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## Working Party on National Environmental Policy

### VOLUNTARY APPROACHES: TWO UNITED STATES CASES

#### The Experience of Intel Corporation and Merck Pharmaceuticals in Project XL

*This report discusses the experience of Intel Corporation and Merck Pharmaceuticals in US Environmental Protection Agency's Project XL program.*

*It was prepared by Ms. Janice Mazurek, director of the Center for Innovation and the Environment at the Progressive Policy Institute in Washington, D.C.*

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## FOREWORD

At its first meeting, 23-24 April 2001, the Working Party on National Environmental Policies under OECD's Environment Policy Committee agreed to start new work on voluntary approaches used in environmental policy, building on a few selected case studies. These case studies were each to be prepared by external consultants – discussing two concrete cases of voluntary policy approaches in Canada, United States, Japan and Denmark respectively.

The present report discusses the experience of Intel Corporation and Merck Pharmaceuticals in US Environmental Protection Agency's Project XL program. It was prepared by Ms. Janice Mazurek, director of the Center for Innovation and the Environment at the Progressive Policy Institute in Washington, D.C.

The case studies will – together with other available material – feed in to a final project report on the use of voluntary approaches in environmental policy that is expected to be released in 2003.

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## VOLUNTARY APPROACHES: TWO US CASES

### The Experience of Intel Corporation and Merck Pharmaceuticals in Project XL

#### EXECUTIVE SUMMARY

*Project XL is a voluntary initiative between regulated industry, public agencies, and NGOs ...*

The Environmental Protection Agency (EPA) and other public agencies in the U.S. government have since 1988 developed nearly 50 voluntary environmental approaches. Among these, Project XL (Excellence and Leadership) is the only initiative that involves negotiation between regulated industry, public agencies, and non-governmental organisations (NGOs). Project XL also is unique among voluntary initiatives in that negotiations typically involve not an entire firm but instead only one of a firm's industrial facilities – a feature that Project XL's critics say leads to high, if not intractable, transactions costs.

*... designed to provide participants regulatory relief in exchange for pollution reductions in excess of status quo.*

Spearheaded by industry and the Clinton administration, Project XL was designed by EPA to provide participants with regulatory relief in exchange for pollution reductions in excess of status quo standards. Since its inception in 1995, more than 50 companies and government agencies have negotiated Project XL agreements with EPA and new entrants continue to apply to the program.

*This case study focuses on agreements involving Intel Corporation and Merck Pharmaceuticals.*

Two of the earliest and most prominent of these are agreements to obtain relief from air permitting requirements developed with Intel Corporation and Merck Pharmaceuticals, two companies that rely on rapid innovation to secure market share for their technologically advanced products. This case study evaluates retrospectively their experience in the Project XL program. In addition to Project XL, this assessment also examines prospectively a newer voluntary initiative known as Performance Track, which EPA administers as well.

*Both firms exceeded their environmental targets, but it is impossible to say whether this was due to Project XL.*

With respect to Project XL, this case study shows that, although it is possible to demonstrate quantitatively that Intel and Merck exceeded by wide margin their stated environmental targets, the lack of appropriate evaluation measures makes it impossible to state with certainty whether Project XL was responsible for the results. In other words, it is possible that both participants would have achieved these targets in the absence of the voluntary initiative.

*Despite a lack of firm evidence, it is likely that both firms realised economic benefits from their participation in Project XL.*

In terms of economic performance, it is likely that Intel and Merck realised benefits either in the form of abatement cost reductions, enhanced competitiveness, or reduced administrative cost. However, Intel, Merck, and EPA have failed to develop quantitative data that would demonstrate whether participation in Project XL led to economic benefits beyond what adherence to traditional regulation would bring. That Project XL has benefited Intel is underscored, however, by the company's recent decision to extend its Project XL for another five years.

*Evaluating the costs and benefits of the new Performance Track voluntary initiative could prove still more difficult.*

Evaluating the environmental and economic costs and benefits associated with Performance Track will prove to be even more challenging than is the case with Project XL, as the initiative is based even more on the use of management practices than on quantitative environmental outcomes. This case study therefore focuses more on the relationship between Performance Track and Project XL, and less on Performance Track's potential economic and environmental benefits.

**VOLUNTARY APPROACHES: TWO UNITED STATES CASES**  
**The Experience of Intel Corporation and Merck Pharmaceuticals in Project XL**

**1. Introduction**

1. This case study evaluates retrospectively the experience of two firms, Intel Corporation and Merck Pharmaceuticals, in what arguably is the most unique voluntary environmental agreement in the United States, Project XL. Project XL was developed and is administered by the U.S. Environmental Protection Agency (EPA). Under the initiative, firms, EPA, and public stakeholders negotiate environmental targets for individual industrial plants. In addition to Project XL, this assessment also examines prospectively a newer voluntary initiative known as Performance Track, which EPA administers as well.

2. With respect to Project XL, this case study shows that although it is possible to demonstrate quantitatively that Intel and Merck exceeded their stated environmental targets, it is not possible to state with certainty whether Project XL was responsible for the results. In other words, it is possible that both participants would have achieved these targets in the absence of the voluntary initiative.

3. In terms of economic performance, it is likely that Intel and Merck realised benefits either in the form of abatement cost reductions, enhanced competitiveness, or reduced administrative cost. However, Intel, Merck, and EPA have failed to develop quantitative data that would demonstrate whether participation in Project XL led to economic benefits beyond what adherence to traditional regulation would bring.

4. Evaluating the environmental and economic costs and benefits associated with Performance Track will prove to be even more challenging than the case of Project XL as the initiative is based more on the use of management practices instead of quantitative environmental outcomes. This case study therefore focuses more on the relationship between Performance Track and Project XL, and less on Performance Track's potential economic and environmental benefits.

**1.1 Project XL**

5. In the United States, the EPA and other agencies in the U.S. government have since 1988 developed nearly 50 voluntary environmental agreements (VAs). Among these, Project XL (Excellence and Leadership) is the only initiative that involves negotiation between regulated industry, public agencies, and non-governmental organizations (NGOs). Moreover, XL is unique among voluntary initiatives in that negotiations typically involve not the entire firm but instead only one of a firm's industrial facilities -- a feature that Project XL's critics say leads to high, if not intractable transactions costs.

6. Spearheaded by industry and the Clinton administration, Project XL was to provide participants with regulatory relief in exchange for pollution reductions in excess of status quo standards. However, uncertainties regarding the legality of the initiative have caused EPA to dilute its design and original goals (Boyd, Krupnick, and Mazurek 1998). Because the initiative involves negotiation, EPA also has sought to streamline the program to reduce transaction costs, which initially were quite high (Blackman and Mazurek 2001).

7. Since its inception in 1995, more than 50 companies and government agencies have negotiated Project XL agreements with EPA and new entrants continue to apply to the program. Two of the earliest and most prominent of these are agreements to obtain relief from air permitting requirements developed by Intel Corporation and Merck Pharmaceuticals, two companies that rely on rapid innovation to secure market share for their technologically advanced products. Before turning to an examination of how individual facilities operated by these two firms performed under Project XL it is necessary to address criticisms levelled by firms and by scholars against the initiative and how EPA has addressed these criticisms.

## ***1.2 Project criticisms and EPA response***

8. Virtually since its inception, Project XL has been plagued by the perception that the project development process is too costly. Traditional EPA regulations, which mandate that firms meet pollutant standards, can cover hundreds if not thousands of facilities simultaneously. In contrast, Project XL targets only individual facilities. As early as the summer of 1996, a little over a year after the project was unveiled, participating firms complained that poor co-ordination among federal, state, and local regulators and a lack of clarity in project guidelines – particularly those concerning superior environmental performance and the stakeholder process – were driving up project development costs (Environmental Reporter 1996, Inside EPA Weekly Report 1997).

9. Written analysis of Project XL has consistently mirrored these early industry complaints. Steinzor (1996) argues that Project XL was pushed forward without clear guidelines for political reasons. Yosie and Herbst (1996) present survey data reflecting frustration among XL participants over the length and cost of EPA's review process and conflicts between EPA regional offices and headquarters. The General Accounting Office (U.S. GAO 1997) contends that Project XL is hampered by poor co-ordination with other reinvention initiatives, weak evaluation, and failure to secure buy-in by agency staff. Finally, Mank (1998) argues that Project XL has been stymied by flaws in program design by legal uncertainty about EPA's authority to develop site-specific regulations.

10. Over the last five years, EPA has undertaken a wide range of measures designed to address these criticisms. At the end of 1996, it appointed ombudsmen in EPA regional offices to resolve problems causing delays in proposal development (Inside EPA 1996). At the beginning of the next year, it published a "mid-course correction" in the Federal Register clarifying guidelines regarding superior environmental performance, regulatory flexibility and the stakeholder process (Federal Register 1997). In 1998, the EPA published a second Federal Register notice soliciting proposals on selected themes, and further clarifying the concept of regulatory flexibility (Federal Register 1998). It also released two reports evaluating specific XL experiences (U.S. EPA 1998). In 1999, EPA issued three guidance documents that grew out of an effort to redesign and streamline the XL approval process as well as a comprehensive evaluation of 14 projects in implementation (Federal Register 1999, Inside EPA Weekly Report 1997, U.S. EPA 1999).

11. Such efforts appear to be paying off. Whereas EPA had only approved 15 projects as of December 1999, now more than 50 are under implementation and three projects, including a bid from Intel to renew its original XL air permit, are underway. Furthermore, median transaction costs associated with project development have fallen over time, as demonstrated in the section of this report that deals with transaction costs. Finally, although the initial transaction costs to Intel and to Merck of developing a Project XL agreement were quite high, it is likely that the costs have been outweighed by the benefits, in both economic and environmental terms that have accrued to the firms and to the public.

### **1.3 Performance Track**

12. Subsequent to Project XL, EPA in 1999 proposed to develop its most recent voluntary initiative, Performance Track. Like Project XL, Performance Track provides some regulatory relief such as reduced inspections, reporting, and monitoring as well as benefits such as improved public recognition. Unlike Project XL, which was promoted mostly by industry as a way to modernise existing environmental laws, Performance Track's genesis stems more from the development and popularity of Environmental Management Systems (EMSs) such as ISO 14001. Because participants do not request relief from existing laws, Performance Track, unlike XL, does not involve negotiation among public agencies, regulated industry, and interested organisations.

13. Whereas industry and decision-makers in the Clinton administration saw Project XL as a way to experiment with environmental regulation, Performance Track builds more on efforts at the state level to promote the use of EMSs. In this regard, Performance Track offers benefits not for improved environmental performance but more for the adoption of management practices that can lead to fewer environmental impacts. Due to its novelty, Performance Track may only be assessed prospectively. Primarily, this case study describes the relationship of Performance Track to Project XL.

### **1.4 Intel's Project XL agreement**

14. Project XL is an exercise in plant-specific regulation, with negotiations between EPA and the regulated firm driving the outcome, but subject to stakeholder approval. The initiative is designed to achieve performance superior environmental and economic results under status quo regulation (U.S. EPA 1996). In November 1996, Intel Corporation became the first major U.S. manufacturer approved for Project XL when it successfully completed an agreement that covers one of its 11 U.S. facilities, located in the state of Arizona (Intel Corporation 2002).

15. The world's largest microprocessor manufacturer had a lot to gain from participation in the Project XL initiative. Intel routinely releases a new semiconductor every 18 months and must typically construct new, billion-dollar plants in which to manufacture them (Hatcher 1994). Project XL, which targets individual facilities, is well suited to a company such as Intel because the products made and processes used at each of its facilities are relatively unique from each other and from other firms in the industry. To achieve refinements and optimise its production process, Intel must constantly modify process chemistries up to 35 times a year and equipment five times a year. However, the manufacturer's ability to release new products and make refinements to existing products in a timely manner is threatened by air permitting provisions. The facility must obtain approval each time it makes a manufacturing change.

16. To address these issues, Intel under Project XL sought a five-year air permit for a new microprocessor manufacturing facility in Chandler, Arizona that approved chemical and equipment changes in advance. The new facility would commence production of a new generation of Intel microprocessor in 1996. The binding, enforceable permit is part of a larger package of voluntary commitments to reduce water use and waste generation at the company's Arizona manufacturing facility. The package also contains commitments that fall outside the scope of federal pollution control law. For example, Intel pledges to donate used computer equipment to local schools.

17. The negotiation for the entire XL project, including enforceable air permit provisions required 17 months, 100 official meetings, and dozens of informal conversations. As required by EPA, Intel assembled 23 official representatives from ten different government agencies and from the local community to negotiate the XL project agreement. At least five Intel employees devoted from 40 to 60 days each on the negotiation.

18. In addition to official participants, at least four non-local environmental groups from outside the Chandler, Arizona area filed detailed technical objections to the air-permitting portion of the XL agreement, the most visible and hotly contested element of the agreement. The air permit covers emissions of conventional and hazardous air pollutants at Intel's existing Arizona facility and gives the manufacturer the ability to construct an additional facility without having to secure a new permit. Intel in 2001 completed construction of that second facility as provided for under the Project XL agreement. In exchange for this relief from regulatory requirements, Intel pledged to accept air pollution caps for the Phoenix facility set lower than required by federal law (the Clean Air Act Amendments of 1990).

### ***1.5 Merck's Project XL agreement***

19. Merck's motivations for participating in Project XL were much like Intel's: the world-wide health products manufacturer is a research-intensive firm that discovers, develops, markets, and manufactures human and animal health products. Chemical processing, drug formulation, and packaging operations are carried out in the company's 31 plants that operate world-wide. Of these, seven manufacturing facilities are in the United States and two are in Puerto Rico (Merck Pharmaceuticals 2002).

20. Of Merck's seven U.S. facilities, the Project XL agreement covers Merck's Stonewall Plant near Elkton, Virginia. The Elkton plant was established in 1941 and more recently modified to produce a new drug for the treatment of human immunodeficiency virus (HIV). Like Intel, Merck makes different products and uses different production processes at each of its different facilities – a feature that makes the manufacturer well-suited to XL's facility-specific focus. Like the dynamic microprocessor manufacturer, Merck sought flexibility from the requirements of the Clean Air Act in order to reduce the likelihood of costly delays associated with air permitting.

21. Unlike Intel, Merck's Stonewall Plant is located near the Shenandoah National Park, an environmentally sensitive area subject to requirements under the Clean Air Act that are more stringent than in undeveloped areas that are not national parks. In recent years, the air quality and visibility in the park have deteriorated. In order to reduce the impacts of its emissions on the park and to improve economic efficiency, Merck in 1995 initiated the XL project with EPA and signed its final XL project agreement 26 months later, in December 1997.

22. Merck's agreement was developed through a stakeholder process similar to Intel's. Participants included Merck, representatives from EPA headquarters and regional offices, and state officials from the Virginia Department of Environmental Quality. Due to the Stonewall plant's proximity to the Shenandoah National Park, other stakeholders included representatives from the U.S. Department of Interior, an agency that oversees national parks. Local stakeholders included representatives from the county government as well as several concerned individuals who lived near the Stonewall plant. As in the case of the Intel agreement, national environmental groups such as the Natural Resources Defense Council monitored the negotiation but did not serve as official stakeholders.

23. The Merck XL Project places a cap or limit on emissions throughout the Stonewall facility for criteria air pollutants (volatile organic compounds (VOCs), as a surrogate for ozone, particulate matter less than ten micron widths in diameter PM-10, carbon monoxide, CO, sulphur dioxide SO<sub>2</sub> and nitrogen oxide NO<sub>x</sub>). The XL permit also contains individual limits on SO<sub>2</sub>, NO<sub>x</sub>, and PM-10. The caps allow Merck to make production changes without obtaining the required prior permitting approval. Whereas Intel's Project XL air permit requires renewal and renegotiation after five years, the term of Merck's XL agreement is lifelong – the project runs in perpetuity as long as Merck remains below levels specified in its targets.

24. Existing air permitting regulations require the Virginia Department of Environmental Quality (VADEQ) to review and approve changes to the facility's air permit. Such requirements can cause costly production delays and require significant investments in human resources to obtain permits. In exchange for relief from permitting requirements, Merck agreed to implement a comprehensive monitoring, record keeping, and reporting requirements that increase in stringency as actual emissions levels approach limits set under the Project XL cap.

## **2. Environmental effectiveness**

### **2.1 Intel Corporation**

25. Intel Corporation and Merck Pharmaceuticals both have exceeded by wide margin their initial targets for air emissions set out in their Project XL agreements. However, it is impossible to state with certainty whether these targets were the result of Project XL or would have been attained by these companies even in the initiative's absence. Before examining reductions in detail it is necessarily to describe the targets for both facilities and how they were set.

#### *2.1.1 Intel's Targets*

26. Under its Project XL agreement, Intel set the following emissions targets. The limits apply to Intel's existing facility as well as the new facility Intel completed in 2001:

- Volatile organic compounds: 40 tons per year
- Nitrogen oxides: 49 tons per year
- Carbon monoxide: 49 tons per year
- Sulphur dioxide: 5 tons per year
- Particulate matter < 10 microns: 5 tons per year
- Hazardous air pollutants: 10 tons per year organic and 10 tons per year inorganic

27. To address concerns regarding potential health risks to humans associated with a cap on hazardous air pollutants, Intel agreed to place individual limits on emissions of phosphine, sulphuric acid, and arsine.

- Phosphine: 4 tons per year
- Sulphuric Acid: 9 tons per year
- Arsine: <14 tons per year.

#### *2.1.2 Baseline measures*

28. Constructing a baseline against which to measure progress under Intel's XL agreement is challenging for several reasons. First, the Arizona facility was new and lacked an emissions history. Second, the microprocessor products made at the Arizona facility and the production processes used to make them are unique from those used at any other Intel facility. Therefore, there was no "twin" facility which could be used as a "control" against which to assess performance. Third, due to the exacting and

complicated nature of microprocessor manufacture the cost of using precise measures such as continuous emissions monitoring to track progress remains prohibitive. Finally, Intel's production processes and chemicals are highly proprietary, a feature which further warrants against the use of precise measurement tools such as continuous emissions monitors.

29. Therefore, as part of its Project XL agreement, Intel agreed to set and measure its emissions targets relative to baseline air emission levels permissible under the Clean Air Act. EPA and Intel XL project stakeholders chose the levels permissible in the Clean Air Other groups that were not part of the formal negotiation objected to the use of this baseline measure, claiming that it failed to constitute environmental performance superior to business-as-usual.

30. In response to criticism from environmental groups such as the Natural Resources Defense Council, which were not part of the official Project XL negotiation, Intel and EPA also adopted as binding a set of voluntary ambient air pollution guidelines developed by the state of Arizona. The guidelines are used to insure that emissions from the Intel facility never reach levels deemed hazardous to human health or the environment. There have been no reports that the manufacturer has exceeded the ambient guidelines throughout the five-year duration of the XL agreement.

### *2.1.3 Measurement and reporting*

31. As part of the Project XL agreement, Intel agreed to develop public emissions reports published quarterly and annually. Intel estimates emissions based on the flow of materials and energy into and out of the semiconductor manufacturing facility. Such flows are estimated by emissions factors that consider, for example, fuel use and the type of equipment used to generate pollution. However, Intel claimed as confidential any emissions factors that apply to specific equipment. Intel's confidentiality claims make it impossible for the public to verify independently data contained in quarterly emissions reports.

32. Several non-local environmental groups that were not part of the official XL negotiations unsuccessfully requested that Intel, as a party to the XL provisions, be required to do more than merely estimate emissions. One group wanted Intel to install emissions monitoring devices that would provide actual, real-time measures of air pollution. However, Intel, like most other microchip manufacturers, maintains that such devices are too costly and may introduce contamination into the production process (Mazurek 1999).

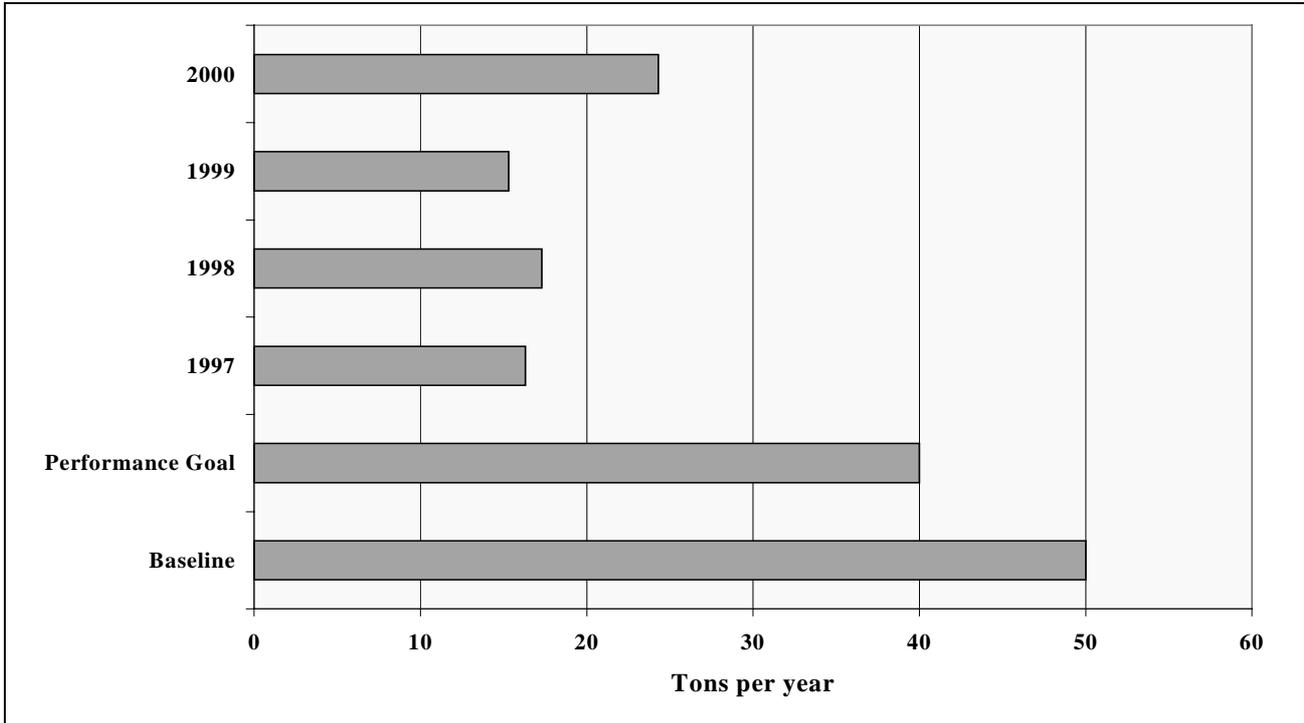
### *2.1.4 Target attainment*

33. As Figures 1-7 illustrate, the Intel facility has remained well under not only baseline levels but also targets that the company established for itself for the nine different pollutants listed above through the year 2000.<sup>1</sup> The results are notable for pollutants such as volatile organic compounds, nitrogen oxide, and sulphur dioxide, which contribute to urban smog but even more notable for a class of air pollutants that are thought to be hazardous to humans and to the environment, known as hazardous air pollutants, or HAPs. HAPs may cause more localised problems and trigger health problems at smaller doses than conventional pollutants. Furthermore, HAPs typically possess unique exposure thresholds, pathways, and properties once released into the environment. That is, some are extremely toxic in small amounts, while others require much larger doses.

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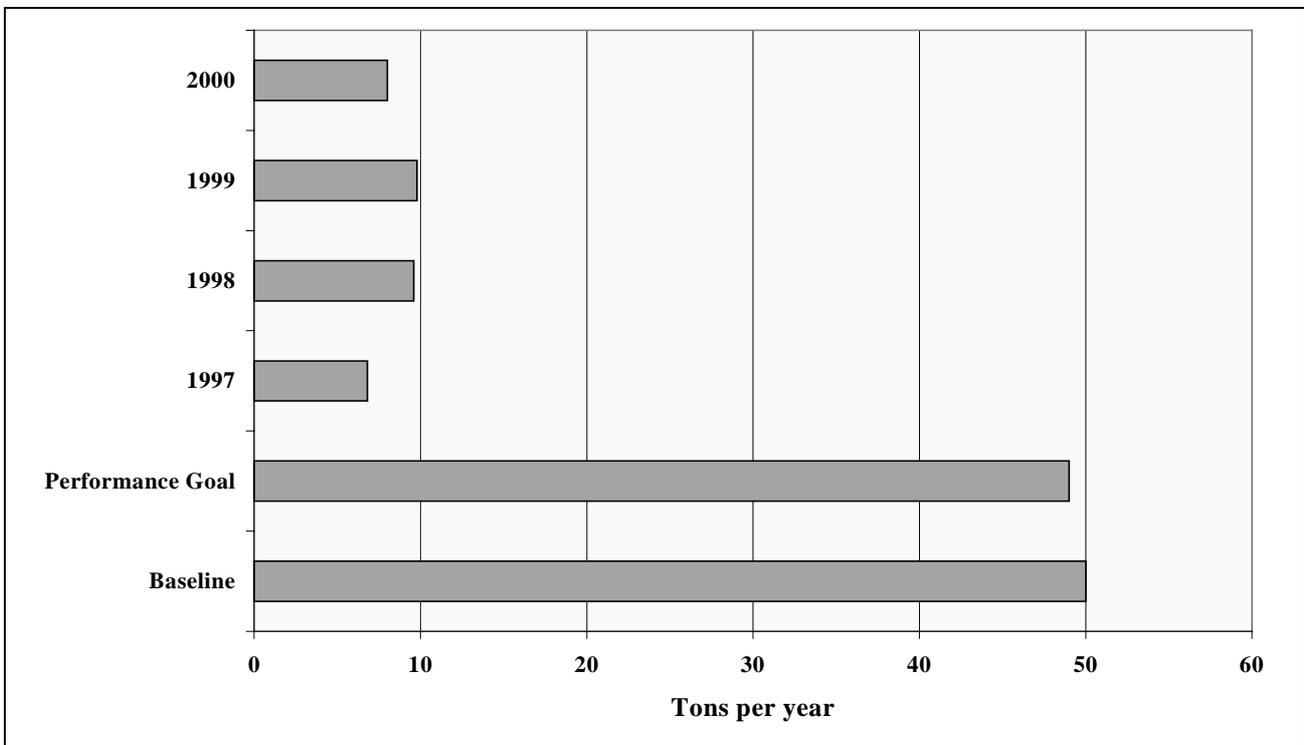
<sup>1</sup> The data are based on EPA reports through the first quarter of 2000. These data are supplemented by more recent reports from Intel available on the company website at <http://www.intel.com/intel/other/ehs/>.

**Figure 1. Intel -- Volatile Organic Compounds**



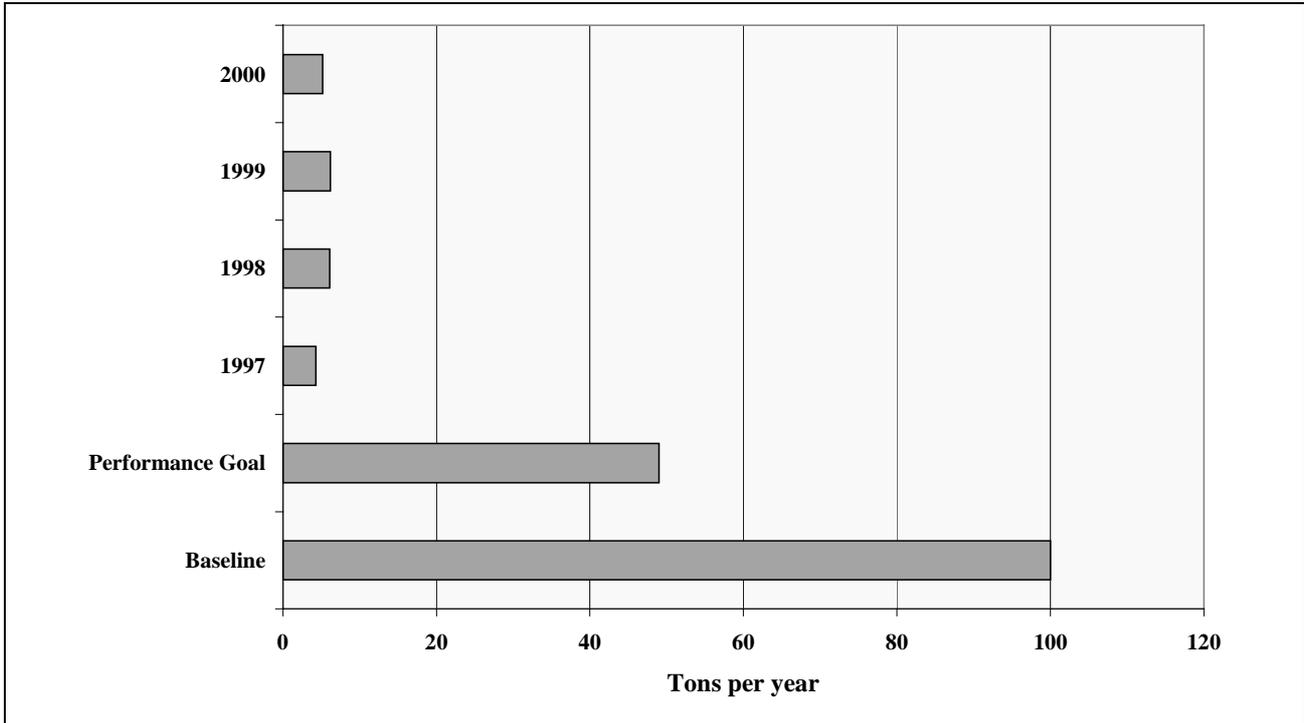
Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 2. Intel -- Nitrogen Oxides**



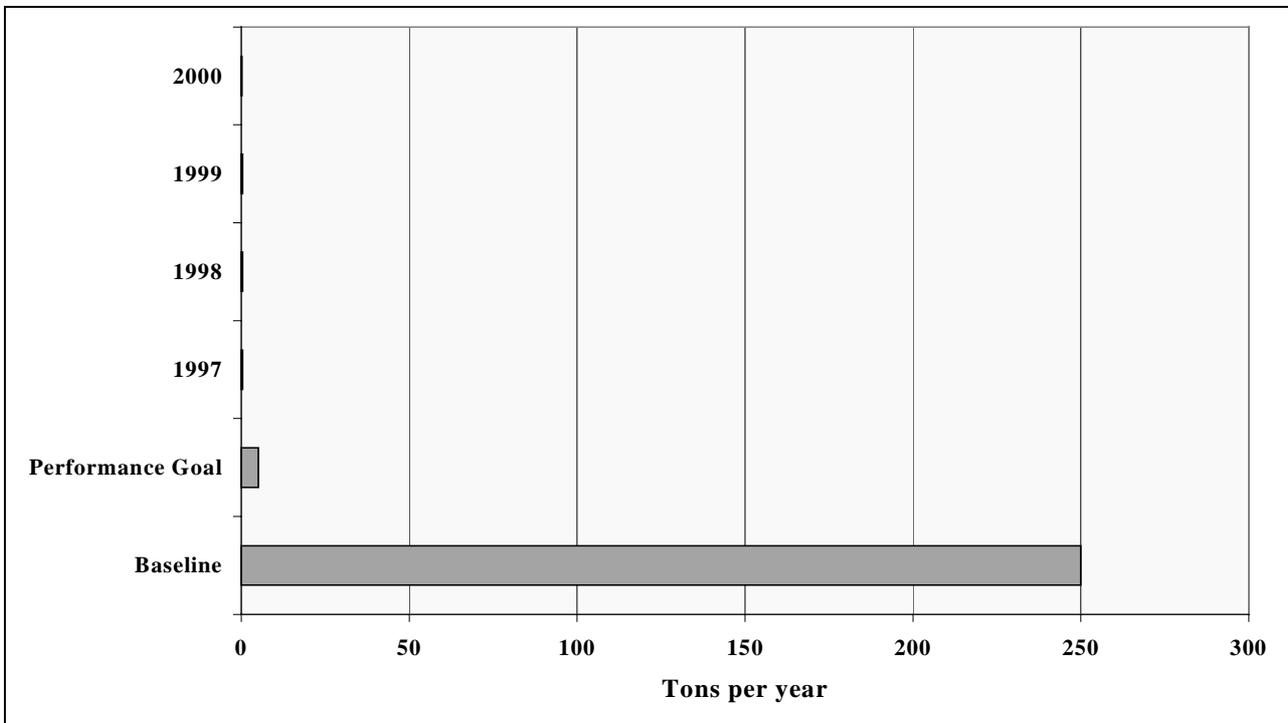
Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 3. Intel -- Carbon Monoxide**



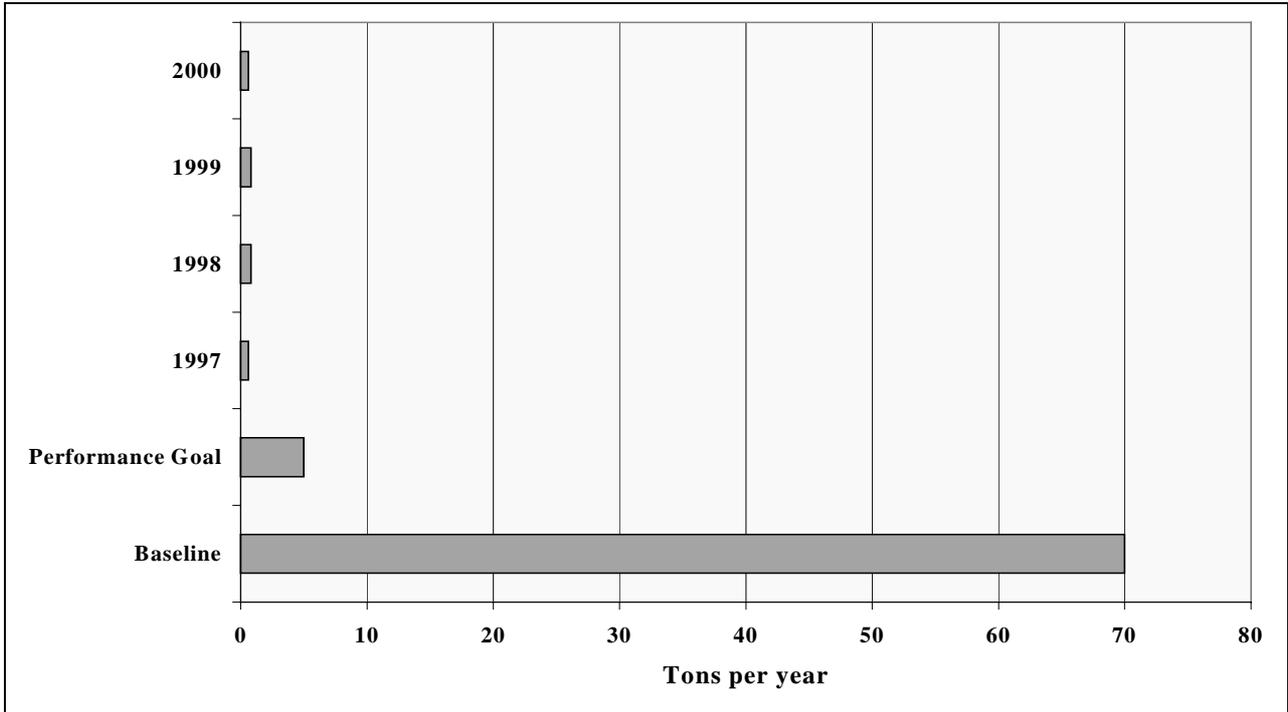
Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 4. Intel -- Sulphur Dioxide**



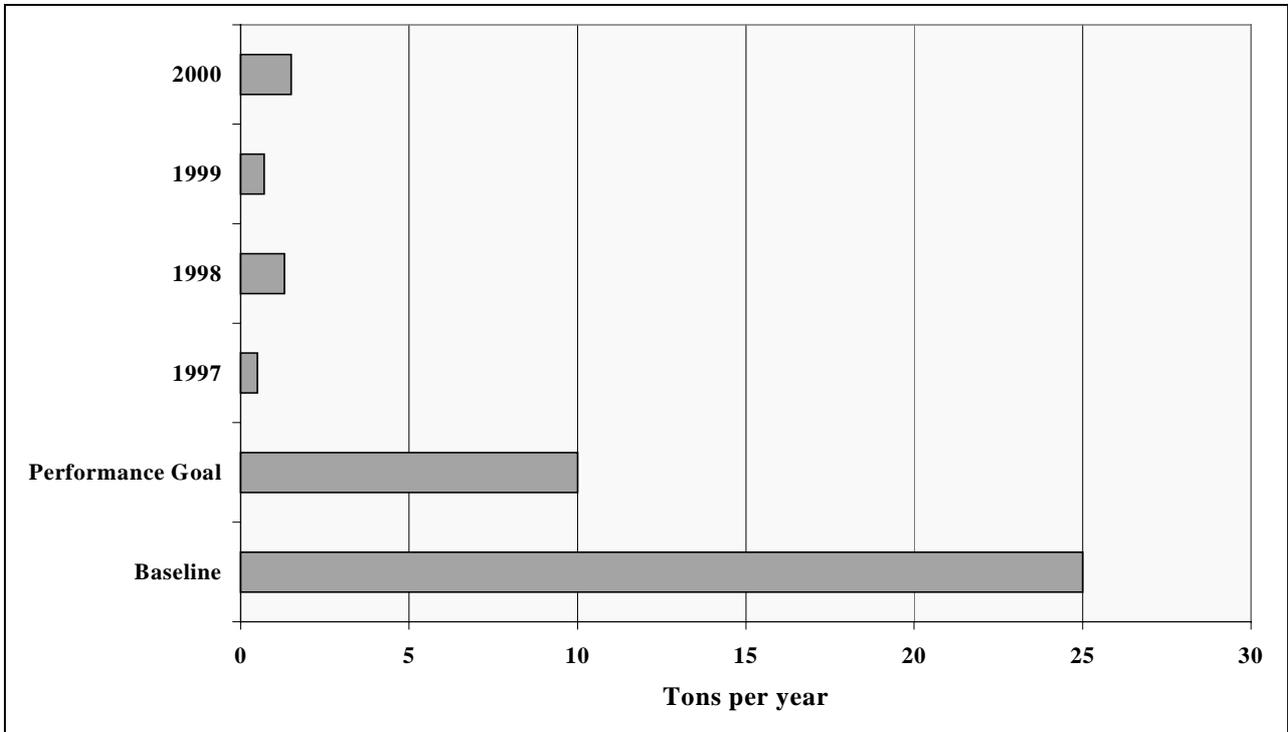
Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 5. Intel -- Particulate Matter**



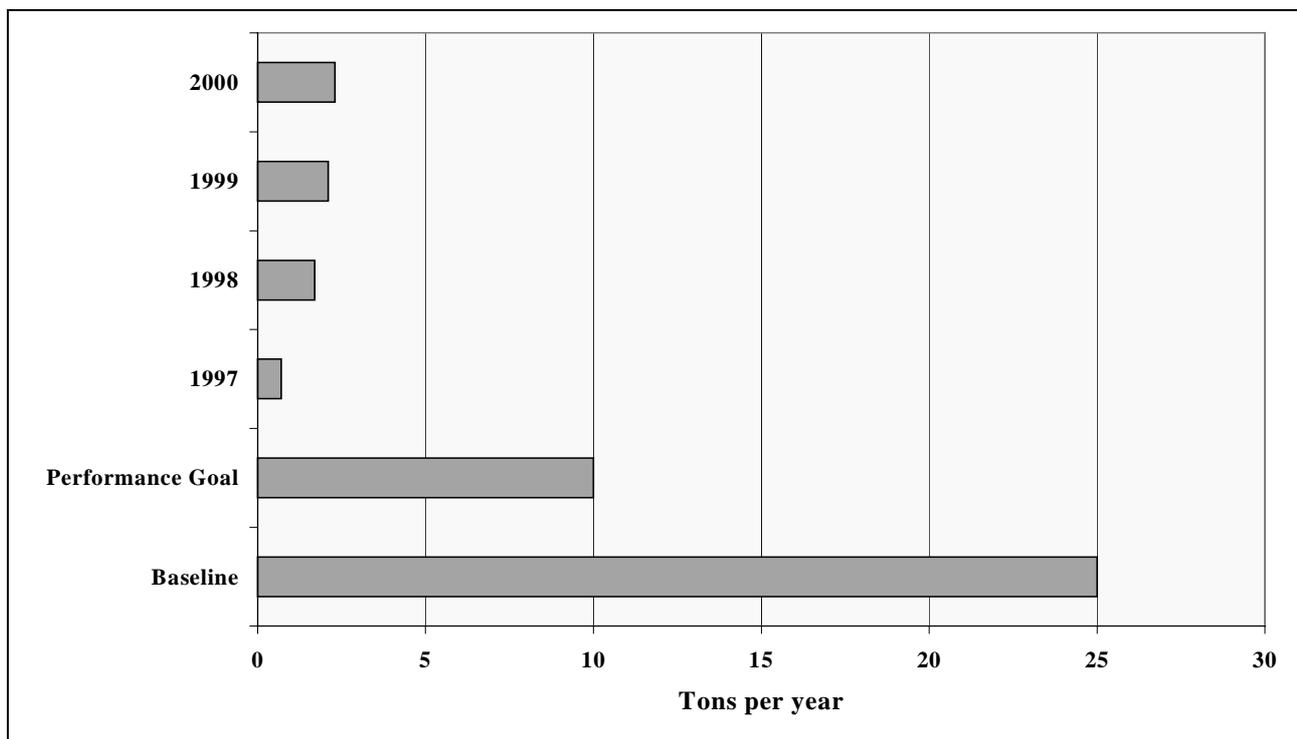
Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 6. Intel -- Aggregate Organic Hazardous Air Pollutants**



Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 7. Intel -- Aggregate Inorganic Hazardous Air Pollutants**



Source: Intel Corporation (2001). Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

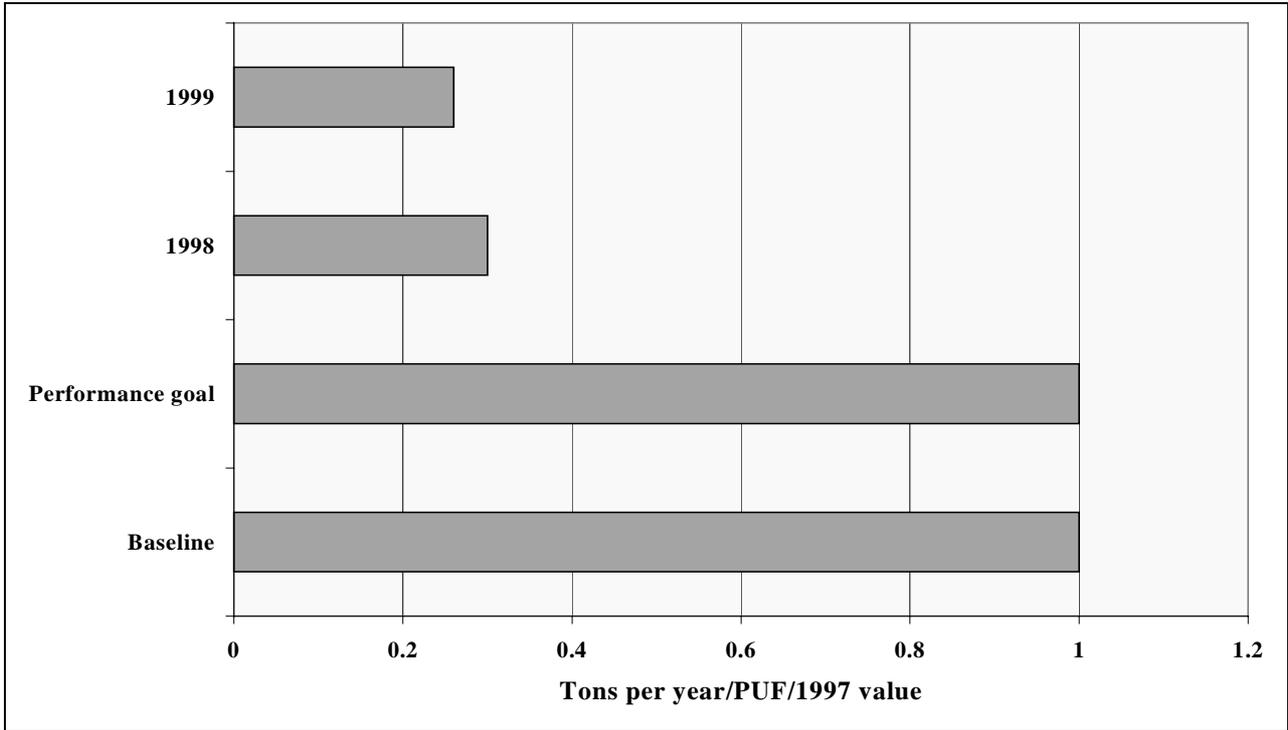
34. In addition to these targets, Intel committed to limit the level of emissions of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) so that air emissions per unit of production will not increase over time. For VOCs, the company used its emissions in 1997 and production levels to establish a baseline ratio of emissions per unit of production, or production unit factor (PUF). Intel's PUF measures annual semiconductor output (square inches of silicon produced by feature size<sup>2</sup>). Intel measures performance annually in terms of tons of VOC emissions divided by the PUF divided by the 1997 value for this ratio. The 1997 VOC value was  $1.28E^{-06}$ . This value is set equal to 1.0 to express the baseline. Each year, Intel reports the annual value relative to this baseline value.

35. As with VOCs, Intel has established a production unit factor for hazardous air pollutants. The baseline index is derived in the same way as the VOC measure. The 1997 value for hazardous air pollutants was  $9.40E^{-08}$ . Intel similarly sets this value equal to 1.0 to monitor performance over time.

36. Figures 8-9 illustrate that Intel's emissions of volatile organic compounds and hazardous air pollutants have remained below normalised production values in 1998 and 1999, the most recent years for which EPA data are available.

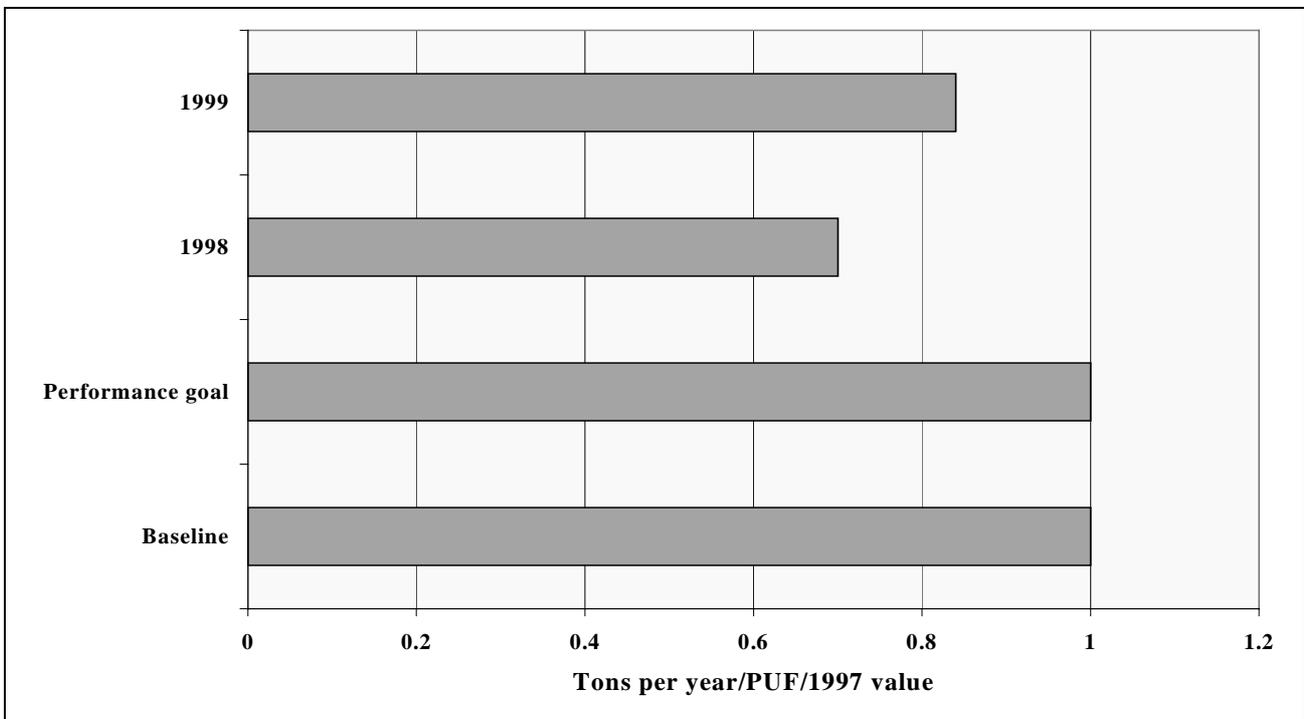
<sup>2</sup> Feature size is the width of the smallest transistor on a microprocessor. In 1997, the micron width was .35.

**Figure 8. Intel -- Total Volatile Organic Compounds per Production Unit**



Source: Intel Corporation. 2001. Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

**Figure 9. Intel -- Aggregate Hazardous Air Pollutants per Production Unit**



Source: Intel Corporation. 2001. Intel Ocotillo Project XL Annual FPA Progress Report. April 1. U.S. Environmental Protection Agency. 2001. Project XL Progress Report. January. EPA Document Number 100-R-00-031.

### *2.1.5 Other policy instruments*

37. Intel's primary motivation for participating in Project XL was to find a way to reduce potential delays associated with permitting under the 1990 amendments to the Clean Air Act. In practice, the potential for Intel to experience delays due to air permitting is minimal for two reasons. First, although Intel feared that the 1990 Clean Air Act requirements would harm competitiveness, the company nonetheless adopted as corporate policy of structuring almost all of its U.S. facilities to emit pollutants well under threshold limits that would trigger reporting for major sources. One exception is a facility in Aloha, Oregon that houses some older production lines and is subject to permitting requirements under the 1990 amendments. There, Intel worked with the state of Oregon and EPA to develop a "Pollution Prevention in Permitting Pilot" (P4). Unlike Project XL, the P4 effort did not involve outside stakeholders in a negotiation. However, P4's environmental requirements arguably are more stringent than those contained in Intel's Project XL agreement.

38. The P4 permit placed a plant-wide cap or limit on emissions and required by law Intel to adopt pollution prevention practices that emphasise the reduction of pollution through design and materials substitution, rather than the control of pollution once it is created. No such provisions were required under Project XL. In exchange, Intel received from regulators an allowance that approved in advance routine production changes at the older manufacturing facility similar to that provided under Project XL. The P4 permit conditions require Intel to describe what types of processes and decision making the firm will use to prevent pollution. The P4 agreement also requires Intel to establish partnership agreements with its suppliers and equipment vendors to select raw materials that minimise hazardous air pollutants and volatile organic compound emissions. Finally, the permit requires Intel to develop a data collection system and an employee-training program to prevent pollution (Mazurek 1999).

39. In contrast, the air-permitting portion of Intel's Project XL agreement formed just one part of a comprehensive plan that covers air, water, and waste issues at Intel's Ocotillo site. However, the permit's pre-approval and emissions cap provisions represent the single source of regulatory flexibility under the XL plan. Not surprisingly, the air permit was the most hotly contested portion of the package, drawing the ire of more than 130 environmental and environmental justice organisations. What EPA originally envisioned as a 6-month process took 17 months to complete. The lengthy and contentious nature of the XL negotiation makes it questionable whether an XL-type process that involves negotiation is the most expeditious or inexpensive way for a company to obtain a permit that helps to reduce manufacturing delays. Provisions to approve in advance routine production changes at an Intel plant could have been achieved through the less prominent, less controversial P4 experiment carried out at Intel's Oregon facility.

## **2.2 Merck & Co., Inc.**

40. Merck sought and received from EPA the ability to make routine production changes without securing additional permits in addition to emissions limits or caps on pollutants that contribute to urban smog (known as criteria pollutants) as well as individual caps in emissions of sulphur dioxide, nitrogen oxide, and particulate matter less than ten micron widths in diameter (PM-10). Merck agreed also to make improvements in emissions from its hazardous waste management equipment. Merck planned to attain its targets largely through conversion of its boilers, which power the manufacturing process. Merck agreed to phase-out its coal-fired boilers and replace them with cleaner, natural gas boilers. Under Merck's Project XL agreement, the manufacturer was required to comply with these facility-wide emissions targets no later than July 2001, 12 months after the facility converted its coal-fired boilers with natural gas.

41. Under its Project XL agreement, Merck set the following targets:
- Total criteria pollutants: 1,202 tons per year (20 percent below the baseline)
  - Sulphur dioxide (SO<sub>2</sub>) emissions: 539 tons per year (25 percent below the baseline)
  - Nitrogen oxides (NO<sub>x</sub>) emissions: 262 tons per year (10 percent below the baseline)
  - Particulate matter less than ten microns: 42 tons per year (about equal to the baseline)

### 2.2.1 Baseline measures

42. Unlike the Intel facility, which was new and lacked an emissions history from which to construct a baseline, Merck's targets are constructed from baselines that represent the facility's actual emissions for each of these pollutants averaged over 1992 and 1993.

43. Environmental groups such as the Natural Resources Defense Council (NRDC) that were not part of the formal stakeholder negotiations objected to these baselines for several reasons. First, they argued that Merck would have made the reductions proposed in its Project XL agreement in the absence of such an initiative. NRDC maintained that proposed new regulations, permits, and regional initiatives to improve air quality in the Shenandoah National Park would, in the absence of Project XL, have required the Merck facility eventually to switch fuels from coal to gas. In this context, NRDC claimed that the only environmental benefit associated with Merck's participation in Project XL would be to encourage Merck to make the fuel switch sooner than otherwise required under pending regulations. NRDC objected to the agreement on the grounds that in exchange for doing something that it would have been required to undertake anyway, Merck's open-ended XL agreement gives the manufacturer air permitting flexibility in perpetuity.

44. NRDC also faulted how Merck set targets relative to its baselines. NRDC wanted the manufacturer to use measures more stringent than average emissions to calculate its baseline (U.S. EPA 1996b).<sup>3</sup> EPA and stakeholders who participated in the Project XL agreement found Merck's proposal to use average emissions to calculate the baseline sufficiently rigorous because the manufacturer agreed to make the frequency of its measurement and reporting commensurate with emissions levels.

### 2.2.2 Measurement and reporting

45. Under Merck's Project XL agreement, the frequency of monitoring and reporting requirements is proportional to the facility's actual emissions – the closer emissions get to the actual cap, the more frequent the reporting requirements. For these reasons, the EPA and stakeholders found that Merck's use of average emissions constituted a sufficiently rigorous baseline.

46. The facility must report on emissions annually when they are less than 75 percent of the cap. Semi-annual reporting is required when facility-wide emissions are between 75 and 90 percent of the cap. Merck must report monthly when emissions are equal to or greater than 90 percent of the total emissions cap.

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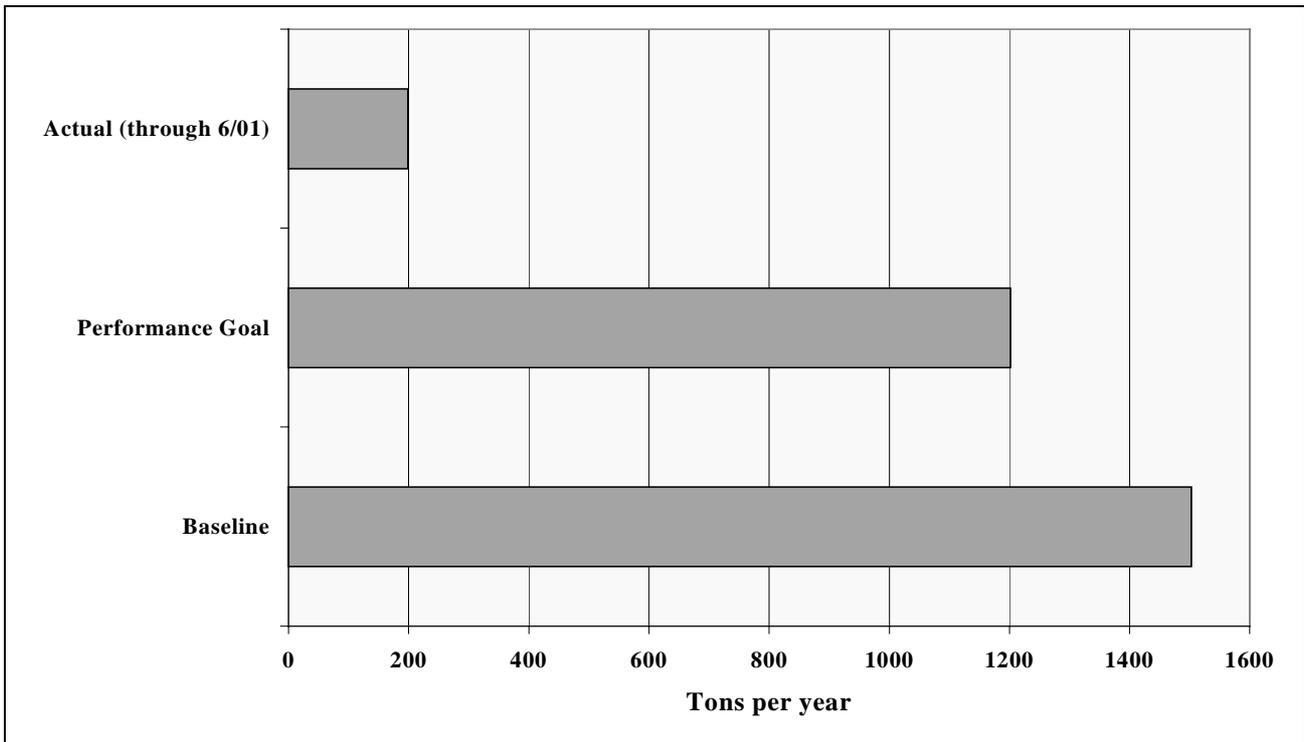
<sup>3</sup> Rather than base reductions on average emissions, NRDC wanted reductions relative to the baseline to represent either 1) the total reduction based on the average operations and production rate of 1992 and 1993; or 2) the total reduction based on the operations and production rate during the time period defined by the highest emission point (HEP); or 3) the total reduction based on another more appropriate emission rate, as agreed upon by the Virginia Department of Environmental Quality, EPA, and Merck.

47. In terms of measurement, the XL air permit requires Merck, after its gas-fired boilers are put into place, to monitor emissions through the use of actual emissions tests on smokestacks and also through the use of emissions factors that are based primarily on the facility’s fuel use. The air permit also specifies how emissions controlled from abatement equipment should be calculated. For example, pollution controlled from scrubbers must be monitored using such measures as scrubber flow and pressure differentials (VDEQ 1998). Although the XL permit requires Merck to make these measurements more often as emissions increase, it does not require the manufacturer to use more stringent measurement methods as emissions increase.

2.2.3 Target attainment

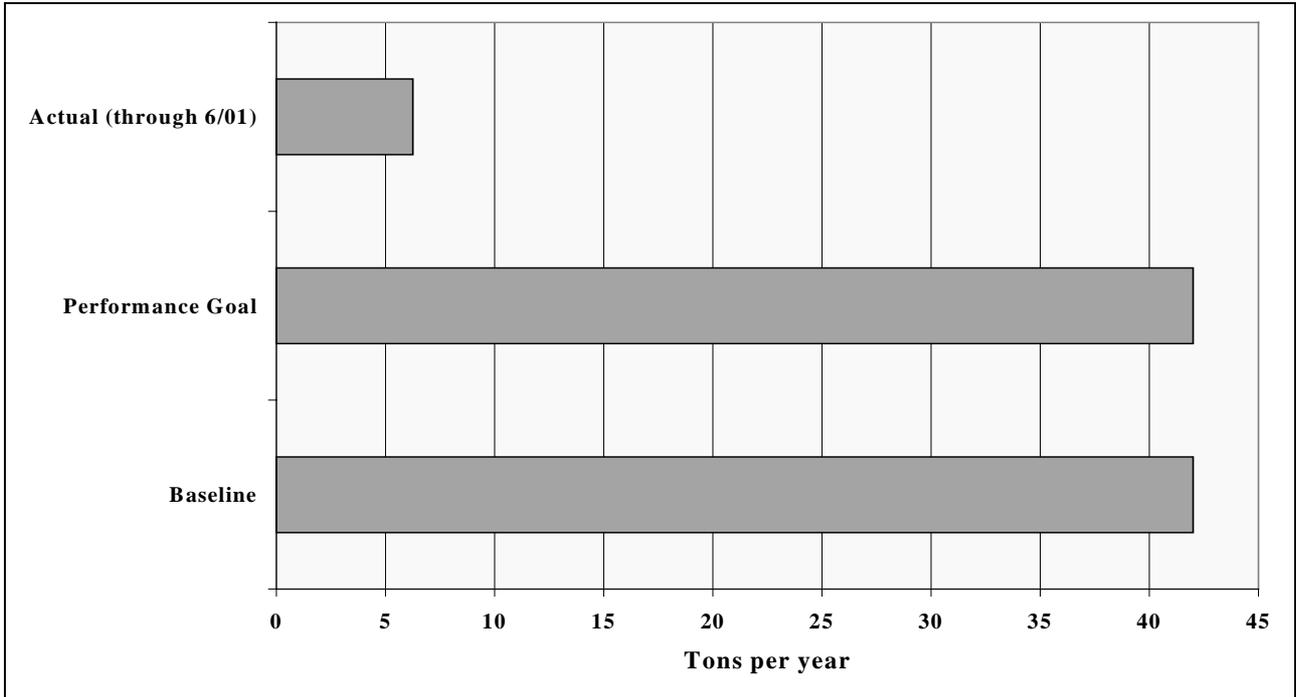
48. Merck completed the conversion of its boilers from coal fired to natural gas in June 2000. Figures 10-13 illustrate Merck’s subsequent environmental performance. The 12-month total for facility-wide criteria pollutant emissions from July 2000 to June 2001 was 199.02 tons, nearly an 87 percent reduction from the baseline emissions. In its semi-annual report, Merck reported a 12-month total of SO<sub>2</sub> emissions from July 2000 through June 2001 of only 18.79 tons, a 97 percent reduction from baseline emissions. The 12-month total of NO<sub>x</sub> emissions from July 2000 through June 2001 was 39.63 tons, an 86 percent reduction from baseline emissions. Merck reported a 12-month total of PM-10 emissions from July 2000 through June 2001 of 6.25 tons, an 85 percent reduction from baseline emissions. This reduction in PM-10 emissions exceeded the expectations outlined in Merck’s Project XL agreement (U.S. EPA 2001c).

**Figure 10. Merck -- Total Criteria Pollutants**



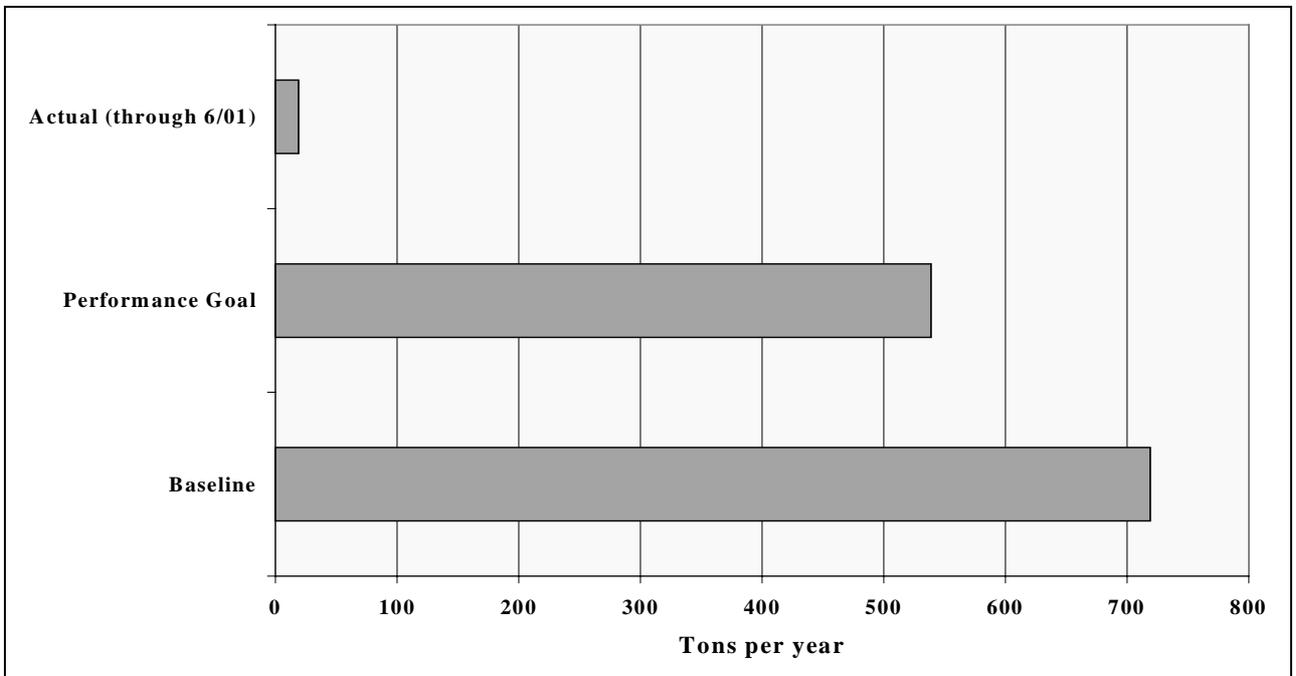
Source: U.S. Environmental Protection Agency (EPA). 2001c. Preliminary Project XL Results for Merck & Co., Inc. for the Period Ending September, 2001. Draft document. EPA Office of Policy and Innovation. Washington, D.C.: U.S. EPA; U.S. Environmental Protection Agency (EPA). 1999. Project XL: 1999 Comprehensive Report. EPA-100-R-99-008. Washington, D.C.: U.S. EPA.

**Figure 11. Merck -- Particulate Matter**



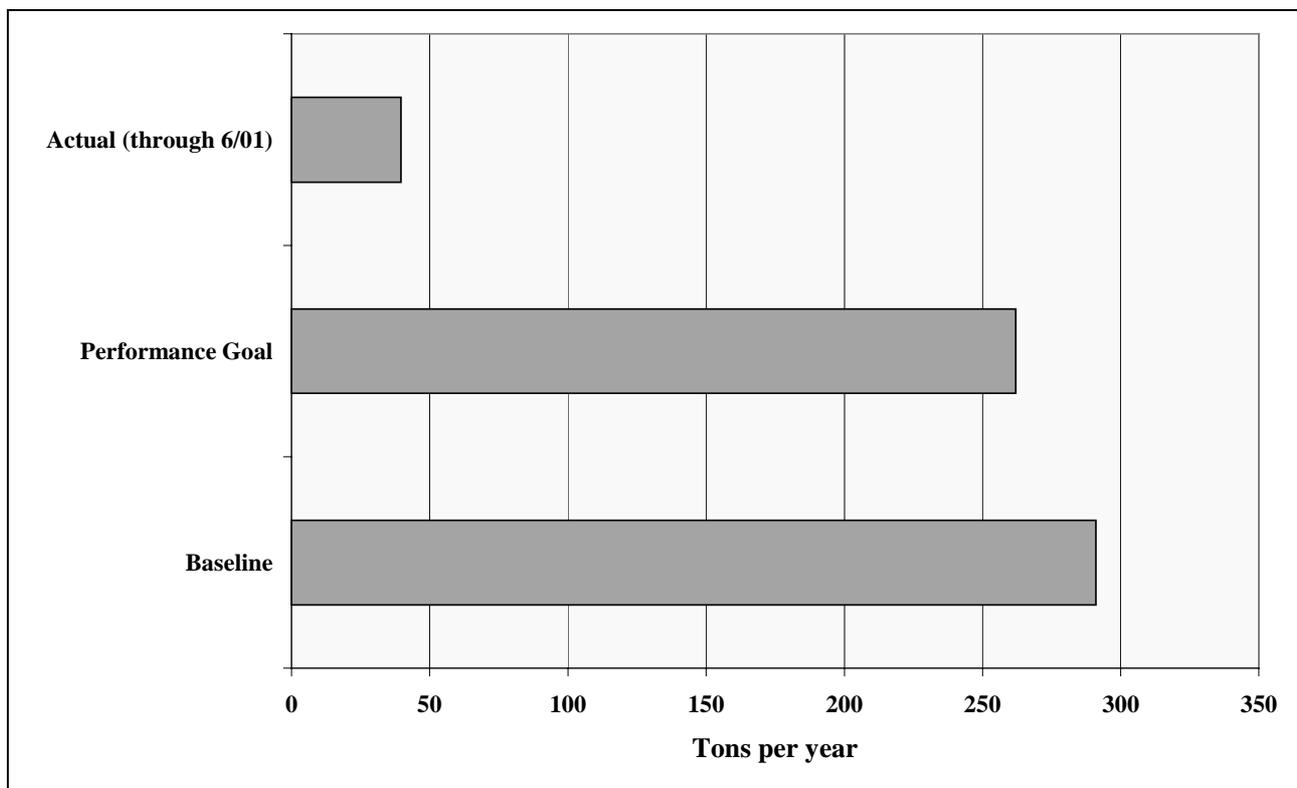
Source: U.S. Environmental Protection Agency (EPA). 2001c. Preliminary Project XL Results for Merck & Co., Inc. for the Period Ending September, 2001. Draft document. EPA Office of Policy and Innovation. Washington, D.C.: U.S. EPA; U.S. Environmental Protection Agency (EPA). 1999. Project XL: 1999 Comprehensive Report. EPA-100-R-99-008. Washington, D.C.: U.S. EPA.

**Figure 12. Merck -- Sulphur Dioxide**



Source: U.S. Environmental Protection Agency (EPA). 2001c. Preliminary Project XL Results for Merck & Co., Inc. for the Period Ending September, 2001. Draft document. EPA Office of Policy and Innovation. Washington, D.C.: U.S. EPA; U.S. Environmental Protection Agency (EPA). 1999. Project XL: 1999 Comprehensive Report. EPA-100-R-99-008. Washington, D.C.: U.S. EPA.

**Figure 13. Merck -- Nitrous oxides**



Source: U.S. Environmental Protection Agency (EPA). 2001c. Preliminary Project XL Results for Merck & Co., Inc. for the Period Ending September, 2001. Draft document. EPA Office of Policy and Innovation. Washington, D.C.: U.S. EPA; U.S. Environmental Protection Agency (EPA). 1999. Project XL: 1999 Comprehensive Report. EPA-100-R-99-008. Washington, D.C.: U.S. EPA.

#### 2.2.4 Dynamic benefits

49. Merck maintains that absent Project XL, it would have lacked sufficient incentives to switch to cleaner burning boilers because it would have been required to undergo a lengthy permitting process. Although it is possible that pending regulations would require the manufacturer to eventually switch fuels, Merck's \$10 million conversion was not required by status quo regulations and was not necessary from an operational standpoint (NAPA 2000). In addition, Merck maintains that its Project XL agreement gave the manufacturer an additional incentive to buy pollution abatement technology that exceeds, rather than simply meets, what status quo air permits require. According to Merck, manufacturers avoid buying and installing abatement technology that exceeds existing standards for fear that EPA, upon discovery that such technology exists, simply will increase the stringency of status quo standards. Under Merck's XL permit, EPA agrees to avoid such practices. In exchange, Merck agreed to purchase and install the least polluting gas boilers available on the market (*ibid.*).

#### 2.2.5 Other instruments

50. Unlike Intel, Merck did not participate in any other initiative comparable to Project XL. In Intel's case, it is likely that the use of P4, instead of Project XL, could have lowered transaction costs and increased environmental benefits. Unlike Project XL, P4 did not involve negotiation, which raised transaction costs substantially. Furthermore, it is possible that P4 delivered more environmental benefits than Project XL because the pilot contained a number of requirements for Intel to prevent pollution.

### 3. Economic efficiency

51. Project XL targets individual industrial plants, rather than all of a firm's facilities. One result is that cost issues, such as those that arise when firms are required to meet the same standard, even if the marginal abatement costs among different firms varies, are not present. At the same time, however, potential cost efficiencies that could be gained from pollutant trading among plants and among firms, are not realised under Project XL.

52. As the following discussion shows, it is likely that the economic benefits to Intel and to Merck associated with participation in Project XL are likely to be quite substantial. However, because neither firm has developed marginal abatement cost curves or other data which with to evaluate economic efficiency, it is impossible to state with certainty the magnitude of benefits to Intel or to Merck. Nonetheless, for both companies, economic efficiencies most likely stem from two sources:

- Advanced approval of production changes: Under traditional air permits Intel and Merck would be required to seek approval before making manufacturing changes.
- Plant-wide emissions caps: Intel's XL air permit replaces individual hazardous air pollution emissions limits with aggregate limits. Merck's XL air permit allows the manufacturer to increase some forms of air pollution in exchange for decreases in others (for example, increase volatile organic compound emissions in exchange for greater reductions in sulfur dioxide emissions). In theory, at least, such features would allow the manufacturers to abate more pollutants that are inexpensive to reduce in exchange for controlling fewer pollutants that are more costly to abate.
- The ability to expand operations without re-permitting: Intel's permit allowed the manufacturer in 2001 to complete construction and commence operations at an additional manufacturing facility at the site without securing additional permits – a process that can require six months to one year to complete under status quo regulation.

#### 3.1 Abatement cost

53. For both Intel and Merck it is likely that abatement costs associated with the Project XL permits are higher than they would be under conventional regulation simply because the manufacturers commit to reducing more pollution in the aggregate than status quo laws and regulations require.

#### 3.2 Reduced potential for product delay

54. Both Intel and Merck's facilities covered under the Project XL agreement produce products that earn monopoly rents as a result of being first to market. Intel makes microprocessors at its Chandler facility and among Merck's products is an advanced drug to combat human immunodeficiency virus (HIV). Abatement costs that are higher under Project XL than under conventional regulation are likely outweighed by Project XL permit features that reduce the threat of production delays. Potential private benefits associated with reduced delays include accelerated income benefits or the ability for the firm to achieve profits sooner rather than later. By extension, consumers may benefit from having a new HIV drug or microprocessor to run their personal computers today rather than tomorrow.

55. Whether or not Intel experiences such benefits is complicated by a number of issues. One of these is related to Intel's strategy to produce in rapid succession new products that make existing products

obsolete. If a new product is introduced too soon, it cannibalises the old. The complementary of microprocessors adds another layer of complexity to the estimation of benefits that arise from speeded product introduction.

56. As the foregoing discussion suggests, the greatest potential source of private benefit to Intel and to Merck is likely due to the effects of accelerated product introduction in a competitive environment. In the presence of competition, delay threatens to erode slim technological and marketing leads. Accelerated permits may provide the firm with “first-mover” effects that allow the firm to pursue strategies to deter the entry of competitors.

57. Although there is no quantitative data to illustrate the magnitude of such benefits to Intel or to Merck, consider that Intel starting in July 2001 initiated a series of stakeholder meetings in Arizona to extend the Project XL air permit another five years (the first agreement expired in December, 2001). On December 19, 2001 Intel, EPA and relevant stakeholders signed an agreement to renew the XL effort for five more years. If Project XL failed to benefit Intel privately, it is unlikely that the manufacturer have elected to continue the initiative for five more years.

#### **4. Practical implementation**

58. In theory, the primary disadvantage of voluntary environmental agreements (VAs) arises from the collective nature of their benefits – participants have a strong incentive to act as free riders. Voluntary agreements also may act to exclude competitors and to restrain trade. Such practices may privately benefit participants but not society generally because they can reduce product supply and increase product cost. Another potential problem is that industry may use VAs to influence and capture the details of environmental policy. Environmental regulation is captured when the regulatory costs are zero or close to zero for a firm or a sector.

59. In practice, free rider problems have not yet been observed among VAs administered by EPA (Mazurek 1998). In the case of Project XL, this is primarily because agreements are on a case-by-case basis, rather than across industry sectors. As a result, firms are unable to free ride at the expense of others that comply with the terms of the voluntary agreement. More generally, however, such problems have not been observed because air, water, and waste laws impede VA implementation. In particular, negotiated strategies such as Project XL, which are designed to provide regulatory relief, fail because EPA lacks the legal authority to waive regulatory requirements.

60. Although free ridership does not appear to be much of a problem, some environmental watchdog groups expressed concern that Project XL would set precedents that firms later could use to undermine permitting laws and regulation. In the case of Intel’s effort, environmental groups complained that regulators and stakeholders involved in the Project XL negotiations lacked sufficient information to assess the costs of firms’ abatement options. Viewed from another perspective, however, it may be that Project XL’s requirements that members of the public to be included in project negotiations provided an additional level of oversight and scrutiny that reduced the likelihood of industry capture.

#### **5. Administrative/transaction costs**

61. The presence of information asymmetries between firms and regulators can provide firms with the ability to “capture” or unduly influence regulatory agencies. Some environmental groups feared that companies would use Project XL as a way to set legal precedents but in practice regulatory capture has not come about. Although information asymmetries under Project XL did not result in regulatory capture, it is likely that they were a significant source of transaction costs associated with the voluntary initiative.

62. In their study of transaction costs, Blackman and Mazurek (2001) find that total costs to develop an XL project were quite substantial. For the 11 firms in their study, the median cost of project development was \$297,500. For EPA regional offices, the median cost was \$37,499. The median total cost was \$334,999. The average length of time required to develop an XL project agreement was 26 months.

63. For Intel and Merck, the cost to participate in Project XL was \$588,000 and \$706,000, respectively (Resources for the Future (RFF) survey, 1998). These costs are considerably above the median and are due in part to the duration of negotiations. Intel's XL negotiation took 17 months to complete whereas Merck's required 26 months. To some extent, the duration may be due to unique features of these firms, their facilities, and where the facilities are located.

64. Intel entered into its Project XL negotiation at a time when the firm had attracted negative attention nation-wide from environmental and other interest groups. The same year that Intel launched Project XL, a philanthropic organisation published a report that was highly critical of Intel's environmental record at a facility in another state. The report was preceded in 1994 by a resolution spearheaded by a minority of Intel shareholders that said that Intel "jeopardizes stockholder investments by picking environmentally risky sites for its operations" (Mazurek 1999, p2). Not surprisingly, then, when Intel sought to finalise its Project XL agreement with EPA and with local stakeholders who had negotiated over its terms, 130 organisations that were not involved in the negotiation issued a statement that implied EPA had been captured by Intel (*ibid.* p. 2). Merck's negotiations, while not as prominent as those of Intel, similarly were likely slowed by the fact that the Stonewall facility is adjacent to an environmentally sensitive area, the Shenandoah National Park.

65. Watchdog group resistance may help to account for the long duration and high transactions cost of these agreements. However, Blackman and Mazurek found that costs for the most part were attributable not so much to the presence of outside stakeholders but instead to the difficulty of securing EPA's final approval over the Project XL agreements. For all 11 firms, in their study, roughly half of their transactions costs arose from dealing with EPA, while stakeholder negotiations—the focus of considerable attention in the literature—only accounted for one fifth of total costs.

66. In particular, the authors found that obtaining final approval from EPA over the negotiated outcomes was the most expensive portion of the Project XL effort. Respondents to Blackman and Mazurek's survey identified two factors as the most responsible for raising costs: lack of co-ordination among EPA offices and lack of clarity about the requirement of superior environmental performance.

67. Blackman and Mazurek also considered a wide variety of characteristics of the project proposal, the facility, the firm, and the negotiation process, to conclude that the complexity of project proposals drove differences in project development costs across firms (see Table 1). As Table 1 illustrates, costs were high for firms that submitted proposals that either involved emissions caps on multiple air pollutants or multiple facilities and low for firms that sought relief from hazardous waste reporting requirements.

68. An important caveat to these findings is in order. When EPA launched Project XL in 1995, the project development process was by all accounts ill defined and poorly managed. Over time, the EPA has taken a number of steps to mitigate these problems (Federal Register 1997, 1999). As a result, some project development costs are lower today than they were for the respondents surveyed in the Blackman and Mazurek study.

69. Indeed, a follow-up survey conducted by Delmas and Mazurek (2001) found that median cost to the more than 50 organisations that as of 2001 had negotiated Project XL agreements had fallen to \$108,000. The drop may be due to refinements made to the program by EPA and/or to the fact that newer

participants have proposed projects far less complicated (and costly) than those developed by Intel and Merck, two the Project XL's first participants.

**Table 1. XL Proposal characteristics by cost category**

<b>Project</b>	<b>Principal flexibility requested</b>	<b>Multiple facilities?</b>	<b>Principal environmental media affected by flexibility</b>	<b>Legal lever used by EPA to provide flexibility</b>
<b>High-cost</b>				
<b>Imation</b>	Emissions caps, permit pre-approval	No	Air	Site specific rule
<b>Intel</b>	Emissions caps, permit pre-approval	No	Air	Alternative permit
<b>Lucent</b>	Permit pre-approval	Yes	Air, water, solid and hazardous waste	Site specific rule
<b>Merck</b>	Emissions caps, permit pre-approval	No	Air	Site specific rule
<b>Weyerhaeuser</b>	Emissions caps	No	Air, water	Existing waiver mechanism
<b>3M</b>	Emissions caps, permit pre-approval	Yes	Air	Wanted site specific rule
<b>Low-cost</b>				
<b>Berry</b>	Consolidated permitting	No	Air, water, solid and hazardous waste	Generally applicable interpretive statements
<b>Hadco</b>	Delist wastewater sludge	Yes	Water, solid waste	Existing waiver mechanism
<b>IBM</b>	Alternative wastewater treatment	No	Water	Determination of equivalent treatment
<b>Molex</b>	Delist wastewater sludge	No	Water, solid waste	Existing waiver mechanism
<b>Osi-Witco</b>	Deferral of new technology standards for hazardous waste	No	Air, water	Existing waiver mechanism

Source: Blackman, A. and J. Mazurek. 2001. "Cost of Site-Specific Regulation." Environmental Management Vol. 27, No. 1, pp. 109-121.

## **6. Voluntary approaches versus tradable permit schemes**

70. The underlying content of the Intel and Merck projects in some respects resembles a tradable permit scheme. Intel and Merck's Project XL agreements allow some trading among different types of pollutants at the facility level. In contrast, emissions trading schemes in the United States, such as EPA's Acid Rain Program, generally involve trading of one type of pollutant – sulfur dioxide (SO<sub>2</sub>) – among

electric utilities whose marginal pollution abatement costs vary. In the case of the Acid Rain Program, trading occurs among facilities and firms. It is likely that Merck and Intel sought to participate in facility-level XL agreements instead of an industry wide trading scheme because they sought to reduce costly delays associated with permitting delays, rather than pollution abatement. In this regard, Project XL, and not a trading scheme, served as the appropriate policy instrument.

## **7. Policy mixes**

71. In contrast to some voluntary initiatives, Project XL is not aimed at one type of environmental or regulatory problem. EPA hoped that Project XL participants would use the initiative as a way to identify and to improve problems found in environmental regulations. To the extent that it deals with regulatory reform rather than specific environmental goals, Project XL is distinct among policy instruments, most of which harness tools such as emissions trading to achieve more effective, efficient responses to environmental -- rather than regulatory -- problems (e.g., carbon dioxide emissions). One exception to policies that focus on problems more so than regulations is the now-defunct Common Sense Initiative (CSI).

72. EPA implemented CSI in 1994 -- one year before it introduced Project XL -- as a way for industry, non-government organisations, and regulators to review, and if necessary, revise regulations identified as ineffective or inefficient (Mazurek 1998). However, the CSI initiative largely was eclipsed by Project XL, which EPA unveiled shortly after it introduced CSI.

73. Whereas Project XL was an exercise in facility-specific regulation, CSI focused on industrial sectors, including computers and electronics. A number of companies, including Intel Corporation, participated in both CSI and Project XL. But there was little or no co-ordination on behalf of EPA or companies between the two initiatives. In theory, the initiatives had the potential to be complementary. For example, because it dealt with sectors, rather than individual companies (and their proprietary processes) CSI could have served as an opportunity to identify and to reduce information asymmetries associated with Project XL. Recall, for example, that environmental groups objected to Intel's use of levels contained in the Clean Air Act as a baseline to assess performance for its Chandler, Arizona facility (which was new at the time and lacked an emissions history). CSI's electronics group, comprised of several semiconductor manufacturers including Intel, could have worked to develop a benchmark based on participants' aggregate performance against which to assess the performance of Intel's individual XL facility.

74. Furthermore, CSI could have provided a way to popularise and transfer to other facilities and firms the results of Intel's Project XL efforts. For instance, the results of Intel's experiment could have been transferred to other Intel facilities and to the facilities of other semiconductor manufacturers. Finally, because they had a one-year lead on Project XL the government, industry, and environmental group participants in CSI's electronics and computer work group could have been enlisted in the negotiation process at Intel's XL site to help reduce controversy that surrounded Intel's XL negotiation process (Mazurek 1999).

75. Since CSI's conclusion in 1998, EPA has launched few initiatives directly comparable to Project XL. One, notable exception is the Performance Track Initiative. Discussed in greater detail below, Performance Track differs from CSI and Project XL in that it provides relief from status quo regulations, such as permitting requirements, in exchange for the adoption of management practices, rather than pollution reductions. As in the case of CSI and Project XL, there appears to be little co-ordination between Project XL and Performance Track.

## **8. Performance Track**

76. EPA proposed Performance Track in 1999 in response to the agency's growing interest in state and private industry use of Environmental Management Systems (EMSs) (EPA 2001b). Unlike ad hoc efforts to reduce pollution emissions, an EMS is a formalised set of management procedures and measurement tools designed to improve a facility's environmental performance.

77. Drawing upon concepts popular in the literature on quality management, firms and other organisations originally adopted EMSs as a way to more systematically manage their environmental activities. In essence, an EMS requires facilities to develop an environmental policy statement and a plan to improve environmental management. As part of this process, the facility sets performance objectives by identifying how its products and processes impact human health and the environment. To promote continual improvement of an EMS, facilities periodically assess either through the use of internal auditors or independent third parties how well their management conforms to their plan. Facility management must then review the results and take steps to improve how the facility's environmental impacts are managed. This process applies not only to regulated aspects of a facility's activities but unregulated aspects as well, for example noise and odour.

78. For some businesses, however, EMS adoption and certification also offers a possible rationale for regulatory benefits. This expectation caught the attention of environmental agencies such as EPA, citizens' environmental groups, and others that expected EMS certification to assure not merely better management for the sake of business, but also regulatory compliance and improved environmental performance.

### **8.1 Program features**

79. EPA's Performance Track requires participants to develop a policy, undertake planning, checking, and corrective action and management review but it does not endorse any particular EMS standards, such as ISO 14001. To qualify for Performance Track, a facility must demonstrate to EPA that it has achieved the following:

- adopted an Environmental Management System (EMS)
- is able to demonstrate specific environmental performance and commit to continual improvement
- commits to public outreach and performance reporting
- has a record of sustained compliance with environmental objectives.

80. In exchange, EPA offers the following incentives to Performance Track participants:

- facility receives lower priority for routine compliance inspections
- reduced reporting and monitoring under certain provisions of the Clean Water Act
- use of the Performance Track logo
- firm is listed on EPA web sites and in case studies and is invited to special performance track conferences, workshops, and networking activities.

81. Also, should the firm face future penalties for failure to comply with environmental laws, EPA will look favourably upon Performance Track participants when assessing penalties (EPA 2001b).

82. Although it has objectives very different than those of its predecessors, the Performance Track initiative builds upon the lessons EPA has learned from CSI and Project XL. Most notably, the experience of Project XL demonstrated to EPA the need to design a program that keeps transactions costs low. Whereas the application process under Project XL required potential participants to develop a voluminous proposal and to recruit external stakeholders to participate in the proposal development process, Performance Track simply requires applicants to complete a short application form. Another key difference is that Performance Track, unlike Project XL, does not require negotiation, either between the company and EPA or with outside stakeholders. Finally, unlike Project XL, one EPA office, rather than several, has the authority to review, accept or reject Performance Track applications, thereby eliminating another substantial source of transactions cost associated with Project XL identified by Blackman and Mazurek (2001).

## **8.2 Implementation**

83. Since the program's launch in 2000, EPA has accepted 251 facilities as Performance Track participants – a participation rate significantly higher than that of Project XL, which now has roughly 50 participants. One likely explanation for Performance Track's higher participation rate is that a number of participants have enrolled more than one facility into the program.

84. Although there is some overlap among participants in Project XL and Performance Track, the two initiatives, for the most part are independent. Performance Track participants that also successfully or unsuccessfully developed XL projects include 3M and IBM Corporation. 3M, a maker of adhesives, office products and digital storage equipment proposed to obtain air emissions caps for three of its facilities under Project XL but the negotiations fell apart ultimately because EPA could not agree as to what constituted environmental performance superior to what traditional regulation could bring. In contrast, five of 3M's facilities have successfully registered their environmental management systems under the Performance Track initiative. In contrast, IBM proposed two projects accepted ultimately by EPA into Project XL. As of 2001, seven IBM facilities, including its Vermont plant that participates in Project XL are enrolled in Performance Track.

85. For the most, part, however, there is little overlap between participants in Performance Track and Project XL. One reason is likely due to the fact that Project XL participants, particularly early entrants, did not have comprehensive EMSs in place, especially EMSs certified to international standards such as ISO 14001. In the U.S. the use of EMSs, particularly those that require conformance to international standards such as ISO 14001 have been slow to catch on in the business community.

86. One exception to this rule is Lucent Technologies, a Project XL participant that embraced the use of EMSs early on. In contrast to most other XL participants, Lucent Technologies not only had in place an EMS registered to ISO 14001 but sought to make its EMS the centrepiece of its XL project. The firm sought to develop a corporate-wide EMS as part of its XL package, which included air emissions caps and permit pre-approvals. Curiously, however, the maker of computer chips and telecommunications devices has not yet applied to Performance Track.

87. Performance Track has managed to attract several large corporations that did not participate in Project XL. Participants include Johnson and Johnson, Lockheed Martin, and Monsanto. For the most part, however, Performance Track has attracted as participants a significant number of smaller firms as well as municipalities, for example, small dry cleaning establishments and city waste disposal facilities. Other participants include a substantial number of U.S. government facilities, which are required by executive order to adopt Environmental Management Systems.

88. In addition to little overlap among Project XL and Performance Track participants, there is little administrative overlap between the two initiatives. One reason is that like the experience of CSI and Project XL, EPA made little effort to co-ordinate the design and administration of Performance Track with existing EPA voluntary initiatives. This lack of co-ordination may be due to longstanding institutional barriers within the agency -- barriers which not only make it difficult to co-ordinate among various initiatives but also to administer individual initiatives such as Project XL that require co-ordination among EPA's various programs and offices.

89. Another is that EPA designed the initiatives for very different reasons. EPA, under direction of the Clinton administration, envisioned CSI and Project XL as ways in which to modernise environmental regulation. If participants could find "cleaner, cheaper, smarter" ways of achieving environmental results, EPA would use CSI or Project XL as a way to allow them to do so.

90. In contrast, Performance Track attempts to recognise and to foster the use of EMSs. Recall that industry and not government originally designed and adopted EMSs as a way to make management of environmental activities more systematic. Some firms also sought to adopt EMSs as a way to obtain eventually relief from status quo regulations. Whereas Project XL is designed to achieve real reductions in pollution superior to what status quo regulation can bring, Performance Track is designed to promote the adoption of better environmental management practices. In theory, better management should translate into less pollution, but whether the use of EMSs actually brings such results about remains an open question.

91. The ability for EMSs to result in better environmental performance has not yet been demonstrated in the literature or in the experience of Performance Track (Coglianese and Nash 2001). However, some firms, state, and federal regulators envision Performance Track as a way for participants eventually to receive regulatory flexibility. Firms would receive flexibility not for superior environmental performance, as in the case of Project XL, but for the presence of a robust EMS. Indeed, EPA is contemplating the development of a second Performance Track tier, which would allow participants to opt out of current laws and regulations, provided that their EMSs was capable of driving continual improvements in environmental management. As in the case of Project XL, however, EPA's efforts to grant Performance Track participants flexibility from laws and regulations is paradoxically undermined by the agency's lack of legal authority to do so.

## **9. Conclusions**

92. EPA's failure to co-ordinate among voluntary environmental initiatives such as the Common Sense Initiative (CSI), Project XL, and Performance Track points to a central deficiency common to all of EPA's efforts to promote the use of voluntary initiatives: In the United States, EPA employs initiatives such as CSI and Project XL to address shortcomings in federal environmental laws. But paradoxically, perhaps, it is the presence of existing federal laws that impedes the effective implementation of voluntary environmental agreements.

93. As the Intel and Merck case illustrate, the United State Congress created major U.S. laws such as the Clean Air Act during the 1960s and 1970s – at the time when companies such as Intel, with its time-sensitivity concerns, were first being created. In addition to their failure to account for quick-to-market concerns of innovative companies, the fragmented nature of air, water, waste, and toxics laws hamper EPA's ability to administer voluntary initiatives (Mazurek 1998).

94. To administer environmental laws, EPA is made of the interplay of various departments, each of which often is driven in their mission and obligation by different laws and different judicially imposed deadlines and timetables. From this perspective, it is difficult for EPA's different offices to reach agreement as to whether or not XL Projects should move forward. As Delmas and Mazurek (2001) demonstrate, such institutional deficiencies drive up transactions costs associated with initiatives such as

Project XL. Ultimately, the U.S. Congress must modernise the current system of fragmented environmental statutes or at a minimum provide limited authorisation for EPA to administer Project XL in order to improve the initiative's performance. In other words, in order for voluntary environmental agreements in the U.S. to perform as intended, they must be made mandatory.

95. The presence of status quo environmental laws reduces the potential economic efficiency of voluntary agreements in terms of transaction costs as well as abatement cost reductions. It is likely that abatement costs are higher under Project XL than status quo laws and regulations simply because participants commit to reducing more reduction than the status quo requires. However, in the case of companies such as Intel and Merck, which can earn monopoly rents by moving products first to market, the transaction and abatement costs of participation in Project XL are most likely outweighed by the benefits of fewer potential permitting delays. This is illustrated most clearly in the case of Intel, which recently completed construction of a second facility under the terms of its Project XL agreement and also is in the process renegotiating its initial five-year agreement, which expired at the end of 2001.

96. As Intel's decision to negotiate a new Project XL agreement after its first agreement expired illustrates, it is likely that both Intel and Merck benefited privately from their participation in Project XL. But it is impossible to state with certainty whether these benefits extended to society as a whole. Intel and Merck by a wide margin exceeded environmental targets set forth in their Project XL agreements. But it is not possible to state with certainty whether these targets would have been achieved anyway, in the absence of Project XL.

97. Despite its deficiencies, a key strength of Project XL lies in its ability to point to problems in status quo environmental laws and regulations (for example, costly permitting delays) and in its ability, however constrained, to test methods to improve upon them. When Congress first created the current set of US environmental laws in the 1960s, lawmakers did not consider problems such as costly permitting delays. One reason that problems such as permitting delays were not contemplated by Congress at the time is because US companies, for the most part, did not yet compete on the basis of moving products first to market. Indeed, Intel, with its time-to-market concerns, was not even founded until 1968. That delays associated with air permits could prove costly to the manufacturer did not become evident until several decades later.

98. In this regard, Project XL has the potential not only to reform existing laws and regulations, such as permitting provisions under the Clean Air Act, but also to inform the development of new laws and administrative programs designed to modernise and integrate the current, piecemeal set of U.S. environmental laws. Indeed, several lawmakers in the United States Congress, including Representatives Cal Dooley (Democrat-California), Ellen Tauscher (Democrat-California) and James Greenwood (Republican-Pennsylvania) have based draft legislation to improve environmental laws on lessons learned from Project XL (House of Representatives, Bill 3448, the Second Generation of Environmental Improvement Act). Such legislation is designed to reform monitoring, reporting, and permitting requirements in the United States. It also would give EPA the authority to provide firms regulatory flexibility to address problems identified as high priority, such as climate change, water run off from diffuse, "non-point" sources, and contamination of urban land or "brownfields." To the extent that it serves as a way to modernise environmental laws and policies, the lessons learned from Project XL may not only benefit regulators in the United States but in other OECD member countries as well.

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