

3. EVALUATING SUBSTANTIAL IMPACTS: PRIVATE-SECTOR ENTITIES

For facilities owned by the private sector, measuring substantial impacts requires estimating the financial impacts on the entities that will pay for the pollution controls. For example, compliance with water quality standards may require that a particular facility, perhaps a factory, install additional wastewater treatment. After estimating the cost of the additional wastewater treatment, the next step is to measure the ability of the factory to pay for the additional treatment. If the analysis shows that the entity will not incur any substantial impacts due to the cost of pollution control (e.g., there will be no significant changes in the factory's level of operations nor profit), then the analysis is completed. If, on the other hand, the analysis shows that there will be substantial impacts on the entity, then the resulting impacts on the surrounding community must be considered (e.g. the impact of lost employment on the community's employment base, or the impact on the overall economy of the community). Impacts to the surrounding community, referred to as widespread impacts, are addressed in Chapter 4.

The following sections describe the steps involved in evaluating whether impacts will be substantial. These steps are outlined in Figure 3-1. This chapter explains how to adapt each of the steps to a range of data sources and provides worksheets to assist the discharger in working through each step. The analytic approach presented here can be used for a variety of private-sector entities, including commercial, industrial, residential and recreational land uses, and for point and nonpoint sources of pollution. The guidance provided in this chapter, however, is not meant to be exhaustive. The State and/or EPA may require additional information or tests in order to evaluate whether substantial and widespread impacts will occur. In addition, the applicant should feel free to include any additional information they feel is relevant. The steps described in further detail in the rest of the chapter are:

- **Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project** - This section discusses factors that should be considered when verifying that the proposed pollution control project is the most appropriate solution to the pollution problem. It also describes the type of general information that should be provided about the proposed project. In addition, it discusses how to annualize capital costs of the project and calculate total annual costs of the pollution control project.
- **Financial Impact Analysis** - This section describes the types of financial tests that should be applied to measure the impact on the applicant. The primary measure is profitability. The secondary measures include indicators of liquidity, solvency, and leverage.

Most of this chapter is written in terms of evaluating whether there will be a substantial impact on a particular discharger. This type of analysis is necessary whenever there is a

request for a variance. These same tests, however, can be used to analyze the impact on a group of dischargers, as might be the case in a use attainability analysis. For example, there may be several facilities that would confront similar requirements to improve their waste water discharges in order to meet a higher water quality standard under consideration. The same primary and secondary tests would be used to measure substantial impacts in the dischargers. The difference would be, however, when the analysis moved to measuring widespread impacts. Here the impacts on the total group of dischargers (or all dischargers in the relevant reach) would be used to measure whether or not the impacts are considered widespread.

3.1 Verify Project Costs and Calculate The Annual Cost of the Pollution Control Project

Before the impact analysis can be performed, the project costs should be verified and the annual costs calculated.

3.1.a Verify Project Costs

The first step in the financial impact analysis is an evaluation of the proposed pollution control project. Private entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment. Specific types of pollution prevention activities to be considered include:

- Change in Raw Materials;
- Substitute Process Chemicals;
- Change in Process;
- Water Recycling and Reuse; and
- Pretreatment Requirements.

Whatever the approach, the discharger must demonstrate that the proposed project is the most appropriate means of meeting water quality standards and must document project cost estimates. If at least one of the treatment alternatives that allows the applicant to meet water quality standards would not impose substantial impacts, then they are not able to demonstrate substantial impacts and should not proceed with the analysis presented in the remainder of this workbook.

Since the most cost-effective approach to meeting water quality standards should be considered, submissions should list their assumptions about excess capacity, future facility expansion, and alternative technologies. The most accurate estimate of project costs may be available from the discharger's design engineers. These estimates can be compared to estimates available from EPA.

3.1.b Calculate the Annual Costs of the Pollution Control Project

In order to perform the economic tests, the cost of the pollution control needed to comply with the Water Quality Standards must be calculated and converted to an annualized cost. Initially, pollution control costs are expressed in two parts: (1) the capital costs of purchasing and installing the equipment and (2) the yearly operating and maintenance (O&M) costs. Both the capital and O&M cost estimates should be provided by the discharger requesting relief. To assess whether the costs represent the most cost effective means of meeting the water quality standards, they should be compared to costs at comparable entities that meet the same standards. For dischargers covered by effluent guidelines, compliance costs have been calculated by the Agency and are available for comparative purposes. (See Appendix A.) Costs for nonpoint sources are less readily available.

Instead of assuming that the total capital costs will be paid in the first year of operation, these costs are usually annualized. By assuming that costs are spread out over several years, annualization calculates the amount that will be paid each year, including the financing costs. In order to allow for comparisons across cases, the analysis should assume that the applicant will borrow the capital for the pollution control equipment and repay the loan in even annual installments over a 10 year period. The assumption of ten years is based on the likely life of the equipment. The assumption of even annual installments is made for convenience. The interest rate on the loan should be equivalent to the rate the applicant pays when it borrows money. If it borrows from the parent firm, the interest charge should be equivalent to the interest charged by the parent firm. If the parent firm would lend the entity money without interest, then the interest payments should be equivalent to the interest rate the applicant would pay to borrow from a bank or on its line of credit. If it is impossible to determine the appropriate interest rate, the analysis should assume an interest rate equal to the prime rate plus one percent.

The financial tests discussed below compare the costs of compliance to other costs and revenues of the applicant. Compliance costs and other costs and revenues must, therefore, be comparable. In other words, they should be calculated for the same year. If compliance costs are estimated assuming construction several years in the future, they should be deflated back to the year of the financial data. This can be done by assuming that the inflation rate over the last five years will continue into the future. See discussion in Section 2.2, and Appendix A for references to inflation/deflation indices. Likewise, if costs were estimated for an earlier year, they should be inflated to current year costs. The Annualized Cost of Pollution Control can be calculated using **Worksheet G**.

3.2 Financial Impact Analysis

The purpose of the financial impact analysis is to assess the extent to which existing or planned activities and/or employment will be reduced as a result of meeting the water

quality standards. The tests described in this Workbook are not designed to determine the exact impact of pollution control costs on an entity. They merely provide indicators of whether pollution control costs would result in a substantial impact.

Four general categories of financial tests are presented in the following sections. As indicated below, the four categories are divided into a primary measure of financial impacts and three secondary measures of financial impacts:

Primary Measure

- Profit -- how much will profits decline due to pollution control expenditures?

Secondary Measures

- Liquidity -- how easily can an entity pay its short-term bills?
- Solvency -- how easily can an entity pay its fixed and long-term bills?
- Leverage -- how much money can the entity borrow?

Profit and solvency ratios are calculated both with and without the additional compliance costs (taking into consideration the entity's ability, if any, to increase its prices to cover part or all of the costs). Comparing these ratios to each other and to industry benchmarks provides a measure of the impact on the entity.

For all of the tests, it is important to look beyond the individual test results and evaluate the total situation of the entity. While each test addresses a single aspect of financial health, the results of the four tests should be considered jointly to obtain an overall picture of the economic health of the applicant and the impact of the water quality standards requirement on the applicant's health. The results should be compared with the ratios for other entities in the same industry or activity. In addition, the ratios and tests should be calculated for several years of operations. This will allow long-term trends to be differentiated from short-term conditions.

The structure, size, and financial health of the parent firm should also be considered. An important factor, which may not be reflected in the preceding measures, is the value of an applicant's product or operations to its parent firm. For example, if a facility produces an important input used by other facilities owned by the firm, the firm may be likely to support the facility even if it appears to have only borderline profitability. The results of these tests and other relevant factors, can be used to make a judgement as to the likely actions of the applicant (e.g. shut down entirely, close one or more product/service lines, shift to other products/services, not proceed with an expansion, continue operations at current levels) faced with the pollution control investment.

Each type of test measures a different aspect of a discharger's financial health. The primary measure evaluates the extent to which an applicant's profit rate will change, and compares the profit level to typical profits in that industry. The secondary measures provide additional information about specific impacts that the discharger would bear if required to meet water quality standards. In some cases, the tests might indicate that the discharger would remain profitable (Profit) after investing in pollution control, but would have trouble borrowing the needed capital (Leverage). This situation would indicate a need to work with the discharger in choosing the technology and schedule used to meet the regulations. In other cases the tests might show that the discharger has a short-term problem with meeting the financial obligation imposed by the standards, but could handle it in the long-run (Liquidity vs. Solvency). This is important information when considering whether or not to grant a variance so as to allow more time for compliance.

Since it is the discharger that will have to pay for the wastewater treatment, the financial tests presented in this Workbook use data about the discharger's operations. This data, however, may not be readily available for the discharger itself, and if available, the discharger may consider the information to be confidential. It is EPA policy, however, that applications based on economic considerations must be accompanied by data that demonstrate the impacts.

If the information is not available at the discharger level, it can be estimated from the balance sheets or income statements of the firm that owns or controls the discharger. Estimates can be made in a variety of ways. One commonly used approach is to compare the discharger's sales or revenues to the firm's sales or revenues and apply this ratio to other financial factors. For example, if the discharger is responsible for 20 percent of its firm's revenues, then it is assigned 20 percent of the firm's current assets and current liabilities. In some cases, particularly with manufacturing facilities, the discharger may not sell its production directly, but may ship it to another facility owned by the same firm. In this case, the discharger's share of sales should be calculated by determining the market value of the goods produced by the discharger, using market prices for the year being analyzed.

The primary and secondary measures are described below, along with an example of specific tests to be used. While there are several ratios that could be used for each test, to simplify the presentation only one ratio per test is described in detail. All four primary and secondary measures, however, should be used in the analysis.

In most cases, interpreting the results requires comparisons with typical values for the industry. Among the sources that provide comparative information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, Dun and Bradstreet's *Dun's Industry Norms*, and Standard & Poor's *Industry Surveys*. The *Annual Statement Studies*, *Dun's Industry Norms*, and Standard & Poor's *Industry Surveys* provide composite statistics for firms grouped into various manufacturing and service industries.

The *Moody's Industrial Manual* provides detailed financial information on individual firms that can be used for comparison purposes. Although benchmarks are available for most financial tests, EPA emphasizes that the discharger should consider these benchmarks as indicators of financial health and not as definitive measures.

3.2.a Primary Measure: Profitability

The Profit Test measures what will happen to the discharger's earnings if additional pollution control is required. If the discharger is making a profit now but would lose money with the pollution control, then the possibility of a total shutdown or the closing of a production line must be considered. Greatly reduced, but still positive, profits are also of concern. Likewise in the case of a proposed facility or proposed expansion; if estimated profits would drop considerably with pollution control, then the development might not take place.

Two pieces of information are needed for the Profit Test. The first piece is the total annual cost of the required pollution control from **Worksheet G**. The second piece is the earnings information from the entity's income statement (**Worksheet H**).

$$\text{Profit Test} = \frac{\text{Earnings Before Taxes}}{\text{Revenues}}$$

The Profit Test should be calculated with and without the cost of pollution control. In the former case, the annualized cost of pollution control (including O&M) is subtracted from the discharger's earnings before taxes (revenues minus costs excluding income taxes) for the most recently completed fiscal year. Profits before pollution control investments have been made should be examined to determine whether the discharger was already in trouble (either not profitable or profits far below industry norms) before pollution control investments were made. If the discharger is already not profitable, it may not claim that substantial impacts would occur due to compliance with water quality standards.

The Profit Test can be calculated using **Worksheets H, and I**. Earnings before taxes (EBT) should be calculated for at least the three previous fiscal years in order to identify any trends or atypical years. Earnings with pollution control costs should be calculated for the latest year with complete financial information. Arguably, as long as the applicant maintains positive earnings, it can afford to pay for the pollution control. Over the long run, however, the owner is likely to shift operations to more profitable facilities, if possible. The workbook, therefore, guides the applicant through a more thorough analysis, which compares the EBT, with and without pollution control, to total revenues to yield a profit rate and change in the profit rate due to pollution control. (Use **Worksheet I**.) These profit rates should be compared to those for facilities in similar

lines of business. As with other tests, it may not be possible to compare the discharger's rate directly with the rates of similar facilities. In such cases the discharger's profit rate should be compared with that of firms that concentrate in similar businesses, using data in *Moody's Industrial Manual*, *Dun & Bradstreet's Industry Norms and Key Business Ratios*, *Standard & Poor's Industry Surveys*, or Robert Morris's *Annual Statement Studies*. If the discharger's ratio compares favorably with the median or upper quartile ratio for similar businesses, the discharger is considered to be financially healthy. A typical income statement, like those found in *Moody's Industrial Manual*, has been included in Exhibit 3-1. The appropriate data have been underlined.

Although complicated, the analysis should consider whether the discharger or firm would be able to raise its prices in order to cover some or all of the pollution control costs. In such a case, revenues increase and earnings fall by an amount less than the costs of pollution control. The degree to which the discharger is able to raise prices is difficult to predict, and depends on many factors. Considerations should include the level of competition in the industry, the likelihood of competitors' facilities facing similar project costs, and the willingness of consumers to pay more for the product.

3.2.b Secondary Measures

The following secondary measures provide additional important information about the financial health of the discharger. All primary and secondary measures will be included in the analysis. It is not sufficient to conclude that the discharger will be unprofitable after pollution control investments. In addition, the applicant should feel free to include any additional information about the discharger's financial health that they feel is relevant.

Liquidity

Liquidity is a measure of how easily a discharger can pay its short-term bills. One measure of liquidity is the Current Ratio, which compares current assets with current liabilities. Current assets include cash and other assets that are or could reasonably be converted into cash during the current year. The following items are considered to be current assets:

- **Inventories**-- finished products, products in the process of being manufactured, raw materials, supplies, fuels, etc.;
- **Prepaid expenses** -- expenses paid in advance of use such as prepaid rent;
- **Short-term investments** -- savings accounts, certificates of deposit;
- **Accounts receivable**;

- **Marketable securities;** and
- **Cash.**

Likewise, current liabilities are items that must be paid within the current year. The following items are considered to be current liabilities:

- **Accounts payable** -- purchases of goods for resale and services received in the normal course of business;
- **Wages payable;**
- **Short-term notes payable** -- any debt initially incurred and due in the current year;
- **Accrued expenses** -- expenses that have been incurred but have not yet been paid at the end of the accounting period;
- **Taxes;** and
- **Current portion of any long-term debt.**

A more stringent test is the Quick Ratio, also known as the Acid Test, which compares current assets without inventories to current liabilities. It does not include inventories since they may take time to convert to cash and may be valued on the discharger's books for more than they could be sold.

The Current Ratio should be calculated for each of the last three full fiscal years for which there are data. Comparing ratios for three years will identify any trends that are developing and will ensure that the most recent year is not an unusual year that might distort the results of the analysis.

The Current Ratio is calculated by dividing current assets by current liabilities.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The Current Ratio can be calculated using **Worksheet J**. The general rule is that if the Current Ratio is greater than 2, the entity should be able to cover its short-term obligations. Frequently, lenders require this level of liquidity as a prerequisite for lending. While a Current Ratio of greater than 2 indicates that the entity can probably cover its short-term obligations, the impact of a major capital investment such as the

pollution control project must be judged in conjunction with the other three financial tests described in this guidance.

In addition, this rule (Current Ratio > 2) may not be appropriate for all types of private entities covered by Water Quality Standards. The Current Ratio of the discharger in question should be compared with ratios for other dischargers in the same line of business. It may not be possible, however, to compare the discharger's ratio directly with other similar dischargers because this information frequently is unavailable at the facility level or is considered confidential. In cases where a direct comparison cannot be made, the discharger's Current Ratio should be compared with the ratio for firms that concentrate in similar businesses. If the discharger's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to cover its short term obligations. Among the sources that provide comparison information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun and Bradstreet's *Dun's Industry Norms*. The *Annual Statement Studies* and *Dun's Industry Norms* provide composite statistics for firms grouped by different manufacturing and service industries. The *Moody's Industrial Manual* provides detailed financial information on individual firms. Pages from both of these sources are displayed in Exhibits 3-2 and 3-3, with the appropriate data indicated.

Solvency

Solvency is a measure of an entity's ability to meet its fixed and long-term obligations. These obligations are bills and debts that are owed on a regular basis for periods longer than one year. Solvency tests are commonly used to predict financial problems that could lead to bankruptcy within the next few years. Since any single year of data can easily be distorted by unusually high or low net income or by the timing of debt, solvency tests must be considered over at least three years of data in order to reveal long-term trends.

As with liquidity, there are several possible tests for solvency. One commonly used solvency test (called Times Interest Earned) compares income before interest and taxes to interest expenses. Another solvency test, the Beaver's Ratio, compares cash flow to total debt. This test has been shown to be a good indicator of the likelihood of bankruptcy.

$$\text{Beaver's Ratio} = \frac{\text{Cash Flow}}{\text{Total Debt}}$$

The Beaver's Ratio can be calculated using **Worksheet K**. Cash Flow is a measure of the cash the entity has available to it in a given year. Since depreciation is an accounting cost -- a cost that does not use any currently available revenues -- it is added back to reported net income after taxes to get cash flow. Total debt is equal to the current

debt for the current year plus the long term debt, since current debt includes that part of long-term debt that is due in the current year.

If the Beaver's Ratio is greater than 0.20 the discharger is considered to be solvent (i.e., can pay its long-term debts). If the ratio is less than 0.15 the discharger may be insolvent (i.e., go bankrupt). If the ratio is between 0.15 and 0.20, then future solvency is uncertain. The discharger's Beaver's Ratio should be compared with the ratios of similar dischargers. However, as with other ratios, it may not be possible to compare the discharger's ratio directly with other similar dischargers. In cases where a direct comparison cannot be made, the discharger's Beaver's Ratio should be compared with that of firms that concentrate in similar businesses, using information from income accounts and balance sheets in *Moody's Industrial Manual*. If the discharger's ratio compares favorably with similar businesses, it should be able to meet its fixed and long term obligations. A typical balance sheet and income statement have been included in Exhibits 3-4 (for calculating total debt) and 3-5 (for calculating cash flow). The appropriate data from them has been underlined.

Leverage

Leverage tests measure the extent to which a firm already has fixed financial obligations and thus indicate how much more money a firm is capable of borrowing. Firms that rely heavily on debt may find it difficult and expensive to borrow additional funds. Most leverage tests compare equity to some measure of debt or fixed assets. The Debt to Equity Ratio is the most commonly used method of measuring leverage. Unlike the ratios discussed above, the debt to equity ratio cannot be easily calculated for a single facility; it must be calculated for the firm, since it is usually the firm, not the facility, that borrows money. The ratio measures how much the firm has borrowed (debt) relative to the amount of capital which is owned by its stockholders (equity). Since values for the Debt to Equity Ratio vary widely by the type of enterprise, the ratio should be compared with the ratio for firms in similar lines of business. The ratio also should be calculated with at least three years of data.

The Debt to Equity Ratio is equal to Long-Term Liabilities (long-term debt such as bonds, debentures, and bank debt, and all other noncurrent liabilities like deferred income taxes) divided by Owners' Equity. Owner's Equity is the difference between total assets and total liabilities, including contributed or paid in capital and retained earnings. For publicly held firms, use Net Stockholders Equity (which is the equivalent of Total Stockholder Equity minus any Treasury Stock).

$$\text{Debt/Equity Ratio} = \frac{\text{Long-Term Liabilities}}{\text{Owners' Equity}}$$

The Debt to Equity Ratio can be calculated using **Worksheet L**. Since there are no generally accepted Debt/Equity Ratio values that apply to all types of economic activity, the ratio should be compared with the ratio of firms in similar businesses. If the entity's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to borrow additional funds. These ratios can be calculated using data in Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun & Bradstreet's *Dun's Industry Norms*. Pages from these sources have been included in Exhibits 3-6 and 3-7, with the appropriate data indicated.

For entities with special sources of funding, leverage is not an appropriate measure of their ability to raise capital. Examples are agriculture and affordable housing, where special loan programs may be available. In these cases, an analysis of the probability that the project would receive this money is appropriate.

3.3 Interpreting the Results

The financial analysis should be used to determine if there will be a substantial adverse impact on the applicant. As indicated above, the Profit Test should be considered first. The Profit Test measures what will happen to the discharger's earnings if additional pollution control is required. If the discharger is making a profit now but would lose money with the pollution control, then the possibility of a total shutdown or the closing of a production line must be considered. Likewise in the case of a proposed facility; if it would make money without the pollution control but would make much less or even lose money with it, then the development might not take place. In either case, there is the chance that employment will be lost and local purchases by the discharger reduced. Whether or not these impacts will be considered widespread is addressed in Chapter 4.

There are several more complicated scenarios that all involve making a judgement as to the likely impacts on the discharger, including questions of the timing of compliance. For example, the Profit Test may indicate that the applicant will continue to maintain profit levels typical for its industry after compliance, but the Debt/Equity Ratio may indicate that they will have trouble raising the required capital through debt. This problem may be solved by giving them more time to meet the regulations (a variance), so that they can restructure their debt and/or find alternative sources of funds. In another case, the applicant might argue that while they will still make money and be able to raise the needed capital, they would alternatively spend those funds on an expansion which would have resulted in increased employment and income for the community. This is a more difficult situation to analyze, and will depend on judgments about the relative importance of water pollution control versus economic growth. These issues are discussed in more detail in Chapter 4.

Another possible scenario is that the discharger may shift to an alternative economic activity (e.g., manufacture another product or produce a different crop). While the

applicant will not have gone out of business, this shift may result in reduced profits, employment, and purchases in the local community that must be considered. In each case, it is important to take the entire picture presented by the four ratios into account in judging whether or not the discharger will incur substantial impacts due to the cost of the necessary pollution reductions.

Using the guidance presented in this chapter, applicants that feel they have demonstrated substantial impacts should proceed to Chapter 4: Determination of Widespread Impacts. If dischargers are not able to demonstrate substantial impacts, the entity must meet existing standards. If a group of dischargers within the community will experience the substantial impacts resulting from compliance with water quality standards, these impacts should be considered jointly when assessing whether or not the impacts will be widespread.