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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 21 1984

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Draft Guidance for Application and Review of Section 301(c) Variance Requests

FROM: Martha G. Prothro, Director
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Regulatory Policy Division, Office of Policy, Planning and Evaluation (PM-221)

TO: Regional Water Management Division Directors

The Permits Division (OWEP) and the Regulatory Policy Division (OPPE) have developed a draft technical guidance manual to assist with the preparation and review of section 301(c) variance requests. As you know, section 301(c) of the Clean Water Act provides a method whereby a discharger may obtain a modification of the requirements of section 301(b)(2)(A), which requires the application of best available technology economically achievable (BAT). An applicant may be granted a section 301(c) variance for nonconventional pollutants, if the proposed modified requirements:

(1) will represent the maximum use of technology within its economic capability; and,

(2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

The purpose of the attached draft guidance is to assist applicants in completing requests for 301(c) variances and EPA Regions and States in reviewing the requests. For the purpose of financial evaluation, we have divided applicants into two groups, regulated and unregulated industries. Regulated industries are those whose rates of return are set by public utility commissions. Most firms are unregulated.

Unregulated firms should perform three financial calculations to determine if they are eligible on economic grounds for a section 301(c) variance. Similarly, regulated firms should perform two calculations to determine their economic eligibility. EPA will grant a variance only if the financial tests (or comparable demonstrations by the applicant) indicate that the required pollution control technology is not economically achievable and if the applicant can demonstrate reasonable further progress toward elimination of the discharge of pollutants. We have provided worksheets for performing the various financial calculations. The tests are designed to be understood by those with minimal training in financial management or accounting. If the results are unrepresentative or inconclusive, additional review or assistance is available from financial analysts at OPPE for the benefit of both permit writers and applicants.

We are eager to receive your comments and suggestions on the draft guidance. We also suggest that you provide copies of the guidance to the NPDES States in your Region. We are particularly concerned about your views on ease of use by both applicants and permit writers and on the appropriateness of the financial screening tests which we have developed. Please send your comments and any comments from your States by September 18 to Tom Laverty or Marilyn Goode of the Permits Division. If you have any questions about the draft guidance, please have your staff contact them at FTS 426-7010. Thank you for your help in putting the guidance in final form.

cc: Regional Permits Branch Chiefs

Attachment

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Appendix 1 - Examples and Sample Worksheets

OUTLINE OF STEPS FOR COMPLETING A SECTION 301(c) VARIANCE REQUEST

Step 1

- o Identify pollutants for which a waiver is sought.
- o Check to ensure the pollutant(s) is a nonconventional.
- o A nonconventional is any pollutant that is not either:
  - a conventional, listed in 40 CFR _____.
  - or a toxic, listed in 40 CFR _____.
- o 301(c) variances are only available for nonconventionals.

Step 2

- o Notify NPDES permit authority of intention to apply.
  - within 270 days of promulgation of the applicable effluent guideline or 270 days of enactment of the 1977 Clean Water Act, whichever is later.
- o All applicants must meet this statutory deadline.

Step 3

- o Check to ensure Best Practicable Technology (BPT) requirements and all applicable water quality standards will be met even with a 301(c) variance.
- o A 301(c) variance is available only for relief from Best Available Technology (BAT) requirements for nonconventionals.

Step 4

- o Determine options available for controlling pollutants beyond BPT and water quality standards.
  - separate nonconventional control costs from cost of controlling conventionals and toxics

Step 5

- o Perform financial tests described in 301(c) guidance manual.

Step 6

- o Demonstrate reasonable further progress.
  - identify additional steps that will be taken that are economically achievable

Step 7

- o Submit information to EPA for review.

Technical Guidance Manual for Application and Review of Section 301(c) Variance Requests

I. INTRODUCTION

A. Purpose of this Manual

The purpose of this guidance manual is to outline a simple, expeditious methodology for assessing the economic capability of dischargers applying for section 301(c) variances. The economic tests specified here are those that EPA prefers and recommends for use in reaching a decision on a section 301(c) variance request. However, as this manual provides guidance only and is not binding, applicants are free to submit other evaluations of their financial condition that respond to the section 301(c) requirements. EPA also may perform further evaluation of applicants' financial ability. Variance determinations will be made on a case-by-case basis as part of the permit issuance process. Accordingly, permit writers will explain their reliance on any specific tests in determining economic capability as well as any conclusion reached. The public will have an opportunity to participate in this decision through the NPDES procedures (40 CFR Part 124) and the ultimate decision on the request will be judicially reviewable as part of the NPDES permit.

B. Statutory Background

The Clean Water Act requires achievement of best available technology economically achievable (BAT) effluent limitations for all nonconventional pollutants by July 1, 1984 or not more than three years after EPA establishes the limitations, up to July 1, 1987, whichever is later. Section 301(b)(2)(F).

Section 301(c) of the Clean Water Act (P.L. 95-217) establishes a mechanism whereby a direct discharger may obtain a modification of the requirements of Section 301(b)(2)(A). The discharger can be granted a Section 301(c) variance by showing that the modified requirements:

(1) will represent the maximum use of technology within the economic capability of the owner or operator; and,

(2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

Section 301 (j)(1)(B) imposes an application deadline for Section 301(c). An applicant for a Section 301(c) variance must submit its application not later than 270 days after promulgation of the applicable effluent guideline or 270 days after enactment the Clean Water Act 1977, whichever is later.*

* See 40 CFR 122.21(l)(2) for specific requirements on the submission of section 301(c) variance requests.

II. APPLICATION AND REVIEW PROCEDURE

A. Summary of Section 301(c) Variance Process

A Section 301(c) variance request must clearly demonstrate that the modified requirements represent the maximum use of technology within the firm's economic capability and that the modified requirements will result in reasonable further progress toward the elimination of nonconventional pollutants. With respect to the latter showing, at a minimum, the applicant must demonstrate compliance with all applicable BPT limitations and pertinent water quality standards. In addition, the proposed alternative must provide for a reasonable degree of improvement in the applicant's discharge. Recommended criteria for demonstrating 'reasonable further progress' are described in Section C below.

The methodologies for determining economic capability for regulated and unregulated industries differ. Regulated industries are those in which Public Utility Commissions (PUCs) set the firm's rate of return, such as the electric utility industry. Most firms are unregulated.

Unregulated firms should calculate three financial tests to determine if they are eligible on economic grounds for a Section 301(c) variance. EPA, generally, will grant a variance only if all three tests indicate that the required pollution control is not economically achievable and the applicant makes the requisite demonstration about reasonable further progress.

Similarly, regulated firms should perform two financial calculations. EPA, generally, will grant a variance only if both tests indicate that the pollution control equipment is not economically achievable and the applicant can demonstrate reasonable further progress.

B. Procedure Governing Section 301(c) Variance Requests

Requests for Section 301(c) variances are governed by provisions in the NPDES permit regulations 40 CFR Parts 122 and 124. These provisions specify when variance requests must be submitted, certain requirements of requests, and the decisionmaking and appeal process. The most important provisions include 122.21(l), 124.62, 124.63, and 124.64. Other pertinent provisions include 122.21(n)(2), 124.51(b), and 124.60.

C. Demonstration of Reasonable Further Progress

There are three criteria for determining whether the modified requirements will "result in reasonable further progress toward the elimination of the discharge of pollutants." The applicant for a Section 301(c) variance will have to meet the following

three criteria to the satisfaction of the Administrator.

First, BPT is an absolute floor--a minimal level of control--for all plants to meet. Any applicant for a Section 301(c) variance must demonstrate current compliance with all applicable BPT limitations and continued compliance under the proposed modified limitations.

Second, the applicant must demonstrate that the proposed modified limitations will assure compliance with the pertinent water quality standards. Section 301(c) provides a variance from the technology-based requirements of BAT, but not from the requirement for compliance with water quality standards.

Finally, to insure that "reasonable further progress" will be made, the applicant should demonstrate to the satisfaction of the Administrator that the applicant has evaluated all combinations of pollution control efforts within its economic capability. Such evaluation shall consider new treatment technologies, upgrading of an existing treatment system, and any process modifications or materials substitutions within its economic capability that will result in a reduction of discharges of the pollutant or pollutants for which the variance is sought.

After conducting its evaluation, the applicant then must propose modified effluent limits based on some combination of treatment and production changes that will involve the maximum use of technology within its economic capability and will result in reasonable further progress toward the elimination of the discharge of pollutants.

In some cases, the availability of technologies only in discrete increments may result in an applicant proposing to use technologies that require an investment that is less than its maximum economic capability. Furthermore, EPA interprets economic capability in terms of the longer-term viability of an applicant. Therefore, the Agency will not require additional controls that may entail a significant risk of exceeding the applicant's longer-term economic capability. However, the Administrator may review control methods not selected by the applicant in determining whether the applicant's selection of control methods satisfies the statutory criteria that proposed modified limits would represent maximum efforts within its economic capability and would ensure reasonable further progress toward the Act's goal of the elimination of pollutant discharges into the Nation's waters. The Administrator's decision will necessarily be made on a case-by-case basis.

Whenever possible, the Agency will determine reasonable further progress in such a manner to be compatible with the ultimate attainment of compliance with BAT limitations. This will avoid investments in pollution control equipment which could not be later adapted

expanded to provide for BAT compliance.

III. ECONOMIC CAPABILITY TEST

A. Summary of Section 301(c) Economic Capability Tests

Unregulated Industries

Economic capability, generally, will be examined for unregulated firms by three financial tests: the Revenue Test, the Earnings Test and the Beaver's Ratio. Since these tests each evaluate a different aspect of a firm's financial condition, their combined results should provide a good estimate of ability to pay for pollution control. They are also relatively easy to apply and rely on normally available financial statement data.

If the results of all three tests indicate that the required technology is not affordable, then a variance most probably will be granted based on EPA's determination of reasonable further progress. If any of the three tests indicate that the required technology is affordable, then a variance most probably will not be granted. A company that can demonstrate that the test results do not reflect its particular circumstances may request a re-evaluation. EPA would require additional financial data from the firm and a more thorough evaluation would be performed by financial analysts at EPA Headquarters.

Regulated Industries

Regulated industries should perform two tests to determine economic capability: the Interest Coverage Ratio and the Cash Income Test. If both tests indicate that the firm cannot afford the required pollution control and the RFP demonstration is made, EPA most probably will grant the variance. If the result of either test indicates that the applicant can afford the required technology, EPA most probably will deny the variance request. If the applicant feels that the results are not representative of its financial condition, it can request a more thorough evaluation by EPA based on additional data that it would supply.

B. Financial Data Requirements

Standard Financial Data

Calculating the economic capability of a source requires estimates of a number of financial parameters. The tests rely as much as possible on financial data from regularly maintained financial records. The tests should be performed for the three most recent years. Plant data should come from audited financial statements when they are available. When audited statements are unavailable, the source of the data should be identified and the data should be accurate to the best knowledge of the firm.

The financial capability tests apply to the point source that requires the NPDES permit. Economic data should be for the function, organizational subdivision, or other work unit for which financial decisions induced by BAT nonconventional requirements will be made by a firm's management and for which cost, revenue, and related financial data have been accumulated historically. This can be the whole facility, and often it will be.

Permit writers should consult with the appropriate project officer who developed the applicable effluent limitations guideline to determine whether a plant-by-plant analysis was performed in developing the guideline to ensure that all information EPA may have regarding the company's economic capability is obtained and considered in making the section 301(c) decision. Of course, where this information is outdated, it may have little relevance. Nonetheless, permit writers should make the appropriate inquiries with the Office of Water Regulations and Standards.

How to Allocate Multi-plant Revenues

When a multi-plant facility is unable to use financial information directly from audited financial statements, it must use the following rules to allocate both income and book value.

- Revenues and expenses for facilities not associated with the facility for which the variance request is made must be excluded.

- Nonoperating revenues and expenses must be excluded.

- Transactions not traceable to the relevant facility's operations must be excluded.

- Affiliated transactions [transactions undertaken with another business with whom the applicant has a common bond of ownership and or managerial control] must be adjusted to prices comparable to those established on unaffiliated customer transactions. The nature and basis of any adjustment must be explained.

- Expenses that may be allocated to the facility must be allocated based on activity or output relationships.

- The interest expense allocated to the applicant's facility must be in the same ratio to the firm's interest expense as the facility's identifiable assets (assets that can be identified with the entity for which this application is being made) are to the firm's assets as reported on an average net book value basis.

Pollution Control Cost Data

In addition to the financial data, pollution control cost data are also required for (1) the BAT nonconventional pollutant control system, (2) other BAT costs if they are used to reduce the baseline values before nonconventional control costs, and (3) the modified nonconventional pollutant control system that represents the maximum use of technology within the applicant's economic capability and that will result in reasonable further progress toward eliminating the discharge of pollutants.

C. Allocating Costs to Nonconventional Pollutants

The Section 301(c) variance is only available for nonconventional pollutants. This limitation requires costs for achieving BCT limitations for conventional pollutants and BAT limitations for toxic pollutants to be separated from the costs for achieving BAT limitations for nonconventional pollutants. The operating assumption for the Section 301(c) variance economic test is that costs for treatment which are necessary to achieve either BAT toxics limitations or BCT limitations should be allocated to those cost categories. Thus, if the applicant requires system A to meet its BAT toxic and nonconventional control requirements but requires a less expensive system B to meet only its BAT toxic limitations, then the difference in cost between systems A and B is the cost of BAT nonconventional control. Costs for achieving limitations other than BAT for nonconventional pollutants may be reflected in the applicant's baseline financial condition. If only a single system is available for treatment of both toxic and nonconventional pollutants, the applicant would not qualify for the variance.

IV. FINANCIAL TESTS FOR UNREGULATED INDUSTRIES

This section describes the three tests to be applied to unregulated industries. It summarizes each test and its interpretation and also describes the calculation in detail. The three tests indicate that the pollution control equipment is affordable if:

- The Revenue Test

$$\frac{\text{Annual Pollution Control Cost}}{\text{Revenues}} < \text{Threshold}$$

- The Earnings Test

$$\text{Earnings Before Taxes} > 0$$

- The Beaver's Ratio

$$\frac{\text{Cash Flow}}{\text{Total Debt}} > \text{Target}$$

A. The Revenue Test

Test Description

The revenue test is a simple, easy-to-perform test which requires information only on plant revenues and pollution control costs. To perform the test, the annual cost of BAT pollution control for the nonconventional pollutant is measured as a fraction of the plant's revenues. When pollution control costs exceed the threshold identified for each specific industrial sector, then the treatment system may not be economically achievable. The threshold for each industrial sector is defined by the historic ratio of BAT costs to revenues for firms eligible for BAT waivers for each specific industrial sector. Exhibit 1 lists the decision rules for the revenue test and the thresholds for each industrial sector by SIC code.

The SIC codes listed in Exhibit 1 are the industrial sectors identified by EPA as potentially eligible for a section 301(c) variance based on the industrial sector having:

(1) BAT requirements for nonconventionals,

(2) BAT limitations that are more stringent than BPT limitations, and

(3) treatment technologies for nonconventionals that can be separated from treatment of conventionals and/or toxics.

If an applicant's industrial sector is not listed in Exhibit 1 contact EPA Headquarters, Tom Laverty (202) 426-2970.

Determining Annual Pollution Control Costs

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 often 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 of .17 can be used.* Exhibit 2 Worksheet 1 demonstrates the calculation of annual costs using this capital recovery factor and hypothetical pollution control capital and operating costs.

Determining Revenue

The revenue test requires only information on plant revenues. Revenue information should come directly from financial statements or, in the case of a sole proprietorship, from income tax records. When individual plants do not record revenues, they can be calculated by multiplying the market or transfer price per unit of product by the number of units of product produced.

Performing The Revenue Test

Exhibit 3 is a sample worksheet for the Revenue test. Revenues are taken from the most recent financial statement or income tax records. Total annual cost of pollution control is determined as outlined above. The threshold number is taken from Exhibit 1. Line 2 is then divided by Line 1 to determine the firm's ratio. This ratio is then compared to the threshold number in Exhibit 1 to determine economic capability.

Interpreting the Revenue Test

When the firm's ratio is above the threshold for all three years the revenue test is indicating that the firm cannot afford the pollution control system. When the firm's ratio is below the threshold for all three years the revenue test is indicating that the firm can afford the pollution control system. If the firm's ratio is very close to the threshold, or is above some years and below others then the ratios should be examined for trends. If the ratio is declining over time the system may not be affordable. If the ratio is improving the system will be considered affordable. If no trend is apparent the revenue test is not a good indicator of affordability and more weight should be placed on the other tests or a more thorough analysis should be performed by EPA Headquarters.

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

B. The Earnings Test

Test Description

The Earnings Test is even more straightforward. After subtracting the annual cost of pollution control, are earnings before taxes greater than zero? If not, the pollution control device may not be economically achievable.

Performing the Earnings Test

Exhibit 4 is a sample worksheet for the Earnings Test. Earnings before taxes are normally calculated on a firm's income statement. Earnings before taxes equals revenues minus all expenses except taxes. Any extraordinary or nonrecurring expenses should be highlighted and, in most cases, excluded from the calculation of earnings before taxes for test purposes. Annual pollution control costs are the same as those used for the Revenue Test (use Worksheet 1 in Exhibit 2).

Interpreting the Earnings Test

If the plant's earnings are below zero for all three years year, the earnings test indicates that the firm cannot afford the pollution control system. If the plant's earnings are above zero for all three years, the earnings test indicates that the firm can afford the system. If the results are very close to zero or mixed over time then the results should be examined for trends. If the results decline over time, the system may not be affordable. If the trend is improving, the system will be considered affordable. Mixed results may have to be referred to headquarters.

The earnings test will also be carefully reviewed by EPA for possible biases. Sole proprietorships, and some corporations, can place large portions of 'earnings' into salaries. This can bias the results of the earnings test. A list of salaries paid to top executives may be requested if any bias is suspected.

C. Beaver's Ratio

Test Description

The Beaver's Ratio involves calculating the ratio of internally generated cash flow* to total debt (current liabilities and long-

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* Internally generated cash flow--net earnings after taxes plus depreciation, amortization, and depletion--would also normally include other noncash expenses, such as deferred taxes. In order to be consistent with Beaver's study, however, non-cash expenses other than depreciation are not included.

term debt). This test assesses the short-term solvency of the company and is a good predictor of bankruptcy up to two years prior to failure. A Beaver's Ratio greater than 0.2 indicates that the firm is solvent. A firm with a Beaver's Ratio less than 0.15 may be in financial distress (in danger of bankruptcy). A grey area exists between 0.15 and 0.2.

Calculation of the Beaver's Ratio

Worksheets 4 and 5, in Exhibits 5 and 6, provide an example of the calculations necessary to determine the Beaver's Ratio. Worksheet 4 describes the procedure for calculating the Beaver's Ratio without additional pollution expenditures. This unadjusted Beaver's Ratio provides a measure of the firm's current financial health. This ratio should be calculated for each of the three most recent years. 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.

Worksheet 6 describes the procedure for adjusting the most recent years' Beaver's Ratio for pollution control expenditures. 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 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.

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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 [(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. (Work Book for Determining Economic Achievability for National Pollution Discharge Elimination System Permits, August 1982).

V. Determining Economic Capability

The economic capability of the firm to meet BAT requirements for nonconventionals is determined by reviewing the results of all three financial tests--the Revenue Test, the Earnings Test, and the Beaver's Ratio. Unless there is some unusual circumstance, if all three tests indicate that the firm cannot afford the system, then the firm is eligible on economic grounds for a Section 301(c) variance. However, before a waiver can be granted, the firm must also demonstrate reasonable further progress and meet the application deadline and meet BPT and all applicable water quality standards.

If all three tests indicate that the firm can afford the system then a Section 301(c) variance will not be granted. However, if the firm feels that there is some unusual circumstance that makes the tests described in this guidance manual inappropriate for determining their economic capability then they may apply to EPA Headquarters for further review. However, they should realize that a complete Net Present Value analysis will be performed which requires very detailed financial information including economic projections.

If the tests provide mixed results then the reviewer should look for trends and/or biases. The section on each test contains a description of how to interprete trends and identify biases. If there is still uncertainty after examining the results for trends and biases the results should be forwarded to EPA Headquarters for further review.

VI. HOW TO USE THE FINANCIAL TESTS TO DETERMINE 'REASONABLE FURTHER PROGRESS'

Once a firm has demonstrated that meeting BAT requirements for nonconventionals is an economic hardship, then ~~their~~ next step is to demonstrate reasonable further progress beyond BPT requirements. If the firm, or EPA, can demonstrate that there are other less expensive options available for increasing the plants control over nonconventionals, then the firm must demonstrate their economic capability for meeting these options. The same tests described above can be used for this purpose. The firm merely replaces BAT pollution control costs in each test with the less expensive control option.

VII. SUMMARY OF REGULATED INDUSTRY FINANCIAL TESTS

EPA recommends that regulated industries utilize both an interest coverage ratio and a cash income test to demonstrate economic hardship in a Section 301(c) application. These two tests analyze the firm's ability to finance new equipment, either through additional debt or internally generated funds.

A utility that has an interest coverage ratio less than 2.0 (or one that would become less than two after adjustment for non-conventional BAT pollution control costs) may be eligible for a variance under Section 301(c) of the Clean Water Act. The utility must then determine whether it not only cannot finance BAT costs with debt, but also does not have sufficient cash income to absorb the costs. The latter can be demonstrated with the cash income test.

A. Calculation of the Interest Coverage Ratio

The interest coverage ratio uses a three-year average of historical data on interest charges and income to compute the ratio. An average is used because a utility's financial condition can quickly change due to decisions of rate commissions to allow them to change their prices. The Section 301(c) test is intended to provide variances only to those utilities for which it is likely that financial conditions have been and will continue to be unfavorable. Thus, the applicant is asked to provide data for each of the previous three years.

All of the data requirements for regulated industries are based on Department of Energy publication definitions. The definition of operating income before taxes is all operating revenue minus operating expenses, maintenance expenses, depreciation expenses, amortization, taxes other than income taxes, provision for deferred income taxes, investment tax credit adjustments and gains and losses from disposition of utility plant. Of course, utility operating income is before interest charges. The definition of other income is the total of nonutility operating income, equity in earnings of subsidiaries, interest and dividend allowance for funds used during construction, miscellaneous nonoperating income, gain or disposition of property. Deductions, are loss on disposition of property, miscellaneous amortization and miscellaneous income deductions.

Exhibits 7 and 8 provide a worksheet for use in performing the interest coverage ratio. The worksheet in Exhibit 7 determines the 3 year average interest expense. The worksheet in Exhibit 8 provides the methodology for adjusting the average interest expense for non-conventional BAT costs.

B. Calculation of the Cash Income Test

While the interest coverage ratio in Exhibit 9 judges whether the applicant is able to finance the cost externally, Worksheet 9 judges whether the applicant is able to finance the cost internally. The cash income test determines whether, for the entire company, the capital cost of compliance is greater than five percent of cash income. Five percent of cash income is assumed to represent a small enough proportion such that no bankruptcies will occur even

if external financing is unavailable, i.e., the firm fails the interest coverage test. Thus, to receive a variance, the applicant must have an interest coverage ratio less than two and capital costs that are greater than five percent of cash income.

The definitions of the inputs for the cash income test are also based on those in "Statistics of Privately Owned Utilities in the United States - 1979," published by the U.S. Department of Energy, Energy Information Administration, October 1980. The data for this test should also be for the entire utility and it should also be an average for the last three years.

Exhibit 1

THRESHOLD VALUES
REVENUE TESTS FOR ELIGIBLE INDUSTRY
SUBCATEGORIES

INDUSTRY - Subcategory	SIC code	Threshold (ratio of BAT costs to revenue (sales))
INORGANIC CHEMICALS		
- Mercury Cell	2812	.005
- Diaphram Cell	2812	.005
- Hydrogen Cyanide	2819	.006
FERTILIZERS		
- Ammonia	2873	.005
- Urea	2873	.005
- Ammonium Nitrate	2873	.020
GLASS MANUFACTURING		
- Automotive Glass Laminating	3211	.005
- Incandescent Lamp Envelope	3229	.005
- Hand Pressed & Blown Glass	3229	.010
MEAT PRODUCTS		
- Meat Cutter	2013	.005
- Sausage	2013	.005
- Ham Processors	2013	.005
- Canned Meats	2013	.005
- Renderers	2077	.010
RUBBER PRODUCTS	3069	.005
FERROALLOYS	3313	.005

Explanation of Threshold Values

1. Divide annual pollution control costs by annual revenue (sales).

2. Compare the results with above threshold values.

3. If annual pollution control costs/revenues are less than threshold values for the appropriate industry subcategory, plants are considered to be able to economically achieve the BAT limits.

4. If annual pollution control costs/revenues are equal to or greater than the threshold value for the appropriate subcategory, applicants should proceed with the next step.

Exhibit 2

Worksheet 1

		$ 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 3

WORKSHEET 2

Example of the
Revenue Test

1.	Revenues (from most recent Financial Statement or Income Tax Record)	119.6
2.	Total Annual Cost of Pollution Control (from EPA Development Documents or company engineering estimates and Worksheet 1)	.74
3.	Threshold (from Exhibit 1 or EPA Headquarters)	.02
4.	Pollution Control Cost as a Fraction of Revenues Line (2) / Line (1)	.006

Decision Rule

Line (4)	$<$ Line (3)	Economically Achievable
Line (4)	$\geq$ Line (3)	Uncertain

Exhibit 4

WORKSHEET 3

Example of the
Earnings Test

1.	Earnings Before Taxes	17.1
2.	Total Annual Cost of Pollution Control (Worksheet 1)	.74
3.	EBT - Cost of Control Line (1) - Line (2)	16.36

Decision Rule

Line 3	>	0	economically achievable
Line 3	$\leq$	0	uncertain

Exhibit 5

WORKSHEET 4

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	20,445
4.	Current Liabilities	91,076	66,370	71,445
5.	Long-Term Debt	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	....

Decision Rule

Line (7) > .20	Economically Achievable
Line (7) < .20, >.15	Review Trends
Line (7) < .15	May not be achievable

Exhibit 5 (Continued)

EXPLANATION OF WORKSHEET

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 debts 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 6

WORKSHEET 5

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

		Recent Year 1976
1.	Long-Term Liabilities: Line (5) from Worksheet 4	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 4	29,601
16.	Adjusted Cash Flow: Line (15) - Line (10) - Line (12) + Line (14)	30,056
17.	Total Debt: Line (6) from Worksheet 4	170,931
18.	Adjusted Total Debt: Line (17) + Line (6)	174,231
19.	Adjusted Beaver's Ratio: Line (16) / Line (18)	0.17

Exhibit 6 (Continued)

EXPLANATION OF WORKSHEET 5

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

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 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 points 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 50 percent.

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.

Exhibit 6 (Continued)

EXPLANATION OF WORKSHEET 5

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 can 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 4.

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 (1) minus Line (12) plus Line (14).

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

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 7
Worksheet 6

Interest Coverage Ratio
Without Pollution Control Adjustment

SCHEDULES

For Unregulated Industries

			FY _____	FY _____	FY _____
A.	Net Utility Operating Income Before Taxes	1.	_____	_____	_____
B.	Net Other Income and Deductions Before Taxes	2.	_____	_____	_____
C.	Total Yearly Net Profit Before Taxes (line 1 plus line 2)	3.	_____	_____	_____
D.	Total Net Profit Before Taxes (Add the entries on line 3)	4.	_____		
E.	Average Net Profit Before Taxes (divide line 4 by three)	5.	_____		
F.	Interest on Long Term Debt	6.	_____	_____	_____
G.	Interest on Debt to Associate Companies	7.	_____	_____	_____
H.	Other Interest Expenses	8.	_____	_____	_____
I.	Total Yearly Interest Expenses (line 6 plus line 7 plus line 8)	9.	_____	_____	_____
J.	Total Interest Expenses (Add entries on line 9)	10.	_____		
K.	Average Interest Expenses (divide line 10 by three)	11.	_____		
L.	Average Interest Coverage Ratio	12.	_____		
M.	Interest Coverage Ratio Less than Two (Skip Exhibit 8 and go directly to Exhibit 9)	13.	_____ | _____ |		
	Interest Coverage Ration Greater Than Two (Go to Exhibit 8)	14.	_____ | _____ |		

Exhibit 7 (Continued)

EXPLANATION OF WORKSHEET 6

Line 1 - Net Utility Operating Income Before Taxes. Enter into the spaces along Line 1 net utility operating income before tax from the applicant's income statement. Non-recurring income/ losses should not be included.

Line 2 - Net Other Income and Deductions Before Taxes. Enter into the spaces along line 2.

Line 3 - Total Yearly Net Profit Before Taxes. Add line 1 and line 2 and enter the totals onto line 3.

Line 4 - Total Net Profit Before Taxes. Add the entries on line 3 and enter onto line 4.

Line 5 - Average Net Profit Before Taxes. Divide line 4 by three.

Line 6, 7, and 8 - Interest Expenses. Enter interest expense in each year on long-term debt into the spaces along line 6, interest on debt to associated companies along line 7, and other interest expenses along line 8. The relevant interest expenses are those defined in the Department of Energy publication described on page 10 of the text.

Line 9 - Total Yearly Interest Expenses. Add line 6, line 7, and line 8 and enter the totals onto line 9.

Line 10 - Total Interest Expenses. Add the entries on line 9 and enter onto line 10.

Exhibit 7 (Continued)

EXPLANATION OF WORKSHEET 6

Line 11 - Average Interest Expenses. Divide line 10 by three.

Line 12 - Average Interest Coverage Ratio. Divide line 5 by line 11 and enter onto line 12.

Line 13 - Check this square if the number on line 12 is less than two.

Line 14 - Check this square if the number on line 12 is greater than or equal to two.

Exhibit 8

WORKSHEET 7

Interest Coverage Ratio Adjusted for BAT Costs

			FY _____
A.	Total Long-Term Debt	1.	_____
B.	Shareholder's Equity	2.	_____
C.	Total Capital (line 1 plus line 2)	3.	_____
D.	Debt Portion of Total Capital (line 1 divided by line 3)	4.	_____
E.	Capital Cost of Pollution Control Equipment for BAT Costs for nonconventional pollutants	5.	_____
F.	Portion of Expenditure Financed With Debt (line 5 multiplied by line 4)	6.	_____
G.	Interest rate paid on Bonds	7.	_____
H.	Interest Expense Before Taxes	8.	_____
I.	Average Interest Expenses	9.	_____
J.	Adjusted Interest Charges (line 8 plus line 9)	10.	_____
K.	Average Net Profit Before Taxes	11.	_____
L.	Annual O & M Expenditures	12.	_____
M.	Adjusted Cash Flow (line 11 minus line 12)	13.	_____
N.	Adjusted Interest Coverage Ratio (line 13 divided by line 10)	14.	_____
O.	Interest Coverage Ratio Less Than Two (Go to Exhibit 9)	15.	_____
	Interest Coverage Ratio Greater Than Two (Ineligible for Variance)	16.	_____

Exhibit 8 (Continued)

EXPLANATION OF WORKSHEET 7

Worksheet 7 has the same general instructions as Worksheet 6. The modifications in Schedule 7 require that you estimate the financing terms for the pollution control costs. The rules for making these adjustments are described below. Worksheet 7 should be filled out for the most recent fiscal year for which annual data are available.

Line 1 - Total Long Term Debt. Long Term Debt should be taken from the applicant's liability section of the balance sheet.

Line 2 - Shareholder's Equity. Shareholder's equity also should be taken from the liability section of the applicant's balance sheet. Include common equity plus paid in surplus and retained earnings and subtract the value of any treasury stock.

Line 3 - Total Capital. Add line 1 and line 2.

Line 4 - Debt Portion of Total Capital. Divide line 1 by line 3 to estimate the debt portion of the capital structure.

Line 5 - Capital Cost of Pollution Control Equipment for BAT for Nonconventional Pollutants. Enter engineering estimate of total capital costs on line 5.

Line 6 - Portion of Expenditure Financed with Debt. Multiply line 5 by line 4 to estimate the amount of additional long-term debt which is incurred to finance the pollution control costs.

Exhibit 8 (Continued)

EXPLANATION OF WORKSHEET 7

Line 7 - Interest Charged on Bonds. Using the bond rating on the firm's least senior debt, determine the average yield for that bond rating classification from Moody's Bond Record. Enter this interest rate on line 7 as an estimate of the rate to be paid on new long-term debt.

Line 8 - Interest Expense Before Tax. Multiply line 6 by line 7 to estimate increased interest payments.

Line 9 - Average Interest Expense. Enter average interest expense.

Line 10 - Adjusted Interest Charges. Add line 8 and line 9.

Line 11 - Average Net Profit Before Tax. Enter average net profit before tax.

Line 12 - Annual O & M Expenditures. Enter the average operations and maintenance expenditure per year based on the engineering estimate.

Line 13 - Adjusted Cash Flow. Subtract line 12 from line

Line 14 - Adjusted Interest Coverage Ratio. Divide line line 10.

Line 15 - Check this square if line 14 is less than two. to Worksheet 9.

Exhibit 8 (Continued)

EXPLANATION OF WORKSHEET 7

Line 16 - Check this square if line 14 is greater than or equal to two. Do not complete Worksheet 9. The applicant is ineligible for a variance.

Exhibit 9

WORKSHEET 8
Cash Income Test

			FY _____	FY _____	FY _____
A.	Net Profit After Tax	1.	_____	_____	_____
B.	Allowance for Funds Used During Construction	2.	_____	_____	_____
C.	Cash Income (Subtract line 2 from line 1)	3.	_____	_____	_____
D.	Total Cash Income (Add the entries on line 3)	4.	_____	_____	_____
E.	Average Cash Income (Divide line 4 by three)	5.	_____		
F.	Capital Cost of Pollution Control Equipment for BAT for Nonconventional Pollutants	6.	_____		
G.	Capital Cost Ratio (Divide line 6 by line 5)	7.	_____		
H.	Capital Cost Ratio Less Than or Equal to 5 Percent (Ineligible for Variance)	8.	_____		
	Capital Cost Ratio Greater than Five Percent	9.	_____		

Exhibit 9 (Continued)

EXPLANATION OF WORKSHEET 8

Line 1 - Net Profit After Tax. Enter into the spaces along line 1 net profit after taxes for the last three fiscal years. Net profit includes both utility operating income and other income and deductions.

Line 2 - Allowance for Funds Used During Construction. Enter into the spaces along line 2.

Line 3 - Yearly Cash Income. Subtract line 2 from line 1 because allowance for funds used during construction is not a cash item and enter the totals onto line 3.

Line 4 - Total Cash Income. Add the entries on line 3 and enter onto line 4.

Line 5 - Average Cash Income. Divide line 4 by three.

Line 6 - Capital Cost of Pollution Control Equipment for BAT for Nonconventional Pollutants. Enter engineering estimate for total capital cost on line 6.

Line 7 - Capital Costs Ratio. Divide line 6 by line 5.

Line 8 - Check this square if capital cost ratio is less than or equal to five percent. The applicant is ineligible for a variance.

Line 9 - Check this square if capital cost ratio is greater than five percent.