

JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

IX. MISCELLANEOUS PROJECTS AND CORRESPONDENCE WITH INDUSTRY

A. Computer Modeling

1. Sample of Correspondence from Northwestern Mutual Life Insurance Company re: "Mutual Model", November 19, 1971

INTER-OFFICE CORRESPONDENCE

THE NORTHWESTERN MUTUAL LIFE  
INSURANCE COMPANY • MILWAUKEE



To Mr. R. Zimmerman

Date May 3, 1971

In reply to  
letter dated

From Donald O'Dell, Specialist  
Genl. Agcy. Real Estate  
Dept., etc.

Regarding Company Books, Tax Books, TYE

In your memo of April 29 to Mr. Hansen, you indicated the depreciable amount and actual depreciation will be understated, if the program remains unchanged. This is partially correct--Company Book Depreciation will be understated.

COMPANY BOOKS

In establishing the Company Book Depreciable basis, interest during construction, ground rent, and real estate taxes must be added to the hard construction costs. Hard construction costs include costs of material, labor, architect's fees, etc. The total of hard construction costs is determined by totaling the loan amounts advanced indicated on the phasing sheet.

Note: Interest during construction includes interest on interest.

TAX BOOKS

The total of hard construction costs equals the tax book basis. Real estate taxes, ground rent, and interest during construction is expensed for tax book purposes-- reduces taxable income. Interest expenses include interest on interest due on construction loans.

TYE

On Friday, April 30, I reviewed the TYE calculations with W. Shinkwin of the Controller's Department. The calculations of TYE appear to be correct, with the exception of line 82. This line should be defined as follows:

(NML's Net Income Before Taxes Line: 36 + NML's Average Unrealized TYE Gain or Loss) Line: 41 or NML's Realized and Unrealized TYE Income ÷ (NML's Book Value Line: 46 + Proportionate # of years X NML's Average Unrealized TYE Gain or Loss Line: 41)

Two additional TYE ratios have not yet been defined in the latest set of output sheets--The Unleveraged TYE return before capital gains and the Unleveraged TYE return with capital gains.

UNLEVERAGED TYE BEFORE CAPITAL GAINS

(Ownership share of interest expense + Book income on Equity) ÷ (Ownership share of loans + NML equity)

Unleveraged TYE after capital gains--Add NML's average Unrealized TYE Gain or Loss to numerator and Add the product Proportion # of years X NML's Average Unrealized TYE Gain or Loss to denominator.

Mr. R. Zimmerman

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May 3, 1971

I believe these TYE ratios can be added with little difficulty at a later date. We should have the leveraged TYE calculations operational initially.

Several of the TYE ratios are given as discounted rates of returns. Shinkwin indicated he wanted both inflows and outflows to be discounted back at 6% then solve for a rate that would make both sides of the equation equal.

If you have any questions concerning the above, do not hesitate to call.

*DOD/gz*  
DOD:gz

CC Mr. Marvin Hansen  
Mr. William Shinkwin



MARVIN A. HANSEN  
Assistant Manager of Investments  
Property Management

720 East Wisconsin Avenue, Milwaukee, Wisconsin 53202

November 19, 1971

Prof. James A. Graaskamp  
Graduate School of Business  
1155 Observatory Drive  
The University of Wisconsin  
Madison, Wisconsin 53706

Dear Jim:

Pursuant to our telephone conversation of yesterday, we enclose the following:

Description of the Output plus Mr. O'Dell's memo to Mr. Zimmermann.

Assumptions and Case 1  
Assumptions and Case 2  
Assumptions and Case 3  
Assumptions and Case 8

The Mutual Model is now operational, the documentation is nearly complete, and by December 2 the input forms will be redesigned and the user's manual will be well outlined. The target date for completion is now December 15.

I believe Mr. O'Dell and Mr. Zimmermann have done a fine job on this project. They both will be available on December 2 at 1:00 to answer any questions we might have.

Thanks again for agreeing to coauthor an article on the Mutual Model. Please provide me with the name of the magazine you think might publish our article.

Sincerely,

A handwritten signature in cursive script that reads 'Marvin'.

Marvin A. Hansen  
Assistant Manager of Investments--  
Property Management

MAH:gaz  
Enclosures  
CC Mr. D. O'Dell  
Mr. R. Zimmermann

TEN YEAR INCOME ANALYSIS - PROJECT

1. Cash Flow Before Debt Service

- a. Less: Interest Expense @ Contract Rates
- b. Less: Participation (Bonus) Interest
- c. Less: Depreciation per Tax Books

Gross Income - Vacancy Allowance = Effective Gross Income - Operating Expenses  
Net Income Before Debt Service.

All interest to be paid during each year at the contract rate, standby fees,  
and loan fees.

All additional interest received during the year calculated as some share of  
operating income, as defined by the "Participation" sheet.

Useful life, method of depreciation and date depreciation commences are given  
as input.

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2. Taxable Income

- a. Plus: Depreciation per Tax Books
- b. Less: Principal Payments (Normal)

All principal payments required on long term loans (Type 1 & 2)

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3. Cash Flow After Debt Service (before taxes)

- a. Plus: Long Term Loans Received (Type 1 & 2)
- b. Plus: Interim Loans Received (Type 3)
- c. Plus: Equity Contributions
- d. Plus: Additional Working Capital Loans
  
- e. Less: Long Term Loans Refinanced (Type 1 & 2)
- f. Less: Interim Loans Paid (Type 3)
- g. Less: Repayments of Working Capital Loans
- h. Less: Capital Expenditures

All long term loans received during current year.

All interim loans received during the current year.

All equity contributions during current year.

Working Capital loans are assumed to insure that cash requirements are met if  
inadequate funds are provided. All working capital loans received during  
current year.

All prepayments of long term loans (Type 1 & 2) during current year.

All principal payments on Interim Loans (Type 3).

All cash flow after taxes first goes to repayment of Working Capital Loans.

All capital expenditures for current period (Accumulated Capital Expenditures end of  
current period - Accumulated Capital Expenditures end of prior period). See Line 10.

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4. Net Cash Available Before Taxes

5. Accumulative Net Cash Available Before Taxes

CAPITAL VALUE SUMMARY - PROJECT

6. Market Value (net selling cost)

- a. Less: Long Term Loans (Type 1 & 2)
  - b. Less: Interim Loans (Type 3)
  - c. Less: Working Capital Loans
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MUTUAL MODEL (cont'd.)

CAPITAL VALUE SUMMARY - PROJECT (cont'd.)

- 7. Net Worth End of Year
- 8. Change in Net Worth
- 9. Capital Gains

Net Worth at the end of the current year - Net Worth at the end of previous year.

Market Value (net of Selling Costs)

Less: Total Capital Expenditures through the current year

Less: Accumulated Depreciation for the Tax Books

Capital Gain or Loss

BOOK CAPITAL VALUE SUMMARY - PROJECT

- 10. Capital Expenditures
  - a. Plus: Interest Expense During Construction)
  - b. Plus: Property Taxes During Construction )
  - c. Plus: Ground Rent During Construction )
- 11. Capital Investment
  - a. Less: Accumulated Depreciation - Straight Line

Total accumulated dollars of cash "outlay" as described in the Capital expenditures and Phasing Sheet by period.

Items expensed for Income Tax Books, but capitalized for Company Books. All interest on construction or interim financing (Type 3) and all property taxes and ground rent during the first phase of construction.

Total accumulated cost of all capital expenditures and accumulated cost of capitalized expenses by period.

Depreciation is based on the Capital Investment base that is depreciable on Line 11.

- 12. Asset Book Value
  - a. Less: Deferred Taxes

NML's Share of Deferred Taxes (Line: 43a) ÷ NML's Equity Ownership Percentage

- 13. Adjusted Assets

BOOK INCOME - PROJECT

- 14. Net Income Before Debt Service
  - a. Less: Depreciation - Straight Line

Line: 1 (Same as Cash Flow Before Debt Service).

Capital Investment (Line 11) of each depreciable asset divided by the useful life described.

- 15. Net Income Before Interest Expense
  - a. Less: Interest Expense

All current period interest paid, but not interest capitalized in determining Capital Investment. (Line: 1a plus Line: 1b) - All interest paid on interim construction loans (Line: 10a).

- 16. Net Income Before Taxes

MUTUAL MODEL (cont'd.)

TEN YEAR INCOME ANALYSIS - NML

17. Normal Interest Income (Contract Rate)	Interest to be received by NML per the contract rate + standby fees + loan fees.
a. Plus: Participation (Bonus) Interest	All additional interest calculated on some formula share of operating income paid to NML. See Participation Sheet.
b. Plus: NML's Share of Project Cash Flow Before Debt Service	Project Cash Flow Before Debt Service (Line: 1) X NML's Equity Ownership percent.
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18. NML's Cash Flow Before Debt Service	
a. Less: NML's Share of Interest Expense	NML's equity ownership percentage X [(interest expense at contract rate + participation on Bonus Interest) or Line: 1a + Line: 1b.]
b. Less: NML's Share of Depreciation per Tax Books	NML's share of depreciation X the current years depreciation per the Tax Books (Line: 1c).
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19. NML's Taxable Income	
a. Plus: NML's Share of Depreciation per Tax Books	Line: 18b.
b. Less: NML's Share of All Principal Payments (Project)	NML's Share of Principal Payments required on Long Term Loans (Type 1 & 2) or NML's Equity Ownership percent X Line: 2b.
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20. NML's Cash Flow After Debt Service (Before Taxes)	
a. Less: Income Tax Expense or	NML's Taxable Income (Line 19) X NML's given rate on Ordinary Income.
b. Plus: Tax Savings (On Other Income)	NML's Taxable Income (Line 19) (if loss) X NML's given rate on Ordinary Income.
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21. NML's Cash Flow After Taxes	
a. Plus: All Principal Payments to NML on Long Term Loans	Principal payments on Long Term Loans made by NML (or payments based on amortization schedule + all prepayments on NML Loans).
b. Plus: All Principal Payments to NML on Interim Loans	Principal Payments on Interim Loans made by NML (Type 3).
c. Plus: NML's Share of All Interim Loans Received (Type 3)	NML's Equity Ownership percentage X all dollars received on Interim Loans during current year Type 3 (Line: 3b).
d. Plus: NML's Share of All Long Term Loans Received (Type 1 & 2)	NML's Equity Ownership percentage X all dollars received on new Long Term Loans during period, Type 1 & 2 (Line: 3a).
e. Plus: NML's Share of Additional Working Capital Loans	NML's Equity Ownership percentage X all dollars received on Working Capital Loans during current year (Line: 3d).
f. Less: NML's Share of Working Capital Loan Prepayments	NML's Equity Ownership percentage X all repayments on Working Capital Loans during the current year (Line: 3g).

## 21. NML's Cash Flow After Taxes (cont'd.)

- g. Less: All Long Term Loans from NML
- h. Less: All Interim Loans from NML
- i. Less: NML's Equity Contributions
- j. Less: NML's Share of all Interim Loans Paid (Type 3)
- k. Less: NML's Share of All Long Term Loans Refinanced  
(Type 1 & 2)
- l. Less: NML's Share Capital Expenditures

New NML Loans during current year (Type 1 &amp; 2).

New NML Interim Loans during current years (Type 3).

All NML equity contributions during current year.

NML's Equity Ownership percentage X all payments made on Interim Loans (Line: 3f)

NML's Equity Ownership percentage X prepayment of Long Term Loans during the current year (Line: 3e).

NML's Equity Ownership percentage X all Capital expenditures for the current period. Line 3h.

Net Cash received by NML during the current year plus tax savings.

Assumed earnings on reinvestment of cash flows based on a given reinvestment rate (Target Rate) X the previous years cash available for reinvestment.

## 22. NML's Cash Available for Reinvestment

- a. Plus: Reinvestment Return

## 23. NML's Cash Available Including Reinvestment

24. NML's Cash Available Including Reinvestment, Accumulative

Cash available including reinvestment for all previous and all the current years.

CAPITAL VALUE SUMMARY - NML

## 25. NML's Share Net Worth - End of Period

- a. Plus: NML's Long Term Loans (Type 1 & 2) - Current Balance
- b. Plus: NML's Interim Loans - Current Balance (Type 3)

NML's Share Market Value (Net of selling cost) - (NML's share of long term loans + NML's share of all working capital loans + NML's share of all Interim Loans).

## 26. NML's Net Worth in Project

- a. Less: NML's Capital Gains Tax - Part Taxed as Ordinary Income.
- b. Less: NML's Capital Gains Tax Part Taxed at Capital Gains rate

NML's Accumulated Accelerated Depreciation - NML's Accumulated Straight Line Depreciation on Tax Book Asset Base) X the given rate on Ordinary Income.

NML's share of Capital Gain - [(NML's accumulated accelerated depreciation - NML's accumulated straight line depreciation on Tax Book Asset Base) X given tax rate on Capital Gains].

NML's Net Worth in Project (Line 26) - NML's Capital Gains Tax (Line: 26a &amp; 26b).

NML's Net Worth in Project at current year end - NML's Net Worth in Project at Previous year end. (Line 26).

Present Year NML's Net Worth After Taxes on Capital Gains - prior year.

## 27. NML's Net Worth after Taxes on Capital Gain

## 28. NML's Change in Net Worth in Project

## 29. NML's Change in Net Worth After Taxes on Capital Gains

## 30. NML's Share Capital Gains or Losses

NML's Share of Market Value - Tax Book Value = Gain or Loss.



MUTUAL MODEL (cont'd.)

BOOK INCOME - NML

31. NML's Share Effective Gross Income From Income & Expense Schedule  
a. Less: NML's Share Total Operating Expenses Property Taxes will be capitalized during the first phase of construction.
32. NML's Net Income Before Financial Adjustments  
a. Less: NML's Share of Ground Rent Ground Rent will be capitalized during the first phase of construction.
33. Net Income Before Depreciation and Interest Adjustments Same as Net Income Before Debt Service.  
a. Less: NML's Share of Depreciation - S.I. Depreciation is based on NML's Share of the Capital Investment (Line: 11).
34. NML's Net Income Before Interest Adjustments  
a. Plus: NML's Normal Interest Income Line:17  
b. Plus: NML's Participation Interest Line: 17a
35. NML's Net Income Before Interest Expense  
a. Less: NML's Share of Interest Expense Line: 18a
36. NML's Net Income Before Taxes

UNREALIZED GAIN OR LOSS - NML

37. NML's Share of Market Value  
a. Less: NML's Share of Assets (Book Value) Line: 43
38. NML's Gain or Loss on Sale  
a. Plus: TYE Adjustment on Gain (TYE Factor - 100) X NML's Gain (Line:38)  
or  
b. Plus: TYE Adjustment on Loss (TYE Factor - 100) X NML's Share of Capital Loss (Line 30 if loss otherwise 0)
39. NML's Unrealized TYE Gain or Loss on Sale
40. NML's Change in Unrealized TYE Gain or Loss on Sale NML's Unrealized TYE Gain or Loss at current year end - NML's Unrealized TYE Gain or Loss at previous year end.
41. NML's Average Unrealized TYE Gain or Loss on Sale NML's Unrealized TYE Gain or Loss in the last period of analysis (Line:39) ÷ the # of periods.

MUTUAL MODEL (cont'd.)

BOOK CAPITAL VALUE SUMMARY - NML

42. NML's Share of Capital Investment	NML's Equity Ownership percent X Project Capital Investment (Line:11)
a. Less: NML's Share of Accumulated Straight Line Depreciation (Book)	NML's Equity Ownership percent X Accumulated Depreciation for Project, - Straight Line (Line: 11a).
43. NML's Share of Assets (Book Value)	
a. Less: NML's Deferred Taxes	(Accumulated Depreciation Tax Book's + construction costs expensed for tax purposes accumulated book depreciation) X NML's given rate on Ordinary Income.
44. NML's Share of Adjusted Assets	
a. Less: NML's Share of all Loan Balances	NML's Equity Ownership percent X all current loan balances (Types 1, 2, & 3).
45. NML's Equity (Book Value)	
a. Plus: NML's Loans	Current Loan Balances on NML Loans (Types 1, 2, & 3).
46. NML's Book Value	

TEN YEAR ANALYSIS OF IMPORTANT RATES, RETURNS AND RATIOS  
(Method of Calculation)

PROJECT RATIOS

Loan Ratios - Project

47. Current Debt Service per Sq. Ft. Net Rentable

Total Interest and Principal Payments on all funds and working capital loans during the current year (Line: 1a + 1b + 2b + 3g) ÷ total sq. ft. of net rentable area.

48. Current Default Per Sq. Ft. Net Rentable

(Total Interest and Principal Payments on all funds and working capital loans during the current year (Line: 1a + 1b + 2b + 3g) + total expenses during the current year) ÷ total sq. ft. of net rentable area.

49. Current Default Ratio

(Total Interest and Principal Payments on all funds and working capital loans during the current year Line: 1a + 1b + 2b + 3g + total expenses during the current year) ÷ gross income during the current year.

50. Current Loan Balance per Sq. Ft. Net Rentable

Principal balances of all funds and working capital loans at current year end ÷ total sq. ft. of net rentable area.

51. Current Loan Balance per Sq. Ft. Gross

Principal balances of all funds and working capital loans at current year end ÷ gross sq. ft. of building area.

52. Current Loan Ratio

Principal balances of all funds and working capital loans at current year end ÷ market value (Net of selling expenses) at current year end. (Line 6a + 6b + 6c) ÷ (Line 6)

Management Ratios - Project

53. Current Expense Per Sq. Ft. Net Rentable

Total Operating Expenses during the current year ÷ total sq. ft. of net rentable area.

54. Current Percentage Property Taxes of Gross Income

Property Taxes during the current year ÷ gross income during the current year.

55. Current Expense Ratio

Total Operating Expenses during the current year ÷ gross income during the current year.

56. Current Management Ratio

(Total Operating Expenses during the current year - (property taxes during the current year + insurance during the current year) ÷ gross income during the current year.

Equity Ratios - Project

57. Current Productivity Ratio (Similar to Capitalization Rate)

Cash flow before debt service during the current year (Line: 1) ÷ market value (net of selling expense) at current year end. (Line: 6)

58. Current Cash Flow Before Taxes on Equity

Cash Flow after Debt Service (before taxes) during the current year Line: 3 ÷ total equity contributions at the end of the current year.

59. Current Gross Tax Shelter Ratio

(Total Expenses during the current year + depreciation (Tax Books) during the current year Line: 2a + total interest expenses during the current year) Line: 1a + 1b ÷ effective gross income during the current year.

60. Current Principal Shelter Ratio

Depreciation (tax books) during the current year Line: 2a ÷ total principal payments on all funds and working capital loans during the current year. (Line 2b + 3e + 3f + 3g)

61. Current Net Tax Shelter Ratio

(Depreciation (tax books) during the current year Line: 2a + total interest payments on all funds and working capital loans during the current year) Line: 1a + 1b ÷ cash flow before debt service during the current year. (Line: 1)

TYE Ratios - Project

62. TYE Yield on Adjusted Assets

Net Income Before Interest Expense (Line: 15) ÷ Adjusted Assets (Line: 13)

Miscellaneous Data - Project

63. Building Efficiency Ratio Total sq. ft. of Net Rentable area ÷ Gross sq. ft. of Building Area.
64. Project Cost per Sq. Ft. Net Rentable Capital Investment (Line: 11) ÷ Total sq. ft. of Net Rentable Area.
65. Project Cost per Sq. Ft. Gross Capital Investment (Line: 11) ÷ Gross sq. ft. of Building Area.
66. Capitalization Rate (Stabilized) Stabilized Net Income Before Debt Service ÷ Capital Investment (Line: 11).

NML RATIOS

Cash Ratios - NML

67. NML's Current Normal Interest Rate Before Taxes NML's Normal Interest Income during the current year Line: 17 ÷ Average Principal Balance during the current year on all outstanding loans made by NML.
68. NML's Current Participation Interest Rate Before Taxes NML's Participation Interest Income during the current year Line: 17a ÷ Average Principal Balances during the current year on all outstanding Loans made by NML.
69. NML's Current Total Interest Rate (NML's Normal Interest Income during the current year Line: 17 + NML's Participations Interest Income during the current year) Line: 17a ÷ Average Principal Balances during the current year on all outstanding loans made by NML.
70. NML's Current Return on Cash Equity Before Taxes and Debt Service NML's share of project Cash Flow before debt service before taxes during the current year Line: 17b ÷ NML's Equity Contribution at current year end. This ratio will not be calculated if NML's Equity Contribution is less than \$100,000.
71. NML's Current Rate of Cash Flow Before Debt Service NML's Cash Flow Before Debt Service (Line: 18) ÷ (Average Principal Balance during the current year on all outstanding loans made by NML + NML's Equity contributions at current year end).
72. NML's Current Rate of Cash Flow After Debt Service on Cash Investment NML's Cash Flow after Debt Service before taxes during the current year Line: 20 ÷ (Average Principal Balance during the current year on all outstanding loans made by NML + NML's Equity contribution at current year end).
73. NML's Current Rate on Cash Flow After Taxes on Cash Investment NML's Cash Flow after Taxes during the current year Line: 21 ÷ (Average Principal Balances during the current year on all outstanding loans made by NML + NML's Equity Contribution at current year end).
74. NML's Current Percent of Cash Investment Recaptured Including Reinvestment NML's Cash Available Including Reinvestment at target rate accumulated through current year end Line: 24 ÷ (Original Amount of all loans made by NML + Original amount of all NML's Equity Contribution).

Returns Assuming Sale of Project

75. NML's Current Cash Flow Before Taxes and Change in Net Worth on Cash Investment (NML's Cash Flow Before Debt Service during the current year (Line: 18) + NML's Change in Net Worth in Project during the current year) Line: 28 ÷ (NML's total Equity Contributions at current year end + Present Balance on all NML Loans at ~~current~~ year end).
76. NML's Current Cash Flow After Taxes and Change in Net Worth on Cash Investment (NML's Cash Flow After Taxes during the current year Line: 21 + NML's Change in Net Worth After taxes on Capital gains at current year end) (Line: 29) ÷ Cash Investment at current year end. (see above)
77. NML's Current Cash Flow Before Taxes and Change in Net Worth on NML's Net Worth in Project (NML's Cash Flow Before Debt Service during the current year (Line: 18) + NML's Change in Net Worth in Project during the current year Line: 28 ÷ NML's Net Worth in Project at previous year end.
78. NML's Current Cash Flow After Taxes and Change in Net Worth After Taxes (NML's Cash Flow After Taxes during the Current year Line: 21 + NML's Change in Net Worth after taxes during the current year) Line: 29 ÷ NML's Net Worth after taxes on Capital Gain at previous year end.
79. NML's Current Return of Cash Available for Reinvestment and Change in Net Worth after Taxes on NML's Net Worth After Taxes (NML's Cash Available for Reinvestment during the current year Line 22 + NML's Change in Net Worth after taxes during the current year) Line: 29 ÷ NML's Net Worth After Taxes on Capital Gains at previous year end.
80. NML's Current Return of Cash Available Including Reinvestment and Change in Net Worth after Taxes on NML's Net Worth After Taxes (NML's Cash Available including Reinvestment during the current year Line 23 ÷ NML's Net Worth After Taxes on Capital Gains at previous years end.

TYE Ratios - NML

81. TYE Yield on NML's Book Value NML's Net Income Before Taxes Line 36 ÷ NML's Book Value Line: 46.
82. TYE Yield on NML's Adjusted Book Value - S.L. (NML's Net Income Before Taxes Line 36 + NML's Average Unrealized TYE Gain or Loss) Line: 41 or NML's Realized and Unrealized TYE Income ÷ (NML's Book Value + NML's Average Unrealized TYE Gain or Loss). Line: 46 + 41.

PRESENT VALUE CONCEPTS CASH BASIS - NML

With "0" Reinvestment Rate

83. Cash Available for Reinvestment - Accumulative  
a. Plus: Net Worth After Taxes
84. Corpus in Dollars
85. Present Value of Investment in Dollars
86. Rate of Return

With Portfolio Rate:

87. Cash Available Including Reinvestment  
a. Plus: Net Worth After Taxes

88. Corpus in Dollars

89. Present Value of Investment in Dollars

90. Rate of Return

With Target Rate:

91. Cash Available Including Reinvestment  
a. Plus: Net Worth After Taxes

92. Corpus in Dollars

93. Present Value of Investment in Dollars

94. Rate of Return

PRESENT VALUE CONCEPTS, TYE BASIS - NML

95. Present Value of TYE Yield on NML's Book Value

Present Value Items on Line 36 equated Present Value Items on Line 46.

96. Present Value of TYE Yield on NML's Adjusted Book Value

Present Value Items on Line 36 & 41 equated Present Value Items on Line 41 & 46.