ENVIRONMENTAL PROTECTION AGENCY

[FRL–6361–7]

Calculation of the Economic Benefit of Noncompliance in EPA's Civil Penalty Enforcement Cases

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance notice of proposed action, response to comment, and request for additional comment.

SUMMARY: In a **Federal Register** Notice on October 9, 1996, the Environmental Protection Agency (''EPA'') requested comment on how it calculates the economic benefit that regulated entities obtain as a result of violating environmental requirements; EPA makes this calculation to establish an appropriate penalty for settlement purposes. This Notice provides both responses to the public comments and advance notice of the changes EPA proposes to make to its benefit recapture approach and to its BEN computer model (which is used by EPA to calculate economic benefit for purposes of settlement). EPA also requests comment on these proposed changes. After the comment period closes, the Agency plans to review all of the comments and revise its benefit recapture approach as appropriate.

DATES: EPA urges interested parties to comment in writing on its proposed changes to the BEN model and to the Agency's benefit recapture approach. Comments must be received by EPA at the address below by July 30, 1999.

ADDRESSES: Written comments should be submitted in triplicate to: U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance, Economic Benefit Docket Clerk, Mail Code 2248–A, 401 M Street, SW., Washington, DC 20460, and should reference this docket. EPA will maintain a record of all written comments submitted pursuant to this Notice. Copies of the comments may be reviewed at the Ariel Rios Federal Building, 1200 Pennsylvania Avenue, Washington, DC 20004. Persons interested in reviewing the comments must make advance arrangements to do so by calling (202) 564–2235.

FOR FURTHER INFORMATION CONTACT: Copies of the BEN computer model and the BEN User's Manual may be obtained from the National Technical Information Service by calling (800) 553–6847. Callers should request order number PB98–500382GEI. Electronic copies of these items are also downloadable through the Office of Enforcement and Compliance Assurance's World Wide Web site on the Internet (http://www.epa.gov/oeca/datasys/dsm2.html). Government users (federal, state, or local) can also obtain copies of the model and manual through the Agency's toll-free enforcement economics helpline at (888) ECONSPT. For further information, contact Jonathan Libber, Office of Regulatory Enforcement, Multimedia Enforcement Division, at (202) 564–6102, or through electronic mail at libber.jonathan@epamail.epa.gov.

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I. Background

A. Overview

One of EPA's most important responsibilities is to ensure that regulated entities comply with federal environmental laws. These laws—and their implementing regulations—set minimum standards for protecting human health and welfare and for achieving environmental protection goals, such as clean air and clean water. EPA upholds these laws through vigorous enforcement actions that correct the violations and appropriately penalize violators.

A cornerstone of the EPA's civil penalty program is recapturing the economic benefit that a violator may have gained from illegal activity. Recapture helps level the economic playing field by preventing violators from obtaining an unfair financial advantage over their competitors who made the necessary expenditures for environmental compliance. Penalties also serve as incentives to protect the environment and public health by encouraging the prompt compliance with environmental requirements and the adoption of pollution prevention and recycling practices. Finally, appropriate penalties help deter future violations by both the penalized entity and by similarly situated regulatees.

EPA has promulgated a generic civil penalty policy, as well as specific penalty policies tailored to suit the needs of particular regulatory programs. For example, one civil penalty policy specifically addresses violations of the Clean Water Act. There are usually two components to the civil penalties sought by EPA: gravity and economic benefit. The gravity component reflects the seriousness of the violation and is generally determined through the application of the appropriate EPA civil penalty policy.

The economic benefit component, on the other hand, focuses on the violator's economic gain from noncompliance, which may occur in three basic ways. The violator can: (1) Delay necessary pollution control expenditures; (2) avoid necessary pollution control expenditures; or (3) gain an illegal competitive advantage during the period of noncompliance. This competitive advantage may occur, for example, if a company sells banned products or captures additional market share by selling its products at a lower cost than its complying competitors.

The Agency designed the BEN computer model to calculate—primarily

for settlement purposes—the economic benefit from these first two types of economic gain. BEN may not be appropriate for all cases. The EPA's regional offices can use an alternative approach that can produce reasonably accurate benefit calculations; however, the Agency believes that BEN is by far the best approach available for calculating economic benefit derived from delayed and avoided costs. The Agency does not have a computer model for calculating the benefit gained from an illegal competitive advantage. EPA considers such gains on a case-by-case basis.

B. EPA Policy and Guidance on Recapturing the Economic Benefit of Noncompliance

Since the BEN computer model's development in 1984, EPA staff have used BEN extensively in generating penalty figures for settlement purposes that reflect the economic benefit a violator derived from delaying or avoiding compliance with environmental statutes.

1. Policy Background

Calculating a violator's economic benefit using the BEN computer model is usually the first step in developing a civil settlement penalty figure under the Agency's Policy on Civil Penalties (PT.1–1) February 16, 1984, and A Framework for Statute-Specific Approaches to Penalty Assessments (PT.1–2) February 16, 1984. The Agency developed the BEN computer model to assist in fulfilling one of the main goals of the Policy on Civil Penalties: recovery—at a minimum—of the economic benefit derived from noncompliance.

The BEN computer model is a tool that is primarily intended to be used in calculating economic benefit for purposes of developing a settlement penalty. In presenting economic benefit testimony at judicial trial or in an administrative hearing, the Agency relies on an expert to provide an independent financial analysis of the economic benefit the violator obtained as a result of its violations. This independent financial assessment reflects the expert's own analytical approach as applied to the particular facts of that case. Use of an expert in a trial or hearing allows the parties the opportunity to examine more closely the analysis applied to the facts at issue than would be possible through reliance solely on a computer model. [1]

2. BEN Calculates the Economic Benefit From Delayed and Avoided Pollution Control Expenditures

The BEN model is designed to calculate two types of economic benefit: those gained from delaying and those gained from avoiding required environmental expenditures. Delayed costs can include capital investments in pollution control equipment, remediation of environmental damages (e.g., removal of unpermitted fill material and restore wetlands), or one-time expenditures required to comply with environmental regulations (e.g., the cost of setting up a reporting system, or purchasing land). Avoided costs include operation and maintenance costs and/or other annually recurring costs (e.g., off-site disposal of fluids from injection wells). BEN does not calculate the third type of economic benefit: that gained from a violator's competitive advantage associated with noncompliance.

3. Current Model Usage and Applicability

The BEN model can be used in all cases that have delayed or avoided compliance costs. (The only exception is Clean Air Act Section 120 enforcement actions, which require the application of a specific computer model.) EPA designed BEN to be easy to use for people with little or no background in economics, financial analysis, or computers. Because the program contains standard values for many of the variables needed to calculate the economic benefit, BEN can be run with only a small number of inputs from the user. The program also allows the user to replace those standard values with user-specific information. Table 1 below lists the inputs to the BEN model. The optional inputs listed in Table 1 are those for which the model has standard default values.

The BEN model can estimate economic benefit for many types of organizations: corporations, partnerships, sole proprietorships, not-for-profit organizations, and municipalities. The BEN model has two sets of standard values: one applies to for-profit business violators, and the other applies to not-for-profit organizations. The BEN inputs listed in Table 1 are discussed in detail in Chapter 4 of the BEN User's Manual for both for-profit and not-for-profit organizations.

Table 1.—Inputs for BEN

Required Inputs

(1) Case Name, Profit Status, and Filing Status.
(2) Capital Investment.
(3) One-Time Nondepreciable Expenditure.
(4) Annual Expenses.
(5) Date of Noncompliance.
(6) Date of Compliance.
(7) Date of Penalty Payment.

Optional Inputs (Standard Values That May Be Modified):

(8) Useful Life of Pollution Control Equipment.
(9) Marginal Income Tax Rate for 1986 and Before.
(10) Marginal Income Tax Rate for 1987 to 1992.
(11) Marginal Income Tax Rate for 1993 and Beyond.
(12) Inflation Rate.
(13) Discount Rate.

C. How a Firm Obtains an Economic Benefit From Delaying or Avoiding Compliance Costs

An organization's compliance with environmental regulations usually entails a commitment of financial resources, both initially (in the form of a capital investment or one-time expenditure) and over time (in the form of continuing, annually recurring costs). These expenditures should result in better protection of public health or environmental quality, but they are unlikely to yield any direct economic benefit (*i.e.*, net gain) to the organization. If these financial resources are not used for compliance, then they presumably are invested in projects with an expected direct economic benefit to the organization. This concept of alternative investment—that is, the amount the violator would normally expect to make by not investing in pollution control—is the basis for calculating the economic benefit of noncompliance.

As part of the Civil Penalty Policy, the Agency uses its penalty authority to remove or neutralize the economic incentive to violate environmental regulations. In the absence of enforcement and appropriate penalties, it is usually in an organization's best economic interest to delay the commitment of funds for compliance with environmental regulations and to avoid certain associated costs, such as operation and maintenance expenses.

1. The Components of Economic Benefit Measured by the BEN Model

A violator may gain economic benefit from either delaying or avoiding compliance costs. By delaying

[1] EPA designed the BEN model as a flexible tool for use in settlement negotiations; it is not used, nor was it ever intended to function, as a rule. An expert witness testifying for the government may use the new Windows version of BEN in court, but the responsibility to determine the economic benefit still resides with the expert. That expert may choose to use whatever analytical tool (*e.g.*, customized computer spreadsheets, the BEN model, or even a calculator) he or she deems appropriate for the particular calculations necessary in the case.

compliance, the violator can earn a return on the delayed capital investment or one-time expenditures required for pollution control compliance. In other words, violators have the opportunity to invest their funds in projects other than those required to comply with environmental regulations. These other investments are ordinarily expected to yield a monetary return at the violator's marginal rate of return on capital. But environmental expenditures typically yield no direct economic benefit. Thus, by delaying compliance, the violator benefits by the amount of earnings that could be expected from alternative investments.

A violator can also gain an economic benefit from avoiding pollution control costs. Avoided costs typically include the continuing, annually recurring costs that a violator would have incurred if it had complied with environmental regulations on time (*e.g.*, the costs of labor, raw materials, energy, lease payments and any other expenditures directly associated with the operation and maintenance of the pollution control equipment). Unlike capital investments and one-time expenditures that are only postponed, annual expenditures are avoided altogether. The resulting benefits to the violator are the total avoided annual costs as well as the return that could be expected on these avoided costs.

2. Taking Additional Factors Into Account

EPA's BEN model evaluates economic benefit in terms of the effect that delayed or avoided pollution control costs have on an entity's cash flows. Cash flow analysis is a standard and widely accepted technique for evaluating costs and investments. In essence, cash flow calculations focus on the real, ''out-of-pocket'' cash effects resulting from an expenditure. Thus, noncash expenditures, such as depreciation, are considered only to the extent that they affect cash income or expenses. The three additional factors the model considers are taxation, inflation, and the time value of money.

a. After-Tax Cash Flows. The BEN model computes economic benefit in after-tax terms to account for certain financial impacts associated with environmental expenditures. For example, one important impact of these expenditures is a reduction in income tax liability. Depreciation, one-time expenditures, and annual costs all effectively reduce taxable income and thereby reduce income tax payments. Also, depending upon the tax year, the original purchase of equipment might have resulted in an investment tax credit. To account for these tax effects, BEN calculates the economic benefit using after-tax cash flows.

b. Inflation. Inflation is another factor for which BEN accounts. The BEN model initially converts all costs to dollars of the noncompliance year and then compares the cost of complying on time with the cost of complying late. The model uses the inflation rate to adjust the current or future cost of compliance into dollars from the year noncompliance began. The BEN User's Manual (see pages 4–27 to 4–29 and Appendix A of the manual) contains a more detailed discussion of the inflation adjustment.

c. Time Value of Money. A third factor relates to the timing of the cash flows, because cash flows occurring in different years are not directly comparable. A basic concept of financial theory is ''present value.'' This concept is based on the principle that ''A dollar today is worth more than a dollar a year from now,'' because today's dollar can be invested immediately to earn a return over the coming year. (Alternatively, a dollar last year is worth more than a dollar today because investment opportunities existed for last year's dollar.) Therefore, the earlier a cost (or benefit) is incurred, the greater its economic impact. BEN accounts for this ''time value of money'' effect by adjusting all estimated cash flows to their ''present value'' equivalents. To accomplish this, BEN first ''discounts'' all cash flows back to the noncompliance date, then calculates an initial economic benefit as of this date, and finally ''compounds'' the economic benefit forward to the penalty payment date. BEN uses a rate that reflects the time value of money (known as a discount rate or compounding rate) to adjust the cash flows for both discounting and compounding.[2] The selection of the appropriate discounting methodology is a significant issue in the BEN model. The *BEN User's Manual* (see pages 4–30 to 4–35 and Appendix A of the manual) contains a more detailed discussion of the discounting and compounding that BEN performs for its present value calculations.

II. Proposed Changes

In its October 9, 1996, **Federal Register** Notice, the Agency sought comment on three categories of issues: (1) Broad economic benefit recapture questions, (2) the BEN model's calculation methodology and assumptions, and (3) the model's user-friendliness.

First, we invited comment on some fundamental questions that the benefit recapture approach has raised: Can an approach both more simple and more accurate than BEN measure the economic benefit of delayed and avoided pollution control expenditures? How should EPA evaluate the economic benefit that companies receive as a result of any illegal competitive advantage stemming from noncompliance?

Second, we invited comment on the BEN model's calculation methodology. While the Agency is confident that the BEN model's overall approach is theoretically sound, we welcomed constructive and documented comment on alternative approaches. In addition, EPA is aware of substantial differences of opinion with respect to the basis of some of the model's assumptions, particularly with respect to the discount rate and inflation rate. EPA requested comment on the BEN model's calculation methodology, or any other aspect of the model's assumptions or methodology.

Third, we requested comment on the model's user-friendliness. The Agency had heard concerns that the model is too difficult to use, particularly regarding BEN's ease of operation and the difficulty of obtaining the necessary data. Because EPA had never been presented with any concrete evidence in support of these assertions, the Agency wanted either to substantiate the problems and address them or to put these issues to rest.

In the following sections, we address the changes that EPA proposes to make in each of the areas on which we requested comment.

A. Broad Economic Benefit Recapture Issues

1. Alternatives to BEN

a. Background. EPA requested comment on whether an approach both more simple and more accurate than BEN could measure the economic benefit of delayed and avoided pollution control expenditures. EPA designed the BEN model to calculate the economic benefit of noncompliance in settlement of the vast majority of its civil penalty enforcement cases. Although BEN has effectively served this purpose, the Agency recognizes that it should be improved or even replaced if a better alternative exists or could be developed easily. This concern is particularly relevant because an increasing number of state and local

[2] For the sake of simplicity, the Agency generally refers to present value adjustments in either direction as ''discounting,'' although we acknowledge that a more precise term for adjusting the initial economic benefit forward is ''compounding.''

government enforcement personnel use the BEN model regularly. Any alternative approach must meet EPA's policy objective of ensuring that violators are put on an even financial footing with those regulated entities that comply on time. Alternatives must also be reasonably accurate, simple to use, and readily understandable to the vast majority of the BEN model's users, as these federal, state and local government enforcement officials usually have limited knowledge of financial economics or accounting.

b. Proposed Changes. Many commenters expressed various criticisms on different aspects of the BEN model. These criticisms, however, focused on suggestions for improving BEN. No commenter proposed an alternative approach to a stand-alone computer model that performs net present value calculations. Therefore, the Agency plans to continue its use of BEN, although it does propose significant revisions (see following sections).

2. Illegal Competitive Advantage

a. Background. Since 1984, EPA's civil penalty policy has maintained that any given penalty should be structured, at a minimum, to recover the economic benefit a violator has enjoyed as a result of its noncompliance. In addition to this economic benefit component, EPA assesses a gravity component that reflects the seriousness of the violation. This gravity component is designed to ensure that the penalty puts the violator in a worse position than those in the regulated community who complied with the law. The economic benefit component of EPA's civil penalty policy focuses specifically on identifying and recovering the gain to a violator in order to remove any economic incentive to violate environmental regulations. The policy does not address incidental and/or indirect losses or gains to society that might result from a violation. For example, consumers may enjoy an economic gain if a violator is able to reduce product prices.

The BEN model calculates the savings from the delayed and avoided costs that the violator realizes through its noncompliance and uses this measure as a proxy for the total economic gain it accrued. This approach represents the lower bound of the total economic gain associated with noncompliance. For example, given a new environmental standard, if all firms in the market except the violator comply by investing in pollution abatement technology, the market price for the product will rise to reflect the higher marginal costs borne by the producers. The violator has a cost advantage and could (a) charge the market price and pocket the avoided costs, (b) charge a lower price than its competitors in order to gain market share, or (c) combine strategies (a) and (b). BEN is designed to calculate only the delayed and avoided costs of noncompliance regardless of which strategy the company pursues. BEN, therefore, implicitly assumes that the violator follows strategy (a), and does not address the potential market impacts associated with the violator's lower marginal costs (*i.e.*, strategy (b) or (c)).

Illegal competitive advantage is an estimate of the total economic gain that the violator enjoys in the market as a result of the violation. Illegal competitive advantage focuses on how delaying and avoiding compliance allows violators to manufacture and sell products in the marketplace more cost-effectively, and also examines violators' short-term and long-term economic advantages associated with improved market position. Note that marginal cost differences are key to illegal competitive advantage: if a company's violation affects only fixed costs, then BEN can generally capture the entire economic benefit from noncompliance. A violator need not demonstrate an intent to improve its market position in order for it to enjoy an illegal competitive advantage.

Illegal competitive advantage can occur in a number of different ways, including:

Violator Sells Products at Below Market Price: A violator might be able to sell its products at a lower price than its complying competitors because it does not incur environmental compliance costs. Depending on market conditions (*i.e.*, elasticity of market demand) the violator may then secure a bigger share in that particular market, with the profit from the extra market share constituting the economic benefit. Some key questions are: how do we assess and prove what share of the market resulted from underpricing, and how do we determine the value of that market share?

Example: A metal finishing company fails to install pollution abatement equipment that would insure compliance with its wastewater discharge permit in order to keep costs low. A competitor producing the same product for the same market cannot compete with the price charged by the metal finisher in noncompliance and, as a result, exits the market. The violator now gains market share. BEN will capture the violator's delayed and avoided costs while in noncompliance, but will not calculate the added profits that the violator realizes from its increased market share.

Example: An auto shop using illegal disposal methods charges the same prices as its competitors and spends its avoided costs on advertising. It builds a larger customer base than it otherwise would have. BEN does not capture the full dimension of economic benefit from the auto shop's expanded customer base.

- *Violator Sells Products that Were Prohibited by Law:* Many EPA regulations prohibit the sale of certain products, either permanently or until EPA reviews and approves them.[3] If the violator produces and sells the prohibited product, the violator will achieve an economic benefit by: (1) making money directly from the sale of the product; and (2) capturing the market for the product, particularly if the product is new.

Example: A company mixes overstock of a restricted agricultural chemical into one of its ''improved'' popular lawn care products. Sales of the product are strong and customer brand identification and approval is high. BEN does not calculate the economic benefit the company has obtained through its illegal sales of the product nor the benefit that will accrue in the future from customer brand loyalty.

- *Violator Initiates Construction or Operation Prior to Government Approval:* Some regulatory requirements prohibit construction or operation until EPA or another government agency grants a permit. When a violator initiates construction or operation prior to this approval, it can begin operating earlier than it would have been able to had it complied with the law (*e.g.*, if operation begins nine months earlier than it should have, the violator can generate sales it should not have made and thereby gain a head start in developing its market). The violator may be partly motivated by the desire to gain an ''early mover'' advantage in a new market. (Note that in many of these cases, the violator will obtain governmental approval anyway. In such cases, no environmental damage has occurred. A penalty is nevertheless necessary, as EPA's policy is designed to maintain incentives to comply promptly with regulations.)

If the violator is operating in a new or rapidly evolving market, it may benefit

[3] Note that this differs from a company that produces an approved product through a prohibited process when the final product possesses all the same characteristics from the consumer's point of view, regardless of the production process (*e.g.*, oil sold from a noncompliant underground storage tank, or a metal part finished with an illegal coating). The economic benefit in such cases would be based on the pollution control costs that the violator delayed and/or avoided by producing the approved product through the prohibited process (*e.g.*, the delayed costs of proper tank inspection or the avoided incremental costs of a legal—and presumably more expensive—coating).

from an ''early mover advantage.'' For example, by signing long-term supply contracts with buyers at prices lower than from other potential entrants (who plan to comply with environmental regulations), the violator may forestall competition in the market. An ''early mover'' may also benefit by building a customer base before other entrants. If decreasing costs are associated with the size or scale of production, the ''early mover'' could also enjoy a long-term cost advantage over its competitors. Presumably an ''early mover'' could then parlay relatively thin profits (or even losses) in the early periods with higher profits in later periods.

One key issue in determining economic benefit is that new businesses often expect to lose money in the first few years of operation. Thus, if a firm starts operating one year earlier than it should have, and EPA examines gross income minus expenses only for that first year, then the violator might argue that its economic benefit is zero even though this was part of the violator's plan. A more appropriate measure of the violator's economic benefit may be the difference in the present value of expected cash flow over the life cycle of the facility from operating under compliance (*i.e.,* delayed opening) and in violation (*i.e.,* actual opening date).

Example: A telephone cable company needed to obtain a dredging permit to lay cable between the mainland and an island. Because of competitive pressures to be the first to offer fiber optics cable services on the island, the company proceeded on an accelerated schedule. Had the company gone through the permitting process, it would have been delayed by eight months. A competitor in the same market is within eight months of being permitted. One of two scenarios is possible here:

The violating company lays the cable and gains the first mover advantage, preventing the other company from being able to enter the market profitably. In this case, illegal competitive advantage includes both the profits the company receives during its eight months of operation that were the result of noncompliance, and also any monopoly profits the company enjoys after this time.

The violating company lays the cable and enters the market with other competitors selling the same service. In this case, illegal competitive advantage includes the profits the company receives during its eight months of operation that were the result of noncompliance. In the absence of this company's entrance, the remaining companies would have expanded to meet demand and would have earned the profits.

In both of these cases, BEN will not estimate the current and future benefits that the company realized from being the first to market.

• *Violator Operates at Higher Capacity:* A firm may be able to comply with applicable environmental regulations by maintaining its output or throughput below a given threshold level. A violator might produce above this threshold level in order to take advantage of high product prices. Alternatively, a violator might realize its lowest unit production costs at an output level that exceeds the level at which it can maintain environmental compliance.

Example: A paper mill can comply with the terms of its wastewater permit as long as its daily output does not exceed 200 tons per day. In order to reap the benefits of a market surge in paper prices, the mill produces an average of 240 tons per day over a six-month period. BEN does not capture the profits realized by the violator from the additional 40 tons per day produced on average over the period of noncompliance.

Example: A cheese manufacturer is committed to purchase the total output of 55 dairy farms through long-term ''take or pay'' contracts. Milk production from the farms exceeds the level that the manufacturer can process while staying within the regulatory limits of its wastewater permit for a three month period. Rather than pay for milk that it does not process, the manufacturer chooses to operate at a level that causes it to exceed its permit levels. The manufacturer enjoyed economies of scale due to noncompliance. That is, the manufacturer's production costs of the additional units are lower while it is in noncompliance because there is no additional cost associated with pollution control.

In summary, EPA is examining the recovery of illegal competitive advantage in cases where the BEN model fails to assess adequately the total economic benefit that the violator enjoys as a result of the violation. The proper evaluation of illegal competitive advantage in EPA policy will involve either identifying the incremental benefit enjoyed by the violator and not addressed by the BEN model, or applying a different analytic tool than BEN for the entire economic benefit calculation.

b. Proposed Changes. The Agency does not believe that a stand-alone computer model analogous to BEN (or an add-on module to BEN) could easily and reliably determine the economic benefit from the widely varying examples of illegal competitive advantage described above. To examine the potential market repercussions of noncompliance clearly involves a significantly greater effort than calculating the benefit from delayed and avoided costs. Tracing the probable use of the avoided cost savings by the violator, investigating the specific conditions of the market or markets in which the violator operates, and determining the resulting impacts of noncompliance on the market dynamics are all usually time-intensive tasks. The Agency proposes to assist enforcement staff in measuring economic benefit in such cases by developing a module for the BEN model that alerts the user to situations in which illegal competitive advantage may be significant and to develop guidance to assist enforcement staff in their calculation of illegal competitive advantage.

EPA proposes to have the BEN model query users regarding a series of conditions that might characterize situations where significant economic benefit from illegal competitive advantage could exist. Whenever the user creates a case, the model would prompt the user to provide answers to a series of questions. Depending on the user's answers to these questions, the model would advise the user to seek assistance in assessing the possible existence and magnitude of the economic benefit gained from illegal competitive advantage. The following questions target certain types of violations that may result in illegal competitive advantage. They are designed to require only a basic knowledge of the company's products and markets. An example of the types of questions to be included in this module (with interpretations of positive responses in parentheses) are as follows:

1. Violator Initiates Construction or Operation Prior to Government Approval

a. Did violator's failure to obtain the appropriate review/permits allow it to begin production or sales sooner than it should have? (If ''yes,'' then the violator may have received early mover advantage.)

2. Violator Sells Products Prohibited by Law

a. Did violator sell prohibited products? (If ''yes,'' then go to next question. If ''no,'' then this is not an issue.)

b. Does the violator plan to continue selling similar products in same market after coming into compliance? (If ''yes,'' then possible lasting market share effects may result from the illegal action.)

3. Violator Sells Products Below Market Price

a. Are the required compliance costs significant enough for the violator to have been able to undercut its competitors during the noncompliance period? (If ''yes,'' then the violator may have benefitted from market share gains, as it may have been able to undercut its competitors through its price advantage from noncompliance.)

b. Does violator market products that can develop ''brand loyalty'' or high switching costs? (*e.g.*, computer software, service such as auto maintenance.) (If ''yes,'' then price advantage could have long-term market distribution effects that benefit the violator.)

c. Has violator developed or marketed new products while in noncompliance? (If ''yes,'' than violator may gain ''early mover'' market share and discourage competitors by keeping prices low.)

4. Violator Operated at Higher Output

a. Could the violator have operated within the law cost-effectively by reducing its output/throughput to a certain level? (If it could have done so, but did not, the violator's gain from the incremental output above the level at which it would have been in compliance should be examined.)

EPA seeks comment on these questions and suggestions for other questions that would be necessary to assess sufficiently whether the economic benefit beyond avoided or delayed costs a violator gains from noncompliance are likely to be significant.

For situations where the model advises the user to assess the possible existence and magnitude of the economic benefit gained from illegal competitive advantage, EPA proposes to develop a guidance document to assist enforcement staff in evaluating illegal competitive advantage. The goal of this document is not to provide a fixed approach to calculating the economic benefit from illegal competitive advantage. Rather, the goal is to educate enforcement staff on the types of illegal competitive advantage that may arise in enforcement actions, as well as to provide a framework for EPA analysts and outside experts who perform the actual calculations. This guidance will eventually be incorporated into a revision of the 1984 ''Guidance for Calculating the Economic Benefit of Noncompliance for a Civil Penalty Assessment.'' EPA proposes the following general outline for the content of the illegal competitive advantage guidance document:

1. Definition of Illegal Competitive Advantage

2. Situations in Which Competitive Advantage May Be Significant

a. The violator has an early mover potential in a changing industry (*i.e.*, has opened facility early).

b. The violator is one of a few members in an industry that dominate that particular industry.

c. The violator has been the low-price producer and gained market share during non-compliance.

d. The violator could have operated within the law cost-effectively by reducing its output/throughput to a certain level, but instead operated above that level and that conduct made the violator more profitable.

3. Situations Where It Is Reasonable To Assess

What is the appropriate threshold value for use by EPA? (*E.g.*, how large does the potential economic benefit beyond avoided or delayed cost need to be to warrant EPA's closer scrutiny?)

4. Guidance Principles

EPA needs to keep information collection and analysis as simple and quick as possible.

5. Avoiding Potential Double Counting

a. Use of an integrated approach that constructs compliance on time and delay compliance scenarios, incorporating the relevant cash flows from delayed/avoided compliance costs and illegal competitive advantage.

b. Potential for recapture of both the benefits from savings and illegal competitive advantage in cases where the economic benefit from illegal competitive advantage is additive to the traditional BEN analysis.

c. Cases in which either the traditional BEN analysis or the illegal competitive advantage analysis drops out of the economic benefit calculation.

EPA seeks comment on the suggested approach and outline for this guidance document.

B. The BEN Model's Calculation Methodology

Over the years, the BEN model has received criticism for alleged flaws in its calculation methodology. The two issues with the greatest potential impact on economic benefit estimates involve the model's discount rate and its inflation rate. The Agency requested substantive and constructive comments on how the BEN model handles these two issues. In addition, EPA invited comment on all aspects of BEN's calculation methodology. The Agency asked commenters to address whether their proposed changes would add any complexity to the computer model, and if so, why the benefit of the change justified the added complexity.

1. Investment Tax Credit and Low-Interest Financing

a. Background. Economic benefit calculations for cases with noncompliance dates prior to the mid-1980s must account for two important tax-code effects: the investment tax credit (ITC) and low-interest financing (LIF).

Prior to 1986, the Federal government allowed companies an ITC on capital investments.[4] The ITC effectively reduced the after-tax cost of a capital investment. Complicated—and changing—rules governed the depreciation basis for a capital investment with an associated ITC.

BEN accounts for the ITC that was available on projects completed before January 1, 1986, but does not do so for the transition years of 1986 and 1987. The transitional rules allowed companies to obtain an ITC for projects completed after December 31, 1985, if the project met one of three criteria regarding the level of planning and construction that had occurred by that date.[5] Because the allowance of the ITC in these years was far from automatic (although still possible), BEN warns the user about this issue if the noncompliance date is between January 1, 1986, and June 30, 1987. If further research and analysis shows that the granting of an ITC was likely in a particular case, then a financial analyst can adjust the BEN result through an ''off-line'' calculation.

Prior to 1987, LIF was available for a business's investment in pollution control. An earlier version of the BEN model included a variable that accounted for LIF. The 1993 version removed this variable because it was relevant only for cases with noncompliance dates before 1987. BEN issues a warning to the user about LIF if the noncompliance date is before January 1, 1987. If further research and analysis show that LIF was probably available in a particular case, then a financial analyst can adjust the BEN result through an off-line calculation.

b. Proposed Changes. As a few commenters suggested, EPA could revise the BEN model to allow an option for ITCs during the 1986–87 transition years, as well as to account for LIF in years prior to 1987. These revisions

[4] Note that this and other tax-related adjustments are irrelevant for municipalities and other not-for-profit entities because their marginal tax rate is equal to zero.

[5] The criteria are: ''1. It is constructed, reconstructed, or acquired under a written contract binding on December 31, 1985; 2. it is constructed or reconstructed by the taxpayer, construction was begun by December 31, 1985, and the lesser of $1 million or five percent of the cost was incurred or committed by December 31, 1985; or 3. it is an equipped building or plant facility, construction was begun by December 31, 1985, under a written specific plan, and more than one-half of its cost was incurred or committed by December 31, 1985.'' (Commerce Clearing House, Inc., *Explanation of Tax Reform Act of 1986*, page 328.)

would, however, add considerable complexity to the model. Furthermore, the Agency did not receive any comments documenting recent instances in which an off-line calculation was necessary to account for ITCs or LIF. This is not surprising—EPA Headquarters has received only one call in the last two years in response to the BEN model's current warning about LIF. Furthermore, the already low likelihood of the need to account for ITCs or LIF continues to decline with the passage of time, as EPA is not likely to see many enforcement actions now in the late-1990s for violations that began in the early to mid-1980s.

EPA instead proposes that the revised BEN model not accept noncompliance dates before July 1, 1987. This will ensure that BEN's omission of ITCs and LIF is not leading to incorrect economic benefit estimates in instances where users do not heed the current model's current warning. EPA will provide assistance in performing the necessary calculations for cases that actually involve noncompliance dates before July 1, 1987.

The Agency welcomes comment on this proposed change. We are particularly interested in how often BEN users have recently analyzed cases with noncompliance dates before July 1, 1987, and how often they anticipate doing so after June of 1999, the expected introduction of the revised BEN model.

2. Depreciation Method

a. Background. The BEN model calculates depreciation for capital investments, as the tax deduction for accounting depreciation charges provides a real after-tax positive cash flow to businesses.[6] BEN calculates depreciation using a five-year straight-line methodology for capital investments made before January 1, 1987, and a seven-year Modified Accelerated Cost Recovery System for capital investments made after January 1, 1987. These assumptions represent the most rapid depreciation periods available for typical pollution control investments, thereby producing the positive depreciation cash flow effects as early as possible. These particular depreciation methods generally result in a conservative economic benefit calculation (*i.e.,* lower than would otherwise be calculated) because they minimize out-of-pocket costs to the violator. Therefore, BEN is often producing economic benefit figures that are very conservative.[7]

For capital equipment that has a very short useful life, the selection of alternative depreciation schedules might be available and also more beneficial to a business. In unusual cases where the violator can demonstrate that an alternative depreciation schedule would be both available and beneficial, then more detailed calculations by a financial analyst in lieu of the BEN model are necessary.

b. Proposed Changes. A revised BEN model could conceivably allow users the option of assuming an alternative depreciation schedule, but we believe the drawbacks of the added complexity and potential user confusion outweigh the gains from addressing a rare circumstance. The Agency welcomes feedback from BEN users on how often violators have asserted that a different depreciation schedule would be both available and beneficial, and how often off-line calculations have been necessary.

3. Tax Rates

a. Background. BEN uses three marginal tax rates: a rate for 1986 and before, one for 1987 through 1992, and one for 1993 and beyond. Users can accept the standard values—which incorporate national averages of state tax rates—or modify the inputs to reflect specific state values.[8]

b. Proposed Changes. EPA proposes that the revised BEN model require the user to enter the state in which the violator is located. The model will then automatically reference an internal database of state tax rates and perform the necessary calculations for the violator's combined federal and state tax rate.[9] EPA also proposes that BEN calculate the tax rate for each separate year of noncompliance, to allow for annual changes in the relevant state tax rate (even when the federal rate remains constant). Users will have the additional option of entering year-by-year combined federal and state rates in a spreadsheet-like format.[10]

Although these options may sound complex, the only data required of the user would be the violator's state. The other screens for additional data entry and modification would appear only to those users who selected such advanced options. The Agency welcomes comments on the added flexibility and applicability that would result from these proposed changes.

4. Differences in On-Time and Delay Scenarios

a. Background. The BEN model assumes that the violator would have used the same technology and approach in the hypothetical on-time compliance as it did in the actual delayed compliance scenario. The only allowed differences are in the two scenarios' exact costs of compliance, which BEN's inflation rate adjusts automatically. But technological, legal, or other relevant changes between the on-time and delay scenarios can conceivably alter the components of the compliance scenarios, increasing or decreasing the compliance costs by a rate other than general price inflation. Where the delay case costs are substantially less than the on-time case costs (*e.g.,* a technological breakthrough in control equipment), BEN will understate the benefit. Where the delay costs are substantially higher (*e.g.,* regulations become more strict, but with ''grandfather'' clauses for already-compliant firms), BEN will overstate the benefit.

Where the on-time and delay compliance scenarios are significantly different, BEN's normal assumption of two identical scenarios is inappropriate. More sophisticated calculations are necessary.[11]

b. Proposed Changes. Modifying BEN to accommodate such circumstances is possible, and we believe the gains from the model's consequently enhanced applicability outweigh the drawbacks of the added complexity and potential user

[6] The IRS does not allow companies to write off completely a capital investment in the year of purchase. Companies must spread the expense of the investment over several years using the appropriate depreciation schedule.

[7] The IRS requires that many types of pollution control equipment be depreciated over a longer period than assumed in the BEN model. Were EPA to tailor the depreciation to account for that longer period, the result would be a higher economic benefit calculation.

[8] Users might also wish to modify the tax rates to reflect a business whose low net income entails a tax bracket other than the highest one assumed in the standard values. Note though that BEN's assumption of the *highest* marginal tax rate produces a *lower* economic benefit estimate (because a higher tax rate decreases the after-tax value of the compliance costs).

[9] The model will also offer the option of the national average of all the state tax rates for cases in which it is unclear to what state the violator pays taxes.

[10] This option would allow users to account for—among other situations—a company whose profitability (and hence tax bracket) was highly variable over different years. (As noted before, BEN's assumption of the highest marginal tax rate throughout the noncompliance period results in a lower economic benefit estimate.) This option could allow users to account for the 1987 transition year in the federal tax rate change, but this is a moot point if the BEN model is changed (as proposed in a previous section) to require noncompliance dates after June 30, 1987.

[11] A similar problem arises when no technologically feasible method of compliance is available. In that case, the only possible compliance method is to cease all production, with the economic benefit calculation requiring a lost-profits approach, which is beyond the scope of the BEN model.

confusion. EPA, therefore, proposes to change the BEN model to allow users to enter separate on-time and delayed compliance costs.

It should be noted that the standard operation of the model would still entail only a single compliance scenario, and the other screens for additional data entry and modification would appear only to those users who select such advanced options. The availability of more advanced options would also enhance the model's ability to account for such atypical situations such as valid pre-compliance expenditures and credits for salvaged capital equipment, thus decreasing the need for off-line calculations. The Agency welcomes comments on this proposed change and how significantly it will enhance the model's flexibility and applicability.

5. Replacement Cycles for Capital Equipment

a. Background. One of the three types of compliance costs BEN analyzes is the capital investment, which represents depreciable pollution control equipment. As the name implies, depreciable equipment wears out with usage and the passage of time. BEN, therefore, asks the user if the violator will need to replace the equipment at some point in the future. If the user specifies that the investment in capital equipment is recurring, then the user can accept the standard value of 15 years for the useful life of the capital equipment, or enter another value.

If the cost of capital equipment is recurring, then a violator receives more than one benefit from delaying the purchase of capital equipment. The violator first receives a benefit from delaying the purchase of the initial capital equipment, and then receives further benefits from delaying the purchase of the replacement capital equipment for each future recurring cycle.

b. Proposed Changes. Some commenters stated that BEN's option of recurring capital equipment replacement cycles is ''speculative,'' as these cycles have yet to occur in the typical case. Although BEN makes an assumption about the future, this assumption is essentially a baseline one: BEN assumes that future pollution control requirements will be neither more stringent nor more lax than current requirements, and that the cost of the replacement equipment will increase by no more and no less than the projected rate of inflation. Therefore, the Agency proposes to keep the option of replacement cycles.

Some commenters argued that BEN should not offer infinitely recurring replacement cycles. The modeling of infinite cycles might at first seem excessive, but all future costs are ''discounted'' back to their present values (see following sections for an explanation of discounting). The result is that any cycle after the first one typically has a negligible impact upon the economic benefit estimate. Therefore, the Agency proposes that the revised BEN model use a default value of one replacement cycle, and offer users a choice of anywhere from zero to five replacement cycles. This approach is in contrast to the current choice of zero or infinite replacement cycles, with no intermediate option.

6. Inflation Treatment

a. Background. The first step in the economic benefit calculation is to determine the compliance costs—for both the on-time and delay scenarios—as of the year in which they were actually incurred (or should have been incurred). Therefore, BEN adjusts the compliance costs from the date they were estimated to the date the costs will be incurred to account for the effects of inflation.

To adjust for inflation, BEN currently uses a standard-value rate calculated from the appropriate ten years of monthly inflation data from the Plant Cost Index (PCI) in the magazine Chemical Engineering. This simple inflation rate adjusts the initial compliance cost estimates, both back in time into noncompliance- and compliance-year dollars, and then forward in time into future-year dollars (typically for capital equipment replacement cycles). The PCI is particularly appropriate for adjusting the costs for inflation that are typically associated with pollution control technology.

b. Proposed Changes. Despite the Agency's specific request for comment on BEN's inflation adjustment, we received almost none. The issues that the few commenters did raise were:

(1) The use of a single inflation rate for both actual and projected inflation,

(2) The basis for the actual inflation rate, and

(3) The basis for the projected inflation rate.

The Agency proposes to change the BEN model to allow two separate inflation adjustments. One adjustment would be for cash flows incurred during the period of historical noncompliance, and then a separate rate for projected inflation which would adjust for future replacement cycles (and other future compliance costs in cases where the violator has not yet come into compliance).

For actual historical inflation, the Agency proposes that BEN adjust each cash flow from the date of the cost estimate to the date on which it is incurred by referencing a look-up table of cost index values.[12] The default cost index would be the PCI. This particular index may not be appropriate for every single case, but we have yet to encounter any other cost index that would form a better basis for a standard value. EPA also proposes that the revised BEN model allow the user to select from multiple look-up tables representing different cost indices—including the Building Cost Index, Construction Cost Index, Consumer Price Index, and the Employment Cost Index—and the option of selecting different indices for different compliance components.[13] The user would also be able to override BEN's inflation adjustments for the capital investment and one-time nondepreciable expenditure, and instead enter separate estimates for these compliance costs as of the noncompliance date, compliance date, and the initial recurring cycle start dates. This customized data entry could represent another alternative cost index, case-specific inflation assumptions, or entirely different actions for on-time and delayed compliance.

[12] The model would not apply an explicit inflation *rate*, although an annualized rate could be imputed from the model's data. For example, suppose a $200 cost estimate from 1991 must be adjusted for inflation to the same day in 1992. The 1991 cost index value is 100, whereas the 1992 index value is 103. The calculation the model performs is $\$200 \times 103/100 = \$206$ (*i.e.*, multiplying the original cost estimate by the ratio of the cost index values from the date on which the cost is actually incurred, and the date on which the estimate is made). The index change from 1991 to 1992 does represent an annual inflation rate of three percent (*i.e.*, $103/100 = 1.03 - 1 = 0.03$), although the model would not directly apply this rate. The calculation that uses the ratio of the index values is both more precise and more simple than calculating multiple annual inflation rates over different periods for historical costs.

[13] See the following table, Different Cost Indicies.

DIFFERENT COST INDICIES

Abbreviation and full name	Description	Typical applications
BCI—Building Cost Index	Building costs; based on 1.128 tons Portland cement, 1,088 bd. ft. 2x4 lumber, 68.38 hrs. skilled labor.	General construction costs, especially structures.
BEN—Current BEN model's constant inflation rate.	Average of PCI's last 10 years; *i.e.,* a *constant* 1.8% increase each year.	Replication of results from current BEN model.
CCI—Construction Cost Index	Construction costs; same as BCI, except 200 hrs. common labor.	General construction projects, especially where labor costs are a high proportion of total costs.
CPI—Consumer Price Index	Representative consumer goods	Compliance involves use of consumer goods.
ECIM—Employment Cost Index: Manufacturing	Employment costs for the manufacturing industry.	One-time nondepreciable expenditures or annual costs; mainly labor costs.
ECI—Employment Cost	Employment costs for white collar labor	Same as ECIM, except pro-fessional labor (*e.g.,* permits).
W—Index: White Collar		
PCI—Plant Cost Index	Plant equipment costs	Standard value.

The Agency welcomes suggestions for other cost indices that the BEN model should offer. Commenters' suggestions should not merely list various indices, but also provide a sufficient rationale for the inclusion of each index, including its components, relevance to pollution control costs, and both historical and future availability.

For projected future inflation, the Agency proposes that the model use a simple, uniform rate. The model will provide a separate standard value for each cost index. (As explained above, users will be able to override the entire inflation adjustments for the capital investment and one-time nondepreciable expenditures as of the initial recurring cycle start date, as well as any compliance dates that are expected to occur in the near future.) The model will also use a separate projected inflation rate for additional recurring cycles, and allow the user to specify an alternative value for this rate.

The Agency proposes using a projected value for each index. (This is a more sophisticated approach than the DOS version of BEN.) However, because published forecasts are generally not available for specialized cost indices, we propose to start with an average of published forecasts for the Consumer Price Index (CPI) because such forecasts are widely available. We would then multiply the average CPI projection by the ratio of the CPIs to the relevant cost index's respective ten-year historical averages. Each of the alternative indices would have its own default future inflation rate, calculated in a similar manner. (Note that the user would not perform this calculation, nor would the model; instead, the Agency would perform the calculations each year to update the standard value, and the model would contain a single, simple projected inflation rate.) We welcome suggestions for other methods of calculating a projected future inflation rate.

The standard operation of the model would still entail absolutely no input whatsoever from the user who is satisfied with BEN's default values. The other screens for additional data entry and modification would appear only to those users who selected more advanced options. EPA welcomes comment from BEN users on whether the proposed changes will enhance the model's accuracy, flexibility, and adaptability.

7. Discount Rate

a. Background. Once the compliance cost estimates are adjusted for inflation, and then for taxation, the BEN model must adjust these after-tax cash flows to a common present value as of the date of noncompliance. The difference between the two present values (of the on-time and delay scenarios) is the initial economic benefit as of the noncompliance date. BEN then compounds this initial economic benefit forward from the noncompliance date to the penalty payment date to determine the final economic benefit. A single rate to adjust all present values both backward and forward in time.[14] This section addresses only the calculation of BEN's standard value for this single discount rate, which is currently based upon a ten-year after-tax weighted average cost of capital (WACC), with the inputs representing averages across all industries.[15]

The WACC is the average of the cost of debt and the cost of equity, weighted by the portions of debt and equity out of total financing. The WACC is first calculated for each year, and then these annual values are averaged over the most recent ten-year period. The (after-tax) cost of debt is the average return on corporate bonds averaged across all industries, and then multiplied by one minus the average corporate tax rate (state and federal combined). The cost of equity is based upon the widely used Capital Asset Pricing Model (CAPM), and is equal to a risk-free rate component plus the expected equity risk premium (*i.e.*, the difference of the arithmetic means of stock market returns and risk-free rates since 1926).

b. Proposed Changes. We propose that the BEN model automatically tailor the standard value discount rate to the period from the noncompliance date to the penalty payment date.[16] The standard value will reference a look-up table, averaging the annual values over the relevant years. Each individual annual calculation will be similar to the standard value's current methodology, as displayed in Exhibit 4–7 of the *BEN User's Manual.*[17]

[14] The Agency received many comments on the use of a single rate as opposed to two different rates. The Notice addresses this issue in section B(8), Discounting Methodology.

[15] The discount rate standard value for not-for-profits is based upon municipal bond yields, averaged across the four investment-quality ratings of Aaa, Aa, A, and Baa. The only comment EPA received on the not-for-profit discount rate was a suggestion that municipal economic benefit be calculated using a discount rate for private entities that perform similar functions (*e.g.*, on a municipal Clean Water Act case, the discount rate would be the average WACC for privately owned wastewater treatment plants). However, because the Agency is trying to calculate the economic benefit that the municipality and its residents or rate payers have actually gained, the Agency prefers to use an estimation of the municipal government's opportunity cost of financing projects, which is equal to the interest rate on the municipality's bonds. This debt rate—which forms the basis for the BEN model's not-for-profit standard value discount rate—will almost always be substantially lower than the private-sector-equivalent cost of capital.

[16] Although the following discussion focuses on the for-profit discount rate, the tailoring of the discount rate to the relevant time period would also apply to not-for-profit cases.

[17] We propose two minor changes to the annual calculation of the WACC. First, we propose replacing the standard value that currently applies the most recent figure for the expected equity risk premium to all prior years' calculations. Instead,

The model will also perform additional customizing automatically, or with minimal input from the user. Because we have already proposed that BEN have an input for the violator's state (thereby customizing the tax rate for compliance costs), we propose using that same customized tax rate for the after-tax debt cost component of the WACC. The model will even select the individual tax rate if the company is not organized as a C-corporation (as profits and losses from S-corporations, partnerships, and sole proprietorships flow through the owners' individual tax returns).

The standard operation of the model would still entail absolutely no input whatsoever from the user who is satisfied with BEN's default values. The other screens for additional data entry and modification would appear only to those users who selected such advanced options. EPA welcomes comment from BEN users on how the proposed changes will enhance the model's accuracy, flexibility, and adaptability.

8. Discounting Methodology

a. Background. As stated in the previous section, once the compliance cost estimates are adjusted for inflation, and then for taxation, the BEN model must adjust these after-tax cash flows to a common present value as of the noncompliance date. The difference between the two present values (of the on-time and delay scenarios) is the initial economic benefit as of the noncompliance date. BEN then compounds this initial economic benefit forward from the noncompliance date to the penalty payment date in order to determine the final economic benefit. BEN uses a single interest rate to adjust all present values both backward and forward in time. Because BEN uses the same rate for going both backward and forward, this calculation is computationally equivalent to bringing all cash flows—both past and future—directly to the penalty payment date at the WACC rate.

The comments fell into three categories. Some thought the WACC rate was too high and especially that the compounding part of the calculation should be based on a risk-free rate. Some agreed with EPA's approach. Others commented that EPA's discount rate was too low and should instead be based on financing pollution control investments with 100% equity.

Several commenters claimed that BEN's use of a WACC-based rate in all parts of the benefit calculation yielded inappropriately high economic benefit calculations. They claimed that future cash flows represent uncertainty and risk, while past cash flows are known, certain and riskless. Thus, they generally agreed that discounting future cash flows should be done with a WACC-based rate or some other risk-free rate, but felt that compounding past cash flows forward should be done with a riskless rate. They cited selected academic literature from economic and financial analysis of commercial damages in torts cases, proposing two alternative methodologies:

- (A) Use BEN's intermediate figure for the economic benefit as of the noncompliance date (*i.e.*, bring all cash flows, irrespective of when they occur, back to the noncompliance date at a rate reflecting risk), but then bring this intermediate economic benefit figure forward to the penalty payment date at a risk-free rate.
- (B) From the perspective of the *penalty payment date*, bring all future cash flows back in time at a rate reflecting risk (*e.g.*, the WACC) and bring all past cash flows forward in time at a risk-free rate (*e.g.*, the after-tax return on short-term U.S. Treasury securities).

Both of these methodologies produce significantly lower economic benefit estimates than the BEN model. A range for the magnitude of the typical differences is difficult to provide because of the many different types of cases, but alternative B will often produce negative economic benefit estimates for the capital investment portion of the compliance scenario.

The second group of commenters agreed that the WACC was appropriate for discounting all future costs back to the noncompliance date, and then compounding the initial economic benefit forward to the penalty payment date.[18] The third group commented that BEN's use of the WACC is incorrect and leads to economic benefit estimates that are too low. These commenters instead favored a company's higher cost of equity capital, rather than the weighted average of the relatively higher-cost equity capital and the relatively lower-cost debt capital. Their rationale was that excess returns flow to a company's equity holders, not to a mixture of its debt and equity owners.

b. Proposed Changes. Although both the conceptual bases and results of the two risk-free rate methodologies contradict each other, they share a similar rationale: cash flows that have yet to occur in the future are uncertain and risky, whereas cash flows that have occurred in the past are certain and riskless. These methodologies, therefore, apply to future cash flows a rate that includes a risk premium (*e.g.*, a company's WACC or some other risk-adjusted rate) and apply to past cash flows a risk-free rate (*e.g.*, the return on short-term Treasury securities). As discussed below, the Agency believes that even if this approach were justified in the context of calculating damages owed to plaintiffs in certain types of tort cases, it is entirely inappropriate in economic benefit calculations for enforcement actions. The goal in the tort damages approach is to make the plaintiff whole by compensating him for his losses. The fundamentally different goal in enforcement actions is to deter future violations by both the defendant we are suing and by other similar situated defendants.

By contrast, the third approach to calculating interest rates advocates the use of an equity-based discount rate. This approach is more reasonable than the risk-free rate alternatives. Not only is it more persuasive, but there have been several court decisions that adopted an equity-based discount rate and rejected a risk free rate approach. Nevertheless, the Agency still believes that using the WACC throughout all aspects of the calculation is the most reasonable and preferable approach.

(i) Risk-Free Rate Forward: Theoretical Issues. The goal in a tort action is to make the plaintiff ''whole.'' The settlement or court determination ultimately should place the plaintiff in the same financial position as if the wrong had not occurred. The first step in such a case is to calculate the necessary compensation at the time of the actual wrong. The next step is to adjust the compensation calculated at the time of the actual wrong to the time

each year's calculation will employ the figure that was actually available in that year.

Second, we propose altering the horizon for the equity risk premium. The standard value currently combines the long-term Treasury security rate with the long-horizon equity risk premium, the latter being equal to the difference of the arithmetic means of stock market returns and the corresponding-maturity risk-free rate. Because the WACC calculation combines the equity risk premium with the risk-free rate of the same maturity that is used initially to calculate the premium, the issue of which horizon premium to use is largely moot. (The expected deviations of the resulting WACC will thereby be both small and nonsystematic.) We propose to switch to the intermediate-horizon risk premium (and the corresponding risk-free rate) as a simple compromise between the long-horizon and short-horizon.

[18] One commenter agreed with compounding the initial benefit forward at the WACC rate, but only to the compliance date, after which a lower compounding rate would be appropriate. His rationale was that a company then must set aside specific funds to pay a penalty; therefore, the economic benefit estimate should be compounded either at the actual interest rate on an escrow account or at the company's debt rate (which reflects its risk of going out of business, resulting in an inability to pay a penalty).

at which such compensation is to be made. Certain authors writing about tort damages have advocated bringing such compensation forward at a risk-free rate.[19] Otherwise, the plaintiff would be ''having-its-cake-and-eating-it-too'': the initial compensation has essentially been invested at the time of the actual wrong at a rate reflecting risk taking, yet the plaintiff is now granted the compensation which grew at that rate, without ever bearing the accompanying risk. (In contrast, the regular investor would have made the investment and then had to stand by nervously as the investment's value either grew or fell). Some commenters thought BEN should employ such a risk-free rate approach.

While the appropriate focus in a tort damage action is on compensating the victim (*i.e.*, plaintiff), this is not appropriate in an enforcement action. The enforcement agency is not suing for damages it has suffered. The goal is not to make the plaintiff whole (*i.e.*, to restore to it the amount by which it was damaged). The goal of the economic portion of a civil penalty is to return the defendant to the position it would have been in had it complied, and thus disgorge from it the amount it wrongfully gained. If civil penalties, composed of the economic benefit and gravity components, effectively allow the violator to gain an economic advantage from its violations, other companies will see an advantage in similar noncompliance. This is a fundamentally different perspective from a tort case, and demands a fundamentally different view of discounting.

The appropriate discount rate for economic benefit calculations is a company's opportunity cost of capital, reflecting the financing costs for pollution control investments or the value of investment opportunities foregone because of pollution control purchases. The opportunity cost of capital is the incremental expected rate of return a company must earn to pay back its lenders (*i.e.*, bond holders) and owners (*i.e.*, stockholders), which is the weighted-average cost of capital (WACC).

The risk-free rate methodologies use short-term U.S. Treasury bill rates that are unrelated to a company's opportunity cost of capital. Only the Treasury of the United States of America is able to borrow at the U.S. Treasury bill rate.[20] Companies lack the advantage of such low financing rates. To finance additional projects, they must either issue debt at higher interest rates, and/or issue equity, which requires returns of even higher rates.

Applying the risk-free rate to a company's cash flows presumes an unattainably low borrowing rate and an insufficient return on investments. (With the exception of mutual funds, a company whose main business was investing in T-bills would not be in business for very long.) The true opportunity cost of capital for a company far exceeds the T-bill rate. The risk-free rate will therefore systematically understate the economic benefit of pollution control noncompliance. Penalties based solely on economic benefit calculated with a T-bill rate would allow a defendant to retain a potentially substantial gain. Because of the precedent of this retained gain, other regulated companies might see an economic advantage in similar noncompliance, and the penalties based on a risk-free rate approach will fail to deter potential violators.

(ii) Risk-Free Rate Forward: Practical Implications. Not only are the theoretical underpinnings of the risk-free rate forward methodologies flawed, but their practical implications are also troubling. Specifically, the use of the risk-free rate fails to achieve the overriding goal of economic benefit recapture: to make the violator financially indifferent between compliance and noncompliance, which in turn constitutes a critically important element of deterrence.[21] An example helps to illustrate this point.

Suppose a company is deciding whether to purchase pollution control equipment this year (*i.e.*, 1999), or to wait until the same month in the next year (*i.e.*, 2000). The company is not necessarily contemplating a willful violation of the law—perhaps the law's interpretation is unclear, and the company would like to know the financial consequences of not purchasing the equipment, and then later being found to be in noncompliance. The company, therefore, wants to know how much better or worse off it will be by delaying the purchase one year.

The company performs three sets of economic benefit calculations. First, it calculates the economic benefit as of the present time (*e.g.*, June 1999). This lets the company know how much better off it will be by delaying the purchase (*i.e.*, until June 2000), in the absence of any penalty. Second, it calculates the economic benefit as of one year later (*i.e.*, June 2000, when it would otherwise purchase the equipment, and also pay any penalty), and then discounts the calculated economic benefit back to the present (*i.e.*, June 1999). This lets the company know the present value of any economic benefit based penalty that is calculated and paid the following year in 2000. Third, it subtracts the second result from the first result to determine the net amount by which it is better or worse off (*i.e.*, the economic benefit of its noncompliance, minus the present discounted value of the economic-benefit-based penalty it can expect to pay in 2000).

The first economic benefit calculation yields the same result regardless of which economic benefit methodology is used, because all the cash flows occur in the future.[22] In this example, the only compliance measure is a one-time capital investment of $10 million.[23] The company calculates that it is financially better off now in 1999 by $494,314 from a projected one-year compliance delay.

The company also needs to know how much better off it will be on net should the enforcement agency assess a penalty in 2000 equal to the calculated economic benefit from its delayed compliance. Assuming that the agency uses BEN, the economic benefit is brought forward one year by an estimate of the company's WACC (in this case 10 percent), so the economic-benefit-based portion of the penalty the company will pay is $543,745.[24] But because the company will pay the penalty a year in

[19] No consensus exists, however, and many other authors have advocated other approaches. Judges in tort cases have arrived at rulings that mandate many different rates, with many different values and rationales.

[20] This is a very favorable rate, because of the U.S. Treasury's over two-century default-free record, its ability to create money, and also the state tax-free status of its debt instruments.

[21] Because benefit recapture by itself merely makes the violator indifferent between compliance and noncompliance, only a total penalty amount that exceeds the economic benefit (by incorporating a gravity component) can achieve actual deterrence. Therefore, a civil penalty should always be at least equal to the economic benefit calculation plus some non-trivial gravity component.

[22] The results might be slightly different depending on what ''risk-adjusted rate'' the risk-free rate forward methodologies use for the future cash flows in their calculations. Different practitioners have used different ''risk-adjusted rates'' in different cases, including the same WACC-based discount rate that the BEN model uses. Therefore, for the purposes of the examples that follow, we assume that the alternative methodologies also use the WACC for future cash flows. If, instead, they were to use a different rate, the exact figures for the results would be slightly different, but the overall implications would remain the same.

[23] Other inputs include a 40-percent tax rate, 2.2-percent inflation rate, and 10-percent discount rate.

[24] Because the time between the noncompliance date and the penalty payment is only one year, the compounding takes the form of simply multiplying the initial economic benefit by the sum of one plus the discount/compound rate (*i.e.*, $494,314 × (1 + 0.10) = $543,745).

the future, it must discount that amount back to the present. If it discounts the penalty at the same rate that BEN used to compound the penalty forward to the penalty payment date, the present discounted value of the future penalty will always be equal to the economic benefit the company calculates for itself (in this case, $494,314). The company can therefore expect to have any economic benefit disgorged from itself, which makes the company financially indifferent between compliance and noncompliance. The column in the exhibit below labeled ''BEN''summarizes these calculations.

Economic benefit	BEN	Alternative A	Alternative B
1. Penalty Payment Date of 6/1/1999	$494,314	$494,314	$494,314
2a. Penalty Payment Date of 6/1/2000	543,745	507,166	(175,797)
2b. Result 2a discounted back to 6/1/1999	494,314	461,060	0
3. Net Result (*i.e.*, 1 − 2b)	0	33,254	494,314

Perhaps, however, the enforcement agency uses one of the alternative methodologies. Under alternative A, as described in Section II B(8)(a), above, the initial economic benefit as of the noncompliance date is calculated with BEN, but is then compounded forward at the after-tax risk-free rate. In this case, compounding the initial economic benefit forward from 1999 to 2000 at an illustrative risk-free rate of 2.6 percent yields $507,166. The company discounts this future penalty back to the present (*i.e.*, 1999) at its WACC, and arrives at $461,060.[25] Because this is less than the current economic benefit of $494,314, the company realizes a net gain of $33,254. This approach fails to make the company indifferent between compliance and noncompliance and, in the absence of any additional gravity-based penalty components, the company will have an incentive to delay compliance.

If the enforcement agency instead uses alternative B, as described in Section II B(8)(a), the economic benefit as expected to be calculated a year from now in 2000 is a negative $175,797.[26] The company realizes that an enforcement agency using this approach will conclude a year from now in 2000 that no economic benefit has been gained, and therefore the economic benefit-based portion of the penalty will be zero. But the company currently calculates its economic benefit in 1999 to be a positive $494,314. At the time of initial noncompliance in 1999, the company concludes that delaying the equipment purchase will result in an economic gain, but that it will never have to pay any economic-benefit-based portion of the penalty. Once again, a risk-free approach fails to make the company indifferent between compliance and noncompliance and, therefore, in the absence of any additional gravity-based penalty components, the company will have a significant incentive to delay compliance.

(iii) Equity Rate Approach. By contrast, an approach that employs a company's equity rate focuses solely on the company's equity owners, as opposed to its other stakeholders (who hold the company's debt). Because the company's cost of equity capital will always exceed or at least be equal to a company's WACC, the economic benefit estimate—with all other assumptions held constant—will be higher or at least the same.[27] While the Agency believes that a reasonable argument supports the use of equity, we nevertheless prefer the WACC, because it better represents firms' total capital structures and their own typical business decision-making practices.

(iv) Proposed Change: Use WACC, Except for a Possible Early Penalty Payment. For the above reasons, the Agency believes that the current basic discounting methodology is appropriate and should not be changed, with one exception: If a company pays to the United States the benefit portion of the penalty while the case is still in litigation, EPA will cut off the compounding rate at the date of payment. Thus, there will no longer be any dispute in that case over the appropriate compounding rate from the date of payment into the future. In appropriate cases, the United States may consider allowing the violator to escrow funds for the economic benefit portion of the penalty demand (whether at the compliance date or at any other time). Then, when EPA runs the BEN model, it will use the date the funds were escrowed as the penalty payment date. The violator would have to furnish proof that it established the escrow account, as well as placed on the account appropriate restrictions (*e.g.*, all accrued interest would go to the Agency).[28] In cases where the period from the initial noncompliance date to the escrow date is short, this will eliminate much of the deviation in results between the competing economic benefit methodologies. We propose that BEN incorporate this guidance into its on-line help system and user's manual.

C. Improving the BEN Model's User Friendliness

EPA understands that some users find the BEN model difficult to use. While that has not been EPA's experience, the Agency expressed its interest in learning of any difficulties users encountered when running the model. The Agency particularly requested suggestions for realistic alternatives that would preserve the model's degree of precision.

[25] Even if the company were to discount the future penalty back at a rate lower than its WACC, this rate would still exceed the risk-free rate that alternative A uses to compound the economic benefit forward, and therefore the discounted future penalty would still exceed the currently calculated economic benefit.

[26] A negative economic benefit result for the capital investment portion of compliance is typical for alternative B. In many recent cases, practitioners implementing this approach have arrived at negative economic benefit results for delayed capital investments, despite no changes in technological or legal requirements over time between the dates of noncompliance and compliance. Applying the combination of an extremely low risk-free rate for past cash flows and a higher risk-adjusted rate for future cash flows to delayed capital investments (with their past cash outflows for the actual investment and their future cash inflows for depreciation tax shields) can produce aberrant results that defy common sense. These perverse negative economic benefit estimates do not reflect any real economic losses because of the expenditure delay. Furthermore, even if the parameters in this example were different, the economic benefit—although perhaps positive—would still be much smaller than even under alternative A, and would similarly fail to make the company indifferent between compliance and noncompliance.

[27] The WACC will equal the equity cost of capital if the company has no long-term debt. Note also that an economic benefit calculation using the equity rate should first net out any cash flows attributable to debt financing, as the focus in such a calculation is on the returns to the company's equity holders only.

[28] Should the escrowed amount exceed the benefit component, then the interest on the amount that exceeded the economic benefit component would accrue to the violator.

1. Is BEN Too Complex To Operate?

a. Background. EPA invited comments on whether any aspect of BEN's operation or the BEN User's Manual is too complex. Although the Agency designed BEN to be straightforward and easy to use, we welcomed any suggestions to make the model and manual easier to use without compromising BEN's degree of precision.

b. Proposed Changes. Many commenters thought that although the BEN model is generally easy to use, certain aspects of its operation are cumbersome. These concerns largely stem from the model's original programming for a mainframe computer environment and its current existence in the DOS operating environment. Because nearly all computer users are now accustomed to the Windows™ operating environment, the Agency proposes to reprogram the model for Windows™. The switch to the Windows™ operating environment should make basic data entry and runs much easier to perform, as well as allow the addition of various advanced features without burdening the user with additional complexity.

Furthermore, EPA has now established a toll-free helpline for federal, state, and local government enforcement staff who need additional assistance in using the BEN model. The helpline provides federal, state, and local environmental enforcement agencies with advice regarding financial issues that impact enforcement cases. The main types of inquiries EPA is addressing with this helpline are:

- The calculation of a violator's economic benefit from noncompliance;
- The evaluation of a violator's claim that it cannot afford to comply, clean up, or pay a civil penalty, and the application of the three computer models—ABEL, INDIPAY, and MUNIPAY [29]—that address these issues; and
- The calculation of the after-tax net present value of a supplemental environmental project, and the application of the computer model—PROJECT [30]—that addresses this issue.

Callers can obtain copies of the BEN model and BEN User's Manual, copies of the previously mentioned other key models, as well as relevant policies and guidance documents. In addition, callers can obtain advice on how to access training courses on the models and related subjects. Inquiries regarding the interpretation of federal statutes and EPA policies will be referred to the EPA, as will inquiries from non-governmental employees.

The toll-free helpline phone number is 888-ECONSPT (326–6778), and is staffed by a contractor, Industrial Economics, Incorporated, located in Cambridge, Massachusetts. The helpline is in operation from 8:00 AM to 6:00 PM Eastern time and will accept voice mail messages when it is not in operation. In addition, the contractor is providing a companion e-mail address: benabel@indecon.com. When requesting help, enforcement staff should identify the government entity for which they are working.

2. Is the Information BEN Needs Difficult or Expensive To Obtain?

a. Background. One of the main breakthroughs BEN achieved over its predecessor model was its streamlining of the data needed to operate the model. While the model requires a minimum of seven and a maximum of only eighteen pieces of data, some users apparently feel the data is difficult to obtain. This has not been EPA's experience, as most (if not all) of the required data inputs are based on facts that are already or should be known to the litigation team as the data are important to other parts of the settlement. Nevertheless, the Agency welcomed any suggestions on how to make this data easier to obtain as long as we can still preserve the model's degree of precision.

b. Proposed Changes.—The Agency received a wide range of responses on this issue. Most users thought the necessary data was easy to obtain; others thought it was prohibitively difficult to obtain. EPA did not receive any specific suggestions on how to streamline the model's data requirements even further. The Agency did receive suggestions that the BEN model incorporate some basic, generic compliance data.

The Agency is in the process of developing a computerized data base for RCRA compliance costs, based on the current RCRA compliance cost handbook. This data base should enable the user to look up the appropriate RCRA compliance costs easily, and then use them in the BEN model to calculate an economic benefit figure. Although this database will not be a substitute for case-specific data, it will at least provide a starting point and a reasonably accurate estimate when a violator refuses to provide any detailed cost information. The Agency welcomes comment on which statutes would benefit the most from similar databases, and what specific compliance components most often need cost estimates.

Also, as noted at end of Section II C (1) (b), above, EPA has established a toll-free helpline to provide assistance to government enforcement personnel regarding financial economics issues in environmental enforcement cases. Helpline staff can provide suggestions on how to obtain the necessary data to run the BEN model.

III. Response to Comments

A. Broad Economic Benefit Recapture Issues

1. Alternatives to BEN

Comment: One commenter stated that the BEN result should be adjusted for the violator's probability of detection and prosecution.

Response: The commenter's suggestion that the penalty should be multiplied by the inverse of the chance of detection and prosecution finds solid support in the literature on deterrence and economics. In brief, the theory underlying the comment is that a reasonable economic actor will weigh its willingness to violate against the size of the penalty that will be assessed, multiplied by the inverse chance of getting caught. For instance, if preventing a violation would cost a person $100, and the penalty that would be assessed if the person is prosecuted is $200, then the person will elect to violate, all other things being equal, unless the chance of getting caught is at least 50%. Nonetheless, despite the validity of the commenter's premise, the comment is beyond the scope of the current public notice. The Agency has asked for comments only on the method for calculating economic benefit, not on the broader deterrent effect of penalties generally.

Comment: One commenter thought BEN understates the economic benefit of noncompliance because the model defines benefit as the income earned from investing the funds that otherwise would have been used to pay compliance costs. The real economic benefit, according to the commenter, is the producer's surplus obtained during the noncompliance period. The commenter proposed that EPA obtain estimates of how people value pollution reductions to estimate a demand curve from which to determine the supply-demand framework facing the violator.

Response: This comment misunderstands the Agency's task, which is to calculate the economic benefit that an individual firm has

[29] ABEL, INDIPAY and MUNIPAY evaluate inability to pay claims from for-profit entities, individuals and municipalities, respectively.

[30] As most supplemental environmental projects (SEP's) are tax deductible and completed long after the cases are settled, any stated SEP cost is usually far above the actual cost to the violator. PROJECT determines a violator's actual out-of-pocket costs for a SEP.

gained (whether from mere delay of compliance costs or larger issues of market share gains), not the benefit the society gains from pollution level changes. The commenter might also be confusing the economic benefit to the violator (which the Agency is trying to measure) with the monetized value of environmental damages that result from noncompliance (which in this context the Agency is not trying to measure).

2. Illegal Competitive Advantage

Comment: One commenter maintained that if EPA decides to pursue illegal competitive advantage (that is, focusing on issues such as illegal profits or market share), then it must establish the appropriate analytic tools that conform to both mainstream financial and economic theory (considering items such as price effects, elasticities, and economies of scale), while keeping BEN relatively user-friendly.

Response: The Agency generally agrees with these sentiments. Nevertheless, keeping BEN relatively user friendly is a nonissue as the model cannot be modified to calculate a benefit based upon illegal competitive advantage.

Comment: Several commenters thought that revenues from the sale of prohibited products were too complicated to include in the BEN model.

Response: The Agency believes that the concept of capturing the revenues or profits from the sale of prohibited products is relatively uncomplicated. Nevertheless, the Agency agrees that it could not modify the BEN model to perform this calculation and remain sufficiently user-friendly for its intended audience. Therefore, the Agency is proposing guidance to address this question as well as the other illegal competitive advantage questions. In addition, the Agency is proposing adding some questions to the BEN model to alert users to these issues.

Comment: One commenter stated that if the prohibited product is the only product produced by a company, then the after-tax net profit is the best measure of the economic benefit of noncompliance. If the prohibited product is one of several produced, then one should allocate the costs and revenues among the products to determine the profit per product. In this case, the commenter concluded, the after-tax profit on only those products that are prohibited should be included in the economic benefit of noncompliance.

Response: The Agency agrees that one factor which it should consider is whether the company is a single-product company or a multi-product company in recapturing any benefit from producing a prohibited product. However, a clear distinction does not always exist between products, product lines, or even companies and divisions within corporations. Where possible in such cases, the analyst may have to evaluate several similar products and make a reasonable judgment regarding the per-unit or per-division after-tax profits that were unlawfully gained.

Comment: One commenter thought that to calculate the benefit a violator gains from selling illegal products, one should calculate the net profit gained by sales of that product, augmented by interest and discounted over time. According to this commenter, net profit equals gross profit less the proportion of gross expenses and overhead attributed to sales of that product, which BEN can already calculate.

Response: The Agency is in agreement that this is a conceptually valid method for calculating the economic benefit from the sale of an illegal product. But the correct allocation of incremental overhead to a specific product is a difficult task, and one for which the BEN model is irrelevant.

Comment: Several commenters thought that the benefit of noncompliance in cases in which losses are reported in the first year of the business's operation is too complicated for the BEN model to address. Another commenter thought that the benefit in such cases equals the future tax benefit received from these net operating losses. However, because the business may choose not to apply these losses for some time, it is difficult to calculate.

Response: The Agency agrees that the BEN model is unable to address the situation in which start-up costs lead to initial losses, even though future profits may be significant.

Comment: One commenter thought another kind of benefit that EPA does not recognize is ''advantage of risk,'' which is the benefit a company gains by putting off expenses in the hopes that future events will render the expenses unnecessary.

Response: EPA already addresses this advantage: the economic benefit calculation can reflect whether events after the noncompliance date (NCD) have rendered the expenses unnecessary. In such a situation, it is necessary to analyze the expenses the company has not merely delayed, but instead has avoided entirely (which increases the resulting benefit). The current BEN model requires an off-line calculation to arrive at the correct result, although the revised BEN model may be able to add flexibility to perform such a calculation internally.

Comment: Several commenters thought that the issue of competitive advantage cannot be adequately calculated in terms of an economic benefit penalty. For example, one person noted that a given market edge may grow over the years, or may be the deciding factor determining whether the violator could stay in business, making it difficult to calculate a benefit figure. Others noted that BEN is inapplicable to cases involving illegal market share gains from violating concentration limits or cap limits in permits. Another suggested that EPA should develop a protocol or give more guidance for illegal competitive advantage cases, including source-specific factors agencies could use to calculate illegal profits or market share gained.

Response: The Agency agrees that there are a number of complex factors to consider in many analyses of illegal competitive advantage. The Agency plans to issue guidance that will aid analysts in such situations.

Comment: One commenter noted that EPA should develop a punitive penalty to discourage violators from achieving a competitive advantage, instead of trying to determine the economic benefit from competitive advantage. Similarly, one person thought that the profit associated with illegal competitive advantage should be a non-negotiable portion of the gravity component of a penalty. Another person thought that when illegal competitive advantage has been proven, companies should be financially punished to a point at which they are worse off (not equal to) their industrial counterparts.

Response: The total penalty comprises two components: economic benefit and the gravity (of the violation). The recapture of economic benefit is designed to place all firms on a ''level playing field'' so that no firm can benefit by avoiding or delaying the necessary compliance expenditures. It is not punitive in nature, but rather is ''no-fault.'' Competitive advantage is a component of economic benefit, and, therefore, should be analyzed in a ''no-fault'' framework. But the presence of competitive advantage could indicate the existence of certain other factors (*e.g.*, recalcitrance) that can enter into the gravity calculation. Once the full economic benefit is recaptured, the Agency then imposes a significant gravity component to ensure that the violator will be worse off than its competitors.

Comment: A few commenters asserted that the competitive advantage gained by delaying or avoiding compliance

costs does not exist after collecting a penalty equal to the BEN-calculated economic benefit. For example, the disadvantages of ''predatory'' underpricing by a company of its products may outweigh the temporarily enhanced market share. Therefore, pursuing illegal competitive advantage would be a form of double recovery. Another commenter stated that ''lost profits'' and ''illegal competitive advantage'' measure the same thing (*i.e.*, the economic benefit from noncompliance), and that EPA is not authorized to collect both.

Response: The apparent disagreement would again appear to stem from wording issues. EPA does not intend to ''double count'' economic benefit, but instead seeks different conceptual terms to approach economic benefit calculations in different situations. As stated previously, EPA's intention is to determine fairly what economic benefit is, and then recapture it as part of an overall penalty, including a significant gravity component reflecting the seriousness of the violation. Alternative approaches such as calculating illegal competitive advantage are meant to add flexibility and are not necessarily additive. Nevertheless, should EPA determine that it needs to consider both types of economic benefit in a particular case, it will do so. Predatory pricing may sometimes be counterproductive, but in certain situations the enhanced market share may constitute an addition to the economic benefit.

Comment: One commenter stated that any marginally increased deterrent effect from trying to capture any illegal competitive advantage would be more than offset by the complications and controversy involved in performing such a calculation. Similarly, some commenters asserted that because evidence suggests that the BEN model is meeting its goal of deterring noncompliance, adding new complications to the model is not justified. Others warned that adding another dimension of economic benefit to measure would make BEN less attractive for states to use, decreasing the usage of BEN in even simpler cases.

Response: Measuring illegal competitive advantage may add complexity to the economic benefit calculation. In some cases it may be worth dealing with the additional complexity if there is only a small increase in economic benefit. In other cases, however, the presence of significant illegal competitive advantage will cause the BEN model to miss most of the economic benefit, and therefore the additional efforts are necessary.

Comment: One commenter contended that EPA's ''illegal competitive advantage'' proposal is driven at least in part by a desire to avoid any possible reductions in fines resulting from proposed changes to the BEN model.

Response: EPA's goal since the establishment of the benefit recapture requirement has been to determine accurately—within reason—the violator's economic benefit of noncompliance from all sources, including illegal competitive advantage. In pursuing that goal, EPA has never reached its various decisions on modifying the BEN model based on keeping annual penalty assessments at a certain level. If that were the case, EPA would never have changed its discount rate assumptions from the equity cost of capital to the weighted average cost of capital (WACC), which—all else being equal—would lower penalty assessments. With regard to illegal competitive advantage, EPA is concerned that its penalty assessments are missing a major component of economic benefit by ignoring illegal competitive advantage. Therefore, EPA is committed to calculating the benefit from illegal competitive advantage in appropriate cases regardless of what other modifications are made to the BEN model.

Comment: One commenter expressed the view that all illegal competitive advantage situations cannot be grouped under the heading of ''illegal competitive advantage,'' and noted that removing such an advantage is only one reason for the economic benefit component of the penalty. The commenter further noted that a violator can receive an economic benefit even without competitive advantage; *i.e.*, when all the firms in an industry are simultaneously out of compliance.

Response: The Agency believes that any apparent disagreement on this issue stems mainly from wording issues. The Agency agrees that many different types of economic benefit exist outside of avoided and delayed pollution control expenditures, but uses the term ''illegal competitive advantage'' as a convenient catch-all. The Agency also agrees that economic benefit can exist even if all firms in an industry are not in compliance.

B. The BEN Model's Calculation Methodology

1. Discount Rate

Comment: Several commenters stated that the discount rate for future cash flows and the compounding rate for past cash flows (*i.e.*, the rate at which the initial economic benefit as of the noncompliance date (NCD) is brought forward to the penalty payment date (PPD)) should continue to be the same. One person noted that using a discount rate that is larger than the compounding rate would underestimate economic benefit. One commenter stated that the reason the weighted average cost of capital (WACC) is the appropriate rate to use as the for-profit entity discount rate is that it represents the fairest and most realistic rate available. Several commenters similarly stated that the WACC should be used for both compounding and discounting, if the EPA wants to ensure that companies do not profit from the additional funds available through noncompliance, as the WACC accurately reflects the opportunity return of alternative investments.

Response: EPA agrees with these positions, as the WACC is the minimum rate that one would expect companies to return to their investors in order for those companies to continue to operate in their current lines of business.

Comment: Some of the commenters expressed concern that the BEN model is essentially flawed by using only one rate—the WACC—for both discounting future cash flows (back to the NCD) and compounding the initial economic benefit (from the NCD to the PPD). These commenters contended that a proper calculation should use two different rates.

Response: The Agency believes that using one rate for compounding and discounting cash flows is soundly based in financial and economic theory. (See Section II.B(8) above.) The use of one rate also maintains an internal consistency within each cash flow that using two different rates could not achieve. For example, assume that a $100 after-tax cash flow was incurred a year after NCD. These commenters would advocate discounting the $100 back to the NCD at a rate of, for example, 10 percent, which would give the cash flow a present value of approximately $91 as of the NCD. But the commenters would then compound the $91 forward to the PPD at a lower rate of, for example, 4 percent. The resulting cash flow would have a present value of approximately $95 as of one year after the NCD (as it is brought forward to the PPD), even though the actual cash flow as of that time was really $100. This result is clearly inconsistent with reality and common sense. (This is an entirely different situation than one in which the violator is already in compliance and has either paid the benefit portion to the United States or escrowed (at the discretion of the government) funds for the economic

benefit portion of the penalty demand. If the benefit portion is paid, then the benefit portion will immediately cease accruing any interest. In the escrow situation, the economic benefit portion will accrue interest at the escrow fund's interest rate, but all the interest will accrue to the United States. In either situation, when EPA runs the BEN model it should use the date the funds were paid or escrowed as the penalty payment date.)

Comment: Several commenters stated that the compounding rate should account only for the ''time value of money,'' and that the after-tax risk-free rate is the correct rate to use. They further contended that since no risk is borne by shifting the net economic benefit forward in time, BEN's use of the company's WACC is wrong because it reflects a risk premium. Another commenter similarly stated that noncompliance, while representing a benefit to the firm, is essentially a new project deserving its own project-specific cost of capital, which is equal to the risk-free rate or the company's debt rate (which reflects its risk of going out of business and hence its inability to pay a penalty).

Response: The process of recapturing the economic benefit of noncompliance is not merely an exercise in moving disembodied cash flows through time to account for the time value of money. Bringing cash flows forward in time (compounding) at a risk-free rate fails to capture the reasonable benefit the company could earn from alternative internal or external investments. The Agency believes that using a risk-free rate would fail to make the violator indifferent to noncompliance.

Comment: One commenter stated that using the equity cost of capital to determine the correct compounding rate lacks support within the mainstream of modern financial theory. Several commenters alternatively argued that the cost of equity was the best rate for bringing the economic benefit forward in time, because excess funds available from noncompliance have a very wide investment opportunity horizon that is best reflected in the equity market rates. Another commenter stated that using equity was preferable because it is simple, fair, easily calculated, and not as prone to a ''battle of the experts'' as is the WACC.

Response: The Agency believes that the use of WACC best captures a violator's benefit. Nevertheless, the Agency also believes that a reasonable argument supports the use of equity, as the equity rate reflects the economic benefit earned by the company's equity owners. The Agency disagrees that using equity would significantly diminish the contentiousness surrounding expert witness analysis in negotiation. If anything, it would probably make it even greater.

Comment: Several commenters asserted that future cash flows should be discounted at an after-tax risk-adjusted rate that is less than a company's WACC, because capital investment in pollution control equipment usually involves a lower degree of risk than in other capital investment projects.

Response: Because investments in pollution control equipment allow a company to remain in business, they are essentially investments in the company as a whole. Therefore, these types of investments have the same degree of risk as other capital investment projects and are financed at the company's overall cost of capital (*i.e.,* the WACC).

Comment: One commenter thought the default discount rate is too general and results in incorrect economic benefit results. The commenter thought that EPA should instead require a case-specific input for the discount rate. Another commenter thought that while default values are sufficiently accurate for most cases, BEN could be improved by adding an option that allows the user inputting current and historical data to calculate a discount rate specific to the time period during which noncompliance occurred.

Response: The model's default rates (for the discount rate and certain other inputs) allow enforcement staff with little knowledge of financial economics to perform reasonably accurate analyses. This is one of BEN's significant improvements upon its predecessor (CIVPEN), whose many required inputs limited its applicability and utility. In the vast majority of cases, the default rates do not differ significantly from case-specific inputs, and EPA is always open to good-faith efforts by a violator to supply case-specific inputs. Furthermore, the revised BEN model for the Windows operating environment will incorporate look-up data tables that will be able to provide more tailored default rates without any input from users.

Comment: One commenter stated that the initial economic benefit should be brought forward from NCD to the compliance date (CD) at the WACC, and then from the CD to the PPD at the debt cost of capital. Another commenter proposed a lower compounding rate based on the violator's actual after-tax rate of return on funds in a dedicated escrow account—if the violator has actually set aside such funds for a penalty payment.

Response: The Agency fully agrees with using the lower rate, but only if the violator has actually escrowed such funds. Because such instances seem to be extremely rare, the Agency does not believe the economic benefit should automatically be brought forward from the compliance date at the lower rate. Instead, if a company escrows funds for the economic benefit portion of the penalty demand (whether at the compliance date or at any other time), then when EPA runs the BEN model, it will use the date the funds were escrowed as the penalty payment date. Once the government approved of the arrangement, the violator would have to furnish proof that it established the escrow account, as well as placed on the account appropriate restrictions (*e.g.,* all accrued interest would go to the Agency, except for any interest that is attributable to escrowed amounts in excess of the benefit component). In cases where the period from the initial noncompliance date to the escrow date is short, this approach will eliminate much of the deviation in results between the competing economic benefit methodologies. We propose that BEN incorporate this guidance into its on-line help system and user's manual.

Comment: One commenter made the point that choosing an appropriate ''interest rate'' was very important, and it was not clear from the **Federal Register** notice that EPA was soliciting comments specifically on this issue.

Response: This seems to be a misunderstanding caused by word choice, as the Agency's request for comment on the ''discount rate'' issue is intended to encompass both the rate used to bring future cash flows back in time, and the ''compounding'' or ''interest'' rate used to go forward from the NCD to the PPD.

Comment: A few commenters stated that the tort law literature suggests rates for bringing the initial economic benefit forward in time from the NCD to the PPD.

Response: The goal in a tort action is to make the plaintiff ''whole.'' In a tort action, the settlement or court determination should place the plaintiff in the same position as if the ''wrong'' had not occurred. The first step in such a case is to calculate the necessary compensation at the time of the actual wrong. The next step is to adjust the compensation calculated at the time of the actual wrong to the time at which such compensation is to be made. This requires compounding and the issue then becomes: what is the appropriate compounding rate to use to make the plaintiff ''whole''? This is sometimes a risk-free rate or a corporate debt rate. On

the other hand, in an environmental enforcement action the Agency is not suing for damages it has suffered. The goal is not to make the plaintiff whole, restoring to it the amount by which it was damaged. Rather, the goal is to return the defendant to the position it would have been in had it complied, and thus disgorge from it the amount it wrongfully gained. This is a fundamentally different perspective from a tort case and demands a fundamentally different view of compounding the initial economic benefit forward to the penalty payment date. The literature from tort law is not relevant.

Comment: Another commenter stated that moving all cash flows directly to the PPD—as opposed to first moving them back to the NCD and then forward to the PPD—was a way of avoiding moving the same funds through time at two different rates.

Response: This approach would eliminate the advantage of being able to see the initial economic benefit as of the NCD, which can provide insight into the violator's decision making. In any event, the BEN model itself uses the same rate to move cash flows back to the NCD and to move the initial economic benefit forward to the PPD. Adopting this approach would not change the end result.

Comment: A commenter stated that the theoretically correct discounting method would be first to discount back to the NCD the expected cash flows for the on-time compliance case (including the depreciation tax shields that occur after the NCD, as well as the annual costs that are avoided under the delayed-compliance scenario), and then to compound these cash flows forward to the PPD. The commenter further stated that cash flows for the delayed compliance case should be discounted back to the compliance date (*i.e.,* the beginning date of that delayed-case set of cash flows), before similarly compounding them forward to the PPD. The difference between the two present values as of the PPD would be the economic benefit.

Response: The Agency believes the BEN model's current approach is theoretically correct; *i.e.,* the cash flows for both the on-time and delay scenarios should be discounted back to the NCD to calculate the initial benefit as of the NCD, and then brought forward to the PPD. The calculation for the initial economic benefit as of the NCD can be thought of from the violator's viewpoint at the time of the NCD, weighing the options of on-time compliance and delayed compliance. Therefore, the violator is looking forward at the two sets of cash flows, implicitly discounting both sets back to the ''present'' (*i.e.,* the NCD). Nevertheless, with identical discounting and compounding rates, this approach yields exactly the same result as the BEN model.

Comment: One commenter advocated calculating the economic benefit for municipalities by using a discount rate for private entities that perform similar functions (*e.g.,* on a municipal Clean Water Act case, the discount rate would be the average WACC for privately owned wastewater treatment plants).

Response: In municipal cases, the Agency is trying to calculate the economic benefit that the municipality and its residents or rate payers have actually gained. Therefore, the Agency prefers to use an estimation of the municipal government's opportunity cost of financing projects, which is equal to the interest rate on the municipality's bonds. This debt rate—which forms the basis for the BEN model's not-for-profit standard value discount rate—will almost always be substantially lower than the private-sector-equivalent cost of capital.

Comment: One commenter argued that smaller firms have higher capital costs and as a result should reflect a higher economic benefit.

Response: The BEN standard value discount rate is based upon the typical large firm's WACC. Although this rate is reasonable for most cases, BEN allows the user to enter a different value for cases in which the specific values may differ significantly, whether because a small firm has a higher cost of capital or for some other reason. Significant evidence exists that small companies on average have higher returns than larger ones, but EPA has conservatively decided to base its standard value discount rate on large companies, instead of on small firms' higher (by about two percentage points) discount rate. For small firms, application of this generic WACC rate yields a benefit number that is smaller than it would otherwise be and thus is particularly conservative in regard to small firms. (For a detailed discussion of this issue, see the Ibbotson Associates *Stocks, Bonds, Bills, and Inflation* annual yearbooks, in particular Chapter 7, ''Firm Size and Return.'')

2. Inflation Rate

Comment: One commenter thought BEN suffers from three inflation rate defects: (1) it uses the same rate for past and future time periods; (2) it uses a 10-year average rather than the actual rate during noncompliance; and (3) it relies on the McGraw-Hill *Chemical Engineering* Plant Cost Index (PCI) to the exclusion of all other relevant inflation indices. A few commenters similarly thought that BEN could be improved by establishing subroutines or look-up tables that allow inputting current and historical inflation rate data to calculate a rate specific to the time period during which noncompliance occurred.

Response: The Agency proposes to address these three concerns in the revised BEN model. First, the model will use a separate projected inflation rate for compliance costs occurring in the future. Second, BEN will use look-up tables (without requiring any input from the user) of cost indices for actual historical inflation. Third, users will have the option to reference cost indices other than the default PCI for cases in which compliance costs merit a different index.

3. Other Technical Aspects

Comment: One commenter thought BEN incorrectly changes the tax rates on July 1 instead of on January 1. This individual felt that if this is not changed, the BEN manual should explain why this convention is used.

Response: This is not in fact what BEN does. The Agency believes that the commenter's attempt to replicate BEN's calculations may have been thrown off by BEN's use of the mid-point of each year to calculate the present value of annual costs and depreciation tax shields (with each year starting at month of the NCD).

Comment: One person commented that BEN does not account for investment tax credits (ITCs) for capital investments after 1985, even though ITCs were still available for certain types of projects in 1986 and 1987.

Response: Given how rare these circumstances are, the Agency believes that the BEN model's current warning about this issue (and the consequent need to consult a financial analyst for the necessary off-line calculations) is sufficient. Nevertheless, the Agency proposes that the revised BEN model not accept noncompliance dates before July 1, 1987. This will ensure that BEN's omission of ITCs—and also low-interest financing (LIF)—is not leading to incorrect economic benefit estimates in instances where users do not heed the current model's current warning. EPA will provide assistance in performing the necessary calculations for cases that involve noncompliance dates before July 1, 1987.

Comment: One person thought that EPA had not adjusted the standard values in BEN for more than two years,

even though they should be updated regularly.

Response: The Agency updates the standard values every year and encourages users to download the most current model version from its Internet site, at http://es.epa.gov/oeca.

Comment: One commenter stated that using BEN is inappropriate in instances in which the violator achieves compliance by using a different production method or by simply submitting the proper paperwork. Similarly, another commenter noted that BEN should have the flexibility to incorporate changes in technology between the on-time and delayed compliance scenarios, taking into account the lowest total cost of compliance as of the compliance date, rather than the actual cost incurred. One commenter stated that changing pollution technologies are inconsistent with the recapture of economic benefit based solely on the BEN model (regardless of the discount or inflation rate used). Another commenter stressed that more of the structure of the model and circumstances of the noncompliance scenario need to be taken into account, which cannot be addressed by just changing input values.

Response: If the violator eventually came into compliance using significantly different methods than would have been required had it complied on-time (*i.e.*, if the compliance components and costs for the on-time scenario differ from those for the delay scenario by more than just the inflation rate), then the current BEN model lacks the flexibility to analyze such a situation without assistance from a financial analyst, who would perform the necessary off-line calculations. The Agency hopes that the revised BEN model for the Windows™ operating environment will be able to offer such flexibility without additional complexity.

Comment: One commenter thought that BEN is not applicable to not-for-profit entities.

Response: This commenter appears to be misinformed, as BEN offers the user the option of selecting not-for-profit status, which then sets the tax rate to zero and the discount rate to the cost of municipal debt.

Comment: One commenter argued that minor infractions should not be considered when determining the dates of noncompliance and compliance—only significant violations should signal the noncompliance date. Similarly, as soon as the facility has remedied the vast majority of its violations, the period of noncompliance should be considered over.

Response: The Agency disagrees. The appropriate noncompliance and compliance dates for an economic benefit analysis are usually the same as their legal counterparts. The noncompliance date is when the violator should have incurred the costs necessary for compliance, and the compliance date is when the violator actually incurred such costs (typically, when compliance is achieved). The significance of the violations is irrelevant: what matters is when the company should have spent the money necessary for compliance, and when—by contrast—it actually did spend such money. There are some situations in which the noncompliance date may have different legal and economic meanings, such as when the first instance of noncompliance occurred prior to the statute of limitations cutoff. For purposes of settlement, the enforcement team may choose to use the statute of limitations date as the noncompliance date even though this means the actual economic benefit that has accrued to the violator may substantially exceed the economic benefit that the enforcement team calculates. Nevertheless, EPA believes that a very strong argument can be and should be made for using the actual noncompliance date and not the statute of limitations date. Economic benefit is a factor for consideration in imposing a civil penalty, and a trier of fact should not be precluded from considering the violator's entire economic gain from its violations. In these situations, the statute of limitations would serve to limit the maximum size of the civil penalty.

Comment: One person stated that unless the penalty is paid over a long period of time through several installments, no additional charges should accrue if the penalty is paid within 90 days of the date when the parties agree to the payment. The commenter also noted that the regulator should act quickly to propose an amount and immediately make the violator aware of the possibility of further compounding the penalty if the payment date is pushed back.

Response: Once final settlement is reached, the payment date and the rate at which the penalty should be compounded if not paid on time are debt collection issues and not relevant to the economic benefit analysis. In contrast, the payment date selected for a benefit analysis is a relevant consideration. Here, the Agency agrees and encourages enforcement staff to make violators aware early in negotiations that the later the penalty payment date, the higher the benefit number. Nevertheless, there is no legal obligation on the enforcement staff to do so.

Comment: One person felt that because BEN, by design, can only calculate an ''estimate,'' it cannot create values that should be used as hard and fast penalties.

Response: Any calculation of economic benefit is by necessity an estimate, as one can never determine economic benefit as precisely as, say, determining the money a bank robber stole (*i.e.*, a violator's financial statements have no line item for ''economic benefit from pollution control noncompliance.'') The Agency believes that BEN is sufficiently accurate for its intended purpose. Furthermore, the economic benefit is only one component of the penalty, to which is added the gravity component.

Comment: One person suggested that a list of common environmental expenditures that are known to be tax-deductible (*e.g.*, engineering costs for permits) would be helpful to those with little or no knowledge of this area.

Response: While the EPA does not give tax advice, the Agency understands that virtually all environmental compliance expenditures are tax-deductible, except for land.[31] Enforcement staff using BEN can always check with the IRS for confirmation of case-specific items.

Comment: One state agency thought it could not use BEN to evaluate a company that failed to install a piece of control equipment that was required for only a three-year period. (The equipment in this particular case was a condenser.) Thus, the company avoided the equipment cost entirely, but if the company had incurred the cost, then the equipment would have commanded a resale value after three years.

Response: In the vast majority of cases, the equipment is installed and operated by the firm for its entire useful life. BEN assumes there is no resale value since the equipment has no useful life left and/or is not worth moving to a new site. In a temporary use situation, off-line calculations are necessary. A user in this situation should consult Appendix B in the BEN User's Manual to determine the economic benefit from an avoided capital investment, and then subtract from that the resale value (or salvage value) of the condenser once it no longer would have been needed. Alternatively, the equipment's lease cost (if such a lease is feasible, and the data

[31] Penalties are almost never deductible. (The only area where they are deductible is where the ''penalty'' is compensating the government entity harmed by the violation, but this is rarely an issue in the benefit context.)

is available) could be entered as an annual cost.

Comment: One commenter stated that BEN should stress ''incremental'' operating and maintenance (O & M) costs (*i.e.,* the additional costs necessary for compliance, over and above the costs the company would otherwise incur in the absence of compliance).

Response: BEN already stresses this; for example, the ''help'' statement option that is available when entering annual costs states, ''The annual expense is an estimate of average annual incremental costs of operating or maintaining required environmental control measures.''

Comment: One group of commenters stated that the analysis of the on-time case must be based on the compliance alternative that would have been chosen from a rational business decision perspective, meaning the compliance option with the lowest *ex ante* net present value of total cost to the company. They further stated that no rational business would spend more than this amount to achieve compliance. Another group argued that the economic benefit calculation should be adjusted for compliance costs that go beyond the regulatory effort, and that companies should not be penalized for implementing ''Cadillac'' remedies when trying to be good environmental stewards. They commented that companies will have no incentive to move ''beyond compliance'' if the BEN model continues to calculate economic benefit based on the more expensive control option chosen by the company.

Response: The Agency agrees that regulatees will generally select the compliance option that has the lowest cost. However, this assumption is only a starting point and does not always hold true; therefore, case-specific information must be examined. Regulatees may choose more expensive compliance options because they will ultimately work better with existing equipment and, consequently, a seemingly more expensive outlay will ultimately entail lower total costs. Alternatively, a lower quote from one vendor may not be as reliable or realistic as a higher quote from another vendor. The Agency generally agrees, nevertheless, that the compliance costs for the BEN inputs should not include additional costs expended in an effort to go beyond minimum compliance. The Agency also cautions enforcement staff to scrutinize such claims closely as the more expensive approach is often undertaken because that was the minimum that a rational business would take for the regulatory requirements at issue.

Comment: A few individuals thought that in cases where a violator ineffectively spends significant resources trying to achieve compliance, or where funds are spent on other unprofitable ventures, the company's economic benefit of noncompliance is smaller than that estimated by BEN. This result occurs because BEN assumes that all resources not spent on achieving compliance are spent on alternative profitable ventures. One commenter noted that not allowing credits for unsuccessful compliance implementation is not an economic decision, but simply a bad policy decision by EPA. Similarly, one group stated that denial of credit for failed precompliance expenditures ''sends a clear message'' that mitigation of pollution problems has no value. Some commenters stated that a way should exist to account for ''good faith'' yet unsuccessful attempts at compliance. In contrast, other commenters argued that no adjustment or credit for costs of compliance efforts that eventually fail should be given. One reason given was that the entire regulated community faced a similar set of challenges in achieving compliance by the required date; another reason given was that ineffective compliance methods should be treated as delaying tactics.

Response: The current BEN User's Manual (1993 edition) provides an explanation of the Agency viewpoint, which is that credit may be given for unsuccessful yet good-faith efforts to comply, as opposed to purported compliance actions that in fact had other motives. Nevertheless, the decision as to what constitutes such a good-faith efforts can be made only on a case-specific basis.

Comment: One commenter stated that the EPA could provide more guidance on the subject of compliance credits. The commenter suggested that to provide the correct incentives, EPA should not grant credit unless ''compelling evidence'' was present that the noncompliant firm had reason to believe that its effort and costs would actually bring it into compliance. Another commenter echoed the sentiment that a case-by-case determination is required.

Response: The Agency will try to elaborate more on its guidance in future versions of the BEN User's Manual, but the determination in each case still requires the judgment of the enforcement staff.

Comment: One commenter provided reports from actual cases in which he had calculated a negative economic benefit, typically because the violator's avoidance and/or delay of pollution control expenditures had ramifications that resulted in economic losses.

Response: The Agency recognizes that economic benefit can be negative—in both theory and practice. Enforcement staff must scrutinize such claims very carefully because violators generally do not avoid or delay pollution control expenditures when making such expenditures are in the violators' best financial interests. Critical factors in such a case may be the various assumptions for hypothetical transactions, the postulated sequence of events, and the relevance of claimed environmental expenditures to the statute at issue. Furthermore, there are limits as to what the Agency will consider in this regard.

Comment: A few commenters made the point that BEN does not take into account different types of compliance credits, such as those for increased production, reduced operating costs, or recycling in the production process.

Response: The Agency's position is that the economic benefit component of the penalty should not be adjusted for any supplemental environmental projects that the violator elects to undertake, which can instead mitigate the gravity portion of a proposed penalty. If the commenter is referring to the cost savings from compliance expenditures, then BEN will accept negative entries for annual costs. For example, suppose a $1 million capital investment will require annual operation and maintenance costs of $100,000, but at the same time will entail annual savings of $200,000. In that case, the BEN user can enter $1 million for the capital cost estimate, but a negative $100,000 for the annual cost estimate. The *BEN User's Manual* provides further guidance and examples for this issue.

Comment: One commenter expressed the idea that BEN could be adjusted to take into account market-based pollution control strategies, such as a permit system or pollution taxes.

Response: For atypical cases that involve noncompliance under an incentive-based pollution control system, a relatively simple computer model such as BEN is generally not sufficient, and the assistance of a financial analyst is necessary.

Comment: Several commenters noted that the BEN model uses inputs that are a mixture of both *ex ante (i.e.,* known only at the time of initial noncompliance) and *ex post (i.e.,* known only now that the calculation is being performed). Several of the commenters stated that BEN should use an *ex ante* view for the cost inputs, although others felt an *ex post* view was

appropriate. Still another commenter saw little value in the *ex ante/ex post* distinction, and felt that virtually all models use a combination of *ex ante* and *ex post* data.

Response: A pure *ex ante* approach is generally impractical because it would require ignoring all information (*e.g.,* tax rate changes, inflation data) that has become known since the date of initial noncompliance. Therefore, BEN uses *ex post* data as an approximation of *ex ante* expectations. The Agency also agrees that the entire *ex ante/ex* post distinction is not very important.

Comment: One commenter stated that the EPA should ''affirmatively indicate'' that specific input values are preferred over the BEN default values. He also stated that BEN needs to reflect the plant-specific financial information within the context of complex corporations. This idea was echoed by another commenter who stated that if a firm has two specific lines of business, then each line will have its own cost of capital and, therefore, the discount rate should be division-specific. However, another commenter stated that the use of the WACC to discount future cash flows was in most cases appropriate and constituted a harmless approximation.

Response: Specific input values are generally preferred, although the basis for their calculation must be in accordance with the general principles of the BEN standard values (e.g., WACC for discount rate with for-profit entities, marginal tax rates, etc.). However, the effort required for their calculation may not always be worth the additional accuracy gained. The Agency agrees that, where practical, discount rates should ideally be tailored to specific lines of businesses, although often these separate lines are sufficiently similar so that a company-wide rate can be used, especially if calculating a line-specific discount rate will entail further complications and inaccuracies.

Comment: One commenter stated that the BEN model should use a 20-year pollution control capital replacement cycle with a finite facility or process lifetime, instead of infinitely recurring future replacement cycles. One commenter thought the use of an infinite number of cycles was speculative.

Response: BEN uses a 15-year capital replacement cycle default value, but the user has the option to enter another value, such as 20. The user must also specify whether the capital investment is one-time, or whether future replacement cycles will occur. Even if the user chooses an infinite number of replacement cycles, the discounting of future cycles means that only the first several replacement cycles typically have any noticeable effect upon the economic benefit result. Furthermore, although BEN is making an assumption about the future, this assumption is essentially a baseline one and hardly speculative: BEN assumes that future pollution control requirements will be neither more stringent nor more lax than current requirements, and that the cost of the replacement equipment will increase by no more and no less than the projected rate of inflation. But because the additional cycles after the first several have almost no impact upon the economic benefit result, the Agency plans to modify the BEN model to incorporate a default value of two replacement cycles, with the option for the user to specify anywhere from zero to five replacement cycles.

Comment: One commenter expressed the opinion that BEN should use an average marginal corporate tax rate in lieu of the highest marginal corporate tax rate. By contrast, a few commenters asserted that EPA appears to have picked the rates for the BEN model that will produce the highest economic benefit. Another commenter felt the inputs and structure of BEN do not capture the ''real world.''

Response: The BEN model, like any other financial economics model, is designed to capture the essence of the ''real world'' by use of simplifying assumptions that produce a reasonable approximation of the violator's economic benefit. The Agency believes that its default rates are reasonable approximations and are appropriate to use in most cases. The BEN standard values are nevertheless only a default, and the user is free to enter any value. Regarding the tax rate, in most cases the highest marginal rate applies, which is why such a rate is the basis for the default value. Note that the use of the highest marginal rate is highly conservative in that it lowers the after-tax cost of compliance to the greatest extent possible, and as a result produces a lower economic benefit estimate than would a lower marginal tax rate.

Comment: One commenter stated that BEN's replacement cycle assumptions should be consistent with those of the PROJECT model (which calculates the after-tax net present value of a supplemental environmental project).

Response: The replacement cycle assumptions used in BEN and PROJECT are based on different conditions. BEN assumes that the violator will have to replace the capital equipment in the future, because the equipment's operation is mandated by law. PROJECT, by contrast, gives no credit for future replacement cycles because the capital equipment purchased as part of the supplemental project is by definition not required by law; it has been put in place for penalty mitigation, with no law or agreement mandating future replacement. Investment in SEP equipment carries no guarantee that the violator will be replace it after its useful life.

Comment: One commenter noted that EPA should recognize that in some situations no technologically feasible means of compliance may exist.

Response: One means of compliance always exists: shutdown. The economic benefit in this situation is the illegal profits the violator gained during the period of noncompliance (*i.e.,* when operations should not have occurred).

Comment: One commenter maintained that the EPA should recognize that when it changes the interpretation of a rule, newly noncompliant companies have gained no past economic benefit. Similarly, another commenter stated that there should be no recovery of economic benefit when an entire industry misinterprets EPA's rule.

Response: Economic benefit is ''no fault'' in nature: a company need not have deliberately violated the law, or even have been aware of its violation, to gain economic benefit. If a company should have been in compliance, but was not, then it is better off economically for not having complied—whether determined prospectively or retroactively. Furthermore, if any entire industry has been in noncompliance, then all of the firms in that industry have gained an economic benefit.

Comment: One commenter claimed that BEN should not be applied to regulated utilities.

Response: The Agency disagrees with this comment and believes that the BEN model applies to regulated utilities without regard to arguments that they would have received higher rates from their ratepayers had they complied on time. Whether and how a business recoups its pollution control expenditures is not part of the benefit calculation for for-profit entities and generally should not be considered in benefit calculations for regulated utilities.

Comment: One commenter noted that alternative depreciation schedules should be allowed when pollution control costs can be verified.

Response: If a company has in fact used a depreciation schedule other than the depreciation schedule that BEN uses, then a financial analyst can perform the necessary off-line calculations to supplement or substitute for the BEN model's results.

C. Improving the BEN Model's User-Friendliness

1. Is BEN Too Complex To Operate?

Comment: Several commenters thought that the BEN model is easy to use and understand, and that it should be kept that way.

Response: The Agency believes that BEN represents a proper balance between ease of operation and accuracy in calculation, and will try to ensure that any future enhancements preserve this balance.

Comment: One commenter suggested that to improve user friendliness, EPA should make the model and manual readily available to the public. Another commenter expressed the difficulty he had in downloading the BEN model and user's manual from the electronic bulletin board system. He also had a difficult time obtaining these materials from the EPA regional library. Another commenter noted that both the model and manual were available from the National Technical Information Service (NTIS).

Response: The Agency is aware of the difficulty of downloading large documents such as the BEN User's Manual and will try to rectify this in the future, as well as to improve the printed quality of the downloaded document. The easiest way to obtain the model is through the Office of Enforcement and Compliance Assurance's World Wide Web site on the Internet (http://www.epa.gov/oeca/datasys/dsm2.html).

Government users can also obtain the model and manual (for BEN and other applications) via the newly created enforcement economics helpline: 888–ECON–SPT (326–6778), which is staffed by a contractor, Industrial Economics, Incorporated, located in Cambridge, Massachusetts. The helpline is in operation from 8:00 AM to 6:00 PM Eastern time and will accept voice-mail messages when it is not in operation. In addition, the contractor is providing a companion e-mail address for this helpline: benabel@indecon.com. The helpline is strictly limited to providing advice to federal, state, and local environmental enforcement agencies regarding financial issues that impact enforcement cases. Callers will also be able to obtain advice on how to access training courses on the models and related subjects. EPA feels that many of the public comments it received from state and local government enforcement agencies could have been addressed easily and quickly with a call to the helpline. Inquiries regarding the interpretation of federal statutes and EPA polices, will be referred to EPA, as will inquiries from non-governmental employees. Non-government users can obtain the models and user's manuals from NTIS at 800–553–6847. (NTIS packages each model and its user's manual together; requesters will also need the following publication numbers—BEN: PB 98–500382GEI; ABEL: PB 99–500357GEI; CASHOUT: PB 98–500390GEI; PROJECT: PB 98–500408GEI; INDIPAY: PB 99–500407GEI; and MUNIPAY: PB 99–500415GEI.)

Comment: One commenter stated that BEN could be used without the manual, although this made the application more difficult.

Response: The Agency agrees, and also reminds users that the model provides significant on-line help, both in the introductory statement and by allowing the user to enter ''HELP'' at each prompt.

Comment: One commenter thought that increasing the flexibility of BEN could result in a less accurate measure of the economic benefit (*i.e.*, too wide a dispersion of many economic benefit values). Another commenter expressed the view that increasing the flexibility of BEN would also increase the complexity of using BEN, which in turn would preclude some states from calculating economic benefit.

Response: The Agency does not feel that the added flexibility will make BEN any less accurate, although it does agree that the potential for added complexity must be considered when adding flexibility to the BEN model.

Comment: Many commenters suggested that in order to improve user-friendliness, EPA should use a Windows-type format. One commenter suggested that an interactive format for BEN could be based on some commercially published financial or tax programs, which have a ''Wizard''-type guidance feature; another suggested that BEN should use a format for common spreadsheet software. Although, one commenter stated that although point-and-click Windows-type features and the ability to move between data entry fields freely would improve the model, it might not be worthwhile to scrap all the original code. Various commenters also suggested that the model should:

- Allow users to add headings and explanatory text to the BEN output;
- Calculate avoided costs without the need for a hand-held calculator;
- Allow printing of individual BEN runs, make printing more straightforward, and print each result on its own sheet of paper;
- Accept data in a table format for cases in which each month must be entered in a separate run;
- Prompt the user about whether to use the standard [default] or state-specific values;
- Accept other than the capital letters ''Y'' and ''N'' for yes and no answers;
- Save model inputs electronically for future use;
- Modify instructions for printing the output— ''positioning the paper'' seems irrelevant; and
- Allow the user to exit the model in the middle of a run.

Response: The Agency plans to reprogram the model for the Windows operating environment, which should address most of these concerns. (The Agency will still maintain the current DOS-based version for a time.) An actual spreadsheet may confuse many users, although the Windows-based model will incorporate many spreadsheet-type features.

2. Is the Information BEN Needs Difficult or Expensive To Obtain?

Comment: One commenter thought that although BEN is a very effective tool for cases in which the violator must install pollution control equipment or perform similar actions to achieve compliance, it is less effective when compliance comprises administrative activities. The commenter explained that this is primarily because of the difficulty of obtaining cost figures for such activities, and suggested that BEN have a subroutine for such cases that provides default cost values.

Response: The Agency understands that cost data can be difficult to obtain for certain cases. But if the violator has already come into compliance, then an estimate of its actual costs should be available. The Agency has begun developing a computerized RCRA compliance cost database which will complement the revised version of the BEN model.

Comment: While some users felt that inputs for BEN are readily available, others found that inputs are difficult to obtain when violators are uncooperative.

Response: In such situations, enforcement staff should use the discovery process to obtain the necessary information, whether through interrogatories, depositions, requests for production, or other legal processes. Another approach is to contact state or federal experts familiar with the regulatory requirement at issue for advice on cost estimates. Finally, retaining an outside consulting expert may occasionally be necessary to develop the compliance cost estimates.

Comment: One commenter wanted the Agency to develop a set of standardized rules or a protocol to be

followed when applying case-specific information to an economic benefit calculation.

Response: The Agency strives to provide sufficient guidance to enforcement staff, but does not feel that a strict protocol is feasible. Therefore, enforcement staff will always have to exercise case-specific judgment.

Comment: One commenter suggested that users should perform a cost-benefit analysis when contemplating the use of case-specific inputs in lieu of BEN default values. The commenter further stated that the Agency should consider allowing enforcement staff more flexibility with respect to the use of investment tax credits, depreciation schedules, tax rate choices, different inflation options, and low-interest financing. Another commenter stressed the increased workload and questionable reliability associated with case-specific data. Similarly, another commenter noted that BEN is intended to serve as only a gross indicator of the economic benefit, rather than as a precise calculation, and that more specific information should be used only if such information will improve the result significantly. This commenter further asserted that the occasional use of more specific data than BEN's default values will lead to skewed results in the aggregate, because only firms that will benefit from the precise information will make it available.

Response: The Agency agrees that the pursuit of case-specific inputs takes place within a resource-constrained environment and should be measured against the expected gains in accuracy. The Agency adopts the same approach to adding flexibility to the model, where such flexibility may make the model more difficult to use for less advanced users. The Agency also agrees that, theoretically, a firm will dispute standard values such as the discount rate only when a more accurate value is in its best interests. But it is the Agency's policy that if it the violator urges the use of a particular company-specific value in place of standard value, the Agency will insist on using company-specific values in place of all the standard values. The Agency believes this approach will limit the aggregate impact of adopting regulatee-specific values instead of standard values.

3. Other Issues Affecting Use of BEN

Comment: One person stated that Appendix A of the BEN User's Manual should be expanded to include the model's entire mathematical algorithm, and should be written with more focus on economic theory, like a textbook. Another stated that Appendix A should include a thorough development of equations 15a and 15b.

Response: The Agency is pleased that at least some members have taken the time and effort to familiarize themselves with the details of the BEN User's Manual. A user's manual for any computer model, however, can not take the place of a textbook on mathematics or financial economics. To answer some of the specific concerns, Equation 15a is the sum of an infinite geometric series, which can be found in most calculus texts. Equation 15b is a simple discount formula similar to the one given on page A–4 in Appendix A. Equation 15c is the sum of the present value of the first replacement cycle plus all the additional replacement cycles to infinity. The Agency encourages enforcement staff who have further questions along these lines to contact its enforcement economics helpline at 888-ECONSPT. As mentioned above, this helpline is strictly limited to employees of federal, state and local government enforcement agencies.

Comment: One person thought the model departs from the formulae in Appendix A for depreciation, and instead appears to use a simplified formula that calculates each year's depreciation as a percentage of the previous year's. This commenter felt that any simplifications or departures from theory made for the sake of simplifying the model's programming should be detailed in the manual.

Response: BEN uses no such simplifying formula, and instead uses a seven-year depreciation life (for capital investments after 1987). The first four years use a double-declining balance with a half-year convention switching to a straight-line depreciation for the rest, corresponding to the revised tax law's Modified Accelerated Cost Recovery System (MACRS). The model adjusts the depreciation deduction to occur once a year at midyear.

Comment: One person stated that the manual should answer questions such as: What is the difference between a C Corporation and an S Corporation? What, other than land, constitutes a one-time nondepreciable expense? What happens when you choose a useful life that is shorter than the depreciation schedule?

Response: Between the BEN User's Manual and the ''Help'' prompts within the model, BEN attempts to provide as much guidance as is feasible in answering these frequently asked questions. For example, the difference between a C Corporation and an S Corporation can be found by selecting ''3'' of input number 1C—BEN will show information about both types of corporations. On page 4–10 of the user's manual, ''nondepreciable expenditures'' are defined as items that ''do not wear out;'' the manual proceeds to list several examples, such as a record-keeping system, employee training, waste removal, etc. For questions such as how to account for a useful life shorter than BEN's depreciation schedule (which requires off-line calculations by a financial analyst), the Agency encourages enforcement staff to contact its enforcement economics helpline at 888–ECONSPT. As mentioned above, this helpline is strictly limited to employees of federal, state and local government enforcement agencies.

Comment: Several commenters agreed that BEN is a useful tool for calculating the economic benefit of noncompliance, and encouraged EPA to retain the model. But other commenters asserted that the regulator's discretion should be used in lieu of BEN's calculation to determine economic benefit; these commenters felt that EPA should not mandate the use of BEN. From the defense bar's viewpoint, one commenter thought that the plaintiff's failure to accept anything other than a BEN calculation can lead to ''unprincipled negotiations.''

Response: Although computer spreadsheets or even programmable calculators can calculate economic benefit accurately, the Agency suspects that leaving economic benefit determination up to the regulator's discretion will result in either no calculations at all or fundamentally flawed calculations. (For example, the Agency examined one state's ''alternative'' to BEN and found it unreliable and even more difficult to use than BEN.) The Agency is convinced that BEN is a reasonably accurate, relatively simple way to calculate the economic benefit from noncompliance, and it continues to promote the use of BEN. The Agency does not require state enforcement agencies to use BEN, but the Agency strongly encourages them to employ it. State enforcement personnel who want to employ a valid alternative to BEN are welcome to do. For example, one state enforcement staff member's spreadsheet version of BEN was perfectly adequate. Nevertheless, EPA strongly believes that the ''risk-free rate'' approaches are seriously flawed and discourages their use as alternatives.

Comment: Some commenters noted that BEN is reasonable and provides results that are fair to the violator. Others thought that estimates of economic benefit obtained from BEN are at times so high that they are useful only

for their shock value. Some commenters noted that BEN gives penalty amounts that are so high that many Agency resources are spent negotiating or pursuing legal judgments with violators who are not confident of the accuracy of BEN's assumptions and methodology. One commenter felt that BEN was designed to produce the maximum possible penalty.

Response: The Agency strives to provide enforcement staff with a model that makes reasonable estimates of economic benefit. If the model produces numbers so high that they are shocking to either the enforcement staff or the violator, then that is generally because the violator has gained a high economic benefit and not because the model is designed to produce the maximum possible penalty. The compliance cost inputs to the BEN model are always open to discussion, but the methodology, by contrast, is not open to compromise. The Agency is comfortable defending its benefit calculations based on the BEN approach.

Comment: One commenter noted that BEN is an inexpensive method of determining economic benefit, making it an economical option for case work, although others thought that BEN is resource-intensive and not cost-effective. Several others felt that attempting to use BEN in ''small'' enforcement activities was a waste of resources, with one commenter noting that in many small cases, the cost associated with using BEN would exceed that of the penalty itself.

Response: The Agency disagrees that BEN is ''resource-intensive and not cost-effective.'' A typical analysis takes about five minutes. The only potential issue is the user's need to determine the compliance costs, which normally should not take much time, particularly for small enforcement actions. In addition, the Agency is not confident that enforcement staff are always able to determine beforehand that a case is too small to merit the use of BEN. Often, it is only after running BEN that the magnitude of the economic benefit becomes apparent.

Comment: Some commenters thought BEN was difficult to understand and explain for enforcement staff, who are often engineers untrained in and unfamiliar with financial economics. While BEN may be designed for people with little background in financial economics, many commenters felt that determining actual numerical inputs, and whether to use BEN's standard values, requires the judgment of a financial expert. Another commenter similarly noted that the EPA needs sufficiently trained staff to handle a variety of ''real world'' circumstances which presumably may require calculations in addition the BEN model.

Response: The Agency strives to make BEN as easy to understand for non-experts as is possible. Interestingly, BEN's compliance cost inputs typically require engineering expertise, not knowledge of financial economics. Once such cost inputs have been obtained—either based on the violator's actual purchases or through the discovery process—then the BEN model can be run with no knowledge of financial economics. The Agency also encourages enforcement staff who have questions to contact its enforcement economics helpline at 888–ECONSPT, from which staff can receive copies of training videos, training materials, and user's manuals. The helpline can also assist users in performing off-line calculations for circumstances that the BEN model cannot accurately calculate by itself. As mentioned above, this helpline is strictly limited to employees of federal, state and local government enforcement agencies. Finally, in the coming years training courses for the new, revised BEN model will be conducted in each EPA Region and at the national headquarters, to which state and local government enforcement staff will be invited.

Comment: One commenter felt that EPA should not ''oversell'' the idea that BEN can be used by people with no knowledge of economics, as that may invite misuse. According to this commenter, users of BEN must at least be willing to learn what the model is doing.

Response: Our experience with the model over the last thirteen years is that users can be very effective in the settlement context without thoroughly understanding the theory behind the model. We do include an extensive presentation of the theory in the BEN training course, although the model is sufficiently simple that users need not possess an intricate knowledge of economic theory to calculate accurate and reliable results.

Comment: One commenter noted that it is not feasible to expect states to hire financial experts and, therefore, that the BEN model should be made easier to understand for non-expert users. Several other commenters thought that EPA should provide the expert assistance to states.

Response: EPA believes that the model is easy to understand and operate as is. Most of our users have taken the four-hour BEN training course, which we have found covers almost every situation our enforcement professionals will encounter. While we are working on ways to improve BEN's simplicity and yet make it more flexible, the current model was designed for use by enforcement professionals with little or no background in finance. The model is used effectively across the country by such personnel. With respect to providing expert assistance to the states, EPA has established the helpline, mentioned above, to address this need.

Comment: One commenter suggested that EPA develop a program to provide investigative and analytical assistance to state and local agencies.

Response: The provision of analytical assistance is being addressed by the helpline mentioned above. The provision of investigative assistance is clearly beyond the scope of this effort to review and revise the Agency's benefit recapture approach.

Comment: In addition, many commenters felt that EPA should provide more training for users of the BEN model.

Response: The EPA has presented over forty BEN courses since 1988. The Agency has conducted over thirty ''live'' BEN training courses at EPA facilities, and EPA invited state enforcement staff to nearly all of them. In addition, EPA has conducted fourteen BEN training courses primarily for state and local government personnel in Hartford, Connecticut (twice); Indianapolis, Indiana (twice); Little Rock, Arkansas; Baton Rouge, Louisiana; Trenton, New Jersey; Boise, Idaho; Ft. Lauderdale, Florida; El Monte, California; Baltimore, Maryland; Richmond, Virginia, Phoenix, Arizona; and Anchorage, Alaska. (Other state and local governments that are interesting in at least sharing the delivery costs with the EPA can also arrange for such a course.) EPA also presented a BEN course via satellite in 1994, and has made videotapes of that broadcast available to government enforcement staff on request.

Comment: One commenter argued that EPA should put pressure on individual states to account for the economic benefit component of noncompliance in their enforcement programs; another stated that EPA should help states incorporate the concept of economic benefit in penalties or assessments.

Response: The issues the Agency is addressing in this Notice are related to the determination of the economic benefit of noncompliance. Whether states are adequately accounting for the economic benefit component is beyond the scope of this effort. The EPA is ready and willing to provide support to states in using the model. Not only has the Agency provided such support to states in the past, but it has even

provided it to the governments of Indonesia, China, Taiwan, Brazil, United Kingdom and Mexico.

Comment: Several commenters noted that short, in-depth, case-specific reviews by experts should replace BEN analyses, as they yield more credible, defensible results than BEN.

Response: The Agency is convinced that the BEN model produces reasonably accurate calculations of economic benefit. It has proven to be an effective enforcement tool over the past 14 years. Furthermore, the new BEN model may often be a sufficiently accurate analytical tool for experts to use in such case-specific reviews. By contrast, to adopt an in-depth review of every case would require costs—either in contractor support and/or full-time in-house staff—that would be prohibitive, as well as add little value.

Comment: Several commenters noted that defending the BEN model's results in court is difficult, for a variety of reasons. While EPA's earlier guidance explains that BEN should be used only in settlement discussions, and that the regulator should never be put in the position of having to defend BEN in court, one commenter felt that most state users cannot follow EPA's advice. According to this commenter, a state's negotiations or settlements occur after a document has already been mailed to the violator with a penalty amount on it; therefore, if the case goes to court, the state must defend the amount.

Response: The suggested protocol is to hire an expert witness to perform an economic benefit calculation for presentation in court, as an expert is necessary to explain the methodology (either that of BEN or of some other analytical tool). If the result of this more customized analysis differs significantly from the initial BEN result, then the penalty demand can be changed.

Comment: One commenter noted that although BEN is not appropriate for all cases, if BEN is not used in every case, then the regulator is subject to criticism for inconsistency.

Response: BEN is appropriate in every case in which compliance costs were avoided or significantly delayed. BEN is not appropriate when the benefit comes from an illegal competitive advantage. As long as the regulator applies the BEN model to all the cases for which it was designed, then the regulator will be consistent.

Comment: Several commenters thought that small businesses and sources which are genuinely ignorant of their violations should be treated differently than large companies which have many resources and who commit egregious violations. One commenter suggested that small communities and businesses should be helped by small business assistance programs to achieve compliance, rather than be penalized for what may well be a genuine mistake. This commenter also suggested that if EPA continues to support the use of the BEN model in these cases, BEN should at least allow the regulator to account for the size of the community or business in question. A few commenters noted that sometimes, even when BEN calculates a positive economic benefit, it may be inappropriate to ask the violator to pay that amount; similarly, some commenters suggested that the regulator should run the ABEL model in conjunction with the BEN model to determine the effects of payment on the entity.

Response: Economic benefit is no-fault in nature and as a result accrues regardless of genuine mistakes. If a small business delays a required pollution control expenditure—for whatever reason—then it obtains an economic benefit. The regulatory agency must recover this benefit, otherwise the business will have an unfair advantage over those businesses that complied. If violations are especially egregious, then this should be reflected in the gravity component of the penalty or in criminal sanctions. The size of the violator is relevant only to the ability to pay a civil penalty. The Agency maintains the ABEL, INDIPAY, and MUNIPAY models (for corporations, individuals, and municipalities, respectively) to guide its enforcement personnel in determining ability to pay. BEN already favors small businesses in that the standard value discount rate is based upon the typical large company's WACC. Significant evidence exists that small companies on average have higher costs of financing than larger ones, but EPA has conservatively decided to base its standard value discount rate on large companies, instead of small firms' higher (by about two percentage points) discount rate. (For a detailed discussion of this issue, see the Ibbotson Associates *Stocks, Bonds, Bills, and Inflation* annual yearbooks, in particular Chapter 7, ''Firm Size and Return.'') Similarly, many small communities have higher debt costs on average than large communities, but the not-for-profit standard value discount rate is nevertheless based upon the average interest rate for communities that have access to the municipal bond market and are able to obtain ratings for the debt issues. If the discount rate were tailored to such small businesses and communities, then the discount rate, economic benefit result, and hence the penalty demand, would be higher. In order to maintain simplicity, BEN actually favors small businesses and communities in this regard.

Comment: One commenter stated that the BEN model should be used more as a tool for promoting environmental compliance than merely for recapturing the economic benefit of noncompliance. Another commenter noted that the EPA should de-emphasize penalty assessment and instead encourage self-compliance. One commenter noted that EPA's goal should be to prevent future noncompliance, which could in some circumstances be accomplished with a fine smaller than the economic benefit.

Response: The Agency is always in favor of promoting compliance and encouraging self-compliance. One means of promotion and encouragement is penalty assessment based upon full economic benefit recapture, which ensures that any gain potential violators reap from noncompliance will be fully taken away from them in the form of a civil penalty. Any penalty assessment short of this creates an incentive among regulatees to wait until they are caught before complying.

Comment: One commenter suggested that the EPA has been secretive regarding the BEN methodology.

Response: The BEN model and its user's manual are freely available, and the calculations are easily replicable.

Comment: One commenter noted that a supplemental environmental project (SEP) would in some cases be better than a ''disgorge'' of economic benefit.

Response: The Agency's policy is that a SEP can be performed for mitigation of only the gravity component of the civil penalty, not for the economic benefit component. Otherwise, given the additional motivations a violator may have for performing a SEP, the Agency could never ensure that the violator was really financially indifferent with respect to noncompliance. Therefore, the civil penalty must always, at a minimum, recapture economic benefit.

Comment: One commenter noted that the EPA should address the issue that competing regulatory requirements may force firms into noncompliance under one set of regulations when these firms comply with another.

Response: This is outside the scope of the issue of economic benefit recapture.

Comment: One commenter noted that it would be helpful if some type of ''gravity'' component could be incorporated into BEN for noncompliance prevention and/or a compliance incentive.

Response: The Agency feels that gravity component calculations in the various penalty policies are sufficiently

simple and straightforward so that a module in BEN is not necessary.

Comment: One commenter stated that BEN has historically been available only through a mainframe, making it useless to staff without such access.

Response: BEN now runs on the EPA LAN or on a personal computer. Copies for the latter are available through the Internet (http://es.epa.gov/oeca) or, for enforcement staff, through EPA's enforcement economics helpline at 888–ECONSPT or, for non-government employees, through National Technical Information Service (NTIS) at 800–553–6847.

D. General Comments on the Public Comment Process

Comment: Several commenters made the point that EPA does not need to go through a formal rulemaking process with the BEN model.

Response: The Agency recognizes the distinct advantages of public input on its benefit recapture approach which is why it is seeking comment at this time.

Comment: Some of the commenters expressed the need for the formation of one or more ''blue ribbon'' panels of outside experts in financial economics (similar to the National Oceanic and Atomospheric Administration panel on the use of contingent valuation in natural resource damage assessment). Along these lines, one commenter thought EPA's goal should be to find a solution with the broadest possible support in the financial field. By contrast, one commenter strongly opposed the ''weight of opinion'' process for adopting changes in BEN. Another commenter felt that although such expert panels might be beneficial, the financial and economic principles BEN uses are simple enough that any finance professor could discover whether the model held to the mainstream of modern finance and economics.

Response: Given that both academicians and practitioners in the field of financial economics disagree significantly (both on economic benefit analysis and a myriad of other issues), the Agency does not feel that the formation of an expert panel would be a productive exercise. For instance, tenured professors from business schools have reached diametrically opposed conclusions in the written comments they have submitted on the BEN model.

Comment: Some commenters expressed doubts about the nature of and manner for this public comment process and recommended a more open policy. To do otherwise, they state, would only continue the controversy and would not be in either EPA's or the regulated community's best interest. Similarly, one commenter stated that the adoption of the procedures for the public comment session should be subject to administrative due process.

Response: The Agency has made every effort to make the public comment process as open as possible.

Comment: A few commenters criticized the limited time for interested parties to respond to the request for comment as listed in the **Federal Register** notice of October 9, 1996.

Response: In response to such concerns, the Agency extended the deadline for public comments from the originally stated January 1, 1997, to a significantly later March 3, 1997, (see **Federal Register** notice on December 12, 1996, at page 65391).

Comment: Some commenters expressed concern that EPA has yet to release earlier statements made by several prominent professors in the field of finance that allegedly criticized the BEN model. These commenters asserted that the professors' prior remarks, if relevant, should also become part of the public record and be incorporated into any forthcoming decision.

Response: The Agency released these statements in April of 1997. The Agency recognized the merit of those comments long before they were released, but some of the statements were the subject of a three-year Freedom of Information Act case. That case was eventually resolved, and the Agency has since released the analyses sought in that case. In addition, the Agency released three other similar analyses which were not sought. Some of the statements were critical of the BEN model as it then existed, and the Agency adopted many of the changes they suggested. In any event, all of the analyses were of the prior BEN model version, not the current version. Copies of these statements are available by calling 202–564–2235.

Comment: Several commenters felt that the EPA should follow up on the public comment period by first drafting the findings, then requesting and evaluating further public comment, and finally publishing a formal draft on the final decision.

Response: The Agency agrees, and is taking that approach.

IV. Request for Comments

The Agency is interested in comments relating to its proposed changes to its benefit recapture approach as discussed in Section II of this Notice. After the comment period closes, the Agency plans to review all the comments and revise its benefit recapture approach and the BEN computer model as appropriate. EPA encourages parties of all interests, including state and local government, industry, not-for-profit organizations, municipalities, public interest groups and private citizens to comment so that we can have as broad a spectrum as possible.

Dated: June 8, 1999.

Sylvia K. Lowrance,

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