161	$8,254,161	0.0%	0.0%	0.000%	$0
VAN	$14,424,791	$8,105,094	11.9%	10.7%	5.99%	$864,542
TT	$6,743,304	$1,936,561	-57.1%	-36.3%	-10.44%	-$703,781
All Intra-SCF					4.29%	$30,417,695
Inter-PDC						
VAN	$23,350,518	$18,072,468	0.0%	0.0%	0.000%	$0
TT	$37,459,139	$31,976,141	0.0%	0.0%	0.000%	$0
Inter-Cluster						
VAN	$18,080,427	$15,475,599	16.6%	14.2%	12.17%	$2,199,800
TT	$70,233,065	$57,385,245	10.5%	9.5%	7.79%	$5,471,689
Inter-Area						
VAN	$21,996,033	$16,428,935	0.0%	0.0%	0.000%	$0
TT	$170,064,609	$90,041,895	8.4%	7.7%	4.09%	$6,654,422
All Inter-SCF					4.29%	$14,625,910

Source: Workpaper RWP-2.

DECLARATION

I, Michael D. Bradley, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

Date: 9/05/00

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.

Eric P. Koetting

475 L'Enfant Plaza West, S.W.
Washington, D.C. 20260–1137
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