WORK BOOK FOR DETERMINING
ECONOMIC ACHIEVABILITY
FOR NATIONAL POLLUTION DISCHARGE
ELIMINATION SYSTEM PERMITS

Prepared for

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Prepared by
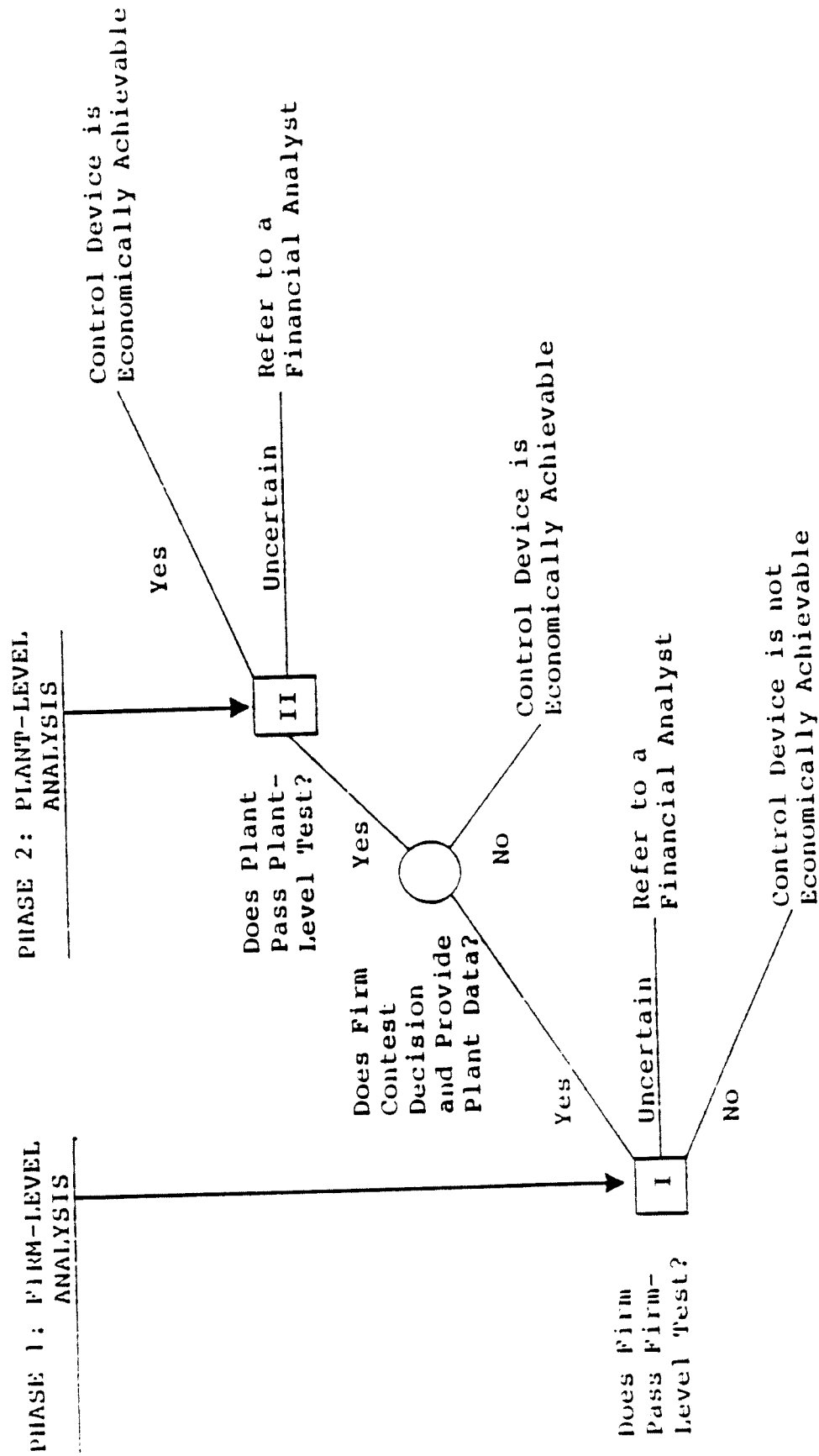Putnam, Hayes & Bartlett, Inc.

August 1982

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Exhibit 1-1

SEQUENCE OF ANALYSES FOR DETERMINING ECONOMIC ACHIEVABILITY

PHASE 1: FIRM-LEVEL ANALYSIS

PHASE 2: PLANT-LEVEL ANALYSIS

Does Firm Pass Firm-Level Test?

I

Yes — Does Firm Contest Decision and Provide Plant Data?

Uncertain — Refer to a Financial Analyst

No — Control Device is not Economically Achievable

Does Plant Pass Plant-Level Test?

II

Yes — Control Device is Economically Achievable

Uncertain — Refer to a Financial Analyst

No — Control Device is Economically Achievable

Control Device is Economically Achievable

Under the National Pollutant Discharge Elimination System (NPDES), dischargers of toxic pollutants are required to apply the best available technology economically achievable (BATEA) to control water discharges by 1984. These technology-based control devices are defined on a case-by-case basis in NPDES permits written by EPA personnel. While the EPA has not defined economically achievable (EA), pollution control technologies are said to be economically achievable in this study if their use would not cause the plant to shut down. This manual will aid permit writers in determining the effect of installing pollution control technologies on the financial condition of firms and plants.

A plant-level definition of EA clearly makes more sense than a definition that only requires that the whole firm be able to finance a control device. Even though a particular control technology may be affordable from the perspective of an entire firm, its application to a particular plant may cause the plant's operations to become uneconomic. The problem, however, is that a plant-level test of EA is very difficult to perform due to limited and confidential financial data for individual plants. In an attempt to overcome this problem, a two-stage test is presented here. The two-stage approach is shown in Exhibit 1-1.

First, a firm-level test is performed using publicly available financial data to determine whether or not the firm can afford the costs of meeting all the BAT requirements of the plant in question.* The results of this test would indicate the effect of these costs on the firm's financial condition. If the results of this firm-level test show that the BAT requirements are economically achievable, then EPA would consider that the proposed pollution control measure is economically achievable unless the firm contests the decision. To contest a decision, a firm must provide EPA with plant-specific financial information -- such information is usually confidential. A plant level test would then be performed to evaluate the economic achievability of the proposed requirements at the plant. In this way, the burden of providing plant-level data is placed on the firm if it chooses to contest EPA's first-stage, firm-level decision.

Permit writers will require a well-constructed plant-level methodology for the second phase test. This methodology would allow them to determine the effect of the proposed pollution control measures on an individual plant's financial condition.

The rest of this manual provides a step-by-step procedure to evaluate EA according to the two-stage test outlined above. Chapters 2 through 4 describe the firm-level methodology. All the firm-level calculations can be performed using three years of data from publicly available sources, such as annual reports and stock market data. Since these sources are not available for companies that are privately held,

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* Alternatively, a firm-level test could evaluate the impact of meeting BAT requirements on all its plants. To do this, a permit writer would have to a) gather data on proposed BAT costs to all plants owned by the firm, and b) evaluate the sum of those costs in the context of the total firm's financial condition. This would show whether the BAT requirements were affordable on average.

evaluation of such companies will be difficult. Dun and Bradstreet reports some information on privately held firms that will enable the analyst to perform a limited evaluation. If conclusions are difficult to reach, EPA may ask the firm to provide confidential financial information. However, most firms of concern to EPA are publicly held companies.

Chapter 5 describes the plant-level methodology. This test uses confidential plant-specific financial data provided by the company to evaluate how the costs of pollution control equipment would impact the plant's earnings.

The firm-level methodology has two components: financial statement analysis and market value analysis. They are described in detail in the second and third chapters of this manual. The financial statement component analyzes a firm's reported values by calculating ratios from data available in annual reports and 10Ks.* This is essentially an historic perspective of the company's operating performance and asset values.

The second component of the firm-level methodology, the market value approach, uses stock market data to evaluate a firm's ability to pay for pollution control. Since stock prices reflect investors' expectations of a firm's profitability, they can be used as a proxy for the _future_ performance of a firm.

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* A 10K is a report. very similar to an Annual Report to shareholders. that is filed with the Securities and Exchange Commission.

Chapter 4 synthesizes the concepts on the use and interpretation of the accounting and stock value indicators of a firm's financial condition. Often, different ratios or methods will provide different indications of the firm's condition. Chapter 4 identifies common conflicting signals and provides some clues that will help resolve them.

The plant level methodology described in Chapter 5 has three components: the earnings test, the gross margin test and the revenue test. The earnings test analyzes a plant's reported earnings before taxes (EBT) and determines if the EBT would be positive after installation of pollution control equipment. This approach requires data which may not normally be collected at the plant level. Therefore, its usefulness may be limited. The gross margin analysis and the revenue analysis require less data and should be useful in more situations. Each approach is described in detail with example calculations in Chapter 5.

The appendices provide worksheets, source data and technical information. In Appendix A all the worksheets and explanations are gathered together for easy reference. These completed sample worksheets are also included in Chapters 2, 3, and 5 of the text where they are described. Appendix B describes the financial theory behind the market value approach that is applied in Chapter 3. Appendix C contains blank worksheets to be used in calculating all financial indicators described in the text. Appendix D contains samples of the data sources that are available. These sample sources provide the data for Inmont Corporation. the firm used to demonstrate the firm level calculations in the text.

The methodology presented in this chapter concentrates on three accounting indicators of financial strength:

- Liquidity -- ability to meet short-term financial obligations,

- Solvency -- ability to meet long-term financial obligations,

- Leverage -- indebtedness as a percentage of total capital,

Using data from balance sheets and income statements, five ratios will be calculated to measure these indicators. The ratios should be calculated using three years of financial data to smooth fluctuations in reported earnings and asset values over time. They will first be calculated with the firm's reported revenues and expenses. Then the ratios for the most recent year will be adjusted for the cost of the control device to determine how the control option will impact the firm's financial health. Each ratio will be evaluated against at least two of the following three criteria:

- A rule-of-thumb target is commonly used by analysts to determine what constitutes acceptable performance in general. In effect, they are empirical "laws" of financial management.

- Cross-sectional analysis is used to compare a firm's ratios to the range of ratios for all the firms in the same industry to get a rough measure of how it compares with average or exceptional competitors.* Although it is impossible to identify precisely the industry in which a firm competes, it can often be usefully approximated by the SIC code numbers of the firm. Financial statements of other firms with the same code provide a distribution of the financial conditions for participating in the industry. The statements of the firm in question can then be compared to lower quartile, median, and upper quartile firms' financial statements to assess relative liquidity, solvency and leverage.

- Intertemporal or longitudinal comparisons of the movement of a firm's own ratios over time indicate how performance is changing over time.

In addition, the profile described by all the ratios should be evaluated as a whole, since no single ratio is a sufficient indicator of a firm's position. There are several ways in which financial ratios can influence each other in opposite directions. These tradeoffs are described in Chapter 4.

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* Robert Morris Associates and others publish annual reviews and summaries of industry financial statements (by SIC code) from which median and quartile values of ratios may be obtained.

The next section of this chapter describes each set of ratios separately according to the following format:

- General description
- Calculation
- Critical values
- Interpretation
- Example

The example calculations use actual data from Inmont Corporation, a chemical specialties company, for the years 1974 to 1976. Exhibits 2-1 and 2-2 that follow describe each balance sheet and income statement item and duplicate the item's value for Inmont Corporation. The actual sources of these data, Moody's Industrial Manual and The Value Line Investment Survey, have been reproduced and are included in Appendix D. When items on the sample statements are labeled or categorized in a different way than on the Moody's statements, the corresponding Moody's item is noted.

Exhibit 2-1

SAMPLE BALANCE SHEET
($ in 000s)

As of December 31

ASSETS

	1976	1975	1974
Current Assets -- Those assets expected to be turned into cash within one year or business operating cycle, whichever is longer.			
Cash -- Funds available for immediate use (in checking accounts, petty cash, etc.).	6,144	7,771	3,930
Marketable Securities -- Investments that are readily marketable and are expected to be converted to cash within the year.	28,928	16,294	11,648
Accounts Receivable -- Money owed to the firm by the customers. Other Receivables (or Notes Receivable) -- Owed to the firm by entities other than customers. (Usually separated but is combined with Accounts Receivable on Moody's statement)	81,568	72,018	67,018
Inventory -- Items either completed or in the process of completion to be available for sale.	91,409	86,642	101,924
Prepaid Expenses -- Usually intangible assets (such as prepaid rent) that will expire within the year.	8,071	3,491	4,052
TOTAL CURRENT ASSETS -- Sum of Above.	216,120	186,216	190,572
Property, Plant and Equipment -- Tangible, long-lived assets. Land -- Reported at original cost, not current value. Buildings and Equipment -- Reported at original cost usually separated but are combined on Moody's statement.	181,048	178,907	169,242
Less: Accumulated Depreciation -- The amount of the building and equipment cost that has already been allocated (as depreciation expense on the Income Statement) as a cost of doing business.	85,335	84,256	76,612
NET PROPERTY PLANT AND EQUIPMENT	95,713	94,651	92,630
Other Assets -- Long-term assets that are not property plant or equipment. Investments -- Securities of another company (long-term ownership as opposed to marketable securities which are a use of excess cash). (Labeled Miscellaneous Assets on Moody's)	5,998	6,929	6,727
Intangible Assets -- Goodwill, patents, etc. Nonphysical items that provide value.	16,487	18,635	16,140
TOTAL ASSETS -- Sum of current and noncurrent assets (Equal to Total Liabilities).	334,318	306,431	306,069

Exhibit 2-1 (Continued)

SAMPLE BALANCE SHEET
($ in 000s)
As of December 31

LIABILITIES AND SHAREHOLDERS' EQUITY

	1976	1975	1974
Current Liabilities -- Obligations occurring within the year that are expected to be satisfied with current assets or by creating another current liability.			
Accounts Payable -- (Claims of suppliers for goods that have been received but not paid for.)	29,147	28,168	22,757
Estimated Tax Liability -- Amount owed the government for taxes.	16,641	5,966	8,141
Accrued Expenses Payable -- Opposite of prepaid expenses (i.e., wages due for work performed). (This item includes both Payroll and Commissions and Other Accrued liabilities on the Moody's balance sheet.)	22,422	18,271	19,462
Deferred Income -- Payment that has been received for service or good not yet provided by firm, or deferred taxes. (Deferred Income Taxes on the Moody's balance sheet.)	994	775	817
Current Portion of Long-Term Debt -- (Payable) Portion of long-term loan due within the year (also called Notes Payable).	21,872	13,190	20,268
TOTAL CURRENT LIABILITIES -- Sum of above.	91,076	66,370	71,445
Other Liabilities -- Obligations which are not due within one year.			
Long-term debt.	60,347	69,827	70,945
Deferred income taxes.	9,838	10,035	5,883
Minority interest.	3,616	3,641	6,341
Other accrued liabilities (includes reserve for disposition of certain assets on Moody's balance sheet).	6,054	8,943	11,896
TOTAL LONG-TERM LIABILITIES -- sum of above (not subtotaled on Moody's).	79,855	92,446	95,065
Shareholders' Equity -- The amount owners have invested in firm.			
Preferred Stock -- Stock that receives fixed dividends; listed at original selling price.	5,047	5,201	5,445
Common Stock at Par Value -- Number of shares of stock outstanding at "par" value. Par value does not reflect either original selling price or current value. (This excludes Treasury Stock (listed separately on Moody's balance sheet) -- stock that is kept by the firm and should not be included in outstanding shares.)	37,670	37,670	37,670
Other Paid in Capital -- Excess over par that investors actually paid for shares (also called Capital Surplus).	607	533	406
Retained Earnings -- Part of total earnings to date that have been retained for use in the business.	120,063	104,211	96,038
TOTAL SHAREHOLDERS' EQUITY -- Sum of common stock at par, other paid in capital and retained earnings. (Net stockholders' equity on Moody's)	163,387	147,615	139,559
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY -- Sum of current and long-term liabilities and shareholders' equity (Equal to Total ...ts).	334,318	306,431	306,069

Exhibit 2-2

SAMPLE INCOME STATEMENT
($ in 000s)

Period Ending December 31

	1976	1975	1974
Net Sales -- ,Gross Revenue from sales after deductions for returns, allowances and sales discounts.	534,265	451,530	469,464
Other Revenues -- Earned from activities other than sales (dividends, interest, & royalties, and other income in Moody's).	3,164	2,986	1,628
Total Revenues -- Sum of Above (not subtotaled on the Moody's statement).	537,429	454,536	471,092
Expenses:			
Cost of Goods Sold -- (Cost of Sales on Moody's) Direct cost of materials, labor, and energy used to prepare goods for sale.	375,255	324,549	339,867
Selling, General, and Administrative Expenses -- Indirect expenses including corporate expense and nonmanufacturing labor.	109,737	96,031	95,997
Other Deductions	1,541		1,463*
Minority Interest -- interest of minority shareholders in the company.	94	cr 608	1,036
Interest Expense -- Paid on loans during period.	7,897	8,892	8,340
Total Expenses -- Sum of expenses (not subtotaled on Moody's statement).	494,524	428,864	444,631
Extraordinary Items -- Any unusual expense (or credit) that is nonrecurring.	0	0	cr 257
Earnings before Taxes -- Total revenues minus all expenses (not subtotaled on Moody's statement).	42,905	25,672	24,646
Income Tax - Tax paid to government on income during year.	22,797	14,023	11,511
Net Income -- Earnings before Taxes minus Income Tax.	20,108	11,649	13,135

* Includes minority interest from Moody's income statement -- Expenses (credits) to other equity owners or subsidiaries.

LIQUIDITY RATIOS

Liquidity ratios reflect a firm's short-term ability to meet financial obligations. They relate the balance of cash and near-cash assets to liabilities maturing within the year. The two most commonly used measures of liquidity are the Current Ratio and the Quick Ratio.

Current Ratio

Current assets are those assets that the company expects to turn into cash within the year (mainly cash, accounts receivable, inventories, and marketable securities); current liabilities are those obligations that the firm expects to meet with cash within the year (usually accounts payable, short-term notes, wages and taxes payable, and currently maturing long-term debt). The ratio of current assets to current liabilities is a measure of the firm's reservoir of excess liquid assets.

Calculation $C\ A/C.L.$

The Current Ratio is the ratio of current assets to current liabilities. These items can be found on the balance sheet. Exhibits 2-3 and 2-4 demonstrate the Current Ratio using worksheets 1a and 1b (available in Appendix C) and the sample firm data. The ratio should be calculated with and without adjusting for the cost of pollution control. The Current Ratio will only be affected by the capital investment, not the maintenance expenses associated with the control equipment; the operating and maintenance expense reduce net

Exhibit 2-3

WORKSHEET 1a
CURRENT RATIO WITHOUT COST OF CONTROL
($ in 000s)

		Three Prior Years of Company Data		
		1 1976	2 1975	3 1974
1.	Current Assets	216,120	186,216	190,572
2.	Current Liabilities	91,076	66,370	71,445
3.	Current Ratio Line (1) ÷ Line (2)	2.37	2.81	2.67

Industry* } Upper Quartile 2.3
Average 1.7
Lower Quartile 1.3

Line (1)   Current assets are subtotaled on the balance sheet.

Line (2)   Current liabilities are subtotaled on the balance sheet.

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*   Source: Robert Morris Associates.

Exhibit 2-4

WORKSHEET 1b
MOST RECENT CURRENT RATIO WITH COST OF CONTROL
($ in 000s)

	Recent Year 1 1981
1. Current Assets	216,120
2. Capital Cost of Control Device Adjusted for ITC (11,765 x 0.85)	10,000
3. Adjusted Current Assets Line (1) - Line (2)	206,120
4. Current Liabilities	91,076
5. Current Ratio Line (3) ÷ Line (4)	2.26

Line (2)   Estimate of the capital cost of the control device multiplied by 0.85 to include the tax credit.

income, not the balance sheet items used to calculate the Current Ratio. Firms receive a 15 percent investment tax credit (ITC) for an investment in pollution control. The benefit of this ITC is accounted for by multiplying the capital cost by 0.85. This is a short-cut method of including the benefit of the tax credit that essentially reduces the capital cost of the control device by the 15 percent ITC.

Critical Values

A Current Ratio of greater than 2.0 is often interpreted to mean that a firm should not have trouble meeting short-term obligations. A ratio of less than 2.0 could imply liquidity problems, but other factors must be considered before drawing any conclusions. A very high ratio may also be undesirable because it could imply a lack of good investment opportunities or mismanagement of cash resources. Operating characteristics vary among industries, causing optimal industry-specific Current Ratios to be greater or less than the general rule of 2.0. Therefore, comparison with industry norms and historic ratios are necessary for a more complete view of the firm's liquidity. Thus, there are three critical values to use for comparison: a target value of 2.0, the industry median and quartile values,* and the firm's own historic values.

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*   Published by SIC code by Robert Morris Associates Annual Statement Studies. See the sample in Appendix D.

Interpretation

Clearly, if the firm's Current Ratio is greater than all three criteria both before and after the cost of the control device is included, the firm will not have difficulty meeting short-term financial obligations. Similarly, if the Current Ratio is always less than the criteria, the firm may have a liquidity problem.

If the ratio is larger than one or two criteria and smaller than the other(s), some judgment is necessary. In general, the target value and industry average values of the Current Ratio are the more important criteria; a declining Current Ratio may even be a positive sign if the ratio has been too high in past years. If the firm's Current Ratio is at least in the middle range (between the upper- and lower-quartile values) of its industry, it probably can be classified as liquid, regardless of its value relative to the target or historical ratios.

In calculating the Current Ratio adjusted for the cost of pollution control, subtract the capital cost of the device from current assets. This is not because the firm would always pay for the device out of current assets, but because this provides a conservative estimate of the firm's ability to pay. If the capital cost of the control equipment can be paid for from current assets without pushing the Current Ratio into the illiquid region, liquidity will certainly not constrain economic achievability. If, on the other hand, the company cannot pay for the control device with current assets and remain above target Current Ratio levels, it cannot be concluded that the option is not economically achievable. This is because the firm would probably not have to pay for the device with

cash or other short-term assets on hand. Instead, loans or installment payments could be used to spread the cost over time.

Several components of the Current Ratio that could cause it to over- or understate true liquidity are discussed below:

- Marketable securities -- A current asset, these securities (often T-bills or commercial paper) are carried on the balance sheet at the lower of cost or market value. If marketable securities are a large portion of current assets, look at the footnotes to the balance sheet to see if they are carried at cost and if market values are very different. Use market values in your calculation of the ratio if it is significantly different from the balance sheet value because they are a better indication of the economic value.

- Short-term obligations -- Financial statements often include current-year obligations to refund long-term debt as a current liability. In fact these are usually refinanced, especially if the firm is growing, and need not be included in the denominator for liquidity calculations. Footnotes for the line item entitled "Current Portion of Long-Term Debt" may reveal the refinancing plans; if it is to be refinanced, exclude it from the calculation.

Example .

The calculations in Exhibit 2-3 use the data for the sample firm from Exhibit 2-1 to calculate a Current Ratio that is greater than the target ratio (2.0) and the industry median (1.7). It is in fact in the

top quartile of the industry (greater than 2.3). Thus, before accounting for the cost of the control option we can conclude that our sample firm will not have difficulty meeting current obligations. We are not concerned with the fact that the ratio is lower than it was in previous years because it is still significantly better than the other criteria.

In the example, the capital cost of the pollution control equipment is assumed to be $11.765 million. This cost is multiplied by 0.85 to account for the investment tax credit and results in a capital cost for calculation purposes of $10 million. After subtracting this cost of control, the sample ratio of 2.26 is still better than either the target or the industry median. Thus, the Current Ratio indicates that an $11.765 million control device ($10 million after adjusting for the ITC) is achievable on a liquidity basis. This preliminary conclusion is based on one single ratio and must be verified by several of the other ratios before any final conclusions are drawn.

Quick Ratio

Inventories are classified as current assets but they cannot be converted to cash as readily as other assets, such as accounts receivable. The Quick Ratio is a second measure of liquidity that excludes inventories from the numerator of the Current Ratio formula.

Calculation

All the items used for the Quick Ratio are located on the balance sheet. Worksheets 2a and 2b in Appendix C can be used for the calculation. Exhibits 2-5 and 2-6 demonstrate the calculation with the sample data and describe the steps.

Critical Values

Analysts expect a Quick Ratio for a healthy firm to be above 1.0. As with the Current Ratio, a low Quick Ratio may indicate liquidity problems and a high ratio could indicate idle cash that will result in a loss of alternative income. Again, comparisons with average industry Quick Ratios and historic ratios are useful and important.

Interpretation

The Quick Ratio can be evaluated against its target (1.0), industry median and historic values in the same manner that the

Exhibit 2-5

WORKSHEET 2a
QUICK RATIO CALCULATION
WITHOUT POLLUTION CONTROL
($ in 000s)

| | | Three Prior Years of Company Data | | |
		1 1976	2 1975	3 1974
1.	Current Assets	216,120	186,216	190,572
2.	Inventory	91,409	86,642	103,924
3.	Quickly Convertible Assets Line (1) - Line (2)	124,711	99,574	86,648
4.	Current Liabilities	91,076	66,370	71,445
5.	Quick Ratio Line (3) ÷ Line (4)	1.37	1.50	1.21

Industry	Upper Quartile	1.3
	Median	1.0
	Lower Quartile	0.7

Line (2)   Inventories are located in the current asset portion of the balance sheet.

Exhibit 2-6

WORKSHEET 2b
QUICK RATIO
ADJUSTED FOR POLLUTION CONTROL
($ in 000s)

		Recent Year 1976
1.	Current Assets	216,120
2.	Inventory	91,409
3.	Capital Cost of Control Adjusted for ITC	10,000
4.	Adjusted Quickly Convertible Assets: Line (1) - Line (2) - Line (3)	114,711
5.	Current Liabilities	91,076
6.	Quick Ratio Line (4) / Line (5)	1.26

Current Ratio is evaluated. The interpretation of the ratio after subtracting for the cost of control is the same: if the ratio is still better than the criteria, liquidity is good, but if it is worse, it does not necessarily indicate that liquidity is bad. For a more in-depth evaluation, consider marketable securities and refinancing of debt, as described for the Current Ratio.

The Quick Ratio is sometimes considered the more conservative of the two liquidity ratios. If the Quick Ratio presents a less optimistic picture of the firm's liquidity position than does the Current Ratio, consider inventory turnover (cost of goods sold divided by inventory). This measures the number of times per year the entire inventory is sold. If this turnover ratio is large (greater than 4.0) the distinction between inventory and other readily converted assets may not be important and the Current Ratio is probably a better measure of liquidity.

Example

The sample firm's Quick Ratio of 1.37 exceeds the target value (1.0) and the upper quartile for the industry (1.3) before inclusion of the control device. After subtracting the cost of the control option adjusted for the ITC, the Quick Ratio (1.26) is still better than the target and the industry median. Both Current and Quick Ratios, therefore, indicate that the sample firm is liquid.

SOLVENCY RATIOS

Ratios that measure solvency -- a firm's ability to meet long-term financial obligations like debt interest payments -- can indicate the likelihood that a firm will go bankrupt within a few years. The Fixed-Charge Coverage Ratio and Beaver's Ratio are commonly used measures of solvency.

Fixed-Charge Coverage Ratio

This approach is a test of a firm's ability to meet its current fixed-cost obligations (interest payments, lease payments and so forth) with cash flows from operations. It compares cash earnings before interest and taxes (EBIT) to all fixed charges which they must cover. It is often used by lenders to determine the firm's ability to incur additional medium- to long-term debt.

Calculation

Worksheets 3a and 3b in Exhibit 2-7 and 2-8 demonstrate the calculations using the sample firm data. The explanatory notes that follow the worksheets explain each step in detail. The calculation assumes that the control device will be financed with proportions of debt equal to the current debt ratio of the whole firm.

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Exhibit 2-7

WORKSHEET 3a
FIXED-CHARGE COVERAGE RATIO WITHOUT ADDITIONAL
POLLUTION CONTROL EXPENDITURES
($ in 000's)

		Three Prior Years of Company Data		
		1 1976	2 1975	3 1974
1.	Net Profit Before Taxes	42,905	25,672	24,389
2.	Interest Expense	7,897	8,892	8,340
3.	Depreciation	9,493	8,614	7,443
4.	Other Fixed Payments (Lease payments, pension payments, etc.)	9,198	8,946	8,645
5.	Cash Earnings Before Fixed Charges: Line (1) + Line (2) + Line (3) + Line (4)	69,493	52,124	48,817
6.	Current Portion of Long-Term Debt	21,872	13,190	20,268
7.	Total Fixed Charges: Line (2) + Line (4) + Line (6)	38,967	19,228	37,253
8.	Fixed Charge Coverage Ratio: Line (5) ÷ Line (7)	1.78	2.7	1.31

Exhibit 2-7 (Continued)

EXPLANATION OF WORKSHEET 3a

Line (1)   Net profit before tax is located on the firm's income statement. Nonrecurring income/losses should not be included. The extraordinary gain of 1974 is excluded. (See Exhibit 2-2)

Line (2)   Interest expense is located on the firm's income statement.

Line (3)   Depreciation is located on the firm's income statement or, alternatively, on the "Statement of Changes in Financial Position." Any depletion and/or amortization charges should be added to the depreciation charge. In the Moody's report (Appendix D) depreciation and amortization is located in the "Supplementary P&L Data" section below the income statement. Rent ($69.5 million in 1976), also in the "Supplemental P&L Data" section of the Moody's report, is the only fixed payment reported.

Line (4)   Other fixed payments may be located on the firm's income statement. If not, a careful reading of the footnotes to the firm's financial statements may reveal the amount of annual lease or rent, pension, and other fixed payments made by the firm.

Line (5)   Sum of Line (1), (2), (3), and (4).

Line (6)   Current portion of long-term debt is listed on the firm's balance sheet, usually in the section titled Current Liabilities. It is the portion of long-term debt due within one year.

Line (7)   Sum of Lines (2), (4) and (6).

Line (8)   Line (5) divided by Line (7).

Exhibit 2-8

WORKSHEET 3b
FIXED-CHARGE COVERAGE RATIO INCLUDING
ADJUSTMENTS FOR POLLUTION CONTROL EXPENDITURES
(\$ in 000's)

		Recent Year
		1976
1.	Total Long-Term Liabilities	79,855
2.	Shareholder's Equity	163,387
3.	Total Capital: Line (1) plus Line (2)	243,242
4.	Debt Portion of Total Capital: Line (1) / Line (3)	0.33
5.	Capital Cost of Pollution Control Equipment Adjusted for ITC	10,000
6.	Portion of Expenditure Financed with Debt: Line (4) x Line (5)	3,300
7.	Interest Charged on New Debt	0.17
8.	Interest Expense (before tax): (line (6) x Line (7)	561
9.	Additional Principal Payments: Line (6) / 5	660
10.	Fixed Charges: Line (7) from Worksheet 3a	38,967
11.	Adjusted Fixed Charges: Line (10) plus Line (8) plus Line (9)	40,188
12.	Cash Flow: Line (5) from Worksheet 3a	69.493
13.	Annual O&M Expenditures	300
14.	Adjusted Cash Flow: Line (12) - Line (13)	69,193
15.	Adjusted Fixed Charge Coverage Ratio: Line (14) / Line (11)	1.72

Exhibit 2-8 (Continued)

EXPLANATION OF WORKSHEET 3b

Line (1) Long-term debt is located in the Liability section of the balance sheet.

Line (2) Shareholder's Equity is located in the Liability section of the firm's balance sheet. Include common equity plus paid-in surplus and retained earnings and subtract the value of any treasury stock.

Line (3) Total of Lines (1) and (2).

Line (4) Long-term debt is divided by Line (3): the sum of of long-term debt plus equity. This gives an estimate of the debt portion of the capital structure.

Line (5) Estimate of the capital cost of the new pollution control equipment multiplied by 0.85 to include the tax benefit (ITC).

Line (6) Multiply the capital cost by the ratio in Line (4). This estimates the amount of additional long-term debt which is incurred to finance the pollution control equipment.

Line (7) The interest rate to be paid on the new long-term debt must be estimated. One source for this information is the Moody's Bond Record which lists average yields by bond rating classification. The bond rating on the firm's least senior debt should be used to determine the interest rate. The firm's bond ratings will be a useful piece of information in itself for evaluating financial condition. It is discussed in Chapter 4. If you cannot get bond ratings for the firm, assume the interest rate of 2 to 3 points above the treasury bill rate.

Line (8) Multiply the new long-term debt by the interest rate. This results in a calculation of increased interest payments.

Exhibit 2-8 (Continued)

EXPLANATION OF WORKSHEET 3b

Line (9) Estimate of additional principal payments is calculated by dividing the amount of additional debt incurred to finance the pollution control expenditure by five. This assumes that the firm will repay the debt over a five-year period. Since five years are likely to be much shorter than the useful life of the equipment, this will often be a conservative assumption. If more accurate information on estimated principal payments is available, the analyst should enter this information on Line (9).

Line (10) Fixed charges from Line (7) on worksheet 3a.

Line (11) Add additional interest and principal payments to fixed charges to estimate adjusted fixed charges: Line (10) plus Line (8) plus Line (9).

Line (12) Cash flow from Line (5) on worksheet 3a.

Line (13) Estimate of annual operating and maintenance expenditures for the pollution control equipment.

Line (14) Subtract additional O&M costs from cash flow in Line (12).

Line (15) The new cash flow divided by the adjusted fixed charges results in an adjusted coverage ratio: Line (14) divided by Line (11).

Critical Values

Firms with Fixed-Charge Coverage Ratios greater than 2.0 are classified as solvent. Firms with ratios below 1.5 are classified as insolvent. The region between 1.5 and 2.0 is considered a grey area. Compare the firm's ratio against these targets and historic ratios. Industry median data are not usually detailed enough to facilitate the calculation of an industry Fixed-Charge Coverage Ratio.

Interpretation

The critical region of solvency (a ratio greater than 2.0) is based on a statistical study of a small sample of firms.* If the test firm's Fixed-Charge Coverage Ratio falls in the grey area, between 1.5 and 2.0, consider the trend in its own ratio over time. If it has been steadily declining there could be some concern over the firm's solvency. On the other hand, if the ratio falls in the grey area but is growing towards 2.0, the firm's condition is probably improving.

The following ratio components could distort the ratio and alter its interpretation:

- Extraordinary gains or losses -- These are not expected to recur and as such should be excluded from the ratio to get an indication of future financial condition.

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* Putnam, Hayes & Bartlett, Inc., Testing A Firm's Ability to Pay, Prepared for Economic Analysis Division. Office of Planning and Evaluation, U.S. EPA, February 9, 1981.

● Current portion of long-term debt -- If it is expected to be refinanced, do not include it in the ratio denominator because its repayment is not a fixed charge.

Example

The Fixed-Charge Coverage Ratio of 1.78 in 1976 for the sample firm was in the grey area (between 1.5 and 2.0) and it is lower than it was in the previous year. This indicates that the sample firm may have difficulties meeting fixed obligations.

Adjusting the ratio for the control device does not impact its value significantly; it drops from 1.78 to 1.72 and remains in the grey area. Since these solvency indicators show the opposite position from the liquidity indicators, this example shows that a clear cut evaluation from a single ratio is not always possible. In this case the footnotes add no clues to the interpretation (e.g., an explanation of the low coverage) and no positive conclusion about the firm's solvency can be drawn. Other indicators of financial health will have to be relied upon to interpret this Solvency Ratio.

Beaver's Ratio

This test involves calculating the ratio of internally generated cash flow to total debt (current liabilities and long-term debt). A major study by William H. Beaver has shown that this ratio represents the single best predictor of bankruptcy when judged against other individual ratios or combinations of ratios. This test assesses the short-term solvency of the company and is a good predictor of bankruptcy up to two years prior to failure.

Calculation

To calculate this ratio, depreciation is added to the firm's net income after taxes to arrive at internally generated cash flow.* This amount is then divided by the sum of current liabilities plus long-term debt from the balance sheet. This ratio should be calculated for each of the most recent three years.

To adjust the ratio for the cost of the control equipment, the conservative assumption that it will be financed partly with debt is used. In this calculation, any additional expenditures serve to decrease the internally generated cash flow of the firm while increasing the firm's total debt, thus decreasing the ratio of cash flow to total debt. To account for these additional costs, all

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* Internally.generated cash flow would also normally include other noncash expenses, such as deferred taxes. In order to be consistent with Beaver's study, however, noncash expenses other than depreciation are not included.

additional interest payments and annual operating and maintenance costs are subtracted from the firm's internally generated cash flow, and any additional debt which will be incurred to finance any capital expenditures are added to the firm's total debt. Any tax shield realized from the additional depreciation should be added to the firm's cash flow.*

Worksheets 4a and 4b in Exhibits 2-9 and 2-10 include the steps necessary to calculate Beaver's Ratio with and without the additional costs of pollution control or penalties.

Critical Values

In Beaver's study of 79 pairs of firms (each pair consisting of one firm which went bankrupt and another that remained solvent) the mean ratio of the failed firms was about 0.15 five years prior to failure and it declined steadily thereafter. Using his results as target values, classify the firm as solvent if the firm has a ratio of cash flow to total debt which exceeds 0.2. If this ratio falls below 0.15, the firm is considered insolvent. A grey area exists between 0.15 and 0.2. Compare the firm's ratio to its historic ratios as well. No industry median can be calculated for the Beaver's Ratio.

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* Depreciation is a noncash tax-deductible expense. Thus, for any increase in depreciation, the firm's income after taxes will decline by the amount of the depreciation expense after tax or (1-tax rate) x depreciation. The cash flow will increase by the amount of depreciation less the depreciation expense after tax since depreciation is added to after-tax income to arrive at cash flow. Therefore cash flow will increase by an amount equal to the increase in depreciation multiplied by the tax rate. This is often referred to as the depreciation tax shield.

Interpretation

The Beaver's Ratio is evaluated in a manner similar to the Fixed-Charge Coverage Ratio: first by comparing it with the target ranges, and then by considering its trend over recent years. In Beaver's study the Beaver's Ratio of firms that eventually went bankrupt declined steadily during the five years prior to bankruptcy. This does not necessarily mean that if a firm does have a declining Beaver's Ratio that it is headed for bankruptcy, but a ratio of less than 0.2 that has been declining in recent years does imply that the firm could have difficulties meeting its debt obligations over the next few years. As with all ratios, the result of this test is not conclusive in itself but should be evaluated in combination with other tests. The key items to focus on in evaluating the reliability of this test are:

- Unusual revenues -- Consider nonrecurring factors as mentioned for the Fixed-Charge Coverage Ratio (extraordinary gain or loss).

- New debt -- This item is discussed in Chapter 4.

Example

The sample firm's Beaver's Ratio has increased from 0.12 to 0.17 since 1974 but it is still below the target value of 0.2. Since it falls in the grey area, just as the Fixed-Charge Coverage Ratio does, it is difficult to conclude anything about the firm's solvency. The fact that the ratio is improving, however, is a positive sign and suggests that the firm is not headed for bankruptcy.

When the 1976 ratio is adjusted for the cost of pollution control it remains approximately the same, still in the grey area -- above the cutoff value of 0.15. The cost of the control does not impact the firm's solvency condition significantly.

LEVERAGE RATIOS

The extent to which a firm has fixed financial obligations is termed its leverage. Leverage measures the proportion of a company's value that is financed by debt relative to the proportion that is financed by stockholders. The Debt-Equity Ratio is the most commonly used indicator of leverage. It is not a particularly useful number for assessing financial health, but it may be helpful in interpreting solvency ratios.

Debt-Equity Ratio

This is the ratio of long-term debt to total stockholders' equity, both long-term items on the liability side of the balance sheet. As a general rule, the debt holders in a highly levered company (those with a high D/E ratio) bear more risk that those in a less levered company, especially if there is some probability of bankruptcy. Therefore, the D/E ratio is used most meaningfully in combination with the Solvency Ratios to evaluate the stability of the firm's operations.

Calculation

Exhibit 2-11 uses worksheet 5 and the sample firm data to demonstrate the calculation of the Debt-Equity Ratio without pollution control expenditures. This ratio is not adjusted for pollution control because the firm is presumably already at its optimal debt-equity level before control is added. Investment in pollution control is a

Exhibit 2-9 (Continued)

EXPLANATION OF WORKSHEET 4a

Line (1)   Net income after taxes is located on the firm's income statement. Nonrecurring income/losses should not be included.

Line (2)   Depreciation is also located on the firm's income statement or, alternatively on the "Statement of Changes in Financial Position." Any depletion and/or amortization charges should be added to the depreciation charge.

Line (3)   Sum of Line (1) and Line (2).

Line (4)   Current Liabilities are located in the Liability section of the firm's balance sheet and include all liabilities which would become due within one year, such as accounts payable, notes payable, short-term debt, taxes, accrued expenses, and the portion of long-term debt due within one year.

Line (5)   Long-Term liabilities are located in the Liability section of the firm's balance sheet and is the sum of all liabilities other than Shareholder's Equity and Current Liabilities.

Line (6)   Sum of Line (4) and Line (5).

Line (7)   Line (3) divided by Line (6).

Exhibit 2-9

WORKSHEET 4a
BEAVER'S RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

		Three Prior Years of Company Data		
		1 1976	2 1975	3 1974
1.	Net Income After Taxes	20,108	11,649	13,135
2.	Depreciation	9,493	8,614	7,443
3.	Cash Flow: Line (1) plus Line (2)	29,601	20,263	20,578
4.	Current Liabilities	91,076	66,370	71,445
5.	Long-Term Liabilities	79,855	92,446	95,065
6.	Total Debt: Line (4) plus Line (5)	170,931	158.816	166,510
7.	Beaver's Ratio: Line (3) / Line (6)	0.17	0.13	0.12

capital investment that does not increase a company's borrowing power because it will not produce future cash flows to service the debt. In financial language, the negative NPV investment does not increase the firm's "debt capacity." We are being conservative, therefore, by assuming that the control device will be paid for with amounts of debt and equity proportional to the total firm D/E ratio.

Critical Values

A target Debt-Equity Ratio is difficult to define because the degree of leverage that is desirable is a function of a firm's operating characteristics and therefore varies among industries and even over the life cycle of one firm. To get a relative indication of a firm's financial riskiness, comparisons against average industry and historic Debt-Equity Ratios are most useful. The industry averages are the most important comparative indicators, since they depict the level of debt commonly associated with the riskiness of that line of business.

Interpretation

The Debt-Equity Ratio can be compared against industry median and quartile values and historic values. The higher the Debt-Equity Ratio, the smaller the relative buffer available to creditors before the firm becomes insolvent. For this reason, potential lenders consider firms with high Debt-Equity Ratios as credit risks and would demand higher interest rates on loans to such firms than to firms with low Debt-Equity Ratios.

Industry median and quartile ratios are used for comparison because better targets do not exist, but this comparison alone is often too simplistic. Operating characteristics may vary considerably within an industry, causing target leverage ratios to be different. A high Debt-Equity Ratio is a problem if there is a fair degree of uncertainty about future earnings. A company with very stable operations can afford to have a higher Debt-Equity Ratio because it is less likely to run into a low period in which the buffer around creditors will be in danger. The company's bond ratings (see Chapter 4) can further help you evaluate the riskiness of its debt, and Solvency Ratios can provide information on the ability of the firm to cover its debt obligations. The total evaluation section in Chapter 4 highlights these points and some ways to do a more sophisticated analysis of financial leverage using values of other financial statement items and ratios.

Example

The Debt-Equity Ratios for the sample firm have been consistently above the industry median and, during 1975 and 1976, in the upper quartile. Thus, relative to other firms in the industry, this firm is not highly levered. In addition, its proportion of debt has declined since 1974. This is not very meaningful in itself but will be discussed further in Chapter 4.

Exhibit 2-10

WORKSHEET 4b
BEAVER'S RATIO INCLUDING ADJUSTMENTS
FOR POLLUTION CONTROL COSTS
($ in 000's)

		Recent Year 1976
1.	Long-Term Liabilities: Line (5) from Worksheet 4a	79,855
2.	Shareholder's Equity	163,387
3.	Total Capital: Line (1) plus Line (2)	243,242
4.	Debt Portion of Total Capital: Line (1) / Line (3)	0.33
5.	Capital Cost of Pollution Control Adjusted for ITC	10,000
6.	Portion of Expenditure Financed with Debt: (Line (4) x Line (5))	3,300
7.	Interest Rate on New Debt	0.17
8.	Interest Expense (before tax): Line (6) x Line (7)	561
9.	Marginal Income Tax Rate	0.46
9A.	1 - Tax Rate	0.54
10.	After-Tax Interest Expense: Line (9A) x Line (8)	303
11.	Annual O&M Expenditures	300
12.	After-Tax O&M Expenditures: Line (11) x Line (9A)	162
13.	Additional Tax Depreciation: Line (5) / 5	2.000
14.	Tax Shield from Depreciation (line (13) x Line (9)	920
15.	Cash Flow: Line (3) from Worksheet 4a	29,601
16.	Adjusted Cash Flow: Line (15) - Line (10) - Line (12) + Line (14)	30,056
17.	Total Debt: Line (6) from Worksheet 4a	170.931
18.	Adjusted Total Debt: Line (17) - Line (6)	174,231
19.	Adjusted Beaver's Ratio: Line (16) / Line (18)	0.17

Exhibit 2-10 (Continued)

EXPLANATION OF WORKSHEET 4b

Line (1)   Long-term liabilities are the same as Line (5) of worksheet 4a.

Line (2)   Shareholder's Equity is located in the Liability section of the firm's balance sheet. Include common equity plus paid-in surplus plus retained earnings and subtract the value of any treasury stock.

Line (3)   Total of Lines (1) and (2).

Line (4)   Long-term debt is divided by Line (3): the sum of long-term debt plus equity. This gives an estimate of the debt portion of the capital structure. .

Line (5)   Estimate of the capital cost of the new pollution control equipment multiplied by 0.85 to account for the income tax credit.

Line (6)   Multiply the capital cost by the ratio in Line (4). This estimates the amount of additional long-term debt which is incurred to finance the pollution control equipment.

Line (7)   The interest rate to be paid on the new long-term debt must be estimated. One source for this information is the Moody's Bond Record which lists average yields by bond-rating classification. The bond rating on the firm's least senior debt should be used to determine the interest rate. Use 2 to 3 above the prime rate if the bond ratings are not known.

Line (8)   Multiply the new long-term debt by the interest rate. This results in a calculation of increased interest payments before tax.

Line (9)   Determine the marginal tax rate for the firm, including both state and federal income taxes. If not known, assume 46 percent.

Exhibit 2-10 (Continued)

EXPLANATION OF WORKSHEET 4b

Line (10)   Multiply new interest payments by one minus the tax rate to obtain the estimate for additional interest payments after taxes.

Line (11)   Estimate of the annual operating and maintenance expenditures for the pollution control equipment.

Line (12)   After-tax annual operating and maintenance (O&M) expenditures are determined by multiplying Line (11) by one minus the tax rate.

Line (13)   Additional depreciation due to the new pollution control can be calculated by dividing the cost of the control by 5. Pollution control equipment is normally depreciated in a straight-line fashion over a five-year period for tax purposes. Other depreciation lifetimes and methods should be used where applicable.

Line (14)   The tax shield from depreciation is determined by multiplying Line (13) by the tax rate.

Line (15)   Cash flow from Line (3) on worksheet 4a

Line (16)   Subtract the new interest and O&M payments and add the new depreciation tax shield to the original cash flow. This represents the adjusted cash flow. Line (15) minus Line (10) minus Line (12) plus Line (14).

Line (17)   Total debt from Line (6) of worksheet 4a.

Line (18)   Total debt plus new debt for additional capital expenditure represents the adjusted total debt. Line (17) plus Line (6).

Line (19)   Adjusted cash flow divided by adjusted total debt equals the adjusted Beaver Ratio. Line (16) divided by Line (18).

Exhibit 2-11

WORKSHEET 5
DEBT-EQUITY RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

		Three Prior Years of Company Data		
		1	2	3
		1976	1975	1974
1.	Long-Term Liabilities	79,855	92,446	94,065
2.	Common Stock at Par	37,670	37,670	37,670
3.	Additional Paid-In Capital	607	533	406
4.	Preferred Stock	5,047	5,201	5,445
5.	Retained Earnings	120,063	104,211	96,038
6.	Stockholders' Equity: Line (2) + Line (3) + Line (4) + Line (5)	163,387	147,615	139,559
7.	Debt-Equity Ratio:	0.49	0.63	0.68

Industry	Upper Quartile	0.6
	Median	1.1
	Lower Quartile	2.4

Exhibit 2-11 (Continued)

EXPLANATION OF WORKSHEET 5

Line (1)   Long-term liabilities are located in the liability section of
              the firm's balance sheet. It is the sum of all liabilities
              other than Shareholders' Equity and Current Liabilities.

Lines (2)
  and (3)   Also located in the liability section of the balance sheet,
              Common Stock is not always separated into par value and
              additional paid-in capital. Exclude Treasury Stock from Line
              (2) because it is not outstanding but rather kept in the firm's
              treasury.

Line (4)   Some companies have more than one category of Preferred
              Stock listed in the liability section of the balance sheet.
              Include all Preferred Stock in the calculation.

Line (5)   Retained Earnings are located in the liability section of the
              balance sheet.

Line (6)   Sum of Lines (2) through (5).

Line (7)   Line (1) divided by Line (6).

The financial ratio approach discussed in the last chapter provides a review of recent historic performance and a point-in-time snapshot of the firm. What is not discernible from this vantage is how pollution control costs based on this snapshot would affect future expectations of performance of the firm. To answer this, one needs a prospective look based on expected operations of the firm with and without pollution control expenses.

One way of doing this would be to project pro forma financial statements into future years, extrapolating past behavior and performance trends into subsequent periods. Efficiency ratios, like inventory turnover, collection or payment periods on accounts receivable and notes payable, give some idea of managerial performance objectives or norms. Other items like sales and operating costs may be extended along recent trend lines. These would allow one to guess what future balance sheets

and income statements might look like. Unfortunately, this would require a detailed understanding of the firm's industry and market: how sales and cost vary with inflation, who the competitors are, what new technologies are influencing the supply and demand for the product, how production assets are tied to sales volume and costs, and so on. Collecting this information would be a formidable task beyond the scope of the permit writer's interests or capabilities. Instead, it is more appropriate to use a proxy for this forward-looking approach.

Fortunately, stock prices are based on the opinions of many analysts evaluating the discounted net present value (NPV) of the firm's future cash flows. As such, they reflect investor's expectations of the future profitability of the firm and constitute a single-number surrogate for a series of projected future financial statements. Since there are many security analysts paid to conduct these evaluations for investors who value such profit opportunity information very highly, we can expect that the stock's market price is a very good synthesis of exactly the analysis which could be done rigorously for EPA.

Since any EPA-imposed pollution control expense will have only negative value as investments for the permit applicant, those costs will flow straight through to reductions in net income and, hence, to equity value (net of tax effects). The stock price thus provides an upper bound on the NPV of the expense which may be borne without inducing bankruptcy. However, since pollution control expenditures are tax deductible and the stock price is the present value of after-tax returns, the impact of the pollution control NPV on equity values should be roughly half the cost of the control device and its operating expenses.

A necessary step for calculating the impact on stock value is the estimation of the NPV of the control device. This may be approximated

Exhibit 3-1

WORKSHEET 6
NPV COST OF POLLUTION CONTROL

		$ 10^3$
1.	Capital Cost of Equipment Adjusted for ITC (C)	10000
2.	Annual Operating and Maintenance Cost (OM)	300
3.	Estimated Life of Equipment (L) (Years)	8
4.	Expected Rate of Growth in Operating Cost (g)	0.10
5.	Company Beta (β)	1.10
6.	Risk Free Rate (r_f)	0.12
7.	Discount Rate (r): line 6 + 0.08 x line 5	0.21
8.	Credits for Product Recovery (CR)	100

9. Present Value Cost of Control:

$$C + \sum_{t=0}^{L-1} \left[\frac{OM \times (1+g)^t}{(1+r)^t} \right] - \sum_{t=0}^{L-1} \left[\frac{CR}{(1+r)^t} \right] = 11{,}310$$

$$10{,}000 + \sum_{t=0}^{7} \left[\frac{300 \times (1.10)^t}{(1.21)^t} \right] - \sum_{t=0}^{7} \left[\frac{100}{(1.21)^t} \right]$$

$$10{,}000 - 1{,}761 - 451 = 11{,}310$$

as the cost of the device plus the present value of the device's operating expenses discounted at the cost of equity. Worksheet 6 outlines the steps for calculating the cost of equity and the present value of the pollution control device. Exhibit 3-1 demonstrates the calculation for the sample firm. Note that the operating costs are discounted at the cost of equity. This is because the cash flows to an investment in pollution control are correlated with the level of production of the firm: the determinants of cash flows to equity shareholders.

Since the stock price reflects the net present value of expected future cash flows, subtracting the after-tax NPV of pollution control costs from the market value provides an estimate of the impact of the device on the present value of future cash flows. In essence, the difference between market value and the NPV of control is what the firm's market value would be if the control were required. Worksheet 7, used with sample firm data in Exhibit 3-2, can be used to perform this calculation.

Interpretation

An examination of the trends in the firm's market price over time can supplement these calculations by providing insight into the stability of the firm and its ability to meet operating expense obligations. Worksheet 8 should be completed using market value data available in Value Line Industry Surveys, Moody's Industrial Manual, Standard and Poor's Industry Reports or the company's annual reports. A sample of each of these sources is attached in Appendix D. Exhibit 3-3 shows Worksheet 8 completed for the sample firm.

Exhibit 3-1 (Continued)

EXPLANATION OF WORKSHEET 6

1. Estimated capital cost of pollution control multiplied by 0.35 to account for the ITC.

2. Estimated annual cost to operate and maintain pollution control equipment.

3. Estimate of the number of years the pollution control equipment will be in operation.

4. Estimate of the rates at which operating costs will increase each year for the life of the device.

5. The company's beta is reported in Value Line. A copy of the data for the sample firm is located in Appendix D.

6. Use the current return on U.S. Treasury Bills to approximate the risk-free rate of return.

7. Calculate this company's discount rate with the following formula:

$$r = r_f + \beta (r_m - r_f)$$

$(\bar{r}_m - r_f)$, the exess return on the market over the risk-free rate, has historically been around 8.0 percent. The theoretical justification for this is described in Appendix B.

8. Sometimes pollution control devices recover chemicals that would otherwise escape. Estimate the value of the chemicals recovered in each year.

Exhibit 3-1 (Continued)

EXPLANATION OF WORKSHEET 6

9. Calculate the present value cost of the control device using the formula. You can think of it as three present values summed together:

C = Total of capital cost

$$\sum_{t=0}^{L-1} \left[\frac{OM \times (1+g)^t}{(1+r)^t} \right] =$$

PV of operating expense = Sum ($\sum$) of the discounted value of the annual expense in each year, t.

$$\sum_{t=0}^{L=1} \left[\frac{CR}{(1+r)^t} \right] =$$ PV of recovered chemicals for each year, t

Exhibit 3-2

WORKSHEET 7

ADJUSTED STOCK PRICE

			10^3
1.	Stock Price:	High	14.8
		Low	7.8
2.	Number of Shares Outstanding		7,890
3.	Market Value:	High	116,772
	Line (1) x Line (2)	Low	61.542
4.	PV Cost of Control		11,310
	Line (7) Worksheet 6		
5.	Marginal Tax Rate		0.46
6.	PV Cost of Control After Tax		6,107
	Line (4) x (1 - Line (5))		
7.	Adjusted Market Value:	High	110,665
	Line (3) - Line (6)	Low	55,435
8.	Adjusted Stock Price:	High	14.0
	Line (7) ÷ Line (2)	Low	7.0
9.	PV Cost of Control	High	0.05
	After Tax as a	Low	0.10
	Fraction of Value		
	Line (6) ÷ Line (3)		

Exhibit 3-2 (Continued)

EXPLANATION OF WORKSHEET 7

1. Stock prices are listed on a per-share basis. The annual high and low values are reported in a variety of sources of which samples are attached in Appendix D.

2. The average number of shares outstanding during the year. (If shares are issued or repurchased during the year, this average number may not correspond to the annual high and low stock prices. This is a problem but difficult to avoid.)

3. The total market value of the firm is the product of the per-share value and total number of shares.

4. The present value of the control device was calculated in worksheet 6, Line (7).

5. The marginal tax rate faced by the firm. (The corporate U.S. rate is 0.46.)

6. Pollution control costs are pretax expenses so their effect on after-tax cash flow and, therefore, market value is less than their cost by one minus the tax rate: Line (4) times (1.00 - marginal tax rate).

7. The adjusted high and low market values are the current values minus the present value cost of pollution control.

8. Adjusted stock price on a per-share basis is obtained by dividing adjusted total value by the number of shares outstanding.

9. The percentage impact of the control device is calculated by dividing the after-tax PV cost of the device by market value.

Adjusted stock prices and Market-to-Book Ratios* that are much lower than the before control values could indicate that the cost of control will have a large impact on the firm's value. Use this result in combination with other indicators to form final conclusions.

Also note the trend in stock price and Market-to-Book Ratios. If the trend is up over time, investors are revising their expectations of future performance favorably. A downward trend signifies that new information has caused investors' expectations to decline. While these trends are no indication of the direction of future changes in market value, they can tell you about recent changes in expectations of future profitability. Chapter 4 discusses the use of these trends in market value to help evaluate trends in the accounting ratios of Chapter 2.

EXAMPLE

In Exhibit 3-1 we assumed that the pollution control device would have an initial capital cost of $10 million (after adjusting for the ITC) and operate at $300 thousand per year. During its estimated eight-year life, operating expenses are expected to increase at a rate of 10 percent per year. It will recover products with a market value of $100 thousand each year. Using these values and the present value formula, the present value cost of installing and operating this device is $11.3 million. Adjusting for taxes and subtracting the after-tax cost ($6,107 thousand) from the high and low market values reduces them by 5 percent and 10 percent, respectively (see Exhibit 3-2). Exhibit 3-3 shows that the Market-to-Book Ratio still remains above historic levels after the adjustment for pollution control. These market value approaches indicate that the pollution control device should not significantly affect the firm's performance and, therefore. is economically achievable.

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* The calculations of Market-to-Book ratios assume the pollution control is not financed by equity.

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Exhibit 3-3 (Continued)

EXPLANATION OF WORKSHEET 8

1. The annual high and low values of the firm's stock price.

2. Book value per share is sometimes reported in footnotes. It can be determined by dividing stockholder's equity by the number of shares outstanding. Stockholders equity is referred to as Net Worth in Value Line and other balance sheet reports. If shares are issued or repurchased during the year, try to match the number of shares used to estimate book value per share with the number of shares outstanding at the time the high and low market values occurred. This may be impossible. In the example Net Worth from Value Line was divided by common shares outstanding: $158 million / 7.89 million shares = $20.00 per share in 1976.

3. Divide the range in market values per share by book value per share to get the range of the Market-to-Book Ratio during each year.

The last two chapters discussed several indicators of financial health and described how they could be interpreted individually. If all the measures uniformly indicate that the firm is healthy and can afford the device, the pollution control option is clearly economically achievable. Similarly, if all the measures indicate poor financial condition, the device would not be economically achievable. Unfortunately, the results of each indicator are unlikely to agree on the condition of the firm, and some total evaluation or tradeoff among indicators will be necessary.

This chapter provides a framework for understanding the causes of conflicting signals from ratios and elaborates briefly on four common ratio combinations that could give opposite indications of financial health.

The "dual entry system" is probably the most important concept in accounting and is useful to keep in mind when interpreting ratios. It basically means that for every transaction there is an offsetting transaction (a debit and a credit). For example, to record the purchase of inventories, the inventory account is increased (a debit) and the cash account is decreased (a credit).

Ratios often include only half of the dual entry transaction and, as such, do not provide a complete picture of the transaction. When interpreting ratios, therefore, it is useful to evaluate not only the change in items included in the calculation but also the corresponding change in the balancing item.

Often offsetting transactions occur within the same class on the balance sheet, that is, between current assets and current liabilities or between long-term assets and long-term liabilities. For example, property plant and equipment -- a long-term asset -- is usually purchased by issuing long-term debt or equity. This is recorded by a debit to a long-term asset and a credit to a long-term liability.

Cross class transactions (e.g., between current assets and long-term liabilities) are less common, but they are more likely to have a strange impact on ratios. For example, if money is borrowed to invest in marketable securities, a long-term liability is credited and a current asset is debited. This is an unusual situation that would be manifested in a high Current Ratio but low Solvency and High Leverage ratios. An investigation into the purpose of the transaction (i.e., is the money to be used to purchase a new asset that is not quite ready for sale) will help evaluate the conflicting ratios.

In summary, it is important to consider complementary transactions when evaluating ratio results. Cross class transactions are most likely to cause conflicting ratio signals. The following sections describe four common combinations of ratios that may appear to be conflicting and provide some explanations for each.

Positive Indicator: Liquidity Ratio Large
Negative Indicator: Solvency Ratio Small
                     Debt-Equity Large

In general, if Liquidity Ratios indicate that the control device can be paid for with cash and equivalent current assets, the device should be considered economically achievable. The exception to this is when the Liquidity Ratios have recently increased, the Debt-Equity Ratio has increased and Solvency Ratios have decreased. (An increase in liquidity is a positive indicator but an increase in Debt-Equity and a decrease in solvency ratios are negative indicators.) These changes may indicate that the firm has recently borrowed money to invest in a new opportunity and is holding that money temporarily as cash or marketable securities. You can verify this if debt has recently increased on the balance sheet. If the firm were required to spend this cash on pollution control, an investment with no return, instead of investing in the new positive NPV opportunity, they would either have to forfeit the investment or issue equity to pay for it. In this case, rely on the interpretation of the Solvency Ratio to determine EA.

Positive Indicator: Debt-Equity Ratio Low
Negative Indicator: Market-to-Book Ratio Low

If book equity is overvalued on the balance sheet (as indicated by a low Market-to-Book Ratio), the Debt-Equity Ratio could be artifically low. Place emphasis on the Liquidity and Solvency Ratios to determine whether a control device is economically achievable.

The book value of equity is not always an accurate reflection of the market value because accounting conventions, such as depreciation method and accounting for intangible assets, do not track true economic value. If equity is undervalued, that is, if the market-to-book ratio is greater than one, a Debt-Equity Ratio based on book values would overestimate the company's leverage. (Book values of debt tend to relate more closely to market values except during periods of high inflation).

Positive Indicator: Debt-Equity Low
               High Bond Ratings
Negative Indicator: Solvency Ratio Low

Solvency Ratios (Fixed-Charge Coverage and Beaver's Ratio) measure the ability of average cash flows to cover debt obligations. A low ratio, therefore, could mean that cash flow may be inadequate to cover debt. If, however, the Debt-Equity Ratio is low and, more importantly, bond ratings are high, both indicating low risk of defaulting on debt, a low solvency ratio can be ignored. In general, bond ratings are good indicators of default risk and they can be relied upon over the solvency ratios. Moody's and Standard and Poor have bond-rating services that assign a firm's bonds to one of nine rating categories:

Moody's	Fitch/Standard & Poor's
Aaa	AAA
Aa˙	AA
A	A
Baa	BBB
Ba	BB
B	B
Caa	CCC
Ca	CC
C	C

Aaa and AAA are the best ratings, assigned to bonds with the smallest degree of investment risk. Thus, if other indicators are positive, trade off a low Solvency Ratio against a high bond rating (above Ba/BB) and conclude that the firm can afford pollution control.

Positive Indicator: Market Value Not Declining
                   Liquidity Ratios Above Cutoff
Negative Indicator: Solvency Ratios Declining

If Solvency Ratios are lower than in previous years while other indicators show steady or improving conditions, it could be due to the lagged effect of a new investment on the income statement. For example, if long-term debt is increased and stock is issued to purchase new equipment, the following balance sheet items are affected:

o   Long-Term Debt -- increase (credit)

o   Common Stock -- increase (credit)

o   Property Plant and Equipment -- increase (debit).

Payments on the loan are expenses that occur on the current period income statement as a result of the purchase, causing a decrease in net income.

Because the capital outlay is not immediately refunded by the performance of the new equipment, the Solvency Ratios (using income statement items in the numerator and balance sheet items in the denominator) would indicate worse financial conditions than before the purchase. These ratios are misleading, however, because the new equipment will increase income in future periods and perhaps improve the firm's financial condition. Rely on the liquidity and market value indicators to draw conclusions.

CONCLUSIONS FOR SAMPLE FIRM

Exhibit 4-1 summarizes the results of all the tests for the sample firm. The Liquidity Ratios indicate that the firm could easily pay for the capital cost of control with current assets. The two solvency ratios both fall in the inconclusive range but they are not significantly affected by the pollution control cost so it does not appear that pollution control costs will push the firm into bankruptcy. The liquidity ratios can be relied upon to resolve this conflict (high liquidity, low solvency) since no new debt has been issued and the ratios have not changed recently. Market values and Market-to-Book Ratios do not change greatly when adjusted for pollution control, both positive signs.

In summary, based on an analysis of several indicators of liquidity, solvency, and financial condition, the hypothetical pollution control device is economically achievable.

Exhibit 4-1

SUMMARY OF SAMPLE FIRM RESULTS

Ratio/Measure	1976 Value Before	Adjusted	Conclusion
Current Ratio	2.37	2.26	Very Good
Quick Ratio	1.37	1.26	Very Good
Fixed-Charge Coverage	1.78	1.72	Inconclusive
Beaver's Ratio	.17	.17	Inconclusive
Debt-Equity	.49	--	Not Highly Levered
Bond Ratings	*	*	Good
Market Value	High 14.8 Low 7.8	14.0 7.0	Good
Market-Book	High .74 Low .39	.70 .35	

*Bonds not rated but Moody's states that firm has a line of credit at eight banks to borrow at the prime rate of interest.

The firm-level test of economic achievability is relatively straightforward and depends only on readily available data. Unfortunately, it may not be a sufficient test to determine if an individual plant can maintain operations when faced with additional pollution control expenditures. Even though the firm could afford the additional cost, it may be more profitable to close the plant rather than install the pollution control equipment. Since it is not the intent of Congress to place excess pollution control costs on plants, the firm-level test will not always be adequate.

The plant-level tests described in this chapter are designed to overcome the drawbacks of the firm-level test. These tests are based on costs and revenues specific to the plant and attempt to focus on potential plant shutdowns rather than total corporate ability to pay. A comprehensive analysis of plant-level economic achievability can be very complex due to the following problems.

- Plant-level financial data are usually confidential,

- The necessary data are not always collected by firm's at the plant level,

- Non-standardized accounting procedures do not facilitate easy verification of reported cost and revenue items, and

- Companies will have the incentive to misrepresent their plant's condition.

The plant-level tests presented in this chapter are designed as screening tests rather than rigorous and definitive evaluations of a plant's ability to afford pollution control costs. If the results of these screens indicate that plant-level impacts would be minimal, then it is safe to conclude that the device is economically achievable. On the other hand, if the results indicate that the pollution control costs may have a substantial impact on the plant, then a more detailed plant closure analysis would be in order. A closure analysis for a chemical plant would entail analysis of detailed financial data and usually a linear programming model to simulate cash flows under different scenarios. These situations should be referred to financial analysts to determine the economic achievability of pollution controls.

Three tests are presented in this chapter. They are all easy to perform and require knowledge of pollution control costs and plant income statement items. The remainder of the chapter is organized as follows:

- Calculation of annual pollution control costs
- Description of plant-level income statement
- Description of plant-level tests
- Summary and limitations

Pollution· Control Cost

Any piece of equipment has two types of costs:

- Capital Cost - The cost of buying and installing the equipment, and

- Operating Cost - The annual expenses necessary to maintain and operate the equipment.

The plant-level tests require comparisons of pollution control costs to annual income statement items. Thus, it is necessary to put the lump sum capital cost in annual terms. A Capital Recovery Factor (CRF) is used to "annualize" capital investment costs over the useful life of the equipment. This factor, when multiplied by the capital cost of the equipment, defines a series of level annual cash flows. These cash flows have a discounted present value equal to the discounted present value of the investment and all tax shields over the useful life of the asset. Ideally, a capital recovery factor would be calculated for every company based on the company's debt-equity ratio, borrowing rate, market risk and state and local tax rates. Because this information can be time-consuming to collect, an average capital recover factor for the chemical industry of .17 can be used.* Exhibit 5-1 demonstrates the calculation of annual costs using this capital recovery factor and hypothetical pollution control capital and operating costs.

Plant Level Income Statement

The three tests of a plant's ability to pay for pollution control use items from the plant's income statement. The basic components of the plant-level income statement are shown in Exhibit 5-2. The plants should be able to provide some or all of this information. Income statement items for a hypothetical chemical plant are displayed in Exhibit 5-3.

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* This CRF is based on a useful equipment life of 15 years, a 5 year depreciation life a marginal corporate tax rate of 50.7 percent (incorporates average federal, state and local taxes), a 10% investment tax-exemption, a book debt-equity ratio of 1.3 and a weighted average cost of capital of 17 percent.

Exhibit 5-1

WORKSHEET 9

		$ MM
1.	Capital Investment Cost	2.0
2.	Annualized Capital Cost: Line (1) x .17	.34
3.	Annual Operating Cost	.40
4.	Total Annual Cost of Pollution Control Line (2) + Line (3)	.74

Exhibit 5-2

INCOME STATEMENT COMPONENTS

REVENUES
- Pounds of chemical or product x price per pound

COST OF GOODS SOLD
- Cost of materials
- Direct labor cost
- Production overhead cost

GROSS MARGIN
- Revenues - Cost of Goods Sold

CORPORATE OVERHEAD
- Selling, general and administrative expenses
- Interest Expense
- R&D Expense
- Depreciation on common property

EARNINGS BEFORE TAXES
- Revenues - Cost of Goods Sold - Corporate Overhead

Exhibit 5-3

PLANT INCOME STATEMENT FOR A HYPOTHETICAL CHEMICAL FIRM

WORKSHEET 10

		$ MM
1.	Revenues	119.6
2.	Less: Cost of Goods Sold	84.2
3.	Gross Margin	35.4
4.	Less: Corporate Overhead	18.3
5.	Earnings Before Taxes	17.1

Many companies do not keep records of revenues for each plant. Instead they maintain only cost records for the plant and record revenues and earnings at the division or firm level. Most products manufactured by chemical firms have easily identifiable market prices. When this is the case revenues can be calculated by multiplying the market price per pound of chemical by the number of pounds produced over the year to get total revenues. A permit writer can verify the prices for each product by checking with the Chemical Marketing Reporter which lists prices for most major chemicals. Sometimes, however, products produced at one plant are used as inputs to processes in another plant in the same firm. These products have no external market and are called intermediate goods. To determine the "revenues" associated with these products, a transfer price needs to be assigned. Usually, the plant should be able to provide this information. By assigning an artificially low transfer price to intermediate goods, a plant can bias revenue estimates downward and cause their financial condition to appear worse than it is. Since transfer prices are often developed by bargaining between plants with the firm, very little can be done to detect biased transfer prices.

The cost of goods sold includes the cost of materials, direct labor, and production overhead (indirect labor, rent, heat, etc.). Standard costs are usually used in process industries like the chemicals industry to assign costs to each of those categories but actual costs are more descriptive of the true cost of goods sold during the year.

The gross margin or gross profit (as reported in Robert Morris Associates) is. the amount of revenue remaining after deducting the cost of goods sold. At this stage, all plant-specific expenses should have been covered.

Corporate overhead is the fraction of total corporate expenses that is allocated to the individual plant. There are a number of different bases by which firms allocate these expenses. Furthermore, these expenses are often difficult to determine for a particular plant. Because of the arbitrary nature in which corporate overhead expenses are allocated, it would be easy to assign artificially large portions of corporate costs to a plant in order to misrepresent its earnings. Finally, earnings before taxes are calculated by subtracing the cost of goods sold and the plant's share of corporate overhead from revenues.

The tests that follow use key items from the plant income statement and the annual cost of pollution control to get a rough estimate of the impact on plant operations.

The three tests are:

- The Earnings Test - Are earnings before taxes greater than zero?

- The Gross Margin Test - Are annual pollution control costs less than a specified fraction of gross margin?

- The Revenue Test - Are annual pollution control costs less than a specified fraction of revenues?

The examples that accompany the description of each test use data for the hypothetical firm in Exhibit 5-3.

The Earnings Test

The Earnings Test is straightforward. After subtracting the annual cost of pollution control, are earnings before taxes (EBT) greater than zero? If so, the pollution control device is economically achievable. This

test is strict but reasonable because a plant which can cover all fixed and variable costs in the long run will remain in operation. In the short run, plants are concerned with covering variable costs and could operate with EBT less than zero. EBT of zero does not permit the plant to earn its entire required return on investment because depreciation accounts for less than half of the required return.* However, this definition does not preclude the plant from taking advantage of growth opportunities and, hence, from earning future profits. An alternative definition would require some arbitrary definition of required profit margin that would in essence force the most profitable firms to install pollution control. Since there is no indication that successful firms are more responsible for discharging pollution than unsuccessful firms, this alternative would be neither equitable nor efficient. Neverhteless, firms probably will contest decisions when EBT estimates are low but positive.

Exhibit 5-4 shows a calculation with the example data. While the earnings test is conceptually appropriate, it has some significant practical problems. Most importantly, corporate overhead expenses are not usually allocated to individual plants explicitly; instead they are assigned to division-level profit centers. Thus, data will not usually be readily available to perform this test. If the plant could provide corporate overhead expenses, then this test could be performed. However, the permit writer must recognize that biases in the overhead allocations will be difficult to detect without a very detailed plant-level questionnaire.

Two alternative tests are designed to avoid this problem of corporate overhead allocation. They are both based on the goal of maintaining a positive EBT.

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* Depreciation is a noncash expense so actual cash flow will be above zero even when EBT equals zero. Thus, money is available for reinvestment in assets.

Exhibit 5-4

WORKSHEET 11

THE EARNINGS TEST

1. Earnings Before Taxes   17.1

2. Total Annual Cost of Pollution   .74
    Control

3. EBT - Cost of Control   16.36
    Line (1) - Line (2)

Decision Rule

Line 3	$>$	0	economically achievable
Line 3	$=$	0	marginal
Line 3	$<$	0	not economically achievable

Gross Margin Test

Gross margin (or gross profit) is equal to revenue minus the cost of goods sold. It is a measure of the profit at the plant before corporate overhead expenses have been deducted. Thus, the use of the gross margin test avoids the difficult problem of determining corporate overhead expenses allocated to a plant. Since earnings before taxes is the standard by which one decides if a pollution device is economically achievable, the gross margin test must be designed to provide a similar measure.

The gross margin test presented here measures the annual cost of pollution control as a fraction of gross margin. If pollution control costs exceed a defined range, then the device may not be economically achievable. The range is defined by the ratio of EBT to gross margin for a specific industrial sector. If pollution control costs exceed this range, the EBT may be less than zero and the device would not be economically achievable. Exhibit 5-5 lists the ranges for seven segments of the chemicals industry by four digit SIC code.

Exhibit 5-6 lists the decision rules for this analysis. It is important to remember that the decision rules are not discrete since the gross margin test is a screening test and because plant operating condition may show considerable variation. For example, if a plant in SIC code 2861 which has a cost to gross margin ratio of .06, indicates it would close rather than install the pollution equipment, a more detail analysis would be needed to determine the actual impact.

Exhibit 5-5

INDUSTRY AVERAGE RATIOS OF EBT

TO GROSS MARGIN AND REVENUE

1980-1981 Data

Industry	SIC	EBT/ Gross Margin	EBT/ EBT/Revenue
Drugs and Medicines	2831 2833 2834	.14 - .21	.05 - .07
Fertilizers	2873 2874	.10 - .15	.02 - .04
Industrial Chemicals	2861 2865 2869	.07 - .19	.02 - .05
Paint, Varnish & Lacquer	2851	.11 - .18	.03 - .06
Perfumes, Cosmetics, and other Toilet Preparations	2844	.12 - .14	.06 - .07
Plastic Materials and Synthetic Resins	2821	.10 - .28	.03 - .06
Soaps and Other Detergents (except Specialty Cleaners)	2841	.10 - .11	.04

SOURCE: Robert Morris Associates 1981

Exhibit 5-6

DECISION RULE FOR THE GROSS MARGIN TEST

$$\frac{\text{Annual Cost of Pollution control}}{\text{Gross Margin}} < \text{Threshold} \quad \text{Equipment is economically achievable}$$

$$\frac{\text{Annual Cost of Pollution Control}}{\text{Gross Margin}} \geq \text{Threshold} \quad \text{Inconclusive: plant closure analysis necessary}$$

SIC	Threshold (= low value of EBT/GM range)
2831	.14
2833	
2834	
2873	.10
2874	
2861	.07
2865	
2869	
2851	.11
2844	.12
2821	.10
2841	.10

Example

Exhibit 5-7 demonstrates the gross margin test using Worksheet 12 and the sample plant data. The hypothetical plant manufacturers industrial chemicals so the threshold for SIC 2861 from Exhibit 5-6 is used. The annual pollution control cost is only 2 percent of gross margin. Since this is less than the 7 percent threshold, the equipment probably is economically achievable.

Limitations

The gross margin test is easy to perform and it avoids the need for data on corporate overhead expenses. It still has limitations, however. First, it is only a proxy for the earnings test; actual EBT are not known. The EBT/gross margin ratio is only an industry average and may not accurately reflect the actual plant's situation. Second, the income statement format in Exhibit 5-2 is based on "standard absorption costing." "Standard costs" are based on predetermined or budgeted annual costs and production levels and are used by most process industries to value cost of goods sold. . Sixty-five percent of American companies that use standard costs have "absorption costing" systems (both variable and fixed overhead are applied to products); thirty-five percent have "variable costing" systems (fixed factory overhead is expensed in the period in which it is incurred). These two systems have very different impacts on net income when production in a period does not equal sales of that period.

If a variable costing system is used instead of absorption costing, gross margin may not be calculated at all. It is likely, however. that the plant would record enough information anyway to derive the components of cost of goods sold so that gross margin could be calculated.

Exhibit 5-7

WORKSHEET 12

The Gross Margin Test

1. Gross Margin   35.4

2. Total Annual Cost of   .74
    Pollution Control

3. Threshold   .07
    (EBT/GM ratio for industry) (2861)

4. Pollution control Cost as a Fraction   .02
    of Gross Margin
    Line (2) / Line (1)

Decision Rule

Line (4) $<$ Line (3)   Economically Achievable

Line (4) $\geq$ Line (3)   Uncertain

Implicitly assumed in this test is that plants cannot pass through any of the added pollution control costs to customers through higher prices. In this sense, the test is conservative because if prices could be raised then some of the impact could be reduced. Also, using the average industry capital recover factor, the tests assume that the risk and return charactertistics of the plant are like that of the industry.

Although, the problem of verifying corporate overhead allocation is avoided with the gross margin test, the potential for misrepresenting revenues and plant costs still exists. If revenues include intermediate goods that are assigned transfer prices by the company, there is little the permit writer can do to check the fairness of the prices. Thus, revenues could be biased downward. Costs can also be misallocated because of the variety of methods of inventory valuation. Standard costs are used most frequently and they are based on predetermined production levels. If possible, actual year end costs, rather than standard costs should be requested (although these may not be representative in unusual years). The revenue test, described in the next section does not require knowledge of costs at all and therefore avoids one more piece of potentially biased information.

THE REVENUE TEST

The revenue test requires only information on plant revenues. As mentioned above, even when individual plants do not record revenues, they can be calculated by multiplying the market or transfer price per pound of product by the number of pounds of product produced. The revenue test should be used when gross margin is not available for a particular plant (because the plant's accounting system does not gather costs in the appropriate manner), or as a check on the gross margin

Exhibit 5-8

DECISION RULE FOR THE REVENUE TEST

$\dfrac{\text{Annual Cost of Pollution Control}}{\text{Revenue}}$ $<$ Threshold $\qquad$ Equipment is economically achievable

$\dfrac{\text{Annual Cost of Pollution Control}}{\text{Revenue}}$ $\geq$ Threshold $\qquad$ Inconclusive: plant closure analysis necessary

SIC	Threshold (low value of EBT/Revenue range)
2831	.05
2833	
2834	
2873	.02
2874	
2861	.02
2865	
2869	
2851	.03
2844	.06
2821	.03
2841	.04

Exhibit 5-9

WORKSHEET 13

The Revenue Test

1. Revenues   119.6

2. Total Annual Cost of Pollution Control   .74

3. Threshold (EBT/Revenue for Industry)   .02
                                                 (SIC 2861)
    See Exhibit 5-8

4. Pollution Control Cost as a Fraction   .006
    of Revenues
    Line (2) / Line (1)

                    Decision Rule

    Line (4) <   Line (3)   Economically Achievable

    Line (4) ≥   Line (3)   Uncertain

        .

SUMMARY AND LIMITATIONS

Exhibit 5-10 summarizes the results of the three plant tests. All tests indicate that the pollution control costs are economically achievable.

The three tests described above are easy to perform and can be done with a relatively small amount of plant accounting data. Permit writers will have to ask plants to provide the information described in Exhibit 5-2. The amount of data the plant provides will indicate which test to use. Because of the limited data each plant will supply, biases will be very difficult to detect. Much more data would be necessary to detect and reallocate improper cost and revenue items. Even then, many types of biased data could not be detected. As a result, the tests are useful as a screen but should not be relied upon in marginal cases.

If the test results indicate that pollution controls would not be economically achievable, then a more detailed, "plant closure analysis" would be necessary. A plant closure analysis would entail working closely with the plant and corporate accountants to gather information on a variety of costs, revenues and accounting procedures. Mathematical modeling of the plant's profitability would also be necessary and would require information on salvage values of equipment as well as projections of future economic conditions.

Since these tests are only screening analyses, their limitations are many. The most significant limitations are summarized below.

- Corporate overhead expenses are not usually allocated to individual plants, and if they are, biases in the allocation method are not easily detected.

- Gross margin at the plant level may not be explicitly calculated and the components of gross margin may not be recorded.

- The components of cost of goods sold are subject to biases and misallocations.

- Transfer prices for inputs "purchased" by the plant from other parts of the company can be inflated to bias costs upward.

- Transfer prices that are assigned to intermediate products "sold" to other parts of the company may be artificially low, causing revenues to be biased downward.

- Average industry ratios of EBT to gross margin and revenue may not reflect specific plant EBT ratios.

- The average industry capital recovery factor may not reflect the risk and return characteristics of the plant or the useful life of the equipment.

Exhibit 5-10

CONCLUSIONS FOR SAMPLE PLANT

	Test	Decision Rule	Conclusions
1.	The Earnings Test EBT - Cost of Control = 16.36	>0	Economically Achievable
2.	The Gross Margin Test $\dfrac{\text{Cost of Control}}{\text{Gross Margin}} = .02$	$<.07$	Economically Achievable
3.	The Revenue Test $\dfrac{\text{Cost of Control}}{\text{Revenue}} = .006$	$<.02$	Economically Achievable

● Control equipment is easily affordable.

WORKSHEET 1a
CURRENT RATIO WITHOUT COST OF CONTROL
($ in 000s)

		Three Prior Years of Company Data		
		1 1976	2 1975	3 1974
1.	Current Assets	216,120	186,216	190,572
2.	Current Liabilities	91,076	66,370	71,445
3.	Current Ratio Line (1) ÷ Line (2)	2.37	2.81	2.67

Industry*	Upper Quartile	2.3
	Average	1.7
	Lower Quartile	1.3

Line (1)   Current assets are subtotaled on the balance sheet.

Line (2)   Current liabilities are subtotaled on the balance sheet.

---

*   Source: Robert Morris Associates.

WORKSHEET 1b
MOST RECENT CURRENT RATIO WITH COST OF CONTROL
($ in 000s)

	Recent Year 1 1981
1. Current Assets	216,120
2. Capital Cost of Control Device Adjusted for ITC (11,765 x 0.85)	10,000
3. Adjusted Current Assets Line (1) - Line (2)	206,120
4. Current Liabilities	91,076
5. Current Ratio Line (3) ÷ Line (4)	2.26

Line (2)   Estimate of the capital cost of the control device multiplied by 0.85 to include the tax credit.

WORKSHEET 2a
QUICK RATIO CALCULATION
WITHOUT POLLUTION CONTROL
($ in 000s)

		Three Prior Years of Company Data		
		1 1976	2 1975	3 1974
1.	Current Assets	216,120	186,216	190,572
2.	Inventory	91,409	86,642	103,924
3.	Quickly Convertible Assets Line (1) - Line (2)	124,711	99,574	86,648
4.	Current Liabilities	91,076	66,370	71,445
5.	Quick Ratio Line (3) ÷ Line (4)	1.37	1.50	1.21

Industry	Upper Quartile	1.3
	Median	1.0
	Lower Quartile	0.7

Line (2)   Inventories are located in the current asset portion of the balance sheet.

WORKSHEET 2b
QUICK RATIO
ADJUSTED FOR POLLUTION CONTROL
($ in 000s)

		Recent Year 1976
1.	Current Assets	216,120
2.	Inventory	91,409
3.	Capital Cost of Control • Adjusted for ITC	10,000
4.	Adjusted Quickly Convertible Assets: Line (1) – Line (2) – Line (3)	114,711
5.	Current Liabilities	91,076
6.	Quick Ratio Line (4) / Line (5)	1.26

WORKSHEET 3a
FIXED-CHARGE COVERAGE RATIO WITHOUT ADDITIONAL
POLLUTION CONTROL EXPENDITURES
($ in 000's)

		Three Prior Years of Company Data		
		1	2	3
		1976	1975	1974
1.	Net Profit Before Taxes	42,905	25,672	24,389
2.	Interest Expense	7,897	8,892	8,340
3.	Depreciation	9,493	8,614	7,443
4.	Other Fixed Payments (Lease payments, pension payments, etc.)	9,198	8,946	8,645
5.	Cash Earnings Before Fixed Charges: Line (1) + Line (2) + Line (3) + Line (4)	69,493	52,124	48,817
6.	Current Portion of Long-Term Debt	21,872	13,190	20,268
7.	Total Fixed Charges: Line (2) + Line (4) + Line (6)	38,967	19,228	37,253
8.	Fixed Charge Coverage Ratio: Line (5) ÷ Line (7)	1.78	2.7	1.31

WORKSHEET 3b
FIXED-CHARGE COVERAGE RATIO INCLUDING
ADJUSTMENTS FOR POLLUTION CONTROL EXPENDITURES
($ in 000's)

		Recent Year 1976
1.	Total Long-Term Liabilities	79,855
2.	Shareholder's Equity	163,387
3.	Total Capital: Line (1) plus Line (2)	243,242
4.	Debt Portion of Total Capital: Line (1) / Line (3)	0.33
5.	Capital Cost of Pollution Control Equipment Adjusted for ITC	10,000
6.	Portion of Expenditure Financed with Debt: Line (4) x Line (5)	3,300
7.	Interest Charged on New Debt	0.17
8.	Interest Expense (before tax): (line (6) x Line (7)	561
9.	Additional Principal Payments: Line (6) / 5	660
10.	Fixed Charges: Line (7) from Worksheet 3a	38,967
11.	Adjusted Fixed Charges: Line (10) plus Line (8) plus Line (9)	40,188
12.	Cash Flow: Line (5) from Worksheet 3a	69,493
13.	Annual O&M Expenditures	300
14.	Adjusted Cash Flow: Line (12) - Line (13)	69,193
15.	Adjusted Fixed Charge Coverage Ratio: Line (14) / Line (11)	1.72

WORKSHEET 4a
BEAVER'S RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

		Three Prior Years of Company Data		
		1	2	3
		1976	1975	1974
1.	Net Income After Taxes	20,108	11,649	13,135
2.	Depreciation	9,493	8,614	7,443
3.	Cash Flow: Line (1) plus Line (2)	29,601	20,263	20,578
4.	Current Liabilities	91,076	66,370	71,445
5.	Long-Term Liabilities	79,855	92,446	95,065
6.	Total Debt: Line (4) plus Line (5)	170,931	158,816	166,510
7.	Beaver's Ratio: Line (3) / Line (6)	0.17	0.13	0.12

WORKSHEET 4b
BEAVER'S RATIO INCLUDING ADJUSTMENTS
FOR POLLUTION CONTROL COSTS
($ in 000's)

		Recent Year 1976
1.	Long-Term Liabilities: Line (5) from Worksheet 4a	79,855
2.	Shareholder's Equity	163,387
3.	Total Capital: Line (1) plus Line (2)	243,242
4.	Debt Portion of Total Capital: Line (1) / Line (3)	0.33
5.	Capital Cost of Pollution Control Adjusted for ITC	10,000
6.	Portion of Expenditure Financed with Debt: (Line (4) x Line (5)	3,300
7.	Interest Rate on New Debt	0.17
8.	Interest Expense (before tax): Line (6) x Line (7)	561
9.	Marginal Income Tax Rate	0.46
9A.	1 - Tax Rate	0.54
10.	After-Tax Interest Expense: Line (9A) x Line (8)	303
11.	Annual O&M Expenditures	300
12.	After-Tax O&M Expenditures: Line (11) x Line (9A)	162
13.	Additional Tax Depreciation: Line (5) / 5	2,000
14.	Tax Shield from Depreciation (line (13) x Line (9)	920
15.	Cash Flow: Line (3) from Worksheet 4a	29,601
16.	Adjusted Cash Flow: Line (15) - Line (10) - Line (12) + Line (14)	30,056
17.	Total Debt: Line (6) from Worksheet 4a	170,931
18.	Adjusted Total Debt: Line (17) + Line (6)	174,231
19.	Adjusted Beaver's Ratio: Line (16) / Line (18)	0.17

WORKSHEET 5
DEBT-EQUITY RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

| | | Three Prior Years of Company Data | | |
| | | 1 | 2 | 3 |
		1976	1975	1974
1.	Long-Term Liabilities	79,855	92,446	94,065
2.	Common Stock at Par	37,670	37,670	37,670
3.	Additional Paid-In Capital	607	533	406
4.	Preferred Stock	5,047	5,201	5,445
5.	Retained Earnings	120,063	104,211	96,038
6.	Stockholders' Equity: Line (2) + Line (3) + Line (4) + Line (5)	163,387	147,615	139,559
7.	Debt-Equity Ratio:	0.49	0.63	0.68

	Upper Quartile	0.6
Industry	Median	1.1
	Lower Quartile	2.4

WORKSHEET 6
NPV COST OF POLLUTION CONTROL

$10^3

1. Capital Cost of Equipment Adjusted for ITC (C) — 10000

2. Annual Operating and Maintenance Cost (OM) — 300

3. Estimated Life of Equipment (L) (Years) — 8

4. Expected Rate of Growth in Operating Cost (g) — 0.10

5. Company Beta (β) — 1.10

6. Risk Free Rate (r_f) — 0.12

7. Discount Rate (r): line 6 + 0.08 x line 5 — 0.21

8. Credits for Product Recovery (CR) — 100

9. Present Value Cost of Control:

$$C + \sum_{t=0}^{L-1} \left[\frac{OM \times (1+g)^t}{(1+r)^t} \right] - \sum_{t=0}^{L-1} \left[\frac{CR}{(1+r)^t} \right] = 11{,}310$$

$$10{,}000 + \sum_{t=0}^{7} \left[\frac{300 \times (1.10)^t}{(1.21)^t} \right] - \sum_{t=0}^{7} \left[\frac{100}{(1.21)^t} \right]$$

$$10{,}000 + 1{,}761 - 451 = 11{,}310$$

WORKSHEET 7

ADJUSTED STOCK PRICE

			10^3
1.	Stock Price:	High	14.8
		Low	7.8
2.	Number of Shares Outstanding		7,890
3.	Market Value:	High	116,772
	Line (1) x Line (2)	Low	61,542
4.	PV Cost of Control		11,310
	Line (7) Worksheet 3.1		
5.	Marginal Tax Rate		0.46
6.	PV Cost of Control After Tax		6,107
	Line (4) x (1 - Line (5))		
7.	Adjusted Market Value:	High	110,665
	Line (3) - Line (6)	Low	55,435
8.	Adjusted Stock Price:	High	14.0
	Line (7) ÷ Line (2)	Low	7.0
9.	PV Cost of Control	High	0.05
	After Tax as a	Low	0.10
	Fraction of Value		
	Line (6) ÷ Line (3)		

WORKSHEET 8

MARKET-TO-BOOK RATIO

			1976	1975	1974
1.	Market Value per Share:	High	14.8	8.8	8.4
		Low	7.8	5.1	4.9
2.	Book Value per Share		20.0	18.5	17.6
3.	M/B ratio: (1) / (2)	High	0.74	.048	0.48
		Low	0.39	0.28	0.28
4.	Adjusted Market Value per Share: Line (8) Worksheet 7	High	14.0		
		Low	7.0		
5.	Adjusted M/B Ratio: Line (4) / Line (2)	High	0.70		
		Low	0.35		

SUMMARY OF SAMPLE FIRM RESULTS

Ratio/Measure	1976 Value Before	Adjusted	Conclusion
Current Ratio	2.37	2.26	Very Good
Quick Ratio	1.37	1.26	Very Good
- - - - - - -	- - - - - - -	- - - - - - -	- - - - - - -
Fixed-Charge Coverage	1.78	1.72	Inconclusive
Beaver's Ratio	.17	.17	Inconclusive
- - - - - - -	- - - - - - -	- - - - - - -	- - - - - - -
Debt-Equity	.49	--	Not Highly Levered
Bond Ratings	*	*	Good
- - - - - - -	- - - - - - -	- - - - - - -	- - - - - - -
Market Value	High 14.8 Low 7.8	14.0 7.0	Good
Market-Book	High .74 Low .39	.70 .35	

*Bonds not rated but Moody's states that firm has a line of credit at eight banks to borrow at the prime rate of interest.

WORKSHEET 9

		$ MM
1.	Capital Investment Cost	2.0
2.	Annualized Capital Cost: Line (1) x .17	.34
3.	Annual Operating Cost	.40
4.	Total Annual Cost of Pollution Control: Line (2) + Line (3)	.74

PLANT INCOME STATEMENT FOR A HYPOTHETICAL CHEMICAL FIRM

WORKSHEET 10

		$ MM
1.	Revenues	119.6
2.	Less: Cost of Goods Sold	84.2
3.	Gross Margin	35.4
4.	Less: Corporate Overhead	18.3
5.	Earnings Before Taxes	17.1

WORKSHEET 11

1. Earnings Before Taxes   17.1

2. Total Annual Cost of Pollution   .74
    Control

3. EBT - Cost of Control   16.36
    Line (1) - Line (2)

            Decision Rule

    Line 3   >   0   economically achievable
    Line 3   =   0   marginal
    Line 3   <   0   not economically achievable

WORKSHEET 12

The Gross Margin Test

1. Gross Margin   35.4

2. Total Annual Cost of   .74
    Pollution Control

3. Threshold   .07
    (EBT/GM ratio for industry) (2861)

4. Pollution control Cost as a Fraction   .02
    of Gross Margin
    Line (2) / Line (1)

.

WORKSHEET 13

The Revenue Test

1. Revenues   119.6

2. Total Annual Cost of Pollution Control   .74

3. Threshold (EBT/Revenue for Industry)   .02
                                                         (SIC 2861)

4. Pollution Control Cost as a Fraction   .006
   of Revenues
   Line (2) / Line (1)

Decision Rule

Line (4) < Line (3)   Economically Achievable

Line (4) ≥ Line (3)   Uncertain

CONCLUSIONS FOR SAMPLE PLANT

	Test	Decision Rule	Conclusions
1.	The Earnings Test EBT - Cost of Control = 16.36	>0	Economically Achievable
2.	The Gross Margin Test $\dfrac{\text{Cost of Control}}{\text{Gross Margin}} = .02$	<.07	Economically Achievable
3.	The Revenue Test $\dfrac{\text{Cost of Control}}{\text{Revenue}} = .006$	<.02	Economically Achievable

● Control equipment is easily affordable.

Modern finance theory characterizes stock prices as the discounted present value of expected future cash flows to investors from owning the security. Those cash flows are dividends, which accrue as residual income to equity holders, and as such, have some uncertainty or risk associated with their distribution. This risk is accommodated by adjusting the discount rate to determine the present value of the expected dividends. However, not all risks are of equal concern (hence, value-impacting) to investors: To the extent that a cash flow varies with the cash flows on the other securities in which one can invest, the risk (variation) is nondiversifiable -- it is unavoidable and cannot be offset by creating a portfolio or investment securities. This risk component is called "systematic risk" and is critical to investors. The remaining variation in cash flows, call "nonsystematic" risk, is specific to activities of each individual firm, and can be eliminated through diversification by investment in a portfolio of securities.

Finance theory argues that the diversifiable, nonsystematic risk is of no consequence to investors and does not affect stock price; the nondiversifiable, systematic risk is the determining factor in setting the value of expected dividends. The Capital Asset Pricing Model (CAPM) summarizes this relationship in the following equation:

$$r_s = r_f + \beta_s (\bar{r}_m - r_f)$$

The equation states that the required return r_s on a security is equal to the risk-free rate r_f plus a multiple β_s of the expected premium of returns on a market portfolio r_m over the risk-free rate. The risk-free rate is generally taken as the yield on government bonds. The multiple β_s, called the beta of security, reflects how volatile the stock's returns are compared to the returns on a portfolio of all stocks (a "market" portfolio). A beta of 2.0 means that if the return on the market portfolio goes up (or down) 200 basis points, the security will be expected to move 400 basis points (or 2.0 x 200) in the same direction. It is a measure of the nondiversifiable risk associated with a security, since it reflects only the "covariance" of the security's returns with the rest of the market. Beta values for each stock are usually estimated statistically by regressing the history returns on a stock against the corresponding returns on a large portfolio like the S & P 500 firms. Most stocks have a beta between .6 and 1.4. The premium on the market over the risk-free rate ($r_m - r_f$) has averaged about 8 percent over the past 50 years. This reflects the fact that investment in a portfolio of stocks is riskier than buying government bonds, so investors require about 8 percent (800 basis points) as a risk premium for making that investment. The empirical evidence for this model (CAPM) is quite good, although there are detractors of the theory. At this time, none of the detractors has a theory with better explanatory power.

The CAPM formula is a way of calculating the rate which should be used to discount expected dividends. The future dividends will arise from two sources: 1) returns on assets currently in place, i.e., income from on-going current operations, and returns on activities expected to be undertaken in the future but not currently in process. These latter returns represent expected growth opportunities, which may come from expansion of current lines of business or entry into new areas. The growth opportunities will be more valuable if their expected profitability is very high and if the expansion into those highly profitable areas is expected to be large. Thus, a stock price (P) is equal to the present value of returns on in-place assets (P_o), plus the present value of growth opportunities (PVGO):

$$P = P_o - PVGO$$

If a stock's value differs significantly from the book value per share of common equity, it is because the firm is either earning more than was expected on the investment in current assets at the time the original equity was raised, or the firm has many highly profitable growth opportunities it is expected to pursue, or both. The ratio of a stock's market value to its book value (market-to-book ratio) gives some idea of how much superior performance and/or future growth is expected. Few firms have ratios significantly different than 1.0, although some occasionally reach extremes of .3 on the low side, or 3.0 on the high side.

WORKSHEET 1a
CURRENT RATIO WITHOUT COST OF CONTROL
($ in 000s)

	Three Prior Years of Company Data		
	1	2	3

1. Current Assets

2. Current Liabilities

3. Current Ratio
   Line (1) ÷ Line (2)

Industry*   Upper Quartile
             Average
             Lower Quartile

Line (1)   Current assets are subtotaled on the balance sheet.

Line (2)   Current liabilities are subtotaled on the balance sheet.

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*   Source: Robert Morris Associates.

WORKSHEET 1b
MOST RECENT CURRENT RATIO WITH COST OF CONTROL
(S in 000s)

Recent Year

1

1. Current Assets

2. Capital Cost of Control Device
   Adjusted for ITC

3. Adjusted Current Assets
   Line (1) - Line (2)

4. Current Liabilities

5. Current Ratio
   Line (3) ÷ Line (4)

Line (2)   Estimate of the capital cost of the control device
           multiplied by 0.85 to include the tax credit.

WORKSHEET 2a
QUICK RATIO CALCULATION
WITHOUT POLLUTION CONTROL
($ in 000s)

	Three Prior Years of Company Data		
	1	2	3
1. Current Assets			
2. Inventory			
3. Quickly Convertible Assets Line (1) − Line (2)			
4. Current Liabilities			
5. Quick Ratio Line (3) ÷ Line (4)			

Industry	Upper Quartile
	Median
	Lower Quartile

Line (2)   Inventories are located in the current asset portion of the balance sheet.

WORKSHEET 2b
QUICK RATIO
ADJUSTED FOR POLLUTION CONTROL
($ in 000s)

<u>Recent Year</u>

1. Current Assets

2. Inventory

3. Capital Cost of Control
    Adjusted for ITC

4. Adjusted Quickly Convertible
    Assets:
    Line (1) - Line (2) - Line (3)

5. Current Liabilities

6. Quick Ratio
    Line (4) / Line (5)

WORKSHEET 3a
FIXED-CHARGE COVERAGE RATIO WITHOUT ADDITIONAL
POLLUTION CONTROL EXPENDITURES
($ in 000's)

	Three Prior Years of Company Data		
	1	2	3

1. Net Profit Before Taxes

2. Interest Expense

3. Depreciation

4. Other Fixed Payments
   (Lease payments, pen-
   sion payments, etc.)

5. Cash Earnings Before
   Fixed Charges:
   Line (1) + Line (2) +
   Line (3) + Line (4)

6. Current Portion of
   Long-Term Debt

7. Total Fixed Charges:
   Line (2) + Line (4) +
   Line (6)

8. Fixed Charge Coverage
   Ratio:
   Line (5) ÷ Line (7)

WORKSHEET 3b
FIXED-CHARGE COVERAGE RATIO INCLUDING
ADJUSTMENTS FOR POLLUTION CONTROL EXPENDITURES
($ in 000's)

<div align="right">Recent Year</div>

1. Total Long-Term Liabilities

2. Shareholder's Equity

3. Total Capital: Line (1) plus Line (2)

4. Debt Portion of Total Capital:
    Line (1) / Line (3)

5. Capital Cost of Pollution Control
    Equipment Adjusted for ITC

6. Portion of Expenditure Financed with Debt:
    Line (4) x Line (5)

7. Interest Charged on New Debt

8. Interest Expense (before tax):
    (line (6) x Line (7)

9. Additional Principal Payments:
    Line (6) / 5

10. Fixed Charges: Line (7) from Worksheet 3a

11. Adjusted Fixed Charges: Line (10) plus
    Line (8) plus Line (9)

12. Cash Flow: Line (5) from Worksheet 3a

13. Annual O&M Expenditures

14. Adjusted Cash Flow: Line (12) - Line (13)

15. Adjusted Fixed Charge Coverage Ratio:
    Line (14) / Line (11)

WORKSHEET 4a
BEAVER'S RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

	Three Prior Years of Company Data		
	1	2	3

1. Net Income After Taxes

2. Depreciation

3. Cash Flow:
    Line (1) plus Line (2)

4. Current Liabilities

5. Long-Term Liabilities

6. Total Debt:
    Line (4) plus Line (5)

7. Beaver's Ratio:
    Line (3) / Line (6)

WORKSHEET 4b
BEAVER'S RATIO INCLUDING ADJUSTMENTS
FOR POLLUTION CONTROL COSTS
($ in 000's)

1. Long-Term Liabilities: Line (5) from Worksheet 4a

2. Shareholder's Equity

3. Total Capital: Line (1) plus Line (2)

4. Debt Portion of Total Capital: Line (1) / Line (3)

5. Capital Cost of Pollution Control Adjusted for ITC

6. Portion of Expenditure Financed with Debt:
   (Line (4) x Line (5)

7. Interest Rate on New Debt

8. Interest Expense (before tax): Line (6) x Line (7)

9. Marginal Income Tax Rate

9A. 1 - Tax Rate

10. After-Tax Interest Expense: Line (9A) x Line (8)

11. Annual O&M Expenditures

12. After-Tax O&M Expenditures: Line (11) x Line (9A)

13. Additional Tax Depreciation: Line (5) / 5

14. Tax Shield from Depreciation (line (13) x Line (9)

15. Cash Flow: Line (3) from Worksheet 4a

16. Adjusted Cash Flow:
    Line (15) - Line (10) - Line (12) + Line (14)

17. Total Debt: Line (6) from Worksheet 4a

18. Adjusted Total Debt: Line (17) + Line (6)

19. Adjusted Beaver's Ratio: Line (16) / Line (18)

WORKSHEET 5
DEBT-EQUITY RATIO WITHOUT ADDITIONAL
POLLUTION EXPENDITURES
($ in 000's)

	Three Prior Years of Company Data		
	1	2	3

1. Long-Term Liabilities

2. Common Stock at Par

3. Additional Paid-In
   Capital

4. Preferred Stock

5. Retained Earnings

6. Stockholders' Equity:
   Line (2) + Line (3) +
   Line (4) + Line (5)

7. Debt-Equity Ratio:

Industry   ·   Upper Quartile
                   Median
                   Lower Quartile

WORKSHEET 6
NPV COST OF POLLUTION CONTROL

$ 10^3

1. Capital Cost of Equipment
   Adjusted for ITC (C)

2. Annual Operating and Maintenance Cost (OM)

3. Estimated Life of Equipment (L)
   (Years)

4. Expected Rate of Growth in Operating
   Cost (g)

5. Company Beta (β)

6. Risk Free Rate (r_f)

7. Discount Rate (r): line 6 + 0.08 x line 5

8. Credits for Product Recovery (CR)

9. Present Value Cost of Control:

$$C + \sum_{t=0}^{L-1} \left[\frac{OM \times (1+g)^t}{(1+r)^t} \right] - \sum_{t=0}^{L-1} \left[\frac{CR}{(1+r)^t} \right] =$$

WORKSHEET 7

ADJUSTED STOCK PRICE

10^3

1. Stock Price: High
                       Low

2. Number of Shares Outstanding

3. Market Value: High
   Line (1) x Line (2) Low

4. PV Cost of Control
   Line (7) Worksheet 3.1

5. Marginal Tax Rate

6. PV Cost of Control After Tax
   Line (4) x (1 - Line (5))

7. Adjusted Market Value: High
   Line (3) - Line (6)   Low

8. Adjusted Stock Price: High
   Line (7) ÷ Line (2)   Low

9. PV Cost of Control   High
   After Tax as a   Low
   Fraction of Value
   Line (6) ÷ Line (3)

WORKSHEET 8

MARKET-TO-BOOK RATIO

		Three Years Data		
		1	2	3
1.	Market Value per Share: High Low			
2.	Book Value per Share			
3.	M/B ratio: (1) / (2) High Low			
4.	Adjusted Market Value per Share: High Line (8) Worksheet 7 Low			
5.	Adjusted M/B Ratio: High Line (4) / Line (2) Low			

MANUFACTURERS - INDUSTRIAL CHEMICALS
SIC 2861 2869

	Current Data				ASSET SIZE		Comparative Historical Data			
4-1-80-9-30-79		4-1-10-3-79-3/31-80					9-30-76 3-31-77	4-30-77 3-31-78	9-30-78 3-31-79	9-30-79 3-31-80
0-250M 2	250M-1MM 22	1-10MM 41	10-50MM 23	ALL 88	NUMBER OF STATEMENTS		ALL 103	ALL 118	ALL 105	ALL 88
%	%	%	%	%	**ASSETS**	%	%	%	%	%
	5.9	4.5	8.8	6.1	Cash & Equivalents		7.4	7.0	5.4	
	25.9	27.9	27.4	29.9	Accts & Notes Rec. - Trade(net)		27.7	28.4	30.2	29.9
	27.5	24.8	23.6	24.8	Inventory		24.5	24.2	22.5	24.4
	1.9	2.5	1.1	1.9	All Other Current		3.3	2.1	2.0	1.9
	70.6	59.4	60.8	62.7	Total Current		62.9	61.7	62.1	62.7
	24.4	31.9	33.1	30.3	Fixed Assets (net)		29.2	31.1	31.1	30.3
	.3	2.2	.6	1.3	Intangibles (net)		.8	.8	.6	1.3
	4.7	5.5	5.4	5.7	All Other Non-Current		7.2	6.4	6.3	5.7
	100.0	100.0	100.0	100.0	Total		100.0	100.0	100.0	100.0
					LIABILITIES					
	5.6	6.3	9.0	7.0	Notes Payable-Short Term		5.8	6.7	6.7	7.0
	5.2	2.4	2.2	3.1	Cur. Mat.-L/T/D		2.8	3.0	2.9	3.1
	29.5	20.5	12.3	20.7	Accts & Notes Payable - Trade		18.8	19.5	19.1	20.7
	5.2	4.4	6.9	5.3	Accrued Expenses		5.8	4.7	5.6	5.3
	2.4	5.8	2.7	4.4	All Other Current		3.7	4.2	3.7	4.4
	48.9	39.4	33.2	40.5	Total Current		36.9	38.1	37.8	40.5
	10.2	14.7	17.1	14.1	Long Term Debt		12.7	16.2	15.1	14.1
	1.6	4.5	3.1	3.3	All Other Non-Current		4.6	3.4	2.7	3.3
	29.3	41.5	46.6	42.1	Net Worth		45.8	42.3	44.4	42.1
	100.0	100.0	100.0	100.0	Total Liabilities & Net Worth		100.0	100.0	100.0	100.0
					INCOME DATA					
	100.0	100.0	100.0	100.0	Net Sales		100.0	100.0	100.0	100.0
	72.5	73.0	71.7	72.3	Cost Of Sales		69.7	71.6	71.1	72.3
	27.5	27.0	28.3	27.7	Gross Profit		30.3	28.4	28.9	27.7
	23.6	19.6	20.4	21.2	Operating Expenses		22.0	21.3	22.7	21.2
	3.9	7.4	7.9	6.5	Operating Profit		8.3	7.1	6.1	6.5
	.3	1.0	1.0	.8	All Other Expenses (net)		.6	.7	.4	.8
	3.7	6.4	6.9	5.7	Profit Before Taxes		7.7	6.5	5.7	5.7
					RATIOS					
	2.0	2.1	3.1	2.2	Current		2.3	2.5	2.4	2.2
	1.5	1.4	2.0	1.6			1.7	1.7	1.6	1.6
	1.1	1.2	1.4	1.2			1.3	1.2	1.3	1.2
	1.5	1.2	1.8	1.3	Quick		1.3	1.4	1.5	1.3
	1.0	.8	1.1	.9			1.0	1.0	1.0	.9
	.6	.6	.7	.6			.7	.7	.7	.6

36	10.2	35	10.3	46	8.1	37	10.0	Sales/Receivables	34	10.6	33	10.9	38	9.6	37	10.0
44	8.0	41	8.9	54	6.8	46	7.9		45	8.2	44	8.3	50	7.3	44	7.9
52	7.0	59	6.2	64	5.7	59	6.2		56	6.5	58	6.3	64	5.7	59	6.2
32	11.3	33	11.1	53	6.9	33	10.9	Cost of Sales/Inventory	36	10.2	30	12.3	36	10.2	33	10.9
54	6.7	51	7.1	62	5.9	54	6.5		54	6.8	53	6.9	55	6.6	54	5.5
83	4.4	74	4.9	91	4.0	83	4.4		85	4.3	85	4.3	63	4.4	83	4.4
	7.9		7.3		3.8		6.2	Sales/Working Capital		4.6		5.1		5.8		6.2
	14.9		13.3		7.1		11.3			10.6		9.5		9.2		11.3
	38.7		40.4		14.9		28.2			20.7		23.1		19.9		28.2
	10.0		11.6		39.4		13.7	EBIT/Interest		17.6		12.5		15.4		13.7
(12)	6.4	(30)	5.6	(16)	8.9	(60)	5.9		(66)	7.1	(85)	5.4	(80)	4.6	(60)	5.9
	2.2		3.1		1.9		2.4			2.1		2.7		2.5		2.4
	5.1		9.9		13.1		10.9	Cash Flow/Cur. Mat. L/T/D		10.5		13.1		7.1		10.9
(12)	2.5	(27)	5.0	(15)	7.2	(55)	5.2		(48)	4.5	(61)	4.7	(54)	3.0	(55)	5.2
	1.2		3.5		2.9		2.1			2.1		1.9		1.5		2.1
	.2		.4		.4		.4	Fixed/Worth		.3		.4		.4		.4
	.5		.9		.7		.7			.6		.7		.7		.7
	.3		.7		1.0		.9			1.2		1.2		.3		.5
	.5		.8		.5		.7	Debt/Worth		.6		.7		.7		.6
	1.4		1.9		1.2		1.6			1.1		1.4		1.3		1.6
	4.0		3.1		2.1		3.1			2.4		2.5		2.1		2.1
	47.3		53.4		36.0		42.7	% Profit Before Taxes/Tangible Net Worth		42.2		38.6		38.9		42.7
(21)	24.3	(40)	26.2		22.4	(86)	24.5		(101)	22.6	(112)	26.5	(102)	22.5	(86)	24.3
	15.5		16.5		14.0		15.6			16.6		11.7		11.9		15.6
	16.3		16.3		21.2		17.3	% Profit Before Taxes/Total Assets		24.6		20.0		17.5		17.3
	11.0		11.4		12.4		11.3			13.4		10.4		8.9		11.3
	4.0		6.0		6.1		5.2			5.3		4.3		4.7		5.2
	29.3		14.1		10.2		15.2	Sales/Net Fixed Assets		14.9		15.7		15.6		15.2
	14.1		9.1		8.0		8.5			8.0		7.4		6.9		8.5
	5.8		4.5		2.9		4.3			4.3		3.8		4.2		4.3
	3.8		3.0		2.2		2.6	Sales/Total Assets		2.7		2.8		2.7		2.6
	2.7		2.2		1.7		2.1			2.2		2.1		2.1		2.1
	1.9		1.3		1.3		1.4			1.7		1.5		1.6		1.4
	.6		1.4		1.2		1.2	% Depr., Dep., Amort./Sales	(94)	2.0	(108)	1.9	(94)	1.7		1.6
(20)	1.3	(25)	2.0		2.1	(50)	1.8			2.3		2.8		2.3	(50)	2.3
	1.9		2.7		3.4		3.0										
			.5		1.1		.6	% Lease & Rental Exp./Sales	(38)	.3	(56)	.3	(43)	.4	(30)	.6
		(14)	1.1		1.1	(30)	1.1			1.1		.9		1.0		.9
			1.9		1.9		1.9			.9		.9					
	1.5		1.3		1.3		2.4	% Officers' Comp./Sales	(30)	1.7	(37)	2.1	(34)	2.5	(29)	2.5
(14)	3.3	(51)	2.2		2.3	(29)	3.3			2.5		3.8		3.8		3.3
	5.1		4.2				5.4			5.5		5.1		5.5		5.4
1332M	27466M	235495M	961972M	1336285M	Net Sales ($)	—	1408177M	1747585M	1558052M	1336285M
209M	11924M	150449M	545587M	708269M	Total Assets ($)		770074M	971099M	875649M	708269M

M = Thousand   MM = Million
See Pages 1 through 10 for Explanation of Ratios and Data

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SOURCE: Robert Morris Associates.

INMONT CORPORATION FINANCIAL STATEMENTS   APPENDIX D

A See inside back cover for definitions.

8.5 x "Cash Flow" p sh

PERFORMANCE **2**

SAFETY **3**
(Scale: 1 Highest to 5 Lowest)

BETA 1.10

Jan. 30, 1976 Value Line
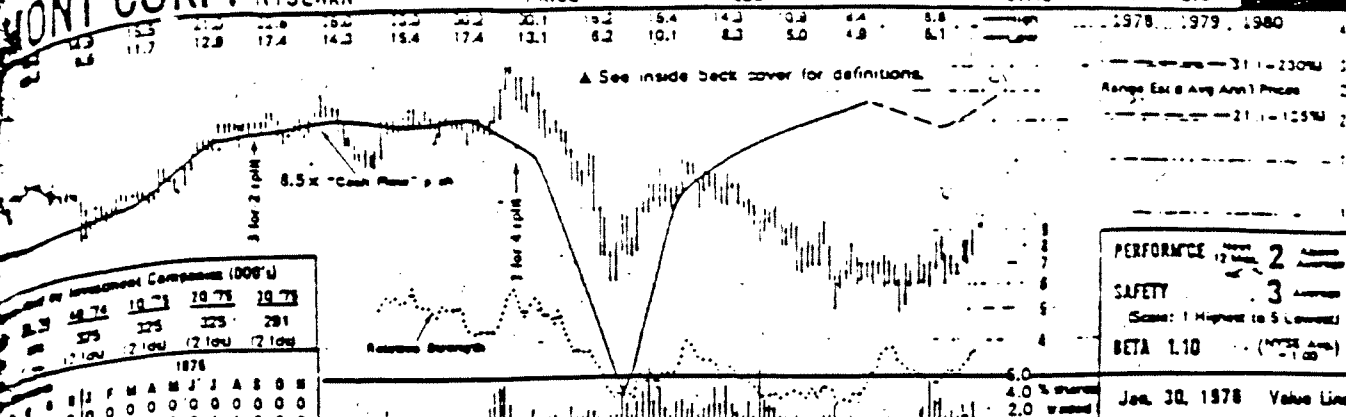
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977		78-80
	24.85	26.77	32.77	33.20	35.87	37.41	40.35	41.76	38.72	41.80	45.28	52.42	59.50	58.40	65.25		Sales per sh	76.05
	1.30	1.47	2.16	2.29	2.47	2.29	2.41	1.85	.21	1.43	1.82	2.19	2.68	2.30	2.95		"Cash Flow" per sh	3.35
	.98	1.12	1.65	1.82	1.90	1.66	1.78	1.17	d.52	.70	1.02	1.34	1.74	1.30	1.90		Earnings per sh	2.20
	.53	.53	.57	.69	.69	.69	.69	.76	.29	--	.10	.28	.35	.41	.45		Div'ds Decl'd per sh	.60
	.70	1.32	1.12	.58	1.35	1.56	.38	1.41	1.23	.50	1.15	1.62	1.80	1.05	1.55		Cap'l Spending per sh	2.70
	8.43	8.90	10.09	10.78	11.90	12.80	13.79	13.51	10.80	11.85	12.51	13.43	14.89	15.80	17.25		Tangible Book Value sh	21.85
	5.61	5.69	5.83	7.93	7.83	7.80	7.86	7.89	7.89	7.89	7.89	7.89	7.89	7.89	7.89		Common Shs Outst'g	7.89
	12.7	11.7	11.3	11.0	9.7	12.2	11.7	18.0	--	18.1	11.0	5.8	3.8	3.4			Avg Ann'l P/E Ratio	12.0
	4.3%	4.1%	3.1%	3.4%	1.7%	1.4%	2.2%	1.6%	2.9%	--	.9%	1.5%	5.3%	5.9%			Avg Ann'l Div'd Yield	2.3%

CAPITAL STRUCTURE as of 12/31/74

				280.7	291.9	316.9	329.5	305.5	328.2	357.1	411.6	469.5	445	515		Sales ($mill)	600
				11.9%	10.2%	11.2%	8.5%	1.4%	7.3%	7.4%	8.3%	9.9%	8.5%	9.0%		Operating Margin	8.5%
				4.3	4.9	5.0	5.4	5.8	5.7	6.3	6.7	7.4	7.7	8.1		Depreciation ($mill)	9.2
				15.4	13.2	14.2	9.5	d3.8	5.8	8.3	10.9	14.0	10.5	15.3		Net Income ($mill)	17.5
				47.8%	45.2%	49.8%	47.8%	--	51.3%	46.7%	48.0%	43.2%	57.5%	52.0%		Income Tax Rate	44.0%
				5.5%	4.5%	4.5%	2.9%	NMF	1.8%	2.3%	2.6%	3.0%	2.4%	3.0%		Net Income Margin	2.9%
				66.9	82.6	89.4	99.9	99.9	89.5	91.4	96.2	119.6	115	130		Working Cap'l ($mill)	150
				22.0	37.8	43.3	84.5	78.5	54.3	55.2	55.4	70.9	71.0	67.5		Long-Term Debt ($mill)	71.5
				108.7	115.4	124.3	127.7	106.5	111.9	119.2	128.0	139.1	148	158		Net Worth ($mill)	194
				12.2%	9.4%	9.3%	6.2%	NMF	4.5%	5.8%	7.2%	7.8%	6.0%	8.0%		% Earned Total Cap'l	7.5%
				14.1%	11.4%	11.5%	7.4%	NMF	5.2%	7.0%	8.5%	10.0%	7.0%	9.5%		% Earned Net Worth	9.0%
				9.4%	7.0%	7.3%	2.7%	NMF	5.2%	6.4%	6.9%	8.2%	5.0%	7.5%		Earn'gs Plowback Ratio	6.5%
				38%	43%	40%	66%	NMF	5%	13%	22%	22%	33%	25%		% All Div'ds to Net Inc	28%

BUSINESS: Inmont Corporation (formerly Inter-chemical Corp.) is a leading producer of printing inks. Sales by major market: transportation equipment (paints, lacquers, upholstery fabrics), 34%; packaging (inks, surface coating systems), 25%; printing (inks, coatings), 25%; building and mfg. (finishes, adhesives, wall coverings, insulating materials), 13%; shoes (breathable plastics), 1%; aquafoods, 1%; other, 1%. Foreign, 24% of sales. Labor costs 35% of sales; R&D, 1.6%. '74 Deprec. Rate: 4.4%. Has 8,316 empls.; 10,057 shrhldrs. Directors own 5% of com.: Northwest Ind., 9.5%. Pres.: W.R. Barrett, Inc.: Ohio. Address: 1133 Ave. of Americas, N.Y., N.Y. 10036.

1976 earnings prospects are good. With the exception of sales to the automotive refinishing market, which remained strong during all of last year, Inmont's businesses reflected the recession in 1975. But sales, particularly to the automotive original equipment market (OEM), began to pick up in the second half of the year. And we expect the improvement to persist as the economy plods along its slow-but-steady path to recovery in the bicentennial year. The automotive OEM figures to be an important source of strength: we estimate that domestic unit car sales will increase 16% in 1976 and that those of Inmont's most important customer, General Motors, will be up by a somewhat higher percentage. . . . Management is considering the possibility of applying the new accounting rules for foreign currency translations to 1975 results. Such a change, if made, would reduce share earnings modestly. . . . Inmont's Performance rank has moved up to a 2 (Above Average). Price recovery potential to 1978-80 is excellent.

The effective tax rate was unusually high last year because of overseas losses which carried little or no current tax benefit. The 75%-owned Porvair subsidiary (makes porous plastics for shoes) was in the red because of (1) the recessions in the United Kingdom and elsewhere, and (2) the loss of part of its market to leather, a competing raw material used in shoes, which declined in price. Other factors causing the tax rate to rise were losses in some foreign developmental operations and a strengthened U.S. dollar. We expect the effective tax rate to decline in 1976 but to be high relative to the past.

Finances have improved. Inmont reduced its inventories by some $20 million last year, repaid short-term borrowings and built up its cash assets significantly. At yearend 1975, both the level of cash and equivalents and the ratio of cash assets-to-current liabilities were probably at their highest levels in memory. Because of its strong cash position, Inmont will probably not have to take on any additional long-term debt during the course of the year even though capital spending in 1976 will probably be well above that in 1975. The lower level of borrowings will benefit earnings by reducing interest expense.
M.C.S. c.n.w.

INMONT CORP.

CAPITAL STRUCTURE

LONG TERM DEBT

Issue	Rating	Amount Outstanding
Notes & other borrowings		$60,041,000

Times Charges Earned: 1976 — 6.45 ; 1975 — 3.39

CAPITAL STOCK

Issue	Par Value	Amount Outstanding
1½% cumulative preferred	$1.00	
Common	5	5,590,001 shs.

Before extraord. credit after $1.03.

HISTORY

Incorporated in Ohio, May 28, 1928 as The International Printing Ink Corp., acquiring substantially all the business and assets of (1) The Ault & Wiborg Co. (Ohio), (2) The Ault & Wiborg Co. of New York, Inc. (N.Y.), (3) The Queen City Printing Ink Co. (Ohio), (4) Philip Ruxton, Inc. (N.Y.); each of these companies made printing inks and Ault & Wiborg also made varnishes and industrial finishes; name changed to Interchemical Corp. Apr. 30, 1937; present name adopted Apr. 15, 1969.

Internal developments and acquisitions added to original product lines pigment dispersions, textile colors, specialty adhesives, sealants, carbon papers, vinyl coated fabrics, and specialty organic chemicals. Purchased majority interests in printing ink manufacturers in France (1961), Italy (1963) and U.K. (1964). For acquisitions, mergers, etc. not listed below, see Moody's 1969 and 1974 Industrial Manuals.

In 1966 acquired Rinshed-Mason Co. (auto and furniture paints) for 2,030,069 present Common Shares.

In 1969 sold Copying Products Division (carbon papers and other coated papers) to Copay Corporation for cash, notes and preferred shares; sold Organic Chemical Division (specialty chemicals) to Arsynco, Inc. for cash and notes; and sold shoe adhesive business.

In 1970 created Extraordinary Reserve for losses on sale or discontinuance of businesses, closing facilities, etc. During 1970 and 1971 sold or liquidated interests in candy manufacturing, specialty food retailing, apparel pattern grading, color separations, magnetic tape and polyester film manufacturing businesses acquired in 1968 and 1969.

In addition, since 1970, has withdrawn from manufacture of molded furniture parts, construction adhesives, automotive plastic profile extrusions, coil coating finishes, specialty polyester resins, disperse dyes for textiles, and vinyl and urethane coated fabrics for footwear, wall covering and upholstery, all in the U.S., as well as bridge paints in the U.K. and house paints in Canada.

In 1969 purchased for cash 49% of Porvair Limited in U.K. (poromeric materials for shoe uppers and other uses); 80% owned by 1975.

In 1970 purchased 71% of stock of Thousand Springs Trout Farms, Inc., cultivator and processor of Idaho trout, for cash. (100% in 1975).

In 1972 acquired for cash entire stock of PCI Corporation, Port Huron, Mich. (one-piece, snap-in automobile roof interiors); (liquidated into Co. in 1976).

In 1975 Company increased interest in ICI PICIS, S.p.A., Italy (printing inks and container coatings) from 70% to 100%.

Also in 1975 purchased 100% of Bonaval-Werke GmbH, Germany (automotive and industrial finishes).

Proposed Acquisition: In Mar. 1977, Co. announced that plans to pay $3,000,000 for a Belvidere, N.J. paint plant and up to $7,000,000 more to refurbish the facility and add a warehouse. Plant which Co. would use to make automotive refinishing products, is owned by Celanese Polymer Specialties Co., a Celanese Corp. unit.

SUBSIDIARIES

Owns entire capital stock of following companies (except where noted):
Long Island Oyster Farms, Inc. (N.Y.)
Thousand Springs Trout Farms, Inc. (Del.)
Inmont Overseas Corp. (Del.)
  Inmont (U.K.) Ltd. (Del.)
    Porvair Ltd. (U.K.)
    Inmont Ltd. (U.K.)
      Fishburn Printing Ink Co. Ltd. (U.K. 92%)
  Inmont Canada Ltd. (Can.)
  Inmont S.A. (France)
  Bonaval-Werke GmbH (W. Germany)
  ICI PICIS S.p.A. (Italy)
  R-M Italia S.p.A. (Italy)
  Inmont South Africa (Pty.) Ltd. (S.A.)
  Inmont de Mexico, S.A. de C.V. (Mexico)
  Inmont de Venezuela, C.A. (Venez.)
  Inmont Industrias Quimicas, Ltda. (Brazil 70%)
The Ault & Wiborg Co. Far East (Philippines)
Rinshed-Mason Ltd. (Japan)

BUSINESS AND PRODUCTS

Company manufactures chemical specialty products for industry. It is a leading producer of printing inks and a major producer of automobile paints and other surface coatings for a variety of technically sophisticated uses. Its markets are diverse but its products are based on generally related chemical compounds, custom formulated to meet individual requirements of color, adhesion, conditions of use, and application methods of customers. Its markets are:

Packaging Industry:

Sales are made directly to packaging makers including in-house packagers (such as food and beverage canners) and to printers. Products decorate and protect metal cans and drums, collapsible tubes, paperboard and corrugated boxes and containers, bottle and jar caps, plastic containers, cellophane, polyethylene, polypropylene films, paper and plastic bags, aluminum foils, cigarette and candy wraps, frozen food containers, labels, milk cartons, etc. Products include printing inks (customade lithographic, flexographic, letterpress and gravure), specialized interior sanitary linings, barrier and gloss coatings, and certain adhesives as well as pigment dispersions sold to other makers of inks and coatings. Trademarks include IPI, Jet Set, RSH, Aqualox, Crystaphane, Vapoglo, etc. Operations in U.S., Canada, U.K., France, Italy, Belgium, Mexico, Venezuela, Brazil, South Africa, Philippines, Hong Kong, Malaysia and Singapore.

Auto "Original Equipment" Industry:

Company sells to new car manufacturers in the U.S., Canada, U.K., France, Belgium, Germany, South Africa and Philippines and to makers of trucks, buses, farm implements, construction equipment and auto parts and accessories. Products include: paints (exterior and interior), primers, undercoats and other finishes; vinyl coated fabrics for auto roof exteriors ("hardtops"), upholstery and interior trim; sealants for metal joints and for glass to metal; shock absorbing foams; and one-piece roof interiors ("headliners"). Trademarks include R-M, Rinshed-Mason, Prestite and PCI.

Publishing and Printing:

Sales to printers of magazines, catalogs, telephone directories, paperback and hard cover books, circulars, newspapers, brochures, business forms, and commercial job printing. Products are: gravure, lithographic, letterpress, and offset printing inks; lithographic chemicals, film and other graphic arts supplies; gloss coatings; adhesives; and pigment dispersions sold to other ink manufacturers. Trademarks include In-Tag, IPI, Speed King, Ultra King, Viva King, Web King, etc. Plants in U.S., Canada, U.K., France, Italy, South Africa, Mexico, Venezuela, Brazil, Philippines, Hong Kong, Singapore, and Malaysia.

Auto Refinishing:

Sells paints, primers, mixing equipment, and associated supplies and equipment to auto repair and repainting shops through distributors (over 1,000 in U.S.). Manufactures in U.S., Canada, U.K., France, Germany, South Africa, Philippines and Venezuela. Distribution networks in Japan, Italy, Belgium and other countries. Trademarks include R-M, Rinshed-Mason, Alpha-Cryl, Beta-Cryl, Super-Max, Tintometer, Green Stuff, Star Rock.

General Manufacturing:

Sells finishes to furniture manufacturers (primers, stains, top paints, varnishes, etc.); coating and finishing systems to producers of plywoods, hardboard, composition board, etc. for wall panels, floors, etc.; including printing cylinders and systems to print wood grains and other decorative designs on the panels; textile printing colors, vinyl dyes for synthetic fibers; pigment dispersions for coating many materials; sealants for furniture; wood and metal window frames; closed-cell sponge rubber compounding materials; plastic colorants; certain pigments and solvents; and specialized coatings. Sold largely in U.S., Canada, and export. Trademarks include Vinylox, Aqualite, ...

Footwear Industry:

Poromeric breathable materials, mainly for shoe uppers but also for wristbands and such industrial uses as battery separators, are made by Porvair Limited in the U.K., with sales in many countries including the U.S.

Aquafoods:

Subsidiaries engaged in scientific cultivation of oysters and rainbow trout, both marketed in fresh and frozen form throughout the U.S. and in certain export markets. Sales both direct and through distributors with bulk of product going to restaurants, clubs, etc. Trademarks are LIOF and 1000 Springs.

Sales Breakdown, by Markets:

	1976	1975
Publishing and printing	15%	16%
Packaging	17%	15%
Auto original equipment	21%	16%
Auto refinishing	9%	10%
Gen. manufacturing	17%	17%
Footwear and associated	1%	1%
Aquafoods	1%	1%
Miscellaneous (principally discontinued products)	2%	2%

Sales Breakdown, U.S. and Foreign

	1976	1975
United States	65%	65%
Foreign Countries	35%	35%

PRINCIPAL PLANTS & PROPERTIES

Main U.S. manufacturing plants, aggregating in excess of 2,250,000 sq. ft., are located as follows (all owned except one in Ohio):

California (2)	Missouri (1)
Illinois (1)	New Jersey (3)
Kentucky (1)	North Carolina (2)
Michigan (4)	Ohio (4)

Company also owns offices and Central Research Laboratories in Clifton, N.J., and owns or leases sales offices, ink mixing branches and warehouses throughout the U.S.

Manufacturing plants of subsidiaries outside the U.S. aggregate about 1,700,000 sq. ft. and include (all owned except 2 in England):

Brazil (1)	Mexico (1)
Canada (5)	Philippines (1)
England (4)	South Africa (3)
France (1)	Venezuela (1)
Hong Kong (1)	West Germany (1)
Italy (2)	Malaysia (1)

MANAGEMENT

Officers

W.R. Barrett, Sr., Pres. & Chief Exec. Off.
W.R. Perdue, Jr., Exec. Vice-President

Senior Vice-Presidents

J.P. Donohue	W.E. Gifford, Jr.
E.E. Fronberg	L.C. Harkness, Jr.

Vice-Presidents

J.P. Brady	D.N. MacIlraith
B.V. Burchunsky	R.L. Pitman
R.J. Carson	M.P. Ryan
R.C. Gravenkemper	J.F. St. Georges
J.B. Hemwall	T.G. Smith
F.E. Husted	A.A. Sommerville
E.M. Irving	G.V.R. Watson
J.L. Jameson	F.R. Whistler
E.A. Kumar	H.N. Wieung
O.H. Kress	

J.J. Kerrigan, Jr., Vice-President—Law & Sec.
C.C. Easton, Jr., Treasurer
H.N. Johnson, Controller

Directors

W.R. Barrett, Sr.	M.L. Mary
F.H. Brandi	H.W. McCall, Jr.
E.E. Fronberg	R. Mannam
R.V. Giordano	W.R. Perdue, Jr.
L.C. Harkness, Jr.	S.V. ...
F.A. Ling	C.T. Stewart

General Counsel: Cravath, Swaine & Moore, New York.

Auditors: Price Waterhouse & Co.

Annual Meeting: Third Tuesday in April.

No. of Stockholders: Feb. 25, 1977 ...

No. of Employees: Dec. 31, 1976, 8,940

Executive Office: ...

INCOME ACCOUNTS

COMPARATIVE CONSOLIDATED INCOME ACCOUNT, YEARS ENDED DEC. 31
(Taken from reports filed with the Securities and Exchange Commission and other Company reports)
(In thousands of dollars)

	1976	1975	1974	1973	1972	1971	1970
Net sales	534,265	451,550	469,464	413,544	357,095	350,750	305,493
Cost of sales	375,253	323,543	339,567	298,007	259,206	240,825	234,074
Selling, admin. & gen. expenses	109,737	96,031	95,597	87,440	79,310	73,082	71,325
Operating profit	49,273	30,979	33,000	28,157	20,079	36,840	53,906
Dividends, interest & royalties	3,164	2,577	1,825	1,452	1,180	1,187	
Other income (net)		409		17	392		
Total income	52,437	33,956	35,225	29,606	21,651	38,227	59,554
Interest expense	8,597	5,892	8,340	3,613	4,398	5,111	5,959
Other deductions (net)	1,541		1,463			670	
Balance	43,299	28,064	18,425	25,993	17,253	33,436	65,513
Prov. for U.S. & for. inc. taxes	22,797	14,023	11,511	10,625	8,036	325	cr2,573
Minority interest	94	cr608	1,036	.046	675	cr567	469
Net inc. bef. extraordinary item	20,108	11,649	12,878	11,722	8,542	5,768	63,309
Extraordinary item			cr257	cr458			dr14,636
Net income	20,108	11,649	13,135	12,180	8,542	5,768	48,445
Retained earnings, beginning of year	104,211	96,038	85,915	76,164	68,678	63,184	53,675
Preferred dividends	232	242	250	259	267	274	284
Common dividends	4,024	3,214	2,762	2,170	789		2,285
Retained earn. end of year	$120,063	$104,211	$96,038	$85,915	$76,164	$68,678	$62,661

SUPPLEMENTARY P.&L. DATA

Maintenance and repairs	$11,369	$9,461	$9,920	$10,513	$7,807	$7,096	$6,586
Depreciation and amort.	9,493	8,614	7,443	6,681	6,306	6,298	5,755
Taxes, other than income tax	15,438	13,926	12,408	11,251	9,164	8,203	643
Rents	9,198	5,946	8,645	6,947	6,253	5,828	5,506
Research and development	7,031	7,113	7,233	6,582	6,928	N.A.	N.A.

Includes related portions of items shown under "Supplementary P. & L. Data" below statement.
1974-73: Tax benefit of operating loss carryforward of Povair Limited. 1970: Provision to cover losses on sale or discontinuance of certain businesses and reduction in value of certain investments.
Restated, for change in accounting principle.
Includes payroll taxes (1976, $9,474,000).

Source & Disposition of Funds (in thousands):
Source of Working Capital:

	1976	1975
Net income	$20,108	$11,649
Depreciation	9,493	8,614
Deferred inc. taxes	250	1,848
Minority int.	94	cr608
Other	1,597	409
Working capital prov. from oper.	31,842	21,912
Proceeds from sale of foreign invest., net of tax	3,199	
Proc. fr. lg.-tm. loans		3,827
Other	1,781	1,336
Total	$36,822	27,075

Use of Working Capital:

	1976	1975
Repay. of lg. tm. debt	$9,480	5,329
Addit. to prop., plt, equip.	14,883	8,032
Dividends	4,256	3,476
Acq. of consol. int.—less net curr. assets		1,640
Other	3,005	1,879
Total	$31,624	26,356
Incr. in work. cap.	$5,198	719

BALANCE SHEETS

COMPARATIVE CONSOLIDATED BALANCE SHEET, AS OF DEC. 31
(Taken from reports filed with the Securities and Exchange Commission and other Company reports)
(In thousands of dollars)

ASSETS	1976	1975	1974	1973	1972	1971	1970
Cash	$6,144	$7,771	$1,930	$7,987	$5,177	$4,245	$6,850
Marketable securities	25,928	16,294	11,648	2,069	3,014	5,149	267
Accounts and notes receivable	81,568	72,018	67,018	65,075	57,244	50,088	50,442
Inventories	91,409	86,642	103,924	81,164	71,874	66,577	66,891
Prepaid expenses	8,071	3,491	4,052	4,161	2,571	2,256	2,177
U.S. inc. tax refundable						1,380	7,853
Total current assets	216,120	186,216	190,572	160,456	137,880	130,295	135,280
Property, plant & equipment	181,048	178,907	169,242	160,393	153,123	146,442	141,630
Less: Reserve for depreciation	85,335	84,256	76,612	72,316	69,421	65,199	50,957
Net prop. plant & equip.	95,713	94,651	92,630	58,077	83,702	81,254	90,673
Intangibles	16,457	18,635	16,140	16,158	14,699	14,210	14,253
Miscellaneous assets	5,998	6,929	6,727	6,723	6,453	6,021	9,544
Total	$334,318	$306,431	$306,069	$271,419	$242,734	$232,369	$240,050
LIABILITIES:							
Notes payable	$21,872	$13,190	$20,268	$13,336	$9,016	$10,570	$5,297
Long term debt due						17,439	17,165
Accounts payable	29,147	25,168	22,757	28,475	22,015	4,197	4,030
Payrolls and commissions	9,847	7,032	7,946	6,215	4,585	6,777	5,341
Other accrued liabilities	12,375	11,239	11,516	7,474	5,774	5,655	1,591
Provision for income taxes	16,641	5,966	8,141	6,956	3,608	900	510
Deferred income taxes	994	775	817	1,225	1,008		
Total current liabilities	91,076	66,370	71,445	63,681	46,306	43,438	35,429
Long term debt	60,147	69,827	70,945	53,354	55,211	55,485	56,461
Res. for assets in foreign countries			5,593	6,066	7,483	3,923	589
Res. for disposition certain assets	5,054	991	6,303	6,471	4,868	4,565	13,360
Other accrued liabilities	7,938	7,952	5,383	4,460	4,091	2,750	4,281
Deferred income taxes	3,616	10,035	6,341	5,366	4,375	4,794	3,175
Minority interest	5,247	3,541	5,445	5,608	5,335	6,028	
4½% cum. preferred stock ($100 par)	39,813	5,201	39,813	39,813	39,813	39,813	39,81
Common stock ($5 par)	407	39,813	406	329	251	50	
Capital surplus	120,063	553	96,038	85,915	76,164	55,073	52,66
Retained earnings		104,211					
Total stockholders' equity	165,350	149,758	141,702	131,504	122,043	114,669	104,909
Less: Treasury stock	2,143	2,143	2,143	2,143	2,143	2,143	2,454
Net stockholders' equity	163,387	147,615	139,559	129,521	119,900	112,526	106,455
Total	$334,318	$306,431	$306,069	$271,419	$242,734	$232,369	$240,050
Net current assets	$125,044	$119,846	$119,127	$96,775	$91,574	$86,357	$99,85

PROPERTY ACCT.—ANALYSIS

Additions to cost	$14,583	$8,032	$14,219	$12,773	$9,407	$7,730	$9,67
Retirement or sales	11,531	3,563	4,021	2,337	1,237	1,182	2,15
Other deductions (dispositions)	1,511	1,759	1,349	1,966	742	1,156	1,30
Other additions (acquisitions)		6,755				5,450	

DEPREC. RESERVE—ANALYSIS

Additions charg. to income	$9,493	$8,614	$7,443	$6,681	$6,306	$6,298	$5,5
Retirements or renew. chgd. to res.	527	1,436	2,568	2,407	762	778	
Other deductions (dispositions)	385		279	1,370		1,564	120
Other additions (acquisitions)		1,305					

Restated, see General Notes (d) below.
At cost which approximates market.
At lower of cost or market; 1976: Comprised: Finished goods, $43,370,000; work-in-process, $18,799,000; raw materials, $29,240,000; total, $91,409,000.

1976-71: 72,505; 1970, 72,737 common shares at cost.

1976:	Book Values	Reserves
Land	$7,387,000	
Buildings	65,213,000	$25,680,000
Machy. & equip.	103,428,000	$56,655,000
Incompl. proj.	5,010,000	
Total	$181,048,000	
After reserves (1976, $6,462,000).	$85,235,000

General Notes: (a) Principles of consolidation: The consolidated financial statements include the accounts of Inmont Corporation and its majority-owned subsidiaries.

(b) FOREIGN CURRENCY TRANSLATION—Assets and liabilities of foreign subsidiaries are translated into U.S. dollar equivalents at year-end exchange rates, except that inventories, prepaid expenses, property, plant and equipment, intangibles and deferred income taxes are translated at historical rates. Income and expense items are translated at average rates of exchange prevailing during year, except principally for cost of products sold and depreciation which are translated at historical rates.

All realized and unrealized foreign exchange gains and losses, including those on forward exchange contracts, are included in the determination of net income currently.

(c) INVENTORIES—Inventories are valued at lower of cost or market. Substantially all inventories in United States are valued using last-in, first-out (LIFO) method. All other inventories are valued using first-in, first-out (FIFO) method.

(d) PROPERTY, PLANT AND EQUIPMENT—Property, plant and equipment are valued at cost and depreciated over estimated useful lives using straight-line method at rates ranging from 2% to 5% for buildings and 6.67% to 33.3% for machinery and equipment.

Expenditures for maintenance, repairs and minor renewals and betterments are charged to income. Major renewals and betterments are capitalized.

In case of retirements and dispositions, cost and accumulated depreciation are removed from accounts and difference between proceeds and cost less accumulated depreciation is included in income.

INCOME TAXES—Provision has made in income statement for deferred income taxes where differences exist between the time at which they enter into determination of income in financial statements. In balance sheet, deferred taxes are classified as current or non-current according to assets and liabilities to which they relate.

The United States investment tax credit is taken into income currently.

(f) RESEARCH AND DEVELOPMENT—Research and development costs charged to income as incurred.

FINANCIAL & OPERATING DATA

Statistical Record	1976	1975	†1974	†1973	†1972	†1971
	$398.45	$225.57	$241.23	$217.18	$146.19	$95.69
Earned per share—preferred						
Earned per share—common:						
Year-end shares:						
Before special items	$2.52	$1.45	$1.60	$1.45	$1.05	$0.70
After special items	$2.52	$1.45	$1.63	$1.51	$1.05	$0.70
Dividends per sh.—pfd. ($100 par)	4.50	4.50	4.50	4.50	4.50	4.50
—common ($5 par)	$0.51	$0.41	0.35	$0.27¼	$0.10	
Price Range—4½% preferred	52-47	50-45¾	54-43	58-54	60-56	62-51
—common	14¾-7¾	8¾-5⅜	8¾-4⅛	10⅞-5	14¼-8¼	15¾-10⅛
Net tang. assets per share						
—preferred ($100 par)	$2,910.93	$2,475.39	$2,266.61	$2,021.18	$1,802.96	$1,650.99
—common ($5 par)	$17.98	$15.69	$14.95	$13.66	$12.59	$11.70
Fixed charges earned:						
Before inc. tax & extraord. item	6.43	3.59	3.92	4.98	4.77	3.56
After inc. tax, bef. extraord. item	3.55	2.31	2.54	3.09	2.94	2.13
Net tang. assets $1,000 lg. tm. debt	$3,434	$2,847	$2,740	$3,047	$2,905	
Net curr. assets per $1,000 lg. tm. debt	$2,072	$1,716	$1,679	$1,743	$1,659	$1,565
Number of shares—preferred	$0.465	$2.105	$4.451	$6.082	$8.149	$60.290
—com. (yr.-end)	7,890.004	7,890.105	7,890.105	7,890.105	7,890.105	7,890.105
†Based on average shares as reported by Co.						
‡Restated for change in accounting principle.						
¶Range to date of delisting on NYSE; also for entire year.						
Financial & Operating Ratios						
Current assets ÷ current liabilities	2.37	2.51	2.67	2.52	2.98	3.00
% cash & securities to current assets	16.23	13.92	8.17	6.27	3.49	7.21
% inventories to current assets	42.30	46.53	54.53	50.58	52.13	51.10
% net current assets to net worth	76.53	81.19	85.36	74.72	76.58	77.19
% property depreciated	47.13	47.09	45.27	45.09	45.34	44.52
% annual depr. etc. to gross property	5.24	4.81	4.40	4.17	4.12	4.30
Capitalization:						
% long term debt	26.97	32.11	33.70	29.94	31.33	33.02
% preferred stock	2.26	2.39	2.59	3.03	3.33	3.58
% common stock & surplus	70.77	65.50	63.71	67.03	65.14	63.39
Sales ÷ inventories	5.84	5.21	4.52	5.10	4.97	4.97
Sales ÷ receivables	6.56	6.27	7.01	6.36	6.24	5.53
% sales to net property	558.19	477.07	506.82	469.57	426.63	407.11
% sales to total assets	159.81	147.36	153.19	152.58	47.11	142.34
% net income to total assets	6.01	5.80	4.21	4.52	3.32	2.48
% net income to net worth	12.31	7.89	9.23	9.05	7.12	5.33
Analysis of Operations:	%	%	%	%	%	%
Gross sales, less returns, allow., etc.	100.00	100.00	100.00	100.00	100.00	100.00
Cost of sales	70.24	71.57	72.39	72.03	72.31	72.61
Selling, general, etc. expenses	20.54	21.27	20.45	21.14	22.07	22.10
Balance	9.22	6.86	7.16	6.81	5.62	5.09
Interest paid	1.48	1.97	1.78	1.56	1.33	1.55
Other income	0.30	0.66	0.35	0.36	0.44	0.42
Income taxes	4.28	3.11	2.45	2.57	2.25	2.21
Extraordinary items				0.11		
Net income	3.76	2.58	2.80	2.94	2.39	1.74

LONG TERM DEBT

1. Notes & other borrowings: Outstanding Dec. 31, 1976, $60,347,000 comprising:
   (1) $27,750,000 6.35% notes, payable $1,850,000 annually thru 1992.
   (2) $28,236,000 9.04% notes, payable $1,764,000 annually from 1977 to 1992. In addition, a final payment of $1,776,000 is due in Dec. 1992.
   (3) $4,361,000 foreign and other.

Co. has a credit agreement with eight banks which provides for borrowing at essentially prime rate of interest. Co. reduced committed amount under this agreement from $20,000,000 to $10,000,000 effective Jan. 1, 1977. Agreement provides for borrowing on a revolving credit basis until Feb. 28, 1978, with provision for conversion at any time until that date, at Co.'s option, to a four-year term loan. A commitment fee is paid equal to one-half of one percent per year of average daily unused amount. No loans were outstanding under this agreement at May 31, 1977.

These agreements provide, among other things, for maintenance of minimum net working capital and restrict payment of dividends. At Dec. 31, 1976, $50,695,000 of retained earnings was free from these restrictions.

CAPITAL STOCK

1. Inmont Corp. 4½% cumulative preferred; par $100:
   AUTHORIZED—77,959 shares; outstanding, Dec. 31, 1976, 30,465.
   PREFERENCE—Has preference for assets and dividends.
   DIVIDEND RESTRICTION—See term loan above.

DIVIDEND RIGHTS—Entitled to cumulative dividends of 4½% annually. Dividends payable quarterly Feb. 1, etc. to stock of record about Jan. 20, etc.

DIVIDEND RECORD—Initial dividend of $1.21¾ per share (includes dividends at 6% to Nov. 17, 1944 on former 6% preferred) paid Feb. 1, 1945; May 1, 1945, $1.12½. Regular dividends paid quarterly thereafter.

VOTING RIGHTS—Entitled to one vote per share.

LIQUIDATION RIGHTS—Entitled to $100 per share and accrued dividends.

PREEMPTIVE RIGHTS—None.

CALLABLE—As a whole or in part at any time on thirty days' notice at 105 and dividends.

SINKING FUND—Semi-annually and cumulative each M&N 1. company is to set aside out of surplus or net profits after preferred dividends the sum of $50,000 to purchase preferred at or below par, any balance after 6 months to be applied to any corporate purpose free from any sinking fund obligation.

TRANSFER AGENT—Chemical Bank, New York.

REGISTRAR—Chase Manhattan Bank, N.A., New York.

PURPOSE—Exchanged for 6% preferred shares in Nov. 1944 pursuant to reclassification plan, share for share plus $5 per share in cash.

Traded—OTC

2. Inmont Corp. common; par $5:
   AUTHORIZED—20,000,000 shares; outstanding, Dec. 31, 1976, 7,890,004 shares; in treasury, 72,505 shares; par $5.
   Par changed from no par May 5, 1948, by 2-for-1 split $5 shares split 2½-for-1 Apr. 1, 1959 and 1½-for-1 Jan. 25, 1965.

As of Mar. 1977, Esmark, Inc. owned 9.5% of outstg. shs.

DIVIDEND RESTRICTION—See term above.

Dividend Record (in $)
(No par shares)

1928	1.04½	1929	2.50	0.30
1931-33	Nil	1934	0.50	0.35
1936	2.75	1937	2.00	0.38
1939	0.40	1940	1.00	0.41
1942-45	0.50	1946	2.00	0.47
1948	0.20			

($5 par shares)

1948	0.60	1949	0.50	0.50-53
1954	1.20	1955	1.70	1956-58
1959	0.65			

($5 par shares—after 2½-for-1 split):

| 1959 | 0.98 | 1960-65 | 0.964 |
| 1965 | 0.45 | | |

(On $5 par shares after ½-for-1 split):

| 1965 | 0.90 | 1966-68 | 0.909 |

(On $5 par shares after 5% stk. div.):

1969	0.45	1970		
1972	0.30	1973		
1975	0.41	1976		

Also stock dividends.

To May 16.

VOTING RIGHTS—One vote per share, same as preferred.

PREEMPTIVE RIGHTS—None.

TRANSFER AGENT—Chemical Bank, New York and First Jersey National Bank, City, N.J.

REGISTRAR—Manufacturers Trust Co., New York.

DIVIDEND DISBURSING—Chemical Bank, New York.

LISTED—On NYSE.