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Project XL: Directory of Project Experiments and Results

2000 Comprehensive Report
Volume 2

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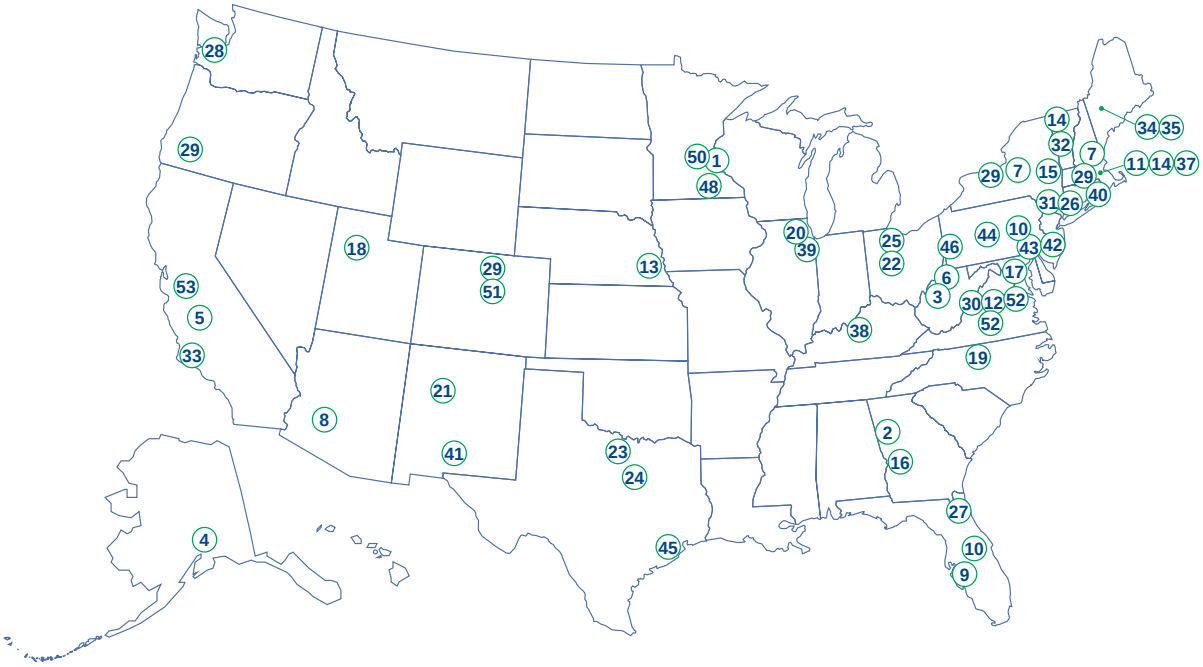
Project XL 2000 Comprehensive Report compiles available information on Project XL. It follows up the work started in the *Project XL 1999 Comprehensive Report* (October 1999).

This report has two volumes. *Volume 1: Directory of Regulatory, Policy, and Technology Innovations* describes more than 70 innovations being explored by Project XL. These innovations are catalogued by the core functions that are the fundamental processes and operations the U.S. Environmental Protection Agency must use in order to perform its mission to protect human health and the environment. Volume 1 presents technical and policy information relevant to each innovation.

Volume 2: Directory of Project Experiments and Results summarizes the more than 50 projects and project proposals Project XL has produced to date. The 16 projects that have been underway for a year or more are described in some detail, including, background, progress in meeting commitments, benefits for the environment, benefits for stakeholders, benefits for the project sponsor, spin-off benefits (where applicable), key issues needing resolution, lessons learned, and information resources. For the 37 projects in implementation for less than one year or still under development, only background information is given.

For a short overview of program accomplishments please see *Encouraging Innovation, Delivering Results* (September 2000) @ *http://www.epa.gov/projectxl/*.

Location of XL Projects



Projects in Implementation December 1999 or Earlier

1. Andersen Corporation, Bayport, MN
2. Atlantic Steel Redevelopment, Atlanta, GA
3. Crompton Corporation Sistersville Facility (formerly Witco), Sistersville, WV
4. DOD: Elmendorf Air Force Base, Anchorage, AK
5. DOD: Vandenberg Air Force Base, Santa Barbara County, CA
6. ExxonMobil Corporation, Fairmont, WV
7. HADCO Corporation, Derry, and Hudson, NH; Owego, NY
8. Intel Corporation, Chandler, AZ
9. Jack M. Berry Corporation, LaBelle, FL
10. Lucent Technologies, Allentown, and Reading, PA; Orlando, FL
11. Massachusetts Dept. of Environmental Protection-ERP, Commonwealth of Massachusetts
12. Merck & Co. Inc., Elkton, VA
13. Molex Incorporated, Lincoln, NE
14. New England Universities Laboratories, Boston College, University of Massachusetts-Boston, University of Vermont
15. NY State Dept. of Environmental Conservation, State of New York
16. Weyerhaeuser Company, Ogelthorpe, GA

Projects Underway or Under Development Since December 1999

17. Anne Arundel County Bioreactor, Severn, MD
18. Autoliv Automotive Safety Devices, Promontory, UT
19. Buncombe County Landfill, Buncombe County, NC
20. Chicago Regional Air Quality and Economic Development Strategy, Chicago, IL
21. City of Albuquerque, Albuquerque, NM
22. City of Columbus (XLC), Columbus, OH
23. City of Denton, Denton, TX
24. City of Fort Worth, Forth Worth, TX
25. Clermont County Watershed Management Program, (XLC) Clermont, OH
26. Crompton Corporation TBT Project, Greenwich, CT
27. DOD: Naval Station Mayport, Jacksonville, FL
28. DOD: Puget Sound Naval Shipyard, Bremerton, WA
29. Eastman Kodak Corporation, Rochester, NY; Windsor, CO; Peabody, MA; White City, OR
30. Georgia-Pacific, Big Island, VA
31. IBM East Fishkill Facility, Hopewell Junction, NY
32. IBM Semiconductor Manufacturing Facility, Essex Junction, VT
33. Imation Corporation, Camarillo, CA
34. International Paper- Effluent Improvements, Jay, ME
35. International Paper- Emissions Monitoring, Jay, ME
36. Labs21, Nationwide
37. Lead Safe Boston, Boston, MA
38. Louisville and Jefferson Counties Metropolitan Sewer Districts, Louisville and Jefferson Counties, KY
39. Metropolitan Water Reclamation District of Greater Chicago, Chicago, IL
40. Naragansett Bay Commission POTW, Providence, RI
41. National Aeronautic Space Administration White Sands Test Facility, Las Cruces, NM
42. New Jersey Department of Environmental Protection Gold Track Program, State of New Jersey
43. Ortho-McNeil Pharmaceutical, Spring House, PA
44. Pennsylvania Department of Environmental Protection, State of Pennsylvania
45. Port of Houston Authority, Houston, TX
46. PPG Industries, Inc., Pittsburgh, PA
47. Progressive Auto Insurance Company, Nationwide
48. Steele County, Minnesota (XLC), Steele County, MN
49. United Egg Producers, Nationwide
50. USFilter Recovery Systems, Inc., Roseville, MN
51. U.S. Postal Service Denver, Denver, CO
52. Waste Management, Inc. Virginia Landfill Bioreactors Project, King George and Amelia Counties, VA
53. Yolo County Bioreactor, Yolo County, CA

Project XL 2000
Comprehensive Report Index

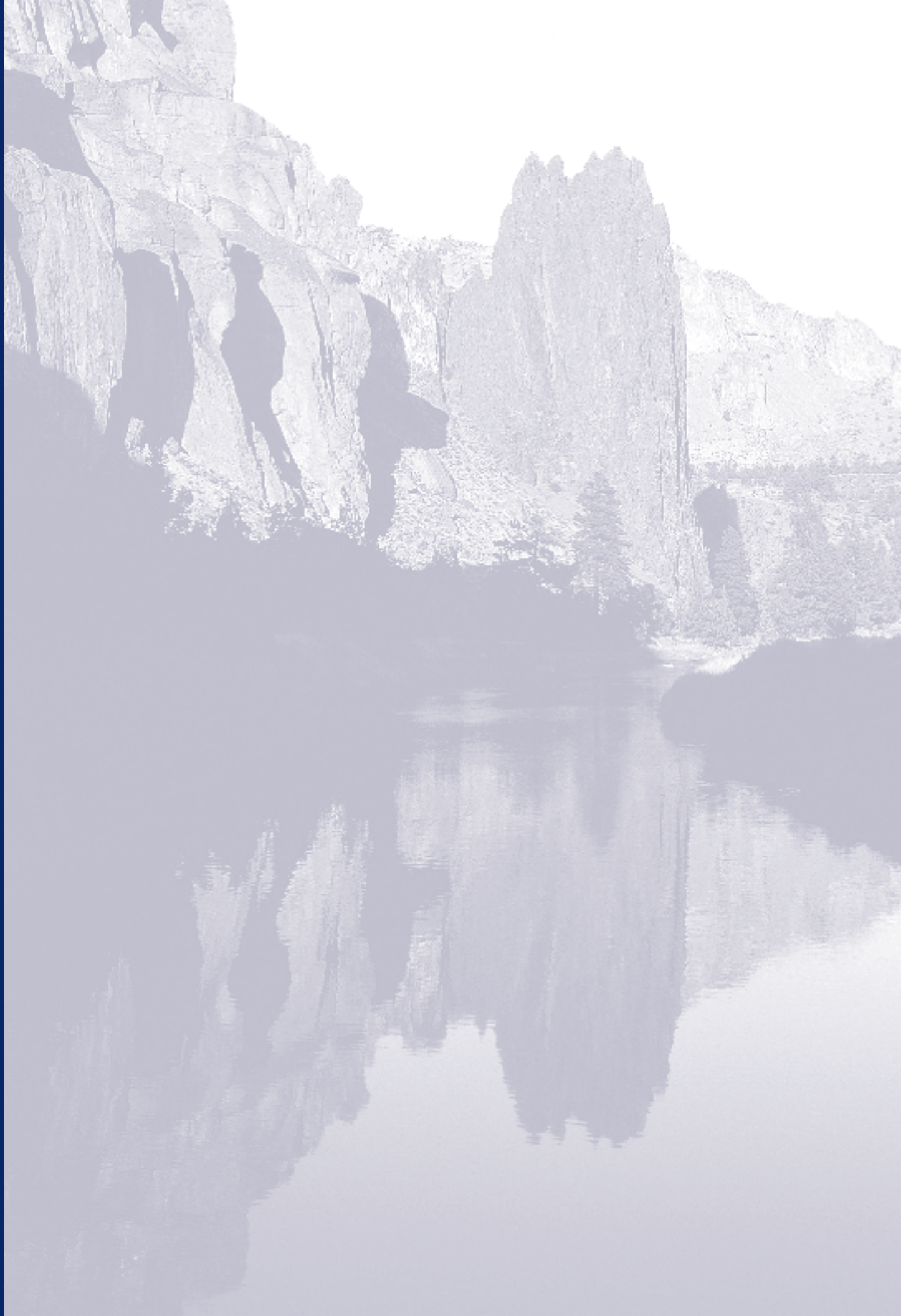
Volume 2:
Directory of Project Experiments and Results

	Related Industry or Public Sector	Location	Relevant Statutes	Featured on page
In Implementation December 1999 or earlier (16)				
Andersen Corporation	wood windows manufacturing	Bayport, MN	CAA	11
Atlantic Steel Redevelopment	Brownfields redevelopment, former steel mill site	Atlanta, GA	CAA	15
Crompton Corporation Sistersville Facility (formerly Witco)	specialty chemical manufacturing	Sistersville, WV	RCRA	19
Department of Defense Elmendorf Air Force Base	Air Force base	Anchorage, AL	CAA	25
Department of Defense Vandenberg Air Force Base	Air Force base	Santa Barbara County, CA	CAA, RCRA, PPA	28
ExxonMobil Corporation	Superfund site redevelopment (former coke works site)	Fairmont, WV	CERCLA	33
HADCO Corporation	printed wiring board manufacturing	Owego, NY Derry, NH Hudson, NH	RCRA	36
Intel Corporation	semiconductor manufacturing	Chandler, AZ (Maricopa County)	CAA, Multimedia	40
Jack M. Berry Corporation	citrus juice processing (small business)	LaBelle, FL	Multimedia	46
Lucent Technologies	microelectronics manufacturing	Allentown, PA Reading, PA Orlando, FL	CAA, CWA, SDWA, RCRA	49
Massachusetts Department of Environmental Protection—Environmental Results Program	small business	Commonwealth of Massachusetts	Multimedia	51
Merck & Company, Inc.	pharmaceutical manufacturing	Elkton, VA	CAA	59
Molex Incorporated	electroplating facility	Lincoln, NE	RCRA	63

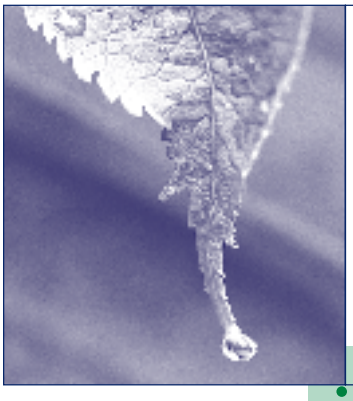
	Related Industry or Public Sector	Location	Relevant Statutes	Featured on page
In Implementation December 1999 or earlier (16) (Continued)				
New England Universities Laboratories	university laboratories	Boston College, University of Massachusetts-Boston, University of Vermont	RCRA	67
New York State Department of Environmental Conservation	public utilities	State of New York	RCRA	70
Weyerhaeuser Company	pulp and paper manufacturing	Oglethorpe, GA	CAA, CWA	72
Underway since December 1999 (32)				
Autoliv ASP, Inc.	automobile safety product manufacturer	Promontory, UT	RCRA	80
Buncombe County Landfill	solid waste management facility	Buncombe County, NC	RCRA	81
City of Albuquerque Publicly Owned Treatment Works	city industries and businesses	Albuquerque, NM	CWA	82
City of Columbus (XLC)	Division of Water	Columbus, OH	SDWA	83
City of Denton Publicly Owned Treatment Works	vehicle maintenance facilities, recycling centers, junkyards, salvage yards, construction sites	Denton, TX	CWA	84
City of Fort Worth	substandard facilities with asbestos-containing building materials	Fort Worth, TX	CAA	85
Clermont County Watershed Management Plan (XLC)	watershed management	Clermont County, OH	CWA	86
Department of Defense Naval Station Mayport	naval station	Jacksonville, FL	CWA	87
Department of Defense Puget Sound Naval Shipyard	naval shipyard, industrial facility	Bremerton, WA	CWA	89
Eastman Kodak Corporation	imaging systems and media manufacturer	Rochester, NY; Windsor, CO; Peabody, MA; and White City, OR	TSCA	91
Georgia-Pacific Corporation	pulp and paper mill	Big Island, VA	CAA	93
Imation Corporation	magnetic data storage cartridges manufacturing	Camarillo, CA	CAA	95

	Related Industry or Public Sector	Location	Relevant Statutes	Featured on page
Underway since December 1999 (32) (Continued)				
International Business Machines East Fishkill Facility	cement production	Hopewell Junction, NY	RCRA	96
International Business Machines Semiconductor Manufacturing Facility	semiconductor facility	Essex Junction, VT	RCRA	97
International Paper—Effluent Improvements	paper mill	Jay, ME	CWA	98
International Paper—Predictive Emissions Monitoring	paper mill	Jay, ME	CAA	99
Labs21	laboratory owners, operators, and designers	Nationwide	CWA, Multimedia	100
Lead Safe Boston	federally funded de-leading assistance program	Boston, MA	RCRA	101
Louisville and Jefferson County Metropolitan Sewer Districts	Chenoweth Run watershed	Louisville and Jefferson County, KY	CWA	102
Metropolitan Water Reclamation District of Greater Chicago	Chicago Publicly Owned Treatment Works	Chicago, IL	CWA	103
Narragansett Bay Commission Publicly Owned Treatment Works	treats domestic, commercial, and industrial wastewater	Providence, RI	CWA	104
National Aeronautics and Space Administration White Sands Test Facility	test facility	Las Cruces, NM	Multimedia	105
Ortho-McNeil Pharmaceutical	pharmaceutical research and development facility	Spring House, PA	RCRA	107
Pennsylvania Department of Environmental Protection	abandoned coal mines	State of Pennsylvania	CWA	108
PPG Industries Inc.	global supplier of coatings, fiberglass, glass, and chemicals	Pittsburgh, PA	TSCA	110
Progressive Auto Insurance Company	auto insurance	Nationwide	CAA	111
Steele County (XLC)	industrial facilities	Steele County, MN	CWA	112
United Egg Producers	farmer cooperative representing egg producers nationwide	Nationwide	CWA	114

	Related Industry or Public Sector	Location	Relevant Statutes	Featured on page
Underway since December 1999 (32) (Continued)				
United States Postal Service Denver	vehicle emissions (postal)	Denver, CO	CAA	116
USFilter Recovery Services, Inc.	commercial hazardous waste treatment and recovery facility	Roseville, MN	RCRA	118
Waste Management, Inc. Virginia Landfill Bioreactors Project	bioreactor landfills	King George and Amelia Counties, VA	RCRA	119
Yolo County	bioreactor landfill	Yolo County, CA	RCRA	121
Under Development As of October 2000 (5)				
Anne Arundel County Bioreactor	solid waste management facility	Severn, MD	RCRA	124
Chicago Regional Air Quality and Economic Development Strategy	development zones	Chicago, IL	CAA	125
Crompton Corporation TBT Project	manufacture tributyltin compounds used in the manufacturing of coatings for marine vessels	Greenwich, CT	CWA	126
New Jersey Department of Environmental Protection Gold Track Program	regulatory flexibility offered to regulatory community based on the level of environmental commitment and environmental performance	State of New Jersey	Statutes to be determined by media-specific addenda	127
Port of Houston Authority	private and public terminal port	Houston, TX	CWA	128



Executive Summary



In 1995, the U.S. Environmental Protection Agency (EPA) launched an unprecedented new initiative known as Project XL to test innovative ideas that demonstrate environmental eXcellence and Leadership by those who must comply with Agency regulations and policies. Project XL is one of several high-priority initiatives that challenged EPA to think about new ways to fulfill America's environmental and human health protection goals, while simultaneously allowing businesses and other regulated entities to achieve those goals in a smarter, cleaner, and cheaper way.

Experimenting with Innovation

Project XL solicits ideas from private and public sector facilities, states, trade associations, and communities that propose solutions to difficult regulatory or technical problems and explore new approaches to protecting human health and the environment, usually at a lower cost or lessened regulatory burden for the sponsor. In opening the door to experimentation, EPA has sent the message that it values innovation and, above all, wants superior environmental results.

Innovation – An action that starts or introduces something new or creative.

The experiments being conducted under Project XL are in various stages: some are just getting started, others have been underway for several years. In the *1999 Comprehensive Report*, we identified 14 projects with signed Final Project Agreements; as of November 2000, there are 48. What we are learning from these experiments has grown dramatically in the past year. Last year, we identified 35 innovations within projects; this year more than 70 innovations have been identified. The *2000 Comprehensive Report*, Volumes 1 and 2 are intended to be a reference guide for those interested

Seven Agency Core Functions

Regulations
Permit Reform
Environmental Information Management
Enforcement and Compliance Assurance
Environmental Stewardship
Stakeholder Involvement
Culture Change

in the details of Project XL. *Volume 1: Directory of Regulatory, Policy and Technology Innovations* presents the innovations and lessons learned organized by how they relate to the seven core functions that the Agency typically performs to carry out its mission to protect human health and the environment. Specifically, it discusses the:

- *Experiment*—characterizing the innovation being tested and the regulatory flexibility being sought;
- *Results/anticipated outcomes*—outlining the expected advantage of the innovation over the current approach and the results to date; and
- *Transferability*—detailing the efficacy of the innovation and its suitability for application beyond the pilot scale.

Volume 2: Directory of Project Experiments and Results provides a status report of the more than 50 projects and proposals Project XL has supported to date. *Volume 2* highlights overall program accomplishments, such as cumulative environmental benefits as exhibited below.

Then, each project is described including a discussion of: the achieved and expected environmental performance; achieved or expected financial and other benefits to the businesses and communities sponsoring projects; achieved or expected benefits to the other stakeholders involved; legal flexibility that allows the project to work; and barriers confronted and lessons learned.

New Approaches to (Old and New) Environmental Problems

Today, EPA has experiments with a variety of partners: Fortune 500 companies and small businesses, state and local government agencies, and communities. Each project has been designed to produce important benefits for the sponsor and the environment. Companies are cutting costs, communities are addressing priority concerns, and regulatory agencies are targeting their resources more effectively. Each of these benefits must meet the standard of superior environmental performance and enhanced environmental protection.

But the intent of the program is not to serve only a select few. The goal of Project XL continues to be much broader—to find solutions that can be integrated into our environmental protection system for everyone's benefit. This goal is being achieved in two ways: first, by creating more options for environmental management and second, by taking a more comprehensive approach to environmental management.

Creating More Options for Environmental Management. Also through Project XL, EPA provides companies and other project sponsors with a forum to demonstrate their abilities to find innovative

Selected Cumulative Environmental Benefits*

	1997-1999	1997-2000
emissions eliminated (criteria air pollutants - nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide)**	20,853 tons	31,775 tons
solid waste recycled	2,089 tons	10,855 tons
water reused	1,069 million gallons	1,846 million gallons

* This summary is based on results reported by Crompton Sistersville (formerly Witco), Intel, Molex, Vandenberg AFB, and Weyerhaeuser.

** Eliminations in emissions are calculated by subtracting reported actual emissions from established baselines for the environmental parameters for each project.

approaches to environmental protection. For example, Project XL provides a way to move state-of-the-art environmental technology from the fringes into the mainstream. It does so by providing companies with the incentives they need to make the requisite testing and evaluation worth their time and investment. We can see in the following examples how, over time, if a technology proves successful and others become more receptive to its use, better results will be achieved for a growing number of people.

- ***Georgia-Pacific Corporation.*** At its Big Island, Virginia pulp and paper mill, George-Pacific is testing a new "gasification" technology to control emissions of hazardous pollutants. One of the byproducts of their manufacturing is a "black liquor," which contains a mix of chemicals used in pulp production. With conventional technology, these chemicals are recovered through combustion evaporation. Preliminary testing shows the new gasification technology uses less energy and significantly lowers emissions of hazardous pollutants. However, the Georgia-Pacific test is the first commercial-scale demonstration and there is some potential that the technology may not work as well as expected. In order for testing of this promising new technology can proceed, EPA will temporarily exempt the company from new hazardous waste emission requirements that are expected to become effective during the experiment.

- ***Molex Incorporated.*** At its electroplating facility in Lincoln, Nebraska, Molex is using new technology to reduce the metal loadings in its wastewater. The new technology separates the wastewater streams from individual metal plating processes, enabling the company to recover different metal contaminants, such as lead and copper, from its wastewater. Molex expected this new technology to reduce metal loadings to the community's wastewater treatment plant by 50 percent. Molex estimates that the new technology has resulted in an average 65 percent reduction in the concentration of copper, tin, lead, and nickel in the effluent discharged by the wastewater treatment plant in 1999 and 2000.

For the past decade, EPA has been building greater flexibility into regulatory programs through trading of emission "allowances" and other approaches. As the following examples show, in Project XL we continue to find that a little flexibility can go a long way toward getting better results.

- ***Denton, Texas.*** Rather than spend its resources monitoring and inspecting wastewater treatment facilities that have excellent performance histories, officials in Denton requested regulatory flexibility to redirect these resources to develop a comprehensive watershed protection program. This approach will support site-specific watershed protection activities, such as developing buffer zones along underdeveloped areas, that are expected to result in better water quality.

- ***New England Universities Laboratories.*** In the Northeast, a consortium of university laboratories proposed a new approach for managing hazardous wastes in laboratory settings. The project enables laboratories to integrate some EPA hazardous waste requirements with Occupational Safety and Health Administration (OSHA) standards for managing chemicals. This approach will potentially lead to better management of the chemicals, which should help prevent pollution and improve worker and student safety.

Taking a More Comprehensive Approach to Environmental Management. Despite strong environmental progress over the past three decades, gaps in environmental protection remain. Communities and facility operators are considering how to meet multiple environmental challenges and socio-economic objectives. The examples below show how using Project XL, communities and businesses alike are finding that taking a more comprehensive view often leads to better results.

- ***Lead Safe Boston.*** Local communities environmental priorities play an increasingly important role in decisions about environmental and human health protection. In Boston, Massachusetts a federally funded program that removes lead from residential homes and apartments asked for approval to use a less

expensive method for handling and disposing of lead-based paint debris. Massachusetts and EPA regulations currently require extensive lead testing on architectural debris and disposal in costly hazardous waste landfills. Through Project XL, Lead Safe Boston identified a potentially more cost-effective option of using a household hazardous waste exception to allow such debris to be disposed of in a municipal solid waste landfill that meets certain performance criteria. With this project, Lead Safe Boston expects to substantially reduce disposal costs, remove lead from more homes, and protect up to 30 more children from lead exposure.

- ***Atlantic Steel Redevelopment.*** In Atlanta, Georgia, a unique public/private partnership has the potential to serve as a national model for creative problem-solving. This redevelopment project expects to demonstrate that the application of "smart growth" concepts can make a difference in addressing transportation and environmental issues. Real estate developers, neighborhood groups, the City of Atlanta, Georgia Department of Transportation, Georgia Environmental Protection Division, and other government agencies are working toward redevelopment of a 138-acre site formerly owned by Atlantic Steel. This project, proposed by Jacoby Development Corporation, includes a multimodal (automobile, pedestrian, bicycle, rail) bridge that would cross and provide access ramps to the adjacent highway as well as connect the site to a nearby MARTA (mass transit) station.

- ***Intel Corporation.*** With the advent of e-commerce and an increasingly global economy, businesses need to be more flexible to change product lines and processes than ever before. First to market is no longer measured in months, but days. EPA and the Arizona Department of Environmental Quality approved a facility-wide emissions cap for Intel's semiconductor manufacturing plant in Chandler, Arizona. The new limits allow Intel to make equipment and process changes and to expand production capacity, without regulatory reviews, as long as the total emissions stay below the specified cap. Since the project began, the company has remained well under its emission limits for all applicable pollutants. Intel also has avoided millions of dollars in production delays by eliminating 30 to 50 new source permit reviews a year. The company has found the emission caps so successful that it will invest $2 billion to build a new wafer fabrication facility (Fab 22) at the site. So long as it remains under the existing cap, Intel can proceed with expansion without first going through regulatory review.

Building a National Laboratory for Innovation

As a vehicle for testing new ideas in environmental protection, Project XL is unprecedented. Predictably for an experimental program, it has experienced some conflict and controversy. But it also has brought important discoveries and insights about ways to improve environmental results. Of the many lessons EPA has learned from this unique program, the following are some of the most important:

- It is possible to experiment with new approaches outside the traditional regulatory system as long as strong, reliable safeguards are in place.

- Some businesses and communities are not only willing, but eager, to take greater responsibility for environmental results if they are given flexibility in meeting the goals.

- If given an opportunity, citizens and other stakeholders can play an active, creative role in finding solutions to problems.

- The opportunities to improve become more visible, and the results potentially more significant, when you step back and look at communities or facilities as a whole, rather than as a set of separate, unrelated components.

With experiments now underway, we have begun cataloging and evaluating the results. This is an important step if we are to progress toward our ultimate goal: bringing successful concepts and approaches to broader application. To realize the true potential of these experiments, we must use what we learn to make improvements in our national programs. In some cases, existing policies and regulations may have to be adapted to reflect more up-to-date knowledge and technology. Already some Project XL innovations have been applied beyond their original experiment. For example, using information from projects that have included plant-wide applicability limits (PALs)—Intel, Merck, Weyerhaeuser, Imation, and Andersen—EPA expects to publish a rule in six months that establishes PALs as way for facilities to establish emission caps on their total air emissions. This action will allow facilities to make process or manufacturing changes without the need for reoccurring permit modifications and will give greater certainty to community members of the emissions being discharged into the local air. In another example, the Lead Safe Boston project has resulted in a new policy issued by EPA this summer allowing residential lead-based paint debris to be disposed in municipal landfills, thus enabling contractors across the country to perform lead abatement more quickly and cost-effectively.

We believe that the type of experimentation allowed under Project XL is fundamental to continued advances in environmental protection. Indeed, we believe that sustaining our strong national legacy of environmental progress depends on innovation—at EPA, in state and tribal environmental programs, in local governments, in businesses, in communities—in all parts of our society. That is why EPA launched Project XL, and it is why we will continue supporting and encouraging those that are willing to search for a better way of achieving environmental goals.

Introduction

In the last decade environmental protection has become more complex. We face challenges, like global warming and urban sprawl, that are not addressed through traditional regulatory approaches. To ensure progress on these and other issues, we need strategies that take into account all the factors affecting the quality of our air, land, and water, that respect natural ecosystems, and that reflect the priorities of local stakeholders. We also need to improve regulatory procedures so businesses and communities can focus on problems, not paperwork.

In 1995, EPA launched a portfolio of high-priority initiatives which challenged us to think of new ways to fulfill America's environmental and human health protection goals. Since then, businesses, communities and other federal agencies have responded to this challenge by participating in these initiatives, including Project XL (which stands for eXcellence and Leadership).

Project XL solicits ideas from private and public sector facilities, other government agencies, trade associations and communities that propose solutions to difficult regulatory or technical problems and that explore new approaches to protecting human health and the environment, usually at a lower cost or lessened regulatory burden for the project sponsor. EPA and these project sponsors formalize the details of these experiments in a document called a Final Project Agreement (FPA) which outlines responsibilities of the project sponsor and describes any regulatory flexibility that EPA or the appropriate state, tribal and local agency is granting in order to conduct the experiment.

These experiments are leading to improvements in well-established programs and exploration of fundamentally new approaches to protect human health and the environment. By testing sensible, flexible solutions to specific obstacles faced by a facility, a sector, a state or a local community, Project XL champions ideas that yield broader concepts for enhancing our environmental protection system.

This type of flexibility is unprecedented, but it is an offer we have been able to make because we set high goals for environmental performance and insist on public accountability for results. And yet, because we have been breaking new ground, we faced difficult issues in the early stages. We wrestled with questions such as: What kind of flexibility should be allowed? How do you define "better results" and "superior environmental performance"? What can we do within the existing laws? Who needs to be involved in the discussions? We learned

a lot, made adjustments to the program, and found ways to be more responsive to stakeholder needs. As a result, projects are underway throughout the country.

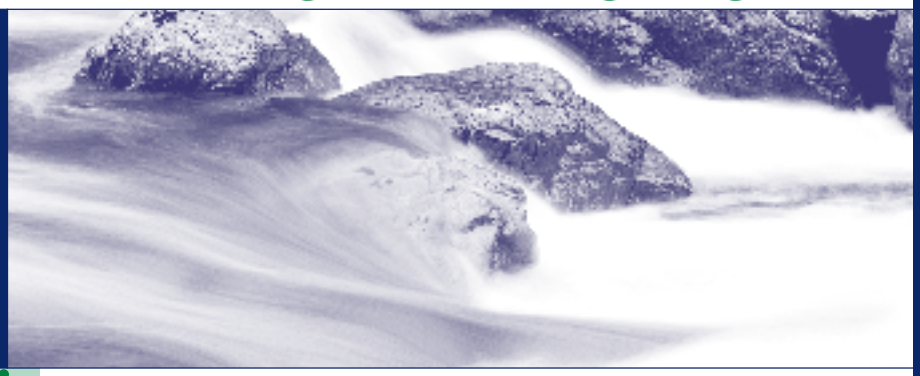
The experiments being conducted under Project XL are in various stages: 16 projects have been underway for a year or more and 37 projects have been in implementation for less than one year or still are under development. Early evaluation results show benefits to the environment, project sponsors and the communities. Data from several projects give us some indication of the great potential their innovative approaches have for significantly improving our system for managing our environment. In fact, Project XL's greatest opportunity, and its greatest challenge, is taking successful ideas from individual pilot projects and moving these ideas to their appropriate system-wide practice and into EPA's everyday way of doing business. Through experimentation and evaluation, Project XL can add to an ever diversifying set of tools for environmental protection, by identifying new approaches, learning about the keys to their effective use, and better enabling EPA to match the right tool to the right problem.

This volume, *Directory of Project Experiments and Results*, provides information on the more than 50 projects and proposals Project XL has produced to date. In order to better understand the detailed information contained in this volume, please refer to the index, which sorts the projects by sector, location, and relevant statute(s).

The companion volume to this, *Directory of Regulatory Policy and Technology Innovations*, describes early innovation results and how lessons learned from these efforts might be incorporated in EPA's everyday work, such as regulation development, permitting, information management and access, enforcement and compliance assurance, environmental stewardship, stakeholder involvement, and Agency culture change.

Project XL is one of many initiatives that EPA national and regional programs are conducting to address environmental problems that have yet to be solved through the current system. For more information on these initiatives, please see *A Decade of Progress: Innovation at the Environmental Protection Agency* (April 2000) available at: *http://www.epa.gov/opeihome/decade/* and the 1999 EPA Innovations Task Force report *Aiming for Excellence: Actions to Encourage Stewardship and Accelerate Environmental Progress (July 1999)* available at *http://www.epa.gov/reinvent/taskforce/report99/*. ❇

Program Highlights



The basic principle of Project XL is that by allowing flexibility in regulatory or process requirements, we can help businesses, communities, and Federal facilities to adapt and innovate in ways that could be better for the environment and public and less burdensome on the regulated entity. The innovations developed by project sponsors spur environmental performance that surpasses current compliance, improve economic benefits, and reduce operational costs, and the sponsors more effectively engage the public in decisions that affect their local environment. The long-term value of Project XL depends on the degree to which individual projects are successful at the local level for the environment, the project sponsors, and community stakeholders. As more projects are implemented, analyses of the value of projects become increasingly important. This section highlights the accomplishments of projects in three main areas: benefits to the environment, benefits to sponsors, and benefits to community stakeholders. This summary is based on a few projects that have been underway for several years. As more projects mature, EPA expects to see benefits to the environment, sponsors, and stakeholders continue to expand and grow.

Benefits for the Environment

Superior environmental performance (SEP) is one of the most critical elements of all projects. During the development of any project, all participants closely examine the projected environmental performance as a measure of the success of an experiment. As a project is implemented, its environmental performance is tracked and reported by the project sponsor, EPA, and stakeholders. EPA's goal (and challenge) is to test new tools in individual pilot projects, evaluate and learn about the keys to their effective use, and then transfer these new tools with their related SEP into appropriate system-wide practice. It is important that projects continue to meet SEP goals such as reducing emis-

sions, reusing resources, recycling wastes, and encouraging "smart growth" redevelopment. For example, the Intel and Weyerhaeuser projects, two of Project XL's pioneering efforts, have been consistently reporting a stream of environmental benefits since inception such as capping air emissions below current regulatory requirements, increasing recycling of solid waste, and reducing hazardous waste generation. The Crompton (formerly Witco) Sistersville project reports that through its project it has prevented almost 3 million pounds of waste from entering the environment over the last three years. Table 1 shows some of the cumulative environmental benefits of five of the projects that are currently fully implementing their experiments and are reporting results from 1997 through the first half of 2000. As Project XL expands to incorporate a wide variety of projects, EPA expects to see a growing set of environmental benefits ranging from reduced vehicle miles traveled and preservation of open space acreage (Atlantic Steel), to the greater inclusion and voluntary participation of non-regulated entities into environmental programs (Massachusetts Department of Environmental Protection).

For many projects underway, the sponsors must first make significant capital investments or process changes before anticipated environmental benefits can be realized. Therefore, as existing experiments mature and new projects are implemented, XL's positive environmental impacts will continue to grow. In fact, the gains demonstrated so far are small compared to the environmental benefits that will continue to accrue over time. A summary of the environmental progress of individual projects is described in the Project Status and Results section below.

Table 1: Selected Cumulative Environmental Benefits*

	1997-1999	1997-2000
tons of criteria air pollutants—nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter, carbon monoxide (CO) emissions eliminated.**	20,853	31,775
tons of volatile organic compounds (VOCs) emissions eliminated.**	2,636	4,028.7
tons of solid waste recycled.	2,089	10,855
tons of nonhazardous chemical waste recycled.	690	1,648
tons of hazardous waste recycled.	613	1,115.6
millions of gallons of water reused.	1,069	1,846
tons of methanol reused.	311	386.8

* This summary is based on results reported by Crompton Corporation Sistersville Facility (formerly Witco), Intel, Molex, Vandenberg Air Force Base, and Weyerhaeuser.

** Eliminations in emissions are calculated by subtracting reported actual emissions from established baselines for the environmental parameters for each project.

Benefits for Project Sponsors

One criticism of Federal environmental protection efforts is that EPA's regulatory requirements can be too prescriptive. For years, EPA has heard, "Give us environmental goals to meet, but don't tell us how to meet them." For the past decade, EPA has been building greater flexibility into regulatory programs through trading of emission "allowances" and other approaches. Through Project XL, EPA is providing companies and other project sponsors with additional opportunities to demonstrate their abilities to find innovative approaches to environmental protection. We are finding that a little flexibility can go a long way toward getting better results.

Under Project XL, project sponsors have gained operational flexibility: expediting or consolidating permitting, reducing the amount and frequency of record keeping and reporting, authorizing facility-wide emission caps, and supporting innovative technology. As a result of operational flexibility, project sponsors, in turn, gain additional benefits from improved administrative or technological efficiencies, industry recognition and leadership, better leveraging of employee expertise, better community and stakeholder relations, and improved relationships with regulators. EPA encourages firms to view the flexibility provided by Project XL as an opportunity to create real incentives for environmental improvement, whether they are financial, competitive, technological, community-related, or otherwise. For example, Intel has announced that it will take advantage of some these concepts in their business planning. Early this year, Intel announced it will build its first 300-millimeter, high-volume production manufacturing facility in Chandler, Arizona. Intel will be able to expand the Chandler facility under its existing air emissions cap for the Chandler facility, which was established under the XL project in1996. As shown in Table 2 on the following page, project sponsors are reporting actual and anticipated economic gains.

As Project XL continues, the significance and variety of operational and economic benefits for project sponsors will expand and compound over time. For example, as part of its newly initiated project, Andersen Corporation expects to save administrative costs by integrating state and Federal emergency response planning and training requirements into a more common sense and useful approach. The New England Universities Laboratories project has been designed to develop a more cost-effective plan for regulating university laboratories, to implement programs to enhance laboratory safety, to illustrate better systems to manage laboratory environmental impacts, and to serve as a potential model for other colleges and universities throughout the country so that operational and economic benefits will accrue to a wider spectrum of regulated facilities.

Table 2: Economic Benefits for Select Project Sponsors

Crompton Corporation Sistersville Facility (formerly Witco) saved $58,000 from waste minimization and pollution prevention (WM/PP) activities in 1998 ($42,000 in one-time activities and $16,000 in savings from recurring air emissions reductions and methanol recycling.) As of July 2000, 67 WM/PP initiatives have been implemented at the Sistersville plant, resulting in a total cost savings of an additional $1,010,000 during 1997-1999, and the first half of 2000. Crompton expects future savings of $800,000 over five years as a result of a negotiated deferral under rules of the Resource Conservation and Recovery Act (RCRA). The company also identified potential recurring cost savings of $620,000 per year to be achieved through WM/PP activities.

Department of Defense Elmendorf Air Force Base (Elmendorf AFB) aims to streamline the application, implementation, management, and renewal process for Elmendorf AFB Title V permit, through reduced monitoring and record keeping. Elmendorf AFB estimates that total monitoring, record keeping, reporting, and overall permit management costs will decrease by about 80 percent, yielding about $1.5 million in savings over six years.

Department of Defense Vandenberg Air Force Base (Vandenberg AFB) negotiated a protocol for source testing and validation with the Santa Barbara County Air Pollution District that is $2,400 cheaper than the standard EPA test ($600 per test rather than $3,000 per test) This complies with administrative requirements to upgrading its infrastructure, pollution prevention programs, innovative technologies, and other approaches that will cost effectively reduce air emissions below mandated levels.

HADCO has gained some cost savings from reducing the number of sludge shipments required, as a result of its voluntary installation of a sludge dryer. HADCO expects to see cost savings from sending its sludge directly to a recycler instead of shipping it to an intermediate processor.

Intel has avoided millions of dollars worth of production delays in the competitive quick-to-market semiconductor industry by eliminating 30 to 50 reviews per year under a facility-wide permit that allows for equipment changes, process changes, and new construction at the site as long as its overall air quality limits are met. Early this year, Intel announced it will build its first 300-millimeter, high-volume production manufacturing facility in Chandler, Arizona. Intel will be able to expand its facility under its existing air emissions cap for the Chandler facility that was established under the XL project in 1996.

Weyerhaeuser achieved an estimated savings of $176,000 in reporting costs during the first year of operation as a result of the successful revision and reissue of the facility's air quality and wastewater discharge permits. The company is now saving $200,000 a year by recovering lime muds and reusing this solid waste in lieu of purchasing new lime for use in the mill's production. (It did incur a one-time cost of $150,000 in 1998 on related sampling collection and analysis.) Weyerhaeuser foresees avoiding $10 million in future capital spending, while it expects to spend $10 million on new water equipment; it will subsequently save $20 million that would otherwise have been spent on air pollution equipment.

Benefits for the Community

Project XL creates an opportunity to make participation more meaningful for local citizens and community organizations by, for instance, allowing firms to redesign reporting mechanisms to enhance community understanding and trust, or by promoting a new, more substantive kind of public involvement. Table 3 shows the benefits community stakeholders have reported.

Project XL is providing communities with opportunities to identify the approaches that work most effectively for them and to build on or establish constructive relationships with facilities that impact the local environment and quality of life. At the same time, EPA is committed to offering communities an increasing number of tools and more information, to build local capacity for tackling environmental problems, and to provide greater public access to important environmental management choices and decisions.

Table 3: Benefits for Community Stakeholders

Greater community input into local development and economic planning through issues such as site reuse and "smart growth."
A cleaner local environment.
Opportunity to forge real and informed trust with the project sponsor.
Opportunity for input into companies' environmental information on the Internet, directly from the facility or from the local library.
Access to reports that are in an easy-to-read format.
Regularly scheduled forums for getting updates on environmental progress and company performance.
Better understanding of a local facility's operations, and of issues facing an industry as a whole.
Community projects such as computer donations and improved landscaping of facility setbacks.

Project Status and Results

As of November 2000 there are 48 projects that have signed Final Project Agreements (FPAs) and are being implemented. These projects are described in the following Project Status and Results chapter of this report. In-depth information is presented in this report for 16 of these projects:

Andersen Corporation

Atlantic Steel Redevelopment

Crompton Corporation Sistersville Facility (formerly Witco)

Department of Defense Elmendorf Air Force Base

Department of Defense Vandenberg Air Force Base

ExxonMobil Corporation Sharon Steel Superfund Site

HADCO Corporation

Intel Corporation

Jack M. Berry Corporation (project is closed)

Lucent Technologies

Massachusetts Department of Environmental Protection

Merck Corporation Stonewall Facility

Molex Incorporated

New England Universities Laboratories

New York State Department of Environmental Conservation

Weyerhaeuser Company Flint River Operation

In order to fully describe these 16 projects, the following components are addressed in the project descriptions:

Background: Who is the project sponsor? What is the main experiment of the pilot project? What is the flexibility that is given to the project sponsor by the regulatory agencies (Federal, state, tribal, and local)? In addition to the main experiment, what other innovations are key components of the pilot project? What is the expected superior environment performance of this project?

Progress in Meeting Commitments: Overall, has the project sponsor met the environmental and process commitments as specified in the FPA?

Benefits for the Environment: Based on the project's progress, what has been the actual benefit or improvement to the local environment?

Benefits for Stakeholders: What benefits have the local community and general public received through project implementation?

Benefits for the Project Sponsor: What cost savings or other benefits have the project sponsor gained?

Spin-off Benefits (where applicable)*:* What related efforts or activities have been spawned by the pilot project?

Key Issues Needing Resolution: What are the barriers to smooth implementation? What are the ongoing concerns about the overall project approach?

Lessons Learned: What are the important process issues that might affect how EPA develops, negotiates, and implements future XL pilot projects?

Information Resources: What are the sources of information for this project's summary?

Please refer to Appendix A, Information Sources and Methodology, which details information sources and methodology used to collect data for the 16 projects that have been in implementation for over a year. The information presented for these 16 projects is considered current at the time of data collection and the writing of this report in September 2000.

For the 32 projects that have been in implementation for approximately one year or less, a synopsis of each project is presented. Information included for these projects includes the concept or idea being tested, the regulatory flexibility being offered, and the expected environmental, economic, and efficiency benefits. These projects will have more detailed results in the next annual report. These 32 projects are:

Autoliv Automotive Safety Devices

Buncombe County

City of Albuquerque

City of Columbus

City of Denton

City of Fort Worth

Clermont County

Department of Defense Naval Station Mayport

Department of Defense Puget Sound Naval Shipyard

Eastman Kodak Company

Georgia Pacific Corporation

Imation Corporation

International Business Machines Corporation, East Fishkill Facility

International Business Machines Corporation, Semiconductor Manufacturing Facility

International Paper Effluent Improvements Project

International Paper Predictive Emissions Monitoring Project

Labs21

Lead Safe Boston

Louisville and Jefferson County Metropolitan Sewer Districts

Metropolitan Water Reclamation District of Greater Chicago

Narragansett Bay Commission

National Aeronautics and Space Administration White Sands Test Facility

Ortho-McNeil Pharmaceutical, Inc.

Pennsylvania Department of Environmental Protection

PPG Industries, Inc.

Progressive Auto Insurance Company

Steele County

United Egg Producers

United States Postal Service

USFilter Recovery Services, Inc.

Waste Management, Inc. Virginia Landfills

Yolo County Bioreactor

This volume also provides background summary information on the following five projects that still are under development as of November 2000:

Anne Arundel County Bioreactor

Chicago Regional Air Quality and Economic Development Strategy

Crompton Corporation TBT Project

New Jersey Department of Environmental Protection

Port of Houston Authority

The background information presented on the projects under development is considered current at the time of the writing of this report in September 2000. Please refer to the Project XL homepage

(www.epa.gov/projectxl) to view up-to-date information and contact information for individual projects.

In order to better understand the detailed information contained in this volume, please refer to the index on page iv, which sorts the projects by sector, location, and relevant statute(s).

Projects in Implementation Since 1996–December 1999

Andersen Corporation

FINAL PROJECT AGREEMENT SIGNED JUNE 30, 1999

Background

The Project Sponsor: The Andersen Corporation is a leading manufacturer of durable, energy-efficient, high-performance, clad wood windows and patio doors. Andersen's main manufacturing plant is located in Bayport, Minnesota, along the St. Croix River, a federally designated "Wild and Scenic River," which forms a large portion of the border between Minnesota and Wisconsin. Existing manufacturing facilities are located on the 11-acre Fourth Street site, which consists of 78 buildings, most of which are interconnected. Andersen purchased an undeveloped 245-acre tract of land in 1994 that is located approximately one mile west of the Fourth Street manufacturing complex. This plot, which is referred to as the Andersen West Site, is intended to be used as an expansion site for various operations. Manufacturing and related processes at Andersen include wood cutting and milling, wood preservative application, painting, vinyl processing, adhesive operations, byproduct transfer, wood-fired boilers, assembly operations, technology development, production support, and maintenance functions.

The Experiment: The Andersen project will test an innovative experiment to reduce air emissions per unit of production. This reduction will be achieved by using performance-based regulatory approaches based on volatile organic compound (VOC) emissions per standard measure of production, referred to as the "performance ratio." While providing incentives for better performance, the performance ratio will essentially prevent a return to traditional solvent-based coating and wood-preservative processes, while allowing the company the flexibility to search for even greater efficiencies and emissions improvements. The company will be allowed to increase production levels without undergoing case-by-case reviews prompted by VOC emission changes, as long as its VOC emissions per unit of production remain below the performance ratio and its overall emissions remain below a facility-wide VOC cap.

The Flexibility: EPA and the Minnesota Pollution Control Agency (MPCA) agreed to develop both a site-specific rule under the Clean Air Act's (CAA) Prevention of Significant Deterioration (PSD) program and a streamlined Minnesota Project XL multimedia permit (Minnesota XL Permit). The Minnesota XL Permit will, to the extent possible, combine air, hazardous waste, and water discharge conditions at the Bayport Facility into one permit, and it will incorporate the Federal air permit as required by 40 CFR Part 70 for the Bayport Facility. The Minnesota XL Permit will be a consolidation of Andersen's various environmental obligations. It will contain the Clean Air Act Title V, minor New Source Review, and PSD permits, and it will be issued subject to public notice and comment and the opportunity for EPA review and public petition. During the permit's development, overlapping or conflicting conditions from existing permits will be combined or reconciled, as allowed by applicable requirements. The flexibility granted Andersen Corporation includes relief from specific applicable synthetic minor air emission limits with the condition that Andersen comply with the site-specific permit limits for particulate matter (PM) and VOCs. The new permit establishes emission caps for VOCs on a "per standard measure of production" basis and on a facility-wide basis and a facility-wide cap on particulate matter. This regulatory flexibility grants preapproval for emission increases that would otherwise require permit modification approval by the regulatory agency. The Minnesota XL Permit will, to the extent possible, reduce the administrative burden through simplified monitoring, reporting, and record keeping.

The Superior Environmental Performance: The project establishes an innovative, incentive-based per unit emission measure that should drive down Andersen's per unit emission of VOCs. In addition to the per unit measure, emission caps on VOCs and particulate matter ensure that the facility's overall emissions will not exceed those from normal operations. Andersen will be able to manufacture more of its windows from wood fiber and vinyl than in the past, reducing both its use of virgin materials and its air emissions. Andersen will also increase its reliance on low-solvent processes, further reducing air emissions at the facility.

Progress in Meeting Commitments
(As of July 2000)

Current activities are primarily focused on finalizing the permit, which is expected in Fall 2000. However, specific commitments have been targeted and are expected to be incorporated into the Andersen Minnesota XL permit.

Andersen

- Limit VOC emissions to 2,397 tons per year for the entire Bayport Facility, with a subcap of 96 tons per year for the Andersen West Site. (see Figure 1)
- Combine the existing diptank VOC synthetic minor limits into a single rolling average limit of 1,573.9 tons per year. (see Figure 1)
- Limit nonmilling PM emissions for the Bayport Facility to 209.1 tons per year, with a subcap of 96 tons per year (milling and nonmilling PM) for the Andersen West Site. (see Figure 2)
- Control all existing and future milling operations with best available control technology (BACT) (currently believed to be baghouse filters), and meet all PSD requirements for PM and particulate matter less than 10 microns (PM-10). Andersen will be allowed to modify or add VOC units and certain PM and PM-10 units as long as they remain below the caps established in the permit.
- Continue to control the door plant paintline emissions with a catalytic oxidizer until the company receives approval to discontinue the use of the control equipment from the MPCA.
- Ensure that any new or reconstructed paintline equipment does not emit at a rate greater than 4.5 pounds of VOCs per gallon of coating applied. (see Figure 3)
- Ensure that any new or reconstructed preservative application process does not emit VOCs at a rate greater than 2.0 pounds per gallon of preservative used. (see Figure 3)

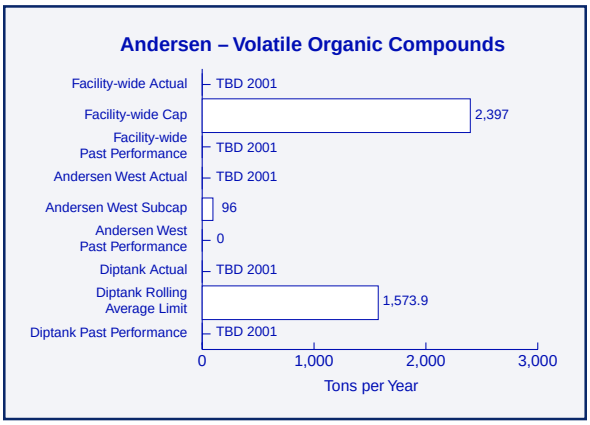


Figure 1

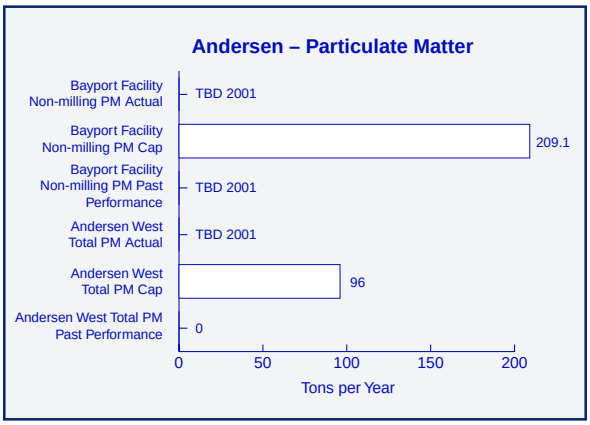


Figure 2

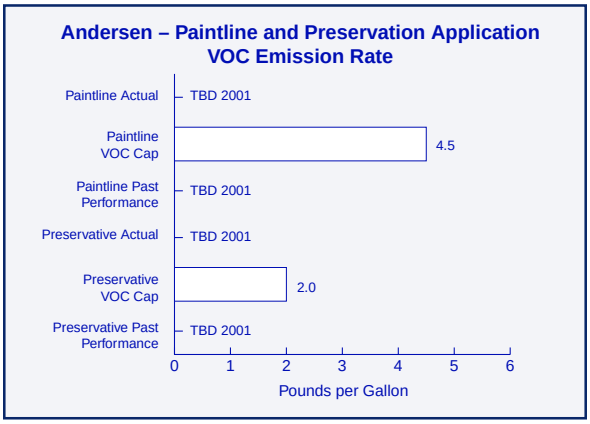


Figure 3

- Conduct a health risk analysis for toxic air emissions.
- Continue to investigate the possibility of recycling windows as feedstock for the Fibrex composite process, and present findings to EPA, the MPCA, Washington County, and the Community Advisory Committee (CAC) within two years of the effective date of the FPA.
- Attempt to cease operation of the west diptank within five years after the start of the project.
- Remove all hazardous waste from the west diptank within 90 days of permanent shutdown; remove all metal parts that have contacted the penta-containing wood preservative and recycle the material using a metal-smelting operation; provide verification acceptable to the MPCA that the parts were properly recycled.
- Finalize calculations to develop the performance ratio and implement the emissions caps.

MPCA

- Finalize and issue the Minnesota Project XL multimedia permit.

EPA

- Promulgate a final rule that will allow regulatory flexibility for this XL project.

Washington County

- Amend its hazardous waste management ordinance.

Benefits for Stakeholders

- Stakeholders can provide input on the project by participating in the CAC, a panel composed of community members established to address and participate in project development and implementation.
- CAC members can learn about Andersen's efforts to stay in compliance while accomplishing project objectives during Andersen's semi-annual compliance status presentations to the CAC.

Andersen continues to keep local residents informed of Project XL initiatives through a local newsletter, Internet postings, news media contacts, open houses, displays, and responses to community inquiries.

Issues Needing Resolution

- Certain stakeholders were concerned that Andersen was not accountable to the CAC, and that the CAC needed greater opportunity to develop overall goals of the stakeholder process.
- Certain stakeholders wished that their concerns not directly related to the XL project would have been more thoroughly addressed during the XL discussions.
- It has been difficult to adequately explain technical aspects of the project to CAC members.
- One stakeholder emphasized that the generally positive reception to the project by the CAC was mainly because the CAC membership was weighted in favor of Andersen supporters.
- MPCA prefers a more extensive role in developing and implementing XL projects.

Lessons Learned

- EPA noted that Andersen's ability to listen and react to community concerns helped make the stakeholder involvement effort a success.
- It is important for stakeholders to understand their roles in the stakeholder process.
- One stakeholder emphasized that the CAC's complete access to information was very important and led to a greater trust in the stakeholder process.
- EPA should have spent more time explaining to stakeholders the reasons its review process continually delayed project development.
- EPA decision makers must be well informed and prepared to participate in key decisions in order for projects to develop in an effective and timely manner.

- Face-to-face meetings appear to have been more effective than electronic and telephone communications.

- Furnishing participants with an outline and the goals of the project, a detailed time line, and description of what to expect from the stakeholder involvement process at the beginning of the project would have been valuable.

Information Resources

(1) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (2) focus group discussions in July/August 1999 with representatives of Andersen Corporation, Federal and state regulatory agencies, and representatives of the local community; (3) the December 1999 *XL Project Progress Report—Andersen Corporation* (100-R-00-016); and (4) Andersen Corporation: Project XL Final Project Agreement.

Atlantic Steel Redevelopment

PHASE ONE PROJECT AGREEMENT SIGNED APRIL 13, 1999
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 7, 1999

Background

The Project Sponsor: Started in 1979, Jacoby Development, Inc., is a privately held real estate company located in Atlanta, Georgia. It specializes in property development, financing, brokerage, leasing, and management. Jacoby has proposed redevelopment of a 138-acre former steel mill formerly owned by Atlantic Steel, located near Atlanta's central business district. The proposed redevelopment will be a mix of residential and business uses and will include a multimodal (cars, pedestrians, bicycles, mass transit) bridge that will both provide access to Interstates 75 and 85 and connect the site to a nearby Metropolitan Atlanta Rapid Transit Authority (MARTA) station.

The Experiment: The Atlantic Steel project will test whether "brownfield" redevelopment strategies can be applied to transportation projects, such that air quality and other environmental performance can be improved, as part of an overall community revitalization plan. The Atlanta region is currently not in compliance with the National Ambient Air Quality Standards (NAAQS) for ground-level ozone. Between January 1998 and July 2000, the Atlanta region was out of compliance with transportation conformity requirements under the Federal Clean Air Act (CAA) because it could not demonstrate that its transportation activities would not exacerbate its air quality problem. The CAA generally prohibits construction of new transportation projects that use Federal funds or require Federal approval in areas that are in a transportation conformity lapse. However, projects that are expected to provide an air quality benefit, called Transportation Control Measures (TCMs), can proceed even during a conformity lapse if they are in a Federally approved State Implementation Plan (SIP), which is used to address how the region will conform to the NAAQS. If the Atlantic Steel site is not redeveloped, the development planned for the site will occur at another site or sites in the Atlanta region. Alternate development will most likely occur in a greenfield area, thus promoting the spread of existing urban sprawl. The redevelopment of the Atlantic Steel site will encourage "smart growth" design principles such as pedestrian-friendly and transit-oriented access between centers of residential entertainment, cultural, employment, and recreational uses, thus reducing vehicular traffic and encouraging a neighborhood environment. EPA believes that the planned redevelopment of the Atlantic Steel site (including the bridge) will lead to less air pollution than an equivalent amount of development at other likely sites in the region.

The Flexibility: Under the Atlantic Steel project, EPA is considering the entire redevelopment project to be a TCM. A TCM is a transportation project that demonstrates an air quality benefit. TCM projects that are approved in the SIP are eligible for Federal funding and may gain Federal approval even in noncompliant areas. For the Atlantic Steel site to qualify as a TCM, EPA is offering flexibility in two areas. (1) EPA views the site's location, design transit linkage, and other transportation characterizations (e.g., provisions for bicyclists, participation in a transportation management association) together as the TCM. While the CAA lists several types of projects that can be TCMs, the statute does not limit TCMs to these measures. Specific types of TCMs listed in the CAA include projects that improve public transit, employer-based transportation management plans, projects that limit certain metropolitan areas to non-motorized and pedestrian use, and programs to provide both travel and storage facilities for bicycles. The plan for the Atlantic Steel redevelopment incorporates many elements that could be TCMs by themselves. For example, improved public transit, bicycle and pedestrian paths, and the requirement that employers at the site will join or form a transportation management association. EPA believes that the combination of these elements will have a positive effect on reducing emissions from single occupancy vehicles by encouraging the use of alternative modes of transportation. (2) This project is testing an innovative approach to determining the air quality benefit of the Atlantic Steel site redevelopment. EPA has modeled the site development's potential air quality benefit relative to an equivalent level of development at other sites in the region. This type

of comparison to support a TCM is available only to this particular redevelopment project through the Project XL process. The site's SIP-TCM designation is only possible because a 1998 study conducted by EPA's Urban and Economic Development Division, titled "Transportation and Environmental Impacts of Infill and Greenfield Development" demonstrated that the Atlantic Steel brownfield redevelopment (with its mixed-use and transit components) would generate a relative air quality benefit when compared to a similar development located some distance outside of the central business district, in a greenfield location. To analyze the transportation and air emissions impacts of locating new development at the Atlantic Steel site, EPA used modeling analysis to compare the site to three other possible locations for similar-scale development in the Atlanta region. EPA's evaluation of the site's impacts was driven by two facts: that Atlanta will continue to grow over the next 20 years and that without redeveloping the 138-acre Atlantic Steel site, more of this growth will occur in outlying areas. The analysis of regional transportation and air emissions impacts of the proposed Atlantic Steel development vis-a-vis likely alternative sites shows that absorbing a portion of Atlanta's future growth at the Atlantic Steel site would create less travel and fewer emissions than developing those alternative sites.

The Superior Environmental Performance: This project includes redeveloping the brownfields site; reducing vehicle miles traveled; accelerating cleanup of hazardous waste; using environmentally friendly building practices, building design, and transit linkages; conserving water and energy; and implementing other smart growth principles. Because of its design, use of existing transportation infrastructure, and location, redevelopment of the Atlantic Steel site can improve rather than exacerbate current air quality problems in the region.

Progress in Meeting Commitments

(As of July 2000)

- Prepared a detailed site plan incorporating recommendations by a town planning firm in February 1998.
- Obtained the approval of zoning conditions for the site by the Mayor of Atlanta in April 1998.
- Received approval of the site remediation plan from the Georgia Environmental Protection Division in December 1999.
- Deconstruction has been completed and the following materials has been recycled: metals, oxidized steel products, concrete, used oils, lead acid batteries, power transformers, and railroad cross-ties.
- EPA completed an Environmental Assessment for the project in compliance with the National Environmental Policy Act (NEPA) in August 2000.
- EPA is anticipated to complete its NEPA analysis by January 2001.
- EPA approved the SIP-TCM on August 16, 2000. The SIP-TCM will be effective September 27, 2000.
- Remediation and infrastructure improvement will continue through January 2001.
- Submitted and received approval of a concept report from the Georgia Department of Transportation for the construction of the 17th Street Bridge/Extension in March 2000.
- Jacoby selected URS Greiner Corporation as the 17th Street Bridge/Extension designer on August 24, 2000. The preliminary design phase is scheduled to begin immediately, and construction of the bridge is scheduled for July 2001 and is expected to require 18 months.

Benefits for the Environment

- Jacoby will reduce carbon monoxide and nitrogen oxides emissions by providing access to a mass transit system and local infrastructure, which will reduce the amount of vehicle miles traveled per individual relative to other sites.
- Jacoby has committed to install separate stormwater and sanitary systems to reduce or

eliminate the flow of pollutants from stormwater runoff to receiving waters. Additionally, stormwater controls will be employed to ensure that surface runoff leaving the site will receive some level of treatment prior to reaching the Chattahoochee River.

- Jacoby will implement strategies to prevent and minimize pollution by selecting construction materials and sustainable building technologies that minimize energy use.

- Jacoby will encourage Atlantic Steel to recycle and reuse the solid waste generated during the demolition of the existing structures on the property.

- Jacoby will comply with state laws and building codes that require all newly constructed properties to reduce water use.

Benefits for Stakeholders

- Stakeholders have been involved throughout the evolution of the project and have been encouraged to share their ideas and concerns through written comments and meetings open to the general public.

- Stakeholders are enabled to participate in the planning of a residential village incorporating "smart growth" design principles promoting pedestrian-friendly walkways, transit links, shopping, entertainment, office, recreation, and open park spaces.

- Stakeholder needs and values are an integral part of the 17th Street Bridge/Extension. URS Greiner will design a bridge that serves to accommodate various modes of transportation, the demands of the site, as well as an architecturally pleasing structure to all the users. The bridge is anticipated to include (1) two 11-foot-wide lanes in each direction for general use traffic; (2) two 16-foot-wide dedicated bicycle and transit lanes; and (3) a 24-foot-wide pedestrian park and thoroughfare, complete with elevated walkways, landscaping, and acrylic panels rather than metal fencing.

Benefits for the Project Sponsor

- Jacoby will be granted regulatory flexibility under Project XL by receiving approval of the redevelopment and its associated transportation projects as a TCM, a step taken to reduce vehicular emissions and improve air quality. In return, Jacoby is working to bring a contaminated site back to productive use, and in turn, examine whether the basis for considering the entire redevelopment project a TCM can leverage environmental benefits in air quality.

Issues Needing Resolution

- Major project milestones are slightly behind schedule. Due to minor setbacks, the construction of the 17th Street Bridge/Extension has been delayed for a year. Jacoby expects to remain on-track in meeting its scheduled commitments, however, and bridge construction is expected to begin in July 2001.

Lessons Learned

- Since the Atlantic Steel redevelopment project is still in its early stages, the principal lesson to be learned is whether smart growth strategies can be applied to brownfields and transportation projects, such that air quality and other environmental performance can be improved, as part of an overall community revitalization plan.

- A number of stakeholders were not satisfied with the stakeholder involvement process. They felt as though the process was unclear from the beginning, did not provide a sufficient forum for input, and was managed as a formality. To avoid this problem in the future, Jacoby will sponsor additional public meetings and encourage more direct stakeholder involvement.

Information Resources

The information in this summary was obtained from the following sources: (1) The February 15, 2000 Atlantic Steel XL Summary Report; (2) the September 7, 1999 Atlantic Steel FPA; (3) The De-

cember 1999 *XL Project Progress Report—Atlantic Steel Redevelopment* (EPA 100-R-00-014); (4) *Project XL Stakeholder Involvement Evaluation, Draft Final Report* (April 2000); (5) News articles from the Atlanta Journal Constitution: "Steely Determination: Green Light is Given for Design Work on 17th Street Bridge" (August 25, 2000), "Designer Sees 17th Street Bridge as Unique Gateway into Atlanta" (August 25, 2000), "Development Plan Falls into Place" (August 25, 2000); and (6) News article from Bizjournals.com/atlanta: "Designer Picked for 17th Street Bridge" (August 24, 2000).

Crompton Corporation Sistersville Facility (formerly Witco)

FINAL PROJECT AGREEMENT SIGNED OCTOBER 17, 1997

Background

The Project Sponsor: Crompton Corporation Sistersville Facility (formerly Witco) is a specialty chemical manufacturer. This project focuses on Crompton's chemical manufacturing plant located 6 miles south of Sistersville, West Virginia, where Crompton produces a broad range of silicone and silane products, including surfactants, emulsions, antifoams, and oils. The facility is located along the east side of the Ohio River in a rural setting near the border of Tyler and Pleasants Counties.

The Experiment: The Crompton project strives to reduce pollution through a combination of flexible air pollution control, waste minimization, and pollution prevention activities.

The Flexibility: EPA and the State of West Virginia have agreed to a deferral of Resource Conservation and Recovery Act (RCRA) organic air emission standards through a site-specific rule applicable to two Crompton surface impoundments. EPA is in the process of promulgating National Emission Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act (CAA). EPA plans to propose NESHAPs applicable to miscellaneous organic processes in the first quarter of 2001; this standard is called "the MON." Production activities at the Sistersville facility will be regulated under the MON. The MON is anticipated to require process vent controls similar to the vent incinerator installed by Crompton under the XL project. Therefore, the project will provide superior environmental performance only until the MON is in effect. The project provides for a reevaluation following the proposal of the MON. Crompton will prepare a project reevaluation report within 90 days following the close of the comment period for the new standards. If EPA, West Virginia, and other stakeholders agree to continue the project, the FPA will be amended to achieve superior environmental performance in a different way and to go beyond the MON requirements.

Other Innovations: (1) *Waste Minimization and Pollution Prevention:* Crompton committed to conducting a waste minimization/pollution prevention (WM/PP) study to identify opportunities for additional reductions in waste generated by the facility. (2) *Case-by-Case Deferrals:* EPA and West Virginia consider the WM/PP initiatives to be an important contribution to the superior environmental performance offered by the Crompton project. The applicability of the WM/PP initiatives could be limited if they are subject to the requirements proposed in CAA Subpart YYY. Subpart YYY, as proposed, applies to a process unit that generates wastewater and produces one or more of the listed chemicals listed as a product, co-product, byproduct, or intermediate product. CAA Subpart YYY would apply if Crompton begins recovering substances listed in the proposed CAA Subpart YYY. If Crompton starts recovering these substances, EPA and West Virginia will then consider issuing a limited scope "allowable exclusion/allowable increase" deferral of the regulations on a case-by-case basis. This deferral would be issued with the provision that EPA and West Virginia find that it will not cause an increase in actual emissions of volatile organic compounds or cause a net adverse environmental impact. Further, Crompton must remain in compliance with the provisions of the XL project. If such a deferral is granted, EPA and West Virginia will consider proposing regulations implementing the deferral.

The Superior Environmental Performance: Crompton will install a process vent incinerator that will destroy 98 percent by weight of "capper unit" air emissions, and Crompton will also recover an estimated 500,000 pounds of methanol per year from the facility's wastewater treatment unit.

Progress in Meeting Commitments
(As of July 2000)

- Crompton has met its commitment to purchase, install, test, and monitor a process vent incinerator on its methyl capper unit.

- Crompton has met its commitment to begin collection of methanol from the condenser unit.

- Crompton has met its commitment to conduct a WM/PP study, deliver a final report on the study, and implement the technically and economically feasible WM/PP opportunities identified in the study.

- Crompton has met the following environmental commitments:

  – Crompton has committed to reducing air emissions that are a byproduct of its operations at the Sistersville, West Virginia, facility. These byproducts (methyl chloride, dimethyl ether, and methanol emissions) are being collected and routed to a new vent incinerator installed on the capper unit. The vent incinerator was put into operation on April 1, 1998. In 1998, Crompton found that the oxidizer was reducing the total organics in the vent stream by 99.99 percent. This exceeded the 98 percent reduction required by the project. In 1998, air emissions from the methyl capper unit were reduced by 128,627 pounds per year, and air emissions from the wastewater treatment system were reduced by 51,368 pounds per year, for a total air emissions reduction of 179,995 pounds per year. In 1999, air emissions from the methyl capper unit were reduced by 199,104 pounds per year, and air emissions from the wastewater treatment system were reduced by 34,654 pounds per year, for a total air emissions reduction of 233,758 pounds per year. (see Figure 4)

  – Excess methanol produced in the methyl capper unit during the production of methyl-capped polyether was previously condensed, collected, and either disposed of in the facility's wastewater treatment unit

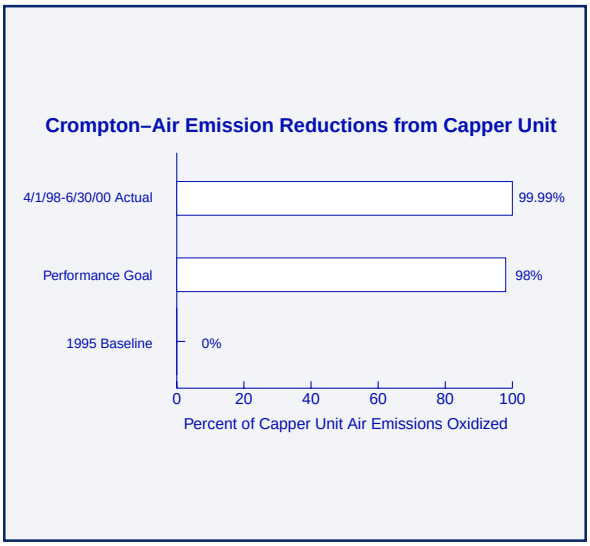


Figure 4

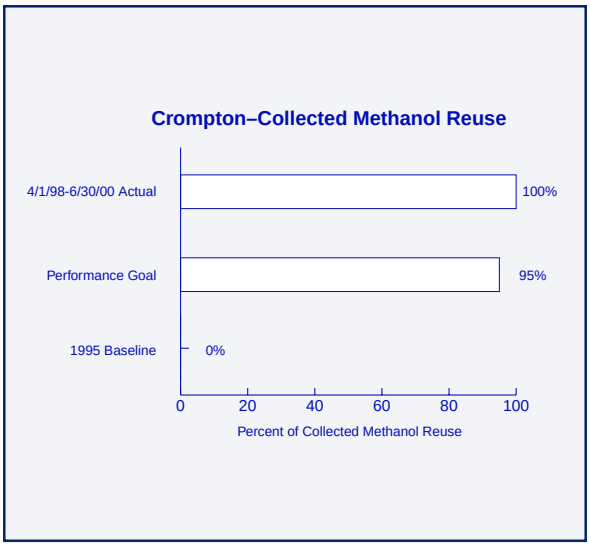


Figure 5

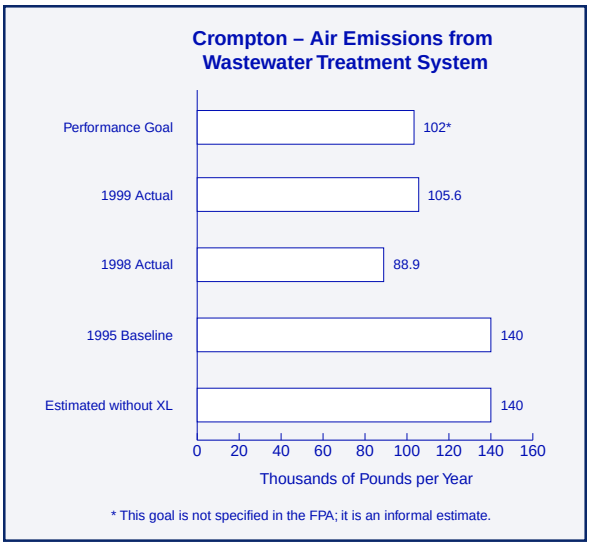


Figure 6

or incinerated. Under this project, Crompton agreed to reuse, recycle, or thermally treat a minimum of 95 percent of this collected methanol. This minimizes the biotreatment of methanol in the facility's wastewater treatment units. Crompton estimated that 500,000 pounds of methanol that otherwise would be treated in the wastewater system will be transferred to tank trucks or rail cars for reuse or recycling each year. In 1998 and 1999, Crompton reused 100 percent of the 852,774 pounds of methanol recovered by the capper unit (424,254 pounds in 1998 and 428,520 pounds in 1999), thus exceeding the 95 percent recycling goal. (see Figure 5)

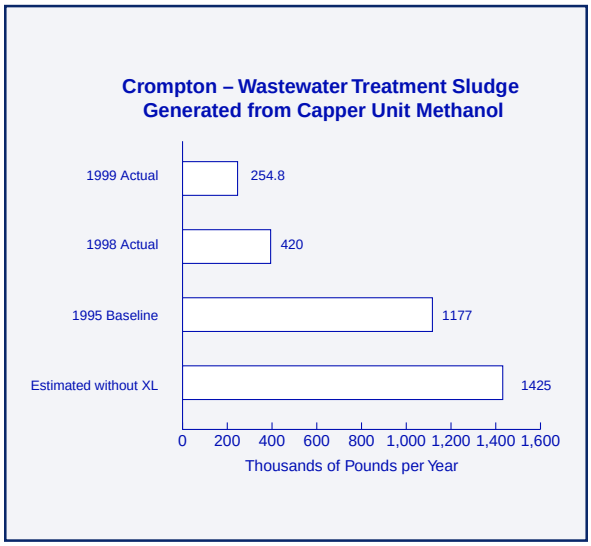


Figure 7

- Key focus areas for successful implementation of the FPA over the next six months include the third semiannual project report due January 31, 2001, the third annual project report due July 31, 2001, and the ongoing implementation of options identified in the WM/PP. EPA is expected to propose new MON standards in the first quarter of 2001. As per the FPA, Crompton will prepare a project reevaluation report within 90 days following the close of the comment period for the new standards. If EPA, West Virginia DEP, and other stakeholders agree to continue the project, the FPA will be amended to include new approaches to providing superior environmental performance.

Benefits for the Environment

- In 1998, Crompton reduced air emissions by 152,217 pounds, reduced wastewater treatment sludge by 542,783 pounds, and reused 424,254 pounds of methanol. (see Figures 6 and 7)

- In 1999, Crompton reduced air emissions by 205,350 pounds, reduced wastewater treatment sludge by 676,930 pounds, and reused 428,520 pounds of methanol. (see Figures 6 and 7)

- The final report of the WM/PP study states that of the 290 pollution prevention options identified, 19 have been deemed "not feasible," 87 "are feasible," and 184 still have their "feasi-

bility undetermined." The report includes 51 recent pollution prevention initiatives that are in various phases of implementation from "scoping" to "complete." The pollution prevention options that have already been determined to be technically and economically feasible are underway. To date, 370 pollution prevention options have been identified, of which 26 are at some stage of study and 67 have been implemented. The implemented "P2" opportunities have prevented a total of 2,943,921 pounds of waste and provided $1,010,000 of cost savings.

Crompton Corporation Sistersville Facility (formerly Witco) WM/PP Study Results* 1997-98 Capper Operations

Year Opportunity was Implemented	Recurring Wastes Prevented, Latest Estimates, lbs/yr	Recurring Cost Savings*, Latest Estimates, $/yr
Air Emissions and Sludge Reduction plus Methanol Recycle (Excludes capital savings from XL project) Actual for Calendar Year 1999	1,310,921	$16,000

Data presented are based upon information found in *Crompton Sistersville Plant Project XL Annual Report,* July 2000.

* Note that these savings do not consider the expense of implementing them. Hence net savings will be less. It is often difficult to assign that expense. For example, a totally new process unit may cost millions of dollars to construct. If that new process produces less waste, how much of the design and construction expense ought to be assigned to the P2 benefits? In the case of a process change being done explicitly for P2 reasons, the expense is more easily determined.

Crompton Corporation Sistersville Facility (formerly Witco) WM/PP Study Results*

Year Opportunity was Implemented	Number of New P2 Opportunities Implemented	Recurring Wastes Prevented, Latest Estimates, lbs/yr	Recurring Cost Savings*, Latest Estimates, $/yr
1997	10	376,000	$228,000
1998	11	111,000	$25,000
1999	32	930,000	$650,000
2000 Jan. – June	14	216,000	$381,000
Total	67	2,943,921	$1,010,000

Data presented are based upon information found in *Crompton Sistersville Plant Project XL Annual Report,* July 2000.

* Note that these savings do not consider the expense of implementing them. Hence net savings will be less. It is often difficult to assign that expense. For example, a totally new process unit may cost millions of dollars to construct. If that new process produces less waste, how much of the design and construction expense ought to be assigned to the P2 benefits? In the case of a process change being done explicitly for P2 reasons, the expense is more easily determined.

Benefits for Stakeholders

- A Sistersville Plant Project XL contact at the facility has been appointed to serve as a resource for the community, as well as to answer community inquiries about the XL project.
- Public files on the project have been established at both the Sistersville Public Library and the EPA Region 3 (Philadelphia) office.
- Crompton continues to keep stakeholders informed of project status by providing copies of semiannual and annual project reports.

Benefits for the Project Sponsor

- As a result of WM/PP efforts, Crompton saved $228,000 in 1997, $25,000 in 1998, $650,000 in 1999, $381,000 in the first half of 2000, and identified potential future cost savings of over $1 million per year.
- As a result of the RCRA deferral, Crompton expects future savings of about $700,000 over the life of the project.

Issues Needing Resolution

- Crompton incorporated a section into the WM/PP study that described regulatory barriers to implementing some of the study's findings, which will need to be addressed.
- Crompton needs to evaluate additional WM/PP opportunities identified in the study relative to other facility projects competing for capital funds.
- Federal and state agency stakeholders expressed interest in seeing greater participation in the XL project from the six surrounding communities. Currently only one community representative is involved in the project, but EPA and the West Virginia Department of Environmental Protection would like to see a minimum of one representative from each community.

Lessons Learned

- During the development of the FPA, project participants should:
  - Show more trust for each other.
  - Simplify the process.
  - Involve program offices early and throughout.
  - Meet face-to-face on a frequent basis.
  - Draft the legal implementation document and the FPA at the same time.
  - Keep the FPA simple; put the details in the legal implementation document.
  - Speed EPA Headquarters review times.
  - Work from drafted language; it is easier than discussing general concepts.
- EPA should encourage other project sponsors to include WM/PP studies in XL projects.
- One stakeholder noted that the key to community participation results from understanding local culture.
- Two community stakeholders noted that it would have been positive if EPA had interacted more with local officials earlier in the project.
- A company stakeholder emphasized that the Crompton XL project provided a means for EPA and Crompton to learn how to work together more effectively.
- For a variety of possible reasons, sometimes community residents simply will not participate in an XL project despite noteworthy efforts made by the project sponsor to encourage it.

Information Resources

The information in this summary comes from the following sources: (1) *Project XL Second Annual Report*, July 31, 2000; (2) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (3) the December 1999 *Project XL*

Progress Report—CK Witco Corporation (EPA 100-R-00-009); (4) the March 1999 *XL Project Progress Report—OSi Specialties* (EPA-100-F-99-009); (5) Witco's January 31, 1999, and July 30, 1999, reports; (6) focus group discussions in December 1998 with representatives of the Federal and state regulatory agencies, Witco, and public stakeholders involved in the project; and (7) the final report from Witco's WM/PP study dated December 1998.

Department of Defense: Elmendorf Air Force Base XL/ENVVEST[1] Project

FINAL PROJECT AGREEMENT SIGNED DECEMBER 15, 1999

Background

The Project Sponsor: Elmendorf Air Force Base (Elmendorf AFB) is located just north of Anchorage, the largest city in Alaska. Elmendorf AFB covers approximately 13,000 acres; it has more than 800 buildings, two runways, 150 miles of roads, and more than 7,500 personnel from all branches of the United States and Canadian armed forces. With civilian workers, retirees, and their families, the number of people associated with Elmendorf rises to nearly 25,000. The southern boundary of the base borders the Anchorage nonattainment area for carbon monoxide (CO) under the Clean Air Act (CAA) National Ambient Air Quality Standards. Elmendorf is not included in the nonattainment area, and therefore reductions in pollution levels for Elmendorf AFB are not required under Title V requirements, a national permit system that applies to major stationary sources of air pollution. Nevertheless, one of the goals of this project is emission reductions on the base, including CO emission reductions.

The Experiment: The Elmendorf AFB project aims to promote pollution prevention activities by using cost savings and paperwork reduction associated with simplified Title V requirements. Under the simplified requirements, the Elmendorf central heating and power plant (CH&PP) will be permitted as the base's only major stationary source, based on its emissions of nitrogen oxides (NO_x) and CO. The Alaska Department of Environmental Conservation (ADEC) will approve potential to emit (PTE) limits for the remaining sources. In total, these administrative changes are expected to result in savings of approximately $1.5 million over a six-year period. These savings will be invested in pollution prevention activities on base, with an emphasis on hazardous air contaminant (HAC) emission reduction. This XL/ENVVEST project will demonstrate the feasibility of alternative-fuel vehicles in the Anchorage area and reduce air pollution base-wide through pollution prevention at multiple minor sources.

The Flexibility: The XL/ENVVEST project will provide Elmendorf AFB with relief from ADEC's operating permit program for major stationary sources. The traditional Alaska operating permit program would treat the entire Elmendorf AFB installation as a single air contaminant emission source, with 106 sources of regulated contaminants addressed in its Title V permit. Under these circumstances, the costs of obtaining and maintaining a Title V permit would be substantial. Under this XL project, the Title V permit would apply to only a small segment of Elmendorf AFB, including one source that is a major stationary source, the CH&PP, and several others that are subject to new source performance standards. ADEC will establish PTE limits for the other sources at Elemendorf AFB to ensure that they are not considered major sources. To enable the regulatory changes under this XL/ENVVEST project, ADEC will work toward inclusion of the major source guidance for Elmendorf AFB into the Alaska Air Quality Control regulations.

Most of the flexibility provided by this project could have been obtained without Project XL through an August 2, 1996, policy guidance document entitled, *Major Source Determinations for Military Installations under the Air Toxics New Source Review, and Title V Operating Permit Programs for the Clean Air Act*, and with the imposition of PTE limits on Elmendorf AFB. However, by participating in this project, Elmendorf AFB obtains the flexibility to redirect money that would have

[1] As part of the Administration's reinvention initiative, EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

been spent on Title V costs into pollution prevention projects. Elmendorf AFB has agreed to invest the expected savings of $1.5 million into projects that will result in actual emission reductions. Without the XL/ENVVEST project, those programs probably would have not otherwise occurred.

The Superior Environmental Performance: Elmendorf AFB is committed to spending the savings derived from streamlining its environmental management costs on pollution prevention (P2) opportunities. A supplemental agreement setting forth the specific additional P2 opportunities to be implemented will be developed with the assistance of stakeholders.

Progress in Meeting Commitments

(As of August 2000)

- Elmendorf AFB is installing a compressed natural gas (CNG) fueling station, purchasing new CNG vehicles, and converting certain base fleet vehicles to be capable of using CNG as an alternative fuel.
- Elmendorf AFB began construction of the CNG fueling station in May 2000, with the ribbon-cutting scheduled for September 2000.
- Elmendorf AFB will convert the first set of five vehicles before the ribbon-cutting, with a total of 13 to 15 vehicle conversions expected before the end of the fiscal year.

Elmendorf AFB is considering the implementation of Clean Cam Technology Systems (CCTS). By replacing engine parts in diesel-powered engines, CCTS can dramatically reduce air emissions, including CO, NO_x, and particulate matter.

- Elmendorf AFB plans to install CCTS on at least one of the base's 86 generators to test the effectiveness of CCTS in the arctic climate, with an eye to using the technology if it proves appropriate.
- Elmendorf AFB has assembled a list of other feasible P2 opportunities available at the base, along with the estimated costs and environmental benefits of each opportunity.
- Elmendorf AFB has completed an Initial Progress Report, detailing progress in the CNG and HAC projects, as well as additional P2 projects under consideration.
- Elmendorf AFB is working with the ADEC to conduct an inventory of non-major sources and establish PTE limits.
- Elmendorf AFB expects to continue implementation of CNG vehicle conversion on base and procure additional dual-fuel vehicles and negotiate and select additional pollution prevention activities with stakeholders.

Benefits for the Environment

- The use of CNG-powered vehicles in place of gasoline-powered vehicles will contribute to reduced CO, NO_x, non-methane organic gases, particulate matter, and CO_2 emissions for Elmendorf. Vehicles will be tested before and after conversion to ensure that emissions are reduced.
- Elmendorf AFB has implemented a base-wide switch-over to high solids/low volatile organic compound paints where technically feasible. These paints have significantly lower levels of HAC solvents, such as toluene, xylene, and methyl ethyl ketone.
- Elmendorf AFB has purchased an automatic paint gun washer that recycles cleaning solvents otherwise released to the atmosphere.
- Elmendorf AFB has also purchased 12 new high-volume/low-pressure spray guns to reduce the amount of paint required per unit of coverage.

Benefits for the Stakeholders

- The use of CNG-powered vehicles at Elmendorf AFB will demonstrate to the general public that this level of technology is achievable and beneficial.
- Regular meetings of the Restoration Advisory Board inform community members of pollution prevention activities resulting from this project.

Benefits for the Project Sponsor

- Reduced administrative and regulatory costs associated with the management of Elmendorf AFB's Title V permit are resulting in the implementation of pollution prevention activities across the base.

- Elmendorf AFB is able to leverage the construction of a CNG fueling station on base for the acquisition of additional new CNG-capable vehicles.

Information Resources

The information in this summary comes from the following sources: (1) the Final Project Agreement for the Elmendorf AFB XL/ENVVEST project (December 1999); (2) supplementary proposal materials, and (3) the *Initial ENVVEST Progress Report* (March 24, 2000).

Department of Defense: Vandenberg Air Force Base XL/ENVVEST[2] Project

FINAL PROJECT AGREEMENT SIGNED NOVEMBER 3, 1997

Background

The Project Sponsor: The 30th Space Wing at Vandenberg Air Force Base (Vandenberg AFB) conducts and supports space and missile launches, operates the Western Test Range, and responds to worldwide military contingencies. Vandenberg AFB covers more than 98,000 acres and is the Air Force's third-largest installation. It is located in Santa Barbara County on the central coast of California, 150 miles northwest of Los Angeles.

The Experiment: Through this XL/ENVVEST project, Vandenberg AFB will use money to achieve superior environmental performance that otherwise would be spent complying with the administrative requirements of Title V of the Clean Air Act (CAA) — permitting, record keeping, monitoring, and training. Vandenberg AFB will apply advanced emission control technologies to stationary sources to reduce annual emissions of ozone precursors. In the first two years of the project, Vandenberg AFB focused on obtaining reductions from boilers, furnaces, and process heaters. Since then, Vandenberg AFB has focused on pollution prevention opportunities from a variety of other sources of ozone precursors, including internal combustion engines and solvent and surface coating applications. Details of the program are specified in an enforceable emission reduction plan prepared by Vandenberg AFB and in the annual and semiannual status reports prepared by Vandenberg AFB.

The Flexibility: Vandenberg AFB, like other military installations, differs from civilian or industrial stationary sources in that the base hosts and supports a unique and wide variety of functions and activities. These activities include residential housing, schools, recreational parks, wildlife reserves, shopping centers, industrial maintenance facilities, airfield operations, and various other mission-related activities. Therefore, Vandenberg AFB creates criteria pollutants normally associated with residential, commercial, and light industrial operations. Most of the stationary source ozone precursor emissions, primarily nitrogen oxides (NO_x), are generated by boilers, furnaces, process heaters, and internal combustion engines. For purposes of permitting under Title V of the Clean Air Act (CAA), EPA and the Santa Barbara County Pollution Control District (the District) historically have considered Vandenberg AFB and all of its individual emission units to be a single stationary source. However, Vandenberg AFB does not fit the single stationary source definition as generally applied to civilian or industrial sources. Vandenberg AFB, in cooperation with the District and EPA Region 9, determined that if the actual emissions that are used to make a major stationary source determination for the base could be reduced to minor source levels, then Vandenberg AFB would be eligible to comply with rules that entail significantly less of an administrative burden. Together, the District, EPA Region 9, and Vandenberg AFB applied EPA's "Guidance for Major Source Determinations at Military Installations under the Air Toxics, New Source Review, and Operating Permit Programs of the Clean Air Act" (memorandum issued on August 2, 1996, by John Seitz, Director of EPA's Office of Air Quality Planning and Standards) to group different base activities as separate stationary sources for purposes of Title V applicability only. This guidance states that certain personnel-related activities at military installations (e.g., base amenities like grocery stores, gas stations, housing,

[2] As part of the Administration's reinvention initiative, EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

theaters, shopping centers, etc.) may be considered not to be support facilities, and therefore can be considered separate sources. In addition, the District amended its regulations to exclude from its major source determination emissions that meet EPA's definition of "non-road engine," including equipment used for tactical support, infrastructure, and maintenance. The District's Rule 370, Potential to Emit—Limitations for Part 70 Sources, allows stationary sources that emit minor source levels of criteria pollutants to comply with Rule 370 requirements rather than having to obtain a Title V operating permit, thereby decreasing the permit administrative requirements for Vandenberg AFB.

The Superior Environmental Performance: Vandenberg AFB will improve the air quality of Santa Barbara County by using innovative technologies and pollution prevention to reduce annual emissions of ozone precursors by 10 tons or more by November 30, 2002.

Progress in Meeting Commitments
(As of July 2000)

- Vandenberg AFB met its commitments to (1) complete an initial assessment and cost feasibility study of emission reduction planning and permitting; (2) complete an evaluation of 29 preselected candidate boilers to determine their feasibility for retrofit or replacement with low-NO_x technology; (3) implement the boiler retrofit and replacement program; (4) submit a Rule 1301 emission reduction plan to the District; (5) implement a program to reduce emissions from solvents, surface coatings, and other sources of volatile organic compounds (VOCs); (6) implement a program to reduce mobile source emissions of VOCs by replacing cars and trucks with electronic vehicles (EVs); and (7) prepare progress reports every six months.

- Vandenberg AFB committed to reducing annual emissions of ozone precursors (NO_x and VOCs) by 2 tons per year by April 30, 2000, and by 10 tons per year or more by November 30, 2002. As of April 2000, Vandenberg AFB had achieved 2.29 tons of emissions reductions through implementation of the boiler retrofit and

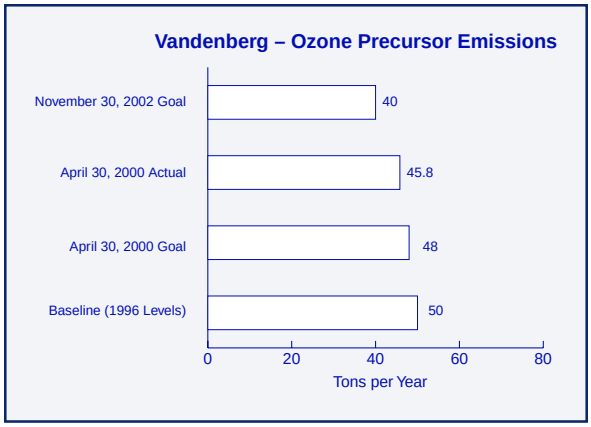


Figure 8

replacement program. An additional 1.92 tons of emissions had been reduced by April 2000 through the implementation of zero-VOC paint and coating substitution (1.27 tons of VOC emissions), paint booth consolidation (0.50 tons of VOC emissions), and construction of a wastewater reclamation system adjacent to a satellite launch facility (0.15 tons of NO_x and VOC emissions). When these 1.92 tons of emissions are combined with the 2.29 tons of emissions reductions achieved through implementation of the boiler retrofit and replacement program, this results in a total of 4.21 tons of real and quantifiable emission reduction credits. (see Figure 8)

- However, only the boiler retrofit and replacement program emission reductions are considered surplus, sustainable, and therefore, enforceable for purposes of the ENVVEST Program. Realizing this, Vandenberg AFB re-evaluated the technical approach and implemented economically viable and sustainable initiatives and found that the goals of the program would not be achieved with the remaining budget and milestone schedule. Therefore, on August 25, 1999, Vandenberg AFB presented an alternative proposal to purchase 12 tons of registered NO_x emission reduction credits (ERCs) from another source located in Santa Barbara County. The application of these 12 tons of purchased ERCs, combined with the 4.21 tons of emissions achieved thus far would result in a total of 16.21 tons of emissions reductions achieved within the air basin. Vandenberg AFB proposes to apply the purchased ERCs to ENVVEST to fulfill the program's 10-ton reduction goal. After that milestone has been achieved, the balance of ENVVEST program funds (approximately $1,000,000) would be used to implement the Mobile Source Reduction Measures at Vandenberg AFB.

The key focus areas for continued successful implementation of the FPA over the next six months will be the following:

- Continue stakeholder meetings.
- Prepare the next XL/ENVVEST project semi-annual progress report for October 2000.
- Negotiate an agreement on Vandenberg AFB's alternative proposal to achieve Milestone # 5.
- Continue implementing the EV loaner program to help evaluate the applicability of EVs.
- Install the necessary infrastructure to support the procurement of a larger-scale pilot fleet of 25 EVs during fiscal year 2000.
- Expand the EV Pilot Program to the extent practical with the availability of ENVVEST Program funds identified in the FPA through fiscal year 2001.

Benefits for the Environment

- Emissions of the ozone precursor, NO_x, have been reduced by retrofitting or replacing those boilers with the highest potential for emission reductions.
- Emissions of the ozone precursors, VOCs, have been reduced by zero-VOC paint and coating substitution, paint booth consolidation, and construction of a wastewater reclamation system adjacent to a satellite launch facility.
- Reduction of ozone precursor emissions may help to prevent Santa Barbara County from being reclassified as an ozone nonattainment area.

Benefits for Stakeholders

- Stakeholders have access to progress reports from the base and will be invited to public meetings.
- Vandenberg AFB personnel conduct briefings on a quarterly basis with the Vandenberg Citizens Advisory Board (CAB) and the Community Advisory Council (CAC), a panel consisting of citizens appointed by the Santa Barbara County Air Pollution Control District board members.

Benefits for the Project Sponsor

- Vandenberg AFB will be able to use resources that otherwise would be spent complying with the administrative requirements of CAA Title V to upgrade combustion technologies to newer, low-NO_x emission technologies.

- Contingent upon meeting the milestones of the FPA and reducing annual emissions of ozone precursors by at least 10 tons by November 30, 2002, Vandenberg AFB will be classified as a minor stationary source rather than a major stationary source for purposes of CAA Title V. This will result in much less future administrative work (reporting, monitoring, record keeping, training) for the base.

- Vandenberg AFB negotiated a protocol for source testing and validation with the District that is cheaper ($600 per test) than the standard EPA test ($3,000 per test).

Issues Needing Resolution

- As of January 1999, the identification of 10 tons of emission reductions was behind schedule. After further evaluation and research for emission reduction opportunities from stationary sources, Vandenberg AFB calculated that this goal would not be achieved with the remaining budget and milestone schedule. Therefore, on August 25, 1999, Vandenberg AFB presented an alternative proposal to meet this goal, which includes the purchase of 12 tons of ERCs from another source with the balance of ENVVEST program funds to be applied to Vandenberg AFB's Mobile Source Reduction Program.

- Vandenberg AFB is updating the original emissions reduction plan submitted to the District pursuant to the first FPA milestone requirement. The original plan was partially approved by the District on February 28, 1998. This plan is being updated to reflect inclusion of the alternative implementation strategy and will be submitted to the District in the summer of 2000. The purchased ERCs will be applied to the fifth program milestone. Upon receipt of the updated emission reduction plan, the District shall be asked to review, approve, and forward the plan to EPA Region 9 for inclusion in the State Implementation Plan (SIP) for the purpose of fulfilling ENVVEST Program goals. As of August 2000, EPA Region 9 is awaiting submittal of an updated emission reduction plan for review. The review and SIP approval process could take several months.

- Overall EPA, participating Vandenberg AFB personnel, and board members of both the CAB and CAC were satisfied with the process leading up to the signing of the FPA. However, CAB and CAC board members expressed interest in seeing greater opportunities for citizen involvement.

- During FPA development, EPA was concerned about the heavy reliance on preexisting Vandenberg community boards, which possibly precluded participation of citizens not associated with the base or county agencies.

- One stakeholder expressed a desire to see an increased level of communications between stakeholders as well as more lead time for stakeholders to consider ideas and proposals affecting the project.

- Due to staff shortages in EPA Region 9, there has been decreased amount of stakeholder communication and facilitation activities undertaken by the Region for this project.

Lessons Learned

- From the DoD perspective, the cost of developing the project was very high, and may ultimately outweigh the benefits. This happened, in part, because this was the first XL/ENVVEST project.

- Since Vandenberg AFB's pollution prevention manager had to spend most of his time on XL/ENVVEST during the first 18 months of the project, there were other pollution prevention opportunities the base could not pursue.

- Even though the project is designed to significantly reduce, if not eliminate, the possibility of citizen lawsuits, the potential for them created anxiety among those in DoD wanting to try innovative approaches.

- The FPA negotiation process needs to be streamlined. The involvement of too many people slowed negotiations, and the DoD chain of command is long. Support from EPA and DoD Headquarters offices is important during negotiations.

- Participants need to know early in the negotiation process their roles and responsibilities and understand which regulations cannot be changed.

- Active support from EPA Headquarters is needed throughout implementation.

- The project probably could not have happened without the EPA/DoD Memorandum of Agreement.

- The FPA allows for continued flexibility during project implementation, which will help in overcoming obstacles.

- True research and development is costly and time consuming.

- There is a perception by many other DoD installations that the ENVVEST program is a tool for avoiding Title V requirements, though this is not the case.

- EPA and DoD have different approaches to, and definitions of, stakeholder involvement.

- The concept of Federal facilities broadening community involvement beyond cleanup and restoration is worthwhile.

- The different public stakeholder advisory board members felt the stakeholder involvement process was a success. Overall, they felt that the issues were reasonably straightforward and that the project as a whole did not require their intense review.

- Early on, one environmental group expressed concerns about the proposed elimination of the facility's Title V major source status. The group was soon after satisfied with Vandenberg AFB's response to the questions and concerns raised and decided not to participate further in the project.

- Vandenberg's positive reputation in the community may have reduced nearby community members' interest in the project.

Information Resources

The information in this summary comes from the following sources: (1) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (2) focus group discussions in January 2000 with representatives of the Federal and local regulatory agencies, Vandenberg AFB, and TetraTech, Inc., a contractor for Vandenberg; (3) the March 1999 *XL Project Progress Report—Vandenberg Air Force Base—ENVVEST* March 1999 (EPA-100-F-99-008); (4) the December 1999 *XL Project Progress Report—Vandenberg Air Force Base—ENVVEST* (EPA-100-R-00-007); (5) focus group discussions in January 1999 with representatives of EPA, DoD, the "District," and Vandenberg AFB; (6) interviews with members of the CAB and a CAC about the stakeholder process; and (7) annual and semiannual status reports prepared by Vandenberg AFB.

ExxonMobil Corporation

FINAL PROJECT AGREEMENT SIGNED MAY 25, 1999

Background

The Project Sponsor: Exxon Company USA, now known as ExxonMobil Corporation (ExxonMobil), is responsible for all domestic oil and gas operations in 12 states, the Gulf of Mexico, and the Pacific Ocean off southern California and Alaska. The Sharon Steel Fairmont Coke Works Superfund Site, located in Fairmont, West Virginia, was placed on the EPA's National Priorities List (NPL) on December 23, 1996. ExxonMobil is the only potentially responsible party (PRP) working with EPA and the West Virginia Division of Environmental Protection under an Administrative Order on Consent to address environmental concerns at this site. ExxonMobil is the first XL project related to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund.

The Experiment: To facilitate and increase the likelihood that interested developers will use the site after cleanup for commercial or industrial development, ExxonMobil proposes to (1) demolish buildings on-site without a finding of environmental risk, (2) engage the services of redevelopment consultants and companies to determine how best to make the site most amenable to development, and (3) work with local stakeholders to identify redevelopment options by preparing, among other things, a "potential for redevelopment" site assessment, an environmental assessment of the property, and a real estate market overview of the site with market options. ExxonMobil has used innovative stakeholder involvement techniques such as public availability sessions to explain project plans and obtain input on future site uses. This project has received a high degree of local community support. In addition, ExxonMobil will use Superfund "non-time critical" removal authorities to accelerate the cleanup of the site. Changes to the traditional Superfund process will be made, affecting (1) the site characterization and cleanup, (2) the risk assessment procedures, (3) the management of on-site landfills, (4) the mitigation requirements onsite for EPA-created wetlands, (5) the stakeholder and community involvement process, (6) the reduction of paperwork requirements, and (7) the quality assurance process. With these changes, this project strives to demonstrate a streamlined Superfund process that results in the reduction of potential risk to human health and the environment in a shorter time frame.

The Flexibility: Superfund sites are typically approached in a phased process. After a site has been listed on the NPL, a remedial investigation/feasibility study (RI/FS) is conducted at the site to assess risk and evaluate alternative technologies for remediation. The RI/FS culminates in a record of decision (ROD), which outlines the actions to be taken and documents the rationale behind the decision to take action at the site. Subsequently, the remedial design (RD) phase determines the specifications for cleanup actions that are implemented during the remedial action (RA) phase. These phases involve the submittal and approval of various documents and public comment periods. It is not uncommon for this process to require several years. Another cleanup approach in the Superfund program is the removal action, which can be completed in significantly less time. ExxonMobil has proposed to conduct the cleanup of this Superfund site as a series of short removal actions. An RI/FS and ROD are not required for a removal action. EPA and the State of West Virginia will provide ExxonMobil with flexibility regarding (1) the use of streamlined removal processes in order to expedite cleanup actions at the site, (2) the mitigation processes for wetlands created by EPA during previous removal actions, (3) the data validation reporting requirements, and (4) the risk assessment criteria and analyses. Long-term remediation will occur if deemed necessary. This flexible approach is expected to reduce the time and cost needed to complete the cleanup.

The Superior Environmental Performance: ExxonMobil will clean up the site in approximately half the time a normal cleanup would take, which will reduce the exposure time period and expedite risk reduction to human health and the environment. In addition, ExxonMobil is focusing on the future use of the site and will incorporate the redevelop-

ment strategy into site remediation. ExxonMobil will continue to work actively to ensure and maintain involvement of key stakeholders and the general public during the site cleanup. ExxonMobil will directly fund the State of West Virginia's involvement in the project and will work with the Fairmont Community Liaison Panel and EPA in every stage of the cleanup process.

Progress in Meeting Commitments
(As of July 2000)

- ExxonMobil has demolished most of the buildings and structures on-site.
- Completed in Spring of 2000, ExxonMobil conducted an Engineering Evaluation/Cost Analysis of proposed removal actions at the waste management areas located on the western portion of the site.
- In June 2000, EPA outlined the non-time critical removal workplan in an Action Memorandum. ExxonMobil has begun the removal action.
- Wetlands in the area have been surveyed and evaluated. EPA has determined that the wetlands are part of existing drainage systems; therefore, mitigation will not be required. However, during remediation, these areas may need to be graded to improve drainage.
- Market valuation of the property has been completed to facilitate redevelopment.
- The focus over the next six months will be to complete the non-time critical removal action at the western portion of the site and to begin work on the second engineering evaluation/cost analysis (EE/CA) to assess the risks at the eastern process area. In addition, the stakeholders will continue to hold meetings approximately every month.

Benefits for the Environment

- Due to the streamlined XL experiment, the risks to human health and the environment at this Superfund site are expected to be addressed in half the time.
- In addition, deed restrictions have been placed on the property to ensure that future activities do not result in exposure to unacceptable levels of risk.

Benefits to Project Sponsor

- Reporting requirements have been reduced, and stakeholders have relied on electronic communication, which expedites review of decision documents.
- The streamlined process will result in a shorter cleanup time and will possibly result in long-term cost savings. In addition, the sooner the cleanup is completed, the sooner investors may purchase and redevelop the property.

Benefits for Stakeholders

- This XL project provides environmental benefits to the community that are not typical for Superfund sites, such as demolishing on-site structures to facilitate redevelopment. The stakeholders hope that such aesthetic improvements will spur investor interest in the site.
- Stakeholders have the opportunity to influence the implementation of the project by participation in a 25-person advisory panel that meets monthly to discuss the project, thereby invoking a sense of trust and respect among stakeholders.
- Citizens can also discuss concerns directly with ExxonMobil by using ExxonMobil's toll-free project hotline set up explicitly for the community.
- Citizens were given a unique opportunity early on in the project to provide input into matters such as the future use of the property, on-site demolition of buildings, and the site cleanup process.

Issues Needing Resolution

- EPA had difficulty obtaining agreement from its internal enforcement offices during the development of the FPA. Internally, EPA must

be able to balance the priorities of the XL program offices with the priorities of the enforcement office.

- Some of the environmental reporting requirements are seen as excessively burdensome and could be streamlined. EPA has since suspended the quarterly status reports because the minutes from the monthly stakeholder meetings provide sufficient information.

- One stakeholder noted that the required environmental reports do not keep up with the actual work taking place and therefore cannot serve as EPA enforcement records.

- Inability to determine whether a nearby artificial wetland can legally be removed has caused delays.

- One stakeholder emphasized the need to ensure that the stakeholder group more accurately reflects a cross-section of the community.

Lessons Learned

- Hosting more than one public meeting to identify stakeholders and technical experts would have been useful.

- The community gained confidence in ExxonMobil through its willingness to interact with the community. The quick, candid dialogue with the stakeholder panel facilitated this trust.

- Certain stakeholders felt that more time should have been spent at the beginning of the project to clarify the roles of the stakeholders participating in the process.

- It can be difficult to identify all parties and the decision maker for each party wishing to participate.

- One stakeholder noted that if agreement is reached regarding what the contaminated site will be used for before or during the site investigation and removal stages, the amount of time needed for the removal and remediation process can be reduced.

- Projects can run more smoothly and efficiently with organized stakeholder involvement.

- One stakeholder emphasized the need to have buy-in from all major parties before moving further into the stakeholder process.

- Another stakeholder emphasized the value of having experts from different agencies involved to enable the community to better understand the different issues.

- Electronic reporting provides real-time communication and expedites review.

Information Sources

The information in this summary comes from the following sources: (1) the Final Project Agreement for the ExxonMobil XL project; (2) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (3) focus group discussions in December 1999 with representatives of ExxonMobil Corporation, Federal and state regulatory agencies, and representatives of the local community; and (4) the December 1999 *Project XL Progress Report Exxon Company USA* (EPA 100-R-00-015).

HADCO Corporation

FINAL PROJECT AGREEMENT SIGNED OCTOBER 2, 1997

Background

The Project Sponsor: The HADCO Corporation, headquartered in Salem, New Hampshire, is a leading manufacturer of printed wiring boards (PWB) and electronic interconnection products. Founded in 1966 as a three-person operation in Cambridge, Massachusetts, HADCO has grown to employ more than 8,000 employees in the United States and Malaysia. Three HADCO facilities currently are involved in the project: Owego, New York; Derry, New Hampshire; and Hudson, New Hampshire.

The Experiment: The HADCO project is examining whether valuable copper metals can be recovered more safely and cost effectively through direct reuse by a primary metals smelter rather than through following the current requirement to first ship copper sludge wastes long distances to intermediate processors. EPA will be able to develop a framework to address the potential transferability of this type of regulatory flexibility to other PWB manufacturers.

The Flexibility: To improve recycling and reduce risks to the surrounding communities, EPA, the State of New York, and the State of New Hampshire are offering flexibility in solid waste disposal from three HADCO facilities. Testing of the facilities' sludge from wastes from electroplating processes indicate that these sludges have a high concentration of several valuable metals, especially copper, and relatively low toxicity in comparison to typical electroplating sludges. New Hampshire has determined that the sludge is eligible for a solid waste variance or a conditional delisting. New York has determined that the sludge is eligible for a solid waste variance. If petitions from the facilities for a variance or delisting are approved, the sludges will not have to be sent to a pretreatment facility prior to recycling.

The Superior Environmental Performance: HADCO has committed to using all savings realized from this project to expand its pollution prevention and recycling programs. HADCO has also committed to recycling copper dust, which is another byproduct of its operations, and to examining the potential of installing sludge dryers to reduce the volume of sludge wastes.

Progress in Meeting Commitments
(As of July 2000)

- HADCO met its commitments to submit samples of its sludge waste for analysis.

- HADCO filed a petition seeking a conditional delisting in the State of New Hampshire, but this process is not complete. In order achieve delisting eligibility, HADCO is required to obtain information from other printed wiring board manufacturers located in New Hampshire and New York concerning the potential transferability of the project. HADCO has committed all of its expected project savings to the reclamation of its copper dusts, through pollution prevention methods, or overall reduction of amounts of waste produced. Additionally, HADCO will verify the environmental benefits attributable to dust reclamation or pollution prevention implementation. HADCO will record its progress in instituting these activities and submit a petition for delisting (FPA paragraphs 28 and 29).

- The New York facility filed for a solid waste variance in the State of New York on September 28, 1999. Once issued by New York State Department of Environmental Conservation, HADCO will begin to recycle its F006 sludge at primary metals smelters or other metal reclamation facilities in hopes that through direct recycling, additional environmental benefits will follow.

- HADCO provided baseline data regarding its voluntary effort to reduce air emissions associated with both direct recycling of F006 sludge and the reduction in the numbers of sludge shipments to processing facilities in its annual report submitted to EPA on January 7, 2000. The report contains data concerning the number of sludge shipments from both the New York and New Hampshire facilities. The Owego, New York facility has had a sludge dryer in operation since mid 1995. A decrease in sludge shipments from the Owego facility has not been apparent, however, due to an overall increase in production as well as relocation/construction activities at the plant that put the dryer out

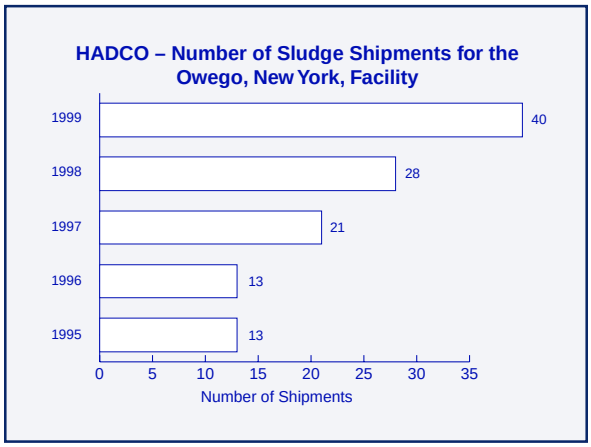


Figure 9

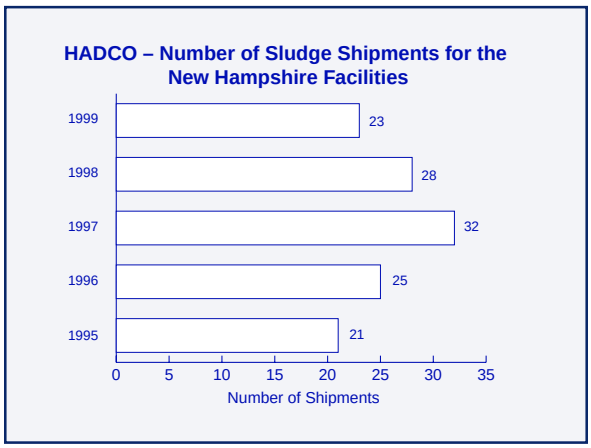


Figure 10

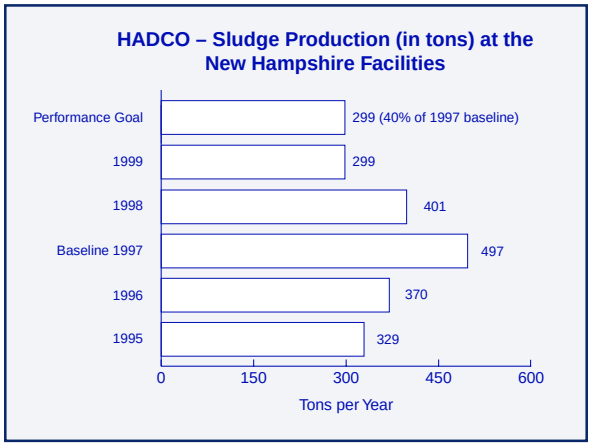


Figure 11

of service from September 1998 through June 1999. After regulatory relief is provided, data from the Derry, New Hampshire, facility will be used to determine if the installation of sludge dryers is economically feasible for each of HADCO's facilities. (see Figures 9 and 10)

- HADCO has submitted to EPA and the states the details of the company's contracts with smelters that can accept the sludge for recycling.

- Once HADCO has the conditional delisting, the solid waste variance, and the appropriate contracts in place, the company will follow through on the following environmental commitments:

  – Cost savings resulting from reduced transportation or recycling under the project will be used to increase copper reclamation activities at the HADCO facilities.

  – HADCO has voluntarily committed to examining ways its New Hampshire facilities may be able to use sludge dryers in order to reduce the quantity of sludge transported. The New York facility currently is operating with a sludge dryer. Prior to this project, HADCO installed one sludge dryer in the Derry facility. Once delisting is granted, the goal is to reduce the sludge from the New Hampshire facilities by 40 percent from the 1997 baseline. HADCO expects cost savings due to the reduction of the number of sludge shipments to processing facilities. HADCO will begin the installation of additional sludge dryers in each of its facilities if it determines that the sludge dryers are technically and economically feasible. HADCO also has committed to minimizing and reclaiming copper drilling, sawing, and edging. The company will begin to reclaim copper dusts and evaluate additional pollution prevention or technology improvements within eight months of the date that each facility is granted regulatory flexibility. (see Figure 11)

- The company will be increasing its current level of stakeholder communication through mailings and inviting stakeholders to visit and tour the facilities.

Benefits for the Environment

- HADCO may reduce mobile source air emissions associated with waste disposal.

- HADCO has improved its pollution prevention efforts by voluntarily installing a sludge dryer in its Derry, New Hampshire, facility, which reduced the quantity of electroplating sludge shipped offsite by 16,000 pounds.

- HADCO will use 100 percent of the cost savings to reclaim non-RCRA regulated copper dusts.

Benefits for Stakeholders

- Stakeholders are able to gain more knowledge about the PWB industry and facility operations.

Benefits for the Project Sponsor

- HADCO has experienced cost savings from reducing the number of sludge shipments due to the sludge dryer's implementation and use.

- HADCO expects to see cost savings associated with sending the sludge directly to a recycler instead of an intermediate processor. The XL project will reduce HADCO's Toxic Release Inventory off-site releases by recycling much of its copper dust wastes, which were formerly sent to a landfill.

Issues Needing Resolution

- HADCO must improve communications with its stakeholders by providing them with information on the sludge tests and analyses.

- Although the delisting process has been delegated to the regions, regional staff will continue to need the expertise of Headquarters delisting staff during the implementation of the HADCO project.

- Putting contracts in place between HADCO and appropriate metal smelters is taking longer, and is more complex, than anticipated. Waste processors and metal smelters seem to be part of a horizontally integrated market, leading to delays in HADCO obtaining the new contracts necessary to implement the project.

Lessons Learned

- Data collection has taken more time than anticipated.
- Clear project goals outlined in a preproposal phase will provide for a smoother negotiation process and shorten the time spent on developing the FPA.
- Clear lines of communication and a decision-making process should be established early on in the negotiations and should be understood and accepted by all project participants.
- Stakeholder outreach and education should be as extensive as possible to attract stakeholders and ensure their continued participation.
- The project structure should have been planned in more detail to ensure that complete interaction was achieved between all parties. Since the project involves multiple jurisdictions—two states, two EPA regions, and EPA Headquarters—some participants felt as though their necessary level of involvements was not always appropriate.
- Stakeholders want more resources (e.g., paid travel) in order to be better involved and more knowledgeable about the different facilities involved.
- The use of communications technology, such as teleconferencing, is a valuable asset for a project that may involve multiple facilities in different locations and may serve to increase involvement of private citizens.
- EPA Headquarters' knowledge of RCRA waste regulations was important to project negotiations and will continue to be important during project implementation.
- Involvement of EPA's upper management can help move negotiations along and can improve the decision-making processes.
- Building consensus among the involved EPA offices at critical junctures of a project must be effectively facilitated by EPA Headquarters to sustain project momentum.

Information Sources

The information in this summary comes from the following sources: (1) the December 1999 *XL Project Progress Report—HADCO Corporation* (EPA-100-R-00-008); (2) HADCO Corporation—Annual Report January 2000; and (3) focus group discussions in January 1999 with representatives of the Federal and state regulatory agencies, HADCO Corporation, and stakeholders involved in the project.

Intel Corporation

FINAL PROJECT AGREEMENT SIGNED NOVEMBER 19, 1996

Background

The Project Sponsor: Intel Corporation (Intel), the world's largest semiconductor manufacturer, has operated the 720-acre Ocotillo site in Chandler, Arizona, since 1996. The largest facility on the site, FAB12, is the company's newest chip fabrication facility. Intel's Project XL agreement applies to the entire Ocotillo site, including any new semiconductor-related facilities that may be built at the site. In the highly competitive semiconductor industry, success is directly related to a manufacturer's ability to bring new technologies to the marketplace quickly.

The Experiment: The Intel project's goal is to implement an Environmental Management Master Plan that includes a facility-wide cap on air emissions to replace individual permit limits for different air emission sources. The Intel project provides a test case for two innovations for improving air permitting: the elimination of case-by-case review of specific manufacturing process changes, if emissions remain under a capped amount, and preapproval of a major plant expansion, if emissions remain below a capped amount for the entire site.

The Flexibility: EPA, the State of Arizona, and the Maricopa County Environmental Services Department have revised Intel's air quality permit covering preconstruction review under the Clean Air Act. The revised air quality permit provides a sitewide cap on air emissions for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter, and volatile organic compounds (VOCs) at levels that ensure that the current site, including any future semiconductor manufacturing plants built on the site, remains in compliance. The air quality permit also provides flexibility to make equipment and process changes and construct new facilities without triggering air quality permit reviews, as long as the air emission caps are not exceeded. This is exemplified by Intel's plan to build a new production manufacturing facility. Early this year, Intel announced it will build its first 300-millimeter, high-volume production manufacturing facility at the Chandler site. The company said it will invest $2 billion to build and equip the wafer fabrication facility. It is expected that Intel will seek this expansion under the Chandler facility's existing air emissions cap, which was established by the original Project XL permit in 1996. Intel has noted that the new facility will allow the company to maintain its leadership in the extremely competitive world of semiconductors.

Other Innovations: (1) *Consolidated Reporting:* The project allows Intel to consolidate reporting for Federal, state, county, and city permitting and regulatory programs into one annual and four quarterly reports. (2) *Stakeholder Input in Reporting:* The new data and reporting formats were designed in conjunction with the EPA, the Arizona Department of Environmental Quality, the Maricopa County Bureau of Air Pollution Control, the City of Chandler, the Gila River Indian Community Department of Environmental Quality, and area residents who are part of the stakeholder team. (3) *Internet Reporting:* In addition to filing its quarterly and annual reports with regulatory authorities, Intel has also made the reports available on a Web site dedicated to this project. The Web site also includes historical information pertaining to the FPA, such as minutes of previous public meetings and public comments and responses.

The Superior Environmental Performance: As long as Intel remains within the air emissions caps, the site will remain a minor stationary source of criteria air pollutants. Intel has also committed to meet other environmental goals that are designed to improve the area's water quality, conserve water, reduce the generation of hazardous and nonhazardous waste, and improve the general environmental performance of the facility.

Progress in Meeting Commitments
(As of July 2000)

Overall, Intel has been very successful in meeting its environmental commitments under the project.

- Intel committed to capping the air emissions for the entire facility as follows: VOCs at 40 tons per year (TPY), NO_x and CO at 49 TPY, SO_2 and particulates at five tons TPY, phosphine at 4 TPY, sulfuric acid at 9 TPY, and organic hazardous air pollutants (HAPs) and inorganic HAPs capped at 10 TPY. For all of these commitments, Intel's facility has remained well under the limit for 1997, 1998, and 1999.

  – Intel has achieved its water quality and water use commitments, with one minor exception. Intel originally committed to use 100 percent treated effluent water for its semiconductor manufacturing cooling tower and for landscaping. Although the facility achieved only 80 percent of wastewater reuse in 1997, Intel achieved 97 percent of wastewater reuse in 1998. Based on a review of the system design and after spending $300,000 annually for phosphate treatment, the company informed stakeholders that it would not likely be able to achieve more than 95 percent consistently without spending significant resources on additional treatment systems. Stakeholders agreed to change the goal from 100 percent to 95 percent. Intel was able to reach a level of 99 percent in 1999.

  – Intel achieved its solid waste recycling goals. Intel's goals are to increase recycling to 40 percent in 1997, 55 percent in 1999, and 60 percent in 2001. In 1997, the facility exceeded its recycling goal, and by the end of 1998, Intel exceeded its commitment for 2001. In 1999, Intel continued its progress toward increased recycling by achieving a level of 98 percent. At the beginning of the project the company struggled to meet these goals, which led to creative, effective solutions. For example, to meet the solid waste recycling commitments, Intel found a box manufacturer that

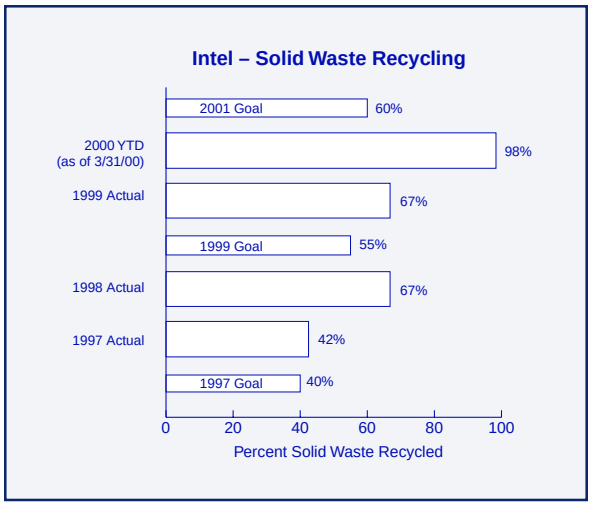


Figure 12

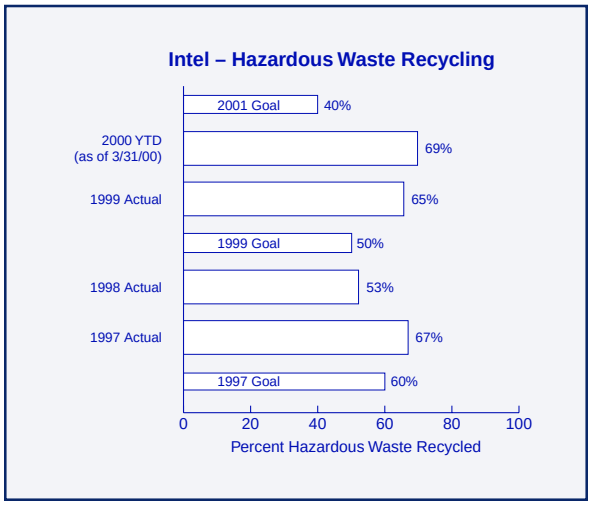


Figure 13

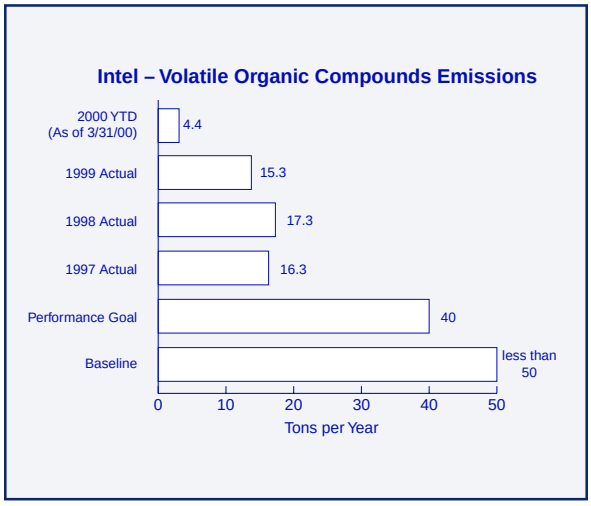


Figure 14

transforms packaging wood into landscaping tree boxes. (see Figure 12)

– Intel's goals are to recycle 60 percent of hazardous wastes generated at the facility in 1997, 50 percent in 1999, and 40 percent in 2001. The specified percentages in the recycling goals decrease because Intel anticipates reducing the hazardous waste generated at the facility through pollution prevention measures. The facility achieved beyond the 60 percent recycling goal for 1997. In 1998, the company started a new manufacturing process module that produced a nonrecyclable waste stream. Intel executed several projects to reduce these wastes, and as a result almost achieved the 1999 goal by the end of 1998 (it achieved a 53 percent recycling rate). In 1999, Intel continued its aggressive hazardous waste recycling efforts and exceeded its recycling goal by achieving a level of 65 percent. (see Figure 13)

– Intel's goals are to recycle 25 percent of nonhazardous chemical waste in 1997, 50 percent in 1999, and 70 percent in 2001. The facility exceeded its 1997 and 1999 goals. Intel achieved a rate of 58 percent in 1997 and a rate of 78 percent in 1999.

- In addition to the site-wide cap on air emissions, Intel voluntarily established a production-based performance standard called the production unit factor (PUF). The purpose of the PUF is to ensure that air emissions per unit of production will not increase. The PUF is expressed annually as tons of emissions (VOCs or HAPs) per year per unit of annual production. In 1997, a baseline PUF was established using the indexing method. For any given year, the production-based emissions would be indexed to a base year. For reporting purposes, the report would show the based year as an index of 1.0, and subsequent years should be 1.0 or less. Each year Intel reports the annual PUF for the reporting year relative to the base year. For example, the VOC and HAP PUFs for 1998 relative to the base year index of 1.0 were 0.3 and 0.7, respectively. This means that the VOC and HAP emissions released in 1998

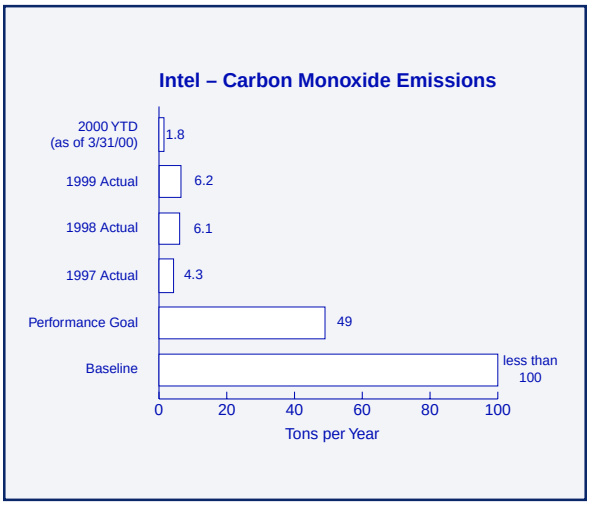


Figure 15

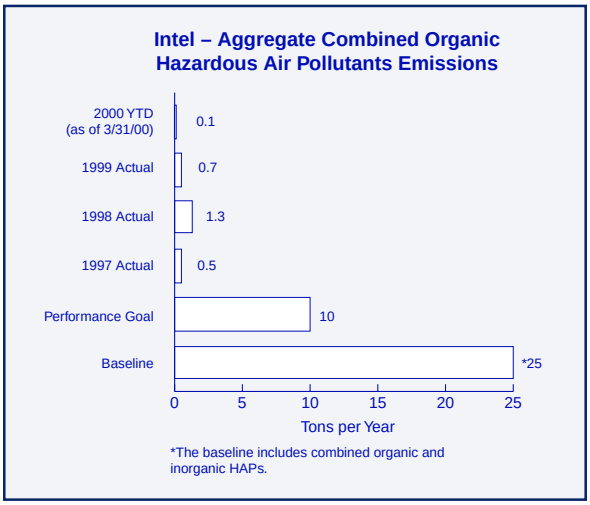


Figure 16

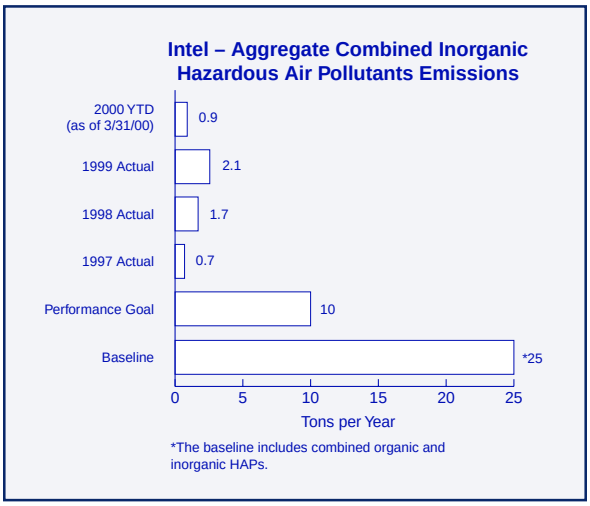


Figure 17

per unit of production for 1998 are less than the VOC and HAP emissions released in the base year per unit of production. The value for VOCs for 1999 relative to the base year was 0.26. This means that the VOC emissions released in 1999 per unit of production in 1999 was less than that for both the base year and 1998. (see Figure 14)

- Intel will continue to meet its commitment to share information and work with concerned parties by completing quarterly progress reports within 60 days after the close of each quarter, planning and implementing a semiannual stakeholders and general public meeting in October 2000, and planning quarterly stakeholder meetings for August and November 2000.

- Intel has fulfilled its commitment to cap CO emissions at less than 49 TPY for the entire site, by achieving a total of 4.3 TPY in 1997, 6.1 TPY in 1998, and 6.2 TPY in 1999. (see Figure 15)

- Intel has far exceeded its commitment to cap aggregate combined organic HAPs at 10 TPY by achieving a total of 0.5 TPY in 1997, 1.3 TPY in 1998, and 0.7 TPY in 1999. (see Figure 16)

- Intel has far exceeded its commitment to cap aggregate combined inorganic HAPs at 10 TPY by achieving a total of 0.7 TPY in 1997, 1.7 TPY in 1998, and 2.1 TPY in 1999. (see Figure 17)

Benefits for the Environment

- Air emissions for criteria and hazardous air pollutants are being maintained at levels that ensure that the current site, including any future semiconductor manufacturing plants built there, remains a minor air emissions source, as defined by the Clean Air Act.

- Intel's recycling activities for hazardous wastes, solid waste, and water are successful. In particular, water conservation is a priority environmental goal in this arid Arizona region, and Intel's activities in this area are well regarded by the City of Chandler.

- Intel is currently in the process of expanding its production capabilities by adding a new process to the existing facility. The new process is designed to adhere to the emissions cap under the permit. The new process allows Intel to incorporate new technologies into their processes to remain competitive without additional impact to the environment.

Benefits for Stakeholders and the Local Community

- Stakeholders continue to have real input into decisions being made involving the Intel project.

- Intel's emphasis on water conservation has been very valuable for the city of Chandler. The Stakeholder Team meets on a quarterly basis to ensure that Intel is meeting the project's superior environmental performance goals and to ensure that quarterly reports will be easily understood by the public.

- Intel renewed its commitment to provide up-to-date environmental project information to the public by making its project Web site more user-friendly.

- Local stakeholders and the surrounding community will continue to enjoy increased economic benefits by Intel's decision to build another semiconductor manufacturing facility at the Ocotillo site. This decision was due in part to the success of the Intel XL project facility emissions cap innovation.

- The nearby community is enjoying reduced risk because of Intel's decision to switch to SDS arsine technology.

- The community has better access to information through Internet reporting and a stakeholder-developed, easy-to-understand format for the consolidated reports.

- Intel has established a Stakeholder Team to ensure the involvement of national, regional, and local regulatory authorities and private citizens as full partners in the project's implementation. This team meets once a quarter to review the project's progress reports.

- Intel has participated in or led a number of activities designed to enhance the local community's environment and education. For example, Intel donated a total of 1,663 personal computer systems through the Arizona Students Recycling Used Technology (StRUT) Program to nonprofit organizations and K-12 schools in 1998 and 2,060 personal computer systems in 1999. Several of these computers are no longer needed at Intel and would normally be disposed of, but Intel refurbishes these computers so they can be used by other organizations.

Benefits for the Project Sponsor

- Intel will build its first 300 millimeter, high-volume production manufacturing facility at the Chandler site under its existing air emissions cap, which was established under the 1996 XL permit.
- Intel has avoided millions of dollars worth of production delays in the competitive, quick-to-market semiconductor industry by eliminating 30 to 50 reviews per year.
- Intel can minimize delays in the expansion of the facility.
- Intel feels that the stakeholder involvement process has been valuable to the facility.
- Intel has found the innovations being tested at the Arizona facility to be so beneficial, that the company is implementing performance-based concepts for air emissions at two other company facilities.
- Intel feels the flexibility allows it to redirect resources toward emissions reductions rather than paperwork.

Spin-off Benefits

- The City of Chandler has received a grant to study the industrial reuse of wastewater. The XL project was used to advance the study.
- The project prompted the City of Chandler's fire department to establish a new overall approach to hazardous waste handling.

Key Issues Needing Resolution

- Certain stakeholders feel that Intel has limited their influence over the project. For example, Intel's decision to change from using arsenic to arsine gas in one of its processes was made without consulting the Stakeholder Team. Several stakeholders noted that more consultation would have been appropriate.
- Certain local industries have noted that not being granted the same regulatory flexibility as Intel is unfair. Some wish to be granted the same level of regulatory flexibility, without necessarily going through the same process. However, several stakeholders strongly object to such action.
- Some stakeholders would prefer that a greater emphasis be placed on water consumption and waste minimization instead of water recycling and waste reduction.
- Most stakeholders believe that greater public participation would improve the project. However, several barriers have prevented this, including lack of time, appropriate level of technical understanding, and resources (including funds for citizen reimbursement and technical support).
- One stakeholder had major concerns about the public availability of timely and detailed information on process changes initiated by Intel. While the specific concern was addressed by Intel through sharing more detailed information about the process change, the stakeholder is still uncomfortable with the long-term implications of this form of public participation. The stakeholder wants more technical details to be available to the public, as well as the technical assistance to interpret it, so that the community can evaluate the potential impacts on health and the environment and then influence the company's decision-making process for choosing among different available technologies or chemicals.
- Except for the small stakeholder team, the public has not shown interest nor attended public meetings. While there is speculation as to why

this is the case (the project is too technical in nature for sustained interest; the sponsor already has the broad trust of the community regarding the project; the public does not have enough access to information in order to be active), the reasons for this trend are not yet well understood.

- Stakeholders stated that project reports could be improved by more narrative descriptions of the company's Design for the Environment commitment, the basis of the air quality standards, and the water and hazardous waste portions of the project.

- There are continuing stakeholder concerns about the state standards (i.e., the Arizona Ambient Air Quality Guidelines) as applied to the fenceline standards used for the project.

Lessons Learned

- Stakeholder concerns can be addressed by providing sufficient information. For example, even though stakeholders were notably concerned about Intel's decision to switch to arsine gas, stakeholder concerns were relieved after Intel made considerable efforts to address them.

- It is important to set ground rules and deadlines at the beginning of the stakeholder process and to make efforts to ensure that all stakeholders fully understand them.

- FPA development could have been expedited if earlier in the process public stakeholders had received education and training on environmental terminology and issues and on the technical and business characteristics of the semiconductor industry.

- Public stakeholders report high costs in terms of their personal time, since they are volunteers.

- Without ongoing technical assistance, the general public's ability to understand the impacts of the project's changes on human health and the environment is limited.

- Through the process of developing the agreement, Intel and the regulatory agencies have developed a better understanding of stakeholder concerns and resource needs to participate in environmental projects.

- The air permit approach is probably applicable to other semiconductor manufacturing facilities but might not be practicable for facilities that experience frequent changes in air emission levels.

- In reference to the introduction of SDS arsine technology, citizens noted that the FPA process worked the way it was intended.

- Report centralization is a good practice.

Information Resources

The information in this summary comes from the following sources: (1) the December 1999 *XL Project Progress Report—Intel Corporation* (EPA-100-R-00-005); (2) focus group discussions in December 1998 and December 1999 with representatives of the Federal, state, and local regulatory agencies, Intel Corporation, and stakeholders involved in the project; (3) data from Intel Quarterly Reports, and the 1997, 1998, and 1999 Annual Reports; and (4) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000.

Jack M. Berry, Inc.

FINAL PROJECT AGREEMENT SIGNED AUGUST 8, 1996; PROJECT CLOSED OUT JUNE 2, 1999

Background

The Project Sponsor: Jack M. Berry, Inc. (Berry), is a midsized citrus juice-processing company. The company's facility in LaBelle, Florida, is the site of the Project XL pilot. It is located 30 miles east of Fort Myers at the site of Berry's largest grove, consisting of about 10,000 acres of orange and grapefruit trees.

The Experiment: The Berry project's goal was to establish a process by which Berry would prepare a Comprehensive Operating Permit (COP) in partnership with the Florida Department of Environmental Protection, South Florida Water Management District, and EPA. The COP would have been a multimedia permit that was part of a streamlined permitting approach that was expected to better integrate plant operation and compliance procedures, as well as eliminate unnecessary administrative requirements.

The Flexibility: Under the COP, the State of Florida and EPA would have relieved Berry of administrative and procedural rules that require the preparation and certification of multiple permit renewal applications every few years. Flexibility in Florida regulations governing the permit application process would have allowed Berry to accelerate its permit application process. The streamlined permitting approach was anticipated to result in cost savings that Berry would have reinvested in new environmentally beneficial operating procedures. The burden on EPA and the State of Florida to review and issue permits would have been reduced as well.

Other Innovations: (1) *Reduction in Reporting Burden*: The State of Florida would have allowed Berry to use nonstandard forms for reporting environmental performance, which would be simplified and part of the approved COP. The State of Florida might not have required Berry to have its environmental reports certified by a professional engineer, because the COP would have been more comprehensive than a certified professional engineer's application. (2) *Environmental Management System (EMS)*: Berry had committed to instituting the International Organization for Standardization (ISO) 14000 EMS program as a means to systematically manage continuous environmental performance, including pollution prevention and source reduction strategies. (3) *Standard Operating Procedures*: Berry had intended to complete detailed yet easy-to-follow work instructions for implementing the COP that ultimately would have been linked to the EMS, to raise the level of employee environmental awareness and contributions to permit compliance.

The Superior Environmental Performance: Berry would have reduced air emissions of volatile organic compounds (VOCs), SO_2, and NO_x through voluntary installation of updated equipment and implementation of updated citrus-processing procedures. Berry would have also reduced the amount of hazardous and solid waste generated by the facility through pollution prevention, reduction, and recycling.

Progress in Meeting Commitments

(As of closeout on June 2, 1999)

- The Berry project was unique in that it was the only XL project that experienced a change in management. Through a lease agreement signed in 1997, Cargill, Inc.,[3] became the new operator of Berry's LaBelle, Florida, facility. As a result, for the Berry XL pilot project to continue, Cargill would have had to become a party to the FPA. Work on development of the COP was put on hold in late 1997 pending a decision by Berry and Cargill regarding continuing the project. Getting to a final decision on the project's future, however, proved elusive. Since further progress appeared unlikely, three years after the project agreement was signed, EPA and the State of Florida chose to

[3]Cargill is an international marketer, processor and distributor of agricultural, food, financial and industrial products with some 80,600 employees in more than 1,000 locations in 65 countries and with business activities in 130 more.

terminate the agreement in June 1999. Therefore, the LaBelle facility remains part of the traditional regulatory system under Federal, state, and local regulations.

- The Berry facility met some of its project commitments even though work on the COP was not completed. In 1997, Berry reported that the facility had:
  - developed some standard operating procedures and detailed work instructions;
  - eliminated an 88-acre spray field in 1997 that had been used for wastewater disposal since 1974;
  - reused treated industrial wastewater produced by the facility for irrigating a 1,400-acre section of citrus groves;
  - installed a more efficient peel dryer to reduce citrus processing VOC emissions;
  - begun work on meeting commitments to reduce disposal of solid waste and increase scrap metal recycling; and
  - begun work to reduce the number and types of solvents and lubricants used on-site.
- Because the COP had not been completed, there was no progress by Berry on:
  - preparing an emissions reduction strategy for SO_2, NO_x, and VOCs and reporting on its results;
  - providing information on the amount of solid waste and scrap metal recycled by December 1998 (In February 1997, the company reported that solid waste recycling was initiated and scrap metal recycling was increased.);
  - providing information on the quantities of hazardous materials eliminated through a self-audit program, on the preparation of an inventory of spray-can solvents and lubricants used on-site, and on the replacement of some hazardous materials with environmentally friendly alternatives;
  - establishing a target date for completing the documentation of implementing the new ISO 14000 EMS;
  - involving stakeholders in the development and implementation of the final COP; and
  - voluntarily meeting drinking water standards equal to half of the maximum contaminant levels (MCLs) allowed under the Safe Drinking Water Act (SDWA) and the Florida Administrative Code. Test data indicated that, except for radionuclides, Berry either met a voluntary drinking water standard equal to half of the MCLs allowed under the SDWA or was not able to detect the contaminant. However, there was information on progress toward reducing radionuclide levels.

Benefits for the Environment

- In 1997, the company reported that the effort to develop easier-to-follow work instructions had led to continuous improvement in environmental performance by reducing incidences of minor environmental violations.
- The elimination of the 88-acre spray field removed an odor problem.
- Treated industrial wastewater produced by the facility was reused to irrigate a 1,400-acre section of citrus groves.

Benefits for Stakeholders

- The stakeholder participation for this project was not evaluated, because it would have been linked to the COP development, which never occurred.

Benefits for the Project Sponsor

- In 1997, Berry reported that the preparation of standardized work procedures increased the Berry facility staff's awareness of the environmental aspects of their jobs. The improved work procedures also standardized environmental testing at the facility and raised its level of compliance by reducing its incidences of minor violations of environmental regulations.

Key Issues Needing Resolution

- Not Applicable

Lessons Learned

- Ultimately, for the Berry project to have gotten back on track, each organization involved would have to had made a new or renewed commitment, with well-defined roles and responsibilities of each partner and a new clear timeline for accomplishing the various tasks involved.

- While the organizations involved had different perspectives about the project's implementation, all of them agreed on the following: testing the COP concept is *still* a good idea; FPAs for XL projects need to describe the steps that should be taken by the signatories should a change in a facility's owner or operator occur; and EPA needs to clarify XL's incentives to attract and maintain the interest of small businesses like Berry.

- For all XL projects, the commitment of all parties, the division of responsibility, and timelines must be very clear from the beginning. Also, the EPA and state regulators must make an accurate assessment of the resources available and the internal capabilities of the company to implement the project.

- If a facility management changeover occurs during a project, the EPA and state regulators must start working with the new company as soon as possible to ease the project's transition.

- XL FPAs must include language that spells out the time frame for making a decision about proceeding with the project when the management of the facility changes.

Information Resources

The information in this summary comes from the following sources: (1) the March 1998 *XL Project Progress Report—Jack M. Berry, Inc.*, (EPA-100-F-99-003); (2) focus group discussions in December 1999 with representatives of the Federal and state regulatory agencies, Jack M. Berry, Inc., and Cargill, Inc.; and (3) the *Project XL Preliminary Status Report* (EPA-100-R-98-008).

Lucent Technologies

FINAL PROJECT AGREEMENT SIGNED AUGUST 19, 1998

Background

The Project Sponsor: The Microelectronics Group of Lucent Technologies, Inc., (Lucent) designs and manufactures integrated circuits and other electronic components for the computer and communications industries. This project will be implemented in a phased approach over a five-year period through site-specific demonstration projects at Lucent facilities in Allentown, Reading, and Breinigsville, Pennsylvania; and Orlando, Florida.

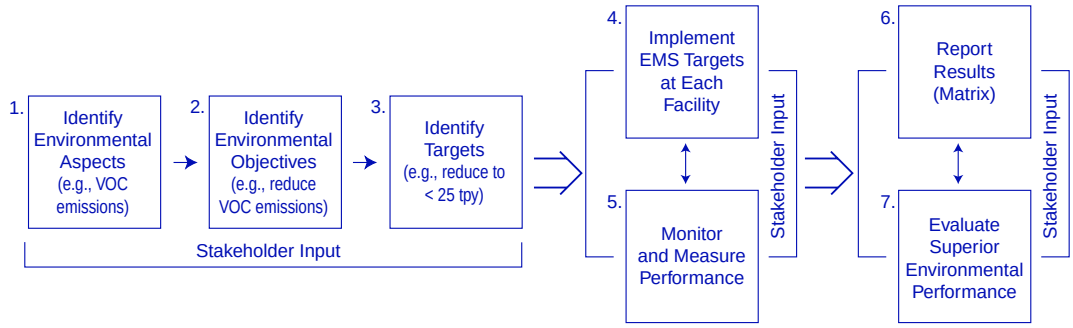
The Experiment: The Lucent Microelectronics Group will operate an environmental management system (EMS), third-party-certified to the International Organization for Standardization's (ISO) 14001, to manage environmental impacts for all media at all of the company's facilities so as to achieve environmental performance superior to that required by its current permits. Specifically, this project will test whether use of a high-quality EMS will create a more efficient, more transparent, more easily understandable, and more flexible system that not only meets the requirements of existing statutes and regulations, but also achieves superior environmental performance. The project will use the unique strategy of integrating regulators into the EMS process to set environmental goals and to track performance. Also, as part of the EMS approach, Lucent is gaining input from a facility-based Local Environmental Advisory Group (LEAG) composed of local stakeholders including environmental organizations, community groups, employees, and other interested citizens. Ultimately, the Lucent project will identify over the five-year period whether and how a high-quality EMS can be the basis for an integrated approach, embodied in a single document, governing environmental management in all media at all Microelectronics facilities.

The Microelectronics EMS is managed by the following four main components, as presented in the flow chart below:

- Identifying and determining the significance, or priority, of "environmental aspects," those environmentally related characteristics of the facility's operations, products, and services (e.g., inputs such as raw materials, water, energy, and chemicals; outputs such as products, emissions, discharges, and wastes);
- Identifying environmental "objectives" that address the performance goals for all environmental aspects;
- Identifying "targets," the programs that define how the objectives will be achieved over time; and
- Continually monitoring and measuring performance of how well objectives are identified and targets implemented.

The Flexibility: The "umbrella FPA" provides an overarching framework for individual Lucent facilities. Each Lucent facility seeking flexibility under the project will develop a "site-specific adden-

Flow Diagram:
Lucent EMS Process Overview



dum" to the umbrella FPA. The Allentown facility will be the location of the first site-specific demonstration project. As successes are generated at Allentown, site-specific projects will be developed at the other Microelectronics facilities in Breinigsville, Reading, and Orlando. It is anticipated that the EMS will provide a vehicle for consolidating all Federal and state permits over time into a single Microelectronics-wide multimedia permit to be based on targets set jointly each year by the company and regulators. This would result in an annual review of the permit rather than the current system of multiyear renewals of individual permits. The EMS also will provide a streamlined process for incorporating new regulatory flexibility approaches and consolidating reporting requirements businesswide. As of the spring of 2000, the Allentown facility submitted a draft addendum to EPA. EPA and the Pennsylvania Department of Environmental Protection are reviewing the draft and will be providing comments to Lucent by August 2000.

The Superior Environmental Performance: The umbrella FPA is a multi-regional attempt to incorporate high-quality environmental management practices, through Lucent's EMS, across the entire business unit. This will drive multimedia superior environmental performance. The parties anticipate that the EMS will foster superior environmental performance by identifying opportunities to reduce Lucent's environmental impacts in a variety of areas, both regulated and nonregulated. Facility-specific addenda to the umbrella agreement will be the vehicles for achieving superior environmental performance and considering regulatory flexibility at the individual facilities.

Information Resources

The information in this summary comes from the following sources: (1) the December 1999 *XL Project Progress Report—Lucent Technologies* (EPA-100-R-00-012) and (2) the Final Project Agreement for Lucent Technologies XL Project.

Massachusetts Department of Environmental Protection, Environmental Results Program

FINAL PROJECT AGREEMENT SIGNED OCTOBER 6, 1998

Background

The Project Sponsor: The Massachusetts Department of Environmental Protection (Massachusetts DEP) is the state agency responsible for protecting human health and the environment by ensuring clean air and water, the safe management and disposal of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources. Massachusetts DEP's role under Article 97 of the Massachusetts Constitution is to guarantee the people's right to "clean air and water," as well as "the natural scenic, historic and aesthetic qualities of the environment."

The Experiment: This project will test a process to streamline permitting and reporting and improve and better measure compliance rates across the state for business sectors. Massachusetts DEP developed the Environmental Results Program (ERP), a multimedia, whole sector-based regulatory system that replaces case-by-case permits with industry-wide environmental performance standards and an annual certification of compliance. Through ERP, Massachusetts DEP will convert permit requirements into industry-wide performance standards. For the first time ever, senior-level company officials will be required to annually self-certify that the participating companies are, and will continue to be, in compliance with all applicable air, water, and hazardous waste management performance standards throughout the facility. Massachusetts DEP anticipates that participating firms will achieve superior environmental performance, because by converting the permit requirements to performance-based standards, facility managers will be aware of their environmental obligations before they make decisions about modifying equipment and operations, rather than at the end of a long, expensive permitting process. This will give companies more flexibility to choose cost-effective compliance strategies for themselves, thereby reducing the "time to market" for new products and removing regulatory obstacles to pollution prevention. In addition, ERP companies will be accountable for reporting any releases or exceedances of discharge or emission standards to the Massachusetts DEP. Violations of appropriate standards will be reported and a "Return to Compliance Plan" submitted to Massachusetts DEP if any such violations are either outstanding at the time of certification or discovered thereafter. Beginning with a demonstration project of 23 companies, industry representatives cooperated with the Massachusetts DEP in establishing criteria for reporting compliance with state standards without developing permits for each facility. The project reduces the reporting burden for affected facilities and the Massachusetts DEP while fostering superior environmental performance by identifying and encouraging opportunities for pollution prevention. The first three small-company sectors are dry cleaners, photo processors, and printers. The Massachusetts DEP is currently developing project agreements and regulations for two more sectors—firms that discharge industrial wastewaters (IWW sector) to sewers and firms installing or modifying boilers (combustion sector). Massachusetts DEP expects to apply ERP to the combustion sector in the Fall of 2000. The IWW sector is being addressed under a larger watershed initiative and is expected to be applied to ERP in 2001.

The Flexibility: The umbrella FPA will be expanded through addenda that will provide the necessary regulatory flexibility and specify requirements for superior environmental performance for each sector. [For example, the umbrella agreement lists anticipated flexibility for the following sectors: dry cleaners—decreased record retention time and extension of time under the maximum achievable control technology (MACT) rule under the Clean Air Act (CAA) for newly constructed sources to notify the state from 30 to 60 days; photo processors—no flexibility needed;

and printers—expedited State Implementation Plan (SIP) approval and the volatile organic compound (VOC) limit on alcohol-free fountain solution.] After evaluation and revision, the program may be transferred to other industry sectors throughout Massachusetts.

The Superior Environmental Performance: Massachusetts estimates that the program will yield significant reductions in the use of smog-forming solvents and alcohol in fountain solutions among commercial printers. The shift to ERP is expected to reduce wastewater discharges of silver by 99 percent of all unregulated photo processors, which make up 15 percent of all photo processors, and achieve a 43 percent reduction in emissions of perchloroethylene from dry cleaners.

Progress in Meeting Commitments
(As of July 2000)

Overall, Massachusetts DEP has successfully met their commitments through the implementation of ERP components to achieve superior environmental performance. ERP provided extensive outreach and technical assistance to participating sectors to promote pollution prevention and successfully eliminated a significant number of permits in the printing sector. A summary of the ERP commitments in the initial umbrella project agreement is provided below. In May 2000, Massachusetts DEP presented its own preliminary assessment of the ERP program to EPA. The preliminary graphical information as well as supporting data that are presented below on the status of ERP are taken from the May 2000 Massachusetts DEP presentation.

- Massachusetts DEP committed to provide clear performance standards and compliance assistance to companies in the participating sectors through outreach and technical assistance.
  - DEP established workgroups of industry and government representatives that worked to formulate industry performance standards for the dry cleaning and photo processing sectors. As part of ERP, Massachusetts DEP developed environmental business practice indicators (EBPIs), industry-specific measures that provide a snapshot of a facility's environmental per-

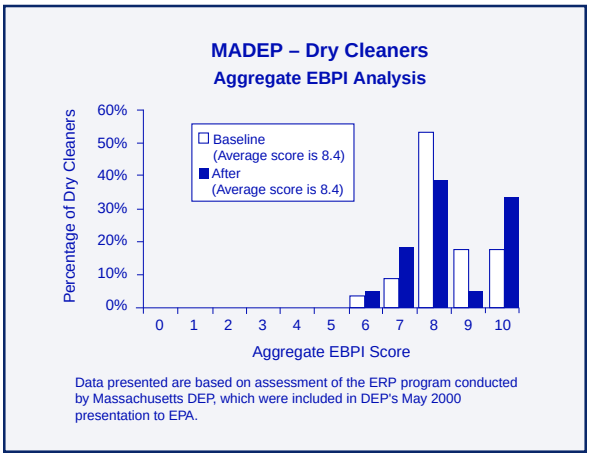


Figure 18

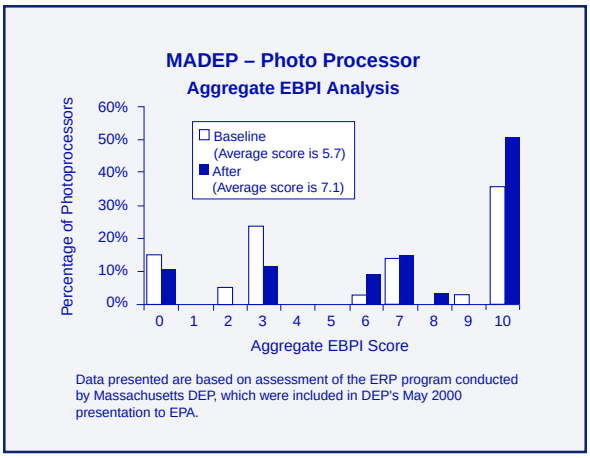


Figure 19

formance. These standards, which can be regulatory requirements or "beyond compliance" measures, were derived using compliance inspection findings, and certification form data for each of the participating sectors. DEP is using the EBPIs to measure and evaluate ERP compliance and environmental results. There are 16 EBPIs for printers, 16 for dry cleaners, and eight for photo processors. The EBPIs compliance requirements have been simplified in an easy-to-read format in the industry workbook and compliance statement.

– In addition, DEP has promulgated regulations with extensive review by the public and industry sectors. During the first year of implementation in each sector, DEP conducted workshops to provide guidance and assistance to industry representatives in understanding and complying with the standards.

– DEP's certification requirements, well-designed workbooks and outreach efforts, have helped firms to establish compliance management procedures, accountability, and records.

- Massachusetts DEP committed to promote corporate accountability and self-evaluation of environmental performance by requiring annual compliance self-certification.

  – Under ERP, Massachusetts DEP established a self-certification process for three sectors. ERP provides the compliance assistance tools that enable businesses in the participating sectors to determine what rules are applicable to them and what is required to comply. Because firms must certify annually, the ERP requires companies to conduct an environmental review annually. ERP includes similar components as an environmental management system where compliance obligations are established and audited on a regular basis. Because the certification forms require the signature of a high-level owner or manager, the process has improved senior management's attention to environmental management.

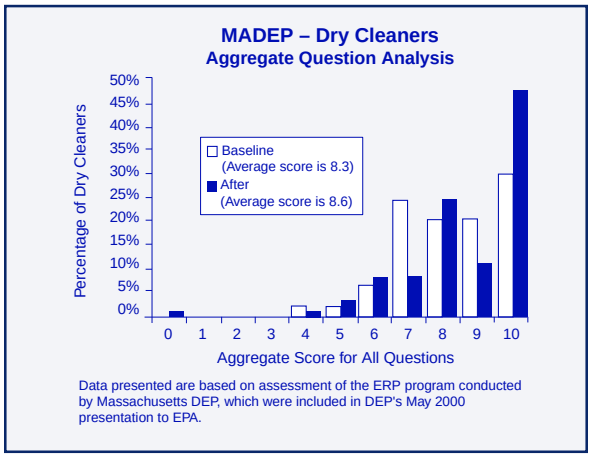


Figure 20

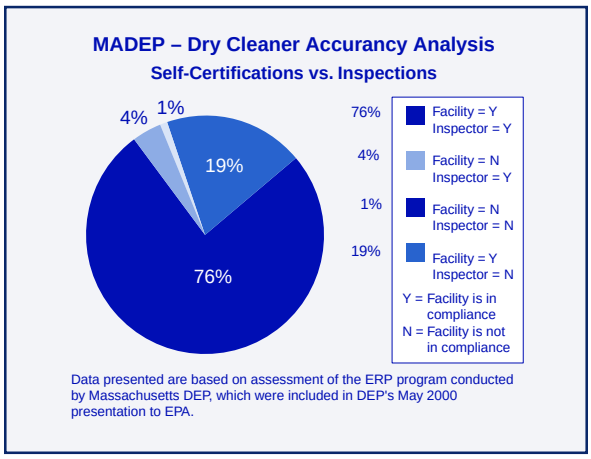


Figure 21

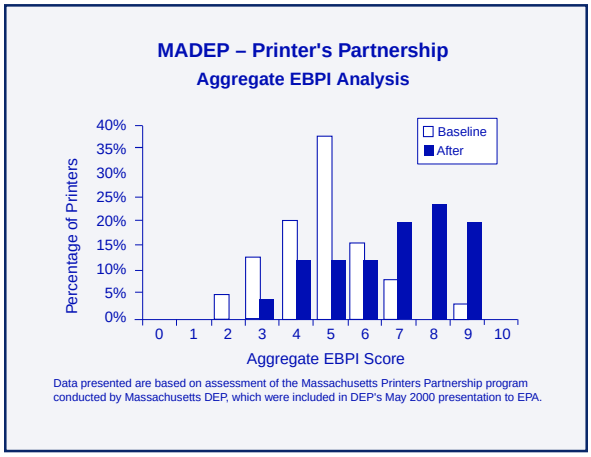


Figure 22

- Massachusetts DEP committed to encourage the adoption of pollution prevention techniques via sector-specific guidance and implementation manuals and inclusion in performance standards (EBPIs).
  - DEP developed workbooks that provide step-by-step guides to compliance and pollution prevention techniques. These outreach efforts were developed through extensive interaction with related industry experts. In the dry cleaning sector, the workbook was translated into Korean to accommodate the large percentage of Korean-owned businesses.
  - Nine specific pollution prevention (P2) measures have been incorporated into EBPIs for the printer sector.
- Massachusetts DEP committed to improve compliance assurance and enforcement by better identifying the universe of firms in each sector, conducting random inspections, and targeting non-reporters and deficient certifiers.
  - In DEP's initial outreach work, the universe of firms under the department's oversight increased by approximately 340 percent. DEP applied the ERP to three small business sectors for which it had little information, yet working with trade associations and other sector stakeholders, Massachusetts DEP identified a more complete universe of firms. It is estimated that the ERP allows DEP to track environmental performance for 80 to 90 percent of the firms in a sector compared to less than 33 percent prior to ERP. To date, based on data collected by Massachusetts DEP, the ERP program has more than 2,500 participating companies—approximately 1,300 printers, 650 dry cleaners, and 550 photo processors. The number of companies exceeds those that were traditionally regulated by DEP prior to the implementation of ERP as shown in the following table. The inclusion of a more complete universe of firms in ERP leads to greater sector-wide compliance.
  - Under ERP, Massachusetts DEP's strategy to ensure compliance includes continued field presence by way of targeted and random inspections, review and analysis of certification data (including Return to Compliance forms), and using the agency's enforcement protocols as appropriate. ERP targets inventoried entities that have not filed certifications, firms whose certifications are incomplete or technically deficient, and companies that have been the subject of complaints. From the program's inception to July 1999, approximately 160 Notices of Noncompliance were issued to dry cleaners and photo-processors that failed to certify. Most facilities responded to the actions. In addition, there have been two high-visibility enforcement actions taken as a result of questions raised in DEP's review of annual certifications.

ERP Universe Identification*

Sector	DEP-Identified Universe Pre-ERP	DEP-Identified Universe Post-ERP
Printers	~250	~1,300
Dry Cleaners	~30	~650
Photo processors	~100	~550
Total	**~380**	**~2,500**

* Information provided in the table is based on *Learning from Innovations in Environmental Protection, Research Paper Number 1, Evaluation of the Massachusetts Environmental Results Program*, by Susan April and Tim Greiner of Kerr, Greiner, Anderson & April, Inc., prepared for the National Academy of Public Administration, dated June 2000.

- Massachusetts DEP committed to conduct an evaluation of the program to measure and evaluate compliance and environmental results.

  – The first year analysis of the ERP program with respect to the dry cleaning and photo-processing sectors also shows significant improvements in compliance and pollution prevention practices and quantifiable emissions reductions. This study uses the Environmental Business Practice Indicators to measure, track, and assess program results and sector performance. Specifically, it compares baseline data (which include EBPIs) collected during random inspections *before* ERP certification to data collected during random inspections *after* outreach and certification under ERP. Facility scores and industry-wide scores (such as "before ERP" dry-cleaner scores versus "after ERP" dry-cleaner scores) have been calculated and are presented in the following graphs. (see Figures 18, 19, and 20)

  – In addition to calculating facility- and industry-wide scores, the first year preliminary analysis included an accuracy analysis. It compares results of data collected from facilities during random inspections *after* ERP to the answers on the certification forms from those facilities to determine the overall level of accuracy of the certification data. In the dry cleaner sector, there is agreement between the certification form and the inspector 76 percent of the time as shown in the chart. (see Figure 21)

  – Two quantitative studies performed on the printing sector [relating to Massachusetts Printing Partnership (MP2) participants] show significant improvements in compliance practices, pollution prevention practices, and quantifiable emission reductions. The graphic displays the analysis of aggregate EBPI scores for the printer sector based on MP2. The graphic shows the comparison of the aggregate EBPI scores for printers *before* the partnership, compared to the aggregate scores *after* the partnership. The information presented in the graph is based on a preliminary assessment conducted by Massachusetts DEP. (see Figure 22)

  – Massachusetts DEP is continuing analysis of EBPI data for the printing sector.

  – Massachusetts DEP is exploring how to make the certification information available to the public.

  – The original intent of ERP was to operate the self-certifications electronically, thus eliminating/minimizing FTE resources required for permit review and facilitating the process of providing public access to these certifications. However, barriers to security, consistent technology accessibility, signatory verification, and business information concerns prevented the electronic mechanism.

  – Information on the progress of ERP is posted on the Massachusetts DEP Web site *(www.state.ma.us/dep/erp)*. The site includes publications, ERP sector regulations, and certification packets, press releases, and other background material. It does not include specific information on facilities participating in the program or any data from the certifications.

- Massachusetts DEP continues efforts to implement their ERP in other industry sectors. In the fall 2000, Massachusetts DEP expects to roll out ERP to boilers; rollout of ERP to IWW sector is projected by late 2001.

Benefits for the Environment

Participating firms must evaluate their environmental systems annually and certify compliance to stringent performance standards. ERP's requirement for stricter practices regarding waste-handling, equipment maintenance and operation, and leak checking should reduce emissions and minimize the likelihood and impact of spills and workplace exposure, specifically:

- ERP requires printers to use low-VOC press cleaning solutions that reduce VOC emissions. Massachusetts DEP predicts that ERP will reduce VOCs by 10 percent, or 168 tons per year.

- ERP requires dry cleaners to use leak test equipment to conduct leak checks weekly, a stricter requirement than the pre-ERP monthly sniff test requirement. It is estimated that using this leak detection technique and conducting repairs as needed could reduce perchloroethylene emissions by roughly 500 tons per year.

- ERP's improved waste-handling practices, especially in the dry-cleaning sector, should improve hazardous waste management, yielding benefits from reduced perchloroethylene-laden waste disposal that has contributed to the creation of numerous hazardous waste sites and water supply closings in the state.

- For the photo processing sector, ERP includes standards to reduce silver discharges to publicly owned treatment works (POTWs), as well as to reduce illegal discharges to septic systems, to the ground, or to surface water. Photo processors have reduced silver discharge through more frequent replacement of silver recovery canisters. Based on an estimate that 15 percent of photo processors had no silver recovery equipment, ERP regulations that require such units are estimated to reduce silver discharges by 99 percent.

Benefits for Stakeholders

- ERP eliminated a significant number of permits in the printer sector. ERP gives printers the flexibility to add or modify certain equipment without waiting for DEP approval.

- Firms in all three rollout sectors are no longer required to obtain permits for industrial wastewater. Prior to ERP, many of the firms in these sectors were required to have IWW permits, yet very few had them or even knew of these requirements. Under ERP, these firms are regulated more equally through the flexibility of the self-certification process. Firms benefit by a level playing field.

- ERP's annual certification requirement and well-designed workbooks help firms establish procedures, accountability, and records similar to components of a small scale environmental management system (EMS). As firms conduct the frequent compliance reviews documented in ERP workbooks, they help ensure that their business is in compliance with all applicable multimedia regulations.

- Participating firms that were already in the DEP system have recognized net savings through the ERP. For example, prior to ERP, a mid-sized printer paid a $300 small-quantity generator-fee, $150 to $450 for air permits, and $1,300 for an IWW permit. Under ERP, those fees were replaced with an annual fee of $200 (printers have gradation in fees depending on the size). Printers who were not already in the system, however, will see the ERP fee as a new cost.

- Firms in participating ERP sectors have the opportunity to assist in the development of performance standards, as well as comment and review regulations proposed for their sector.

- The community has better access to information through the Massachusetts Web site. Information on the progress of ERP is posted on the Massachusetts DEP Web site (*www.state.ma.us/dep/erp)*. The site includes publications, ERP sector regulations and certification packets, press releases, and other background material. It does not include specific information on facilities participating in the program or any data from the certifications

- The ERP has brought improved public relations to Project XL in that it has brought the concept of ERP to a wider, national audience. ERP has raised awareness and brought attention to Project XL and displayed the ERP concept to a national audience. This exposure fosters the possibilities for great environmental gains through other state XL projects.

Benefits for the Project Sponsor

- Massachusetts DEP created a more complete database of the universe of firms in each sector.

- Massachusetts DEP now has the capability to track the environmental performance for 80 to 90 percent of the firms in the dry cleaning, photo processing, and printing sectors. This is a significant increase to the universe of firms identified prior to ERP (which is estimated to be less than one-third).

- Massachusetts DEP will be able to focus their resources on non-responding entities and accuracy of certification, thus targeting entities that are more likely to be in noncompliance with environmental standards.

Key Issues Needing Resolution

- Massachusetts DEP and EPA have invested significant resources in the XL effort, yet XL as a regulatory flexibility mechanism has encountered barriers in the implementation of ERP. Under ERP, multi-facility, sector-wide XL agreements, which include Federal regulatory flexibility, are still being explored.

- The most significant issue that has arisen during the execution of ERP is the state's request for flexibility in the dry cleaning sector requirements that are covered by EPA's air toxics maximum achievable control technology (MACT) rule. In consideration for the more stringent state standards established under ERP for the dry cleaning sector, and in an effort to offer the dry cleaners some regulatory relief in exchange, DEP agreed to pursue two areas of flexibility. The dry cleaning addendum requests a decrease in the federally required record retention time from five years to three and also seeks to allow new sources 60 instead of 30 days to report to the state under the MACT. However, because record retention limit is a statutory requirement, DEP was told by EPA that they must submit an application for delegation of the air toxic program [the section 112(l) delegation under the Clean Air Act]. Massachusetts DEP is currently evaluating the delegation.

- Massachusetts DEP is reviewing the feasibility of widespread permit retirement as part of ERP. There are significant barriers to the elimination of permits including federal permitting requirements, the need to take into account site considerations for large-scale operations and/or plants that are controversial to their communities, and DEP air-permit staff's preference for best achievable control technology (BACT) review over ERP's process-specific standards (especially for large sources).

Lessons Learned

- DEP found it difficult to develop "pure" performance standards. Many of the regulatory standards resemble general permits or those with source-specific standards. These standards are based on technology or performance, or some of both.

- Building on the success of the Massachusetts Printing Partnership, DEP's effort to include a more complete universe of firms in each sector has leveled the playing field between firms complying with regulations and those that have gained a competitive advantage by ignoring their regulatory responsibility.

- Stakeholder relationships have suffered with ERP expansion. DEP's involvement of stakeholders was key to getting the ERP program off the ground. Throughout the initial design of ERP, DEP convened a multi-stakeholder design group consisting of members of EPA, environmental advocacy groups, business and industry, consulting firms, and the legal community. However, after the first 18 months the group has not met on a regular basis. In order to sustain ERP, DEP has recognized the need for continued stakeholder involvement and support. As a result, DEP has assigned sector managers to develop communications plans to improve communication with and among stakeholders after sector implementation.

Information Resources

The information sources used to develop this project summary include (1) the FPA for the Massachusetts DEP XL project; (2) an ERP brochure and report entitled *Evaluation of the ERP Demonstration Project* from the Massachusetts DEP Web site; (3) Project XL background information and a press release dated October 6, 1998, from the U.S. EPA Project XL Web site.; (4) Learning from Innovations in Environmental Protection, Research Paper Number 1, Evaluation of the Massachusetts Environmental Results Program By Susan April and Tim Greiner of Kerr, Greiner, Anderson & April, Inc. prepared for the National Academy of Public Administration dated June 2000; (5) the December 1999 *Project XL Progress Report Massachusetts Department of Environmental Protection* (EPA 100-R-00-013); and (6) Massachusetts DEP Environmental Results Program (ERP) briefing presented by Steve DeGabriel, Director, Business Compliance Division, Bureau of Waste Prevention, Massachusetts DEP, May 2000.

Merck & Company, Inc., Stonewall Plant

FINAL PROJECT AGREEMENT SIGNED DECEMBER 15, 1997

Background

The Project Sponsor: Merck & Co., Inc. (Merck), is a worldwide, research-intensive, health-products company that discovers, develops, manufactures, and markets human and animal health products. Merck's Stonewall Plant near Elkton, Virginia, was established in 1941. The plant employs more than 900 people in a range of pharmaceutical manufacturing activities such as fermentation, solvent extraction, organic chemical synthesis, and finishing operations. The Stonewall Plant is located within 2 kilometers of the Shenandoah National Park, which has experienced substantial air quality degradation and related resource impacts over the past several decades.

The Experiment: In this project, Merck's air quality permit includes a site-wide cap on the facility's total emissions of criteria air pollutants [volatile organic compounds (VOCs) as a surrogate for ozone, particulate matter-10, carbon monoxide (CO), sulfur dioxide (SO_2), lead, and nitrogen oxides (NO_x)]. The company aims to reduce emission levels for SO_2 and NO_x to protect visibility and reduce acid deposition in nearby Shenandoah National Park and the neighboring community. To gain operational flexibility under the cap, Merck will convert its coal-burning powerhouse to natural gas, a much cleaner-burning fuel, at a capital cost of approximately $10 million. As long as emissions remain below the caps, Merck will no longer need to obtain prior approval from EPA or the Virginia Department of Environmental Quality (VADEQ) for changes at the facility that cause changes in emissions.

The Flexibility: EPA and the State of Virginia issued a site-specific rule, variance, and permit under the Clean Air Act's (CAA) Prevention of Significant Deterioration (PSD) program to authorize site-wide caps and an innovative best achievable control technology (BACT) approach. Existing air permitting regulations require that most changes to the manufacturing process be reviewed and approved by the VADEQ prior to being implemented. This requires a considerable effort by the facility as well as the regulators to frequently prepare and review permit applications for many process modifications. EPA and the State of Virginia also provided flexibility in complying with RCRA air emission requirements that apply to certain existing hazardous waste management units.

The Superior Environmental Performance: Merck will improve air quality in the Shenandoah National Park and surrounding community by operating under the site-wide emissions cap and permanently reducing criteria air pollutant emissions by approximately 300 tons per year, a 20 percent reduction. The conversion of the facility's coal-burning powerhouse to natural gas is expected to result in an initial reduction of SO_2 and NO_x emissions by 900 tons per year, a 65 percent reduction, and a reduction of hazardous air pollutants by 47 tons per year. The emission subcaps guarantee at least a 25 percent reduction of SO_2 and 10 percent reduction of NO_x.

Progress in Meeting Commitments
(As of July 2000)

- EPA has met its commitment to propose a site-specific PSD and New Source Review (NSR) rule, which provides an alternative means of compliance with state and Federal air standards for the Merck Stonewall Plant. EPA promulgated the final rule on October 8, 1997. In addition, EPA delegated full authority to Virginia for implementing and enforcing the PSD rule on November 24, 1997.

- The State Air Pollution Control Board of Virginia issued a variance on September 10, 1997 consistent with EPA's rule; VADEQ granted the PSD permit to the Merck Stonewall Plant on February 10, 1998.

- The Merck Stonewall Plant in Elkton, Virginia, has met its commitment to replace its coal-fired boilers with natural gas boilers. The conversion was completed in July 2000. Within the first few weeks of burning natural gas, Merck significantly reduced SO_2 and NO_x air emissions and has committed to a cap of total emissions of criteria air pollutants (except lead) at a level 20 percent below baseline levels. The facility's actual emissions averaged over 1992 and 1993 were used to establish a baseline level of 1,503 tons per year for total criteria pollutants. Under the new facility-wide cap, total criteria pollutant emissions will be maintained at levels below 1,202 tons per year. In addition to the facility-wide cap on total criteria pollutants, subcaps will be placed on Merck's emissions of SO_2, NO_x, and particulate matter. Baseline levels for these criteria pollutants are the average actual emissions during 1992 and 1993. The new subcaps will limit SO_2 emissions to 539 tons per year (a 25 percent reduction) and NO_x emissions to 262 tons per year (a 10 percent reduction). The particulate matter subcap initially will be placed at the baseline level of 42 tons per year. There will be an automatic, one-time increase in the particulate matter subcap of 1 to 10 tons per year to account for condensable particulate matter emissions that the new gas-fired boilers could generate at their full capacity. The cap on total criteria pollutant

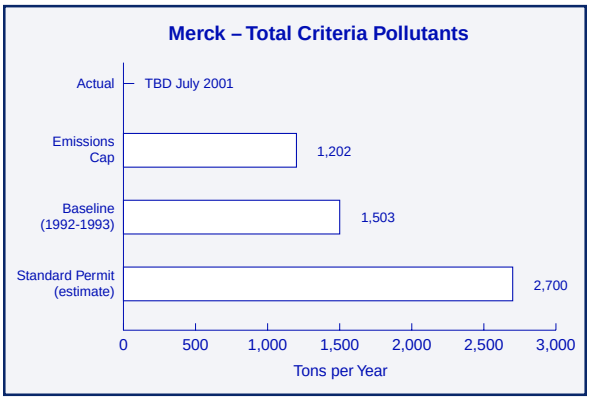
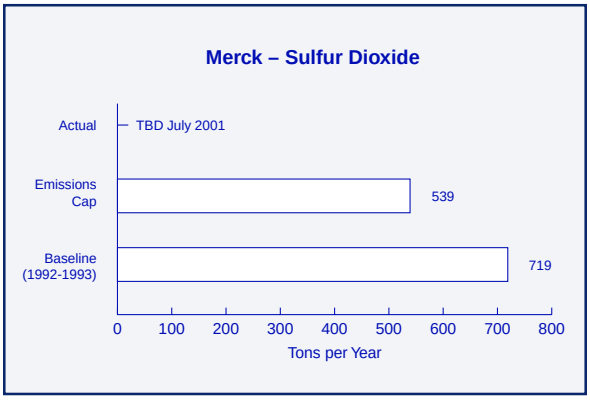


Figure 23



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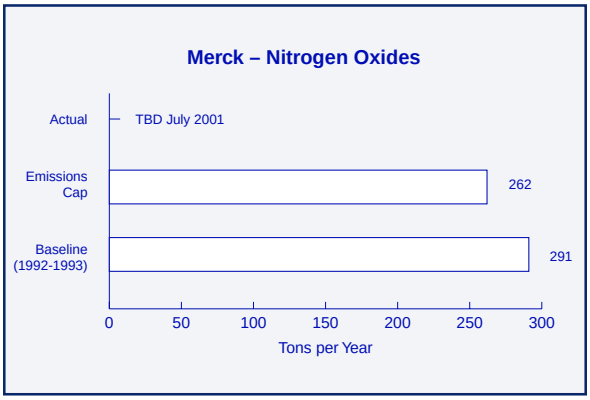


Figure 25

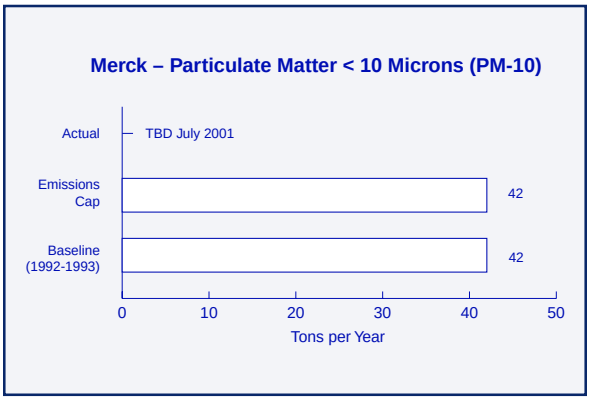


Figure 26

emissions will not be changed by this automatic increase in the particulate matter subcap. Facility-wide and subcap air emissions will be determined monthly. (see Figures 23, 24, and 25)

- The new PSD permit and associated caps will be fully effective no later than 12 months after the conversion to natural gas, or before that date should Merck begin to report emissions below the permit caps sooner. As soon as Merck begins operating under the emissions caps, they will be allowed to make changes to their processes that could result in air emissions increases without prior approval, as long as they remain below the caps. Additionally, once the caps are in effect, the Stonewall Plant will be required to operate under the caps and increase the frequency of their monitoring, record keeping, and reporting if criteria pollutant emissions trigger more frequent data-collection requirements. Part of the project is a comprehensive monitoring, record keeping, and reporting system that increases in stringency as actual emissions approach the cap.

- Also, because of concerns expressed by stakeholders about VOC emissions and the potential reduced visibility and increased vegetation impacts caused by greater ozone formation, Merck will assess air quality impacts on nearby Shenandoah National Park if VOC emissions reach certain specified levels. Due to recent changes in production mix, VOC emissions decreased substantially in January 2000.

- The focus for the next six months will be to monitor facility-wide air emissions and notify the stakeholders when emissions are reduced below the caps specified in the new permit. Merck will submit semiannual emission reports and annual progress reports beginning in 2001.

Benefits for the Environment

- The facility-wide cap will limit total emissions of criteria air pollutants to levels 20 percent below baseline levels, SO_2 emissions to levels 25 percent below baseline levels, NO_x emissions to levels 10 percent below baseline levels, and particulate matter to levels approximately equal to baseline levels. The caps are not enforceable until July 2001, because the conversion was completed in July 2000, unless Merck notifies the DEQ that its emissions have been reduced below the caps sooner. While quantitative emissions cannot be reported yet, it should be noted that directly upon conversion to natural gas, SO_2 and NO_x air emissions were significantly reduced. (see Figure 26)

- The conversion to natural gas will reduce total criteria air pollutant emissions for the powerhouse by 900 tons per year, will virtually eliminate lead emissions, and will reduce the combined emissions of the hazardous air pollutants, hydrogen chloride and hydrogen fluoride, by 65 percent. The conversion to natural gas is anticipated to cost Merck approximately $10 million in capital investment, but is not required by regulations or as a result of operational problems.

- A comprehensive monitoring, record keeping, and reporting program will increase in stringency as actual criteria pollutant emissions approach the cap. This provides an incentive for Merck to minimize air emissions.

- Air quality in the Shenandoah National Park will improve. This XL project has the potential to improve visibility and vegetation damage in the park by reducing SO_2 and NO_x air emissions.

- Merck will assess the air quality impacts in Shenandoah National Park if VOC emissions reach specified levels.

Benefits for Stakeholders

- Stakeholders will have better access to environmental information through Merck's comprehensive monitoring, record keeping, and reporting program.

- Stakeholders will receive information on an ongoing basis that enables them to evaluate Merck's performance under the facility-wide emission caps and the impact of incentives to minimize facility air emissions.

- The Merck stakeholder group can participate in periodic reviews of performance in meeting limits set under Merck's PSD permit. The stakeholder group will meet every five years to evaluate the project's implementation and to mutually agree on whether project changes are needed.

Benefits for the Project Sponsor

- Merck expects to avoid millions of dollars worth of potential production delays in the competitive first-to-market pharmaceutical industry by eliminating repetitive permit reviews.
- Merck is provided flexibility to make production changes without first obtaining permitting approval, as long as emissions remain below capped levels.
- The permit streamlines content requirements of the application for Merck's Title V operating permit and compliance certification.

Issues Needing Resolution

- It is unclear how this project will address the recently issued pharmaceutical maximum MACT requirements. Merck, EPA, and the State of Virginia are working to ensure that XL project flexibility gains can continue under these recently issued regulations.
- Because the facility-wide caps do not place an individual subcap on VOCs, the community and National Park Service are concerned about the potential impacts of increased VOC emissions. Actual VOC emissions will be tracked closely, and VOC impact analyses will be updated as needed.
- Stakeholders believed that it was premature to try to identify barriers to project implementation in 1998, since Merck's PSD permit has just been issued by the Commonwealth of Virginia.
- The stakeholders did not anticipate the length of time needed to secure a natural gas supply connection to the boilers. The delay led to more limited interaction between Merck and some of the stakeholder groups, including the National Park Service and local community members, presumably due to a lack of information to report.

Lessons Learned

- Technical support for community stakeholders is needed early in the process.
- EPA needs to communicate clear goals at the beginning of project development negotiations.
- Third-party facilitation would have helped the negotiation process.
- Transaction costs for community stakeholders were particularly high.
- An incentive-based permit provided Merck with the motivation to purchase the lowest emission technology available.
- Community stakeholders felt they were not included in some crucial negotiations.
- For this XL project, stakeholders did not anticipate the delay in securing a natural gas line. Nonetheless, the conversion was completed before the August 2000 deadline. Stakeholders caution others to anticipate worst case scenarios and to build in time for potential delays.

Information Resources

The information in this summary comes from several sources, including (1) the December 1999 *Project XL Progress Report—Merck Stonewall Plant* (EPA 100-R-00-010); and (2) focus group discussions in December 1999 with representatives of EPA and the Merck Stonewall Plant.

Molex Incorporated

FINAL PROJECT AGREEMENT SIGNED AUGUST 8, 1998

Background

The Project Sponsor: Molex Incorporated (Molex) is a multinational company that operates 47 facilities worldwide, manufacturing electroplating, metal stamping, fiber optics, plastic molding and other products. The Molex project covers an electroplating facility in Lincoln, Nebraska.

The Experiment: Molex electroplates coatings of nickel, copper, and tin and lead on substrate materials for a variety of manufacturing purposes. The process generates large volumes of wastewater containing metal contaminants, which are subsequently captured in wastewater treatment systems and become a RCRA hazardous waste. Molex previously operated a wastewater treatment system that combined the wastewater streams from nickel, copper, and a tin/lead composite plating processes. These wastestreams were treated in a single wastewater treatment process that generated a hazardous multiple-metal waste material from which only one of the metals could be recovered with the rest disposed. By switching to a process that segregates the wastewater streams from the plant's multiple electroplating processes and treats each one separately, Molex is able to recover metal contaminants separately, reduce the amount of metal disposed of, and reduce metal contaminant levels in the effluents discharged from the facility's wastewater treatment systems to the city's publicly owned treatment works (POTW). Molex has requested a variance from hazardous waste regulations in order to reduce the costs of storing and shipping these wastes and to increase the rate of metals recovery from the multiple wastestreams.

The Flexibility: EPA, pursuant to RCRA Section 3005(b), has authorized the State of Nebraska's Department of Environmental Quality (NDEQ) to carry out Nebraska's Hazardous Waste Management Program in lieu of the Federal program. Under this authority, the NDEQ issued a variance to Molex granting it a temporary exemption from the classification as hazardous waste of segregated sludges generated during wastewater treatment. Without this variance, the sludge materials would be subject to the NDEQ's generator requirements for storage and shipment of hazardous wastes. By obtaining approval from the NDEQ under RCRA to classify its segregated process sludge as a "commodity-like" material rather than as a hazardous waste, Molex can ship the sludges using common carriers rather than hazardous waste haulers, who are subject to additional RCRA regulations. Additionally, Molex is permitted to ship the hazardous materials on an as-needed basis, rather than every 90 days as is typically required for hazardous waste.

On July 10, 2000, Molex requested a two-year extension of the temporary variance which had remained in effect for two years and was set to expire August 7, 2000. In the request for this extension, Molex noted that it is expanding the production area of the plating department at the Uplands facility. This expansion, Molex stated, may offer an opportunity to continue to gather data under a greater process flow. In response, on August 2, 2000, EPA and NDEQ issued a six-month extension of the variance. The additional six months will allow Molex time to complete the final report. After reviewing Molex's final report, EPA and NDEQ have the option to issue an additional two-year variance.

The final data will be examined to determine the effect that separate treatment of Molex's waste streams has on metal content in wastewater effluents. Data gathered will also be examined to demonstrate whether the segregated system produces a recyclable sludge with market value. Ultimately, data gained through this project will provide the information necessary to assess whether modifications to national or state performance standards are possible.

The Superior Environmental Performance: In the Molex project, the treatment of segregated wastewater streams should result in at least a 50 percent reduction in mass loadings of metal contaminants in wastewater effluents, as well as in lower tin/lead composite sludge disposal costs because pure metal sludges can be sold directly to processors. Molex is making a significant up-front investment for longer-term benefit. The pure tin/lead composite sludge does not require disposal and thus, no disposal fee; however, the operational and compliance costs of a segregated waste treatment system are higher than those associated with a single wastewater treatment process.

Progress in Meeting Commitments
(As of September 2000)

- Overall, Molex has been successful in meeting its environmental commitments under the project.

- *Note about the baseline data*: It is important to note that sludge volumes between the combined treatment process and the baseline segregated treatment process are not strictly comparable, because the combined treatment sludges were dried, but the segregated treatment sludges were not. Data from 1999 were measured based on four Molex quarterly reports, which covered project performance from August 7, 1998, to August 7, 1999. Data from 2000 were measured based on four Molex quarterly reports, which cover project performance from August 8, 1999, to August 7, 2000.

  – Molex estimated that the segregated treatment system would generate a total of 71,328 pounds of sludge, but 1999 actual generation rates based on the quarterly reports indicate that actual sludge generation rates were 10.3 percent higher (78,709 pounds) than the estimated baseline for the segregated system. In 2000, the total amount of metals sludge generated was 112,498, a 58 percent increase over the estimated baseline. Based on the quarterly reports, it is estimated that the segregated treatment system has resulted in an average 65 percent reduction in the concentration of copper, tin and lead, and nickel in the effluent discharged by the POTW in 1999 and an average 76 percent reduction in 2000.

  – Molex estimated that 13,376 pounds of copper sludge would be generated with the segregated treatment system. However, 1999 actual generation rates were 59 percent higher (21,242 pounds) than the estimated baseline. For 2000, Molex has generated 35,200 pounds of copper sludge, a 163 percent increase from the baseline data. Based on the quarterly reports, and since this sludge is recycled, it is estimated

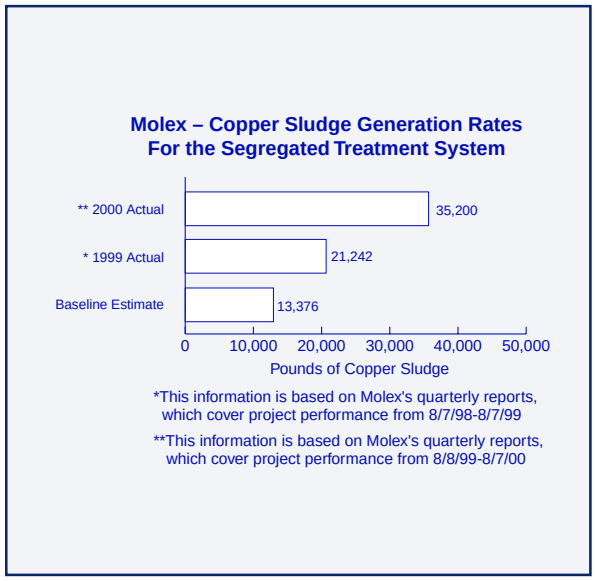


Figure 27

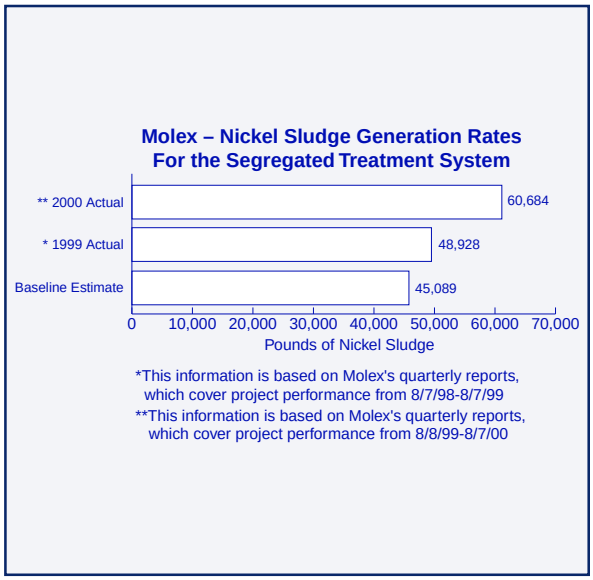


Figure 28

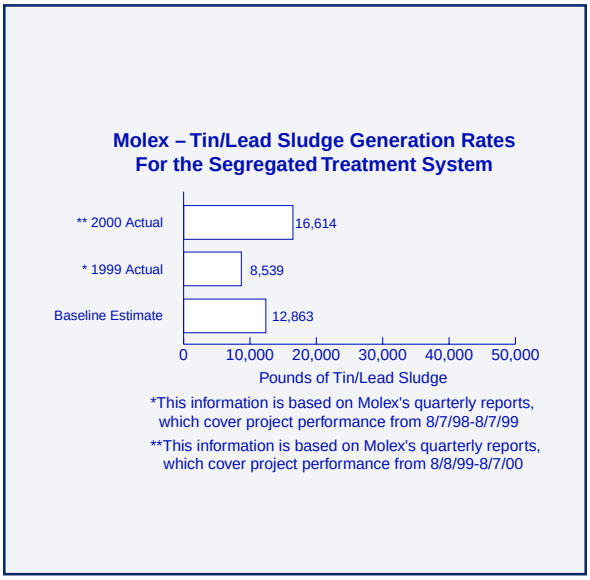


Figure 29

that the use of the segregated system has resulted in decreased copper concentrations in the POTW's effluent by 66 percent in 1999 and an average 76 percent reduction in 2000, compared to baseline. (see Figure 27)

– Molex estimated that 45,089 pounds of nickel sludge would be generated with the segregated treatment system. However, 1999 actual generation rates were 8.5 percent higher (48,928 pounds) than the estimated baseline. In 2000, a total of 60,684 pounds of nickel sludge have been generated. Based on the quarterly reports, and since this sludge is recycled, use of the segregated system has resulted in decreased nickel concentrations in the POTW's effluent by 67 percent in 1999 and 82 percent in 2000. (see Figure 28)

– Molex estimated that 12,863 pounds of tin and lead sludges would be generated with the segregated treatment system. Actual generation rates in 1999 were 34 percent lower (8,539 pounds) than the estimated baseline. However, in 2000, Molex has generated 16,614 pounds of tin and lead sludges. Based on the quarterly reports, and since this sludge is recycled, use of the segregated system in 1999 has resulted in estimated decreased concentrations of tin (98 percent) and lead (29 percent) in the effluent being discharged by the POTW. In addition, in 2000 the use of the segregated system has resulted in estimated decreased concentrations of tin (98 percent) and lead (44 percent) in the effluent. (see Figures 29 and 30)

– Molex estimated that it would be able to recycle 71,328 pounds of metals sludges in a year. However, the quarterly reports indicate that between August 1998 and August 1999, a total of 78,709 pounds of sludge were sent to the recycler, 10.3 percent more than estimated. In addition, in 2000, a total of 134,988 pounds of sludge were sent to the recycler, 89 percent more than expected. (see Figure 31)

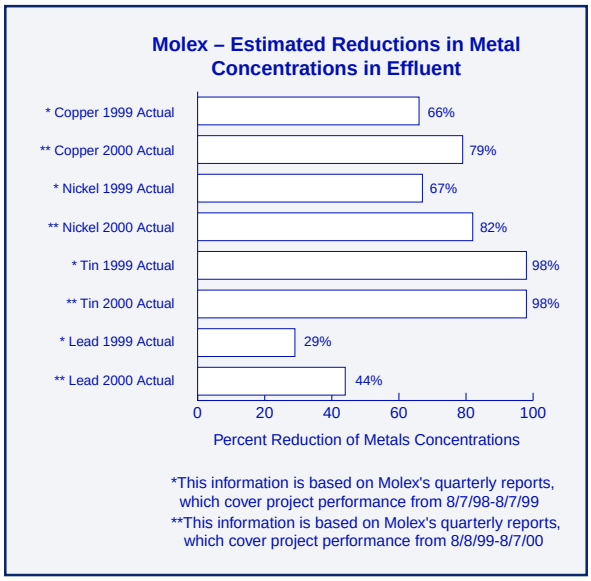


Figure 30

Figure 31

- In the next six months, NDEQ and EPA will review the analytical data and the final report provided by Molex in accordance with requirements in the temporary variance and the FPA. Among the factors to be considered in any final variance determination following the expiration of the existing temporary variance are (1) the degree of processing the material has undergone and the degree of further processing that is required, (2) the value of the material after it has been reclaimed, (3) the degree to which the reclaimed material is like an analogous raw material, (4) the extent to which an end market for the reclaimed material is guaranteed, (5) and the ability to handle the reclaimed material in a manner that minimizes loss.

Benefits for the Environment

- The amount of metals discharged to Lincoln, Nebraska's POTW have been reduced.

- A total of 213,697 pounds of sludge have been sent to the recycler since project inception. This direct recycling of mono-metals bearing sludges by reclamation facilities has decreased the need for mining of ores and the use of other virgin materials.

Benefit to Project Sponsor

- Molex has been allowed to handle the nonprecious mono-metals-bearing sludges as precious metals-bearing sludge and not as a RCRA hazardous waste. This results in a reduced cost of storing and shipping the sludge.

Benefits for Stakeholders

- Stakeholders were involved in the environmental design and impact assessment of the XL project and were given opportunity to participate fully in project development.

- The public will have access to periodic reports submitted by Molex to EPA through the XL Web site.

Key Issues Needing Resolution

- The two-year temporary variance was set to expire on August 7, 2000. EPA and NDEQ have granted an additional six-month variance. Molex has formally requested a two-year extension to continue the XL project under increased production. A decision by NDEQ and EPA on extending the variance an additional two years is expected after Molex has completed the final report.

Lessons Learned

- One stakeholder suggested that it would have been more helpful to give EPA Region 7, as opposed to EPA Headquarters, greater responsibility over the project.

- All parties involved in FPA development should know their roles and responsibilities at the beginning of FPA development.

- Late involvement of national groups delayed implementation of the project. However, this may have been avoided if EPA had encouraged national stakeholders to hold discussions with local stakeholders from the beginning of the project.

- One stakeholder noted that the project may have advanced more smoothly if more time was spent up front talking through the issues.

Information Resources

The information in this summary comes from several sources: (1) The December 1999 *Project XL Progress Report—Molex Incorporated* (EPA 100-R-00-011); (2) focus group discussions in December 1999 with representatives of the Molex Company, EPA Regional and Headquarters staff, World Resources (a national environmental group), Nebraska Department of Environmental Quality, and the City of Lincoln; and (3) Molex Project XL quarterly reports through September 2000.

New England Universities Laboratories

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 21, 1999

Background

The Project Sponsor: Boston College, the University of Massachusetts-Boston, and the University of Vermont make up the New England Universities Laboratories XL consortium. The management and disposal of chemical waste from laboratories is a significant issue for the universities; laboratory waste management accounts for the most substantial expense for their environmental, health, and safety programs. Boston College, with 14,000 students, has approximately 130 research and teaching laboratories. The University of Massachusetts-Boston has 13,000 students and 144 laboratories, and the University of Vermont has 10,000 students and 538 laboratories.

The Experiment: The Universities Laboratories project intends to test the integration of some of the current RCRA hazardous waste regulations with current Occupational Safety and Health Act (OSHA) regulations by requiring that the universities develop a plan similar to the OSHA required Chemical Hygiene Plan (CHP). As a result of the harmonization of the OSHA CHP and the RCRA-oriented Laboratory Environmental Management Plan, the new system will actively encourage chemical reuse and recycling, reduce costs, increase efficiency, and better educate laboratory professionals and researchers. In addition, the new system is expected to provide a better management approach for laboratories and to result in increased pollution prevention while still ensuring protection of human health and the environment.

The Flexibility: EPA published a new site-specific rule that creates a pilot performance-based system for managing laboratory waste at these three universities. This new Laboratory Environmental Management Standard defines criteria for the effective management of laboratory waste and incorporates requirements detailing the organizational responsibilities and the training requirements of each participating university laboratory. EPA and the states are providing the universities with a temporary conditional deferral from two specific RCRA regulations dealing with Hazardous Waste Determinations and Satellite Accumulation Provisions. Participating universities will be allowed to formally defer the hazardous waste determination from the laboratory to a central on-site location. This should allow the universities' Environmental Health and Safety professionals to more effectively manage the laboratory waste at the institutional level and thus increase reuse and recycling opportunities. Under the XL rule, the permissible time for waste pickups when stored laboratory waste reaches 55 gallons is extended from just 3 to 30 days. This flexibility allows for a more coordinated and efficient pickup and delivery system, which frees up staff time and prevents many of the compliance problems associated with hasty, last-minute pickups.

The Superior Environmental Performance: By offering regulatory flexibility to the participating universities in conjunction with the Environmental Management Plans, EPA, the Massachusetts Department of Environmental Protection, and the Vermont Department of Environmental Conservation will be able to evaluate the effectiveness of offering flexibility in waste determination and accumulation in order to encourage the more efficient management of hazardous waste at the university level as well as recycling, reuse, and pollution prevention efforts at universities. The information that will be gained on environmental benefits and cost savings experienced by the universities under this project may be used by EPA to develop a framework to address the potential transferability of this type of regulatory flexibility to university laboratories at large.

Progress in Meeting Commitments

(As of August 2000)

- The universities have met their commitment to complete a baseline report of current laboratory waste collection and disposal practices, the amount of waste generated and disposed of by each university, a "hazardous chemical of concern" inventory, and a survey of laboratory workers' environmental knowledge. (see Figures 32, 33, and 34)

- Vermont has promulgated a state-specific rule through revisions to the Vermont Hazardous Waste Management Regulations covering the participation of the University of Vermont.

- Massachusetts Department of Environmental Protection has issued a "Letter of Forbearance" as an interim measure until a state-specific rule that incorporates the terms of the Federal rule is finalized.

- The Laboratory Environmental Management Plans have been submitted to EPA and the appropriate state agencies for review and comment in order to ensure that the requirements of the Laboratory Environmental Management System have been met.

- The universities will be finalizing and implementing the Environmental Management Plans in the 2000-2001 academic year, including meeting the Minimum Performance Criteria in the laboratories and implementing the laboratory inspection program.

Benefits for the Environment

- The universities will reduce the overall amount of hazardous waste generated from participating laboratories by 10 percent (from baseline) over the life of the project.

- The universities will increase the reuse of laboratory waste by 20 percent (from baseline) over the life of the project. Currently, less than 1 percent of all laboratory waste produced in university labs is estimated to be reused.

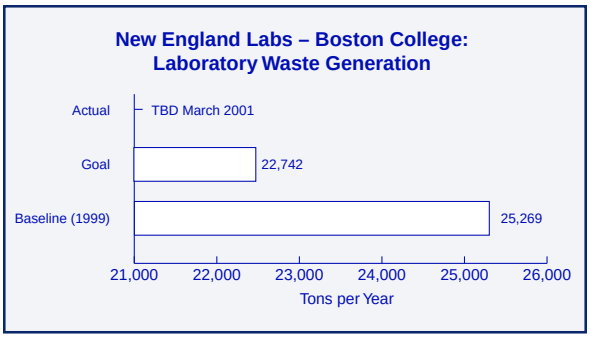


Figure 32

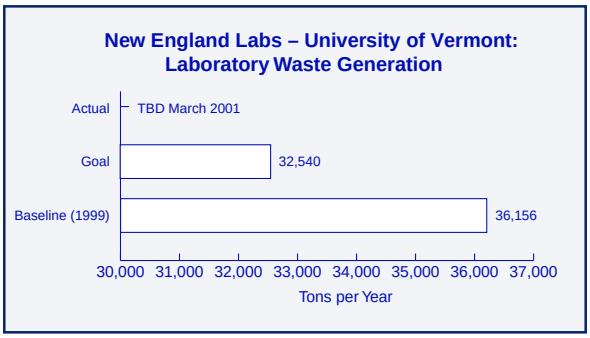


Figure 33

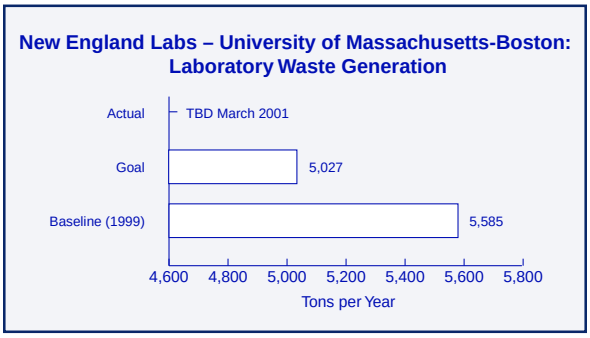


Figure 34

Benefits for Stakeholders

- Implementation of the Environmental Management Plans in each of the laboratories on campus will increase laboratory workers' familiarity and knowledge of proper laboratory waste disposal methods and increase awareness of possibilities for chemical reuse and recycling.

Benefits for the Project Sponsor

- Deferral of hazardous waste determination from the laboratory to a central on-site location will allow the more effective management of laboratory waste at the institutional level and thus increase reuse and recycling opportunities.

- Increase of permissible time for waste pickups from 3 to 30 days will allow for a more coordinated and efficient pickup and delivery system, which frees up staff time.

- The benefits of this project include the development of infrastructure and training designed to increase waste minimization and an organized and coordinated campus-wide chemical reuse system.

Information Resources

The information in this summary comes from the following sources: (1) the FPA for the New England Universities Laboratories Project, September 1999; (2) Project XL Site Specific Rulemaking for University Laboratories, Final Rule, published in the Federal Register September 28, 1999; (3) Amendments to Vermont's Hazardous Waste Management Regulations, March 2000; (4) Boston College's Draft Environmental Management Plan, April 2000; and (5) New England Laboratories Project XL Baseline Assessment, June 28, 2000.

New York State Department of Environmental Conservation

FINAL PROJECT AGREEMENT SIGNED JULY 12, 1999

Background

The Project Sponsor: The New York State Department of Environmental Conservation (New York State DEC) was created on July 1, 1970, to bring together in a single agency all state programs directed toward protecting and enhancing the environment. The New York State DEC is responsible for administration and enforcement of the New York State Environmental Conservation Law. The New York State DEC has three main functions: natural resource management, environmental quality protection, and the promotion of human health, safety, and recreation.

The Experiment: The New York State DEC project would allow public utilities located in New York State to consolidate hazardous wastes generated at remote locations (e.g., manholes). The project will allow the utilities to consolidate the waste at a central collection facility for up to 90 days before transport and disposal, rather than having to transport piecemeal such wastes directly to permitted hazardous waste treatment/disposal facilities.

The Flexibility: RCRA regulations generally require utility companies that generate hazardous wastes at remote locations (e.g., manholes) to transport such wastes directly to treatment, storage, or disposal facilities (TSDFs). Under this project and its site-specific rule, the participating utilities will instead be able to transport the waste to off-site central collection facilities, where they may consolidate waste within 90 days. In addition, participating utilities will be allowed to submit a single Biennial Report for the central collection facility, rather than for each remote location from which hazardous waste is generated.

The Superior Environmental Performance: The project requires each participating utility to reinvest one-third of its direct cost savings into one or more new environmentally beneficial projects; reduces the risk of hazardous waste releases at remote locations (e.g., manhole covers) while avoiding traffic disruptions; allows the consolidation of similar wastes at central collection facilities, which will reduce the number of vehicle trips to often distant treatment, storage, and disposal facilities; and simplifies existing paperwork and reporting requirements.

Progress in Meeting Commitments

(As of July 2000)

- EPA has published a final rule that will allow participating New York State utilities to consolidate hazardous waste generated at remote locations. The rule became effective January 10, 2000.
- On February 23, 2000, New York State DEC issued an enforcement directive that allows the state to proceed with implementing the XL project until it publishes its own state rule.
- On October 7, 1999, the Atlantic States Legal Foundation and other parties filed a Petition for Review of EPA's final Project XL Rule for New York State Public Utilities in the U.S. Court of Appeals for the District of Columbia Circuit. EPA is currently exploring the option of settlement with these petitioners.

Benefits for the Environment

- This project will increase public safety by facilitating and requiring the expeditious removal of hazardous wastes from remote locations.

Benefits for Stakeholders

- Public utilities should realize considerable direct-cost savings through more efficient transportation use from centrally consolidating hazardous wastes and thereby reduce the number of lengthy trips made by waste transporting vehicles.

- The project also will eliminate the need to report remote locations under separate identification numbers and will allow the participating utilities to biennially report waste generated at separate remote locations.

- Overall, the results of this project will minimize unnecessary paperwork and more efficiently use time and labor resources.

Benefits for the Project Sponsor

- This project will bring about a significant reduction in paperwork and savings in time and labor, both for public utilities and environmental regulatory agencies, who can then redirect such resources to other environmental needs.

Key Issues Needing Resolution

- The outcome of the Petition for Review may impact the implementation of this Project. In light of this, New York State DEC has placed a moratorium on accepting applications from utilities to participate in the project.

Information Resources

The information sources used to develop this progress report include: (1) the December 1999 *Project XL Progress Report—New York State Department of Environmental Conservation* (EPA-R-00-0017) and (2) the Final Rule adopted by EPA on July 12, 1999.

Weyerhaeuser Company Flint River Operations

FINAL PROJECT AGREEMENT SIGNED JANUARY 17, 1997

Background

The Project Sponsor: The Weyerhaeuser Company (Weyerhaeuser) is one of the largest private owners of forest, with 5.4 million acres in the United States. Among its products are timber, paper, and pulp. Weyerhaeuser's Flint River pulp manufacturing facility in Oglethorpe, Georgia, manufactures 320,000 tons per year of absorbent fluff pulp used in diapers. The facility was opened in 1981 and is located 100 miles southwest of Atlanta, Georgia.

The Experiment: Weyerhaeuser is striving to minimize the environmental impact of its manufacturing processes on the Flint River and the surrounding environment by pursuing a long-term vision of a minimum impact mill (MIM). Minimum impact manufacturing contains the elements of a comprehensive pollution prevention program designed to minimize the use of raw materials and to stop waste generation rather than to rely on "end-of-pipe" remedies. MIM involves multidisciplinary teams employing a systems engineering approach, waste reduction, and a commitment to continuous improvement rather than the more traditional "project" focus. Specifically, the Weyerhaeuser project tests a facility-wide permitting approach addressing water effluent discharges, air emissions, and solid waste generation that is designed to promote the MIM concept.

The Flexibility: EPA Region 4 and the State of Georgia have revised Weyerhaeuser's National Pollution Discharge Elimination System (NPDES) permit both to include more stringent effluent limits on biological oxygen demand (BOD), total suspended solids (TSS), and adsorbable organic halides (AOX), and to streamline the permit renewal process. EPA Region 4 and the State of Georgia have modified the facility's existing air quality permit to include dual emission caps for air pollutants. The dual emission caps are (1) a cap that allows the recovery furnace, smelt dissolving tank, calciner, and combination boiler (the facility's four major sources of emissions) to be operated to their design capacity without triggering permit review and (2) a cap covering all facility sources except those four major sources. The dual emission caps contain separate limits for particulate matter, sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and total reduced sulfur (odor-causing pollutant). The modified air quality permit also streamlines the permit renewal process, includes alternate excess emission reporting protocols, and includes a protocol for conducting manufacturing process experiments without triggering a permit review. EPA Region 4 and the State of Georgia have agreed to provide Weyerhaeuser the flexibility to demonstrate hazardous air pollutant (HAP) emission reductions that would use innovative pollution prevention approaches rather than end-of-pipe HAP controls. Weyerhaeuser will prepare an alternative compliance plan that will present the HAP emission reductions to be achieved by the facility following the April 15, 1998, promulgation of the maximum achievable control technology (MACT) cluster rule for the pulp and paper industry. EPA will use a site-specific rulemaking or similar mechanism to authorize alternative MACT compliance. EPA Region 4 and the State of Georgia will modify Weyerhaeuser's solid waste permit to allow nonhazardous industrial wastes containing free liquids to be disposed of in a permitted, onsite landfill.

Other Innovations: (1) *Reporting Burden Reduction*: The Weyerhaeuser project allows the facility to consolidate reporting for some of the applicable Federal, state, and local permitting and regulatory programs into two comprehensive reports each year. Also, the facility is allowed to eliminate fish tissue sampling requirements due to improvements in process technologies that have eliminated detectable dioxin levels in effluents, remove a requirement for additional assimilative capacity studies, and perform annual compliance certification in lieu of periodic discharge monitoring reporting (DMR) due to the company's 16-year history of meeting all required discharge levels. (2) *Environmental Management System (EMS):* Weyerhaeuser will voluntarily institute an Interna-

tional Organization for Standardization (ISO) 14001 EMS at the Flint River facility. The facility is developing a comprehensive procedures manual that conforms to the ISO 14001 standard, which will, in turn, provide data for EPA's evaluation of options for an Agency policy on EMS. (3) *Best Management Practices:* Weyerhaeuser will also reduce solid and hazardous waste generation and improve forest management practices in more than 300,000 acres of timberland. EPA will participate in review and evaluation of feasibility studies with potential applicability of results across the pulp and paper industry.

The Superior Environmental Performance: Weyerhaeuser will (1) reduce allowable air emissions by 60 percent under the dual emissions caps, (2) cut bleach plant effluent by 50 percent over a 10-year period, (3) reduce water usage by 1 million gallons a day, (4) cut solid waste generation by 50 percent over a 10-year period, and (5) prepare and implement a facility-wide plan to reduce energy use.

Progress in Meeting Commitments
(As of June 2000)

- Overall, Weyerhaeuser has been very successful in meeting its environmental commitments under the project.
  - Weyerhaeuser's site-wide air quality permit for the Flint River facility in Olgethorpe, Georgia, includes dual emission caps for air pollutants. The following caps are based on a 60 percent reduction from the levels a standard permit would allow—particulate matter at 589 tons per year, total reduced sulfur at 62 tons per year, SO_2 at 879 tons per year, NO_x at 1,300 tons per year, CO at 2,516 tons per year, and VOCs at 778 tons per year. In 1998, the Flint River facility's actual emissions were the following: particulate matter at 395 tons, total reduced sulfur at 35 tons, SO_2 at 303 tons, NO_x at 814 tons, CO at 1,599 tons, and VOCs at 632 tons. Weyerhaeuser will report the 2000 actual emission values at the end of 2000. (see Figure 35)

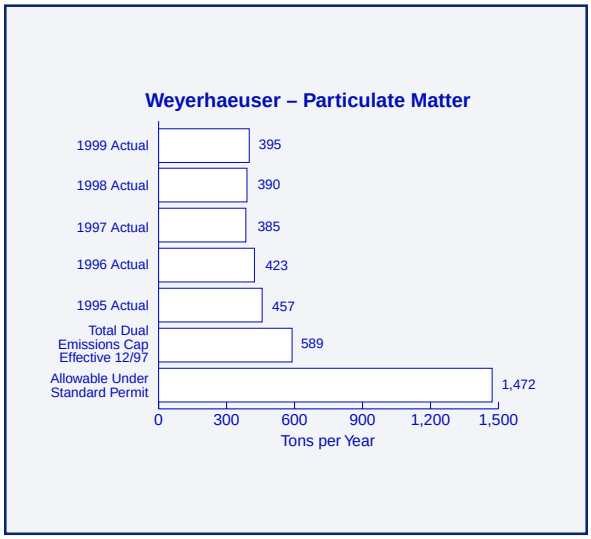


Figure 35

– Weyerhaeuser will (1) reduce the allowable air emissions by 60 percent under the dual emission caps and (2) continue to look for new developments that may help reach the goal of reducing bleach plant effluent by 50 percent over a ten-year period. Weyerhaueser has committed to researching the feasibility of implementing future technological developments in the industry that may allow the facility to reduce its bleach plant effluent flow by 50 percent to 10 cubic meter per air dried metric ton (ADMT) of finished product (fluff pulp used to make diapers) by the year 2006. The environmental benefits projected include a reduction in water usage (the bleach plant accounts for approximately half of the plant's water usage) and reductions in effluent limits on BOD, TSS, and AOX. To reach its goal, Weyerhaeuser has conducted feasibility studies on its water use. The results of these studies will be used by EPA, the State of Georgia, and Weyerhaeuser to negotiate a NPDES permit to be issued in 2002. An ultrafiltration pilot test has been initiated at another Weyer- haeuser facility; these results may be used to reduce bleach plant effluent flow at the Flint River facility. Weyerhaeuser already has modernized several components of the pulping process, reducing the amount of BOD, TSS, and AOX in bleach plant wastewater. The facility's January 1998 NPDES permit allows the discharge of 3.8 pounds of BOD per ADMT of finished product and 4.09 pounds of TSS per ADMT of finished product. In 1998, the facility reduced BOD in its effluent to 2.13 pounds per ADMT and TSS in its effluent to 2.80 pounds per ADMT. In 1999, the BOD in effluent slightly increased to 2.83 pounds per ADMT and TSS in effluent increased to 3.87 pounds per ADMT. For the first six months of 2000, the BOD increased to 4.01 pounds per ADMT and TSS increased to 4.60 pounds per ADMT. The permit also allows the discharge of 0.15 kilograms of AOX per ADMT. In 1998, adsorbable organic halide levels peaked at 0.13 pounds

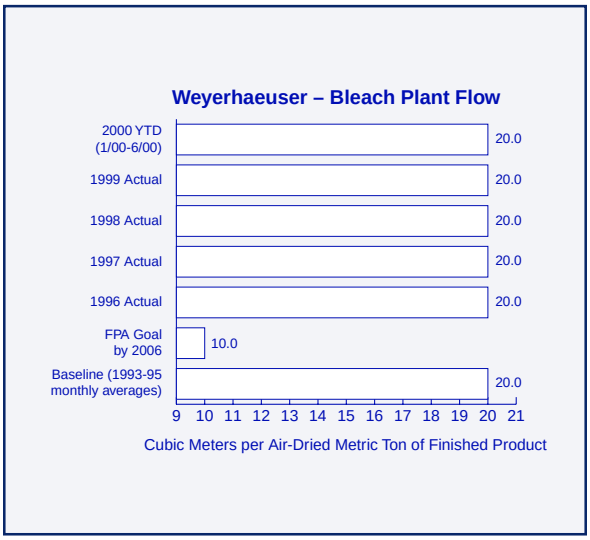


Figure 36

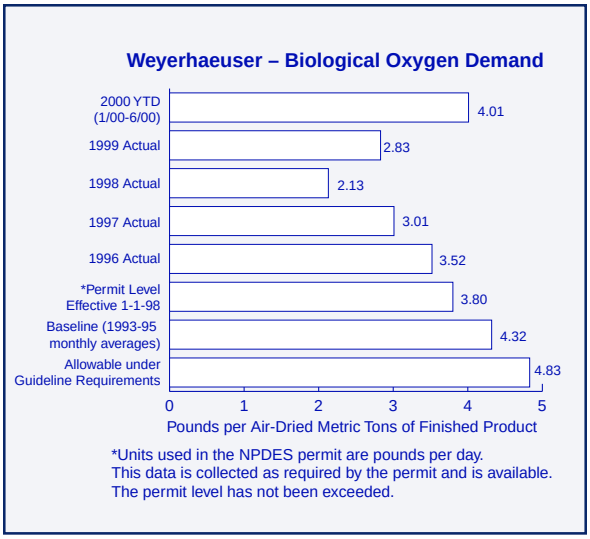


Figure 37

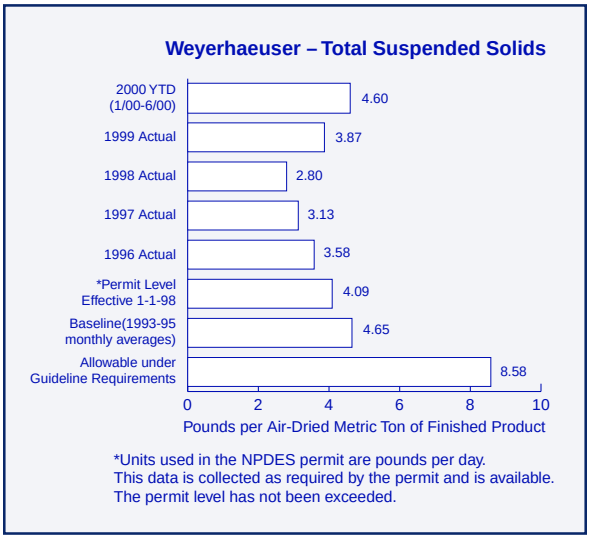


Figure 38

per ADMT due to an increase in customer demand for high-brightness pulp. As a result, the facility has altered its use of brightening chemicals in the bleach plant area and has been able to regain the project average of 0.10 kilograms of AOX per ADMT. In 1999, AOX remained at 0.10 kilogram per ADMT. AOX has decreased to 0.09 kilogram per ADMT through June 2000. (see Figures 36, 37, 38, and 39)

– Weyerhaeuser also committed to reduce the facility's use of water from the Flint River to 11.5 million gallons a day (MGD) monthly average which, in turn, will reduce the quantity of treated wastewater discharged back into the river. Weyerhaeuser's long-term goal is to reduce water withdrawal from the Flint River to a voluntary limit of 10.18 MGD monthly average. Baseline water withdrawal at the facility was 11.18 MGD monthly average based on average monthly values for 1993 through 1995. Water use reductions anticipated from modernization projects were not sufficient to offset increased water usage from other facility process areas, which resulted in 1997 raw water use of 11.74 MGD monthly average. In 1998, the total usage returned to 11.49 MGD monthly average through the daily water conservation focus of the production operators. In 1999, the water use increased to 11.92 MGD monthly average. The primary cause for this increase was a customer demand for a higher-brightness pulp. In February 2000, the Flint River facility initiated several water usage reforms that have reduced average daily water usage by 500,000 gallons per day by the end of June 2000, bringing the total to date raw water usage to 11.47 MGD. Water use reductions will continue to be a focus area within the MIM Phase V feasibility studies. (see Figure 40)

– Weyerhaeuser's goal is to reduce its 1995 level of solid waste generation by 50 percent by the year of 2006. This goal will be accomplished through source elimination

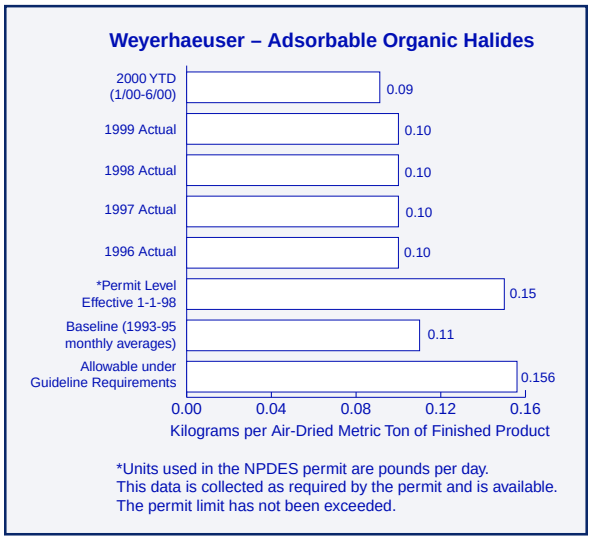


Figure 39

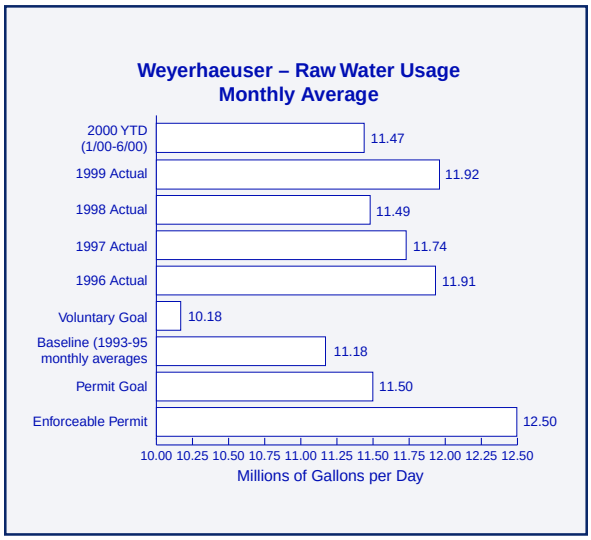


Figure 40

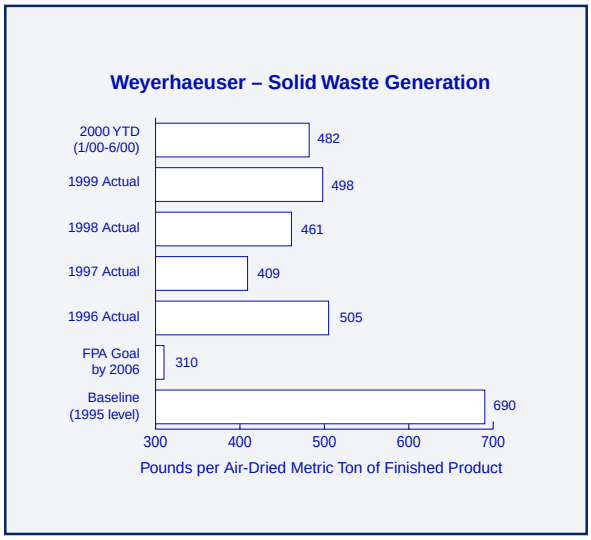


Figure 41

and byproduct recycling and reuse. Weyerhaeuser has modernized several components of its pulping process, which has generally reduced the amount of solid waste generated by the plant. The facility has begun recovering and reusing lime muds used in its manufacturing processes. The solid waste generation for 1999 was 498 pounds per ADMT of production. This is an increase over the 1998 level of 461 pounds per ADMT, but below the baseline of 690 pounds per ADMT generated. This increase was caused primarily by continued calciner operating and mechanical issues and an increase in wastewater primary clarifier sludge. Other reductions achieved in 1999 were approximately 126 tons in screening room knots and 630 tons of power boiler fly ash. Through June 2000, solid waste generation decreased to 482 pounds per ADMT. The mill will be initiating a major study in the second half of 2000 to determine the scope required to meet the 2006 solid waste goal. In addition, the plan to refine composting methods and cost was completed in the first half of 2000. If possible, approval will be sought during 2001. In addition, the power boiler advanced control study is in progress to investigate ways to reduce combustion of fly ash from the boiler. The study is expected to take approximately one year to complete. In addition, wood yard sticks from the debarking room are currently being recovered back to the fiberline via the log flume. (see Figure 41)

- Weyerhaeuser also will be required to reduce hazardous air pollutant emissions equivalent to the reductions that would have been achieved under the MACT pulp and paper cluster rule. Specific methods for attaining reduced levels will be determined based on a site-specific assessment conducted by the facility, an alternative compliance plan developed by the facility, and EPA and the State of Georgia's approval of that alternative compliance plan through a site-specific rulemaking or similar mechanism. On schedule, Weyerhaeuser has submitted the site-specific compliance plan. During the past six months, a draft site-specific MACT rule has been written to formalize this agreement, as specified in the FPA, and is in circulation for approval within EPA. Weyerhaeuser already has modernized several components of the pulping process, which has reduced emissions from its pulp bleach plant.

- Weyerhaeuser has feasibility studies in progress on composting facility byproducts and applying the composted material on timberlands. This trial is continuing into the second growing season. Soil sampling and growth rate measurements have been conducted on a quarterly basis. Weyerhaeuser has observed no effect on the mortality rate of seedlings during the first growing season. In subsequent years, the growth rate is expected to be positively impacted.

- Weyerhaeuser has completed three small-scale energy conservation studies, and it has completed a facility-wide energy conservation study. As an outcome of the Energy Conservation Study, an energy goal of 20,000 pounds of steam/ADMT has been set. Weyerhaeuser has included one energy conservation project in the plant's major capital funding plan for consideration in 2001.

- Weyerhaeuser has met its commitments to upgrade equipment, study process changes, reduce effluent discharges, reduce air emissions, reduce hazardous substance use, recycle solid wastes, implement timberland management practices, conduct stakeholder meetings, and prepare progress reports.

- Weyerhaeuser is working towards reorganizing and documenting the Flint River EMS to conform to the ISO 14001 standard. Most of the high-level documentation has been completed and significant environmental aspects have been identified, 50 percent of which have been documented. The plant has prepared a training package on EMS responsibilities for plant leadership, team leaders, and all mill employees. An initial EMS audit is scheduled for November 2000. Weyerhaeuser plans to have a fully functioning EMS that conforms to ISO 14001 completed by the end of 2000.

- In the next six months, Weyerhaeuser plans to identify and implement water conservation measures to drive towards the goal of 10.18 MGD total water usage and define possible water reuse and reduction opportunities that would reduce bleach plant effluent flow. In addition, Weyerhaeuser will continue efforts in energy conservation and complete the effort to convert Flint River Operation's EMS into ISO 14001 EMS in 2000.

Benefits for the Environment

- As of January 2000, the amounts of BOD and total suspended solids per ton of finished product have been reduced to 34 percent and 17 percent, respectively, from the baseline.

- As of June 2000, the amount of solid waste generated has been reduced by 30 percent.

- Over the course of the project, actual air emissions of particulate matter, total reduced sulfur, NO_x, and CO, have been reduced with decreases ranging from 10 percent for total reduced sulfur to 2 percent for NO_x.

- After initiating several energy conservation measures by June 2000, the total plant steam usage has decreased by 4 percent and the power boiler steaming rate has decreased by 27 percent.

Benefits for Stakeholders

- Stakeholders have a better understanding of facility operations.

- Stakeholders continue to have better access to project information directly from the facility in a simplified, consolidated report

- Stakeholders also continue to have the opportunity to learn more about the project and its progress in meeting project goals status by attending Weyerhaeuser Company's annual stakeholder meeting.

Benefits for the Project Sponsor

- Weyerhaeuser achieved an estimated savings of $176,000 in reporting burden costs during the first year of operation as a result of the successful revision and reissue of the facility's air quality and wastewater discharge permits.

- Weyerhaeuser foresees avoiding $10 million in future capital spending; while it expects to spend $10 million on new water equipment, it will also save $20 million that it otherwise would have had to spend on air pollution equipment.

- The "bubble" concept for air emission regulations (i.e., the dual emissions cap) allows the company to avoid costly unnecessary permit reviews.

- The MACT applicability assessment and site-specific rule will allow the company to meet or exceed the environmental benefits that would have resulted from new regulations in a manner that is less costly for the facility.

- EMS implementation has begun to increase staff education and awareness of the environmental aspects of their jobs.

Spin-off Benefits

- The cooperative relationship between regulators and the company has had benefits beyond the company because of the company's efforts to educate other pulp and paper facilities and timber suppliers. Specifically, Weyerhaeuser is working with other timber suppliers and the Georgia Forestry Commission to promote best management practices on timberland and plantations.

- The Weyerhaeuser approach to solid and hazardous waste reduction (e.g., recovering lime muds) is providing a case study that the State of Georgia will use with other pulp and paper mills.

- By working directly with a state-of-the art facility, EPA is gaining real-world information and experience about pulp and paper facilities.

Key Issues Needing Resolution

- The delays in conducting feasibility studies for the air emissions and part of the solid waste portions of the project have occurred in part because Weyerhaeuser has a set budget and must prioritize staff time. Also, it takes time to get the permits needed to initiate and conduct the studies.

- Three energy conservation projects—the recovery boiler sootblower steam, power boiler advanced controls, and the turbo generator exhaust pressure control—are currently in progress to improve the efficient use of steam in the plant. Weyerhaeuser is monitoring these projects to determine if they result in less steam generation. A major steam-saving project will be initiated in 2001 if the necessary funding is approved.

- At this time, it is not known how much cost savings Weyerhaeuser will gain through implementing the dual emissions cap as a result of facility expansion, because no expansion is planned at this time.

Lessons Learned

- Site visits early in FPA negotiations helped to build trust and educate regulators about facility operations.

- Stakeholders want more education (i.e., technical assistance) early in the FPA negotiation process.

- Including permit language in FPA appendices was very important for smooth implementation of the project commitments by Weyerhaeuser, EPA, and the state.

- Conducting studies on changes to manufacturing processes takes more time than the project participants expected.

- The facility has a set budget, and therefore staff time has to be prioritized for implementing different parts of the FPA, particularly the voluntary and feasibility study commitments.

- All employees should be involved in the development of an integrated EMS.

Information Resources

The information in this summary comes from the following sources: (1) the December 1999 *XL Project Progress Report—Weyerhaeuser Flint River Operations* (EPA 100-R-00-006); (2) Focus group discussions on December 1998 with representatives of the Federal and state regulatory agencies, Weyerhaeuser Flint River Operations, and a local stakeholder involved in the project; (3) annual and midyear reports prepared by Weyerhaeuser Corporation available through August 2000; and (4) focus group discussions in January 2000 with representatives of the Federal and local regulatory agencies, Weyerhaeuser, and a local stakeholder.

Projects in Implementation One Year or Less

Autoliv ASP, Inc.

PROMONTORY, UTAH

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 20, 2000

The Project Sponsor: Autoliv ASP, Inc., is a manufacturer of automobile safety products. Autoliv's Promontory Facility is located in a remote area of Box Elder County, Utah. The Promontory facility manufactures pyrotechnic products for use in the airbag industry. The facility consists of 75 storage and manufacturing buildings concentrated on a 53-acre site. The only bordering neighbors are another corporation and a winter cattle range. The extended surrounding area consists of the small farming/ranching communities of Howell, located approximately 10 miles to the north, and Promontory, located 8 miles to the west.

The Experiment: During the manufacturing of materials, reactive hazardous wastes are generated. This waste is presently treated off-site at a treatment, storage, and disposal facility (TSDF) that is permitted to accept hazardous waste from outside sources and treat it via open burning. Although open burning is the safest and most effective treatment method available at the present time, open burning allows for no pollution controls. The company currently operates a highly advanced, metals recovery facility (MRF) designed to process and recover aluminum and steel from previously fired air bag inflator units. Autoliv proposes that the technology and pollution control devices used in the MRF be adapted to process their waste pyrotechnic materials on-site rather than sending the materials to a TSDF for open burning. The emissions from the pyrotechnic materials, if processed at the MRF, would pass through the air pollution control train rather than being emitted, thus achieving a significant reduction of air pollutants released to the environment. Additionally, Autoliv expects to recover additional materials, such as copper, from the MRF-processed pyrotechnic materials.

The Flexibility: Autoliv is requesting regulatory flexibility from the RCRA Part B requirements that regulate hazardous waste treatment, storage, and disposal. It also seeks regulatory relief from the Utah Department of Environmental Quality for similar state standards. With the requested regulatory flexibility, Autoliv can safely and effectively dispose of their pyrotechnic material in the MRF while reducing emissions/pollutants to the environment.

The Superior Environmental Performance: With this project, Autoliv expects that the following superior environmental benefits will be achieved:

- Elimination of the open burning of 158,000 pounds of pyrotechnic material per year, which in turn eliminates 22,876 pounds per year of particulate emissions;
- Recycling of copper and other materials found in the slag of MRF-processed pyrotechnic materials, which can then be recycled back to Autoliv's raw material suppliers; and
- Elimination of the risk associated with transporting hazardous pyrotechnic materials to an outside processor.

Buncombe County Landfill Project

BUNCOMBE COUNTY, NORTH CAROLINA
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 18, 2000

The Project Sponsor: The Buncombe County Solid Waste Management Facility (BCSWMF) opened in September 1997. The 550-acre facility is located in the western part of North Carolina in the Blue Ridge Mountains. It is owned and operated by the Buncombe County General Services Department. The facility serves only Buncombe County, which has six municipalities: Asheville, Biltmore Forest, Black Mountain, Montreat, Woodfin, and Weaverville. BCSWMF is one of the ten largest publicly owned municipal solid waste landfills in the state. It accepts approximately 100,000 tons of waste per year from the area's 200,000 residents, which continues to grow at a rate of 2 percent per year. In addition, the landfill receives about 150,000 tons of municipal solid waste per year, including construction and demolition wastes.

The Experiment: Over the past two years, Buncombe County has been researching a new method for operating sanitary landfills—the bioreactor method. The bioreactor method involves the recirculation of leachate during the operational phase of the landfill to enhance and accelerate waste decomposition and landfill gas generation. Initial results show that when different portions of the landfill are compared, the alternative liner offers 50 percent more protection to the underlying aquifer than the standard composite liner. There are five components to the Buncombe County Landfill Project: (1) combined leachate circulation and gas collection system, (2) horizontal trenches, (3) a pressure injection system, (4) active gas collection, and (5) an alternative liner system. In addition, results from this project could result in revisions to existing EPA regulations that allow and promote the use of alternative liner systems in municipal solid waste landfills utilizing leachate recirculation.

The Flexibility: EPA's RCRA Subtitle D regulations currently allow municipal solid waste landfill leachate to be placed back into the landfill if the landfill is designed with the standard composite liner and the leachate collection system used is made to regulatory specifications. If granted the requested flexibility, Buncombe County will be allowed to recirculate leachate into its landfill units constructed with an alternative liner system.

The Superior Environmental Performance: When implemented, the leachate recirculation/gas recovery landfill approach strives to provide superior environmental performance in a number of ways:

- Acceleration of waste decomposition, which should enhance groundwater protection;
- Early compliance with Clean Air Act requirements for municipal solid waste landfills through installation of a gas collection and control systems;
- Reduction in emissions as a result of producing a more efficient landfill gas;
- Reduction of potential risk to workers and the community from transport of collected leachate to the publicly owned treatment works via tanker trucks;
- Improved leachate quality and, ultimately, discharge water quality to the receiving stream;
- Reinvestment of cost savings in pilot projects to enhance integrated solid waste management practices in Buncombe County;
- Additional waste capacity and longer life of existing landfill cells, reducing the need for new landfill sites;
- Evaluation of the horizontal trench design for leachate recirculation/gas recovery landfills by providing valuable large-scale operational data; and
- Identification and quantification of performance advantages or limitations of the process.

City of Albuquerque Public Works Department—Pretreatment Program

ALBUQUERQUE, NEW MEXICO
FINAL PROJECT AGREEMENT SIGNED FEBRUARY 3 , 2000

The Project Sponsor: The City of Albuquerque Wastewater Utility Division of the Public Works Department is responsible for maintaining Albuquerque's wastewater collection system and wastewater reclamation plant. All the Albuquerque area homes, businesses and institutions—about 500,000 people, 100 major industries, and 12,000 commercial customers—are connected to the Division's sewer system. The Division operates the Southside Water Reclamation Plant, the largest wastewater treatment facility in New Mexico, which receives and reclaims about 60 million gallons of wastewater daily.

The Experiment: This project aims to reduce the amount of pollutants released into the environment from industries and businesses in Albuquerque by integrating pollution prevention (P2) activities with the existing Industrial Pretreatment Program (IPP). The City of Albuquerque's proposal allows the present IPP program to shift resources from certain less productive requirements to innovative activities such as using alternative monitoring methods, modifying some permits for burden reduction, replacing certain permits with general use permits, and revising its enforcement response plan. These changes will allow Albuquerque to shift resources to cover P2 outreach and other costs associated with reducing certain pollutants by 10 to 25 percent.

The Flexibility: Potential regulatory flexibility expected would allow Albuquerque to (1) use an alternative definition of significant industrial user (SIU), (2) use an alternative definition of significant noncompliance (SNC), (3) reduce permitting requirements for participating industrial users (IUs), (4) use alternative monitoring methods, and (5) reduce reporting requirements for participating IUs.

The Superior Environmental Performance: Albuquerque will attempt to initially reduce loadings of aluminum, cadmium, chromium, copper, cyanide, fluoride, lead, mercury, molybdenum, nickel, selenium, silver, and zinc by 10 to 25 percent. In addition to reducing pollution loadings for these 13 pollutants of concern and improving the area's overall water quality, this project will reduce mass and concentration loadings of influent, effluent, and biosolids. To help reach these goals, Albuquerque plans to increase the number of businesses using P2 techniques by 25 new businesses per year.

City of Columbus

Columbus, Ohio

XLC[4] Final Project Agreement Signed September 26, 2000

The Project Sponsor: The City of Columbus Project focuses on an area within Columbus where 84 percent of all elevated blood lead levels in the city have been found. Situated in central Ohio, the area of concern falls within a ten-zip code area located in predominantly low-income minority neighborhoods, where the housing is generally much older than the remainder of the city. The City Department of Health and the City Division of Water would implement the project.

The Experiment: The city proposes to increase funds needed to implement a comprehensive Lead-Safe Columbus Program (LSCP) designed to identify and reduce lead hazards and address other routes of lead exposure, such as lead paint and dust in the highest-risk areas of the city. The program's interventions are targeted to children who are at most risk for lead poisoning and exposure to lead. The LSCP will provide free blood testing, public education, medical intervention for lead-poisoned children, and up to $100,000 in grants per year for lead abatement to residents in high-risk areas.

The Flexibility: This project strives to maximize the city's efforts to decrease lead exposure by providing the City of Columbus with flexibility from regulations that deal with lead in drinking water. The City of Columbus' Division of Water seeks regulatory flexibility from compliance with the Lead and Copper Rule (LCR) promulgated under the Safe Drinking Water Act. In the past, Columbus made necessary changes to its water treatment process and inadvertently caused an increase in the lead levels in the water. Columbus is concerned that it may need to make a water treatment change in the future that may likewise impact lead levels. EPA aims to allow the city a temporary suspension of the lead service lines (LSL) testing and replacement provisions of the LCR for up to three years beginning if and when the city exceeds the lead limit. If the city is successful in maintaining low lead levels for six years after making a treatment modification, the opportunity to use the three-year window of flexibility would expire. However, should it be necessary in the future, EPA has the discretion to establish another three-year window of flexibility. In exchange for this flexibility, the City Division of Water plans to contribute $300,000 a year for 15 years to the LSCP. This flexibility would allow the city to use more of its resources effectively and to directly target problem areas through its lead program.

The Superior Environmental Performance: The LSCP endeavors to yield superior environmental performance through greater public health protection from lead exposure in Columbus' community. Protection will be established at an equivalent or lower cost than would be obtained by strict adherence to the LCR requirements. In addition, the project plans to maintain City of Columbus Water Division funding ($300,000 annually) to the LSCP for 15 years. The LSCP would provide public education/outreach materials and issue lead hazard and abatement grants with this funding. In addition to providing increased resources to the city's LSCP, an alternative treatment technique for drinking water would be implemented. The alternative treatment technique involves closer coordination between the City of Columbus, the Ohio EPA and U.S. EPA on water treatment changes while allowing the city to adjust its drinking water treatment to establish the most effective level of lead treatment in conjunction with other water treatment processes. The entire treatment process would provide the same level of benefit of protecting the citizens of Columbus as would LSL testing and replacement.

[4]Project XLC, eXcellence and Leadership for Communities, encourages local public sector and community organizations to come forward with new approaches to demonstrate community-design and directed strategies for achieving greater environmental quality consistent with community economic goals.

City of Denton

City of Denton, Texas
Final Project Agreement Signed February 22, 2000

The Project Sponsors: In 1997, the City of Denton Environmental Services Division and the University of North Texas (UNT) Institute of Applied Sciences conducted an 18-month study to assess the feasibility of integrating the industrial pretreatment program activities with those required under the Phase II Stormwater regulations. Denton's XL project will allow it to continue implementation of recommendations resulting from that study, which was completed in March of 1998. Denton will reduce its monitoring and annual inspections for certain individually approved facilities and focus on pollutants in the urban stormwater drainage.

The Experiment: Denton's proposal is unique in that it will integrate its flash-flood early warning system with transmission of real-time water quality data from remote monitoring stations both up and down stream of the water treatment facility. The system will be connected to dispatchers, emergency response crews, and the facility. Through this experiment, Denton will determine if the biological sensors developed by UNT can trigger automatic samplers to take water samples. Denton will also develop alternative best management practices (BMPs) to prevent erosion and runoff from the biosolids composting operation.

The Flexibility: Denton will reduce its monitoring and inspection frequencies for certain individually approved facilities so that it can use those resources to focus on other, more significant contributors of pollutants in the urban stormwater drainage.

The Superior Environmental Performance: The resources saved by the flexibility and the experiment will be used in watershed protection activities, including inspections of vehicle maintenance facilities, recycling centers, junkyards, salvage yards, municipal and school district fleet service operations, and construction sites; establishment of a remote creek monitoring network; and incorporation of pollution prevention BMPs into the local code of ordinances.

City of Fort Worth

Fort Worth, Texas

Final Project Agreement Signed September 29, 2000

The Project Sponsor: Fort Worth, Texas, is located in north-central Texas. Fort Worth is a home-rule municipality and the seat of Tarrant County. The geographical area is 300 square miles, with an estimated population of 471,125. The City of Fort Worth has been awarded an EPA Brownfields redevelopment pilot program grant in addition to numerous national and regional awards for its storm water and wastewater programs. The city also has the premiere household hazardous waste collection center in the State of Texas and is recognized for its strides in environmental education.

The Experiment: As part of its effort to address urban blight and attendant crime and public safety hazards, the City of Fort Worth has identified a significant number of substandard, abandoned structures to be demolished. Dozens of these structures contain asbestos-bearing materials and are subject to the demolition requirements specified in an asbestos emission standard—Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP)—issued by EPA under the Clean Air Act (CAA). The city does not have the funds to demolish in a timely manner all of these structures according to the Asbestos NESHAP. Under this project, the City of Fort Worth proposes to demonstrate that use of an alternative demolition method will protect human health to the same degree as the method in the Asbestos NESHAP, while reducing demolition costs.

The Flexibility: The City of Fort Worth seeks relief from the requirements of the Asbestos NESHAP and the Texas Asbestos Health Protection Rules to the extent that these regulations require the removal of regulated asbestos-containing building materials (ACBM) from substandard structures prior to their demolition.

The Superior Environmental Performance: Implementation of the proposed Fort Worth Method will provide environmental performance superior to that which is realized under traditional approaches, and will serve to improve the community at large. The Fort Worth Method aims to maintain the level of environmental protection currently dictated by the Asbestos NESHAP, as well as worker protection dictated by the Occupational Safety and Health Administration, while reducing the costs of demolition of substandard structures and reducing the amount of red tape required for compliance. The main benefit to the process would be an accelerated revitalization of areas of the city that have become run down. Reduced demolition costs would allow the city to accelerate urban renewal, thereby eliminating havens for drug use and other criminal activities and reducing safety hazards associated with the abandoned structures. This project plans to aid in the economic growth of the involved neighborhoods and would complement the city's Brownfields Redevelopment Pilot Program, by opening up more land to facilitate the economic development of the distressed neighborhoods of Fort Worth.

Clermont County Watershed Management Plan

CLERMONT COUNTY, OHIO

XLC[5] FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 6, 2000

The Project Sponsor: Clermont County, located just east of Cincinnati, is one of the fastest developing counties in Ohio. The county is experiencing significant changes in population density and rural demographics. The Clermont County Project focuses on the East Fork of the Little Miami River (EFLMR) watershed. The specific waters within the county considered under this agreement include the EFLMR mainstream and tributaries and Harsha Lake, which is located centrally within the EFLMR basin. The EFLMR is a major tributary to the Little Miami River, which is a designated State and National Scenic River and is the State of Ohio's largest Exceptional Warmwater Habitat stream.

The Experiment: Clermont County proposes a comprehensive watershed management plan for the EFLMR. The major goal of this watershed plan is to address environmental management of its resources with an aggressive and innovative approach so that it can maintain a balance between economic growth and the preservation of its rural character and environment and, where possible, strive to improve the environment and protection of the area's natural resources. The county will work in partnership with the Ohio Environmental Protection Agency (OEPA) and U.S. EPA to design and implement a plan to maintain and improve water quality, land use, and economic development in the county. The development of this watershed plan will empower the local community to work the county to review current water quality standards and establish meaningful measures of environmental conditions that are based on the specific characteristics of the EFLMR and its tributaries. Once the water quality goals are established for the watershed, the primary responsibility for achieving those goals will be at the local level. The typical command and control regulatory framework will be replaced with a collaborative goal setting approach. As part of the watershed management plan, Clermont County will develop a sampling and monitoring program, and a County Environmental Protection Plan that will enable the county to compile data on existing watershed environmental conditions. New findings from the sampling program pertaining to the chemical and biological characteristics of the EFLMR will be used in computer-based simulations to make predictions regarding point and non-point source pollution. The plan will also use the information to identify which policy and capital changes regarding the land management policies must be made in order to attain the county's water quality goals in the watershed. In addition, the county anticipates using an effluent trading system in which pollution credits may be exchanged among point and non-point sources.

The Flexibility: No regulatory flexibility is needed for the initial planning phase of this project. More specific details regarding regulatory flexibility will be identified in the development of subsequent phases.

The Superior Environmental Performance: This multiphased approach is expected to achieve superior environmental performance through greater local responsibility and management of point and non-point sources. Further, this proposed project is comprehensive in scope and will include development issues closely tied to water quality such as land use, development procedures, open space and farmland preservation, and economic development. Most importantly, the county is being proactive—investing in watershed management controls not currently regulated by National Pollutant Discharge Elimination System permits and much sooner than would otherwise be required under a waste load allocation and total maximum daily load developed by OEPA. Because the watershed is rapidly developing and degraded water quality is expected if existing regulations and practices are continued, the baseline for this proactive approach to superior environmental performance is defined as no adverse trends in water quality indicators. Consequently, this innovative project should result in environmental benefits sooner than would be realized under current and anticipated regulations.

[5]Project XLC, eXcellence and Leadership for Communities, encourages local public sector and community organizations to come forward with new approaches to demonstrate community-design and directed strategies for achieving greater environmental quality consistent with community economic goals.

Department of Defense: Naval Station Mayport[6]

JACKSONVILLE, FLORIDA
FINAL PROJECT AGREEMENT SIGNED MAY 30, 2000

The Project Sponsor: The Naval Station Mayport (NS Mayport) is located in Jacksonville, Florida, and encompasses more than 3,400 acres on the northern end of a peninsula bounded by the Atlantic Ocean to the east, the St. Johns River to the north, and the Intracoastal Waterway to the west. The station is a home-port for more than 14,000 sailors and civilians, making it the third largest fleet concentration in the United States, and serves as a base for Navy ships, airplanes, and helicopters, as well as a training and repair station for the Atlantic fleet of the U.S. Navy. NS Mayport has nearly 1 mile of beachfront and 4.5 miles of river shoreline, and almost half of the 3,400 acres are classified as wetlands, brackish marshlands, or beaches. The Navy shares the area with numerous animal species, including manatees, ospreys, sea turtles, and northern right whales. NS Mayport has been designated as the East Coast Navy Environmental Leadership Program base to help lead the Navy by developing innovative technologies and management practices to protect the environment and natural resources. In 1995, EPA and the Department of Defense (DoD) signed a memorandum of agreement for regulatory reinvention pilot projects. This agreement (commonly known as ENVVEST) was established to provide a framework for the development of regulatory reinvention pilot projects at approximately three to five selected DoD facilities. DoD and EPA outlined the ENVVEST agreement to reflect Project XL requirements.

[6] As part of the Administration's reinvention initiative, EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

The Experiment: To maintain operations at NS Mayport, 600,000 cubic yards of sediment must be dredged every 18 to 24 months. The station is investigating and demonstrating two innovative methods for beneficially reusing dredged material: (1) producing construction building blocks from dredged material and (2) producing artificial reef material from dredged material. Use of the dredged material would eventually eliminate the need for ocean disposal of the material and/or permanent upland storage. NS Mayport will also test to see if excess fly ash from the City of Jacksonville's Electric Authority serves as a good solidification material for the construction blocks.

The Flexibility: Under the current system, NS Mayport can dispose of dredged sediment in the ocean or store it upland at the facility. The existing upland storage capacity is exhausted, and ocean disposal of the dredged material has been approved under the Naval Station's current U.S. Army Corps of Engineers (USACE) permits. NS Mayport is currently required to obtain three permits, with three different time lines, to dredge and dispose of its dredged material. The USACE permits require that chemical, biological, and physical analyses on the dredged material be performed and approved by EPA every three years. In return for testing possible beneficial uses for dredged material, EPA under the XL/ENVVEST process will create a partnership with the USACE, the State of Florida, the City of Jacksonville, and other interested stakeholders that will facilitate streamlining the permitting process.

The Superior Environmental Performance: Potential environmental benefits of this project include:

- A decrease in and eventual elimination of ocean disposal of dredged material, which minimizes the potential for impacts to water quality and benthic communities;
- Creation of new reef habitats or reparation of existing reefs by use of solidified dredged material as artificial reef;
- A lowering of the potential impact to the endangered northern right whale by reducing the

number of transects across the whales's migration pathways and calving grounds;

- Reduction in the waste streams associated with disposal of fly ash; and
- Reduction of the need for raw materials (cement, aggregate) necessary for making concrete (for construction blocks to be used on land).

Department of Defense: Puget Sound Naval Shipyard[7]

BREMERTON, WASHINGTON
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 25, 2000

The Project Sponsor: Puget Sound Naval Shipyard (PSNS) is a large industrial facility in Bremerton, Washington, that has been in operation since 1891. PSNS is the workplace of approximately 7,700 civilian and 2,900 military employees, including those assigned to ships and overhauls. The shipyard performs repair, overhaul, conversion, refurbishment, refueling, decommissioning, dismantling, and recycling of Navy submarine and surface ships. Resources for performing this work include manufacturing, research, development, and testing facilities. Today, the shipyard of six drydocks, seven piers, and 130 buildings is located on 750 acres of land, which is surrounded by evergreen trees and salmon runs. It also serves as the homeport for six ships in the Sinclair Inlet.

PSNS has been the recipient of numerous awards, including the Navy's most prestigious awards for installation excellence and environmental quality—the Commander-In-Chief's Installation Excellence Award (1991, 1995), the Secretary of the Navy's Environmental Quality Award for Industrial Installations (1994, 1999), Washington Governor's Award for Outstanding Achievement in Pollution Prevention, Most Improved Governmental Facility (1997), Secretary of the Navy Pollution Prevention Award, Industrial Installation (1997,1998), Chief of Naval Operations Pollution Prevention Award, Industrial Installation (1997, 1998, 1999), Naval Sea Systems Command Pollution Prevention Award, Industrial Installation (1997, 1998, 1999), Navy Community Service of the Year Award (Regional Winner) Environmental Stewardship (1998), the Secretary of the Navy's Recycling Award for Industrial Installations (1995), and the Chief of Naval Operations Environmental Quality Industrial Installation Award (1999).

In 1995, EPA and the Department of Defense (DoD) signed a memorandum of agreement for regulatory reinvention pilot projects. This agreement (commonly known as ENVVEST) was established to provide a framework for the development of regulatory reinvention pilot projects at approximately three to five selected DoD facilities. DoD and EPA outlined the ENVVEST agreement to reflect Project XL requirements. Puget Sound shipyard was selected as one of the DoD facilities to participate in ENVVEST.

The Experiment: The Puget Sound Naval Shipyard proposes to develop and demonstrate an alternative strategy for protecting and improving the health of Sinclair Inlet of the Puget Sound. This proposal would achieve its objectives through the use of sound ecological science and risk-based management and employ techniques consistent with the EPA Ecological Risk Assessment Guidelines. Key elements include development of a unified ambient monitoring program, comprehensive electronic database, risk-based pollutant prioritization, and data to support the development of total maximum daily loads (TMDLs). Development of these components is intended to suggest alternatives to current National Pollutant Discharge Elimination System (NPDES) requirements otherwise applicable to PSNS. The project would be a pilot program to demonstrate concepts currently under development to address water pollution associated with naval shipyards.

The project would involve two main phases. The first phase would involve a thorough study of Sinclair Inlet watershed. It would include an extensive study/research project involving a mapping-design process and database development. The second phase would implement the mapping/design process phase. The second phase of FPA development would be developed for and described

[7] As part of the Administration's reinvention initiative, EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

in a subsequently negotiated and signed phase-specific addendum to the FPA.

The Flexibility: In Phase I, no regulatory flexibility is being sought. Rather, PSNS is proposing to conduct preliminary data collection and modeling for Sinclair Inlet and the watershed. Upon completion of the data collection and review of its findings, PSNS may seek regulatory flexibility in Phase II.

The Superior Environmental Performance: To assist in reaching the goal of superior environmental performance, Puget Sound shipyard will use the unified database in:

- Identification of overlapping data collection efforts;
- Determination of areas needing increased data collection; and
- Assessment of the stressors affecting the health of the Inlet.

Superior environmental performance would be measured by changes in water quality, sediment quality, biological health, and biodiversity within the Inlet ecosystem. Environmental benefits are not expected to flow from Phase I implementation, but rather implementation of the whole project.

Eastman Kodak Company

Rochester, New York; Windsor Colorado; Peabody, Massachusetts; and White City Oregon
Final Project Agreement Signed September 14, 2000

The Project Sponsor: The Eastman Kodak Company (Kodak) is the world's leader in imaging, and a manufacturer of imaging systems (cameras, scanners) and media (film, photographic paper, photographic chemicals). Kodak employs 46,300 people in the United States and has manufacturing facilities in Rochester, NY; Windsor, CO; Peabody, MA; and White City, OR. The Health and Environment Laboratories (HAEL) division of Kodak is a central/corporate facility that evaluates materials and equipment that are involved in manufacturing processes or are being considered for use in new products. As a leader in new technology development in the imaging industry, Kodak submits many new chemical substances to EPA for review each year. Once approved, these substances may be used in one or several of the company's facilities, and it is these substances that allow the company to develop and improve the products it sells.

The Experiment: The EPA Office of Prevention, Pesticides and Toxic Substances (OPPTS) has developed a set of computerized risk screening tools called the Pollution Prevention Framework. These tools allow companies to (1) calculate or estimate important risk-related properties based on an analysis of chemical structure and (2) design safer chemicals, reduce waste generation, and identify other pollution prevention opportunities. Kodak aims to test the application and dissemination of information about the Pollution Prevention Framework under this project. Kodak intends to use EPA's Pollution Prevention Framework in the development of its new chemical products to ensure that they are as environmentally benign as possible. Kodak also proposes to share its expertise in the use of the Pollution Prevention Framework with other companies to encourage its greater use. Kodak plans to showcase the Pollution Prevention Framework by working with scientific and technical staff at other chemical companies, reaching out to business audiences, and contacting senior managers in other organizations. Kodak will also complete an environmental cost accounting study and a management study to facilitate its discussions with business audiences and senior managers. Overall, this experiment strives to show that increased use of the Pollution Prevention Framework during the early stages of new chemical research and development will facilitate increased reliance on environmental decision making, ultimately leading to the production of more environmentally friendly chemicals.

The Flexibility: Under the Toxic Substances Control Act (TSCA), a prospective manufacturer must wait 90 days after submitting a pre-manufacture notice (PMN) before beginning manufacture of a new product. Often, EPA concludes its review of the PMN after 28 days for chemicals identified as "low risk drops". As a result of new and less toxic chemicals produced using the Pollution Prevention Framework, Kodak expects that EPA would generally complete its review of Kodak's chemicals in 28 days or less. Kodak therefore proposes that, EPA allow Kodak to submit concurrently a PMN and a Test Marketing Exemption (TME) application for the same chemical substance, so Kodak may commence manufacture for test marketing purposes 45 days after the TME is submitted and full-scale nonexempt commercial manufacture 90 days after the PMN is submitted. The shortened 45-day waiting period will be available only for chemicals for which EPA has no further concerns, in cases where EPA's review is completed in 28 days.

The Superior Environmental Performance: The Kodak project anticipates the following four components of superior environmental performance:

- Application of the Pollution Prevention Framework to screen new chemicals to be submitted for PMN review;
- Communicating with, reaching out to, and working with scientific and technical staff from a variety of chemical companies and stakeholders, to support and promote their implementation of the Pollution Prevention Framework;
- Reaching out to the business audience to promote the use of the Pollution Prevention Framework as a best business practice; and

- Reaching out to the senior managers of industry counterparts to assist them in understanding what management structures can facilitate the implementation of Pollution Prevention concepts in their companies.

More importantly, by using the Pollution Prevention Framework, it is expected that Kodak will use safer chemicals in its products, as well as innovative, cleaner, and prevention-based technologies in its manufacturing processes and plants.

Georgia-Pacific Corporation

Big Island, Virginia
Final Project Agreement Signed May 31, 2000

The Project Sponsor: Georgia-Pacific Corporation is one of the world's largest forest products companies and is a major manufacturer and distributor of building products, pulp, paper, and related chemicals used in papermaking and the production of building products. The Georgia-Pacific Corporation owns and operates a non-sulfur, non-bleaching pulp and paper mill at Big Island, Virginia. The facility produces corrugating medium, which is used by box plants to make the fluted inner layer of corrugated boxes, and linerboard, which is used for the inside and outside layers of boxes. The mill is located in Bedford County, adjacent to the James River. The George Washington National Forest is located to the north and east of the James River; and to the west is the Jefferson National Forest. The James River Face National Wilderness Area is about 3 miles to the northwest of the mill. The facility sits on 900 acres of land and employs about 380 people.

The Experiment: Georgia-Pacific is investigating using "black liquor gasification," which is a new and innovative way to recover chemicals used to make wood pulp at the Big Island facility. To make pulp, wood is chipped and added to a digester containing a chemical solution called "white liquor" (primarily consisting of sodium carbonate at the Big Island facility). The white liquor is heated in the digester and cooks the chips and forms pulp by breaking down the lignin, or glue, that holds the wood together. The wood pulp is recovered from the digester, leaving unusable wood products in the pulping chemical solution, which is now considered "black liquor." The current practice at the mill to recover the useful chemicals in the black liquor is to reduce the volume and concentrate the liquid through evaporation. The liquid is then burned in two smelters, called "recovery furnaces." The smelters recover the sodium carbonate in a molten form, which is dissolved again to produce new white liquor. The new gasification process that this XL project tests, uses heat and steam to convert organic compounds (including lignin and wood fines) in the black liquor into a gas consisting primarily of hydrogen, and recovers the pulping chemicals for reuse. The hydrogen gas would then be used as a fuel source to run the gasification process and to produce steam. The pulping chemicals are recovered as pellets of sodium carbonate that will be used to make new solutions of white liquor.

The Flexibility: Under the Clean Air Act, the mill at Big Island must comply with the Pulp and Paper Mill Cluster Rule, which is a hazardous air pollution standard that requires installation of maximum achievable control technology (MACT), to limit the amounts of air pollutants that can be emitted from regulated areas in the plant. A second MACT standard (MACT II), that would apply to the existing smelters, was proposed in 1998 to control and reduce emissions from combustion sources associated with recovery of chemicals used to make wood pulp. Due to the age and the physical condition of the plant, Georgia-Pacific would have to substantially upgrade or rebuild the smelters and add additional emissions controls to meet the MACT II standards, or they would need to replace the smelters with new recovery boilers using conventional technology. Georgia-Pacific expects that its gasifier technology could be operational in time to meet the MACT II standards when they become effective. However, Georgia-Pacific is using XL to get flexibility in the following ways:

- To be able to operate the existing smelters past the MACT II compliance date, if necessary while the gasifier technology is brought online;
- To ensure that if the gasifier technology fails, Georgia-Pacific would be allowed to operate its existing smelters, as necessary, past the MACT II compliance date while it constructs a conventional recovery furnace to replace the existing smelters; and
- To allow the existing smelters to operate for a set period of time after the MACT II compliance date while Georgia-Pacific runs trials of the gasifier on black liquor imported from a Kraft pulp mill (these tests are crucial to demonstrating that this new gasification technology can be used in other plants in the pulp and paper industry, which are dominated by Kraft type mills).

The Superior Environmental Performance: Georgia-Pacific's use of the black liquor gasification system would be the first commercial application of this technology in the country. Use of the system promises the following environmental benefits:

- Significant reductions in air emissions of particulate matter, sulfur dioxide, nitrogen oxides, volatile organic compounds, and greenhouse gases;
- Reduced consumption of fossil fuel;
- Increased efficiency in energy conversion and chemical recovery; and
- Elimination of the possible explosion hazards associated with the operation of other recovery technologies.

Imation Corporation

Camarillo, California

Final Project Agreement Signed December 20, 1999

The Project Sponsor: Imation produces magnetic data-storage tapes, primarily for the computer industry, at its plant in Camarillo, California. Magnetic tape manufacturing employs high-technology processes and caters to a rapidly evolving worldwide industry.

The Experiment: Imation is testing a broader application of the Clean Air Act (CAA) regulations that require manufacturers to obtain approval for each prospective change to plant processes and/or new equipment additions through a preconstruction review procedure and revision of the plant's operating permit. Imation's project will attempt to demonstrate that its alternative approach of accounting for process modifications and new equipment additions that Imation anticipates making in the future will produce better environmental results compared to the current regulatory structure and related policies. The project will also test whether enforcement is easier under Imation's system and whether permitting costs are reduced.

The Flexibility: Traditional case-by-case preconstruction review processes are meant to ensure that plant changes (1) do not jeopardize attainment and maintenance of National Ambient Air Quality Standards (NAAQS) under the CAA or (2) reasonably further progress toward attainment. In this Imation experiment, the volatile organic compound (VOC) cap will be established to ensure that the emissions from the plant do not contribute to regional air pollution so that the NAAQS are not exceeded and individual preconstruction reviews will not be triggered. Also, the changes anticipated by Imation will be described and preapproved in their operating permit, expanding use of the concept of alternate operating scenarios. Alternate operating scenarios are allowed under current permitting rules; however, they traditionally have been limited to known and precisely defined changes to existing operations.

The Superior Environmental Performance: With this experiment, Imation strives to attain the following environmental benefits:

- Imation will comply with emissions caps on VOC emissions, which produce smog, and other air pollutants. The VOC cap is below the historic baseline level of actual emissions. Emission reduction credits generated through imposition of the VOC cap will in part be retired by Imation and in part donated to Ventura County, where the Camarillo plant is situated. Ventura County will sell the credits and use the proceeds to fund clean air projects that would not have been funded otherwise.

- Imation equipment emitting VOCs will comply with the most stringent federal emission reduction requirements of all those that apply at the plant, even though many plant operations are subject to less rigorous requirements.

- VOC emissions will be tracked through a state-of-the-art continuous emissions monitoring device, which is not otherwise required. This will provide the best available compliance information.

International Business Machines (IBM) Corporation East Fishkill Facility

Hopewell Junction, New York
Final Project Agreement Signed September 29, 2000

The Project Sponsor: The IBM East Fishkill facility is located in the Town of Hopewell Junction, New York, and is located approximately 10 miles east of the Hudson River. The facility currently houses various research and development operations as well as the facilities and operations involved in the manufacturing of semiconductor and electronic computing equipment.

The Experiment: As a result of manufacturing operations, including electroplating operations, wastewater containing dissolved heavy metal and fluoride compounds is produced by various process operations in a number of buildings throughout the facility. Currently, IBM East Fishkill generates approximately 825 tons of sludge in two separate wastewater treatment systems annually and transports the material approximately 350 miles to Canada for disposal in a permitted landfill. This waste is designated as F006 (i.e., electroplating sludge) and regulated under RCRA regulations. After careful evaluation of the chemical constituents of the sludges, IBM believes that the sludge generated in one of the wastewater treatment systems (approximately 300 tons annually) can be recycled and used as an ingredient in the manufacture of a commercially available product, cement. The sludge generated at the facility is basically a hydroxide sludge with chemical constituents closely aligned with natural materials typically used by cement kilns.

The Flexibility: Because cement is typically a product used on the land, RCRA regulations as well as state regulations, would subject the electroplating sludge to regulation as a hazardous waste. IBM believes the sludge does not require RCRA hazardous waste regulatory oversight as the sludge can be legitimately recycled as an ingredient in cement production.

The Superior Environmental Performance: By using the sludge in the manufacture of cement, this project strives to realize a number of environmental benefits. These include:

- Increasing landfill capacity to handle other wastes that cannot be recycled; and
- Reducing the amount of raw materials that must be mined and transported to a kiln to manufacture cement, thereby reducing the impacts of surface mining/quarrying techniques.

International Business Machines (IBM) Corporation Semiconductor Manufacturing Facility

Essex Junction, Vermont
Final Project Agreement Signed July 31, 2000

Project Sponsor: IBM Essex Junction, Vermont, is a semiconductor facility located in Chittenden County near Burlington, Vermont. The facility property encompasses approximately 735 acres, which are divided by the Winooski River. The manufacturing facility lies on 243 acres west of the Winooksi River in Essex Junction, and the remaining property contains non-manufacturing buildings. The Essex Junction facility manufactures and tests semiconductor memory and logic devices through a complex, multistep manufacturing process. In addition to the 7,500 IBM employees working at the site, there are approximately 1,500 contractors working on-site on any given day.

The Experiment: IBM has recently developed an innovative copper metallization process to create electrical interconnections between device levels for new semiconductor technologies. This process replaces the Aluminum Chemical Vapor Deposition process, which was used in previous generation semiconductor device technologies. IBM will test this new metallization process to ensure that it is environmentally superior to the old process. Previous tests have shown that it is 30 to 40 percent more energy efficient than the old process, and the chips produced are approximately 25 percent more energy efficient. Additionally, the new process virtually eliminates the use of perfluorinated compounds (PFCs), a cleaning agent for the aluminum deposition process, which are global warming gases. IBM estimates that the new process will prevent the emission of 10,000 metric tons of carbon.

The Flexibility: IBM's new process results in the generation of copper plating rinsewaters, which are combined with other process wastewater generated at the facility and treated in a wastewater treatment unit. This treatment produces a sludge that is classified by waste type and currently regulated under RCRA. IBM believes that the classification system used by RCRA artificially inflates the company's hazardous waste generation numbers, fails to provide additional environmental protection, and increases paperwork and reporting burdens. With this test of an innovative process improvement, EPA can explore a different approach to determining whether a waste that does not pose a risk to human health or the environment should be subject to a hazardous waste listing.

The Superior Environmental Performance: IBM expects that the following environmental benefits will emerge from this project and the promotion of the new copper metallization process:

- An increase in energy efficiency for electrical interconnections production by 30 to 40 percent;
- Production of a chip that is approximately 25 percent more energy efficient than previous products;
- Encouragement of more efficient production methods with corresponding reductions in waste generation for other semiconductor facilities interested in the new process;
- Reductions in greenhouse gas emissions as a result of conversion to the copper process; and
- Additional voluntary greenhouse gas emission reductions in chamber cleaning process at other operations at the facility.

International Paper Effluent Improvement Project

Jay, Maine

Final Project Agreement Signed June 29, 2000

The Project Sponsor: International Paper's (IP) Androscoggin Mill is a large integrated kraft pulp and paper mill and a major manufacturer of coated paper and specialty paper. The facility includes a woodyard, two woodrooms, utilities, two continuous pulp digesters, two bleach plants, and five paper machines. The plant is located in Jay, Maine, adjacent to the Androscoggin River and has been in operation since 1965. It produces approximately 1,860 tons of paper per day and has 1,200 employees. The facility was in EPA New England's (Region 1) 1996 Environmental Leadership Program and a participant in the StarTrack Program and has won numerous Governor's Award for Environmental Excellence.

The Experiment: IP seeks a regulatory exemption from the best management practices (BMPs) required under the water portion of EPA's Pulp and Paper Cluster Rules (40 CFR 430.03) in order to reinvest resources to implement effluent improvement projects designed specifically to reduce final effluent discharge of chemical oxygen demand (COD) and color from the facility. The exact mix of projects will be identified through a collaborative process with IP, EPA, Maine Department of Environmental Protection (ME DEP), the Town of Jay, and active stakeholders. EPA and IP anticipate that implementation of these effluent improvement projects will yield greater COD and color reduction than compliance with the Cluster Rule's BMPs. The facility will design and implement the effluent improvement projects with the assistance of the Collaborative Process Team, and the facility's effluent discharge permit will later be modified to reflect the resulting performance gains.

The overall goal for this project is to use the regulatory relief described in the Final Project Agreement as an opportunity to reallocate resources to select and implement effluent improvement projects that maximize improvements in environmental performance at the Androscoggin Mill.

The Flexibility: Through this experiment, generic BMP requirements will be replaced with targeted, facility-specific effluent improvement projects and with quantitative, enforceable permit limits.

Superior Environmental Performance: The project will replace generic BMP requirements with targeted, facility-specific effluent improvement projects and with new permit limits. This is expected to reduce the mill's discharge levels of several key pollutants to approximately one-half of current levels. Specifically, the mill currently discharges its effluent with COD at approximately 47 kg/kkg (kilogram per air-dried metric ton of pulp production) and color at approximately 60 kg/kkg. Analysis performed on facility operations and these parameters predicts that through this project, these levels will be reduced to approximately 26 kg/kkg and 25 kg/kkg, respectively. A reduction of this magnitude is unlikely to occur without XL, and ultimately these effluent improvements will contribute to improved ambient water quality downstream in the Androscoggin River.

International Paper Predictive Emissions Monitoring Project

Jay, Maine

Final Project Agreement Signed April 20, 2000

The Project Sponsor: International Paper's (IP) Androscoggin Mill is a large integrated kraft pulp and paper mill and a major manufacturer of coated paper and specialty paper. The facility includes a woodyard, two woodrooms, utilities, two continuous pulp digesters, two bleach plants, and five paper machines. The plant is located in Jay, Maine, adjacent to the Androscoggin River and has been in operation since 1965. It produces approximately 1,860 tons of paper per day and has 1,200 employees. The facility was in EPA New England's (Region 1) 1996 Environmental Leadership Program and a participant in the StarTrack Program and has won the Governor's Award for Environmental Excellence numerous times.

The Experiment: IP's Androscoggin Mill will develop, test, and validate a state-of-the-art innovative computer model that can accurately predict pollutant [particulate matter, sulfur dioxide (SO_2), and nitrogen oxides (NO_x)] emissions on a continuous basis. The computer model is called a predictive emissions monitoring system (PEMS). The PEMS will be installed on the waste fuel incinerator (WFI)—a type of boiler that burns paper mill waste products, including wood chips, pelletized paper, sludge, bark, and fuel oil to produce steam—and is monitored for emissions annually at the stack. The PEMS would develop a relationship between the WFI operating conditions (i.e., burn rates and fuel type), steam production, and emission rates to continuously predict pollutant emissions. The PEMS technology may also be able to optimize the relationship between emissions and steam production rates identifying the operational setting so the WFI can be operated at minimum emissions at maximum steam production. IP will also test PEMS to see that it is providing instant compliance information, allowing mill operators to prevent potential noncompliance situations and stay within permitted limits. PEMS have been developed and used for simple stacks such as gas-fired boilers, but until recently have had only limited application for complex stacks such as the WFI.

The Flexibility: In order to develop the PEMS computer model, during testing IP will be allowed to briefly exceed its air pollution license limits on the WFI, under controlled and limited circumstances. However, as specified in the FPA, IP will offset any emissions exceedances by emission reductions at the mill's other stacks. The ability to exceed license limits during model development, testing, and modification of PEMS is the only way that IP can ensure that the PEMS model will accurately predict actual exceedances if they occur once the PEMS is operating. The FPA provides the terms and limitations of any potential exceedances during the testing of PEMS. IP will also be allowed to replace their continuous emission monitors with PEMS if it is shown that PEMS does accurately provide continuous emissions data.

The Superior Environmental Performance: The primary environmental benefit of this project is the increased information on environmental emissions, especially on particulate matter, and the enhanced ability to adjust emissions before an exceedances actually occurs. IP also voluntarily agrees to commit to maintain operations at a level equal or less than 90 percent of its maximum permitted emission limits. In addition, IP will optimize production so that emissions decrease while production remains the same or increases.

Labs21

NATIONWIDE

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 7, 2000

The Project Sponsor: At this point in the project, no specific sponsor has been identified. Rather, during the first stage of the project, EPA has committed to work internally and with laboratories to synchronize the Labs21 and XL application and review processes. EPA anticipates working with individual companies in the second, later stage of the project to identify and implement opportunities for environmental innovations.

The Experiment: Working together, EPA and the U.S. Department of Energy (DOE) are developing a new, voluntary initiative—Laboratories for the 21st Century, or Labs21—to improve the environmental performance of the nation's laboratories. The goal of Labs21 is to improve laboratory energy and water efficiency, encourage the use of renewable energy sources, and promote environmental stewardship in U.S. laboratories. This initiative evolved out of EPA's recent efforts to improve the environmental performance of its own laboratories. Through the XL project for Labs21 partners, EPA is developing a streamlined Agency process to maximize laboratories' environmental performance. In the first stage of this project, EPA will work internally and with laboratories to synchronize the Labs21 and XL application and review processes. During the second stage of the XL project, EPA will develop and issue case-specific agreements that test innovative ways to maximize environmental performance at laboratories. These agreements may be either facility-, group-, or media-specific in nature and may grant specific regulatory flexibility.

The Flexibility: Specific regulatory flexibility will be analyzed and granted, if appropriate, in the second stage of the project in order to facilitate environmental performance at laboratories as part of case-specific agreements.

The Superior Environmental Performance: By applying the Labs21 approach at its own facilities, EPA has realized significant environmental water- and energy-efficiency gains. Offering the possibility of exploring environmental innovations through the XL project may make it possible for future Labs21 partners to realize and even improve upon these environmental results.

Lead Safe Boston

Boston, Massachusetts
Final Project Agreement Signed October 2, 2000

The Project Sponsor: Lead Safe Boston (LSB) is a federally funded de-leading assistance program that operates under the City of Boston's Department of Neighborhood Development. The program collaborates with state agencies and private organizations, including the Massachusetts Housing Finance Agency's "Get the Lead Out" Program, the Lead Action Collaborative, Ecumenical Social Action Committee, and Massachusetts Affordable Housing Alliance, to prevent lead poisoning of young children by working to control lead hazards in the highest-risk areas of the city. Boston has an estimated 153,064 units of housing containing lead-based paint (LBP), of which approximately 69,500 are occupied by families with children.

The Experiment: In this XL project, LSB seeks to utilize provisions in the RCRA Household Waste Exclusion (HWE) Rule at 40 CFR §261.4(b)(1) to allow LBP debris from residential housing units to be disposed of as household waste instead of as hazardous waste. Disposing of LBP debris as a household waste will reduce the cost of lead abatements in residential housing. As part of this project, LSB has pledged to use the cost savings made available through implementation of this XL project to perform approximately 12 additional residential lead abatements that will reduce lead exposure risks for roughly 30 children in Boston's Dorchester and Roxbury neighborhoods.

The Flexibility: LSB will utilize provisions in a Policy Memorandum developed by EPA's Office of Solid Waste and Emergency Response (OSWER) to extend the use of the RCRA HWE rule to contractors and individuals performing lead abatements in residential housing units. The provisions will enable LSB to treat the architectural lead debris from these projects as household waste in lieu of hazardous waste and, thereby, forego costly toxicity characteristic leaching procedure testing, and dispose of lead debris in municipal solid waste landfills.

The Superior Environmental Performance: This XL project will enable LSB to abate more residential units and thereby decrease the LBP exposure risk for additional children in Boston.

Louisville and Jefferson County Metropolitan Sewer District

Louisville and Jefferson County, Kentucky
Phase I Final Project Agreement Signed January 31, 2000

The Project Sponsor: The Louisville and Jefferson County Metropolitan Sewer District (MSD) is responsible for wastewater collection and treatment, a comprehensive public stormwater drainage system for Louisville and Jefferson County, flood management and control, stream monitoring, hazardous materials control, and several other programs. MSD is a nonprofit regional utility service. In September 1998, MSD was awarded a grant for the development of pretreatment performance measures, which will help MSD develop, implement, and assess specific "performance measures" designed to measure the environmental impact of the Pretreatment Program in the Jefferson sewershed.

The Experiment: MSD plans to experiment with its approach to its pretreatment program at the Jefferson Wastewater Treatment Plant by establishing links between wastewater programs (such as collection systems, storm water, sludge) and moving toward a more holistic watershed protection strategy. Through information gathering and sharing between wastewater programs, MSD will test shifting resources from the pretreatment program and applying resources toward other environmental programs to achieve greater environmental gain in the watershed with fewer resources expended.

The Flexibility: Potential regulatory flexibility expected will allow MSD to (1) use an alternative definition for significant industrial user, (2) use an alternative definition for significant noncompliance, and (3) allow participating industrial users to not sample for pollutants that are not expected to be present.

The Superior Environmental Performance: MSD proposes to better manage its pretreatment program through a holistic watershed approach, leading to improved pollutant loading trends in the watershed. MSD aims to develop a specific strategy to monitor and identify pollutant sources, conduct pollution prevention outreach, provide education and technical assistance, and reinvest cost savings in watershed-based improvements.

Metropolitan Water Reclamation District of Greater Chicago

Chicago, Illinois
Final Project Agreement signed August 30, 2000

The Project Sponsor: The Metropolitan Water Reclamation District (District) of Greater Chicago is a publicly owned treatment works that treats wastewaters from domestic, commercial, and industrial sources in Chicago and 126 surrounding communities. Located in Cook County, the District has maintained an industrial waste pretreatment program for more than 30 years. Through its industrial pretreatment program, the District regulates process wastewater discharges from approximately 535 significant industrial users (SIU), including approximately 360 categorical industrial users (CIU).

The Experiment: During implementation of the project, the District plans to redirect resources currently allocated for certain regulatory obligations that add limited environmental value to other programs that it believes potentially provide greater environmental benefit within the District's pretreatment program. The District primarily seeks to free up additional resources by reducing the self-monitoring frequency and reporting for, and inspection and monitoring of, small CIUs with good compliance records. In addition, during project implementation, the District has as a goal to limit the detailed oversight information regarding SIUs) in their annual report to EPA to only the population of SIUs that were found in significant noncompliance at any time during the report year.

The saved resources from the program flexibility described above would be reallocated within the District to advance environmental protection. The District aims to create strategic performance partnerships with industrial sector facilities meeting the goals of the national strategic goals program (SGP). The SGP establishes both facility-specific and sector-wide performance goals that extend beyond traditional compliance with environmental regulations. The strategic performance partnerships would develop and evaluate alternative monitoring systems that would hopefully prove superior to the current traditional monitoring systems. The District intends to begin addressing local pollutants that have not been regulated, through the development of toxic reduction action plans. The District also intends to revise the Pretreatment program annual report format to include detailed information regarding environmental performance not currently required.

The Flexibility: In order to reallocate resources, the District is seeking flexibility under the Clean Water Act's General Pretreatment Regulations. First, the District requests flexibility to reduce the self-monitoring frequency and reporting for, and inspection and monitoring of, small categorical industrial users CIUs. Second, should strategic performance partnerships experience success in identifying superior alternative monitoring systems, this project strives to provide flexibility regarding the self-monitoring of CIUs that would be participating in the strategic performance partnerships. Third, the District is seeking relief in regards to the content and format of the pretreatment program annual report.

The Superior Environmental Performance: This project has the potential to achieve environmental performance that is superior to the current system. Regulatory flexibility would allow the District to reallocate currently committed resources to other activities with greater potential for environmental benefit. The creation of strategic performance partnerships would enable the District to further work with demonstrated sector leaders to develop, test, and implement alternative measurement systems demonstrating environmental performance. These alternative measurement systems have the potential to be more accurate and precise, allowing for improved process performance and decreased loadings of regulated pollutants. The toxics reduction action plan would identify and address currently unregulated pollutants of local concern. The newly formatted annual report would include additional useful information. The reduced oversight of smaller CIUs may provide incentives for facilities to reduce pollutant loadings and water usage, and improve facility performance; similarly, the opportunity to participate in the strategic performance partnerships may serve as an incentive for sector industries to participate in the SGP.

Narragansett Bay Commission

PROVIDENCE, RHODE ISLAND
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 25, 2000

The Project Sponsor: Narragansett Bay Commission (NBC) operates the wastewater collection and treatment system for the greater Providence area, including wastewater discharges from approximately 360,00 people and 8,000 businesses. NBC has two treatment plants, the Field's Point wastewater treatment plant and the Bucklin Point wastewater treatment plant. Since initiating its industrial pretreatment program, NBC has reduced its metal and cyanide loadings to its Field's Point treatment plant headworks by more than 94 percent. Through its high level of performance NBC has received EPA's Pretreatment Excellence Award in 1990 and 1998. In 1994, NBC developed two regulatory/pollution prevention integration programs, NBC Metal Finishing 2000 and CLEAN P2 Regulatory Relief. The programs test new regulatory approaches to improve environmental compliance by the local industrial community.

The Experiment: The NBC permits and regulates approximately 100 metal finishing companies. Through Project XL, NBC would like to improve environmental performance of a select number of metal finishing companies by redirecting pretreatment regulatory efforts away from ten metal finishing companies that have demonstrated superior environmental performance records (Tier 1 facilities) and focus regulatory efforts on ten companies with lower performance records (Tier 2 facilities). The primary goal of this project is to demonstrate that through more efficient use of existing resources and manpower, NBC can achieve measurable improvements in environmental performance.

The Flexibility: NBC requests modification of the pretreatment regulations for up to ten metal finishing companies that have established a history of exemplary environmental performance and compliance as an incentive to maintain their performance. NBC requests flexibility to reduce inspection frequencies and eliminate some monitoring requirements for these Tier 1 facilities to allow NBC to refocus its resources towards increased compliance inspections, pollution prevention audits, and technical assistance on Tier 2 facilities.

The Superior Environmental Performance: With this project, NBC seeks to achieve superior environmental performance by the industrial community and will be demonstrated in the form of:

- More companies utilizing pollution prevention in place of end-of-pipe treatment;
- Production techniques that use less water;
- Lower Toxic Release Inventory (TRI) emissions;
- Less hazardous waste generation by participating companies;
- Fewer overall industrial user violations;
- More companies participating in NBC's pollution prevention technical assistance efforts and programs; and
- Higher-quality wastewater discharges.

National Aeronautics and Space Administration White Sands Test Facility

LAS CRUCES, NEW MEXICO
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 22, 2000

The Project Sponsor: The National Aeronautics and Space Administration (NASA) White Sands Test Facility (WSTF) is located approximately 18 miles northeast of Las Cruces, New Mexico, and operates as a field test installation for the NASA Lyndon B. Johnson Space Center in Houston, Texas. The facility also provides test service and support for the Department of Defense, Department of Energy, private industry, and foreign government agencies. The primary WSTF mission is to develop, qualify, and test the limits of spacecraft propulsion systems and subsystems. The installation also operates several laboratory facilities that conduct compatibility and material test protocols.

The Experiment: NASA WSTF proposes to consolidate, streamline, and simplify the collection, management, reporting, and archival of environmental compliance data required by EPA and several different Bureaus in New Mexico's Environment Department (NMED). This project provides a unique opportunity for EPA and NMED to construct, implement, test, and operate a Bureau-wide reporting system that will provide regulatory reports and supplemental information on a Web-based information management and regulatory reporting system.

The Flexibility: In this project, NASA WSTF requests regulatory flexibility from applicable existing EPA and NMED reporting regulations that specify submission of a paper report or written signature. Specifically, NASA is seeking regulatory flexibility in order to electronically report the following:

- Allow the electronic submission of the annual Post-Closure Care written reporting requirements issued by the NMED Solid Waste Bureau as specified in Permit No. 8800019434-2;
- Allow the electronic submission of permit modification requests as specified by 40 CFR §270.42. This regulatory relief will include the ability to electronically transfer the signatory to permit applications and report requirements of §270.11;
- Allow the electronic submission of quarterly and semiannual reports as specified by NMED Groundwater Bureau Discharge Plans DP-392, DP-697, DP-584, and DP-1170;
- Allow the electronic submission of regulatory reports as specified by all sections of Air Quality Control Permit No. 329-M-1;
- Allow the electronic transfer of groundwater monitoring data and status reports from the 700 Area Landfill as required by the Closure and Post-Closure Care Plan issued by the NMED Solid Waste Bureau;
- Allow the electronic transfer of progress reports, data, and supplemental information regarding the plume-front remediation system to the Groundwater Bureau and Hazardous and Radioactive Materials Bureau;
- Minimize the hard copy archival requirements of the §3008(h) Consent Order, the Post-Closure Care Permit, and the RCRA Hazardous Waste Operating Permit by allowing recordable CD-ROM storage of archive data; and
- Allow the electronic submission of the §3008(h) regulatory requirements for written monthly status reports currently submitted to the Secretary in triplicate.

The Superior Environmental Performance: In order to achieve superior environmental performance, this project seeks to do the following:

- Provide real-time desktop access to environmental compliance report deliverables and associated data;

- Consolidate multi-bureau reporting requirements into one system;
- Provide public access to encourage participation in Federal facility compliance activities;
- Increase intra-bureau personnel communication and encourage comprehensive review of data by allowing desktop access to data;
- Provide graphical presentations to increase visualization of WSTF conditions and data interpretations and enhance environmental management;
- Archive data that can be easily accessed for determinations of past results and comparisons to current conditions;
- Eliminate hard copy reports in triplicate (some documents require five copies); and
- Ensure the project is simple and easily transferable to other Federal facilities and private sector entities throughout the United States wishing to pursue a similar type of system.

Ortho-McNeil Pharmaceutical and the R.W. Johnson Pharmaceutical Research Institute

Spring House, Pennsylvania
Final Project Agreement Signed September 22, 2000

The Project Sponsor: Ortho-McNeil Pharmaceutical (OMP) and the R.W. Johnson Pharmaceutical Research Institute (PRI), divisions of Johnson & Johnson, are jointly sponsoring this XL project. OMP's research and development efforts are conducted by PRI, a sister company. PRI develops and uses radiolabeled compounds for the research and development of pharmaceuticals/drugs. OMP is headquartered in Raritan, New Jersey, and employs more than 2,000 people. The company has manufacturing operations in Raritan, New Jersey; Spring House, Pennsylvania; and Manati and Dorado, Puerto Rico. This project is being conducted at the Spring House, Pennsylvania, site.

The Experiment: The medical research experiments conducted at the facility result in waste mixtures consisting of radioactive material and an organic compound. The organic compound that is produced is considered a hazardous waste substance, and therefore, the waste mixture is labeled as "mixed waste," regulated by EPA and the Nuclear Regulatory Commission. There are very few licensed and approved treatment facilities that can accept mixed waste in the United States. OMP has developed a unique treatment process to deal with mixed waste that uses catalytic oxidation to destroy the hazardous component and capture the radioactivity from the waste mixture. Oxidation of radioactive labeled compounds produces radioactive water and carbon dioxide that are low-level radioactive wastes and that can be easily stabilized and disposed of at various facilities throughout the country.

The Flexibility: In using the new catalytic oxidation process, OMP will be required to obtain a treatment, storage, and disposal facility (TSDF) permit under RCRA. In order to encourage the use of the oxidation process, OMP and PRI are asking for EPA to either (1) exempt OMP and PRI from permitting requirements for the new oxidation treatment or (2) provide a permit-by-rule exemption for the treatment and de-list post treatment waste to allow for management of the waste as low-level radioactive waste rather than as mixed waste.

The Superior Environmental Performance: The primary environmental benefit that this project offers is the opportunity to develop environmentally protective on-site treatment of mixed wastes while effectively capturing all of the radioactivity. Providing OMP and PRI exemptions for on-site treatment utilizing the catalytic oxidation process should enhance opportunities for developing a waste stream that is amenable to recycling and reuse.

Pennsylvania Department of Environmental Protection Coal Remining and Reclamation Project

State of Pennsylvania
Final Project Agreement Signed September 22, 2000

The Project Sponsor: The Pennsylvania Department of Environmental Protection's (PADEP) mission is to protect Pennsylvania's air, land, and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. PADEP works as a partner with individuals, organizations, governments, and businesses to prevent pollution and restore natural resources. Six district mining offices within PADEP oversee Pennsylvania's mining program. Their duties include licensing, bonding, permitting, and inspecting all surface and underground anthracite and bituminous coal mines, coal preparation plants, coal refuse disposal, and industrial mineral quarries. The offices also concentrate on industry compliance assistance as well as all aspects of pollution prevention advocacy.

The Experiment: PADEP proposed this project to explore a new approach to promoting coal remining. The approach would be based on compliance with best management practices (BMPs) instead of National Pollutant Discharge Elimination System (NPDES) numeric loadings-based effluent limitations and would monitor performance based on in-stream water quality instead of at individual preexisting discharge points. This project would test this approach in up to eight watersheds with significant acid mine drainage (AMD) pollution. The objective of the project is to collect data to compare in-stream concentration versus the loading from individual discharge points and provide for the evaluation of the performance of this strategy in PADEP's efforts to address AMD.

The Flexibility: An existing amendment to the Clean Water Act (CWA) grants remining operations an exception to the effluent limitation permitting requirements for iron, manganese, and pH for preexisting discharges from abandoned mine lands mined before 1977. Instead, the permit may set site-specific numeric effluent limitations representing best available technology on a case-by-case basis for these parameters. These limits are to be set so that the permit may not allow the levels of acidity, iron, and manganese discharged to exceed pre-existing levels from past mining operations in the area before the remining activity begins. The remining operation must demonstrate the potential for improved water quality from the remining operation.

Under this project, PADEP would continue to apply current effluent limitations/permitting requirements to preexisting discharges that are co-mingled with discharges from active remining operations. However, PADEP, in an exercise of its enforcement discretion, will require in-stream compliance monitoring rather than point of discharge compliance monitoring for pre-existing, non-encountered discharges and all pre-existing discharges after active remining operations.

The Superior Environmental Performance: This pilot project is expected to provide superior environmental performance because it will encourage coal operators to undertake remining projects that otherwise would have been too risky or expensive because of the potential to have to treat preexisting acidic discharges. In return for this lessening of the risk of treatment, the reminers would implement more reclamation activities in the watershed than existing Pennsylvania regulations require. With this proposal, the reminers would still be responsible for an equally protective standard of maintaining overall water quality but would accomplish this via BMPs. Under this project, treatment of discharges would only be undertaken as a last resort if the BMPs fail (or were not implemented) and water quality is degraded. This additional reclamation is not required under current state or federal law. Remining (with reclamation to present-day standards) is an effective way to reclaim abandoned mine lands and improve water

quality, at little or no cost to taxpayers. These pilots are designed to increase the number of remining operations providing reclamation and to enhance the degree of reclamation and AMD-abatement measures taken on remining operations.

Each of the pilot watersheds has been severely degraded by acid mine drainage from abandoned mine discharges and is either currently listed on Pennsylvania's CWA list of impaired waters that do not meet water quality standards or has been identified as a water body that does not meet water quality criteria due to abandoned mine drainage. For each watershed, PADEP expects that remining efforts will be an integral part of a water quality remediation plan and that water quality improvements will be achieved by implementing BMPs.

PPG Industries, Inc.

Pittsburgh, Pennsylvania
Final Project Agreement Signed September 14, 2000

The Project Sponsor: PPG Industries, Inc. (PPG), is a global supplier of products in four major areas: (1) coatings, (2) continuous-strand fiberglass, (3) flat and fabricated glass, and (4) chemicals. PPG is composed of 16 strategic business units in the four major product areas and has about 50 production facilities in the United States and 110 worldwide. The company employs approximately 32,500 people worldwide. PPG has three research and development facilities located in the greater Pittsburgh, Pennsylvania, area that develop new chemical substances and submit new substances to EPA for review each year.

The Experiment: The Pollution Prevention (P2) Framework is a new tool developed by the Office of Prevention, Pesticides and Toxic Substances and provided to the chemical manufacturing industry to promote incorporation of risk screening and pollution prevention in the design and development of chemicals. The objective of the P2 Framework is to promote the selection and application of safer chemicals and processes during the early stages of decision making regarding chemical development. PPG is using the P2 Framework to test the idea that by pre-screening product development options, the company's business practices will change, resulting in increased opportunities for pollution prevention. PPG is also conducting a validation study to compare measured data with the predictions of selected polymeric chemicals generated by the P2 Framework ECOSAR model, which predicts aquatic toxicity of chemicals based on analysis of the chemical structure. This study seeks to verify that the P2 Framework model provides a reliable method for assessing aquatic toxicity. PPG will also actively communicate with other companies on the uses and benefits of the P2 Framework.

The Flexibility: The Toxic Substances Control Act (TSCA) governs the manufacture, importation, processing, distribution, use, and disposal of "industrial" chemical substances, including new chemicals. Annually, EPA evaluates approximately 2,000 new chemical notices submitted by industry. Under TSCA, a prospective manufacturer must wait 90 days after submitting a pre-manufacture notice (PMN) before beginning manufacture of a new product. During that 90-day PMN review period, EPA determines whether the substance may present an unreasonable risk to human health or the environment. Often, EPA concludes its review of the PMN after 28 days for chemicals identified as "low-risk drops." As a result of new and less toxic chemicals produced using the P2 Framework, PPG expects that EPA would generally complete its reviews of PPG's chemicals in 28 days or less. PPG therefore proposes that in cases where EPA's reviews are completed in 28 days, it be allowed to begin manufacture after 45 days, rather than 90 days. The shortened 45-day waiting period will be available only for chemicals for which EPA has no further concerns.

The Superior Environmental Performance: By using the P2 Framework, it is expected that PPG, will develop innovative, cleaner, and more environmentally benign products and processes. In addition, it is expected that PPG's manufacturing processes and waste handling processes will operate at higher levels of environmental performance due to an increased emphasis on pollution prevention.

Progressive Auto Insurance

NATIONWIDE
FINAL PROJECT AGREEMENT SIGNED JULY 27, 2000

The Project Sponsor: Progressive Auto Insurance (Progressive) is the fourth largest auto insurer in the United States, insuring more than 5 million people and operating more than 350 offices nationwide. In August 1998, Progressive began a limited marketing test in Houston, Texas, of a new product that bases auto insurance premiums in part on when, where, and how much a vehicle is driven. The product is called Autograph℠. In August of 1999, the company expanded the test throughout the State of Texas.

The Experiment: Auto insurance rates are traditionally based on variables, including vehicle age; vehicle manufacturer and value; driver's age, sex, marital status, place of residence, and driving record; types of coverages; and deductibles selected. However, more specific information about customer driving patterns, such as mileage driven and time of day and location of driving, are generally not taken into account because of the difficulty involved in monitoring and tracking the information. Progressive has piloted a unique voluntary insurance program in the State of Texas that uses the new auto insurance product, Autograph℠, to determine a consumer's auto insurance rate based on actual vehicle usage, including when and how much the vehicle is driven with the use of a global positioning system installed in the vehicle. When a consumer decides that Autograph℠ is right for him or her, the consumer and Progressive enter into an agreement that gives the company access to the data and affords the consumer protection as to uses of the data—only the company or the consumer have access to it. With this system, Progressive seeks to create a variable insurance cost that will be influenced by the customer's driving activity and provides a financial incentive to drive less and choose alternate forms of transportation. This project gives EPA a unique opportunity to work with a nonregulated entity to study and determine the environmental impact of this new insurance product. Progressive will make available to EPA aggregated data on participants' driving mileage in response to the use of the product. Progressive is also interested in working with auto manufacturers to increase pilot activities and national product availability.

The Flexibility: As this project is an analytical experiment, no regulatory flexibility is being requested and Progressive does not obtain modifications of any future laws or regulations. However, as the project progresses, if it is found that the insurance system proves to be environmentally beneficial, it is possible that some alternatives would be explored for offering incentives to key groups who enable the expansion of this type of insurance.

The Superior Environmental Performance: EPA's interest in the Progressive pilot program derives from the possibility that insurance pricing plans like Autograph℠ might alter driving habits, as well as distinguish existing differences in habits, as drivers learn how their driving habits affect their costs. With this program, EPA can collect data on whether people who sign up for a voluntary program like Autograph will reduce their total driving or their driving during congested periods, as understanding total vehicle miles traveled is essential to promoting and crafting EPA's policies dealing with congestion, smog, vehicle emissions, and "smart growth" concerns.

Steele County Project

STEELE COUNTY, MINNESOTA
XLC[8] FINAL PROJECT AGREEMENT SIGNED MAY 31, 2000

The Project Sponsor: The Steele County Project encompasses nine small- to medium-sized industrial facilities in Owatonna and one facility (Atofina, formerly known as Elf Atochem) in Blooming Prairie, Minnesota. Steele County is located in southeastern Minnesota, approximately 60 miles south of Minneapolis. The facilities participating in this project are primarily metal finishers.

The Experiment: The Steele County Project is testing the effectiveness of a community-based approach to industrial regulated wastewater effluent and water use reduction controls in order to enhance local environmental quality. In addition, this project will also experiment with providing mass-based limits prior to full adoption of water conservation practices to see if this encourages facilities to incorporate water conservation measures into their operations. Steele County will also test to see if the development of an alternative approach to significant noncompliance (SNC) publication enhances a community-based approach to joint problem solving. A second phase of the project (not yet proposed) would examine a multimedia approach to environmental permitting and would be based on overall community performance, rather than individual sponsor performance.

The Flexibility: To help participating Owatonna facilities meet project goals, EPA has granted flexibility under the Clean Water Act. With this flexibility, participating Owatonna facilities may be allowed to (1) reduce monitoring frequency if discharge reduction goals are met and (2) reduce or eliminate monitoring where a pollutant is not discharged in the past three years. The Owatonna Waste Water Treatment Facility (OWWTF) will also be give the discretion to regulate participating facilities with mass-based limits instead of concentration-based limits. Participating Owatonna facilities will use their best efforts to reach a 20 percent reduction goal in nickel, chromium, copper, and zinc (by mass for each individual pollutant) that is discharged to the OWWTF. If the first 20 percent reduction goal is met, a further 20 percent reduction goal could be set for the remaining project term. If the initial 20 percent reduction goal is met for all pollutants, the city would be authorized, at its discretion, to reduce the self-monitoring frequency of participating Owatonna facilities to once per year.

In addition, the OWWTF may also develop an alternative approach for notifying the public of SNC by participating Owatonna facilities by publishing the SNC notice on the Minnesota Pollution Control Agency's Web site rather than in the local newspaper. A stakeholder committee will also investigate and report on each noncompliance event so that the public will have access to the information to ensure those who do not have Internet access may obtain information on the facilities. With this new approach, the OWWTF hopes to provide prompt and appropriate assistance for identifying and correcting violations, and reserve newspaper publication for cases that require greater public attention.

The participating facility in Blooming Prairie did not seek regulatory flexibility.

The Superior Environmental Performance: Specifically, under the FPA, participating Owatonna facilities agree to:

- Reduce the discharge of four priority metals (nickel, chromium, copper, and zinc);
- Reduce water usage;
- Arrange and participate in training for the development of an ISO 14000-based environmental management system (EMS) for each facility; and
- Minimize the adverse impact of stormwater on the local wastewater treatment facility by reducing the runoff from each participating facility and developing educational materials for the local community.

[8]Project XLC, eXcellence and Leadership for Communities, encourages local public sector and community organizations to come forward with new approaches to demonstrate community-design and directed strategies for achieving greater environmental quality consistent with community economic goals.

The participating Blooming Prairie facility agrees to:

- Reduce three pollutant effluents that flow to the Blooming Prairie Waste Water Treatment Facility (BPWWTF): biological oxygen demand (BOD), total suspended solids (TSS), and total Kjeldahl nitrogen (TKN); and

- Work to limit water usage.

The Steele County Project is expected to achieve superior environmental performance beyond that which is achieved under the current CWA regulatory system by encouraging the sponsors to work together in a coordinated manner. The Steele County project will work towards 20 percent reductions in metal discharges to the OWWTF and in BOD, TSS, and TKN to the BPWWTF. These reductions will be made within the first five years of the project. In addition, more environmental benefits should be realized because of participating Owatonna facilities' commitments to develop environmental management systems and their additional commitments to assist the city in alleviating the problem of storm sewer overflow.

United Egg Producers

NATIONWIDE

FINAL PROJECT AGREEMENT SIGNED ON OCTOBER 25, 2000

The Project Sponsor: United Egg Producers (UEP) is a farmer cooperative representing egg producers nationwide, most of whom own their flocks and do not contract out the production as in the chicken broiler industry. Most farms are integrated from the point of production through the final marketing of the eggs. UEP currently supplies approximately 240 eggs per year to each of the nation's 260 million people. Most farms (approximately 80 percent) are solely dry litter operations, in which chicken litter is collected and stored in watertight cement pits below the bird cages, dried for several months, and are annually removed for sale or gift to third parties (75 percent), spread on nearby farmland owned or controlled by the egg producer (15 percent), or composted into mulch or pelletized for sale into the nursery or retail garden markets (20 percent). Smaller operations are more likely (75 percent) to sell their eggs to larger operations for washing and processing, where collection and disposal of egg wash water is often a permitted activity. Most large egg production operations store egg wash water and spread it on land they own or control. Although egg wash water lagoons are most common among those who wash eggs on-site, some operators collect egg wash water in large tanks and haul it weekly to water treatment centers.

The Experiment: Various state water officials and environmental groups, U.S. EPA, and others are participating in this project with UEP to develop a comprehensive program to help participating facilities achieve superior environmental performance by implementing an environmental management system (EMS) through a general permit issued by individual states or EPA. EPA supports coverage under general permits because it will bring egg-producing facilities under permits faster and help ensure continuing compliance and superior environmental performance through the implementation of EMSs. This innovative program, which will also include a third-party auditing component, will also utilize those common procedures and on-farm management practices most likely to result in superior environmental performance. EPA, working with UEP, states, and others, will develop a model general permit that states can choose to adopt where they are the permitting authority. EPA will use the general permit and the EMS program requirements in states where it continues to administer the program.

The Flexibility: The project is a progressive concept that offers environmental and resource benefits to states, EPA, the public, and egg producers. Under current law, the dry manure storage and handling procedures of most very large poultry operations are generally not covered under existing Clean Water Act regulations or National Pollutant Discharge Elimination System (NPDES) permits for Concentrated Animal Feeding Operations (CAFOs). However, several state actions and newly proposed EPA guidance to states for CAFO regulation have alerted the poultry industry to upcoming rulemaking that would require most egg producing operations to obtain individual NPDES permits. The XL project proposed by UEP uses a less costly and less complex mechanism—a general permit and an EMS-based program—tailored to the needs of the egg-laying industry as an incentive for the industry's large producers to maintain superior facilities and practices.

The Superior Environmental Performance: The following environmental benefits are expected to accrue from this project:

- UEP members will work to establish and implement an EMS program that will standardize certain best management practices and operational procedures. The EMS program will also identify overall goals for the industry, general management procedures and practices (e.g., training, internal audits, record keeping, and maintenance), along with pollution prevention technologies. Each EMS at participating facilities will be subject to third-party audits as a condition of receiving a general permit and information from these audits will be available to the public.

- UEP plans to expand its industry education program. This will include printed and Internet information, demonstration projects, regional workshops, and other activities to promote effective nutrient management planning, employee training, and general permit compliance (including EMS implementation).

- UEP will help organize a third-party manure user program designed to help recipients of manure understand how to properly develop nutrient management plans and properly utilize CAFO-generated manure.

United States Postal Service (USPS) Denver

Denver, Colorado
Final Project Agreement Signed May 22, 2000

The Project Sponsor: The United States Postal Service (USPS) is perhaps the most visible of all federal services, carrying more mail to more people over a larger geographic area than any other country. The USPS has an annual operating revenue of $63 billion and invests billions of dollars annually in new or improved buildings and mail processing equipment ($3 billion in 1999). USPS submitted this project to Project XL and the Colorado Environmental Leadership Program. The USPS is currently evaluating its fuel vehicle fleet nationally to optimize resources and protect the environment by using low-emission vehicles.

The Experiment: This project is examining an innovative approach to managing a new fleet of flexible fuel vehicles (FFVs) for the USPS. The Colorado Clean Fuel Fleet (CCFF) program requires that new vehicle fleet purchases consist of at least 50 percent of vehicles that are low-emitting vehicles (LEVs). The USPS was unable to find a supplier when it requested bids for the required number of LEVs. However, the USPS received one bid that would supply transitional low-emitting vehicles (TLEVs), which do not meet the LEV requirements. USPS proposes to scrap 512 aging postal vehicles and replace them with FFVs that are capable of using unleaded gasoline with up to 85 percent ethanol (E-85). These vehicles will result in lower emissions and will promote the use of E-85 in the Denver area.

The Flexibility: The Denver area is currently a nonattainment area for carbon monoxide but is in the process of complying with national air quality standards. Although this project does not specifically ask for flexibility from federal regulations, the State of Colorado will grant the USPS flexibility through the Colorado Environmental Leadership Program. The State of Colorado will also submit a revision to its State Implementation Plan (SIP) for EPA approval. As the TLEVs do not meet CCFF requirements, the USPS requested flexibility to enable it to concentrate approximately 794 FFVs in the Denver area, eliminate 512 aging fleet vehicles from the Denver/Boulder nonattainment area, and relocate 282 1987-1991 USPS delivery vehicles. Colorado will give the USPS 512 emission credits to replace 512 aging vehicles—one credit for each vehicle replaced. The USPS can also receive up to 282 additional credits based on the amount of ethanol used in the vehicles. In addition, the State of Colorado will also give the USPS preferred vendor status and public recognition, as well as assistance in publicizing the XL project.

The Superior Environmental Performance: The following are the projected environmental benefits that are expected from this project:

- Introduction of approximately 794 FFVs within the Denver metropolitan area;
- A significant decrease in USPS's contribution to vehicle emissions within the Denver metropolitan area. The model year 2000 vehicle engines are cleaner burning and more fuel-efficient than the older model year vehicle engines they are replacing. For example, each of the vehicles to be replaced emits 250 pounds per year more carbon monoxide than each of the replacement FFVs. The net emissions reduction over a 20-year life cycle is estimated to be 432 tons of carbon monoxide, 24 tons of hydrocarbons, and 10 tons of nitrogen oxides;
- Expedited removal of 512 1975-1983 model year delivery vehicles from the Denver/Boulder nonattainment area. Vehicles will be removed from service and sold as scrap;
- Reduction in evaporative emissions of hazardous chemical constituents (e.g., benzene) associated with unleaded fuel dispensing;
- Increased market demand for E-85 fuel, both through the USPS's addition of the approximately 794 vehicles and the publicity that the project will provide regarding alternative fuel vehicles. These two factors will provide economic incentive to encourage retail fuel providers to convert existing gasoline storage tanks

to E-85 storage tanks. The USPS's involvement in Project XL and the Environmental Leadership Program are expected to increase the visibility and promote the uses of E-85 and alternative fuel vehicles. Additionally, as the commercial availability of E-85 increases, the purchase of dedicated alternative fuel vehicles, including FFVs and those that meet LEV or cleaner emissions standards, by vehicle fleets and private individuals will increase, thereby reducing mobile source emissions further;

- Creation of a USPS alternative fuel vehicle model for metropolitan areas that could be expanded and applied to other areas; and

- Reduction in risk from stored fuel, since the ethanol component of E-85 poses less risk to the environment and worker safety than traditional fuels.

USFilter Recovery Services, Inc.

Roseville, Minnesota
Final Project Agreement Signed September 21, 2000

The Project Sponsor: USFilter Recovery Services, Inc., is a subsidiary of Paris-based Vivendi, the leading global provider of commercial, industrial, municipal, and residential water and wastewater treatment systems, products, and services, with operations in more than 100 countries. The USFilter Recovery Services (USFilter) facility in Roseville, Minnesota, is in the business of treating inorganic industrial waste, and whenever technically and economically feasible, USFilter recovers the metals from the received wastes for recycling and reuse. Roseville is a suburb centrally located between the cities of Minneapolis and St. Paul.

The Experiment: In most electroplating and metal finishing manufacturing processes today, wash and rinse water is used once then treated on-site and discharged. USFilter proposes to install an ion exchange system at certain approved customers' facilities that removes metal contaminants from the water, making it available for reuse. The system consists of ion exchange canisters that USFilter would install on the customer's (primarily metal finishers and electroplaters) process lines that contain wastewaters. The ion exchange process causes the metals in the wastewater to adhere to the resin material in the canister, rendering the water free of metal contaminants. The water can then be reused in the customer's process lines. USFilter would collect the spent ion exchange canister containing the metals (using Minnesota Department of Transportation hazardous waste licensed transporters), replace the spent canister with a fresh one at the generator facility, and treat the spent resin at USFilter's facility in order to regenerate it.

The Flexibility: Those facilities that seek to use the USFilter ion exchange system would generate spent resins that are regulated as hazardous wastes under RCRA. In order to promote use of this system, flexibility has been granted to allow participating generators and transporters of the USFilter ion exchange wastes to replace certain existing RCRA requirements for hazardous waste generators and transporters with a comprehensive program implemented by USFilter. This program seeks to ensure that generators and transporters properly store and transport the USFilter water treatment ion exchange resins.

The Superior Environmental Performance: The following environmental benefits are expected from the USFilter project over three years:

- Reduction in discharge of neutralized effluent to the publicly owned treatment works by approximately 2.3 million gallons; and
- Recovery of approximately 2,250 pounds of copper, nickel, and zinc that would have been landfilled.

Waste Management, Inc., Virginia Landfill Bioreactors Project

King George County, Virginia
Amelia County, Virginia
Final Project Agreement Signed September 29, 2000

The Project Sponsor: Waste Management, Inc. (WM), provides comprehensive waste management services to more than 10 million residential customers and 1 million businesses. Based in Houston, Texas, WM operates a network of service facilities throughout the United States, Canada, Mexico, and Puerto Rico and is the largest company in its industry. WM proposes to implement and operate different bioreactor operations at the Maplewood Recycling and Waste Disposal Facility (Maplewood) in Amelia County, Virginia, and King George County Landfill and Recycling Center (King George) in King George County, Virginia. Maplewood is located approximately 30 miles southwest of Richmond, Virginia, and King George is located approximately 50 miles north-northeast of the city. The Maplewood and King George landfills are located in the same geographic area and receive similar waste streams.

The Experiment: In the past, the design goal of a "traditional" landfill was to minimize the quantity of water introduced into the landfill, thus minimizing leachate generation. The disadvantage to this approach is that the lack of liquid causes the biodegradation process to occur very slowly, thus leaving waste in a relatively undecomposed state for a long period. In this case, waste continues to be a potential source of groundwater contamination throughout the post-closure period of the landfill. Because biodegradation occurs slowly, the liner system is potentially exposed to leachate for a relatively long period of time. In a bioreactor landfill, controlled quantities of liquids are recirculated and/or added through waste as appropriate to accelerate the natural biodegradation rate of waste and therefore decrease the waste stabilization and composting time relative to what would occur within a conventional landfill. If the waste decomposes in the absence of oxygen (anaerobic decomposition), landfill gas or biogas is produced. Biogas is a mixture of methane, a major global warming contributing gas, carbon dioxide, and volatile organic compounds, which are local air pollutants. Methane gas, similar to natural gas, can be used as a fuel source if it is recovered and captured from the landfill.

This project will test two different methods for recirculating and adding leachate to the waste at the different landfills in order accelerate waste decomposition. The Maplewood bioreactor will involve the recirculation of leachate generated at the facility; and the King George bioreactor will involve the recirculation of leachate plus the addition of other liquids at the facility. Operating these landfills using two different application rates will allow the relative performance and cost-saving benefits of the two bioreactor approaches to be compared. Moreover, the waste received at these landfills is primarily municipal solid waste, making this experiment unique from other bioreactor projects in the XL program.

The Flexibility: As part of the project, WM will be granted regulatory flexibility from the requirement of RCRA that prohibits application of bulk liquids in municipal solid waste landfills (MSWLFs) and the recirculation of leachate in MSWLFs with alternative liner systems, as presented in Title 40 of the Code of Federal Regulations (40 CFR) Section 258.28.

The Superior Environmental Performance: The following superior environmental benefits are expected with this project:

- Reduction in source contamination in landfills and minimization of the threat to groundwater sources and surface water quality by accelerating the biodegradation of organic constituents in wastes;
- Increased waste screening to prevent the disposal of wastes that could adversely impact groundwater quality;

- Leachate containment within landfills due to construction of effective liner leachate containment systems; and
- Minimization of leachate formation by preventing the addition of liquids during the active life of the landfill.

Yolo County Bioreactor Project

YOLO COUNTY, CALIFORNIA
FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 14, 2000

The Project Sponsor: The Yolo County Central Landfill (YCCL) in the northeast City of Davis, California, encompasses 722 acres and is owned and operated by Yolo County. The YCCL was opened in 1975 for the disposal of nonhazardous solid waste, construction debris, and non-hazardous liquid waste. Existing on-site operations include an 11-year-old landfill methane gas recovery and energy generation facility, a drop-off area for recylables, a metal recovery facility, wood and yard waste recovery and processing area, and concrete recycling area.

The Experiment: The county proposes to operate its next 20-acre landfill module near Davis as a controlled bioreactor landfill to attain a number of superior environmental and cost savings benefits. In a bioreactor landfill, controlled quantities of liquids are added and circulated through waste as appropriate to accelerate the natural biodegradation rate of waste and therefore decrease the waste stabilization and composting time relative to what would occur within a conventional landfill. If the waste decomposes in the absence of oxygen (anaerobic decomposition), landfill gas or biogas is produced. In the first phase of this 20-acre project, a 12-acre module has been constructed. This 12-acre module contains one 9.5-acre cell, which will be operated anaerobically, and a 2.5-acre cell to be operated aerobically. The county will construct the second phase of Module D in two years and, depending on the results of the first phase of Module D, the county may operate the second phase either anaerobically or aerobically. The monitoring and reporting of the second phase of Module D are not discussed in this proposal as the county intends to revise the FPA in two years when more data become available from phase one of the project. The county decided to construct this 20-acre cell in two phases to reduce the construction cost of the project and be able to apply what is learned from the first phase to the second phase.

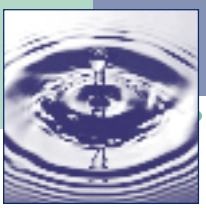
During the waste filling, horizontal gas wells will be constructed in both the aerobic and anaerobic cells. Gas will also be extracted from the base layer of both cells during waste filling. The purpose of this extraction system design is to lower methane emissions, one of the climate change contributing gases, that would normally be released to the atmosphere during filling in the anaerobic cells. An impermeable cover will be placed over each cell shortly after waste filling has been completed. Landfill gas will be collected from the anaerobic cell, and the aerobic cell atmospheric air will be pulled or pushed through the waste. In the aerobic cell, it is expected that this will increase the rate of degradation but inhibit methane formation. Many gas and leachate parameters will be monitored during the operation of these cells to collect in situ data as well as laboratory analysis.

The Flexibility: The county is requesting regulatory flexibility from the prohibition in 40 CFR 258.28 Liquid Restrictions, which may preclude addition of useful bulk or non-containerized liquid amendments. The county is proposing to supplement the liquid addition with groundwater, but would like to obtain the flexibility to possibly use other liquids, such as gray-water from a wastewater treatment plant, septic waste, and food-processing wastes that are currently land applied. Liquid wastes such as these, that normally have no beneficial use, may beneficially enhance the biodegradation of solid waste in a landfill for this project. The county intends to use leachate and groundwater first, but if not enough liquid is available then other liquids will be used.

The county also requests similar flexibility on liquid amendments from California and local regulatory entities. Several sections of the California Code of Regulations (CCR), Title 27, Environmental Protection, address the recirculation of liquids in lined municipal waste landfills. While the regulations do not specifically endorse bioreactors, regulatory flexibility is provided.

The Superior Environmental Performance: With a bioreactor landfill, superior environmental and waste management results include:

- Maximization of landfill gas control and capture of methane and volatile organic compounds emissions;
- Greater recovery of landfill methane;
- Landfill life extension and/or reduced landfill use;
- Greater capture of leachate and a decrease in the pollutant loads of leachate;
- More rapid waste stabilization; and
- Decreased long-term risks associated with the landfill.



Projects Under Development as of October 2000

Anne Arundel County Bioreactor Project

Severn, Maryland
Project Under Development

The Project Sponsor: The Millersville Landfill and Resource Recovery Facility is located on a 565-acre parcel of land in Severn, Maryland, approximately 10 miles south of Baltimore. The facility is owned and operated by Anne Arundel County and is the only active municipal solid waste landfill in the county. The facility handles about 390 tons per day of solid waste, of which about 130 tons per day is recovered for reuse and recycling and the remaining 260 or so tons per day is landfilled. Since late 1997 the landfill has accepted primarily construction debris wastes, and relatively small quantities of curbside municipal solid waste. The facility serves about 660 customers, including businesses and residents.

The Experiment: Anne Arundel proposes to operate a small-scale, controlled, fully monitored, and evaluated bioreactor pilot project at the Millersville landfill. Through the use of leachate recirculation, the bioreactor landfill will facilitate microbiological processes to transform and stabilize the decomposable organic waste within five to ten years. Bioreactors provide accelerated waste biodegradation, a means for recovery of air space capacity, enhancement of landfill gas generation rates and leachate quality, and reduction of long-term risks associate with landfills. Bioreactors minimize long-term environmental risk and liability due to the controlled settlement of the solid waste during landfill operation, reduced potential for leachate migration into the subsurface environment, and the recovery of landfill gas during operation. The bioreactor project will involve injecting a controlled amount of liquids through injection devices into a three-quarter-acre area of the landfill over time and monitoring the results. Although this project has similar goals to other bioreactor landfill XL projects, this project provides EPA with the opportunity to obtain data on the differing impacts that geography, climate, construction, design, maintenance, and waste streams may have on the performance of the bioreactor system.

The Flexibility: Since the project requires the introduction of liquids into a small portion of the landfill, the county proposes to recirculate their leachate. If the available leachate quantities are incapable of supplying amounts sufficient for the bioreactor to work efficiently, the county would like to supplement it with onsite stormwater runoff. Anne Arundel County is requesting flexibility from the RCRA requirements that restrict liquid waste introduction into landfills unless the waste is either household waste (excluding septic waste), leachate, or gas condensate from the landfill.

The Superior Environmental Performance: Anticipated environmental benefits of this project include data gathering relevant to the following long-term goals:

- Reduced need for construction of new landfills and corresponding reduction (or elimination) of the land, air, and water impacts associated with landfill construction;
- Decreased concentration of most leachate constituents as cycling of leachate removes or reduces contaminants;
- Reduction in the amount of leachate requiring pretreatment;
- Reduction in the amount of leachate that the facility discharges to the local wastewater treatment plant, and subsequent discharge of effluent to the Patuxent River; and
- Reduction in post-closure care, maintenance, and risk.

Chicago Regional Air Quality and Economic Development Strategy

Chicago, Illinois
Project Under Development

The Project Sponsor: The Chicago Department of Environment (CDOE) is working with other metropolitan communities to address the area's designation of severe ozone nonattainment. This, in part, means that the region exceeds the ozone levels necessary to protect public health and the environment. The region's nonattainment status impacts regional health as well as regional economic development.

The Experiment: The Chicago Regional Air Quality and Economic Development Strategy project is innovative because it creates a framework for addressing mobile and area pollution sources. Under the current system, in order for a new major facility or a major modification to an existing facility to occur in a nonattainment region, the new source must achieve the lowest achievable emissions rate (LAER) and offset its projected emissions by reducing emissions further from existing sources. With this project, new sources must still achieve LAER; however, instead of acquiring their own emission offsets, new sources may utilize offsets acquired by the municipality. CDOE plans to test the concept of having Chicago and other regional municipalities create emissions reductions from their local activities as part of its Campaigns for Clean Air and Development. The reductions would be used to create a growth allowance that would be used in lieu of new source review offsets.

The growth allowance would be available to companies who locate in proposed "development zones." Section 173(a)(1)(B) of the Clean Air Act (CAA) would be employed to identify the development zones. Section 173(a)(1)(B) of the CAA states that a new or modified source of air pollution may be issued a permit to construct if it is located in a zone within the nonattainment area identified by EPA, in consultation with the Secretary of Housing and Urban Development, as a zone to which economic development should be targeted. The new emission source must also not exceed the allowance permitted for the pollutants for that area.

This experiment will strive to promote growth and development in areas locally designated for redevelopment, thereby encouraging brownfield redevelopment, reducing impervious surfaces in certain areas, and protecting habitat and green space at the fringe of the metropolitan areas.

The Flexibility: This project does not seek regulatory flexibility. It would, however, utilize the growth allowance developed from mobile and area emissions reductions in the Campaigns for Clean Air and Development in lieu of new source offsets for development in the development zones. This is an innovative way to account for the offsets needed for new or modified sources of pollution. In addition, Section 173(a)(1)(B) of the CAA has not yet been exercised. By employing this section of the CAA, this project will work toward preventing urban sprawl.

The Superior Environmental Performance: The superior environmental benefits that are expected to accrue from this project include:

- Exceeding what is necessary to demonstrate attainment of national air quality standards by using the proposed growth allowance;
- Retiring 40 percent of the emissions reduction generated, while retaining the remainder for sources to use in lieu of obtaining offsets;
- Creating an incentive to implement programs under the Clean Air Campaigns by directing cost savings to new growth in development zones;
- Achieving reductions in mobile and area pollution sources above Federal and state goals; and
- Promoting industry development in such a manner so as to encourage brownfield redevelopment, reduce impervious surfaces in certain areas, and protect habitat and green space at the fringe of the metropolitan areas.

Crompton Corporation TBT Project

Greenwich, Connecticut
Project Under Development

The Project Sponsor: Crompton Corporation (Crompton), based in Connecticut, is a producer of tributyltin compounds (TBT), a compound used in the manufacturing of coatings for marine vessels. TBT-based paints assist in keeping ship hulls free of marine organisms by acting as both a biocide and as an agent that imparts a "self-polishing" quality to marine paints. In the late 1980s there was increasing concern about levels of TBT being found in the marine environment, in the vicinity of shipyards and marinas, and the toxic effects of such levels on various "non-target" marine organisms. In response to these concerns, in 1988 Congress passed the Organotin Antifouling Paint Control Act of 1988 (OAPCA). OAPCA aimed at reducing the amount of TBT loadings to the environment while permitting some continued use of TBT-based paints on large ocean-going vessels because of lower economic costs associated with the continued use of TBT-based paints. OAPCA also required that EPA and the Navy monitor TBT in the water column, tissues of marine organisms, and sediments over a ten-year period to determine whether the OAPCA-mandated regulatory restrictions on TBT use actually resulted in reduced TBT concentrations in the marine environment and no adverse effects in the marine environment, or to determine whether additional restrictions are needed. As a result, under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) EPA issued a data call-in (DCI) to Crompton and others who manufacture TBT-based paints to measure the adequacy of the current regulatory restrictions to protect "non-target" organisms. The 1989 DCI requires Crompton to monitor, for ten years, TBT concentrations in the water column, sediments, and the tissues of marine organisms at certain specified areas in the Great Lakes and other intercoastal waterways in the United States. To date, Crompton has gathered 1.25 years of data. The DCI data from Crompton and other registrants show a downward trend in TBT concentrations in the marine environment. These data are consistent with data gathered by the U.S. Navy, the National Oceanic and Atmospheric Administration, and the National Status and Trends Mussel Watch.

The Experiment: Crompton is proposing a reduction in the emission of hazardous air pollutants and volatile organic compounds (VOCs) from its plant in Taft, Louisiana.

The Flexibility: Crompton seeks to end required TBT monitoring under the DCI and to use the savings to decrease air emissions at its plant.

The Superior Environmental Performance: The following benefits in superior environmental performance will likely result from this project:

- Reduction in emissions of hazardous air pollutants—methyl chloride, toluene, and hexane—by approximately 4 tons per year;
- Reduction in emissions of certain VOCs by approximately 12 tons per year;
- Reduction in total hazardous waste production by 48,000 pounds per year; and
- Reduction in nonhazardous waste that is currently deep well injected.

New Jersey Department of Environmental Protection Gold Track Program

State of New Jersey
Project Under Development

The Project Sponsor: In November 1996, the New Jersey Department of Environmental Protection (NJDEP) embarked upon the development of a tiered environmental performance system, the Silver and Gold Track Program, which rewards participating facilities for committing to high standards of environmental achievement. The Silver Track portion of the program was implemented in September of 1999 and includes baseline incentives such as expedited permitting, consolidated reporting, and facility recognition. As New Jersey continues to face numerous environmental management challenges related to its industrial history, the nature of its economy, high population density, and intensive land development patterns, the implementation of the Silver and Gold Track program is viewed as an innovative strategy to promote high standards of environmental protection throughout the state.

The Experiment: NJDEP is working on a statewide XL approach to its experimentation with the Gold Track Program for Environmental Performance. The Silver Track tier provides moderate levels of operational incentives that do not require the granting of Federal regulatory flexibility. In contrast, the Gold Track tier will seek to test the concept of providing some Federal regulatory flexibility based on a higher level of environmental commitment made by the participating facility. Under this project, NJDEP would be responsible for oversight of participating facilities and would be empowered to administer, via the XL mechanism and to the extent possible, all of the flexibility described in the Gold Track Final Project Agreement and media-specific Addenda.

The Flexibility: The Gold Track proposal will use the XL mechanism to enable NJDEP to negotiate Federal regulatory flexibility as an incentive under Gold Track. The FPA would include an outline of the process and criteria for admission into and administration of Gold Track. Specific regulatory flexibility would be presented and described in media-specific addenda to the FPA, followed by any necessary rulemaking to make the project legally enforceable.

The Superior Environmental Performance: The following represent the range of "beyond compliance" environmental benefits that could be expected from Gold Track participants:

- Reduced carbon dioxide (CO_2) emissions by 3.5 percent over 1990 levels by 2005;
- Increased use of environmental management systems;
- Enhanced recycling, water balance analysis, energy conservation, process change, or other substantive facility modifications which enhance environmental protection with reasonable milestone status reporting and program implementation deadlines;
- Reduced emissions of signature pollutants in addition to CO_2 (nitrogen oxides and volatile organic compounds), and certain hazardous air pollutants such as mercury; and
- Greater use of comprehensive facility monitoring and consolidated targeted environmental tracking and reporting.

Port of Houston Authority

Houston, Texas
Project Under Development

The Project Sponsor: The Port of Houston extends approximately 25 miles south of the City of Houston, and consists of both private and public terminals with more than 7,000 ships and 100,000 barges traveling through the port each year. The Port of Houston Authority (PHA) owns and operates public terminals and facilities along the Houston Ship Channel. In addition, there are a number of private terminal owners who operate a variety of cargo facilities, including a $15 billion petrochemical facility. A total of 156 million tons of cargo are shipped through the port annually, of which 26 million tons of cargo pass through PHA facilities. PHA oversees approximately 150 tenants who are engaged in a number of activities that have a direct impact on the marine environment.

The Experiment: PHA is proposing to test an advanced tenant environmental management and inspection program that has the potential to be used by other ports nationwide to improve the environmental compliance of poor tenants by developing an easy-to-use handbook that will describe the elements of, and process for, developing a highly effective tenant program. The tenant inspection and management program will allow EPA and state agencies to effectively reallocate resources to concentrate on those tenants that have poor compliance records and provide greater incentives for complying tenants.

The Flexibility: The regulatory flexibility for this project will be implemented through the development of an Environmental Response Policy in which EPA aims to clearly outline and agree to exercise their prosecutorial discretion in a manner favorable to the PHA. The Agency would look first to the tenants for remediation of violations for which tenants and PHA, in its capacity as an owner, are simultaneously potentially liable, in exchange for PHA undertaking the commitments outlined in the PHA's XL proposal.

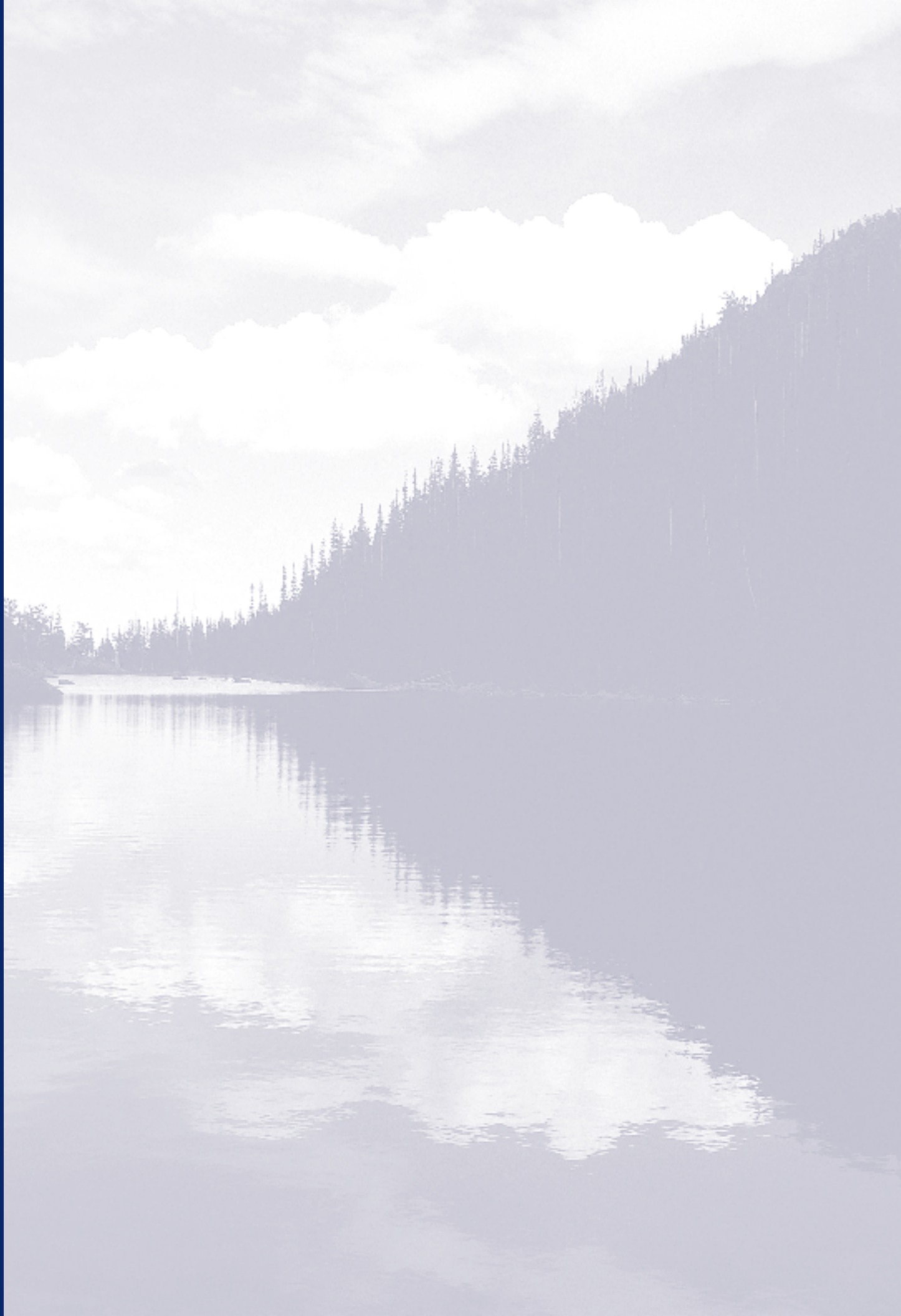
The Superior Environmental Performance: The tenant environmental management program is expected to demonstrate superior environmental performance by:

- Improving environmental compliance;
- Encouraging proactive environmental management by requiring tenants to enroll in the TNRCC's permanent pollution prevention program; and
- Redirecting more enforcement resources to problem tenants.

In addition to implementing an inspection and compliance program, PHA will put in place an emissions reduction strategy that will reduce nitrogen oxides (NO_x) and particulate emissions from non-road equipment operated at PHA's facilities. The emissions reduction strategy will include the following:

- PuriNOX diesel fuel derivative will be used by PHA's yard haulers to reduce NO_x and particulate matter in emissions. Yard haulers are non-road-going diesel trucks that are used to haul containers from ships to storage areas at the Port's cargo and container staging area. These vehicles are not subject to the EPA vehicle emissions standards. PHA currently operates a fleet of 293 of these vehicles. If fully implemented, PHA estimates use of Paranoias would result in a 342.1 ton per year reduction in NO_x emissions and 49.8 ton per year reduction in particulate emissions.
- PHA will conduct a demonstration project to determine the feasibility of installing selective catalytic reduction (SCR) technology in its rubber tire gantry (RTG) cranes. If fully implemented, PHA estimates the installation of SCR technology in each of its 29 RTG cranes will reduce NO_x emissions 189.7 tons per year and particulate emissions by 6.8 tons per year.

Appendices



Appendix A: Information Sources and Methodology

This report relies on the cumulative information from a number of sources. The sections below describe these sources with brief descriptions of the methodologies involved in developing them.

Sponsor's Reports

Project sponsors prepare quarterly, midyear, or annual reports as required by the individual project FPAs. For more information on these reports, please visit EPA's Project XL Web site at *http://www.epa.gov/projectxl*.

EPA Progress Reports

Progress reports completed in March and December 1999 provide an overview of the status of projects implementing final project agreements for one year or more. These reports are developed by EPA with the assistance of the project sponsors and co-regulators; the stakeholders who are direct participants in the projects have the opportunity to review them. The progress reports include (1) a background section briefly describing the facility's project and anticipated environmental benefits; (2) a description of the regulatory flexibility offered by EPA and other regulatory agencies; (3) a summary of innovations and potential system change; (4) the status of commitments made by the facility; (5) a review of the progress in environmental performance; (6) a summary of the stakeholder involvement for the project; (7) names and organizations of the project contacts; and (8) a six-month outlook section. These progress reports are available on the Internet via EPA's Project XL Web site at *http://www.epa.gov/projectxl*.

Project Focus Groups

EPA conducted focus groups in December 1998, January 1999, and January 2000 for various projects. Focus group participants included company employees, co-regulator representatives (typically state and local government), citizen and non-government organization stakeholders, and EPA Headquarters and regional staff. Project-specific protocols were distributed to participants prior to each focus group conference call. During the focus groups, participants gave opinions on (1) the ease and effectiveness of the project implementation process; (2) the value of the project to their organization; and (3) the opportunities to apply information gained from the projects more broadly. These are part of an annual program evaluation cycle for Project XL and serve as an opportunity for project participants to provide feedback to EPA on any aspect of their experience in developing and implementing a project. A list of the focus groups and their participants are included in Appendix B of this Volume.

Stakeholder Involvement Reports

In September 1998, a report entitled *Evaluation of Project XL Stakeholder Processes* (EPA-100-R-98-009) was prepared by Resolve, Inc. This report provided a review of the design and conduct of the stakeholder processes at four of the initial projects (Intel, Weyerhaeuser, HADCO, Merck). The report described the involvement of stakeholders in final project agreement (FPA) negotiation and implementation, with information on national and local stakeholder perspectives about their role. It also outlined the various models developed by

company sponsors and reported stakeholder perspectives on the processes as gathered in a stakeholder survey.

In 1999, EPA initiated a second extensive evaluation, which has been conducted by the Southeast Negotiation Network. *Project XL Stakeholder Involvement Evaluation* (Draft—April 2000) covers eight projects in various stages of negotiation or implementation (Andersen, Atlantic Steel, CK Witco, ExxonMobil, HADCO, Intel, New England Labs, and Vandenberg). It considers the early dynamics of stakeholder processes in projects developing their final project agreement, stakeholder satisfaction and effectiveness of involvement for projects that had recently signed their agreements, and the status of ongoing involvement in projects that have been underway for at least one year.

Other EPA Reports

The *Project XL Preliminary Status Report* (September 1998) examined three projects in implementation for at least a year as of January 1998: Berry, Intel, and Weyerhaeuser. The report covers the projects' initial results on innovation and system change, as well as progress in meeting final project agreement commitments, stakeholder participation outcomes, environmental performance, and lessons learned.

The *Project XL 1999 Comprehensive Report* (October 1999) provides an overview of the status of 14 projects, as well as program-wide results and lessons learned. It also presents technical and policy information on 25 innovations sorted by core functions. Information compiled in progress reports, focus groups, stakeholder reports, and other documentation and information gained through the experience of Agency staff is synthesized and described. The report follows up the work started in the *Preliminary Status Report*.

Appendix B: List of Focus Groups Participants

Crompton Corporation Sistersville Facility (formerly Witco)

FOCUS GROUP CONDUCTED IN DECEMBER 1998

Name	Organization
Okey Tucker	Crompton
Tony Vandenberg	Crompton
Brenda Gotanda	Manko, Gold & Katcher
Lucy Pontiveros	West Virginia Department of Environmental Protection
Jon McClung	West Virginia Department of Environmental Protection
Tad Radzinski	EPA Region 3
Beth Termini	EPA Region 3
Nancy Birnbaum	EPA Office of Environmental Policy Innovation
Sherri Walker	EPA Office of Environmental Policy Innovation
Jim McKnight *	Citizen Stakeholder
Michele Aston *	EPA Office of Air Quality Planning and Standards

ExxonMobil

FOCUS GROUP CONDUCTED IN JANUARY, 2000

Name	Organization
Art Chin	ExxonMobil USA
John Hannig	ExxonMobil USA
Tom Bass	West Virginia DEP
Melissa Pennington	EPA Region 3
Michael Cummings	Fairmont Community Liaison Panel
Nick Fantasia	Fairmont Community Liaison Panel
David Nicholas	EPA Headquarters
Katherine Dawes	EPA Office of Environmental Policy Innovation
Greg Ondich	EPA Office of Environmental Policy Innovation
Ian Penn	EPA Office of Environmental Policy Innovation

HADCO Corporation

FOCUS GROUP CONDUCTED IN DECEMBER 1998

Name	Organization
Lee Wilmot	HADCO Corporation
George Frantz*	EPA Region 1
Ken Rota*	EPA Region 1
Aleksandra Dobkowski	EPA Region 2
James Sullivan	EPA Region 2
Ken Marschner	New Hampshire Department of Environmental Services
Larry Nadler	New York State Department of Environmental Conservation
Sam Sage	New York Local Stakeholder

Intel Corporation

FOCUS GROUP CONDUCTED IN DECEMBER 1998

Name	Organization
Jim Larsen	Intel Corporation
Gregg Workman	Arizona Department of Environmental Quality
Jo Crumbaker	Maricopa County
Pat Sampson	City of Chandler
Barbara Knox	Community Advisory Panel
Jim Lemmon	Community Advisory Panel
David Matusow*	Community Advisory Panel
Colleen McKaughan	EPA Region 9

FOCUS GROUP CONDUCTED IN DECEMBER 1999

Jim Larsen	Intel Corporation
Steve Brittle	Local Citizen
Jim Lemmon	Local Citizen
Greg Workman	Arizona Department of Environmental Quality
Jo Crumbaker	Maricopa County, Arizona
Pat Sampson	City of Chandler, Arizona
Colleen McKaughan	EPA Region 9
Katherine Dawes	EPA Office of Environmental Policy Innovation

** These persons were unable to attend the scheduled focus group and so were either interviewed separately or asked to submit written comments.*

Jack M. Berry, Inc.

Focus Group conducted in December 1998

Name	Organization
Charlie Fast	Cargill, Inc.
Ernie Caldwell	Jack M. Berry, Inc.
Jacki McGorty*	Florida Department of Environmental Protection
Chad Carbone*	EPA Office of Environmental Policy Innovation
Michelle Glenn	EPA Region 4
Zylpha Pryor	EPA Region 4

Merck Stonewall Plant

Focus Group conducted in December 1998

Name	Organization
Ted Jett	Merck & Co., Inc.
Stephen Klevickis	Merck & Co., Inc.
Stephen Tarnowski	Merck & Co., Inc.
Larry Simmons	Virginia Department of Environmental Quality
Mike Kiss	Virginia Department of Environmental Quality
Christi Gordon	National Park Service, Shenandoah National Park
Betty Sellers	Elkton Community
Cecil Rodrigues	EPA Region 3
Robin Moran	EPA Region 3
Nancy Birnbaum	EPA Office of Environmental Policy Innovation

Focus Group conducted in January 2000

Ted Jett	Merck & Co., Inc.
Greg Ondich	EPA Office of Environmental Policy Innovation
Eric Marsh	EPA Office of Environmental Policy Innovation

Molex Corporation

Focus Group conducted in December 1999

Name	Organization
Paul Eckerson	Molex Corporation
Bill Gilley	Nebraska Department of Environmental Quality
Gerardo Talero	City of Lincoln, Nebraska
Miles Takaki	World Resources Corporation (Stakeholder)
Allen Moser	World Resources Corporation (Stakeholder)
David Doyle	EPA Region 7
Bob Richards	EPA Region 7
Katherine Dawes	EPA Office of Environmental Policy Innovation
Ian Penn	EPA Office of Environmental Policy Innovation
Mitch Kidwell	EPA Office of Environmental Policy Innovation
Greg Ondich	EPA Office of Environmental Policy Innovation
Jim Lounesbury	EPA Headquarters
Marilyn Jude	EPA Headquarters
Christine Mason	EPA Headquarters

** These persons were unable to attend the scheduled focus group and so were either interviewed separately or asked to submit written comments.*

Vandenberg Air Force Base

Focus Group conducted in January 2000

Name	Organization
Monte McVay	Vandenberg Air Force Base
John Gunderson	Vandenberg Air Force Base
Lt. Col. Scott Westfall	Vandenberg Air Force Base
Nancy Wilhausen	Tetra Tech (Vandenberg AFB contractor)
Peter Cantle	Santa Barbara County Air Pollution Control District
Jerry Schiebe	Santa Barbara County Air Pollution Control District
Dave Romano	Santa Barbara County Air Pollution Control District
Ron Tan	Santa Barbara County Air Pollution Control District
Maureen Sullivan	Department of Defense, Pentagon
Col. John Coho	Department of Defense, Pentagon
Joe Wilson	Department of Defense, Pentagon
Sara Segal	EPA Region 9
John Walser	EPA Region 9, Air Office
Will Garvey	EPA Federal Facilities Restoration and Reuse Office
Walter Walsh	EPA Office of Environmental Policy Innovation

Weyerhaeuser Company

Focus Group conducted in December 1998

Name	Organization
Frank Wohrley	Weyerhaeuser Flint River Operations
Terrell Aldridge	Weyerhaeuser Flint River Operations
Willard Parker	Weyerhaeuser Flint River Operations
Mark Johnson	Weyerhaeuser, Atlanta, Georgia
Harland Cofer	Georgia Southwestern University (Local Stakeholder)
David Word	Georgia Environmental Protection Division
Bob Donaghue	Georgia Pollution Prevention Assistance Division
Lee Page	EPA Region 4
Michelle Glenn	EPA Region 4
Karrie Jo Shell	EPA Region 4
Nancy Birnbaum	EPA Office of Environmental Policy Innovation

Focus Group conducted in December 1999

Gary Strandburg	Weyerhaeuser Flint River Operations
Frank Worhrley	Weyerhaeuser Flint River Operations
Mark Johnson	Weyerhaeuser Flint River Operations
Gary Risner	Weyerhaeuser Flint River Operations
Harland Cofer	Georgia Southwestern University (Local Stakeholder)
Lee Page	EPA Region 4
Steve Shedd	EPA Region 4
Katherine Dawes	EPA Office of Environmental Policy Innovation
Greg Ondich	EPA Office of Environmental Policy Innovation
Ian Penn	EPA Office of Environmental Policy Innovation

Glossary

Adsorbable Organic Halogens (AOX): AOX is a measurement of the amount of organic halogens present in water. In paper manufacture organic halogens are commonly byproducts of chlorine bleaching processes. The AOX value is expressed in equivalent chlorine.

Aerobic: Life or processes that require, or are not destroyed by, the presence of oxygen. (See: anaerobic.)

Aluminum Chemical Vapor Deposition Process: A dry process used for the current generation semiconductor device technologies. Vapor deposition technologies include processes that put materials into a vapor state via condensation, chemical reaction, or conversion.

Anaerobic: A life or process that occurs in, or is not destroyed by, the absence of oxygen.

Area of Contamination (AOC): A non-discrete land area on which there is generally dispersed contamination. Generally, for contaminated soil, considered are sampling locations that indicate observed contamination and the area lying between such locations to be an area of observed contamination. Asphalt or other impenetrable materials contaminated by site-related hazardous substances may be considered areas of observed contamination.

Asbestos-Containing Waste Materials (ACWM): Mill tailings or any waste that contains commercial asbestos and is generated by a source covered by the Clean Air Act Asbestos NESHAPS.

Attainment Area: A designated geographic area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Baseline Standard: The measure by which future environmental performance can be compared.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Biochemical Oxygen Demand (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

Biodegradable: Capable of decomposing under natural conditions.

Black liquor: Spent cooking liquor that has been separated from the pulp produced by the kraft, soda, or semi-chemical pulping process.

Brownfield: Abandoned, idled, or under used industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Catalytic Oxidation: Catalytic oxidation is an alternative technology used in selective applications to greatly reduce emissions due to VOCs, hydrocarbons, odors, and opacity in process exhaust. VOCs are thermally destroyed at high temperatures by using a solid catalyst. Catalyst systems used to oxidize VOCs typically use metal oxide.

Categorical Industrial User: An industrial user which is subject to a categorical standard promulgated by EPA.

Categorical Pretreatment Standard: A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system.

Chemical Oxygen Demand (COD): A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chloroform: A colorless liquid with a sweet odor. It is used primarily in the production of chlorofluorocarbon and in the production of plastics. Its other uses are as an industrial solvent in the extraction and purification of some antibiotics, alkaloids, vitamins, and flavors; as

a solvent for lacquers, floor polishes, resins, fats, adhesives, oils, and rubber.

Clean Air Act (CAA): The Clean Air Act is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

Clean Water Act (CWA): The Clean Water Act sets the basic structure for regulating discharges of pollutants to waters of the United States. The law gives EPA the authority to set technology-based effluent standards on an industry basis and continues the requirements to set water quality standards for all contaminants in surface waters. The CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a National Pollutant Discharge Elimination System (NPDES) permit is obtained under the Act.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): CERCLA is the legislative authority for the Superfund program funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List (NPL), investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions.

Conditional Delisting: Use of the petition process to have a facility's toxic designation rescinded.

Conformity: Conformity is a Clean Air Act requirement intended to ensure that new transportation investments do not jeopardize air quality in nonattainment and maintenance areas. According to the Clean Air Act, no transportation activity can be funded or supported by the Federal government unless it conforms to the purpose of a state's air quality plan. An EPA rule describing the criteria and procedures for determining conformity is found in 40 CFR parts 51 and 93.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

Consumptive Water Use: Water removed from available supplies without return to a water resources system, e.g., water used in manufacturing, agriculture, and food preparation.

Continuous Emission Monitoring (CEM): Continuous measurement of pollutants emitted into the atmosphere in exhaust gases from combustion or industrial processes.

Criteria Air Pollutants: The CAA requires EPA to set National Ambient Air Quality Standards (NAAQS) for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six criteria air pollutants—ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxides. EPA must describe the characteristics and potential health and welfare effects of these pollutants.

Data Call-In: A part of the Office of Pesticide Programs (OPP) process of developing key required test data, especially on the long-term, chronic effects of existing pesticides.

Dioxin: Any one of a family of compounds known chemically as dibenzo-p-dioxins. Concern about dioxin arises from their potential toxicity as a contaminant in commercial products. Tests on laboratory animals indicate that dioxin is one of the most toxic of synthetic compounds.

Discharge Monitoring Reporting (DMR): Facilities that discharge wastewater directly from point sources to surface waters must submit DMRs under National Pollution Discharge Elimination System (NPDES) wastewater permitting.

Dredge/Dredging: Removal of mud from the bottom of water bodies. This can disturb the ecosystem and causes silting that kills aquatic life. Dredging of contaminated muds can expose biota to heavy metals and other toxics. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human action(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose response assessments, and risk characterization.

Effluent: Wastewater or other liquid, raw (untreated), partially or completely treated, flowing from an industrial user, treatment process or treatment plant.

Electroplating Operations: Involves plating various metals onto printed wiring boards and computer components that provide electronic interconnection.

Emergency Planning and Community Right to Know (EPCRA): Also known as Title III of SARA, EPCRA was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards.

Emissions Cap: A limit designed to prevent projected growth in emissions from both existing and future stationary sources from exceeding any mandated levels. Generally, such provisions require that any emission increase from equipment at a facility be offset by emission reductions from other equipment under the same cap.

End-of-Pipe Controls: Technologies, such as scrubbers on smokestacks and catalytic convertors on automobile tailpipes, that reduce the emission or discharge of pollutants to the environment after they have formed.

Engineering Evaluation/Cost Analysis (EE/CA): The EE/CA is a flexible document tailored to identify and analyze the scope, goals, objectives and effectiveness of a non-time critical removal action. It contains only those data necessary to identify the selection of a response alternative, and relies on existing documentation whenever possible.

Environmental Council of States (ECOS): The mission of ECOS is to improve the environment of the United States by providing for the exchange of ideas, views and experiences among states and territories, fostering cooperation and coordination in environmental management, and articulating state positions on environmental issues.

F006 Listing: A hazardous waste that is wastewater treatment sludge produced from nonspecific electroplating processes and operations.

Feasibility Study (FS): Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS."

Fenceline Standard: A baseline standard measured at the property line of a facility.

Flexible Fuel Vehicle (FFV): A vehicle specially designed to use methanol or regular unleaded gasoline in any combination from a single tank. The vehicles have a special sensor on the fuel line that detect the ratio of methanol to gasoline that is in the tank. The vehicle's fuel injection and ignition timing are adjusted by an on-board computer to compensate for the different fuel mixtures.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fugitive Emissions: Emissions not caught by a capture system

Gasification: Conversion of solid material such as coal into a gas for use as a fuel.

Global Positioning System (GPS): A precise surveying system based on a set of satellites that orbit about 12,000 miles above the earth. On earth, a hand-held specialized computer, a portable GPS receiver, can receive signal from a GPS satellite above the horizon. The receiver then calculates absolute position, an accuracy that is usually within a few feet, or better.

Greenfield: Greenfields are generally parkland, previously undeveloped open space and agricultural lands, located near the outskirts of towns, cities and larger metropolitan areas. (See: Brownfield.)

Hazardous Air Pollutants (HAPs): Air pollutants that are not covered by the National Ambient Air Quality Standards but that may have an adverse effect on human health or the environment. Such pollutants include asbestos, beryllium, mercury, benzene, coke-oven emissions, radionuclides, and vinyl chloride.

Hazardous Waste: Byproducts of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Hazardous waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Hydrogen Chloride: Hydrogen chloride is a noncombustible compound that is highly soluble in water. In aqueous solution, it forms hydrochloric acid. Hydrochloric acid is used to make and clean metals, to make chloride dioxide for the bleaching of pulp and other chemicals, to make phosphate fertilizers and hydrogen, for the neutralization of basic systems, in the treatment of oil and gas wells, in analytical chemistry, and in the removal of scale from boilers and heat-exchange equipment.

Hydrogen Flouride: Hydrogen fluoride, or hydrofluoric acid, is a colorless gas or fuming liquid. It is a chemical intermediary for fluorocarbons, aluminum fluoride, cryolite, uranium hexafluoride, and fluoride salts. It is used in fluorination processes, as a catalyst, and as a fluorinating agent in organic and inorganic reactions. It is used to clean cast iron, copper, and brass; remove efflorescence from brick and stone; or sand particles from metallic castings.

Indirect Discharge: Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Influent: Wastewater or other liquid, raw (untreated), partially or completely treated, flowing into a treatment process or treatment plant.

Industrial User: Any non-domestic source that introduces pollutants into a municipal wastewater collection system [40CFR 403.3(h)].

Interference: A discharge which, alone or in conjunction with a discharge from other sources, both (1) inhibits or disrupts the POTW; and (2) therefore is a cause for violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

International Organization for Standardization (ISO) 14000: ISO 14000 is primarily concerned with environmental management. The ISO 14000 series sets out the methods that can be implemented in an organization to minimize harmful effects on the environment caused by pollution or natural resource depletion.

Kraft Mill: Any industrial operation which uses for a cooking liquor an alkaline sulfide solution containing sodium hydroxide and sodium sulfide in its pulping process.

Land Disposal Restrictions (LDR): Rules that require hazardous wastes to be treated before disposal on land to destroy or immobilize hazardous constituents that might migrate into soil and ground water.

Lignin: Organic substance which acts as a binder for the cellulose fibers in wood and certain plants and adds strength and stiffness to the cell walls. It imparts considerable strength to the wall and also protects it against degradation by microorganisms.

Low-emitting Vehicles (LEVs): A vehicle that emits 0.075 g of hydrocarbons per mile.

Maximum Available Control Technology (MACT): The emission standard for air pollution sources requiring the maximum reduction of hazardous emissions, taking cost and feasibility into account. Under the CAA Amendments of 1990, the MACT must not be less than the average emission level achieved by controls on the best performing 12 percent of existing sources, by category, of industrial and utility sources.

Maximum Containment Level (MCL): The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Methanol: An alcohol that can be used as an alternative fuel or as a gasoline additive. Poisonous if ingested.

Methyl Chloride: A colorless flammable gas. Used in the production of chemicals, as a solvent and refrigerant, and as a food additive. Mildly toxic if inhaled.

Metallization: The fabrication step in which proper interconnection of circuit elements is made. The act or process of imparting metallic properties to something.

Mobile Source: Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, and locomotives.

"The MON": The National Emission Standard for Hazardous Air Pollutants (NESHAP) for the source category "Miscellaneous Organic Chemical Production and Processes." Some examples of these processes are: explosives production; photographic chemicals production; polyester resins production; and the production of paints, coatings and adhesives.

Multimedia: Several environmental media, such as air, water, and land.

National Ambient Air Quality Standards (NAAQS): Standards established by EPA under the Clean Air Act applicable to outdoor air throughout the country.

National Contingency Plan (NCP): The federal regulation that guides determination of the sites to be corrected under both the Superfund program and the program to prevent or control spills into surface waters or elsewhere.

National Emissions Standards for Hazardous Air Pollutants (NESHAPs): Emissions standards set by EPA for air pollutants not covered by National Ambient Air Quality Standards (NAAQS), that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. Primary standards are designed to protect human health, and secondary standards are designed to protect public welfare (e.g., building facades, visibility, crops, and domestic animals).

National Pollutant Discharge Elimination System (NPDES): A provision of the CWA that prohibits the discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a State, or where delegated, by a Tribal government on an Indian reservation.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Trust Fund for remedial action.

New Source Performance Standards (NSPS): Uniform national EPA air emission and water effluent standards which limit the amount of pollution allowed from new sources or from modified existing sources.

New Source Review (NSR): The NSR provisions of the Clean Air Act strive to ensure that potential new sources of air pollution (new plants or facilities, or additions to existing ones) take proper steps to minimize pollution levels. The goals of the NSR program are (1) to ensure that an increase in emissions due to a new source or modification to an existing source does not significantly deteriorate air quality; (2) to ensure that source emissions are consistent with applicable State attainment plans; (3) to ensure that air quality related values are not negatively impacted in areas that have greater pollution problems; and (4) to establish control technology requirements that maximize productive capacity while minimizing impacts on air quality.

Nitrogen Oxides (NOx): Air pollutants that are the result of photochemical reactions of nitric oxide in ambient air. Typically, it is a product of combustion from transportation and stationary sources. It is a major contributor to the formation of tropospheric ozone, photochemical smog, and acid deposition.

Nonattainment Area: A designated geographic area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act. (See: Attainment.)

Non-time-critical Removal (NTC): Those removals where, based on the site evaluation, the lead agency determines that a removal action is appropriate and that there is a planning period of more than six months available before on-site activities begin.

Organic Compounds: Naturally occurring (animal or plant-produced) or synthetic substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Oxygen Delignification: Use of oxygen to remove lignin from pulp after high-density stock storage and prior to the bleaching system. Oxygen delignification system equipment includes the blow tank, washers, filtrate

tanks, any interstage pulp storage tanks, and any other equipment serving the same function as those previously listed.

Particulate Matter (PM): Fine liquid or solid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Phosphine: Phosphine occurs as a colorless, flammable gas that is slightly soluble in water. It is used as an intermediate in the synthesis of flame retardants for cotton fabrics, as a doping agent for n-type semiconductors, a polymerization initiator, and a condensation catalyst.

Plant Site Emission Limits (PSELs): Plant site emission limits are facility based emission caps that allow production changes and facility expansion without recurring air quality permit reviews.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollution Prevention: 1. Identifying areas, processes, and activities which create excessive waste products or pollutants in order to reduce or prevent them through alteration, or eliminating a process. Such activities, consistent with the Pollution Prevention Act of 1990, are conducted across all EPA programs and can involve cooperative efforts with such agencies as the Departments of Agriculture and Energy. 2. EPA has initiated a number of voluntary programs in which industrial, or commercial or "partners" join with EPA in promoting activities that conserve energy, conserve and protect water supply, reduce emissions or find ways of utilizing them as energy resources, and reduce the waste stream.

Pass-through: A discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with other discharge sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Perfluorinated compounds (PFCs): Compounds in which all the hydrogen atoms are replaced by fluorine. PFCs are greenhouse gases and are expected to have long atmospheric lifetimes.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Potentially Responsible Party (PRP): A PRP is the owner or operator of a contaminated site, or the person or persons whose actions or negligence may have caused the release of pollutants and contaminants into the environment, requiring a remedial action response under CERCLA and SARA. The PRP is potentially liable for the cleanup costs in order to compensate the government for its remediation expenditures.

Pretreatment: Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non- domestic sources before they are discharged into publicly owned treatment works (POTWs).

Premanufacture Notification (PMN): Section 5 of TSCA regulates anyone who plans to manufacture or import a "new" chemical substance for commercial purposes. Under section 5, EPA requires notice before manufacture or importation of non-exempt substances so that EPA can evaluate whether the chemical substance poses a threat to human health or the environment. This notice is called a premanufacture notice (PMN).

Prevention of Significant Deterioration (PSD): Standards aimed at keeping areas that are in compliance with National Ambient Air Quality Standards from backsliding.

Printed Wiring Board (PWB): A device that provides electronic interconnections and a surface for mounting electronic components.

Production Unit Factor (PUF): A production-based performance measure.

Pyrolyzed: (Pyrolysis): Decomposition of a chemical by extreme heat.

Radiolabel: To tag (a hormone, an enzyme, or other substance) with a radioactive tracer.

Relative Accuracy Test Audits (RATA): The primary method of determining the correlation of continuous emissions monitoring system data to simultaneously collected reference method test data, using no fewer

than nine reference method test runs conducted as outlined in 40 CFR 60, Appendix A.

Regulated Asbestos-containing Material (RACM): Under the asbestos NESHAP, RACM is defined as (1) friable asbestos material, (2) Category I non-friable Asbestos Containing Material (ACM) that has become friable, (3) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (4) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

Remedial Investigation (RI): An in-depth study designed to gather data needed to determine the nature and ex- tent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS."

Remining: The surface mining of previously-mined and abandoned surface and underground mines to obtain remaining coal reserves.

Remote Monitoring Station: Self-contained multidetector electronic instruments installed at remote locations in creeks and other water bodies to assess ambient water quality and detect real-time changes of dissolved oxygen, pH, conductance and temperature.

Removal action: A removal action is a short-term federal response to prevent, minimize, or mitigate damage to the public or the environment at sites where hazardous substances have been released. Examples of removal actions are excavating contaminated soil, erecting a security fence, or stabilizing a berm, dike, or impoundment. Removal actions may also be necessary in the event of the threat of release of hazardous substances into the environment such as taking abandoned drums to a proper disposal facility. Removal actions may take place at NPL or non-NPL sites.

Remedial Action: Remedial actions are actions documented in the ROD that are taken at NPL sites to eliminate or reduce the pollution to levels which prevent or minimize the release of hazardous substances so that they do not migrate or cause substantial danger to public health or welfare, or the environment. An example is to remove hazardous constituents from groundwater using pump and treat technologies.

Resource Conservation and Recovery Act (RCRA): Passed in 1976, RCRA gives EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of nonhazardous wastes. RCRA enables EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned sites.

Response Action: Generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems. A CERCLA-authorized action involving either a short-term removal action or a long-term remedial response.

Record of Decision (ROD): A ROD documents the remedy decision for a site or operable unit. The ROD certifies that the remedy selection process has followed the requirements of CERCLA and the NCP, and discusses the technical components of the remedy. The ROD also provides the public with a consolidated source of information about the site.

Reverse Osmosis (RO): Reverse osmosis is a high-pressure filtration process which separates dissolved salt and minerals from water, using a membrane. Clean water passes through the membrane, and the salt and minerals are rejected.

Riparian Zone: Areas adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands.

Safe Drinking Water Act (SDWA): SDWA was established to protect the quality of drinking water. This law focuses on all waters actually or potentially designated for drinking use, whether from above-ground or underground sources. The Act authorizes EPA to establish safe standards of purity and requires all owners or operators of public water systems to comply with primary (health-related) standards. State governments,

which assume this power from EPA, also encourage attainment of secondary standards (for example, water clarity).

Semi-chemical Mill: A mill that produces pulp using a combination of both chemical and mechanical pulping processes, with or without bleaching

Sludge: A semi-solid residue from any of a number of air or water treatment processes; this can be a hazardous or non-hazardous waste.

Sludge Dryers: A piece of equipment that reduces the volume and weight of the semi-solid sludge wastes by drying and reducing the water content of the sludge.

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved.

State Implementation Plan (SIP): EPA approved state plans for the establishment, regulation, and enforcement of air pollution standards.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes. (See: Point Source.)

Sulfur Dioxide (SO_2): Sulfur dioxide gases are formed when fuel containing sulfur (mainly coal and oil) is burned and can be formed during metal smelting and other industrial processes. Sulfur dioxide is associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility, and such adverse health effects as inhibition of breathing, respiratory illness, and aggravation of existing cardiovascular disease.

Sulfuric Acid: Sulfuric acid is a clear, colorless, oily, and odorless liquid. It is also known as sulphine acid and hydrogen sulfate. Its main use is in phosphate fertilizer production. It is also used to manufacture other acids, explosives, dyestuffs, parchment paper, glue, wood preservatives, and lead-acid batteries in vehicles. It is used in the purification of petroleum, the pickling of metal, electroplating baths, nonferrous metallurgy, and production of rayon and film; and as a laboratory reagent.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA hazardous waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions.

Sustainable Forestry Initiative (SFI): The Sustainable Forestry Initiative™ is a comprehensive program of forestry and conservation practices designed to ensure the continuing sustainable management of forestlands. The SFI was developed nationally through the American Forest and Paper Association (AF&PA), whose members produce 90 percent of the paper and 60 percent of the lumber produced in America today. Compliance with the SFI guidelines is mandatory for AF&PA companies to retain AF&PA membership.

300-millimeter Wafers: 300-millimeter wafers manufactured at a high volume production manufacturing facility represent a technological advance in semiconductor chips over the standard 200-millimeter (8-inch) wafers that are used in many semiconductor manufacturing plants today. 300-millimeter chips offer over twice as much surface area over the conventional chips and will reduce manufacturing costs per wafer by more than 30 percent.

Title V of the Clean Air Act: Establishes a Federal operating permit program that applies to any major stationary facility or source of air pollution. The purpose of the operating permits program is to ensure compliance with all applicable requirements of the CAA. Under the program, permits are issued by states or, when a state fails to carry out the CAA satisfactorily, by EPA. The permit includes information on which pollutants are being released, how much may be released, and what kinds of steps the source's owner or operator is taking to reduce pollution, including plans to monitor the pollution.

Toxic Release Inventory (TRI): Database of toxic releases in the United States compiled from SARA Title III Section 313 reports.

Toxic Substances Control Act (TSCA): TSCA was enacted by Congress in 1976 to give EPA the ability to track the 75,000 industrial chemicals currently produced

or imported into the United States. EPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

Total Suspended Solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended nonfilterable solids."

Total Kjeldahl Nitrogen (TKN): TKN is defined functionally as organically bound nitrogen. TKN is the sum of free ammonia and organic nitrogen compounds which are converted to ammonium sulfate. Organic nitrogen includes such materials as proteins, peptides, nucleic acids, urea and numerous synthetic organic compounds.

Transitional Low-Emitting Vehicles: A vehicle that emits .125 g of hydrocarbons per mile

Transportation Control Measure: TCMs include a variety of measures used to reduce motor vehicle emissions, primarily reducing the amount of vehicle miles traveled (VMTs). These can include carpool and vanpool programs, parking management, traffic flow improvements, high occupancy vehicle lanes, and park-and-ride lots.

Tributyltin (TBT): TBT based paints assist in keeping ship hulls free of marine organisms by acting as both a biocide and as an agent that imparts a "self-polishing" quality to marine paints. For ocean going vessels, TBT self-polishing copolymer paints are currently the most effective means of preventing ship hull fouling by marine organisms.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Vehicle Miles Traveled (VMT): A measure of the total amount of miles traveled by vehicle within a region.

Volatile Organic Compounds (VOCs): Any organic compound that easily evaporates and participates in atmospheric photochemical reactions, except those designated by EPA as having negligible photochemical reactivity.

Wastewater: Spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater Treatment Sludge: The sludge that is produced from the treatment and removal of pollutants of wastewater.

Watershed: The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

"Wet" Demolition Method: A demolition technique specified in the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) requirements to limit the release the asbestos particulates.