

SECTION SIX

ANALYSIS OF FIRM-LEVEL IMPACTS

The firm-level analysis evaluates the effects of regulatory compliance on firms owning one or more affected pharmaceutical facilities. It also serves to identify impacts not captured in the facility analysis. For example, some firms might be too weak financially to undertake the investment in the required effluent treatment, even though the investment might seem financially feasible at the facility level. Such circumstances can exist, in particular, at firms owning more than one facility subject to regulation. Given the range of possible firm-level impacts, the firm-level analysis is an important component of this EA.

EPA determined that 190 firms are potentially affected by the Final Pharmaceutical Industry Effluent Guidelines, of which 36 are considered certifying firms—that is, they certified their surveyed facilities as incurring no impacts under the Final Pharmaceutical Industry Effluent Guidelines. Certifying firms are assigned a no impact status by the firm-level model. Three firms had insufficient data against which to judge impacts, thus this analysis investigates impacts on 187 firms.

To evaluate precompliance conditions at and postcompliance impacts on noncertifying firms, EPA divided the firms into two categories—single-facility firms and multifacility firms (see Section Five).

A total of 76 firms classified themselves as single-facility firms.¹ These firms operate as independent entities, although, in some cases, single-facility firms can have an ultimate parent company. As independent entities, these firms maintain balance sheets and income statements and pay corporate taxes on their own earnings. Single-facility firms also are generally smaller than multifacility firms in terms of revenues, production, and employment. Of these firms, 66 meet the definition of small under Small Business Administration (SBA) definition (fewer than 750 employees). Section Nine discusses the combined impacts of closures and failures on small firms in the pharmaceutical industry

¹As noted in Section Five, single-facility firms are both firms and facilities. EPA evaluates impacts on these entities on the firm level in this section rather than on a facility level in Section Five.

In addition to the 76 single-facility firms, EPA estimated that there are 114 multifacility firms. These firms own and operate more than one facility and have at least one pharmaceutical facility.² In addition, they maintain financial records for all their facilities at the firm level and typically pay corporate taxes at the firm level for all owned facilities. As noted above (and as shown in Section Three), multifacility firms tend to be substantially larger than single-facility firms although 80 are classified as small under SBA definitions.^{3,4}

The basic core of the firm-level analysis, both for single-facility and multifacility firms, is the Altman Z-score analysis, a ratio analysis that employs several indicators of financial viability to assess firm-level precompliance conditions and postcompliance impacts. Section 6.1 presents an overview of this ratio analysis methodology. Section 6.2 discusses the Altman Z-score model as it applies to the pharmaceutical industry. Section 6.3 summarizes the results of the firm-level analysis in terms of the number of firms that face bankruptcy prior to regulatory compliance (baseline bankruptcies) and the number of firms that are estimated to experience bankruptcy as a result of additional regulatory compliance costs associated with the Final Pharmaceutical Industry Effluent Guidelines (incremental bankruptcies). It also discusses the number of firms that, while considered financially healthy in the baseline, slip from the financially healthy category into an indeterminate category in the postcompliance analysis (this is considered an impact short of bankruptcy). All of these results occur under the assumption that no costs can be passed through to customers and thus are likely to be an upper bound of potential impacts to industry from the rule.

² EPA assumes that all multifacility firms are captured by the Section 308 Survey. Where a multifacility firm owns a facility with a statistical weight of 2, EPA assumes that the firm owns two such facilities and assigns compliance costs on that basis. All facilities were either censused (and have a weight of 1) or were sampled (and have a weight of approximately 2). Three multifacility firms were not analyzed due to insufficient data.

³ Impacts on parent companies (i.e., owners of the owner companies) are not analyzed in this EA because the impacts of a given facility closure or major facility-level capital investment become more dilute as assets increase at higher levels in the corporate hierarchy. Thus EPA's analysis assumes that the impacts fall on the most vulnerable firms. Had EPA assumed that the firms in the analysis could be "bailed out" by their parent companies, impacts would most likely have appeared less. For most of the 76 single-facility firms, however, analysis at the facility level, firm level, and corporate parent level coincide.

⁴ The large number of multifacility firms classified as small occurs because employment numbers were estimated for many of these firms, based primarily on the employment figures *for their surveyed facilities only*. Therefore these estimates of employment are considered lower bound in most cases.

6.1 RATIO ANALYSIS METHODOLOGY

Ratio analyses are conducted from the perspective of creditors and equity investors who would finance a company's treatment system investment. To attract financing for a treatment system, a company must demonstrate financial strength both before and, on a projected basis, after the treatment system has been purchased and installed. The ratio analysis undertaken in this section simulates the analysis an investor and/or creditor would be likely to employ in deciding whether to finance a treatment system or make any other investment in the firm.

The baseline ratio analysis evaluates the company's financial viability before the investment, and the postcompliance analysis predicts the company's financial condition subsequent to the investment. The baseline analysis identifies companies in extremely weak financial condition, independent of pending regulatory actions. Such companies are at risk of financial failure even without the additional cost of the regulation. Firms that are projected to fail in the baseline analysis are excluded from the postcompliance analysis. This development of a regulatory baseline is consistent with OMB guidance, as discussed in Section Five.⁵ Again, as in Section Five, EPA has developed three baselines. Baseline 1 represents the industry prior to either the MACT standards rule or the Final Pharmaceutical Industry Effluent Guidelines, Baseline 2 incorporates MACT standards costs associated with wastewater emission controls into the affected firms' baseline finances, and Baseline 3 adds total MACT standards costs into these finances. The methodology for incorporating MACT standards costs into the baseline is presented in Section 6.2.

The postcompliance analysis identifies companies for which regulatory compliance poses a threat to financial viability, although they are otherwise financially sound. Such companies could be weakened by the costs of meeting the requirements of the rule. These companies are characterized as experiencing a larger impact from the Final Pharmaceutical Industry Effluent Guidelines than the majority of pharmaceutical firms. Postcompliance impacts are measured incrementally from all three regulatory baselines.

⁵ OMB, 1996. *Economic Analysis of Federal Regulations under Executive Order 12866*. January 11.

For the pharmaceutical industry, a ratio analysis based on the Altman Z-score is used to characterize the baseline and postregulatory financial conditions of potentially affected firms. This method is described in more detail below.

The Altman Z-score, originally developed in the late 1960s for manufacturing firms, is a multidiscriminant analysis (MDA) used to assess bankruptcy potential.^{6,7} Over the years, the Altman Z-score model has gained acceptance among financial institutions⁸ and, more recently, has been used by EPA in the economic and regulatory impact analyses for centralized waste treaters, the pulp and paper industry, transportation equipment cleaning, and industrial laundries. Altman's Z-score model analyzes a number of financial ratios simultaneously to arrive at a single number to predict the overall financial health of a particular firm. The advantage of the Altman Z-score model over traditional ratio analysis is its simultaneous financial consideration of liquidity, asset management, debt management, profitability, and market value. It addresses the problem of how to interpret a series of financial ratios when some financial ratios look "good" while other ratios look "bad."⁹ The Altman Z-function is given in Equation 1:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5 \quad (1)$$

where,

⁶ Multidiscriminant analysis is a statistical procedure similar to regression analysis. It is used primarily to classify or make predictions in cases where the dependent variable is qualitative. In this case, the dependent variable would be "financially stable" or "financially unstable."

⁷Altman, Edward, 1993. *Corporate Financial Distress and Bankruptcy*. New York: John Wiley and Sons.

⁸ See for example, Altman, 1993, *Ibid.*; Brealy, Richard A., and Stewart C. Meyers, 1996. *Principles of Corporate Finance*, McGraw Hill Companies, Inc.; and Brigham, E.F., and L.C. Gapenski, 1997. *Financial Management Theory and Practice*. Chicago: The Dryden Press, 8th edition, pp. 1064-1066.

⁹ Brigham, Eugene F., and Louis C. Gapenski, 1997. *Ibid.*

$Z = \text{Overall Index}$

$$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}}$$

$$X_2 = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

$$X_3 = \frac{\text{Earnings Before Interest and Taxes}}{\text{Total Assets}}$$

$$X_4 = \frac{\text{Market Value of Equity}}{\text{Book Value of Total Liabilities}}$$

$$X_5 = \frac{\text{Sales}}{\text{Total Assets}}$$

Each of the above ratios is further defined below.

- **Working Capital to Total Assets** is a liquidity ratio which measures a firm's net liquid assets relative to total capitalization.¹⁰
- **Retained Earnings to Total Assets** indicates the total amount of reinvested earnings and/or losses associated with a firm over its entire life, relative to total capitalization.
- **EBIT to Total Assets** measures the productivity of a firm's assets. Earnings are total firm revenues minus total firm costs (including general and administrative costs and depreciation).
- **Market Value of Equity to Total Liabilities** is a solvency ratio that measures the firm's total indebtedness to the capital invested by the stockholders. High debt levels can indicate high levels of risk.
- **Sales to Total Assets** is another measure of the productivity of a firm's assets.

The Section 308 Survey was not designed originally to perform an Altman Z analysis and lacked data on retained earnings and market value of equity (a major issue only for public firms since retained earnings

¹⁰ Working capital is current assets minus current liabilities and is a measure of available cash on hand.

typically are less than owner equity, and market value often exceeds book value by a wide margin). EPA therefore used financial data from annual reports, 10-K forms, and accounting reports that were submitted as a part of the Section 308 Survey, where available, to obtain these data. EPA also obtained data from SEC submittals for approximately 40 firms identified as “sensitive” in the analysis.¹¹

In a later work, Altman developed two modified versions of this original model for use in evaluating privately held firms (Z' -score) and firms within a service industry (Z'' -score).¹² In the original model, the market value component (X_4) uses stock price data; consequently, the Altman Z -score is only applicable to firms with publicly traded stock. The Z' -score model substitutes the book value of equity (owner equity) for the market value in X_4 and thus can be used to evaluate privately and publicly held firms on an equal basis.

Because the pharmaceutical industry includes both publicly and privately owned firms, the Agency has identified, to the extent possible, whether the firms are public or private. Where no information on whether a firm is public or private was available, EPA has assumed the firm is private (see footnote above). The Z' -score model for private firms is shown in equation 2.

$$Z' = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.42XX_4 + 0.998X_5 \quad (2)$$

where,

¹¹ These key firms were either (1) baseline or postcompliance failures when run as private firms, (2) baseline or postcompliance failures when run as public firms or (3) indeterminate (i.e., neither appearing as financially healthy or as a likely candidate for bankruptcy run either as a public or private firm), but only if compliance costs to revenues exceeded 0.1 percent under a worst-case cost scenario. For firms with no data (they did not submit supporting financial data, submitted financial data only for an ultimate parent firm, or could not be found in SEC submittals), EPA assumed the firm was private. This assumptions should not affect the outcome of this analysis, since the Agency also ran an analysis assuming these firms were public firms, using the assumption that retained earnings equaled one-third of owner equity and that market value equaled book value, with no change in outcome.

¹² Altman, Edward. 1993. *Op. cit.*

Z' = Overall Index

$$X_1 = \frac{\text{Working Capital}}{\text{Total Assets}}$$

$$X_2 = \frac{\text{Retained Earnings}^{13}}{\text{Total Assets}}$$

$$X_3 = \frac{\text{Earnings Before Interest and Taxes (EBIT)}}{\text{Total Assets}}$$

$$X_4 = \frac{\text{Book Value of Equity}}{\text{Total Liabilities}}$$

$$X_5 = \frac{\text{Sales}}{\text{Total Assets}}$$

Taken individually, each of the ratios given above (X_1 through X_5) using either equation is higher for firms in good financial condition and lower for firms in poor financial condition. Consequently, the greater a firm's bankruptcy potential, the lower its discriminant score. For public firms, an Altman Z-score below 1.81 indicates that bankruptcy is likely; a score above 2.67 indicates that bankruptcy is unlikely. Z-scores between 1.81 and 2.67 are indeterminate. Likewise for private firms an Altman Z' -score below 1.23 indicates that bankruptcy is likely and one above 2.90 indicates that bankruptcy is unlikely. A score of 1.23 to 2.90 is indeterminate.¹⁴ EPA treats firms with indeterminate scores as financially viable but nevertheless undertakes a separate postcompliance analysis of firms that have baseline scores in the range indicating that bankruptcy is unlikely, but with postcompliance scores in the indeterminate range. These firms are considered to experience some financial impact short of bankruptcy.

¹³ For this analysis, owner equity (which is total assets minus total liabilities) is used as a proxy for retained earnings for privately held firms. Owner equity includes retained earnings; it also can include paid-in capital, which is the dollar amount over par in stock value for publicly held firms and shares of preferred and common stock. For privately held firms, therefore, owner equity will equal retained earnings.

¹⁴Altman, 1993. *Op. cit.*

6.2 EVALUATING BASELINE AND POSTCOMPLIANCE RATIOS

6.2.1 Baseline Analysis

As discussed in Section Five, OMB requires EPA to establish a regulatory baseline. There are a number of firms in this analysis that are estimated to be likely to fail regardless of whether the rule is promulgated. As was done in Section Five for facilities closures, EPA divides vulnerable firms into those likeliest to fail in the baseline vs. those likeliest to fail postcompliance as a way to avoid either overcounting or undercounting impacts.

The Baseline 1 analysis uses the Altman Z-score or Z'-score model to separate financially healthy firms from those likely to fail regardless of whether the regulation is promulgated. To evaluate the baseline viability of the companies analyzed, the baseline Altman Z-score was calculated for each firm using Section 308 Survey data and data from other sources (e.g., 10K forms). Where sufficient data were available, 3-year average (1988-1990) financial ratios were calculated and used as the baseline ratios.¹⁵

Those firms with baseline scores below 1.81 (public) or 1.23 (private) are considered baseline failures and are removed from the analysis. All other firms (including those with scores in the indeterminate range) are included in the postcompliance analysis.

Baseline 2 is created by using MACT standards costs associated with wastewater emission controls to adjust baseline financials, similar to how effluent guideline compliance costs are used to adjust postcompliance financials, as discussed below in Section 6.2.2. Baseline 3 is created by using total MACT standards costs to adjust Baseline 1 financials.¹⁶

¹⁵ Data on assets, liabilities, owner equity, and EBIT from the Section 308 Survey were inflated by the CPI for SIC 2718 and averaged over the available years of data (which ranged from 1 to 3 years). Data on retained earnings and market value were taken from 1990 data, where available.

¹⁶ See Section Two for a description of the MACT standards cost categories.

6.2.2 Postcompliance Analysis

EPA undertakes postcompliance analysis for those firms found to be financially viable in the baseline analysis (i.e., those firms for which the baseline results are “bankruptcy unlikely” or “indeterminate”).¹⁷ The total number of potentially affected firms in the postcompliance analysis is adjusted downward to exclude the baseline bankruptcies. In this way incremental bankruptcies associated with the Final Pharmaceutical Industry Effluent Guidelines can be identified under all three baseline scenarios.

Postcompliance bankruptcy predictions are based on changes in the financial status of a firm as a result of incremental pollution control costs.¹⁸ The change in a firm’s bankruptcy potential as a result of incremental pollution control costs, as predicted by the Altman Z-score or Z’-score, is determined using firm-specific capital and annual O&M costs associated with each regulatory option. These options are analyzed separately (costs for each option are applied to firms one at a time) and then as a group under a “selected options scenario.” Since firms can own facilities in more than one subcategory, the combined effect of all selected options must be determined. As noted in Section Four the selected options are BAT-A/C (with revised BPT) for A/C directs, No Action (but with revised BPT) for B/D directs, and PSES-A/C and PSES-B/D for both A/C and B/D indirects. For the postcompliance analysis, the relevant survey data (total assets, total liabilities, and EBIT) are adjusted to reflect annual facility compliance costs for all facilities owned by a particular company.¹⁹ Compliance costs for each facility owned by each company are incorporated into the analysis as follows:

- $\text{Postcompliance Total Assets} = \text{Total Assets} + \text{Capital Cost}$ (3)

- $\text{Postcompliance Total Liabilities} = \text{Total Liabilities} + \text{Capital Cost}$ (4)

¹⁷ As noted above, EPA considers firms with Z-scores that fall in the “indeterminate” range to be viable operations, although the financial stability of these firms is somewhat uncertain.

¹⁸ The annualized pollution control costs for each effluent guideline option were calculated with the cost annualization model described in Section Four.

¹⁹ To estimate firm-level impacts at multifacility firms owning pharmaceutical facilities with a survey weight of 2, EPA assigned costs for both the surveyed and nonsurveyed facility to the firm.

■
$$\text{Postcompliance EBIT} = \text{EBIT} - (\text{Postcompliance Change in EBIT})^{20, 21} \quad (5)$$

The postcompliance analysis is performed under the assumption that the industry cannot pass through any portion of compliance costs to its customers.

Note that even if a firm is considered likely to fail, its facilities (as determined in the facility closure analysis) might not close. In the cases where a firm is considered likely to fail, its viable facilities could be sold as part of the company liquidation process and operated successfully under different ownership. Also note that some facilities could be sold (and continue to operate) to raise the necessary capital to finance the installation of pollution control equipment at a firm's remaining facilities. Thus multifacility firms that are projected to fail postcompliance but that do not have facilities that are estimated to close (as discussed in Section Five) are not considered as severely affected as firms that are estimated to fail and also must close some or all of their facilities. Single-facility firms that fail are assumed to be sold, so the primary impact to these firms is their loss of independent status, with one exception. If a single-facility firm both fails *and* has zero or negative earnings postcompliance, EPA assumes this firm might be liquidated. EPA individually investigates all postcompliance failures to determine if they are single-facility firms with zero or negative net income. A failure without closure is considered to be a lesser impact than closure and, further, is likely to

²⁰ These calculations assume 100 percent financing of compliance equipment through long-term debt, although tax shield on interest payments is not included (see Appendix A). Firms are assumed to incur all compliance costs for all facilities regardless of whether the facilities close in the baseline or postcompliance facility-level analyses, since liquidation and other costs associated with a facility closure will not exceed the compliance costs associated with a closing facility. Note that working capital and owner equity do not change with compliance costs because current assets and liabilities are assumed to be unaffected by long-term debt and total assets and total liabilities are assumed to change in tandem (i.e., as debt is paid off, depreciation reduces the book value of the asset).

²¹ The postcompliance change in EBIT (in absolute value terms) is calculated using the cost annualization model described in Section Four. The total pretax cash outflows calculated by this model are composed of cash outflows for depreciation and O&M. The change in EBIT related to compliance costs corresponds to the change in O&M plus the change in the depreciation expenses. EPA adds the present value (PV) of depreciation to the PV of O&M payments to calculate the PV of the change in EBIT. This value is then annualized, because the Altman Z analysis is a period-by-period analysis (i.e., a firm's health is analyzed on the basis of one or more "snapshots" corresponding to, for example, quarterly or annual accounting reports).

have only a small impact on employment in the industry.²² EPA also individually investigates any postcompliance failures to determine if multifacility firms own facilities that do not appear self-supporting in the various baselines. Of all the baseline closures identified in Section Five, only those facilities belonging to firms that do not appear financially able to support these facilities are considered true baseline closures.

6.3 BASELINE AND POSTCOMPLIANCE ALTMAN Z-SCORE RESULTS

6.3.1 Baseline Altman Z-Score Results

Table 6-1 presents the baseline results of the Altman Z-score analysis, grouped according to baseline and subcategory. The table presents the total number of firms in each of the Z-score categories (i.e., “bankruptcy likely,” “indeterminate,” and “bankruptcy unlikely”). As stated previously, an Altman Z-score below 1.81 (public) or 1.23 (private) indicates that bankruptcy is likely; a score above 2.67 (public) or 2.90 (private) indicates that bankruptcy is unlikely. Z-scores between these two groups are indeterminate.

The results in Table 6-1 indicate that under Baseline 1 (no MACT standards costs considered) 18 firms are likely to fail before the effects of any regulatory costs are considered. These 18 firms are 9.6 percent of the total number of firms in the analysis. Most of these firms (13) own B/D indirect facilities. One additional firm fails under the assumptions of Baseline 2 and two additional firms fail under the assumptions of Baseline 3 (compared with Baseline 1).

6.3.2 Postcompliance Altman Z-Score Results — “Bankruptcy Likely”

Table 6-2 presents the results of the postcompliance Altman Z analysis under all three baselines. In Baseline 1, firms potentially facing bankruptcy (or loss of independent status) under the selected options total four firms, or 2.4 percent of all firms. One of these same firms fails under the initial Baseline 2 assumptions,

²² Employment losses associated with firms that fail but whose facilities do not close are assumed to lose 10 percent of their workers due to acquisition and consolidation of the firms’ viable facilities. (See Section Seven)

Table 6-1

Baseline Firm Failures By Subcategory

Subcategory	Total Number of Firms *	Baseline 1		Total Number of Firms	Baseline 2		Total Number of Firms	Baseline 3	
		Number **	% of Total		Number	% of Total		Number	% of Total
Direct Discharge									
A/C	19	1	0.5%	19	1	0.5%	19	1	0.5%
B/D	11	2	1.1%	11	2	1.1%	11	2	1.1%
Indirect Discharge									
A/C	69	6	3.2%	69	7	3.7%	69	8	4.3%
B/D	95	11	5.9%	95	11	5.9%	95	11	5.9%
All Firms									
Selected Options	187	18	9.6%	187	19	10.2%	187	20	10.7%

* Three firms were not included due to insufficient data.

** The total number of firms column adds up to more than the actual number of firms because some firms own more than one type of facility. The total includes 7 firms with non-discharging facilities.

Source: Section 308 Survey Data, SEC Data, and the Pharmaceutical Industry Facility and Firm Model, EPA, 1998.

Table 6-2

Postcompliance Firm Failures By Option

Options	Total Number of Firms *	Baseline 1		Total Number of Firms	Baseline 2		Total Number of Firms	Baseline 3	
		Number **	% of Total		Number	% of Total		Number	% of Total
Direct Discharge									
BAT-A/C (with BPT)	18	0	0.0%	18	0	0.0%	18	0	0.0%
BAT-B/D (with BPT)	9	0	0.0%	9	0	0.0%	9	0	0.0%
Indirect Discharge									
PSES-A/C	63	3	1.8%	62	2	1.2%	61	1	0.6%
PSES-B/D	84	1	0.6%	84	1	0.6%	84	1	0.6%
All Firms									
Selected Options	169	4	2.4%	168	3	1.8%	167	2	1.2%

* Three firms were not included due to insufficient data.

** The total number of firms column adds up to more than the actual number of firms because some firms own more than one type of facility. The total includes 7 firms with non-discharging facilities.

Source: Section 308 Survey Data, SEC Data, and the Pharmaceutical Industry Facility and Firm Model, EPA, 1998.

so does not appear as a postcompliance failure under Baseline 2. Two of these firms fail under the initial Baseline 3 assumptions, so they also do not appear as postcompliance failures under Baseline 3. To be conservative, EPA assumes the four firm failures are attributable to the Final Pharmaceutical Industry Effluent Guidelines, regardless of baseline.

Three of these firms are A/C indirects and one is a B/D indirect. One of the A/C indirects and the B/D indirect are single-facility firms. The single-facility A/C indirect has negative firm-level earnings (EBIT) postcompliance (but not in any of the baselines). Thus EPA considers this firm likely to fail and close. The B/D indirect firm has positive earnings (EBIT) postcompliance. Although it is likely to lose its financial independence, EPA believes it will be a viable facility and will remain open postcompliance. One of the A/C indirect facilities is owned by a multifacility firm, but it is the only facility owned by this firm that is covered by the Final Pharmaceutical Industry Effluent Guidelines. EPA determined that the facility would not close postcompliance in the facility-level analysis in Section Five. Thus the Agency believes this facility is likely to be sold but will continue to operate postcompliance. The firm is thus considered most likely to lose ownership of this facility, but it is counted as a failure to be conservative. The fourth firm owns two A/C indirect facilities, both of which have positive net facility-level earnings (posttax operating earnings) postcompliance. EPA considers these facilities likely to be sold as viable continuing operations but, again, to be conservative, the firm itself is considered a failure postcompliance as a result of the Final Pharmaceutical Industry Effluent Guidelines. Thus out of the four firm failures projected to occur, only one is expected to result in both a firm failure and a facility closure. The other three firms will incur substantial impacts up to and including firm failure (although in reality they might not fail, but instead might be forced to sell their facilities).

This analysis further shows that all facilities projected to close in the baseline facility closure analysis can be supported by their firms postcompliance without significant impact on these firms.

6.3.3 Postcompliance Altman Z-Score Results — Change From Healthy to Indeterminate Status

Table 6-3 presents the results of an analysis looking at the numbers of facilities that change from Altman Z-scores of greater than 2.67 or 2.90 (bankruptcy unlikely) to less than 2.67 or 2.90 but greater than 1.81 or 1.23 (status “indeterminate”) for the selected options scenario. As the table shows, four firms change financial status in this manner across all three baselines as a result of the Final Pharmaceutical Industry Effluent Guidelines. This result is considered a lesser impact than bankruptcy, because these firms might not be on track to failure and probably have more time and flexibility to improve their financial condition than those firms whose scores fall in the “bankruptcy likely” category.

Table 6-3

**Indeterminate Analysis
(among firms that are considered “healthy” in the Baseline)**

Options	Total Number of Firms *	Baseline 1 Closures		Baseline 2 Closures		Baseline 3 Closures	
		Number	% of Total	Number	% of Total	Number	% of Total
Direct Discharge							
BAT-A/C (with BPT)	19	0	0.0%	0	0.0%	0	0.0%
BAT-B/D (with BPT)	11	0	0.0%	0	0.0%	0	0.0%
Indirect Discharge							
PSES-A/C	69	3	4.3%	3	4.3%	3	4.3%
PSES-B/D	95	1	1.1%	1	1.1%	1	1.1%
All Firms							
Selected Options	187	4	2.1%	4	2.1%	4	2.1%

* The total number of firms column adds up to more than the actual number of firms because some firms own more than one type of facility. The total includes 7 firms with non-discharging facilities

Source: Section 308 Survey Data and the Pharmaceutical Industry Facility and Firm Model, EPA, 1998.