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ECONOMIC BENEFIT

The federal government's method for calculating the economic benefit of noncompliance with pollution control laws, the Environmental Protection Agency's BEN Model, has been controversial for at least 15 years. As the author's review of recent case law concerning economic benefit demonstrates, the controversy continues. As a matter of good public policy, the author suggests EPA adopt a methodology based on sound economic and financial principles. He argues that an independent peer review of BEN, perhaps under the aegis of EPA's Science Advisory Board, may be a necessary step in that direction.

U.S. v. The New Portland Meadows Deviates From 'BEN' Methodology

BY ROBERT H. FUHRMAN

Robert H. Fuhrman, a principal of Seneca Economics and Environment LLC in Germantown, Md., has worked on more than environmental civil penalty cases and has served as a testifying economic expert on behalf of The New Portland Meadows LLC and several other corporations. The opinions expressed here do not represent those of BNA, which welcomes other points of view.

According to various environmental statutes, the ''economic benefit'' a firm obtains due to noncompliance with environmental requirements is one of several factors a federal judge or the Administrator of the Environmental Protection Agency must consider when establishing civil penalties. Since the mid-1980s, there has been much controversy over how EPA calculates economic benefit and whether that methodology is consistent with sound economic and financial principles.[1] The main debate has been over the appropriate interest rate to use to adjust past savings to present values. Earlier this year, a federal district court heard testimony on both the government's methodology that is

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based on use of the corporate ''weighted average cost of capital'' (WACC) for this purpose and an alternative based on interest rates associated with short-term U.S. Treasury bills, with adjustment for taxation. The court concluded that use of ''Treasury's short-term cost of capital . . . results in a more reasonable estimate of economic benefit.''

In a July 29, 2003, decision in an environmental civil penalty case involving a Portland, Oregon, race track, *United States v. The New Portland Meadows LLC,* [2] federal district court Judge Garr M. King relied on after-tax, short-term U.S. Treasury bill rates (i.e., a ''risk-free'' rate) to adjust past economic savings to present values.[3] In so doing, King chose not to use the approach EPA has utilized in hundreds of settlements since 1992, and that economic witnesses for the U.S. Department of Justice have relied on steadfastly in the few civil penalty cases that have been adjudicated.

The EPA approach is incorporated in its BEN model, the computer software EPA uses to calculate economic benefit for the purpose of negotiating settlements of civil penalty disputes.[4] At trial, economic witnesses for the Justice Department utilized the same financial method, except it was presented in a spreadsheet format.

The BEN Model

BEN focuses on two types of monetary savings—those that resulted from not installing pollution control equipment when it was legally necessary to do so and those that resulted from not operating and not maintaining such equipment during the period of noncompliance. The model does not attempt to quantify the economic benefit a firm may have obtained by improving its competitive position as a result of such savings.[5, 6]

To compare the costs of ''on-time'' and ''delayed'' compliance, the model projects all past and future cash flows associated with installing, operating, and maintaining the equipment throughout its useful life and through one or more replacement cycles. These cash flows are then adjusted for taxation and ''discounted'' back to the same point in time, the date of alleged noncompliance.[7] The difference between the two present values (the one for ''on-time'' and the other for ''delay'' case cash flows) is said to be the economic benefit as viewed from the date of noncompliance. BEN then assumes that the alleged violator earned a rate of return on these savings equivalent to the discount rate and compounds the calculated economic benefit at that rate to the assumed date of penalty payment.

To perform the necessary computations, BEN requires at least the following inputs:

- the dates of noncompliance, compliance, and actual or assumed penalty payment;
- delayed costs, such as the capital investment in the required pollution control equipment, and any one-time expenses, such as the cost of acquiring land; and
- avoided costs, i.e., operations and maintenance expenses that would have been incurred had the investment been made ''on time.''

Inputs also may include an inflation rate, a discount rate, and a combined marginal federal and state tax rate. If the user decides not to specify one or more of these rates, the model assigns a ''default value'' for the relevant parameter(s).

A critical aspect of the BEN methodology is the attribution of interest on calculated past savings. In BEN, as it is presently structured, the same interest rate is used both for discounting and for compounding past savings to present values, a rate based on the weighted average cost of capital (WACC).[8,9] Use of the WACC as the in-

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[1] See, e.g., Robert H. Fuhrman, ''Penalty Assessment at the U.S. Environmental Protection Agency: A View from Outside,'' (22 ER 1574, 10/18/91); Fuhrman, ''Getting It Right: EPA's 'BEN' Model Still Needs Work,'' (23 ER 3100, 04/2/93); Jasbinder Singh, ''Discount Rate and EPA Penalties: Confusion and Possible Repercussions,'' (12 TXLR 73, 06/18/97); Robert H. Fuhrman, M. Alexis Maniatis, and Kenneth T. Wise, ''The Economic Benefit of Noncompliance: A Response,'' (12 TXLR 463, 09/17/97); Jasbinder Singh, ''Use of the After-Tax Risk-Free Rate Theory in Calculating EPA Penalties: Point,'' (12 TXLR 703, 11/19/97); and Robert H. Fuhrman, M. Alexis Maniatis, and Kenneth T. Wise, ''Use of the After-Tax Risk-Free Rate Theory in Calculating EPA Penalties: Counterpoint,'' (12 TXLR 704, 11/19/97).

[2] U.S. District Court for the District of Oregon, No. 00-507-KI, 07/29/03.

[3] Because the United States has never defaulted on its debt instruments and short-term U.S. Treasury bills incorporate the very little if any inflationary expectation, the short-term Treasury bill rate is sometimes referred to as the ''risk-free rate.''

[4] EPA, *BEN User's Manual*, September 1999. According to page 1-2 of the manual, ''BEN is easy to use and designed for people with no background in economics or financial analysis.''

[5] In 1999, EPA expressed interest in trying to develop a methodology to quantify and capture those savings. See 64 Fed. Reg. 32,951. For a critique of the views EPA expressed in that *Federal Register* notice, see Paul G. Wallach, Eric S. Andreas, and Robert H. Fuhrman, ''Comments of the Ad Hoc Group Submitted to the Public Docket on Calculation of the Economic Benefit of Noncompliance in EPA's Civil Penalty Enforcement Cases,'' Sept. 30, 1999, which is available from the National Association of Manufacturers at http://www.nam.org/tertiary.asp?TrackID=&CategoryID=799&DocumentID=21011 on the World Wide Web.

[6] On Aug. 6, 2003, EPA announced it will establish an advisory committee under its Science Advisory Board to address ''illegal competitive advantage'' issues in determining civil penalties for environmental violations (68 Fed. Reg. 46,604; 153 DEN A-1, 08/8/03).

[7] ''Discounting'' is a technique used in financial analysis to adjust a stream of monetary payments or costs for the time value of money. The concept underlying this adjustment is that a dollar received today is worth more than a dollar received one year from now, and the further the payment is in the future, the less it is worth today. A table of discount factors may be found in many textbooks on corporate finance.

[8] The WACC is based on a firm's mix of stock (equity) and debt financing. In recent years, the default value in BEN for the WACC has been between 10 percent and 12 percent, depending on the initial date of noncompliance, whereas the after-tax, risk-free rate has been 4 percent or less, depending on the relevant time period.

[9] According to page 5 of Stewart C. Myers, Kenneth T. Wise, and M. Alexis Maniatis, ''The BEN Model and the Calculation of Economic Benefit,'' a paper prepared for The BEN Coalition (a group of trade associations) and the Synthetic Organic Chemical Manufacturers Association and submitted to EPA in March 1997, ''Finance theory does not mandate the WACC for the discount rate. Theory also says that WACC is *not* correct as an interest rate. The correct rates are a function of the risks of the cash flows at issue and depend, in part, on whether the analysis is considering expected benefits at the time of noncompliance or actual benefits viewed from the present.''

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terest forward rate produces substantially higher estimates of economic benefit than would result from using the after-tax, risk-free rate for this purpose.[10]

For example, in *New Portland Meadows,* based on the financial methodology that the court concluded produces ''a more reasonable economic benefit estimate,'' Judge King determined that the defendant had obtained $866,130[11,12] due to noncompliance. Had he accepted the WACC as the interest forward rate, he would have concluded that the economic benefit was $1,204,065, which is approximately 39 percent higher.[13]

The following rationale for use of the WACC is provided in the *BEN User's Manual*:

> For a for-profit entity's discount/compound rate, BEN uses the weighted-average cost of capital (WACC) for a typical company, reflecting the cost of debt and equity capital weighted by the value of each financing source. A company must on average earn a rate of return necessary to repay its debt holders (e.g., banks, bondholders) and satisfy its equity owners (e.g., partners, stock holders). While companies often earn rates in excess of their WACC, companies that do not on average earn at least their WACC will not survive (i.e., their lenders will not receive their principal and/or interest payments, and their owners will be dissatisfied with their returns). The WACC represents the return a company can earn on monies not invested in pollution control, or, viewed alternatively, represents the avoided costs of financing pollution control investments.[14]

As argued later in this article, this logic is not compelling.

EPA-Sponsored Reviews of BEN

Although EPA first started using BEN in settlement negotiations in 1984, EPA never put the model through notice and comment rulemaking. Nonetheless, EPA always has maintained that the model is correct.

From the mid-1980s through the early 1990s, the interest forward/discount rate EPA used in BEN was based on the ''equity cost of capital,'' i.e., the cost shareholders were said to demand for holding a firm's common stock. Much to the consternation of many defendants, during that time period the equity rate ranged from 15 percent to 18 percent, and EPA demanded past economic savings be compounded to the present at such rates. Many firms did not consistently earn rates of return of that magnitude, so many companies and trade associations were quite vocal about criticizing this aspect of the BEN methodology.

In 1988 and again in 1991, EPA consulted on the BEN methodology with two different sets of finance professors. Each time, EPA did this without following the procedures it later established for peer reviews, such as providing a written assignment to the reviewers and keeping sufficient records to enable nonparticipants to understand the reviewers' reasons for reaching key conclusions.[15] Nonetheless, EPA later described these consultations as ''peer reviews.''[16]

Citing deliberative process privilege, potential disclosure of techniques and procedures for law enforcement investigations or prosecutions, attorney-work product, and considerations of personal privacy, EPA attempted to withhold from the public the various memoranda that memorialized these so-called ''peer reviews.''[17] When in 1997 EPA finally released many of these documents, it did so primarily to end Freedom of Information Act litigation brought against it by the Washington Legal Foundation.

The facts in the following four paragraphs are based on the released documents.

The 1988 reviewers recommended future cash flows be discounted at the WACC rate and that past calculated savings be compounded to the present based on the long-term corporate borrowing rate, an interest rate substantially closer to the risk-free rate than to the equity rate.[18] These recommendations would have resulted in substantially lower calculations of economic benefit, however, EPA chose to retain use of the equity rate.

In 1991, EPA convened a second panel of finance professors.[19] From the released documents, it is not apparent whether the second panel was aware of the recommendations of the first panel, or why the two panels reached dramatically different conclusions. These points aside, two of the three members of the second panel recommended use of the WACC rate both for discounting and for interest forward calculations, and one recommended continued use of the equity rate for both financial adjustments.

In 1992, without admitting that the use of the equity rate had been wrong, EPA started using the WACC in its BEN Model instead of the equity rate.[20]

It is not possible to reconstruct fully the thought process of the second panel. However, one of its members,

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Myers teaches corporate finance at the Sloan School of Management at Massachusetts Institute of Technology and is a past president of the American Finance Association and coauthor (with Richard A. Brealey) of the widely-used, graduate-level textbook, *Principles of Corporate Finance* (McGraw-Hill, sixth edition, 2000).

[10] According to the decision in *United States v. WCI Steel Inc.*: ''The central issue is whether a rate reflecting risk should be used as to past benefits or obligations. Any return above the risk-free rate is earned not from delay but by assuming risk, and therefore is not properly considered economic benefit.'' 72 F. Supp. 2d 810, 831, 49 ERC 1685 (N.D. Ohio 1999).

[11] Based on New Portland Meadows's net worth, Judge King reduced the penalty to $500,000.

[12] The parties disagreed about which pollution control measures were necessary to bring the facility into compliance with Clean Water Act requirements. Judge King's decision accepted one of the Department of Justice's compliance scenarios.

[13] Declaration of Jonathan S. Shefftz, July 3, 2003, p. 4, in the United States' Post-Trial Brief on Civil Penalty in *United States v. The New Portland Meadows LLC*.

[14] EPA, *BEN User's Manual*, September 1999, pp. 3-14 and 3-15.

[15] EPA, *Peer Review Handbook*, January 1998, pp. 10 and 38. See also p. 11, which differentiates between a ''peer review'' and ''peer input.''

[16] Revised Vaughn Declaration of Jonathan D. Libber dated Nov. 3, 1993, in *Washington Legal Foundation v. EPA*, D.D.C., No. 93-1202.

[17] Ibid.

[18] Deems Buell and Marc Blaustein (then employees of Temple, Barker and Sloane Inc.), ''Decisions about BEN Discount Rates,'' Aug. 22, 1988.

[19] In the same year, the decision in an environmental civil penalty case *United States v. Roll Coater*, No. IP 89-828 C, 1991 U.S. Dist. LEXIS 8790 (S.D. Ind. 1991), was announced. That decision accepted the WACC as the discount rate and rejected the equity rate. No testimony about the ''risk-free rate approach'' was presented in that case.

[20] Herbert H. Tate Jr. (then EPA Assistant Administrator for Enforcement), ''Change in Methodology for Determining the BEN Model's Discount Rate,'' Oct. 19, 1992.

James C. Van Horne, of Stanford University Graduate School of Business Administration, wrote that if hindsight was used in an economic benefit analysis, EPA would leave itself open to the argument that the risk-free rate of interest associated with short-term U.S. Treasury bills should be used to adjust past economic savings to present values.[21] Van Horne wrote that he believed economic benefit should be calculated based on an ''ex ante'' interest rate, that is, one that is not based on use of hindsight.[22]

However, BEN has always been structured to make use of information that is only known with hindsight, e.g., the dates of noncompliance and, frequently, compliance, and the actual capital investment and operations and maintenance expenses. It is unclear why Van Horne believed it would be permissible in BEN to intersperse an *expected* rate of return (i.e., the WACC) with other variables known only with hindsight.

In 1996, before EPA released the documents referred to above, the agency established a public comment period on how it calculates economic benefit. In 1999, EPA published its response to the comments it received, including a strong repudiation of the risk-free rate approach.[23] The response also included the following paragraph, which is most telling:

> 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 [to opine on which methodology is most appropriate for use in BEN] 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.[24]

In short, EPA decided *it* would determine the financial methodology to use in BEN rather than commit itself to a process that might produce results that EPA's Office of Enforcement might not like.

Past Judicial Decisions

Federal district courts have reached dramatically different conclusions about the appropriate interest-forward rate to use in litigated civil penalty cases, upholding at various times the equity cost of capital (*Friends of the Earth v. Laidlaw Environmental Services*, 890 F. Supp. 470, 40 ERC 2063 (S.D.S.C. 1995)), the WACC (*United States v. Smithfield Foods Inc.*, 972 F. Supp. 338 , 45 ERC 1387 (E.D. Va. 1997)), and the after-tax, risk-free rate (*United States v. WCI Steel Inc.*).

Relying on a 1991 decision in *Public Interest Research Group of New Jersey v. Powell Duffryn Terminals Inc.*,[25] an environmental civil penalty case, the court in *Smithfield Foods* wrote, ''Since it is difficult to prove the precise economic benefit to a polluter, a reasonable approximation of economic benefit is sufficient.''[26] The court went on to reject the testimony of the defendants' economic experts ''in most part'' without further explanation and to state that it was ''more persuaded'' by the United States' economic expert.

The *Smithfield Foods* decision did not discuss the relative merits of the WACC and the ''risk-free'' rate approaches, nor did it offer an analytical justification for selecting one methodology over the other. It simply asserted that use of the WACC is ''the best and the appropriate method to determine how much money the defendants made on the funds they did not spend for compliance.''[27]

The decision in *WCI Steel* provided a more principled analysis of why one methodology was superior to the other:

> The central issue is whether a rate reflecting risk should be used as to past benefits or obligations. Any return above the risk-free rate is earned not by delay but by assuming risk, and therefore is not properly considered economic benefit from noncompliance. Because this amount is known and the existence and solvency of the party is also known, it is inappropriate to increase the rate to reflect risk. . . .
>
> In determining economic benefit, the Court therefore finds an after-tax, risk-free rate is correct.[28]

The decision in *WCI Steel*, however, did not lay this issue to rest. In 2002, the decision in *United States v. Allegheny Ludlum Corp.*, 54 ERC 1908 (W.D. Pa. 2002), upheld the use of the WACC as the interest-forward rate, stating in part:

> A key point that the Third Circuit has firmly recognized in examining economic benefit analysis is that ''a violator's economic benefit under the Clean Water Act may not be capable of ready determination.'' *Dean Dairy*, 150 F.3d at 264. The court of appeals' review in *Dean Dairy* of its opinion in *Powell Duffryn*, legislative history, Supreme Court precedent, and decisions of other courts establishes that a plaintiff may make a reasonable approximation of economic benefit to the violator, without elaborate or comprehensive proof, to successfully meet its burden. A court may exercise its discretion under the Act in accepting proof that is imprecise and approximate at best.[29]

The *Allegheny Ludlum* decision did not refer to *WCI Steel*, even though it was discussed at trial by the defendant's economic expert, Howard A. Pifer, a former finance professor at Harvard Business School. The decision specifically rejected use of the short-term Treasury bill rate as the interest-forward rate, stating that the defendant had use of the funds obtained through noncompliance for ten years and there was no evidence that the company had invested the money in Treasury bills. Furthermore, it stated:

> [T]he funds might have been used for very profitable investments or for less profitable investments. But the WACC offers a reasonable alternative for averaging what ALC [the defendant] did with the money.[30]

The Outcome in *New Portland Meadows*

In *United States v. The New Portland Meadows LLC*, both at trial and in the three exchanges of economic expert reports that preceded it, extensive attention was

[21] James C. Van Horne, ''Evaluation of Discount Rate: BEN Model of Delayed Compliance Benefits,'' 1991, p. 5.

[22] Ibid., p. 7.

[23] 64 Fed. Reg. 32,947; 117 DEN AA-1, 6/18/99. Discussion of the risk-free rate approach and the alleged flaws agency staff and their consultants attributed to it, pp. 32,957-32,959.

[24] 64 Fed. Reg. 32,972.

[25] 913 F.2d 64, 80, 31 ERC 1905 (3rd Cir. 1990), cert. denied, 498 U.S. 1109 (1991).

[26] *United States v. Smithfield Foods* 45 ERC at 1396.

[27] 45 ERC at 1397.

[28] *WCI Steel Inc.*, 49 ERC 1701.

[29] 54 ERC at 1915.

[30] 54 ERC at 1918.

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devoted to the interest-forward rate issue, including discussion of past judicial decisions.

The plaintiff's economic expert attempted to buttress his methodological discussion by providing quotes from two professors who had participated in the second ''peer review'' of BEN and from an additional professor who had participated in the government-sponsored public comment process. However, that expert's reports did not support use of the WACC as an interest-forward rate through citations to published economic or financial literature.

Immediately prior to trial, the Justice Department produced a trial exhibit that appeared to be a paragraph from a book on commercial damages. However, upon inspection, that paragraph turned out to be a combination of sentences taken from two paragraphs, with one ellipsis missing. The resulting paragraph could be read two different ways and was not fully supported by the summary of the relevant chapter.

On the other hand, the defendant's expert supported his position on the interest-forward rate by quoting from *published* academic literature, including three journal articles[31] and a textbook on corporate finance.[32] None of those materials was discredited at trial.

In the absence of more complete information, one may speculate about Judge King's reasons for relying on the after-tax, risk-free rate as the interest-forward rate to use in the economic benefit calculations he accepted.

In the view of the author of this article, Judge King did not miss the following points that were brought out in the course of this case:

- A fundamental principle of corporate finance is that the *interest* or *discount rate* used to value cash flows must reflect the time value of money and the riskiness of those cash flows.
- Past and future cash flows have substantially different risk characteristics.
- Standing in the present, no risk is associated with past cash flows. To determine their present value, they therefore should be adjusted solely for the time value of money, which is reflected in the risk-free rate.[33]
- In comparison with past cash flows, future cash flows are inherently risky and subject to uncertainties that cannot be eliminated. This implies that different rates should be used for discounting future cash flows and for compounding past cash flows forward in time.
- The plaintiff did not identify any support in the financial literature for the notion that the same rate of interest must be applied both for discounting and for compounding.
- For a given project, the cost of capital depends on the use of the funds, not their source.[34] A particular project is risky regardless of who owns it.[35]
- Financial theory does not hold that the WACC is a *guaranteed* rate of return. In fact, the WACC is an *expected* rate of return. All corporations have positive WACCs.
- Corporations, however, are not money machines. Actual returns may differ substantially from expected returns.
- For example, in the year 2000, 53 Fortune 500 companies reported a total of $18.1 billion in losses. In 2001, 97 such companies reported a total of $148.5 billion in losses. In 2002, 120 Fortune 500 companies reported a total of $295.7 billion in losses.[36]
- The use of the WACC for adjusting past costs to present values is without support in the mainstream literature on corporate finance.
- Companies typically do not require savings from noncompliance to finance incremental investments. They usually have alternative sources of financing.
- If one were to believe economic benefit is a function of the *source* of the funds, in many cases the economic benefit of noncompliance would be a function of the defendant's borrowing costs or the return it received on its cash and cash-equivalents rather than its overall cost of capital.[37]
- According to the ''pecking order theory of corporate finance,'' firms prefer internal finance, i.e. funds obtained from past and current operations. If external financing is necessary, they issue the safest and least costly debt instruments first. They tend to issue equity, which is relatively more costly, only as a last resort.[38]
- Funds saved through noncompliance are not necessarily profitably reinvested in the firm.
- A company does not have an unlimited number of investment opportunities that can provide returns equivalent to its WACC.
- Funds obtained through noncompliance may be invested, profitably or not, or used to purchase productive or nonproductive assets, returned to owners in the form of dividends, spent to pay down existing debt, or utilized to keep alive failing businesses or product lines.
- Use of the WACC as an interest-forward rate in an economic benefit calculation is wrong as a matter of financial theory and does not produce results that are a ''reasonable approximation'' of economic benefit.

Concluding Remarks

As the author of this article has stated elsewhere:

[31] James M. Patell, Roman L. Weil, and Mark A. Wolfson, ''Accumulating Damages in Litigation: The Role of Uncertainties and Interest Rates,'' *Journal of Legal Studies*, Vol. XI, June 1982; R.F. Lanzillotti and A.K. Esquibel, ''Measuring Damages in Commercial Litigation: Present Value of Lost Opportunities,'' *Journal of Accounting, Auditing & Finance*, Winter 1990; and Franklin M. Fisher and R. Craig Romaine, ''Janis Joplin's Yearbook and the Theory of Damages,'' *Journal of Accounting, Auditing & Finance*, Winter 1990.

[32] Stewart C. Myers and Richard A. Brealey, *Principles of Corporate Finance*, sixth edition. See, in particular, footnote 26 on page 566, which speaks to the appropriate interest forward rate to use.

[33] Stewart C. Myers, Kenneth T. Wise, and M. Alexis Maniatis, ''The BEN Model and the Calculation of Economic Benefit,'' a paper prepared on behalf of The BEN Coalition and the Synthetic Organic Chemical Manufacturers Association and submitted to EPA, March 1997, pp. 9-11.

[34] *''The true cost of capital depends on the use to which the capital is put.''* Brealey and Myers, *Principles of Corporate Finance*, sixth edition (2000), page 222. (Emphasis in the original.)

[35] Ibid.

[36] Ann Harrington, ''Honey, I Shrunk the Profits: Accounting Made a Bad Year Look Worse,'' *Fortune Magazine*, pp. 198-99.

[37] As a case in point, since its founding in 1991, New Portland Meadows never issued any additional equity.

[38] Brealey and Myers, pp. 524-527.

> Until EPA performs . . . an independent, well-documented peer review, courts will, no doubt, be forced to grapple with issues of economic theory that they are not necessarily well qualified to address, which will likely lead to a series of contradictory decisions.[39]

[39] Robert H. Fuhrman, ''Second-Highest CWA Penalty Raises Questions about Calculation Methodology,'' *Environmental Compliance and Litigation Strategy*, June 2002, p. 4.

As a matter of good public policy, EPA should adopt a methodology that is based on sound economic and financial principles. Establishing an independent peer review of BEN, perhaps under the aegis of EPA's Science Advisory Board, may be a necessary step in that direction.

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