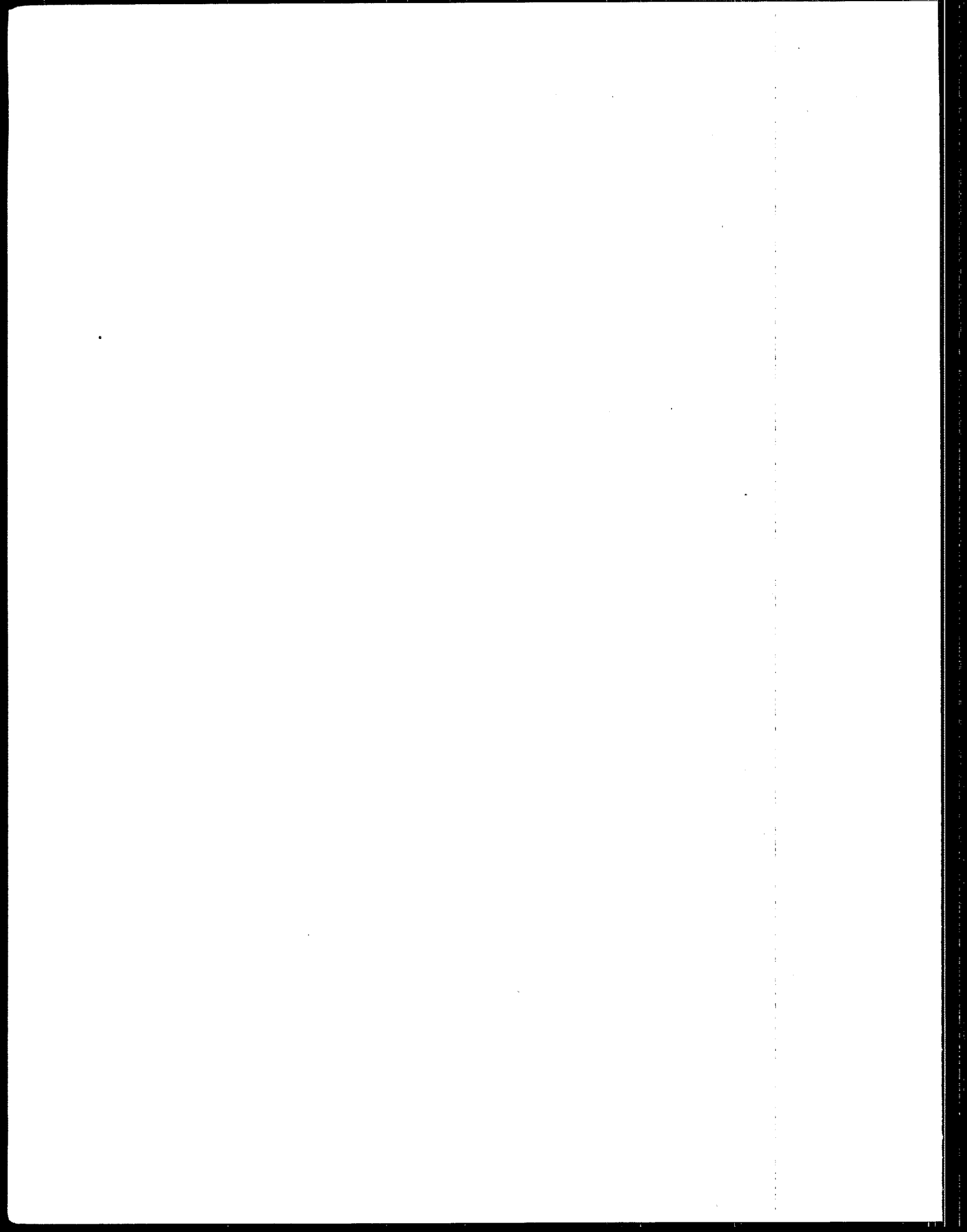




Providing Waivers From NPDES Permit Compliance Schedules For Industrial Pollution Prevention Technology

The Industrial Pollution Prevention
Project (IP3) Analysis of Sections
301(k) and 307(e) of the
Clean Water Act



A NOTE TO THE READER

This study analyzes why the Clean Water Act's section 301(k) provision did not work. Following the recommendations for change in this study, EPA wrote draft legislation amending section 301(k) for consideration in the Clean Water Act reauthorization process. If you wish to obtain a copy of this proposed legislation, please write to Jim Lund, Director of the IP3, USEPA, 401 M Street SW, Washington, DC 20460.

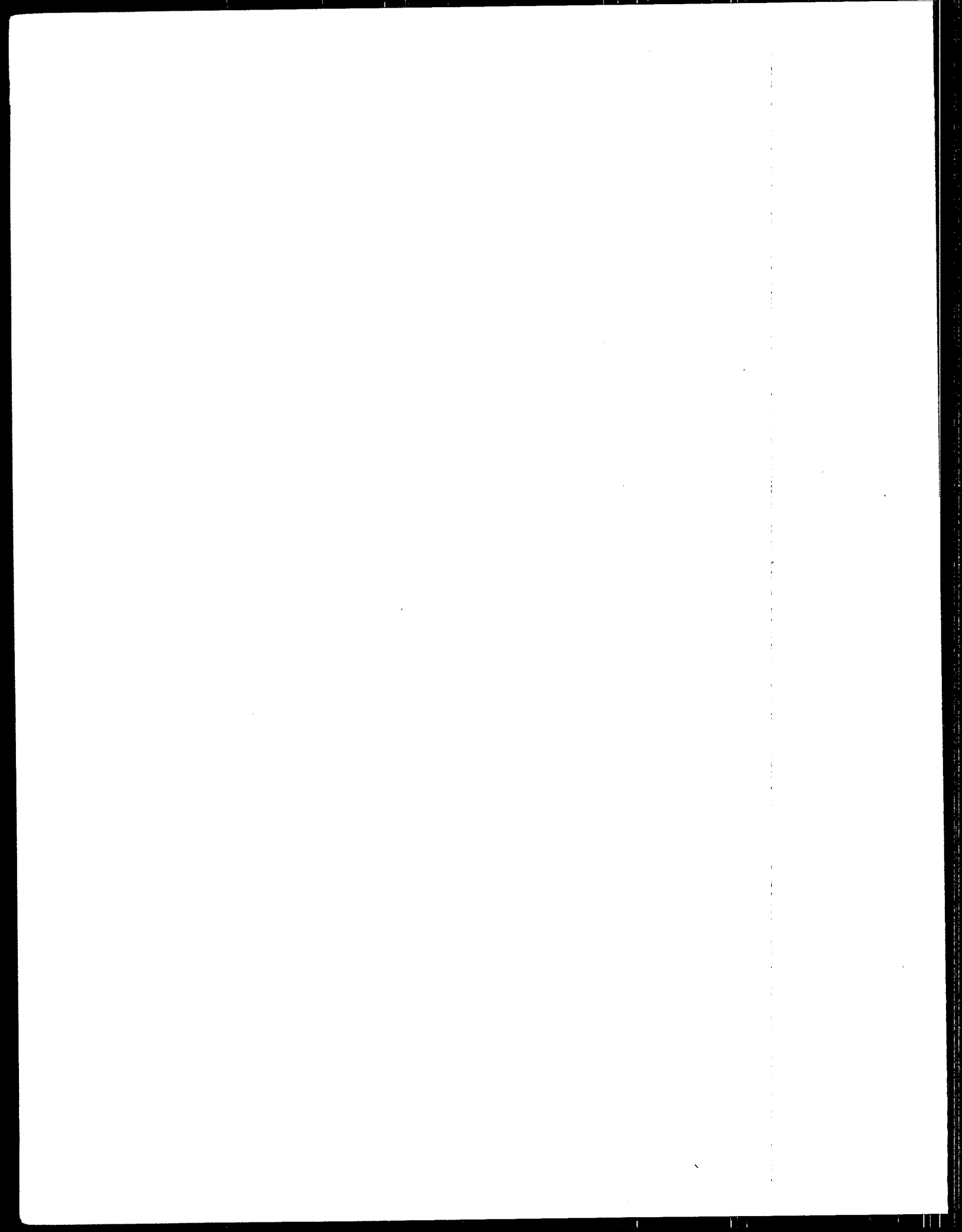


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EXECUTIVE SUMMARY

Innovation waivers were incorporated in both the Clean Air Act and the Clean Water Act as devices to promote the full development of new technologies which promised either to exceed current environmental standards, or to achieve those standards at substantially lower cost. The objective of the waivers was to provide an extended compliance period during which companies could complete technical development and gain the requisite working experience to make an innovative technology fully operational and effective.

While utilization of the original waivers was limited, there has been interest in whether such waivers would be useful for encouraging implementation of innovative pollution prevention technologies, which often involve changes affecting both the environmental performance and overall productivity of a facility. Interestingly, some industrial commenters on EPA proposals for 301(k) in 1980 and 1981 stressed that the major value of an innovation waiver was for process changes rather than end-of-pipe technologies.

As part of the 1977 amendments to the Clean Water Act (CWA), Congress created an innovation waiver (or variance) provision in Section 301(k). Congress declared the purpose of the waiver provision was to "encourage improved or cost saving technologies for meeting the national goal of eliminating discharges of all pollutants." The innovation waiver in section 301(k) provided time extensions for compliance with Best Available Technology Economically Achievable (BAT) effluent guideline requirements to facilitate implementation of innovative technologies which would either reduce pollution to a greater extent than BAT, or would meet BAT requirements at a significantly lower cost. In 1987, Congress extended the applicability of 301(k) until 1991, and added a parallel provision (307(e)) for dischargers to POTWs.

In the fourteen years from the creation of 301(k) in 1977 until its expiration in 1991, it was hardly ever used. On the basis of available EPA records, there may have been as few as five 301(k) variance applications, and only one variance approval.

The section 301(k) innovative technology compliance extension originated as part of a broad Congressional intent to promote and diffuse

new technologies to reduce toxic discharges to water. The section allowed for a three year compliance extension beyond the 1984 BAT compliance deadline stipulated in the 1977 Clean Water Act, in order to provide sufficient time to experiment with and fully implement an innovative technology. As part of the effort to promote technology diffusion, the legislation also required that the technology have industry-wide applicability which, while undefined in the legislation, House managers of the bill recommended be interpreted so as not to discourage use of waivers. The House managers also urged the Administrator to encourage use of 301(k) innovation waivers.

The objectives of the legislation, and the expectations of its proponents, were clearly not met. Many factors contributed to industry's failure to use section 301(k) innovation waivers:

- o Regulatory uncertainty and political conflict:

With the array of new requirements imposed by the 1977 amendments, the proposed rules for implementation of 301(k) were delayed. An ANPRM was issued in the fall of 1980, a proposed rule near the end of 1981, and a final rule was delayed until 1984. During that period, public interest groups had become increasingly concerned that they could not rely on EPA to simultaneously provide regulatory flexibility and ensure sufficient protection of the environment.

NRDC, which had supported the provision in the 1977 amendments, argued in response to the 1981 proposal that applicability of the waiver should be narrowly interpreted, and that "industry-wide" should require that the new technology could be used at the majority of plants in an industrial category. NRDC sued EPA over the final rule, which was remanded to the Agency. A new proposed rule issued in 1985 was never finalized. Although Congress reauthorized 301(k) in 1987, rules interpreting key terms of the provision were never issued before the provision's expiration in 1991.

- o Limitations on the time to fully implement an innovative technology:

Industry commenters stated during each comment period that the three-year extension was too short a period to bring an innovative technology to full operation. The period was shortened to two years by the 1987 amendments.

- o Lack of certainty, and high cost, involved in an innovation waiver

application:

Because of the regulatory uncertainty and the lack of enthusiasm by Agency staff for the program, a company proposing an innovation waiver could face a high probability of rejection, and the need to still meet the compliance deadline with a more standard technology. Because innovation waivers involved exceptions to otherwise applicable environmental rules, they would also potentially attract adverse attention from the public and environmental groups.

- o Lack of a "soft landing" alternative where technologies narrowly missed compliance with the standard:

Companies felt that where a good faith effort to implement an alternative narrowly missed the standard, they might nonetheless be forced to make a full investment in the standard control technology. After implementation of a less-polluting process that fell just short of compliance, for example, companies felt there was no assurance they would not be required to install a full end-of-pipe treatment system as well.

Overall, the risks of the process seemed to most companies to exceed the benefits of the waiver.

For EPA, the waiver had the liability of requiring substantial resources (already overstrained) to examine the validity of an individual permit application. In addition, some staff felt that the waiver might encourage companies to request extensions without a legitimate basis. Staff would be required not only to evaluate the potential adequacy of technologies with which they were unfamiliar to meet environmental standards, but to determine whether or not such technologies were genuinely "innovative." All of these decisions about an exception to the rules would need to be made in highly visible cases where staff would be risking making decisions which could turn out to jeopardize the environment.

The limitations which hobbled the 301(k) waiver in the past could prove difficult to correct. Partial remedies might include increased technical support for permit writers, defined progress steps for recipients of waivers, and some form of "soft landing" mechanism. The changes which would make the waiver more viable for industry, however, would be likely to raise concerns with public interest groups and Agency personnel. Increased

technical resources for waiver evaluations would come from other Agency activities. Increased time limits for waivers, without systematic criteria, would heighten concern of public interest groups over environmental outcomes, and over the ability of Agency staff to assess innovation waiver proposals.

An alternative might be to establish criteria within effluent guidelines for additional environmental goals which would need to be included in any permit providing alternative compliance deadlines for implementation of innovative technology. Such criteria could include additional reductions in mass and/or concentration discharge levels beyond the requirements in the guideline, or defined additional multimedia benefits. While determining appropriate parameters for such tradeoffs could be difficult, they would occur in a context of overall decisions affecting all facilities covered by a guideline, rather than in the context of a permit providing a compliance exception for an individual facility.

Extension of the 301(k) process in its current form is unlikely to be more successful in the future than it has been in the past. Its fundamental flaw is that it requires relatively large resources to make uncertain individual case decisions, and makes each such decision highly visible. All parties are at risk, with very unsure rewards, and possibly severe penalties. The flexibility is limited and, as the years since 1977 have shown, the potential public benefits are limited.

Encouraging companies to make innovative changes which both improve the environment and are more cost effective, however, remains important. An approach to innovation combining greater flexibility in day-to-day implementation of performance standards with pre-established parameters for compliance extension tradeoffs under the guidelines could provide a more realistic, workable alternative than the 301(k) program of the past. By placing priority on environmental success rather than technological judgments, such an up-front approach to the parameters could provide a more predictable and congenial atmosphere both for the implementation of technological innovations, and for the projection of environmental benefits.

1 INTRODUCTION

1.1 Purpose

The Office of Water has initiated an Industrial Pollution Prevention Project (IP3) to look at how best to promote multi-media pollution prevention in its current and future regulatory activities. One facet of the IP3 is to explore the degree to which the Section 301(k) innovation waiver provision under the Clean Water Act (CWA) has been, or could become, an effective vehicle for promoting the development and implementation of innovative pollution prevention technologies. While the 301(k) variance provision for direct dischargers expired in March 1991, a parallel provision for indirect dischargers, 307(e), is still in effect. Further, the 301(k) provision could be reactivated by Congress during the current CWA reauthorization.

The objectives of the of the 301(k) variance study for the Industrial Pollution Prevention Project are to:

- o review legislative and regulatory history;
- o examine the degree to which the 301(k) variance has been used in the past, what the results have been, and the reasons for those results;
- o analyze the problems and issues associated with such a variance;
- o evaluate the applicability and desirability of such a variance to foster industrial pollution prevention;
- o examine how, or whether, such a variance could be modified to be more acceptable to its critics and more effective in promoting industrial pollution prevention.

1.2 Overview and Organization

In 1977, Congress created an innovation waiver provision in Section 301(k) of the Clean Water Act (CWA). The purpose of the provision was to "encourage improved or cost saving technologies for meeting the national

goal of eliminating discharges of all pollutants."¹ The provision in the 1977 CWA specifically provided industry with possible time extensions for compliance with Best Available Technology Economically Achievable (BAT) effluent guideline requirements. The additional time would be used to facilitate implementation of innovative technologies which would either reduce pollution to a greater extent than BAT, or would meet BAT requirements at a significantly lower cost. No similar compliance extensions were provided for meeting Best Conventional Pollutant Control Technology (BCT), for new sources subject to the effluent guidelines, or for indirect dischargers sending releases to publicly owned treatment works (POTWs).

In the Water Quality Act of 1987, Congress expanded the applicability of innovative technology compliance extensions. It specifically added BCT to the scope of compliance variances for direct dischargers, and created a new parallel provision for indirect dischargers (section 307(e)).

Despite the renewed Congressional endorsement of the innovation waiver, it has not been a popular program. While there is no comprehensive, centralized record of 301(k) variance applications, it is clear that very few firms have applied -- perhaps as few as five. Further, only one 301(k) variance appears to have been granted. In that single case, the company had already run a successful pilot project using the innovative technology.

Why did so few firms show any interest in the waiver?

In order to answer this question, this report explores four principal topics. Section 2 presents a legislative and regulatory description and history of the 301(k) and 307(e) programs. This includes a summary of major issues and concerns raised by interested parties in industry, government, and environmental groups, either in the legislative and regulatory documents, or in public comment or legal action related to EPA regulatory actions; it also includes a review of the available information on applications submitted by industry under the 301(k) program. Section 3 is an analysis of why firms may not have taken advantage of the program, based both on public comments and on comments from contacts made for this paper. Section 4 briefly reviews other programs or approaches, including the variance program under the Clean Air Act, intended to promote the development of innovative technology to benefit the environment.

¹ Senate Report 95-370 (P.L. 95-217), in 77 U.S. Code Admin. News, p. 4375.

Section 5 reviews the viability of a revived 301(k)/307(e) provision in promoting technological innovation in pollution prevention, and briefly outlines an alternative structure for an innovative technology compliance extension which might arrive at the same objective more effectively.

2 SECTIONS 301(k) AND 307(e) OF THE CLEAN WATER ACT: BACKGROUND AND USE

Under the most recent (1987) amendments to section 301(k) of the Clean Water Act, an industrial direct discharger of toxic, nonconventional or conventional pollutants required to achieve limitations reflecting BAT or BCT under section 301(b)(2) of the CWA could request a compliance extension for implementation of innovative technology. A company could be eligible for such a compliance extension if it chose to comply with the requirements:

... by [replacing] existing production capacity with an innovative production process which will result in an effluent reduction significantly greater than that required by the limitation otherwise applicable to such facility and moves toward the national goal of eliminating the discharge of all pollutants, or with the installation of an innovative control technique that has a substantial likelihood for enabling the facility to comply with the applicable effluent limitation by achieving a significantly greater effluent reduction than that required by the applicable effluent limitation and moves toward the national goal of eliminating the discharge of all pollutants, or by achieving the required reduction with an innovative system that has the potential for significantly lower costs than the systems which have been determined by the Administrator to be economically achievable...[and] if it is also determined that such innovative system has the potential for industrywide application.

Section 307(e) provides a similar opportunity for indirect dischargers. Existing facilities may gain a compliance extension if they choose to comply with the pretreatment standards of section 307(b) by meeting the same requirements as 301(k), with the additional stipulations that the POTW owner/operator must decide to accept such an alternative (with the concurrence of the Administrator), and that the compliance extension for the indirect discharger "will not cause the publicly owned treatment works to be in violation of its permit under section 402 or of section 405 or to contribute to such a violation."

When the 301(k) provision for BAT standards was incorporated into the Clean Water Act in 1977, the original deadline for the extension was to be no later than July 1, 1987, an extension of the July 1, 1984 BAT deadline. The Water Quality Act of 1987, however, extended the compliance deadlines established for BAT limitations to no later than March

31, 1989, and allowed 301(k) compliance extensions of an additional two years for innovative technologies -- to March 31, 1991. The Amendments also offered a waiver from BCT limitations to those discharging conventional pollutants, and introduced the parallel 307(e) compliance extension for indirect dischargers.

Since the deadline for innovation compliance extensions for meeting the BAT and BCT standards was March 31, 1991, the 301(k) section has currently expired. The 307(e) program, however, has not expired; indirect dischargers are still subject to new pretreatment requirements.

2.1 Legislative and Regulatory History

The following is a brief chronology of the legislative and regulatory history of Section 301(k) and 307(e) of the Clean Water Act:

- o 1977 301(k) Provision for Innovation Waiver passed in Clean Water Act
- o September 19, 1980 Advance Notice of Proposed Rulemaking (ANPRM) for 301(k)
- o October 20, 1980 Close of comment period on ANPRM
- o September 21, 1981 Proposed Rule for 301(k)
- o November 20, 1981 Close of comment period for Proposed Rule
- o June 25, 1984 Final Rule for 301(k)
- o October 5, 1984 Petition for Review of Final Rule filed by NRDC
- o April 16, 1985 EPA's motion for voluntary remand and to propose new rulemaking on 301(k) granted
- o December 5, 1985 Proposed regulation
- o January 6, 1986 Regulations
- o Close of comment period on Proposed Regulations

- o February 4, 1987 Water Quality Act of 1987. BAT deadlines extended to March 1989. 301(k) deadline extended to March 1991. 301(k) waiver made applicable to BCT limitations. Section 307(e) added to provide innovation waiver to indirect dischargers.
- o January 4, 1989 Codified rulemaking. EPA revised 301(k) regulations to reflect changed compliance deadline and extend the waiver to direct dischargers with BCT limitations.
- o March 31, 1991 Section 301(k) expired.

2.1.1 Clean Water Act of 1977

The section 301(k) innovative technology compliance extension originated as part of a broad Congressional intent to promote and diffuse new technologies to reduce toxic discharges to water. This included altering the scope of the BAT effluent standards for existing sources to focus specifically on toxic pollutants. Improved controls for conventional pollutants were to be advanced by the new best conventional technology requirement (BCT).

Section 301(k) came from the Senate bill, with no comparable provision in the House-passed bill. The compliance extension in the Senate bill was for a maximum of two years beyond a proposed July 1983 compliance deadline for BAT. The Senate report describes 301(k) as similar to the innovative technology extension adopted by the Senate in the Clean Air Act. It states that it is intended to encourage "improved or cost-saving technologies" but also to impose a "substantial burden of proof" upon the applicant to show that its waiver request is supported by a technology which "represents a significant development for industrywide application."²

The CWA Conference Report extended the 301(k) waiver to three years beyond the 1984 BAT compliance deadline agreed to by the Conference Committee. Other than that, it retained the Senate provision. The Report discussion also stressed the importance of industrywide

² Ibid.

applicability. While states with approved NPDES programs were to be involved in making innovation waiver determinations, both the Conference Committee Report and the Senate Managers' Statement on the Conference Report emphasized the central role of EPA in assuring that such permits were not "improvidently granted."³

A more extensive intent for use of the variance comes through in the House Managers' Statement on the Conference Report. In addition to echoing the general expectation regarding an incentive to develop new processes, the House Managers point out the Administrator's obligation to encourage use of Section 301(k) and to respect the confidentiality of proprietary information regarding new processes. The House Managers also instruct the Administrator to interpret "industrywide application" liberally -- i.e., requiring no more than two plants even if the two are part of the same corporation.⁴

Since the Senate committee report specifically referred to the 301(k) innovation waiver as fulfilling a purpose similar to the innovation waiver provisions of the 1977 Clean Air Act (CAA) amendments, it is useful both to observe some of their similarities and differences:

- o One major difference between the CWA and CAA provisions is that the scope of coverage of the CAA waivers is far broader. The two compliance extensions in the 1977 CAA (sections 111(j) and 113(d)(4)) encompass innovative technology for both existing and new sources; 301(k) was restricted to existing sources, and was not inclusive for even those sources -- excluding both BCT technologies and indirect dischargers.
- o With respect to existing sources covered, however, the 113(d)(4) provision applies to facilities "unable to comply with any requirement of an applicable implementation plan."⁵ The extended compliance period for such sources is specified in a compliance order; section 113,

³ CWA, 3 Legislative History, Senate Managers' Statement (Senators Muskie and Stafford), p. 452; Conference Report, House 95-830, p. 79.

⁴ CWA, 3 Legislative History, p.452.

⁵ Section 113(d)(1) in the CAA (as amended in 1977).

in which the provision is included, is on "federal enforcement."⁶ Section 301(k), by contrast, is specifically an innovative technology provision, not tied to an enforcement measure.

- o The maximum time allowed for the air waivers was longer. The section 111(j) waiver for NSPS extends up to seven years from the time the waiver is granted, and up to four years from the beginning of operation of the innovative technology. For an existing source under 113(d)(4), a compliance order could extend five years beyond the otherwise applicable compliance deadline. By contrast, section 301(k) only offered a compliance extension for up to three years beyond the BAT compliance deadline of 1984.

The longer compliance extension in the CAA, however, was already shorter than the proposed ten years originally in the House bill.⁷ The ten year time-period had been included as a limitation on the original Ford Administration CAA innovation waiver proposal, which included no time limit.⁸

- o Another significant difference between the 111(j) and 301(k) provisions is that 301(k) avoids the oddly conflicting requirements of 111(j)(1)(A) that the innovative technology both should not "have ... been adequately demonstrated" and should provide certainty that it "will operate effectively."
- o Both the CAA and CWA provisions have a major similarity in what they do not do. They do not mandate that the states accept an innovation

⁶ One result of this placement of the innovative technology provision for existing sources in the enforcement section was that implementation was assigned to the Division of Stationary Source Enforcement (DSSE), and DSSE tended to regard it as another enforcement mechanism rather than as a means of promoting innovation. And since 113(d)(4) went to DSSE, organizational logic dragged 111(j) there as well. See Jay Evans, "Opportunities for Innovation: Administration of Sections 111(j) and 113(d)(4) of the Clean Air Act and Industry's Development of Innovative Control Technology," Volume 3 of Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series (April, 1980), NBS-GCR-ETIP 80-88, pp. 10-12.

⁷ See proposed section 111(f)(1)(D) in Clean Air Act Amendments of 1977, Report by the Committee on Interstate and Foreign Commerce, Report #95-294, 95th Congress, 1st Session, p. 358.

⁸ Ibid., pp. 196-197.

waiver program. "The Ford Administration [CAA] bill would have authorized preemption of state and local standards. By contrast, the committee bill only permits a variance from Federal standards."⁹

2.1.2 Advance Notice of Proposed Rulemaking, September 1980

On September 19, 1980, three years after passage of the Clean Water Act, the Agency put out an advance notice of proposed rulemaking (ANPRM)¹⁰ briefly outlining the initial EPA position on implementation of Section 301(k) of the Clean Water Act and asking for comments from the public. The ANPRM explained that companies could apply for a waiver from meeting the BAT deadline of July 1, 1984 if they could offer a plan with an innovation which would either reduce effluents below the BAT limits or meet the BAT effluent limits at a lower cost than BAT. As part of the ANPRM, the Agency also requested public comment on the following issues:

- o the degree to which there was genuine interest in the 301(k) innovation waiver, and whether it could in fact serve as an inducement for the development of innovative technology (specifically, "innovation in industrial wastewater treatment");¹¹
- o the adequacy of the three-year extension provided by 301(k);
- o the appropriateness of defining the potential for "industry-wide application" of a candidate innovative technology as meaning either the majority of plants, or just two or more plants, in the pertinent industrial subcategory;¹²
- o whether it would be appropriate, as EPA intended, to group the key

⁹ Ibid., p. 196.

¹⁰ 45 FR 62510, 9/19/80.

¹¹ Ibid., 62510.

¹² "Industrywide application" was not defined in either the statute or the legislative reports (perhaps because it seemed intuitively clear to be a significant, or large, proportion). As noted above, however, in the House Managers statement on the Conference Report, Congressman Roberts had stated that "for the purposes of this section industrywide application should be interpreted to include more than one plant and the plants might be a part of the same corporation." House Managers statement, op.cit., p. 341.

undefined terms in 301(k) -- "innovative production process," "innovative control technique," and "innovative systems" under the term "innovative technology" for the purposes of the program;

- o whether to include other factors not specifically mentioned in 301(k) in evaluation of whether a proposed technology was innovative -- factors such as by-product recovery, net energy consumption, recycling and reuse of wastewater, reduced abatement expenditures for other forms of pollution including air pollution or hazardous wastes;¹³
- o at what point a technology which is undergoing, or has undergone, a full-scale demonstration should be deemed "innovative" when distinguishing an innovative technology from one which has been proven;
- o the appropriate approach to duplicate technology applications;
- o whether standards for "significantly greater effluent reduction" and "significantly lower cost" should be determined case-by-case, on the basis of national norms (e.g., target percentage effluent reduction or cost reduction), or on the basis of norms established for each industrial category;
- o the appropriate enforcement response when innovative technologies failed to achieve their targets;
- o the value of requiring a verification of engineering and cost data in an application by a professional engineer;
- o the benefit of a technical appendix which would include a listing of technologies which the Agency considered to be possible candidates for designation as innovative.

¹³ Section 111(j) of the CAA included consideration of "energy, economic, or non-air quality environmental impact[s]...." Senator Muskie, in the Senate Managers Statement on the CWA Conference Report, stated that "the Administrator is expected to approve as innovative techniques those systems which provide for productive use of nutrients and reclaiming and recycling of water." CWA, 1977, 3 Legislative History, p. 452.

2.1.3 Comments

EPA received comments from a number of industries on the ANPRM. Industry respondents supported the inclusion of an innovative technology waiver in the Clean Water Act. Some, however, indicated that the waiver would be of no use if the rules and the process were not put in place quickly, since the BAT deadline was approaching rapidly and no regulations had yet been issued. Several argued that innovative technologies would take between five to seven years to develop and implement.

In addition to the timing issue, industrial respondents also stressed other factors that they felt to be essential for an effective waiver program:

- o Emphasis on process rather than end-of-pipe innovation:
 - EPA should encourage process changes rather than end-of-pipe technology. Changes in the production process could reduce costs for the company and would be beneficial to the environment. End-of-pipe technology is expensive and incurs high energy and annual maintenance costs. According to the American Iron and Steel Institute, "... the large capital investments on production units may be recovered in time, whereas almost none of the costs of EPT are recoverable."
- o Protection against failure of the innovative technology:
 - EPA should offer assurance that facilities would have time to make corrections without penalty if the innovative technology failed and they needed to install demonstrated treatment or production-process technologies. Monsanto wrote, in a letter of October 20, 1980, that unless EPA "provides some mechanism to avoid penalizing failure, the risk of attempting innovative technology development with significant resource commitment more than offsets the benefits of a three year delayed compliance deadline."
 - EPA should offer protection from citizen suits as well as EPA enforcement actions if the company made a good faith effort to install an approved innovative system.
- o Definition of "industrywide":

- Firms should not need to prove that their technology has the potential to be used in more than two facilities in an industrial category or more than one facility in at least two industrial categories. There should be no need for firms to market the technology, nor requirement that they divulge proprietary information in applying for the waivers. Firms could license and sell their innovative processes if they chose.
- o Definition of "innovative":
 - Combinations of systems which are used in innovative ways in production should be included as innovative even if the separate technologies are not innovative.
- o Defined, clear procedures for waiver application and approval:
 - The application process for an innovation waiver should be well defined. EPA and the companies involved should be required to meet interim deadlines. At the same time, the process should not require too much paperwork and firms should not be required to expend undue amounts of money to apply.
 - EPA should develop a plan for closely monitoring the company's progress in installing the approved innovation.
- o Scope of waiver:
 - The compliance variance should be extended to indirect dischargers, to conventional pollutants and to new sources.
- o Insulation from new requirements:
 - EPA should provide a grace period from changing emissions requirements after an innovative technology is installed and proven in the plant. In its letter of comment of October 20, 1980, Monsanto argued that "once a technology is defined as innovative, EPA should provide a protection period (e.g. 10 years or appropriate amortization period) during which time a discharger is not required to increase its control over the subject waste stream."

2.1.4 Proposed Rule, September 1981

EPA issued proposed regulations for the 301(k) program on September 21, 1981, and included responses to comments received from sixteen sources on the ANPRM.¹⁴ The Agency's proposed decisions included:

- o Retain the grouping of the terms innovative system, control, and production process.
- o Assess on a case-by-case basis whether a technology could achieve significantly greater effluent reduction (to be assessed on a mass-loading rather than concentration basis) or significantly lower cost than BAT.
- o Define the term "industry-wide" to include innovative technologies which might be used at one or more facilities in any two industrial categories.
- o Refrain from trying to anticipate or list potential innovative technologies in a technical appendix.
- o Keep the extension deadline at July 1, 1987.
- o Continue to consider a technology innovative for as long as possible with respect to additional 301(k) applications for the same technology.
- o Avoid seeking penalties from dischargers with section 301(k) permits that could demonstrate making all possible efforts to achieve compliance with permit limitations. Dischargers would then have to install other technology necessary to meet BAT limitations. EPA would require compliance as expeditiously as possible and would initiate enforcement actions to place permit violators on schedules toward compliance.
- o Possibly allow firms whose waste streams included both conventional and toxic pollutants and who might have treated both streams with the same equipment a compliance waiver. Enforcement Compliance Schedule Letters (ECSLs) would be issued on a case-by-case basis for

¹⁴ 46 FR 46597, September 21, 1981.

those firms required to meet BCT (Best Conventional Treatment) standards. These would state that EPA, subject to certain conditions, could refrain from civil actions to enforce compliance with BCT requirements. "The purpose of the ECSL would be to allow permittees proceeding in good faith to install section 301(k) technology which will achieve both BCT and BAT."

- o Require certification of the engineering data and cost estimates.
- o Prohibit extension of section 301(k) to indirect dischargers, new sources, or dischargers of exclusively conventional pollutants.

In addition to these issues, EPA proposed a three phase application process under section 301(k):

- o In the first phase, the applicant would show how the new technology would meet the qualifications for innovation and would be applicable in at least one other facility. The discharger was also required to include an evaluation of how it would meet BAT standards if the innovation failed. During this phase, the applicant and EPA or state technical personnel would begin discussions about the proposed innovative technology.
- o After the request was prepared, it would be reviewed by the regional or headquarters coordinator and then sent to a panel of EPA and state personnel familiar with the industrial category. The panel would decide whether the technology was innovative, offered a significant cost savings or effluent improvement, and had the potential for application in another plant.
- o Once approved, a permit writer would write the permit including a compliance schedule calling for implementation of the innovative technology no later than July 1, 1987. The permit would require regular evaluations of progress in installation and compliance with limits once installed.

2.1.5 Comments

Comments on the proposed rules were received from industry and the Natural Resources Defense Council (NRDC). Industry comments repeated

many of the comments made in response to the ANPRM, particularly concerns about the shortness of the time deadlines since no regulations had yet been promulgated, and a fourth year had passed since passage of CWA. In addition, they noted lack of protection from citizen lawsuits, vague interpretations of some of the issues in the proposed rule by EPA, and burdensome procedures such as certification by a professional engineer.

NRDC supported section 301(k) when it was adopted in the 1977 Clean Water Act amendments. However, in its November 20, 1981 letter commenting on the proposed regulations, NRDC argued that the incentive needed to be limited in order for the program to be successful. NRDC's main areas of disagreement with the proposed rule were that:

- o The proposed rules ignored the distinctions between innovative systems, production processes, and control techniques that Congress made when writing the section. EPA grouped all three terms under the term "innovative system." NRDC wrote that "only with respect to innovative systems did Congress intend to provide extensions solely on the basis of cost savings. Such a system can justify the extension even if it does not result in better effluent reduction. By contrast, a production process change or a control technique cannot justify an extension where it results in cost savings without 'significantly greater' effluent reduction as well as movement toward the elimination of discharge." NRDC argued that Congress did not want "to permit extensions when a discharger merely wishes to cut costs by modernizing its production capability."
- o EPA defined the term "industry-wide" too broadly. NRDC proposed a definition that would require the applicant to demonstrate that the technique could be applied to a majority of plants in the industrial category. Even if EPA did not expand the definition, the Agency would need to assure that the innovation could be made commercially available to other firms.
- o EPA should not be permitted to grant 301(k) extensions in the absence of categorical BAT effluent limitations. "Any case-by-case proposal to use a process, technique, or system that is effective and affordable must be considered to be BAT for that discharger.... Where EPA has not made an industry-wide BAT determination, we believe a so-called innovative technology plainly qualifies as BAT."

- o EPA should make it clear that section 301(k) would not be available to "new dischargers."¹⁵
- o EPA should not allow the compliance deadline waivers to be extended to BCT through the use of ECSLs.
- o EPA should not require the states to grant 301(k) extensions.
- o EPA should not grant longer than necessary waivers to install the innovative processes, techniques or systems.

2.1.6 Final Rule, June 1984

The final rule was promulgated on June 25, 1984.¹⁶ For purposes of the rulemaking, it was issued on July 9, 1984 and scheduled to be effective August 8, 1984. The rule appeared over two years after the proposal and only three years before expiration of the 301(k) provision.

There were few changes from the proposed regulations. The most significant revisions were:

- o A technology would be considered "innovative" until it had been successfully operated at full scale in a commercial plant for a full cycle of the plant's operation.
- o The requirement for engineering data from a certified engineer could be waived on a case-by-case basis, and would in any case be limited to an assertion that the estimates in the application were made in accordance with good engineering practices, rather than (as in the proposal) a certification that the project-life cost estimates in the application were accurate within 15%.
- o Administrative Orders, instead of ECSLs, could be issued for firms with

¹⁵ A "new discharger," unlike a "new source," is a facility which, although it existed, "did not commence discharging before August 13, 1979, which is not a new source, and which has never received a finally effective NPDES permit." If a facility was constructed after issuance of NSPS for its industrial category, it is a "new source." 50 FR 49907.

¹⁶ 49 FR 25978, June 25, 1984.

the waiver who also needed to meet BCT limitations with the same innovative technology.

- o Applicants could apply for the innovative waiver program even after the public hearing period for their permit was over, if permission was granted by the Regional Administrator.
- o Proprietary information would be protected.

EPA noted in its discussion of the final rule that the Agency had "already received applications for 301(k) extensions which contend that savings of over eight million dollars will result, and that improved effluent treatment will occur."

2.1.7 NRDC v. EPA

On October 5, 1984, NRDC filed a petition for review of the final rule in the United States Court of Appeals for the District of Columbia (NRDC v. EPA, D.C. Circuit No. 84-1500). The basis for the suit was that EPA had not addressed certain comments submitted by NRDC in response to the proposed rule (September 21, 1981) in the final rulemaking of June 25, 1984.

EPA filed a motion for voluntary remand of the case on January 15, 1985 in order to propose a new rulemaking under 301(k), and to reopen the entire section 301(k) rule for reconsideration and public comment. NRDC opposed the voluntary remand on the grounds that it was less interested in the technical failure of EPA to respond to its comments than it was in obtaining judgment on the substantive issues in which it felt EPA's rule violated the CWA. The issues raised were primarily those previously raised in comments on the proposed rule.¹⁷ EPA's motion was granted on April 16, 1985.

¹⁷

Response of Natural Resources Defense Council in Opposition to Respondent's Motion for Voluntary Remand, January 25, 1985, NRDC v. EPA, U.S. Circuit Court of Appeals for the District of Columbia Circuit, No. 84-1500.

2.1.8 Proposed Regulation, December 1985

EPA published a new proposed rule on December 5, 1985.¹⁸ This notice responded to three main issues raised by NRDC, and proposed minor revisions to the 301(k) rule. The entire section 301(k) was opened to reconsideration and public comment.

What may have been more important in some respects than the substance of the issues raised or resolved in this proposal were two crucial factors which had been recognized since the passage of 301(k) and the beginning of the rulemaking process as having central importance:

- o the problem of adequate time -- the re-proposal was taking place only one-and-a-half years before the final expiration deadline for any compliance extensions; and
- o the problem of uncertainty -- the NRDC suit had succeeded in making an already dubious process even more uncertain for any prospective (or even current) applicants.

The specific issues raised in the proposal included the following:

- o NRDC contended that Congress did not intend for the three undefined terms -- innovative "production processes," "control techniques," and "systems" -- to be placed under the umbrella term "innovative technology," and that lower costs were only eligible for a waiver with respect to "systems." EPA argued that NRDC's effort to construe an innovative treatment "system" as being something conceptually separate from a production process, a control technique, or some combination of the two, made little substantive or legislative sense. The Agency reaffirmed its approach, with minor clarification of the definition of "innovative technology."
- o NRDC argued that "industrywide" should require broad applicability in an industry sector. EPA used the statement of Congressman Roberts (above) as adequate evidence that the only specific reference to the issue in the legislative history supported its position of applicability to at least two plants.

¹⁸ 50 FR 49904, December 5, 1985.

- o Finally, EPA proposed to retain the availability of section 301(k) extensions for permittees with BAT limitations based upon Best Professional Judgment (BPJ) where BAT effluent guidelines had not been developed. The Agency rejected as too narrow NRDC's interpretation that, in the absence of a guideline, any innovative technology proposed by a discharger who planned to install and operate the technology should be considered BAT for that discharger.
- o EPA also addressed NRDC's concerns on a few other issues. The Agency amended its rules on the length of time a technology is considered "innovative" by requiring the Administrator to make a judgment of "no commercial demonstration" each time a 301(k) compliance extension was to be granted. It changed the rules to make clear states were free not to offer section 301(k) extensions. Finally, it clarified the fact that extensions would only be available for the amount of time necessary to install and start-up the innovative technology, but in any case would not extend beyond July 1, 1987.

2.1.9 Comments

Both the general apathy about the program and the extremely short remaining time period for use of the 301(k) provision were reflected in the fact that only four comments were submitted in response to the 1985 proposed rules. Two were from industry, and the others were from the Department of Energy and NRDC. One industry respondent argued that innovation waivers should be allowed for dischargers of conventional pollutants. The other supported EPA's proposed rules with some minor exceptions.

DOE supported EPA's interpretation of "industrywide," and argued that while a recipient of an innovation waiver should make information available concerning its process, it should not be required to market it. NRDC restated its points on the length of time a technology should be considered innovative, that innovative technology should be made available to other firms, and that new dischargers should not be eligible for the extension.

2.1.10 Water Quality Act of 1987

Congress revised section 301(k) in the Water Quality Act of 1987 (WQA)¹⁹ before the final rules were promulgated. Under these amendments, direct dischargers of conventional pollutants were allowed to apply for an extension from BCT limitations and the maximum compliance extension from both BAT and BCT limitations was limited to two years beyond the otherwise applicable date. The WQA amendments changed the BAT and BCT compliance dates for direct dischargers from July 1, 1987 to no later than March 31, 1989. This allowed innovation waivers for direct dischargers to be available until March 31, 1991.

In addition to expanding the applicability of 301(k) to innovative technological alternatives to BCT, Congress opened the innovation waiver program to indirect dischargers. A new section, 307(e), was created which references 301(k), and allows POTWS, with concurrence of EPA, to grant two year compliance extensions for indirect dischargers utilizing innovative technologies to meet applicable pretreatment standards. Since establishment of pretreatment standards is on-going, the 307(e) provision has not expired.

The extension of the time for the technology waiver in the Water Quality Act of 1987 originated in the House version of the 1986 bill; it had been incorporated into the Water Quality Act of 1986 (which passed the Congress but was vetoed). In extending the availability of the waiver, the House Report recognized that use of Section 301(k) had been hampered by delays in publication of effluent guidelines and stated a belief that "[t]here is still potential for the kinds of innovative processes contemplated by the 1977 Amendments."²⁰

The Conference Report on the 1987 amendments also clarified the meaning of "industrywide application." The phrase required only "technical feasibility" of use, but required that such feasibility apply to a "significant portion of the facilities in an industrial category or subcategory," and that the technology "be made commercially available by the applicant, unless the

¹⁹ Pub. L. 100-4, section 305, 101 Stat. 7, 34-35 (1987).

²⁰ Water Quality Renewal Act of 1986, House Report No. 99-189, July 2, 1985, p. 24.

applicant is the only facility in the subcategory."²¹

2.1.11 Codification Rulemaking, January 1989

On January 4, 1989, as part of a rulemaking codifying legislative and court-specified changes to NPDES regulations, EPA revised the 301(k) regulations to reflect the changed compliance deadline and the extension of the waiver to direct dischargers with BCT limitations.²² The Agency did not, however, formulate or propose changes to other regulatory provisions relevant to innovation waivers -- such as the interpretation of "industrywide," the interpretation of the components of "innovative technology," definition of the term "significantly greater effluent reduction" for purposes of BCT, or the application of the 301(k) provisions to indirect dischargers under 307(e). It stated that these revisions and other issues would be considered in subsequent notice and comment rulemaking.

2.1.12 Subsequent Actions Relating to Section 301(k)

Although EPA developed draft regulatory language for 301(k) and other NPDES permit issues, these changes were never formally proposed. Since the last possible date for a 301(k) compliance extension was March 31, 1991, direct dischargers could no longer take advantage of the provisions. But proposals for the interpretation of the remaining issues under 301(k) were still being considered, since they would provide the basis for innovation waivers for indirect dischargers under section 307(e).

Subsequent to the remand of the 1984 301(k) regulations to EPA by the Appeals Court, EPA had been required to report periodically to the Court on progress on revision of the regulations. In 1993, EPA and NRDC jointly requested the Court to vacate the 301(k) regulations.

Continuation of the 301(k) innovation waiver is included in the "Water Pollution Prevention and Control Act of 1993" (S. 1114) -- the clean water reauthorization bill introduced by Senators Baucus and Chafee. Section

²¹ Conference Report for the Water Quality Act of 1987, reprinted in Legislative History 2 U.S. Code Cong. and Admin. News (1987), pp. 21-22.

²² 54 FR 246, 1/4/89.

502(h) of the bill amends and extends the applicability of 301(k) -- instituting a range of requirements to ensure innovativeness and compliance with alternative limits during the period of the waiver. The bill also limits the time extension under the waiver to 90 days, with the possibility of granting an additional 90-day period.

2.2 Applications Submitted under 301(k)

Current information indicates that only five companies applied for compliance extensions under Section 301(k). Four of the five were Inland Steel, LTV (Republic) Steel - Cleveland, USX - Lorain, and Great Lakes (National) Steel - Zug Island. No information is available at EPA headquarters on any of these applications. EPA Region 5 has a partial file on Inland Steel, which received a 301(k) compliance extension. The Regional Office does not have information on whether any other extensions were granted, or the specific nature of the applications of the other steel companies. Most government officials contacted (federal and state) indicated that their files on 301(k) are nonexistent or do not go back that far.

The June 25, 1984 Final Rule stated that "all applications approved by the State Director or Regional Administrator shall be submitted to the [technical] review panel for technical evaluation. The Panel members (to be appointed by the Director of the Office of Water Enforcement and Permits) will consist of Headquarters, Regional, and State personnel familiar with the industrial category in question. They will review all applications which the State Director or Regional Administrator believe are worthy of consideration." This type of organizational approach to 301(k) application reviews was also called for in the September 21, 1981 proposed rules. Officials in EPA's Office of Wastewater Enforcement and Compliance in the Office of Water, however, indicated that no applications received by EPA were ever reviewed by such a Panel. Further, these officials were unsure if a Panel was ever assembled.

Representatives of the steel companies (above) which had submitted 301(k) applications, with the exception of Inland Steel, were unable to find any records relating to 301(k). An official at Great Lakes National Steel indicated that he might have heard of the variance years ago, but was unable to find the records in the company's archives. A former EPA analyst who worked on the Inland Steel application remembers that other steel companies initially showed some interest in the waiver and the innovative

process to be used by Inland Steel, but that the demand for steel was declining so fast in the early 1980's that production was reduced to the point that plants were being closed. Permit limits could generally be met at those operations remaining open.²³

No record has been found to date at the Agency of any applications for 307(e) compliance extensions.

2.3 Inland Steel

In August of 1982, Inland Steel inquired about a compliance extension for an innovative blast furnace recycle system blowdown treatment facility which would service 5 furnaces. This technology was based on a pilot project conducted at the facility and was projected to result in effluent quality equal to the applicable BAT effluent limitations for ammonia-N, lead, and zinc, and about half of the BAT limitation for total cyanide. The technology was also projected to be cheaper than the applicable BAT; Inland Steel estimated it would save \$2.6 million in investment and \$600,000 in annual chemical costs.²⁴

At the time of Inland Steel's inquiry in 1982, final rules for section 301(k) had not been promulgated. At the request of EPA Region 5, Inland Steel sent the application to the Indiana State Board of Health (ISBH). EPA offered to assist ISBH in assessing the compliance extension request. It appears that subsequently EPA approved an extension, although not through July 1, 1987 as requested, but rather through January of 1985.²⁵ A draft permit was issued in September of 1983.

Ultimately, the innovative process for which Inland Steel received the 301(k) waiver was utilized for only a few months. It was designed to service six furnaces. Two of the furnaces were located about two miles away, thus requiring construction of a three million dollar pipeline. Before

²³ Gary Amendola, former Senior Iron and Steel Specialist, EPA Region 5.

²⁴ The relevant excerpt from Inland Steel's permit is attached in Appendix A.

²⁵ Letter from Gary Amendola, EPA - Region 5, to Larry Kane, Division of Water Pollution Control, Indiana State Board of Health, November 15, 1982.

the process became operational, two of the other four furnaces were shut down because they were old and unneeded. It was decided that effluent limits for the two furnaces located two miles away could be met by quenching their slag with the wastewater from the scrubbers instead of building the costly pipeline. After the innovative process, installed at a cost of \$12 million, had been in operation for a short period of time, Inland Steel concluded the process was not needed to meet effluent limits. During that period it did not generate enough ammonia to work effectively with the two remaining furnaces, and Inland found that the wastewater from these furnaces could meet the permit effluent requirements without further processing. It is not known whether the system would have performed had it been given a longer testing period and had it been servicing all six of the furnaces for which it was originally designed.²⁶

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Information from Bob Johnston, Staff Engineer, Inland Steel.

3 WHY FIRMS DID NOT TAKE ADVANTAGE OF THE 301(k) COMPLIANCE WAIVER

Even if more firms showed interest in the 301(k) innovation waiver than the available EPA historical records show, it is clear that the waiver was not a popular option for companies. It certainly did not succeed in its mission of spurring innovative technology.

In discussions with industry and government officials about why so few companies took advantage of the 301(k) compliance extension, three basic barriers have been suggested:

- o The risks to the firm for attempting to use innovative technology outweighed any potential benefits in most cases. These risks included: 1) the expenditure of substantial amounts of capital on technologies which ultimately might fail, while tried solutions were available at known costs; 2) failure to meet BAT guidelines with the innovative technology, which could result in compliance actions or civil suits, and further expenditure of funds on a conventional solution; 3) the potential need for specially trained workers and/or sensitive machinery for innovative technology which could add costs ; and 4) time consuming procedures which could delay implementation of the innovative process.
- o The interpretation of section 301(k) was unclear to industry. Much of the uncertainty had to do with the fact that the rules were promulgated slowly, key terms in the section were undefined and controversial, and corporate confidence that the Agency was favorably disposed to granting the waivers was limited. In addition, states had the option to refuse to grant innovation waivers.
- o Lastly, the requirement that the technology be innovative remained ambiguous. The height of the hurdle, from imaginative engineering application to fundamentally new concept, remained unclear, either regulatorily or in administrative application.

3.1 Risks to Firms

The largest number of comments received in response to the 301(k) Federal Register notices, and the most frequent observation from industry

and government officials contacted for this study, focus on perceived risks to the firms applying for a 301(k) extension as the main deterrent to pursuing a compliance waiver.

3.1.1 Possible Failure of Innovative Technology

Utilizing untried technology can be risky for firms. Changing a production process or installing an innovative treatment system often requires large capital costs, time expenditure, and research and development. Many companies do not have large sums of capital for research and development nor the staff to undertake development projects. These firms would be more likely to use conventional means to meet their permitted effluent limits. The 301(k) program provided no monetary or technical assistance to help these companies develop innovative solutions, or to offset the risks of failure. For small, undercapitalized firms, a failure of an expensive innovative system could put them out of business. In addition, the risk of injury or adverse health effects which could result from a failed technology must be considered as disincentives to innovate.²⁷

In addition, a firm with an approved waiver request might find that its innovative technology fails to meet the criteria for the waiver, although the technology might not be a total failure. The system might fail to perform quite at the expected level, and thus fall short of the BAT/BCT standard, or the system might take longer than expected to meet the standard, leaving the plant out of compliance at the expiration of the variance. In either case, the 301(k) waiver would require the facility to install standard engineering systems to come into compliance with BAT/BCT. For plants undertaking an innovative process technology just barely missing the BAT target, this could mean investing in the treatment system the plant had been trying to avoid in the first place. Where an innovative treatment system fails, there is the potential additional cost of standard technology.

The case of time-related problems may be most significant as a deterrent for using a 301(k) waiver for innovative process technology. One of the uncertainties about any new technology, even when it involves imaginative application in a specific plant of a technology which is in use in

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See comments by American Paper Institute/National Forest Products Association, November 20 1981; Scott Paper Company, October 16, 1980; American Iron and Steel Institute, October 17, 1980; Monsanto, October 20, 1980; Olin Corporation, October 17, 1980.

some form elsewhere, is how long it will take, even if successful, to reach the originally projected level of performance -- either with respect to product or environmental parameters. A metal-plating plant in Massachusetts (visited as part of a related project) replaced its nickel-chrome plating process with an alkaline-zinc plating process for shopping carts.²⁸ The changed chemistry affected not only the plating line but the wastewater treatment system design. When the new system was originally installed, the company found unexpected spikes in zinc levels in effluents. Initially these spikes were well out of the compliance range. It required four years, and a significant number of ad hoc improvisations, to understand the process sufficiently to reduce the spikes to compliance level. At that point, the company still found unacceptable (from an operating perspective) variations (although now within compliance limits) that staff could not predict and did not understand.

While this particular case did not involve a 301(k) or 307(e) waiver, it does illustrate the type of potential technical problem which could make such a waiver unappealing. The technology, in this case, did not "fail" either in terms of environmental benefit (considering what it replaced) or production. But it might have "failed" in meeting a waiver deadline.

Several companies specifically indicated that the limited time of the 301(k) waiver was too short to implement and successfully use the technology, thus increasing the probability of failure.²⁹ An article in Chemical Engineering News (November 2, 1981) entitled "Project Selection in the 1980's" by J.B. Weaver was submitted by one of the commenters. The study (not specific to environmental issues) shows that, in most cases, the time elapsed from project proposal to operation of the technology can be anywhere from 5 to 6 years. The commenter noted that this would not leave sufficient time under the permit for implementation of an innovative technology before mandatory deadlines for compliance were reached.

²⁸ See draft report, prepared for IP3 by Kerr & Associates, "Incentives and Disincentives for Adoption of Pollution Prevention Measures under the Clean Water Program."

²⁹ Comments by Air Products and Chemicals, Inc., October 22, 1981; Washington Legal Foundation, November 20, 1981; Chemical Manufacturers Association, November 20, 1981.

3.1.2 Possible Lawsuits

One of the potential costs of failure -- whether marginal, major or time-related -- was the absence of any legal assurance from EPA that the permittee would not be subject to enforcement action and citizen suits immediately after the expiration of the waiver. Assurance by the Agency that it would try to provide a reasonable framework for subsequent compliance was not considered sufficient by some companies because of the potential for litigation by citizen groups. For many firms, the possibility of immediate court action in the event of technical inadequacy -- regardless of the extent of the failure or of the effort made -- outweighed any potential economic benefits from experimenting with a new and unproven technique.³⁰

3.1.3 Additional Costs to Train Workers

For smaller firms, not only the capital expenditures for the equipment necessary to implement the new technology but the costs to train existing staff or hire skilled employees may pose barriers to innovation. Small firms may often have difficulty in finding employees with the necessary experience or training, and re-training can be a lengthy and costly process. If such a firm believes there is a significant risk that the new technology might have to be entirely replaced because of a failure, even a marginal failure, to meet environmental standards, these barriers are likely to become insurmountable.

One of the commenters on the proposed 301(k) regulations, an owner of a metal finishing plant, stated that he had actively pursued innovative solutions to the plant's pollution problems, and reported that he was "scared to death to go on vacation, for fear that something might happen to the equipment and endanger it or the welfare of his staff." He noted that the plant has been used by EPA as an example of successful innovation.³¹

³⁰ By contrast, section 111(j)(2)(A) of the Clean Air Act specifically provided that EPA could grant the permittee up to a three year additional extension to come into compliance if the innovative technology failed.

³¹ Comments by Gary Trehy, Rampard Industries.

3.1.4 Time Consuming Process

The firm may also face the risk that EPA's application process might be time consuming and costly, and that the application would ultimately be rejected. This situation could cause a problem in meeting compliance deadlines. Even if EPA ultimately granted the applicant a waiver, the delay could leave little time for implementation of the innovative technology before the deadlines expired.³²

3.1.5 Additional Issues

The structure of many large corporations might also affect the decision as to whether to try an innovative solution to a pollution problem. In many cases, the person in charge of company pollution controls or safety is mid-level. He may not be willing to put his job on the line by pursuing a risky policy.

In addition, some of the industries contacted about the 301(k) innovation waivers program expressed concern over the possibility of bad press associated with the program. In essence, the program allows a facility to abide by less strict pollution guidelines than other facilities in the industry category until the innovative technology is in place and working or until a specified time limit (3 year maximum). The public, including environmental groups, are perceived as focusing less on potential long-term benefits of a successful application of the innovation waiver and more on the immediate pollution problem. Many companies fear that the "bad press" generated by these groups will affect the marketability of their products and, therefore, are not interested in attempting an innovation waiver.

Some of those perceiving this as a problem suggested solutions to alleviate it might include working with environmental and public interest groups to help them fully understand the program and its repercussions. Also, constant communication between EPA, the facility, and the public while the facility is implementing and monitoring the innovative technology

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Comments by Union Camp, November 19, 1981; Monsanto, October 20, 1980.

could eliminate some confusion or apprehension about the program.³³

3.2 Uncertainty of the 301(k) Program

3.2.1 Rules Promulgated Slowly

Congress added Section 301(k) as part of the CWA in 1977. The process of implementing the section by EPA began in 1980 with the Advance Notice of Proposed Rulemaking. A proposed rule and final rule were put out by EPA in 1981 and 1984, respectively. After the subsequent litigation by NRDC, EPA again proposed 301(k) rules in 1985. By the time of the re-proposal Congress was already well along in the process of reauthorizing the CWA. Before a new final rule was promulgated, Congress amended the CWA with the Water Quality Act of 1987. While final rules changing the dates of availability of the 301(k) waiver and including BCT within the scope of 301(k) were made final in 1989, final rules on the controversial remaining issues, and on the expansion of the innovation waiver to include indirect dischargers under 307(e), have never been promulgated.

A primary reason for the slow and lengthy rules process was that the EPA staff was overtaxed. During the late 1970's, EPA was working on the basic rules of the NPDES permitting system, which were not made final until 1979. According to a former EPA official, it was not until 1980 that the staff had the opportunity to start drafting the rules for the 301(k) provision. During the rulemaking period there were also several office reorganizations which may have slowed their progress. Other factors contributing to slow promulgation was the perception within EPA that the Congressional intent of the legislation was unclear and that there was not overwhelming demand by industry for the program.³⁴

³³ Comments, op.cit. on ANPR and proposed rules; Mark Mahoney, EPA, Region I, and by Frederick Moore, Union Carbide, Danbury, Conn. (personal communications).

³⁴ Tom Laverty, formerly EPA Permits Division (personal communication).

3.2.2 Lack of Agency Commitment to the Innovation Waiver Program

Some industry representatives doubted EPA's commitment to the waiver. They believed that the Agency was interested in enforcement rather than in finding innovative solutions to pollution problems. Some Regional enforcement personnel also indicated that interest in innovation among enforcement personnel was limited; they sought compliance. For them, waivers often were seen merely as a way firms might postpone compliance.

As a practical matter, it would have been difficult for EPA permit writers to encourage use of the waiver. The lack of a defined process for reviewing applications and the ambiguity in the definitions would have made it extremely time consuming to process the applications. A former Region 5 EPA official who worked on the waiver application for Inland Steel said that processing it "chewed up an extreme amount of [his] time". In his opinion, waivers are an inefficient way of trying to promote innovation.³⁵

3.2.3 Option of States not to Grant Innovation Waivers

Federal regulations are merely guidelines for the states. States have the option to regulate more stringently than the federal guidelines outline. This option thus allows states not to grant innovation waivers, since not granting them is more stringent than federal guidelines. Many industries felt the states did not want to bother with the paperwork and time required to proceed with an innovation waiver.³⁶

3.3 Ambiguity of the Requirement that the Technology be Innovative

Congress never defined what was meant by "innovative." The issue was raised by EPA in the various Federal Register notices, and in the NRDC suit. The issues were defined in terms of "duplicative" proposals, the length of time a technology would still be considered "innovative," and the

³⁵ Gary Amendola, former Senior Iron and Steel Specialist, EPA Region 5 (personal communication).

³⁶ Michael Hayes, Illinois State Environmental Protection Agency (personal communication).

relevance of imaginative engineering adaptations to specific situations of technologies which, in some generic form, were already in use. Even the distinction in the law between the terms "innovative system, techniques or production process" became an issue of contention, with NRDC arguing that only an innovative "system" (somehow distinguishable from either a technique or production process) could qualify for the waiver based on cost considerations. Innovative production processes and control technologies would need to reduce effluent below categorical limits.

Obviously the varying definitions of "industrywide applicability" were also relevant to this dispute. If "industrywide" could mean two plants, then innovative engineering adaptations might pass the test. If "industrywide" required applicability to the majority of plants in an industry sector, then the technology involved would have to be more of a fundamental breakthrough. The definition of "industrywide" was finally resolved by Congress in 1987 as referring to a "significant proportion" of the facilities in an industry sector or subsector, thus leaning towards a concept of innovative technology involving a more fundamental change.

The lack of final determinations on all of these issues related to the concept of "innovativeness" would have made it difficult for companies to apply for a waiver, or for regulators to determine whether particular applications were appropriate.³⁷

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Comments by Dow Chemical, November 11, 1981; NRDC, November 20, 1981 and February 13, 1987; American Iron and Steel Institute, October 17, 1980; American Textile Manufacturers Institute, Inc., October 20, 1980; Hunton and Williams on behalf of Utility Water Act Group, Edison Electric Institute, American Public Power Association, National Rural Electric Cooperative Association, January 6, 1986; Michael Hayes, Illinois EPA (personal communication).

4 SIMILAR/ALTERNATIVE REGULATORY MECHANISMS USED TO PROMOTE INNOVATIVE CHANGES IN PRODUCTION PROCESSES, SYSTEMS OR TECHNOLOGY

The federal, state and local governments have offered other ways of promoting innovative changes in pollution prevention and control technologies. Among those are other waivers for innovative technology, encouragement of pollution prevention in enforcement settlements, and flexibility in compliance deadlines on a case-by-case basis. Another major incentive for both pollution prevention and innovation can be the imposition of more stringent water quality standards in permits.

4.1 Other Compliance Waiver Programs for Innovative Technology

In addition to the innovation waivers available under section 301(k) of the Clean Water Act, there are other compliance waiver programs for innovative technology at both the federal and state levels. Examples include the innovation waivers under the Clean Air Act, the Illinois Toxic Pollution Prevention Act and a former waiver from air standards in Massachusetts which gave companies time to reformulate their processes to emit fewer VOC's to the air.

4.1.1 Innovation Waivers under the Clean Air Act

The Clean Air Act amendments of 1977 contained provisions (discussed in section 2.1.1 above) providing waivers for the development and implementation of innovative technological control systems. Innovative technology waivers for new major sources of air pollution were authorized under Section 111(j), and delayed compliance orders for existing major stationary sources using "new means of emission limitation" were authorized under Section 113 (d)(4).

Under the section 111(j) provision, the waiver could be granted if the technology had not been previously demonstrated, but it was nonetheless known that it would operate effectively, and that it would be likely to either reduce emissions below the level required by NSPS or achieve a reduction equivalent to NSPS "at lower cost in terms of energy, economic or non-air quality environmental impact".

While more successful than the CWA waiver provision, relatively few firms have applied for innovation waivers under the Clean Air Act. The assignment of the program to the Division of Stationary Source Enforcement, the lack (similar to 301(k)) of a clear definition of "innovation," and the somewhat contradictory requirements for known effective operation in the absence of any demonstration may have contributed to its lack of use, as well as the general reluctance to enter an uncertain process. The time period, while potentially longer than under 301(k), is still regarded by industry as short.³⁸

Despite the difficulties, at least ten waivers have been granted to assembly plants for automobile and light duty truck surface coating operations. EPA had established a standard of 1.47 kg VOC/liter of applied coating solid for topcoat operations. This was based on the use of water-borne coatings for solid-color top-coatings (or could alternatively be met with incineration or carbon adsorption units for solvent-based coatings). Foreign manufacturers, however, had developed a coating which involved a base coat covered by a clear coat (BC/CC), which gave the car a glossier look and a presumed competitive advantage. BC/CC coating operations in Japan, however, were operating at emissions level over twice the U.S. standard. The plants requested the waivers in order to have the time to experiment with and develop BC/CC coating systems which could comply with the EPA standard. The waiver temporarily raised the emissions limit for VOC's per liter of applied coating solids in order to provide time to get the new system operating properly to meet the standard.³⁹

Two additional waivers were granted to a mine-mouth coal utility in Homer City, Pennsylvania, and to a kraft pulp mill plant in Georgia.⁴⁰

³⁸ See Jay Evans, "Opportunities for Innovation: Administration of Sections 111(j) and 113 (d)(4) of the Clean Air Act and Industry's Development of Innovative Control Technology," Volume 3 of Incentives for Technological Innovation in Air Pollution Reduction: An ETIP Policy Research Series (April, 1980), NBS-GCR-ETIP 80-88, pp. 10-12.

³⁹ See 47 FR 34342, 8/9/82; 49 FR 5452, 2/4/84, 50 FR 36830, 9/9/85, and JoAnn McNally Muir, "Pollution Prevention Regulatory Review: Part III: The Air Program," New Jersey Department of Environmental Protection, Division of Science and Research and Office of Pollution Prevention, pp. 14, 28.

⁴⁰ See 40 CFR 60.47; 50 FR 6316, 2/14/85.

4.1.2 Illinois Toxic Pollution Prevention Act

On September 11, 1989, the Illinois General Assembly approved the Illinois Toxic Pollution Prevention Act. The purpose of this Act is to reduce the disposal and release of toxic substances to the environment, to promote toxic pollution prevention, to establish State programs that provide high-level attention to toxic pollution prevention policy initiatives, to integrate existing regulatory programs to promote toxic pollution prevention, and to stimulate toxic pollution prevention strategies by industry.

The Act defines toxic pollution prevention as "in-plant practices that reduce, avoid or eliminate: (i) the use of toxic substances, (ii) the generation of toxic constituents in wastes, (iii) the disposal or release of toxic substances into the environment, or (iv) the development or manufacture of products with toxic constituents through input substitution; product reformulation; production process redesign or modification; production process modernization; improved operation and maintenance of existing production process equipment and methods; or recycling, reuse or extended use of toxic substances by using equipment or methods which become an integral part of the production process."

Under section 6(c) of the Act, companies which submit acceptable Toxic Pollution Prevention Innovation Plans after January 1, 1990 are eligible for regulatory incentives. A Toxic Pollution Prevention Innovation Plan would propose reduction of toxics "through the use of an innovative production process involving a new application of technology or a combination of existing technologies that have not previously been implemented together." If Illinois EPA concurs with the plan submitted by a company, the environmental incentives for which the company could be eligible are stated in the Act as including:

- (1) expedited coordination and processing of any applicable permit applications;
- (2) cooperation, as appropriate, with any request for an applicable variance, adjusted standard or site-specific standard pursuant to the Environmental Protection Act; and
- (3) appropriate technical assistance to avoid or eliminate any potential

compliance problems resulting from the proposed process.⁴¹

The first company to submit a proposed innovation plan under this Act was LaClede Steel in Spring 1990. LaClede generates high volume waste containing lead and zinc during its operating process. This waste is classified as RCRA waste K061 (emission control dust/sludge from the primary production of steel in electric furnaces). A baghouse collects the emission dust which has been stored onsite.

In its innovation plan application, LaClede proposed to change its process by adding a step in which the dust would be separated into a nonhazardous stream which could be landfilled and a hazardous stream which would be remelted and recycled back into the process. This process change would be an in-line, onsite, closed loop recycle step which would eliminate the need for landfilling a hazardous waste. LaClede felt that the economics of the process, however, would be significantly affected by whether existing stores of the hazardous emission control dust (RCRA hazardous waste K061) could be retained on-site until the process was on-line, and then gradually reduced by being utilized in the process. The innovative technology instituted was being developed with a Norwegian company. Both U.S. EPA and other companies have indicated interest in this new system.

In filing an innovation plan, LaClede hoped to get assistance with its air permitting, and technical assistance with any compliance problems which might arise due to implementation of processes and practices proposed in the application. One specific objective was to obtain the state's assistance in obtaining a variance to store the emission control dust (which had become subject to the land ban provisions of RCRA on August 8, 1988) until it could be used by the new system, which was under construction at the time.

LaClede received a draft letter of response for approval from the State on June 21, 1990. Section 6(d) of the Illinois Toxic Pollution Prevention Act states that "the Agency shall make a final determination within 120 days after receiving a proposed plan." In addition, 35 Illinois Administrative Code 181.302 states that "if the Agency does not concur with the proposed plan, the Agency shall provide the owner or operator with a written statement of the reasons for its refusal to concur, and the owner or operator may modify

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Illinois Toxic Pollution Prevention Act (Public Act 86-914, approved September 11, 1989, as amended Illinois Revised Statutes, Chapter 111 1/2, section 7951 et seq, section 6(c)).

the plan, submit a new plan for review, or appeal the decision." Although LaClede received neither final approval nor denial of the innovation plan, it proceeded with installation of the new technology.

One of the difficulties involved in LaClede's plan was that what it proposed to do with the hazardous waste it was currently generating would have required the agreement not only of IEPA, but also of Region 5 of U.S. EPA, since the storage of its electric arc furnace dust would constitute a violation of RCRA. The company was sued by the U.S. Environmental Protection Agency in August, 1990 for violating RCRA provisions. The case appears to provide an example of the difficulty posed by the relationships of state and federal legislative and regulatory requirements in efforts to promote innovation waivers at the state level.

4.1.3 Alternative Air Compliance Extension Program

In the late 1970's, Massachusetts instituted regulations which promoted the development of what was a pollution prevention approach to meeting RACT requirements. Compliance extensions were encouraged for paper and fabric and miscellaneous Metal Parts Coatings categories implementing CTG's for VOC's. The regulation required the firms to reduce their VOC emissions below 4.786 pounds per gallon of solids by December 31, 1982, unless they could prove both that they could not do so, and that they had a plan to study and develop alternative coating processes. They needed to implement alternative low/no VOC coating conversions as expeditiously as practical but in no case later than January 1, 1987. While other states in Region I also provided some form of compliance extension, Massachusetts seems to have both taken the measure further in terms of the extent of the variance than other states in the Region, and to have promoted it more aggressively.

The main purpose of the regulation was to alleviate the economic burden on the smaller companies in the industry caused by the standard. The RACT standard applied to all sources, no matter how many or few VOC's they emitted. The CTG recommended use of afterburners to control the VOCs. This was too expensive for many of the smaller emitters and would have forced them to go out of business rather than comply.

The benefit of the waiver was that it resulted in innovation and pollution prevention. Firms reformulated their coatings to reduce VOC's. The

program was successful for several reasons: the Massachusetts Department of the Environment (MDEP) worked closely with the coating shops, offering them technical information, providing them with information on possible sources, and sharing experience of other coaters; the coatings industry association promoted low VOC coatings and showed the shops how to use them; and paper/fabric coating firms often have chemists on staff who do a lot of their own research and development.⁴²

4.2 Enforcement-Related Approaches

Innovation waivers were designed to provide incentives to promote innovation in the permit-writing of the regulatory process. An alternative would be to structure incentives for innovation into the enforcement component of regulatory activities.

4.2.1 Strict Enforcement

Stringent standards combined with strict enforcement of the standards have historically provided much of the impetus for development of new environmental technologies. Assured rigorous enforcement puts pressure on companies to find ways to comply with requirements; meeting stringent standards provides a motive for looking for more cost-effective alternatives.

The question is whether strict enforcement provides by itself a sufficient impetus to innovation. There can be little doubt of the importance of stringent environmental standards in promoting innovation, either with respect to industrial production or new products. One example among many of a stringent regulation which led to product and process innovation was the ban on fully halogenated chlorofluorocarbons ("CFCs") from aerosol applications. Industry responded by producing a non-fluorocarbon propellant using CO₂ and by developing a cheaper pumping system not dependent on propellants.⁴³

Without strict enforcement, companies will lack motivation to make

⁴² Mass Reg. Ref.: 310 CMR 718 14(a) and 15(a); and information from Jeannie Watters, Massachusetts DEP.

⁴³ Ashford, Nicholas, "Regulation and Innovation". Harvard Environmental Law Review, Volume 9. p. 419-466

the changes necessary to meet the new standards. The issue for advocates of innovation waivers and enforcement flexibility, however, is not whether strict enforcement is a necessary component of the elements needed to promote innovation. It is whether strict enforcement is sufficient to encourage innovation, or whether it primarily promotes compliance by companies with standard methods least likely to raise questions from regulators.

4.2.2 Enforcement Flexibility

One way in which innovation and pollution prevention is being encouraged is in compliance enforcement. In February of 1991, EPA issued an Interim Policy on the Inclusion of Pollution Prevention and Recycling Provisions in Enforcement Settlements. This policy encourages "the use of pollution prevention and recycling conditions in enforcement settlements, either as injunctive relief or as 'supplemental environmental projects' incidental to the correction of the violation itself." Under this policy, pollution prevention conditions can be considered as part of a consent order or decree. "Agency negotiators are strongly encouraged to try to incorporate pollution prevention conditions in single and multi-media settlements when feasible."

In recognition of the fact that changes in production processes and innovative techniques may take longer to implement than proven technology, EPA is encouraging flexibility in the negotiations on implementation schedules. However, additional implementation time can be allowed only if the pollution prevention settlement condition corrects the violation. In deciding whether to extend a compliance schedule, the settlement team is directed to consider the seriousness of the violation, the net permanent reduction in pollution resulting from the proposed corrective pollution prevention activity, the reliability of the technology, whether the technology is applicable to other firms, and whether the pollution prevention option offers the best long term solution to the pollution problem.

Normally a compliance action ends in the assessment of a fine. The fine is based on the gravity of the offense and on the economic benefit the firm has derived from polluting. If the respondent is willing to correct a violation via a pollution prevention project, the new policy allows the gravity portion of the penalty to be adjusted downward. The economic benefit portion of the penalty is normally based on the length of time the firm is out

of compliance. This might deter firms from solving their violation with a pollution prevention activity if that activity would require more time to institute than a conventional solution. In order to eliminate a possible disincentive, the penalty will be assessed based on the solution that would require the shortest length of time to implement, rather than on the longer-term pollution prevention solution actually agreed to under the compliance action.

A disincentive for the firm to use innovative technologies remains in the policy. If the pollution prevention activity fails to correct the violation, then the traditional solution must be instituted. The policy states:

In order to make sure that the violation is corrected (as well as minimize any additional liabilities which may accrue to the defendant/respondent) the consent order or decree will state that any pollution prevention project which is used to achieve compliance with a legal standard must have a "fall-back" schedule requiring the use of a proven technology agreed to by all parties to the settlement and which will be implemented, if necessary, by a time certain.

Penalties in this case would only be assessed if the economic benefit from non-compliance exceeded the money spent on the pollution prevention activity, but the added cost of implementing the "fall-back" might be substantial.

- o A case in Massachusetts provides an example of how innovation issues can be raised in the context of enforcement actions. EPA and a POTW are working with local industry to solve a compliance problem. As a result of industrial discharge with high copper content, the sewage treatment facility was out of compliance with new NPDES limits. The major facilities discharging the copper included fiber/fabric dyers; the colors of blue, green and turquoise all contain copper. The firms estimated that installation of the necessary pretreatment capabilities could cost them one million dollars each -- potentially crippling to the companies and resulting in severe hardship on the community. As part of a compliance action, EPA issued an administrative order requiring the firms to do pollution prevention audits to identify ways to reduce the copper discharges through source reduction and process changes. The POTW and Massachusetts' Office of Technology Assessment (OTA) worked with the firms to provide guidance as to how they might achieve the goals. In addition, the

firms talked to the dye manufacturers about possible reformulations of the dyes. Even if a control/pretreatment solution is finally required, the enforcement process has been used in an effort to encourage technology innovation.

In addition to the federal initiative, some state and local authorities are also showing flexibility in compliance actions when pollution prevention and innovative techniques are proposed as solutions to compliance problems. In a case in California, for example, a POTW allowed a plant violating BOD limits time to study and implement pollution prevention processes as an alternative to requiring add-on controls.

- o As part of an enforcement action against a non-compliant company, the Orange County Sanitation Districts in southern California requires companies to conduct a waste minimization assessment and submit a report to the Districts. A company is required to implement those techniques that are found to be technically and economically feasible.

One company, Beatrice/Hunt Wesson was discharging large amounts of BOD into the system. On February 14, 1989, the Districts sent the company a new industrial wastewater discharge permit for their cannery which specified new interim and final limits. Beatrice objected to the interim conditions and appealed the decision to the Districts' Board of Directors. The Board denied the appeal and ordered the permit issued.

The company challenged the decision in California Superior Court and initiated two suits against the Districts, challenging both the permits and the Districts' ordinance. The Superior Court determined that the Districts properly imposed the BOD discharge limits. A Settlement Agreement was signed between the Districts and Beatrice on April 17, 1991 which included provisions for the installation of pretreatment equipment and compliance with the daily maximum limits effective February 1, 1992. An interim permit was issued for the period before February 1, 1992, which provided an intermediary step to restrict the BOD discharges.

After the Settlement Agreement was executed, Beatrice requested a one-year extension in meeting the final BOD limits in order to investigate the feasibility of adopting several waste minimization strategies, including an innovative approach involving installation of an

Italian tomato peeling process which vacuums off the skins and a solids separating system which was being tested at the Beatrice Fullerton plant.

The Districts granted Beatrice the 12-month extension in order to give the company time to study the environmentally-preferable pollution prevention options, as opposed to forcing the construction a pretreatment facility (as agreed to in the Settlement). During the interim the company would have to meet somewhat reduced maximum and average loadings. The Amendment to the Settlement Agreement also contained a provision that stated that if the waste minimization techniques were insufficient to bring the company's discharge into compliance, it would have to use pretreatment equipment adequate to ensure that its effluent discharge would comply with the final BOD limits by February 1, 1993.

On November 14, 1991, the company asked for another extension because it was concerned that its waste minimization reduction estimates were too optimistic, and that it might be necessary to design a pretreatment facility as well. Beatrice wanted to evaluate the 1992 canning season, to determine what type of pretreatment to install. The company's further request for an extension is being evaluated by staff and Districts' legal counsel.⁴⁴

While flexibility in enforcement actions provides a valuable and necessary mechanism for encouraging innovation, it does not constitute a complete solution to promoting innovative technology. The principal drawback is the obvious one; it provides a solution only in the context of a violation. There is no guarantee that the relevant agency will in fact provide flexibility for innovation, and the process carries significant risks of fines.

⁴⁴ Letter (December 5, 1991) from Margaret Nellor, Source Control Manager, County Sanitation Districts of Orange County, California.

5 POTENTIAL FUTURE ROLE OF AN INNOVATION WAIVER

The innovation waivers in federal legislation are one possible vehicle for providing flexibility to encourage innovation. Few would argue that the waiver is a prerequisite for either flexibility or innovation. Rather, it is one mechanism which can be used to promote the objective of innovation. The question is whether the particular role an innovation waiver potentially plays can be adequately met through some other alternative or alternatives, or whether the waiver is in fact capable, with some re-designing, of meeting the need its supporters originally envisaged.

Interest in the innovation waiver has not vanished. The water reauthorization bill introduced in the Senate by Senators Baucus and Chafee in June, 1993 (S. 1114) includes a revised section 301(k). The new provision, however, does little to solve the problems which have resulted in limited use of 301(k). The provision moves even further away from one of the most crucial requirements identified by industrial commentators -- adequate time. The waiver proposed in S. 1114 is limited to 90 days, with a possible additional 90-day extension. The constricted time period reflects the continuing concern of those who feel that the real environmental benefits or losses from innovative waivers are difficult to evaluate, and that resulting compliance extensions may simply provide an extended license for uncontrolled pollution. Companies which found two year waivers inadequate, however, are unlikely to have much interest in so short a limit.

In the absence of an innovation waiver, there still are sources of increased flexibility in the development of permits for dischargers. One area of potentially greater flexibility could come in the day-to-day implementation of the NPDES permitting program. Most requirements under the effluent guidelines are in the form of technology-based performance standards. In many individual permit-development situations, however, the technology basis for the performance standard becomes a de facto technology standard. Such a result may comprise the lowest-risk approach for both the permit writer (sometimes lacking in adequate technical expertise or experience to evaluate complex or non-standard alternatives) and the permittee (concerned with being assured the facility is in compliance).

To encourage greater flexibility entirely within the current framework of standards, permit writers could be trained to recognize the benefits of pollution prevention approaches as a means of achieving compliance. They could also be informed regularly of alternative technologies or technical

approaches which have been used to meet performance standards elsewhere, perhaps through frequent technical updates to the background and materials provided to them. Such an approach would serve at least to increase the dissemination -- carefully implemented to preclude any liability for permit writers -- of technological innovations, even if it would not serve to facilitate implementation of other more fundamentally new innovations.

For some larger or more complex facilities, the need for formal mechanisms to allow trials with innovative alternatives may be more limited than in smaller or less diverse facilities. In some cases, such facilities may be able to experiment with a single line or process and still meet the overall limitations on discharges from the plant's treatment system. Under these circumstances, plants may be able to effectively create the needed flexibility internally.

The flexibility for innovation either already inherent in, or potentially achievable under, current rules may be substantial. Nonetheless, there may still be innovations which can not be readily accommodated -- for example, some innovative approaches which comprise a significant component of the production process, which are more important for substantial multimedia benefits than for the margin of compliance with NPDES requirements, or which potentially have lengthy shakedown periods. That is, there still may be a potential need for the flexibility which 301(k) was intended to provide.

5.1.1 A Revived 301(k) Provision

Were Congress to reauthorize the 301(k) innovation waiver provision, there are measures which could be taken to try to make the waiver more effective. Whether measures acceptable to all parties would be sufficient to make the waiver truly useful for industry is more doubtful. The most important changes would include:

- o Meaningful organizational support within EPA, at both the Regional and headquarters levels, for technical review of innovative technologies for which innovation waivers are requested. Such support would need to include access to legal experts (e.g., in OGC) and to technical experts (e.g., in ORD) in key industrial categories. Permit writers would need this kind of support in order to be able to make the necessary evaluations of the appropriateness and technical adequacy of the proposal.

- o Defined progress steps and schedules toward implementation of the innovative technological alternative during the period of the waiver. These steps could include a variety of factors, such as financial, research and environmental measures.
- o Some form of alternative compliance mechanism, where feasible, for innovations which fail marginally to meet the required standard, rather than an automatic requirement to install the technology for which the innovative approach was supposed to be a substitute. Such "soft landings" could be available where a facility made a good-faith effort (perhaps defined in terms of progress steps) to implement the innovative approach, and should be designed to achieve a net environmental benefit. Acceptable measures should be defined in the permit incorporating the innovation waiver.
- o Greater flexibility with respect to the allowed time period of a compliance extension, depending on the extent to which the technology for which the waiver is sought is a fundamental change, and the degree to which meaningful progress steps can be defined.

It is questionable, however, whether adequate agreements could be reached to make and effectively implement these changes. The fundamental difficulty of the 301(k) innovation waiver is that it provides for an exceptions process under which all parties are subject to intense scrutiny.

- o For companies proposing an innovation waiver, there are the risks of:
 - a prolonged, costly evaluation and negotiation process, with highly uncertain results, possibly leaving inadequate time to come into compliance and avoid fines if rejected;
 - the financial risk inherent in an innovative technology of at least partial failure, with the potential need to make a substantial subsequent investment to achieve compliance;
 - the public relations risk of appearing to be trying to avoid environmental compliance; and

- more intense scrutiny by EPA and state agencies of all aspects of plant operations.
- o For EPA and state agencies which must review proposals for innovation waivers, the difficulties include:
 - limited technical resources for review of complex technical proposals, and the risk of making a decision which inadequately protects, or is perceived to inadequately protect, the environment; and
 - expenditure of unusual resources to review a single permit at one facility, at the same time that overall compliance and enforcement resources may be inadequate to meet basic needs.
- o For public interest groups, skepticism is based on concerns that:
 - EPA or state agencies may not have, or should not expend, the technical resources to adequately evaluate the adequacy and appropriateness of an innovative technology proposal by a single firm;
 - companies may use an innovative waiver as a means to extend compliance without creating a significant longer-term environmental benefit, particularly if compliance schedules are extended to the degree that industry argues is necessary to make the waiver useful;
 - a particular decision on a single innovation waiver, inadequately scrutinized, may create a precedent for further decisions which could create substantial aggregate environmental damage; and
 - if the innovation waiver provision were widely used, the resources of the public interest groups would not be sufficient to review the proposals adequately to ensure that appropriate decisions were made by the agencies.

Because the innovation waiver is an exceptions process, it generates focused attention on all the parties involved. Each is likely to feel increased

vulnerability in the decision process. The result has been clearly apparent in the fourteen year history of the 301(k) provision. Public interest groups and agency personnel have generally been opposed to the process, agency personnel have been unwilling to encourage applications for the waiver, and companies have either preferred to look for other mechanisms under which to promote innovations, or to avoid the risks altogether.

5.1.2 Building a Structured Flexibility Format into the Rules

A possible alternative to an exceptions process involving individual waivers for individual facilities would be to establish basic rules involving compliance extensions for innovative pollution prevention technologies in the promulgation of the effluent guidelines. There are several potential advantages to such an approach. First, it would move much of the substantial expenditure of time and resources involved from the approval of one company's individual application to a more general determination which could potentially affect all facilities. Second, it would involve an up-front determination by all parties of the value of the tradeoffs involved in implementing an innovative technology which might require delayed compliance.

Examples of the kinds of tradeoffs which might be stipulated in the guidelines include:

- o provisions allowing a longer time to achieve compliance with the requirements of the guideline if the facility would then achieve substantially greater reductions in pollutant discharges within some established longer timeframe; or
- o a longer timeframe for meeting the effluent guideline requirements if some predetermined additional multimedia environmental benefits could be achieved during that same time period.

These decisions would not be easy to make. The advantages, however, are that:

- o tradeoffs would be faced in a general format, rather than without guidelines in the context of an individual permit decision;

- o resources for making the decisions would be expended on issues affecting more than one facility; and
- o the existence of pre-defined general conditions and goals for an innovation waiver, in place of case-specific determination of basic parameters, would provide companies more certainty in assessing whether to implement a potential innovative technology.

Such an up-front approach is not without challenges:

- o Less would be known at the time of the decisions about the nature of, and appropriate limits for, potentially innovative technologies.
- o Explicit risk tradeoffs between media, beyond their inherent difficulties, involve site-specific elements which might prove difficult to anticipate in structuring a guideline.
- o Individual waiver applications would still require careful individual evaluation. It would remain necessary to determine whether an individual technology seemed a reasonable candidate to meet the parameters in the guideline, and to specify progress steps to be met by the company.

These difficulties are not insurmountable. Goals in the guidelines could be set in terms of desirable environmental outcomes, rather than in terms of the current state of knowledge about possible forthcoming technologies. So long as the environmental objectives remain primary, forecasting would be of limited concern.

While risk tradeoffs may be conceptually problematic, both of the options suggested above involve surpassing current environmental requirements. What would be established initially would only be the level of additional environmental improvement required for a compliance extension, not a lessening of the ultimate performance standard for discharge. Site specific concerns might be dealt with by alternatives such as establishing interim standards during the period of the waiver (perhaps depending on whether the water body impacted is particularly sensitive, or is severely environmentally impacted relative to its intended use). It would be important, in any case, to establish (as part of the permit) a timeline of steps

to be taken to demonstrate adequate progress toward the ultimate compliance objectives.

The determination of "innovativeness" could still be an important issue for a specific permit. Evaluation of the technical adequacy of the technology might be made less resource-intensive, however, by placing more emphasis on performance, and thus more of the burden on the applicant. For example, criteria could be established under the guidelines under which soft-landings or a range of penalties could depend on how close the technology came to meeting the compliance goals.

Extension of the 301(k) process in its current form is unlikely to be more successful in the future than it has been in the past. Its fundamental flaw is that it requires relatively large resources to make uncertain individual case decisions, and makes each such decision highly visible. All parties are at risk, with very unsure rewards, and possibly severe penalties (e.g., unforeseen environmental impacts, financial losses, loss of public trust, adverse performance evaluations). The flexibility is limited and, as the years since 1977 have shown, the potential public benefits are limited.

Nonetheless, a system which encourages flexible, innovative individual responses to environmental goals can have significant benefits. Such a concept is central to the acid rain program under the Clean Air Act -- a program which is predominately results-oriented. While most individual decisions by utilities on how to meet SO₂ reduction objectives will not involve use of innovative technologies, the system provides rewards for those who develop innovative alternatives.

Clearly there are substantial differences between a program addressing a nationwide total pollutant loading problem, and an effluent guideline addressing individual plants impacting specific water bodies. The objective of trying to encourage companies to make changes which both improve the environment and are more cost effective, however, remains important.

An approach to innovation combining greater flexibility in day-to-day implementation of performance standards with pre-established parameters for compliance extension tradeoffs under the guidelines could provide a more realistic, workable alternative than the 301(k) program of the past. It would substitute a general program with specific goals for environmental improvement for a plant-specific exceptions process with no defined environmental parameters. By placing priority on environmental success

rather than technological judgments, such an up-front approach to the parameters could provide a more predictable and congenial atmosphere both for the implementation of technological innovations, and for the projection of environmental benefits.

