ACTUARIAL RESEARCH CLEARING HOUSE
1993 VOL. 3

REVIEW OF BAD-DEBT RESERVES

FOR THE PERIOD ENDING JUNE 30, 1992

Bruce E. Ollodart, F.C.A.S., M.A.A.A.

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INTRODUCTION

Objective

At the request of the Company we conducted a limited-scope actuarial review. The objective of our review was to develop a methodology (independent of the Company's current methods) and corresponding analysis, based on statistical methods and using the Company's historical data, to estimate a reasonable value for the Company's corporate level bad-debt reserves at a valuation date of June 30, 1992. Bad-debt reserves are defined as the amounts held to cover bad-debt write offs arising from cumulative sales made as of the valuation date. Our review was limited to the three largest U.S. operating divisions of the Company.

Data Used

The data that formed the basis for our review consisted of:

- Company calendar quarter amount of write offs net of recoveries, recoveries, number of write offs, and reserves gross of recoveries for bad-debt for first quarter 1987 through second quarter 1992 (the experience period),
- Company sales data for the experience period,
- Telephone conversations with certain credit managers of the Company,
- Government economic statistics, and
- Credit insurance industry information.

Standards of Practice

Our review was conducted in a manner consistent with the Standards of Professional Conduct and Qualifications of the American Academy of Actuaries and the Standards of Practice adopted by the Actuarial Standards Board.

Background

The Company is a large multi-national manufacturing concern that produces a variety of construction related items for homes and commercial buildings. Data was supplied by the Company separately for three divisions and was then combined for analysis purposes.

ANALYSIS

Overview of Methodology

Any singular methodology used to estimate bad-debt reserves has inherent advantages and disadvantages based on the trends and changes within the business environment and company administrative policies. Our preferred approach is to select an estimate of reserves based on comparing results of different reserving methods as opposed to reliance on any singular method. This approach is consistent with generally accepted actuarial methods used for estimating reserves for other types of contingencies such as health insurance and workers' compensation losses.

In the context of this report the amount of paid loss is defined as the amount of bad-debt write offs reported by the Company. Counts are equal to the number of bad-debt write offs as reported by the Company. An incurred loss is defined as the paid losses during a period plus the change in reserves during that period. These definitions were made to help provide consistency and a linkage to the actuarial concepts, methods, and assumptions being promulgated.

For our review, we calculated three estimates of the Company's bad-debt reserves as of June 30, 1992. The estimates were derived using the following methods and assumptions:

- Payout on incurred loss method.
- Ratio of paid losses to historical reserves method.
- Ratio of incurred losses to historical reserves method.

Each of these methods relied on multiple linear regression models of the incurred and/or paid losses. These methods are based on generally accepted principles and techniques of the actuarial profession. However, the application of these principles and

techniques to the estimation of bad-debt reserves for non-insurance companies is a recent development.

Considerations

Homogeneity

Reserving accuracy may be improved by subdividing data into groups exhibiting similar characteristics. We applied the estimation methods to the three divisional data groups combined. While each division would provide a more homogeneous data grouping for analysis purposes, the resulting volatility and lack of credibility because of the small volume of data for each division could distort the estimates and could more than offset the benefits of increased data homogeneity. The bad-debt experience of the three divisions, while possibly different on an absolute basis, should respond in a comparable manner to general economic changes which appear to be a significant factor driving the Company's bad-debt experience. Because the three divisions are all tied to the construction industry and/or the general condition of the U.S. economy, the factors that influence the individual divisional bad-debt reserves should be relatively homogeneous for all three divisions.

Payout Patterns

The payout patterns for bad-debt losses were determined based on information provided by the Company and insurance industry data. No historical payout pattern data for the Company was available for this review. We reviewed insurance industry payout pattern data for the surety and credit lines of insurance (which cover risks comparable to

those corresponding to the Company's bad-debt reserves) as a possible supplement to the Company's payout pattern assumptions. After review it was determined that the insurance data appeared to require adjustment to be reasonably consistent with the payout patterns that we anticipated based on the Company's information. The reason for this appears to be the additional reporting and payment lags present in insurance situations as compared to the direct reporting and payout relationship of the Company with their own customers. Therefore, insurance industry payout patterns were used only after adjustment to shorten the average payout duration.

External Influences

A variety of external factors may directly or indirectly impact the accuracy of the estimates contained in this report. Within the scope of our review, it was possible to quantify the impact of certain external factors. These factors are reflected in our multiple regression model and include such items as unemployment rates, construction expenditures, and the Gross Domestic Product.

Other external factors in addition to those that we reviewed may impact the accuracy of the estimates contained in this report. In the course of our review, we became aware of no such factors and did not attempt to identify all such factors which would be expected to impact the results of this analysis.

Explanation of Methodology

The bad-debt reserve estimation methodology that we employed in this analysis emphasized the use of estimation techniques that are

relatively independent of the Company's current bad-debt reserve estimation methodology. The following steps were followed to develop our bad-debt reserve estimates:

- The data (sales, net paid losses, counts, net incurred losses, and net reserves) for the three Company divisions were aggregated into one data set. Only aggregated data net of recoveries was used in our estimates. Using net data produces reserve estimates that are net of anticipated recoveries. All data references from this point on (to paid losses, incurred losses, etc.) are net or recoveries unless otherwise stated. Exhibit 6, Pages 1 through 4 display this information.

- Twelve month moving averages (TMMA) were computed to help smooth the irregularities and random fluctuations that were present in the data. These averages were computed for fourth quarter 1987 through second quarter 1992.

- Using the TMMA data we computed paid and incurred severities (amount of loss divided by number of counts), frequency (number of counts divided by amount of sales), paid and incurred loss costs (amount of loss divided by sales), and paid and incurred loss to reserve ratios (amount of loss divided by amount of reserves). This information was graphed to visually analyze the changes over the experience period. Refer to Exhibit 5, Pages 1 through 3, to view this information.

- We reviewed certain government statistics for quarterly periods corresponding to the Company's experience period. Based on a comparison of the graphs of Exhibit 5 to graphs of these government statistics, we selected a sub-set of the government statistics which appeared to move in a direction comparable to the movements of the Company's frequency, severity, and loss costs. The selected government

statistics (unemployment rate, employment number, construction sales, and gross domestic product) are displayed on Exhibit 7.

- Linear multiple regression models were fitted to the TMMA severity, frequency and loss cost data using the selected government statistics as the independent variables. Approximately 20 different models were tested. Of the models tested, six are displayed on Exhibit 4, Pages 1 through 6. It was observed early in our model testing that separate models for frequency, severity, and loss costs were not required because the independent variables that we determined best predicted these quantities were the same (that is, the same basic model worked on frequency, severity and loss costs). Demonstration of this observation is made by comparing the models displayed on Exhibit 4, pages 1, 4, and 5 where the same independent variables were used for each of the three quantities being modeled. Exhibit 4, Pages 2 and 3, display our best models for the loss costs. Exhibit 4, Page 2 - Loss Cost Model 2 - is a model of the Company's paid loss costs. Exhibit 4, Page 3 - Loss Cost Model 3 - is a model of the Company's incurred loss costs. Additional details regarding the multiple regression models are contained in the Technical Appendix.

- Payout patterns were estimated for the Company's bad-debt quarterly incurred losses. The payout pattern assumptions are displayed on Exhibit 3, Page 2. See the section below on Analysis of Payout Patterns for details.

- Incurred losses were computed using the Model 3 loss cost projections and the Company's sales data (Incurred losses equal loss costs multiplied by sales). The selected payout patterns were applied to the Company's incurred losses to determine expected loss payments to be made after June 30, 1992 (unpaid losses as of June 30, 1992) on incurred losses

as of June 30, 1992. The sum of these unpaid losses equals the indicated bad-debt reserves as of June 30, 1992. An important assumption underlying this methodology is that the calendar quarter incurred loss costs produced by Model 3 are approximately equal to the occurrence quarter incurred loss costs for the same quarter. This assumption has been shown to be reasonable for short duration liabilities, which the bad-debts appear to be. These calculations are displayed on Exhibit 3, Page 1.

- A second methodology was applied by multiplying the second quarter 1992 modeled loss cost times the second quarter 1992 amount of sales to compute an indicated quarterly loss. These amounts were computed for Model 2 (paid losses) and Model 3 (incurred losses). Ratios of paid losses to reserves were selected (based on the latest five quarter average) and divided into the paid losses as computed above producing an estimate of the bad-debt reserves needed as of June 30, 1992. Ratios of incurred losses to reserves were selected (based on the latest five quarter average) and divided into the incurred losses as computed above producing an additional estimate of the bad-debt reserves needed as of June 30, 1992. An important assumption underlying this methodology is that the historical reserves of the Company have been adequate and that the ratios of paid losses to reserves and incurred losses to reserves have been relatively stable over the experience period on which the average was selected. Exhibit 2, Pages 1 and 2, display the calculations for this methodology.

- The three estimates of bad-debt reserves were summarized and compared to the Company's actual bad-debt reserves as of June 30, 1992. This comparison is displayed on Exhibit 1.

Analysis Of Payout Patterns

Payout patterns were determined based on information provided by the Company and insurance industry data. An analysis using a payout pattern is based on the assumption that the average historical pattern of losses paid for an occurrence period that is mature will be reasonably predictive of the pattern of losses paid for occurrence periods which are not mature. An occurrence period is defined as the period during which losses occur or during which the exposure that resulted in a loss was assumed by the Company. An occurrence period is not mature if losses have been incurred but not necessarily paid. An occurrence period is mature if the losses that were incurred are paid. The payout pattern represents the portion of the total loss paid during each subsequent period (payout quarter) after the losses have occurred.

According to Company management there are two basic types of bad-debt losses that occur:

- A customer goes into bankruptcy which occurs as a surprise to the Company.

- A customer is experiencing some business difficulties which are identified by the Company's credit managers. The Company may attempt to reduce the amount of exposure (bills outstanding) in anticipation of more serious difficulties in the future. The customer may go along with the Company's strategy and recover, may switch to another supplier and leave the Company with the bills outstanding, or may eventually go into bankruptcy.

A payout pattern was developed based on the assumption that the types of losses described above would be comparable to the types of losses that occur under credit insurance policies. The payout pattern assumed in our analysis was based on credit insurance industry paid loss data. The resulting credit insurance payout

pattern was judgmentally shortened in duration by approximately 4 quarters and then smoothed over a 16 quarter period. We assumed this payout pattern is representative of the Company's future payout on quarterly incurred losses. Refer to Exhibit 3, Page 2 for details of the payout pattern assumed.

Results Of Analysis

A summary of the results of our analysis is displayed on Exhibit 1. This exhibit displays the three estimates of bad-debt reserves derived using the methodologies described above. These estimates are compared to the Company's actual reserves as of June 30, 1992. Also shown on Exhibit 1 is our selected estimate of the bad-debt reserves. As shown on Exhibit 1, the Company's bad-debt reserve of approximately $18,464,000, as of June 30, 1992, falls within our range of reasonable estimates of approximately $15,713,000 to $19,991,000 and is $1,964,000 higher than our selected estimate of $16,500,000.

Our selected estimate is closest to the estimate based on the Payout on Incurred Loss Method. This estimate appeared to be the most reasonable of the three. It also appears that more confidence should be placed on the methods that rely on the incurred loss estimates. This is because the regression model provided a superior fit to the incurred losses relative to the paid losses.

Bruce E. Ollodart, FCAS
Hartford, Connecticut

GUIDE TO EXHIBITS

Following is a list of the exhibits contained in this report:

- Exhibit 1 - Summary of Estimated Reserves.
- Exhibit 2, Page 1 - Estimate of Reserves using the Incurred/Reserve Ratio Method.
- Exhibit 2, Page 2 - Estimate of Reserves using the Paid/Reserve Ratio Method.
- Exhibit 3, Page 1 - Estimate of Reserves using the Payout on Incurred Loss Method.
- Exhibit 3, Page 2 - Analysis of the payout pattern.
- Exhibit 4, Page 1 - Multiple Regression Loss Cost Model 1 - model of paid loss costs.
- Exhibit 4, Page 2 - Multiple Regression Loss Cost Model 2 - model of paid loss costs.
- Exhibit 4, Page 3 - Multiple Regression Loss Cost Model 3 - model of incurred loss costs.
- Exhibit 4, Page 4 - Multiple Regression Frequency Model.
- Exhibit 4, Page 5 - Multiple Regression Paid Severity Model.
- Exhibit 4, Page 6 - Multiple Regression Loss Cost Model 4 - model of incurred loss costs.
- Exhibit 5, Pages 1 through 3 - Graphs and the corresponding twelve month moving averages of the Company's data including severity, frequency, loss costs, paid/reserve ratios, and incurred to reserve ratios.
- Exhibit 6, Pages 1 through 4 - Company quarterly sales and loss data for the three divisions reviewed and the three divisions in the aggregate.
- Exhibit 7 - Quarterly U.S. Government economic statistics used in our analysis.

Bad–Debt Reserve Analysis
Summary of Estimated Reserves As Of 6/30/92

	Reserve Estimation Method Used	Estimated Reserve	Actual * Reserve	Difference
(1)	Incurred/Reserve Ratio Method	$15,713,254	$18,464,000	$2,750,746
(2)	Paid/Reserve Ratio Method	$19,991,057	$18,464,000	($1,527,057)
(3)	Payout on Incurred Loss Method	$16,469,360	$18,464,000	$1,994,640
	Selected Estimate	**$16,500,000**	**$18,464,000**	**$1,964,000**

(1) Exhibit 2, Page 1, Row (5)
(2) Exhibit 2, Page 2, Row (5)
(3) Exhibit 3, Page 1, Column (5), Total

* Sum of 6/30/92 Gross Reserves for the three divisions reviewed – refer to Exhibit 6, Pages 2 through 4, Column (3).

Bad–Debt Reserve Analysis
Estimate of Reserves As Of 6/30/92
Incurred/Reserve Ratio Method

(1)	Model 3 Incurred Loss Cost at 2nd Qtr 1992	$558
(2)	Average Sales at 2nd Qtr 1992 (000)	$537,757
(3)	Indicated Incurred Losses	$3,001,182
(4)	All Yrs Incurred/ Reserve Ratio	0.191
(5)	Indicated Reserve As of 6/30/92	$15,713,254

(1) Exhibit 4, Page 3, Column (5)
(2) Exhibit 5, Page 3, Column (1)
(3) [(1) x (2)] / 100
(4) Exhibit 5, Page 3, Column (6)
(5) (3) / (4)

Note: This method assumes that historically the Company's estimated reserves have been adequate on average and that a reasonably stable relationship exited between historical incurred losses and reserves as measured over the latest experience period.

Bad – Debt Reserve Analysis
Estimate of Reserves As Of 6/30/92
Paid/Reserve Ratio Method

(1)	Model 2 Paid Loss Cost at 2nd Qtr 1992	$443
(2)	Average Sales at 2nd Qtr 1992 (000)	$537,757
(3)	Indicated Paid Losses	$2,384,825
(4)	All Yrs Paid/ Reserve Ratio	0.119
(5)	Indicated Reserve As of 6/30/92	$19,991,057

(1) Exhibit 4, Page 2, Column (6)
(2) Exhibit 5, Page 3, Column (1)
(3) [(1) x (2)] / 100
(4) Exhibit 5, Page 3, Column (7)
(5) (3) / (4)

Note: This method assumes that historically the Company's estimated reserves have been adequate on average and that a reasonably stable relationship exited between historical paid losses and reserves as measured over the experience period.

Bad–Debt Reserve Analysis
Estimate of Reserves As Of 6/30/92
Payout on Incurred Loss Method

Occurrence Quarter	Model 3 Incurred Loss Cost (1)	Average Sales (000) (2)	Incurred Losses (3)	Losses Unpaid Pattern (4)	Unpaid Losses (5)
4/88	$233	$566,040	$1,318,998	0.055	$72,545
1/89	238	574,903	1,370,281	0.110	150,731
2/89	267	572,139	1,526,264	0.165	251,834
3/89	274	565,656	1,548,839	0.220	340,745
4/89	359	568,993	2,045,402	0.275	562,486
1/90	325	563,744	1,830,102	0.330	603,934
2/90	313	558,141	1,745,825	0.385	672,143
3/90	305	560,062	1,707,632	0.440	751,358
4/90	364	548,975	1,995,606	0.518	1,033,724
1/91	379	529,536	2,006,474	0.596	1,195,859
2/91	415	526,349	2,182,337	0.674	1,470,895
3/91	469	517,659	2,428,446	0.752	1,826,192
4/91	522	510,208	2,665,632	0.814	2,169,825
1/92	561	519,518	2,913,224	0.876	2,551,984
2/92	558	537,757	3,001,182	0.938	2,815,109
Total			$30,286,243		$16,469,360

Indicated Reserve As of 6/30/92 **$16,469,360**

(1) Exhibit 4, Page 3, Column (5)
(2) Exhibit 5, Page 3, Column (1)
(3) (1) x (2)
(4) Exhibit 3, Page 2, Column (3)
(5) (3) x (4)

Bad–Debt Reserve Analysis
Bad–Debt Payout Pattern Assumed

Payout Quarter	Incremental Payout Pattern (1)	Cumulative Payout Pattern (2)	Losses Unpaid Pattern (3)
1	0.062	0.062	0.938
2	0.062	0.124	0.876
3	0.062	0.186	0.814
4	0.062	0.248	0.752
5	0.078	0.326	0.674
6	0.078	0.404	0.596
7	0.078	0.482	0.518
8	0.078	0.560	0.440
9	0.055	0.615	0.385
10	0.055	0.670	0.330
11	0.055	0.725	0.275
12	0.055	0.780	0.220
13	0.055	0.835	0.165
14	0.055	0.890	0.110
15	0.055	0.945	0.055
16	0.055	1.000	0.000
Total	1.000		

Average Payout Duration Assumed 2.0 Years

(1) Based on credit insurance data adjusted to a shorter payout duration to reflect the faster payout anticipated for the Company.
(2) Cumulative sum of amounts in (1)
(3) 1 – (2)

Bad–Debt Reserve Analysis
Multiple Regression Loss Cost Model 1

Qtr/Yr Ending	Relative Quarter	Actual Paid Loss Cost (1)	Unemply Rate (%) 3–QTR LAG (2)	Employment Number 3–QTR LAG (3)	Private Res. (4)	Private NonRes. (5)	Public (6)	Gross Dom. Product (7)	Modeled Loss Cost (8)
187	−2	–			$560.9	$369.9	$226.4	$4,460.0	
287	−1	–			596.3	369.9	223.9	4,515.3	
387	0	–			595.2	383.3	225.5	4,559.3	
487	1	$140	6.5	108,218	584.7	388.7	231.2	4,625.5	$117
188	2	168	6.1	109,108	582.9	380.8	227.7	4,655.3	159
288	3	129	5.9	109,882	570.5	385.9	234.0	4,704.8	179
388	4	93	5.8	110,529	588.5	392.0	235.6	4,734.5	150
488	5	206	5.6	110,899	603.1	396.1	243.6	4,779.7	173
189	6	165	5.3	111,933	605.5	401.5	238.4	4,809.6	145
289	7	181	5.4	112,158	591.9	400.2	248.6	4,832.4	176
389	8	216	5.3	112,816	582.4	407.9	252.5	4,845.6	155
489	9	97	5.0	115,038	571.2	406.6	265.4	4,859.7	154
190	10	90	5.3	114,958	591.6	471.3	324.9	4,880.8	47
290	11	65	5.3	114,689	567.9	468.8	319.4	4,900.3	75
390	12	48	5.4	114,192	539.1	473.3	327.5	4,903.3	109
490	13	288	5.2	113,710	505.1	447.5	334.7	4,855.1	282
191	14	297	5.2	113,623	469.8	427.9	320.8	4,824.0	308
291	15	338	5.6	113,806	464.7	416.2	323.3	4,840.7	316
391	16	390	6.0	113,545	467.4	392.9	328.2	4,862.7	371
491	17	348	6.7	114,155	503.8	384.4	337.9	4,868.0	317
192	18	365	6.9	114,201	511.1	378.6	350.7	4,896.9	355
292	19	372	6.8	113,230	531.5	376.2	360.0	4,891.0	421
			7.1	113,545					
			7.3	113,951					
			7.8	114,322					

NOTE: Refer to Technical Appendix for Explanatory Footnotes

Regression Output:

Constant		4219.118				
Std Err of Y Est		46.627				
R Squared		0.890				
No. of Observations		19				
Degrees of Freedom		12				
Column:	(2)	(3)	(4)	(5)	(6)	(7)
X Coefficient(s)	−111.3112	−0.0390	−0.6493	−3.5554	2.8412	0.4304
Std Err of Coef.	56.1108	0.0209	0.5736	0.6825	1.1907	0.5276

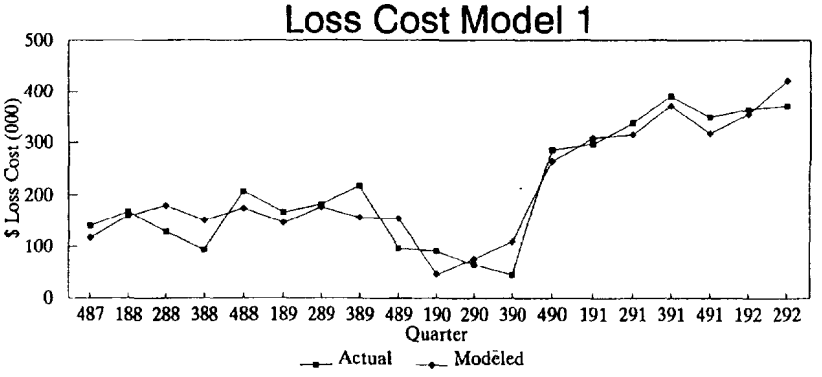


Exhibit 4

Bad-Debt Reserve Analysis
Multiple Regression Loss Cost Model 2

Qtr/Yr Ending	Relative Quarter	Actual Paid Loss Cost (1)	Unemply Rate (%) 3-QTR LAG (2)	Employment Number 3-QTR LAG (3)	Private NonRes. (4)	Public (5)	Modeled Loss Cost (6)
187	-2	-			$369.9	$226.4	
287	-1	-			369.9	223.9	
387	0	-			383.3	225.5	
487	1	$140	6.5	108,218	388.7	231.2	$118
188	2	168	6.1	109,108	380.8	227.7	169
288	3	129	5.9	109,682	385.9	234.0	175
388	4	93	5.8	110,529	392.0	235.6	148
488	5	206	5.6	110,899	396.1	243.6	179
189	6	165	5.3	111,933	401.5	238.4	147
289	7	181	5.4	112,158	400.2	248.8	169
389	8	216	5.3	112,816	407.9	252.5	143
489	9	97	5.0	115,038	406.6	265.4	168
190	10	90	5.3	114,958	471.3	324.9	75
290	11	65	5.3	114,689	468.8	319.4	74
390	12	46	5.4	114,192	473.3	327.5	87
490	13	286	5.2	113,710	447.5	334.7	271
191	14	297	5.2	113,623	427.9	320.8	305
291	15	338	5.6	113,806	416.2	323.3	297
391	16	390	6.0	113,545	392.9	328.2	363
491	17	348	6.7	114,155	384.4	337.9	309
192	18	365	6.9	114,201	378.6	350.7	350
292	19	372	6.8	113,230	378.2	360.0	443
			7.1	113,545			
			7.3	113,951			
			7.8	114,322			

NOTE: Refer to Technical Appendix for Explanatory Footnotes.

Regression Output:

Constant		5562.956		
Std Err of Y Est		45.488		
R Squared		0.877		
No. of Observations		19		
Degrees of Freedom		14		
Column:	(2)	(3)	(4)	(5)
X Coefficient(s)	-152.4790	-0.0340	-4.2623	3.7931
Std Err of Coef.	41.2233	0.0127	0.6131	0.6148

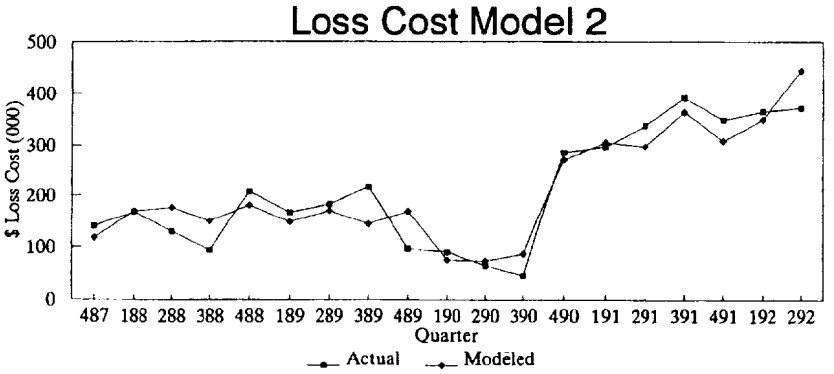


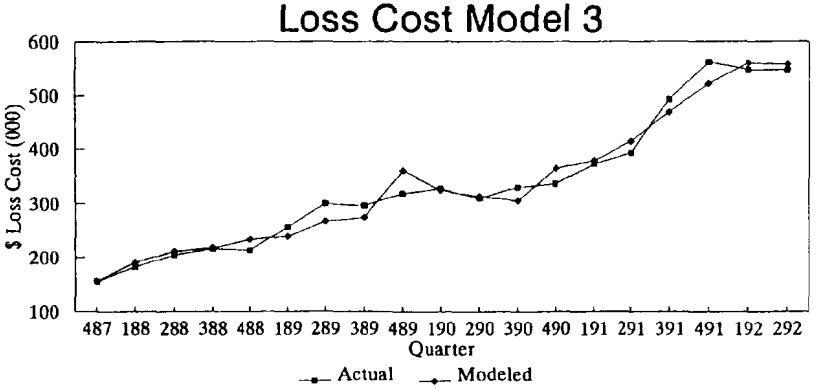
Exhibit 4

Bad-Debt Reserve Analysis
Multiple Regression Loss Cost Model 3

Qtr/Yr Ending	Relative Quarter	Actual Incurred Loss Cost (1)	Employment Number 3-QTR LAG (2)	Private Nonfarm (3)	Public (4)	Modeled Loss Cost (5)
187	-2	-		$369.9	$226.4	
287	-1	-		369.9	223.9	
387	0	-		383.3	225.5	
487	1	$155	108,218	388.7	231.2	$156
188	2	182	109,108	380.8	227.7	190
288	3	204	109,882	385.9	234.0	211
388	4	218	110,529	392.0	235.8	217
488	5	213	110,899	396.1	243.6	233
189	6	256	111,933	401.5	238.4	238
289	7	299	112,158	400.2	248.8	267
389	8	295	112,816	407.9	252.5	274
489	9	318	115,038	406.6	265.4	359
190	10	328	114,958	471.3	324.9	325
290	11	309	114,589	468.8	319.4	313
390	12	330	114,192	473.3	327.5	309
490	13	336	113,710	447.5	334.7	364
191	14	372	113,623	427.9	320.8	379
291	15	383	113,808	416.2	323.3	415
391	16	492	113,545	392.9	326.2	469
491	17	562	114,155	384.4	337.9	522
192	18	548	114,201	378.6	350.7	561
292	19	547	113,230	376.2	360.0	558
			113,545			
			113,951			
			114,322			

NOTE: Refer to Technical Appendix for Explanatory Footnotes.

Regression Output:			
Constant		-2257.119	
Std Err of Y Est		23.690	
R Squared		0.970	
No. of Observations		19	
Degrees of Freedom		15	
Column:	(2)	(3)	(4)
X Coefficient(s)	0.0263	-2.2378	1.8832
Std Err of Coef.	0.0049	0.2070	0.1866



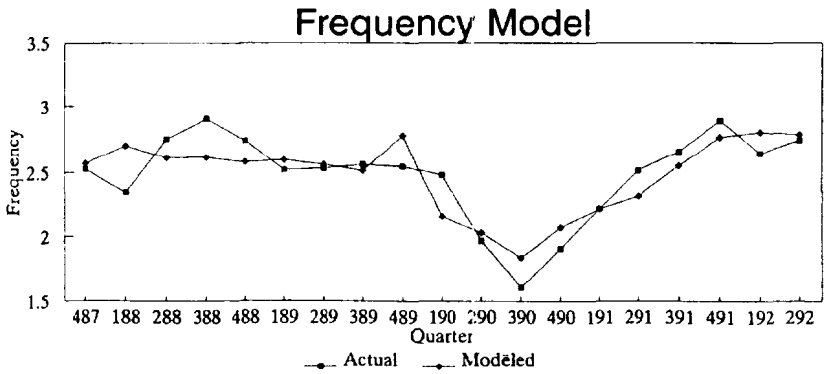
Bad--Debt Reserve Analysis
Multiple Regression Frequency Model

Qtr/Yr Ending	Relative Quarter	Actual Freq (1)	Unemply Rate (%) 3-QTR LAG (2)	Employment Number 3-QTR LAG (3)	Private Res. (4)	Private NonRes. (5)	Public (6)	Gross Dom. Product (7)	Modeled Freq. (8)
187	-2	-			$560.9	$369.9	$226.4	$4,460.0	
287	-1	-			596.3	369.9	223.9	4,515.3	
387	0	-			595.2	383.3	225.5	4,559.3	
487	1	2.53	6.5	108,218	584.7	388.7	231.2	4,625.6	2.57
188	2	2.35	6.1	109,108	582.9	380.8	227.7	4,655.3	2.70
288	3	2.75	5.9	109,882	570.5	385.9	234.0	4,704.8	2.61
388	4	2.91	5.8	110,529	586.5	392.0	235.6	4,734.5	2.62
488	5	2.74	5.6	110,899	603.1	396.1	243.6	4,779.7	2.58
189	6	2.52	5.3	111,933	605.5	401.5	238.4	4,809.8	2.60
289	7	2.53	5.4	112,158	591.9	400.2	248.8	4,832.4	2.56
389	8	2.56	5.3	112,816	582.4	407.9	252.5	4,845.6	2.52
489	9	2.55	5.0	115,038	571.2	406.6	265.4	4,859.7	2.78
190	10	2.48	5.3	114,958	591.6	471.3	324.9	4,880.6	2.16
290	11	1.97	5.3	114,669	567.9	458.8	319.4	4,900.3	2.03
390	12	1.61	5.4	114,192	539.1	473.3	327.5	4,903.3	1.84
490	13	1.91	5.2	113,710	505.1	447.5	334.7	4,855.1	2.07
191	14	2.22	5.2	113,623	469.8	427.9	320.8	4,824.0	2.22
291	15	2.52	5.6	113,806	464.7	416.2	323.3	4,840.7	2.32
391	16	2.66	6.0	113,545	487.4	392.9	328.2	4,862.7	2.55
491	17	2.89	6.7	114,155	503.8	384.4	337.9	4,868.0	2.76
192	18	2.65	6.9	114,201	511.1	378.6	350.7	4,896.9	2.60
292	19	2.74	6.8	113,230	531.5	376.2	360.0	4,891.0	2.79
			7.1	113,545					
			7.3	113,951					
			7.8	114,322					

NOTE: Refer to Technical Appendix for Explanatory Footnotes.

Regression Output:

Constant		0.787				
Std Err of Y Est		0.223				
R Squared		0.712				
No. of Observations		19				
Degrees of Freedom		12				
Column:	(2)	(3)	(4)	(5)	(6)	(7)
X Coefficient(s)	-0.0116	0.0001	0.0029	-0.0107	0.0013	-0.0022
Std Err of Coef.	0.2683	0.0001	0.0027	0.0042	0.0057	0.0025



Bad–Debt Reserve Analysis
Multiple Regression Paid Severity Model

Qtr/Yr Ending	Relative Quarter	Actual Paid Severity (1)	Unemply Rate (%) 3–QTR LAG (2)	Employment Number 3–QTR LAG (3)	Private Res. (4)	Private NonRes. (5)	Public (6)	Gross Dom. Product (7)	Modeled Severity (8)
187	–2	–			$560.9	$389.9	$226.4	$4,460.0	
287	–1	–			596.3	389.9	223.9	4,515.3	
387	0	–			595.2	383.3	225.5	4,559.3	
487	1	$55.38	6.5	108,216	584.7	386.7	231.2	4,625.5	$44.48
188	2	71.31	6.1	109,108	582.9	380.8	227.7	4,655.3	62.90
288	3	46.74	5.9	109,882	570.5	385.9	234.0	4,704.8	70.55
388	4	32.05	5.8	110,529	588.5	392.0	235.6	4,734.5	57.09
488	5	75.32	5.6	110,899	603.1	396.1	243.6	4,779.7	68.81
189	6	65.57	5.3	111,933	605.5	401.5	238.4	4,809.8	55.94
289	7	71.50	5.4	112,158	591.9	400.2	248.8	4,832.4	66.67
389	8	64.33	5.3	112,816	582.4	407.9	252.5	4,845.6	58.24
489	9	38.03	5.0	115,038	571.2	406.6	265.4	4,859.7	57.24
190	10	36.39	5.3	114,958	591.8	471.3	324.9	4,880.8	27.58
290	11	33.00	5.3	114,689	587.9	468.8	319.4	4,900.3	36.98
390	12	28.36	5.4	114,192	539.1	473.3	327.5	4,903.3	52.70
490	13	149.33	5.2	113,710	505.1	447.5	334.7	4,855.1	124.55
191	14	133.74	5.2	113,623	489.8	427.9	320.8	4,824.0	140.03
291	15	134.08	5.6	113,606	464.7	416.2	323.3	4,840.7	132.67
391	16	146.93	6.0	113,545	487.4	392.9	328.2	4,862.7	147.19
491	17	120.51	6.7	114,155	503.8	384.4	337.9	4,868.0	110.22
192	18	137.93	6.9	114,201	511.1	378.6	350.7	4,896.9	122.89
292	19	135.49	6.8	113,230	531.5	376.2	360.0	4,891.0	159.24
			7.1	113,545					
			7.3	113,951					
			7.8	114,322					

NOTE: Refer to Technical Appendix for Explanatory Footnotes.

Regression Output:

Constant		2516.419				
Std Err of Y Est		20.060				
R Squared		0.865				
No. of Observations		19				
Degrees of Freedom		12				
Column:	(2)	(3)	(4)	(5)	(6)	(7)
X Coefficient(s)	–66.0595	–0.0201	–0.2507	–1.3882	1.3649	0.1077
Std Err of Coef.	24.1401	0.0090	0.2468	0.3797	0.5122	0.2270

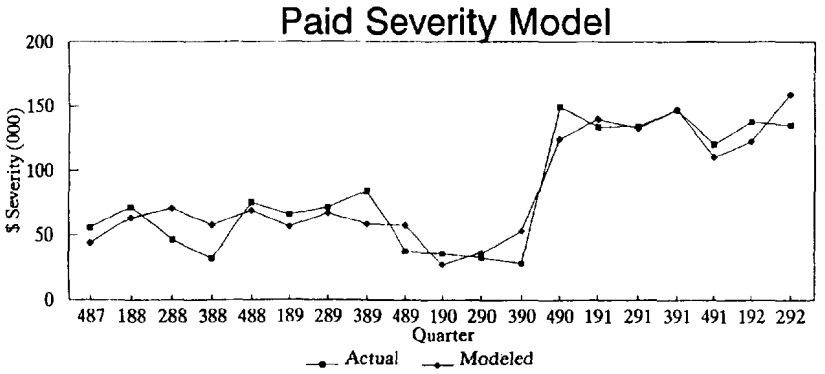


Exhibit 4

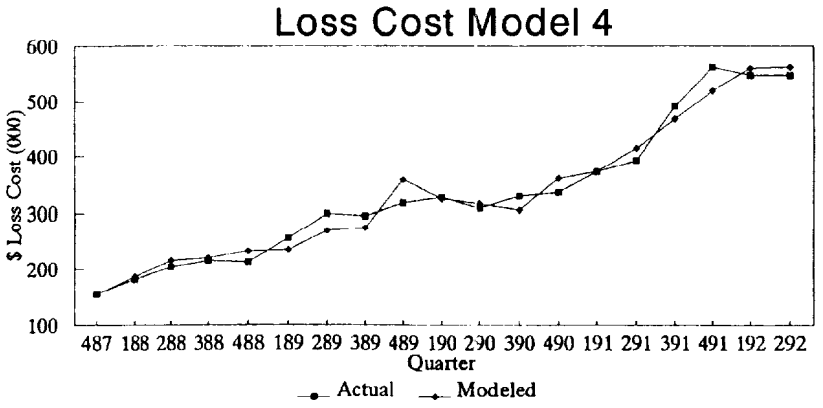
Bad-Debt Reserve Analysis
Multiple Regression Loss Cost Model 4

Qtr/Yr Ending	Relative Quarter	Actual Incurred Loss Cost (1)	Total Housing Starts (2)	Employment Number 3-QTR LAG (3)	Private NonRes. (4)	Public (5)	Modeled Loss Cost (6)
187	-2	-	348.1		$365.9	$226.4	
287	-1	-	480.2		386.9	223.9	
387	0	-	447.8		383.3	225.5	
487	1	$155	343.2	108,218	386.7	231.2	$154
188	2	182	297.2	109,108	386.8	227.7	$186
288	3	204	443.6	109,882	385.9	234.0	$216
388	4	216	404.9	110,529	386.0	235.6	$220
488	5	213	342.4	110,899	386.1	243.6	$232
189	6	256	303.8	111,933	401.5	238.4	$235
289	7	299	404.6	112,158	400.2	248.8	$270
389	8	295	366.4	112,816	407.9	252.5	$275
489	9	318	301.5	115,038	408.6	265.4	$358
190	10	328	294.5	114,958	471.3	324.9	$325
290	11	309	358.0	114,689	468.8	319.4	$317
390	12	330	307.0	114,192	473.3	327.5	$308
490	13	336	233.1	113,710	447.5	334.7	$361
191	14	372	185.5	113,623	427.9	320.6	$373
291	15	393	300.8	113,606	416.2	323.3	$415
391	16	492	284.8	113,545	392.9	328.2	$468
491	17	562	243.0	114,155	384.4	337.9	$520
192	18	548	262.0	114,201	378.6	350.7	$560
292	19	547	340.8	113,230	376.2	360.0	$562
				113,545			
				113,951			
				114,322			

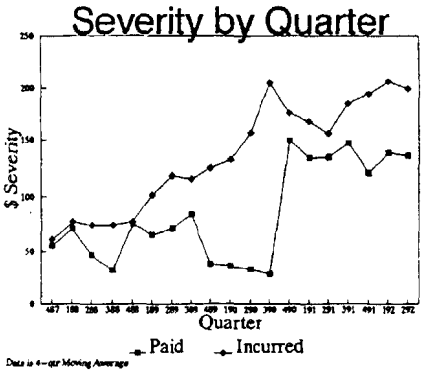
NOTE: Refer to Technical Appendix for Explanatory Footnotes.

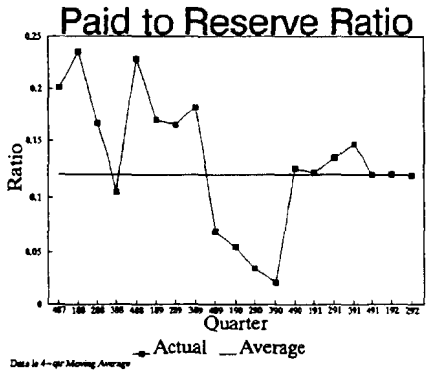
Regression Output:

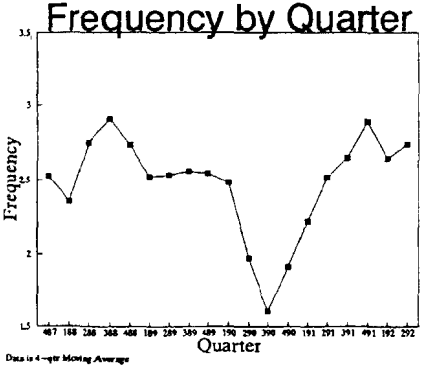
Constant		-2298.991		
Std Err of Y Est		24.293		
R Squared		0.971		
No. of Observations		19		
Degrees of Freedom		14		
Column:	(2)	(3)	(4)	(5)
X Coefficient(s)	0.0572	0.0264	-2.2395	1.8243
Std Err of Coef.	0.1113	0.0050	0.2173	0.2076



Bad--Debt Reserve Analysis







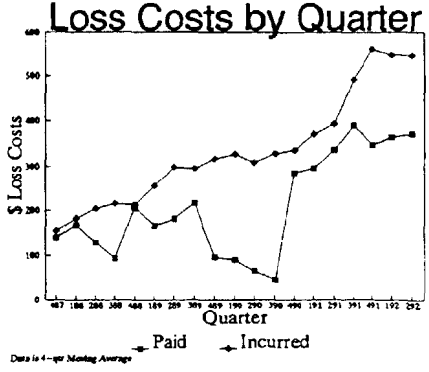


Exhibit 5

Bad – Debt Reserve Analysis

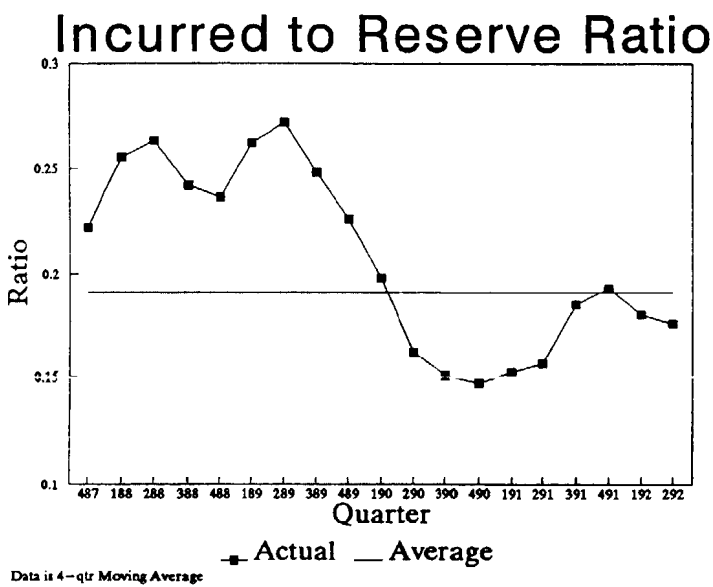


Exhibit 5

Bad–Debt Reserve Analysis
Three Division Total
(Amounts in 000)

Twelve Month Moving Averages

Qtr/Yr Ending	Sales (1)	Net Reserve (2)	Net Paid (3)	Counts (4)	Net Incurred (5)	Incurred to Reserve Ratio (6)	Paid to Reserve Ratio (7)	Paid Severity (8)	Incurred Severity (9)	Frequency (10)	Paid Loss Cost (11)	Incurred Loss Cost (12)
487	$553,956	$3,854	$775	14	$858	0.222	0.201	$55.38	$61.25	2.53	$140	$155
188	553,024	3,933	927	13	1,005	0.256	0.236	71.31	77.33	2.35	168	182
288	563,589	4,358	725	16	1,150	0.264	0.166	46.74	74.16	2.75	129	204
388	567,283	5,052	529	17	1,224	0.242	0.105	32.05	74.15	2.91	93	216
488	566,040	5,089	1,168	16	1,204	0.237	0.229	75.32	77.68	2.74	206	213
189	574,903	5,611	951	15	1,473	0.262	0.169	65.57	101.57	2.52	165	256
289	572,139	6,287	1,037	15	1,713	0.272	0.165	71.50	118.14	2.53	181	299
389	565,656	6,735	1,223	15	1,671	0.248	0.182	84.33	115.22	2.56	216	295
489	568,993	7,993	552	15	1,809	0.226	0.069	38.03	124.78	2.55	97	318
190	563,744	9,330	510	14	1,847	0.198	0.055	36.39	131.93	2.48	90	328
290	558,141	10,693	363	11	1,726	0.161	0.034	33.00	156.86	1.97	65	309
390	560,062	12,285	255	9	1,847	0.150	0.021	28.36	205.25	1.61	46	330
490	548,975	12,564	1,568	11	1,847	0.147	0.125	149.33	175.90	1.91	286	336
191	529,536	12,963	1,572	12	1,971	0.152	0.121	133.74	167.70	2.22	297	372
291	526,349	13,254	1,777	13	2,067	0.156	0.134	134.08	156.02	2.52	338	393
391	517,659	13,781	2,020	14	2,548	0.185	0.147	146.93	185.29	2.66	390	492
491	510,208	14,873	1,778	15	2,870	0.193	0.120	120.51	194.54	2.89	348	562
192	519,518	15,823	1,897	14	2,846	0.180	0.120	137.93	206.98	2.65	365	548
292	537,757	16,768	1,999	15	2,944	0.176	0.119	135.49	199.56	2.74	372	547
					All Yrs. Avg.	0.191	0.119					

(1), (2), (3), (4) and (5) are twelve month moving averages of the corresponding data from Exhibit 6, Page 1.
(6) (5) / (2)
(7) (3) / (2)
(8) (3) / (4)
(9) (5) / (4)
(10) [(4) / (1)] x 100,000 (Number of claims per $100 million of sales)
(11) (8) x (10)
(12) (9) x (10)

Bad–Debt Reserve Analysis
Three Division Total
(Amounts in 000)

Year	Quarter	Sales (1)	Net Reserve (2)	Net Paid (3)	Counts (4)	Net Incurred (5)
1987	1	$504,775	$3,734	$281	13	$209
	2	541,155	3,422	1,017	5	705
	3	611,163	4,126	688	13	1,392
	4	558,731	4,135	1,115	25	1,124
1988	1	501,046	4,047	888	9	800
	2	583,417	5,122	207	15	1,282
	3	625,936	6,905	(95)	17	1,688
	4	553,760	4,281	3,670	21	1,046
1989	1	536,499	6,135	21	5	1,875
	2	572,361	7,827	551	15	2,243
	3	600,002	8,697	649	17	1,519
	4	567,108	9,312	985	21	1,600
1990	1	515,503	11,485	(147)	3	2,026
	2	549,949	13,277	(35)	3	1,757
	3	607,688	15,065	218	9	2,006
	4	522,758	10,428	6,236	27	1,599
1991	1	437,748	13,081	(133)	8	2,520
	2	537,201	14,440	785	9	2,144
	3	572,927	17,175	1,193	11	3,928
	4	492,956	14,796	5,265	31	2,886
1992	1	474,988	16,879	343	4	2,426
	2	610,158	18,220	1,193	13	2,534

(1), (2), (3), (4) and (5) sum of corresponding data on Exhibit 6, Pages 2 thru 4.

Exhibit 6

Bad–Debt Reserve Analysis
Division 1
(Amounts in 000)

Year	Quarter	Sales (1)	Net Reserve (2)	Gross Reserve (3)	Gross Paid (4)	Recovery (5)	Net Paid (6)	Counts (7)	Gross Incurred (8)	Net Incurred (9)
1987	1	$216,299	$2,019	$2,200	$148	$18	$130	9	$166	$148
	2	214,299	1,597	1,778	877	100	777	3	455	355
	3	260,911	2,137	2,318	594	3	591	10	1,134	1,131
	4	255,908	2,769	2,950	1,015	362	653	17	1,647	1,285
1988	1	214,787	2,135	2,316	959	116	843	6	325	209
	2	213,105	2,602	2,783	589	112	477	14	1,056	944
	3	238,507	3,199	3,380	753	424	329	13	1,350	926
	4	240,567	1,575	1,756	2,674	107	2,567	12	1,050	943
1989	1	222,805	3,178	3,359	82	97	(15)	2	1,685	1,588
	2	201,349	4,269	4,450	770	218	552	1	1,861	1,643
	3	223,955	4,360	4,541	582	31	551	0	673	642
	4	243,371	3,724	3,905	1,059	84	975	4	423	339
1990	1	209,989	4,753	4,934	26	142	(116)	2	1,055	913
	2	194,480	5,769	5,950	63	103	(40)	1	1,079	976
	3	222,426	6,253	6,434	238	54	184	7	722	668
	4	225,843	3,157	3,338	3,150	61	3,089	24	54	(7)
1991	1	182,451	4,266	4,447	406	138	268	6	1,515	1,377
	2	178,898	4,808	4,989	973	262	711	8	1,515	1,253
	3	215,616	5,288	5,469	1,220	24	1,196	11	1,700	1,676
	4	213,896	5,417	5,598	1,971	51	1,920	20	2,100	2,049
1992	1	190,692	6,939	7,120	8	41	(33)	1	1,530	1,489
	2	188,076	8,117	8,298	352	140	212	5	1,530	1,390

(2) Estimated by subtracting 1992 year to date recovery from 6/30/92 gross reserve and then rolling backwards using net incurred and net paid amounts.
(3) Estimated by rolling back reserve from 6/30/92 amount using gross incurred and gross paid amounts.
All other data as provided by company

Exhibit 6

Bad–Debt Reserve Analysis
Division 2
(Amounts in 000)

Year	Quarter	Sales (1)	Net Reserve (2)	Gross Reserve (3)	Gross Paid (4)	Recovery (5)	Net Paid (6)	Counts (7)	Gross Incurred (8)	Net Incurred (9)
1987	1	$146,991	$877	$938	$151	$0	$151	4	$62	$62
	2	182,355	1,011	1,072	0	0	0	0	134	134
	3	212,766	1,091	1,152	113	15	98	3	193	178
	4	158,734	400	461	519	64	455	5	(172)	(236)
1988	1	135,432	952	1,013	8	0	8	1	560	560
	2	207,070	1,294	1,355	0	270	(270)	0	342	72
	3	233,115	1,437	1,498	307	730	(423)	4	450	(280)
	4	163,961	832	893	172	(24)	196	4	(433)	(409)
1989	1	147,864	1,087	1,148	0	(5)	5	1	255	260
	2	201,268	1,618	1,679	29	8	21	0	560	552
	3	229,328	2,160	2,221	113	15	98	4	655	640
	4	179,877	3,053	3,114	132	18	114	4	1,025	1,007
1990	1	154,559	3,988	4,049	15	16	(1)	1	950	934
	2	201,404	4,618	4,679	5	1	4	1	635	634
	3	248,114	5,768	5,829	50	0	50	1	1,200	1,200
	4	172,093	4,632	4,693	2,586	1	2,585	2	1,450	1,449
1991	1	135,454	6,003	6,064	4	273	(269)	1	1,375	1,102
	2	225,025	7,128	7,189	0	5	(5)	0	1,125	1,120
	3	222,320	8,978	9,039	0	1	(1)	0	1,850	1,849
	4	150,656	6,687	6,748	3,391	4	3,387	10	1,100	1,096
1992	1	142,148	7,587	7,648	0	60	(60)	0	900	840
	2	211,041	7,705	7,766	982	1	981	7	1,100	1,099

(2) Estimated by subtracting 1992 year to date recovery from 6/30/92 gross reserve and then rolling backwards using net incurred and net paid amounts.
(3) Estimated by rolling back reserve from 6/30/92 amount using gross incurred and gross paid amounts.
All other data as provided by company

Exhibit 6

Bad–Debt Reserve Analysis
Division 3
(Amounts in 000)

Year	Quarter	Sales (1)	Net Reserve (2)	Gross Reserve (3)	Gross Paid (4)	Recovery (5)	Net Paid (6)	Counts (7)	Gross Incurred (8)	Net Incurred (9)
1987	1	$141,485	$838	$840	$0	$0	$0	0	($1)	($1)
	2	144,501	814	816	241	1	240	2	217	216
	3	137,486	898	900	0	1	(1)	0	84	83
	4	144,089	966	968	8	1	7	3	76	75
1988	1	150,827	960	962	37	0	37	2	31	31
	2	163,242	1,226	1,228	1	1	0	1	267	266
	3	154,314	2,269	2,271	−1	0	(1)	0	1,042	1,042
	4	149,232	1,874	1,876	949	42	907	5	554	512
1989	1	165,830	1,870	1,872	41	10	31	2	37	27
	2	169,744	1,940	1,942	0	22	(22)	14	70	48
	3	146,719	2,177	2,179	0	0	0	13	237	237
	4	143,860	2,535	2,537	34	138	(104)	13	392	254
1990	1	150,955	2,744	2,746	0	30	(30)	0	209	179
	2	154,065	2,890	2,892	3	2	1	1	149	147
	3	137,148	3,044	3,046	5	21	(16)	1	159	138
	4	124,822	2,639	2,641	564	2	562	1	159	157
1991	1	119,843	2,812	2,814	88	220	(132)	1	261	41
	2	133,278	2,504	2,506	79	0	79	1	(229)	(229)
	3	134,991	2,909	2,911	−2	0	(2)	0	403	403
	4	128,404	2,692	2,694	47	89	(42)	1	(170)	(259)
1992	1	142,148	2,353	2,355	438	2	436	3	99	97
	2	211,041	2,398	2,400	0	0	0	1	45	45

(2) Estimated by subtracting 1992 year to date recovery from 6/30/92 gross reserve and then rolling backwards using net incurred and net paid amounts.

(3) Estimated by rolling back reserve from 6/30/92 amount using gross incurred and gross paid amounts.

All other data as provided by company

Bad-Debt Reserve Analysis
Government Economic Statistics

Year	Qrt/Ending	Unemployment Rate (1)	Employment Number (Millions) (2)	$ Construction Sales (Billions) Private Res. (3)	Private NonRes. (4)	Public (5)	Total (6)	Gross Dom. Product (Billions) (7)	Total Housing Starts (8)
1987	Mar	6.5 %	108,218	$560.9	$369.9	$226.4	$1,157.2	$4,460.0	349.1
	Jun	6.1	109,108	596.3	369.9	223.9	1,190.1	4,515.3	480.2
	Sep	5.9	109,882	595.2	383.3	225.5	1,204.0	4,559.3	447.8
	Dec	5.8	110,529	584.7	388.7	231.2	1,204.6	4,625.5	343.2
1988	Mar	5.6	110,899	582.9	380.8	227.7	1,191.4	4,655.3	297.2
	Jun	5.3	111,933	570.5	385.9	234.0	1,190.4	4,704.8	443.6
	Sep	5.4	112,158	586.5	392.0	235.6	1,214.1	4,734.5	404.9
	Dec	5.3	112,816	603.1	396.1	243.6	1,242.8	4,779.7	342.4
1989	Mar	5.0	115,038	605.5	401.5	238.4	1,245.4	4,809.8	303.8
	Jun	5.3	114,958	591.9	400.2	248.8	1,240.9	4,832.4	404.6
	Sep	5.3	114,689	582.4	407.9	252.5	1,242.8	4,845.6	366.4
	Dec	5.4	114,192	571.2	406.6	265.4	1,243.2	4,859.7	301.5
1990	Mar	5.2	113,710	591.6	471.3	324.9	1,387.8	4,880.8	294.5
	Jun	5.2	113,623	567.9	468.8	319.4	1,356.1	4,900.3	358.0
	Sep	5.6	113,806	539.1	473.3	327.5	1,339.9	4,903.3	307.0
	Dec	6.0	113,545	505.1	447.5	334.7	1,287.3	4,855.1	233.1
1991	Mar	6.7	114,155	469.8	427.9	320.8	1,218.5	4,824.0	185.5
	Jun	6.9	114,201	464.7	416.2	323.3	1,204.2	4,840.7	300.8
	Sep	6.8	113,230	487.4	392.9	328.2	1,208.5	4,862.7	284.8
	Dec	7.1	113,545	503.8	384.4	337.9	1,226.1	4,868.0	243.0
1992	Mar	7.3	113,951	511.1	378.6	350.7	1,240.4	4,896.9	262.0
	Jun	7.8	114,322	531.5	376.2	360.0	1,267.7	4,891.0	340.8

(6) (3) + (4) + (5)
(7) Adjusted for inflation to 1987 dollars.
Note: Shaded figures are estimated.

TECHNICAL APPENDIX

The following notes provide certain details regarding the multiple regression models. Additional information can be obtained on request:

- o Explanatory Footnotes - The following explanatory footnotes relate to calculations displayed on Exhibit 4:

  . Page 1

  - Column (1) references Exhibit 5, Page 3, Column (11).
  - Columns (2), (3), (4), (5), (6), and (7) reference Exhibit 7, Columns (1), (2), (3), (4), (5), and (7), respectively.
  - Column (8) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).
  - Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

  . Page 2

  - Column (1) references Exhibit 5, Page 3, Column (11).
  - Columns (2), (3), (4), and (5) reference Exhibit 7, Columns (1), (2), (4), and (5), respectively.
  - Column (6) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).

- Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

. Page 3

- Column (1) references Exhibit 5, Page 3, Column (12).
- Columns (2), (3), and (4) reference Exhibit 7, Columns (2), (4), and (5), respectively.
- Column (6) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).
- Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

. Page 4

- Column (1) references Exhibit 5, Page 3, Column (10).
- Columns (2), (3), (4), (5), (6), and (7) reference Exhibit 7, Columns (1), (2), (3), (4), (5), and (7), respectively.
- Column (8) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).
- Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

. Page 5

- Column (1) references Exhibit 5, Page 3, Column (8).
- Columns (2), (3), (4), (5), (6), and (7) reference Exhibit 7, Columns (1), (2), (3), (4), (5), and (7), respectively.
- Column (8) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).
- Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

. Page 6

- Column (1) references Exhibit 5, Page 3, Column (12).
- Columns (2), (3), (4), and (5) reference Exhibit 7, Columns (8), (2), (4), and (5), respectively.
- Column (6) equals the Constant of the Regression Output plus the sum of the X Coefficient(s) of the Regression Output times the corresponding data values of the columns indicated above the X Coefficient(s).
- Regression Output was produced by Lotus 1-2-3, Version 3.1, multiple linear regression functions.

o Frequency, severity, paid loss costs, and incurred loss costs were the dependent variables for which multiple regression models were developed. After some initial

testing of separate models for frequency, severity, and loss costs it was determined that all four dependent variables correlated highly with the same independent variables. Hence, it was determined that a single model of the loss costs rather than separate models of frequency and severity would be used for reserve estimation purposes. This determination can be made by comparing the models displayed on Exhibit 4, pages 1, 4, and 5, where the same independent variables were used to model different dependent variables.

- Our best fitting models were loss cost model 2 and loss cost model 3. Loss cost model 1, while having a higher r-squared coefficient than either loss cost models 2 or 3, had fairly high standard errors of estimate for the X coefficients. Therefore, we considered loss cost models 2 and 3 to be better fitting models than loss cost model 1. Loss cost model 4 (Exhibit 4, Page 6) includes housing starts in addition to the independent variables of loss cost model 3. While a correlation between housing starts and the incurred loss costs was found (approximately 25 percent r-squared), the additional variable does not appear to improve the fit relative to loss cost model 3. The standard error of the X coefficient was also relatively high for the housing starts variable. Hence, we continue to view loss cost models 2 and 3 as our best fitting models based on the information reviewed. It is possible that other independent variables not considered in our review, combined with housing starts, could produce a fit comparable to loss cost model 3.

- Loss cost model 2 used only four independent variables (unemployment rate, employment number, private non-residential construction sales, and public construction sales). Loss cost model 3 used these same independent variables as loss cost model 2 excluding the unemployment rate. Other independent variables tested were eliminated

because they did not contribute significantly to the goodness of fit measurements (that is, no significant change in the r-squared coefficient was observed) and/or because the X coefficients associated with these variables exhibited large degrees of error (that is, the standard errors of estimate for the X coefficients were large relative to the value of the X coefficients being estimated).

- All independent variables were reviewed for multicollinearity and no significant multicollinearity was found.

- Our best fitting models used unemployment rates and/or employment numbers that were lagged by three quarters. This significantly improved the predictive power of these independent variables. Other lag periods (one quarter and two quarters) and lagging other independent variables were tested with no appreciable improvement in fit.

- Revisions to government statistics could change the models selected for our analysis. Historically, the government has often made revisions to their published statistical data. To the extent such revisions are made in the future, the models should be updated for the new statistics, reviewed for reasonability, and revised if indicated.

- For the best fitting models the sign of the coefficients can be explained as follows:

    . The negative sign of the coefficient for the unemployment rate is apparently caused by the lagging of the unemployment rate combined with the short tail nature of these liabilities. After unemployment rates have already changed direction the Company responds to the change and adjusts their credit policies

appropriately. The effect of these changes then shows up some time later in the reserves and resulting write offs. For example, when the unemployment rate increases the Company responds by tightening their credit policies which results in lower bad-debt write offs.

The sign of the coefficient for the employment number is apparently caused by the effect employment has on the overall economic growth of the nation. For example, as employment increases, the major customers of the Company become more profitable and hence produce fewer bad-debt write offs. On the other hand more economic growth implies larger lines of credit which could result in larger bad-debt write offs when they occur. The change in the sign of this coefficient between loss cost models 2 and 3 appears to be caused by the Company's response to anticipated economic changes that are reflected in the bad-debt reserves. These reserves constitute part of the incurred losses but are not part of the paid losses.

The negative sign of the coefficient for the private non-residential construction sales is apparently caused by the effect construction sales has on the overall economic health of the Company's major customers. For example, as these sales increase, the major customers of the Company become more profitable and hence produce fewer bad-debt write offs.

The positive sign of the coefficient for the public construction sales is apparently related to the observation that public construction sales tend to increase, relative to private construction sales, when the economy is weak and construction capacity is high

(which provides government with lower cost construction work). This variable is reflecting the overall economic health of the Company's major customers. For example, as these sales increase, the major customers of the Company become less profitable (operate at smaller profit margins) and hence produce more bad-debt write offs.

Addendum

Considerations Regarding the Use and Update of Bad-Debt Reserve Model

This addendum provides information that the Company might consider when using and updating the bad-debt reserve model that was developed in our report:

- The model relies on multiple regression fits between the Company's historical data and certain economic statistics. The relationship between the Company's data and these statistics can change over time, particularly if the statistics are revised or changes in the Company's operations are significant

- Unanticipated changes in the economy or financial condition of the Company's customers may not be reflected in the economic statistics or the Company's historical data. Therefore, the bad-debt reserve model may not accurately reflect such changes in the estimated reserve

- The Company should consider monitoring the accuracy of the bad-debt reserve model to determine how well the model predicts bad-debt reserves as compared to actual bad-debt write-offs. The model uses broad averages and tends to smooth irregularities. Therefore, a reasonable monitoring process might be one that measures accuracy over a multi-year period.

- The bad-debt reserve model relies on certain assumptions. These assumptions should be reviewed regularly to determine if they are reasonable. The following assumptions should be included in such a review:

    - The timing of write-offs relative to the bad-debt provision (the payout pattern as defined in our report) was assumed to be comparable to credit insurance,

    - Write-off severity, frequency, and loss costs were assumed to be correlated with the same economic variables,

    - The difference between net and gross reserves was assumed to be a constant amount over the historical experience period, and

- Certain economic statistics were estimated for the more recent quarters.

The considerations given above include those that we believe are most relevant to the use and update of the bad-debt reserve model. There may be other considerations based on actuarial judgment and experience that are not readily identifiable in advance.