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3. Project Results

Project Accomplishments

Project XL builds on the basic principle that project sponsors can receive flexibility in regulatory or process requirements in exchange for better environmental results than would have been achieved under current requirements, as long as the agreement is developed with the input of those who have a stake in the decisions. The degree to which individual projects are successful at the local level for the environment, the project sponsors, and community stakeholders, in turn contributes to the immediate and long-term value of Project XL. The benefits of projects are summarized below.

Benefits for the Environment

All projects must produce superior environmental performance (SEP). This is one of the most important and highly scrutinized (by EPA and others) project criteria. With successful projects, EPA will seek to transfer their innovations and related SEP into the national system in order to gain better overall environmental protection at less cost. Projects have a growing track record of meeting SEP goals, such as reducing emissions, reusing resources, and recycling wastes. Table 1 shows some of the cumulative environmental benefits of three of the projects underway in 1997 and 1998.

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 come on line, XL's positive environmental impact will continue to grow. In fact, the gains demonstrated so far are small compared to the environmental benefits that will accrue over time. A summary of environmental progress of individual projects is described in the "Project Status" section.

Table 1: Selected Cumulative Environmental Benefits 1997-1998*

- 20,853 tons of criteria pollutant—nitrogen oxide (NOx), sulfur dioxide (SO_2), particulate matter, and carbon monoxide (CO) emissions eliminated.**
- 2,636 tons of volatile organic compounds (VOCs) emissions eliminated**.
- 2,089 tons of solid waste recycled.
- 690 tons of nonhazardous chemical waste recycled.
- 613 tons of hazardous waste recycled.
- 1,069 millions of gallons of water reused.
- 311 tons of methanol reused.

* This summary is based on results reported by Intel, Weyerhaeuser, and Witco.

** Eliminations in emissions are calculated by subtracting reported actual emissions from established project baselines.

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Benefits for Project Sponsors

EPA encourages firms to view the flexibility provided by XL as an opportunity to create real incentives whether they are financial, competitive, technological, community-related, or otherwise, for environmental improvement. In exchange for SEP, Project XL has proven particularly adept at providing incentives to sponsors in terms of operational flexibility: expediting or consolidating permitting; reducing the amount and frequency of record keeping and reporting; and authorizing facilitywide emission caps. As a result of operational flexibility, project sponsors, in turn, benefit 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. For example, before the project closed out, Jack M. Berry, Inc. reduced environmental training costs during the first year because of improved work procedures developed through Project XL. As shown in Table 2 , six 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 efficient and useful approach. As EPA transfers such project innovations into the national sys-

Table 2: Economic Benefits for Project Sponsors

- 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 facilitywide permit that allows for equipment changes, process changes, and new construction at the site as long as its overall air quality limits are met.
- 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.
- HADCO has gained some cost savings from reducing the number of sludge shipments required, as a result of its 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.
- Witco saved $58,000 from waste minimization and pollution prevention activities in 1998 ($42,000 in one-time activities and $16,000 in savings from recurring air emissions reduction and methanol recycling). Witco expects future savings of $800,000 over 5 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 waste minimization and pollution prevention activities.
- Vandenberg AFB negotiated a protocol for source testing and validation with the Santa Barbara County Air Pollution Control District that is cheaper ($600 per test) than the standard EPA test ($3,000 per test). Vandenberg AFB will redirect resources that otherwise would have been spent complying 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.
- Merck expects to avoid millions of dollars worth of production delays in the competitive first-to-market pharmaceutical industry by eliminating repetitive permit reviews for changes or additions to facility operations as long as its air emissions stay under a facilitywide cap.

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tem, operational and economic benefits will accrue to a wider spectrum of regulated facilities.

Benefits for the Community

The flexibility offered in 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.

Table 3: Benefits for Community Stakeholders

- A cleaner local environment.
- Opportunity to forge real and informed trust with the project sponsor.
- Opportunity for input into companies' environmental performance decisions.
- Improved access to environmental information on the Internet, directly from the facility, or from the local library.
- Access to reports that are in easy-to-understand formats.
- 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 property setbacks.

Project Status

This section summarizes the status of the 14 projects underway in Project XL.

For seven projects—Intel Corporation, Weyerhaeuser Corporation, HADCO Corporation, Witco Corporation, Vandenberg Air Force Base, Merck, Inc., and Jack M. Berry, Inc. (which is closed out)— the following topics are addressed:

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 environmental performance of this project?

Progress in Meeting Commitments: Overall, has the project sponsor met the environmental and process commitments as specified in the Final Project Agreement (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 has 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?

For the seven projects in implementation for less than one year, only background information is provided. These projects are Molex, Inc., Lucent Technologies, Massachusetts Department of Environmental Protection, Atlantic Steel, Exxon Corporation, Andersen Corporation, and New York State Department of Environmental Conservation.

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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, FAB 12, 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 facilitywide 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 oxide, sulfur dioxide, carbon monoxide, particulate matter, and volatile organic compounds 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.

Other Innovations: (1) *Consolidated Reporting:* The project allows Intel to consolidate reporting for Federal, State, and county and city permitting and regulatory programs into one annual and four quarterly reports. (2) *Stakeholder Input in Reporting:* The new data and reporting format 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 them 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 March 1999)

- 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: volatile organic compounds (VOCs) at 40 tons per year; nitrogen oxides (NO_x) and carbon monoxide (CO) at 49 tons each per year; sulfur dioxide (SO_2)and particulates at five tons each per year; phosphine at four tons per year and sulfuric acid at nine tons per year; organic hazardous air pollutants (HAPs) and inorganic HAPs capped at 10 tons each per year. For all of these commitments, Intel's facility has remained well under the limit for 1997 and 1998.
  - —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 ad-

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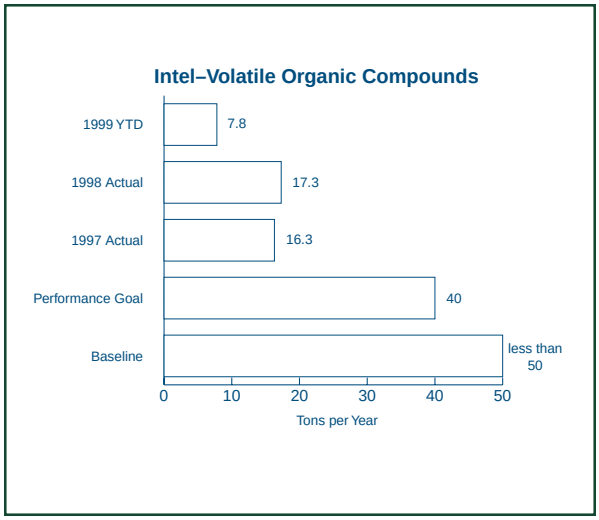
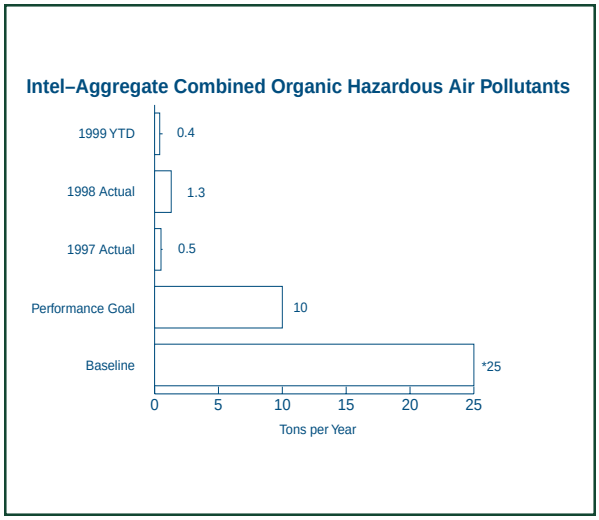
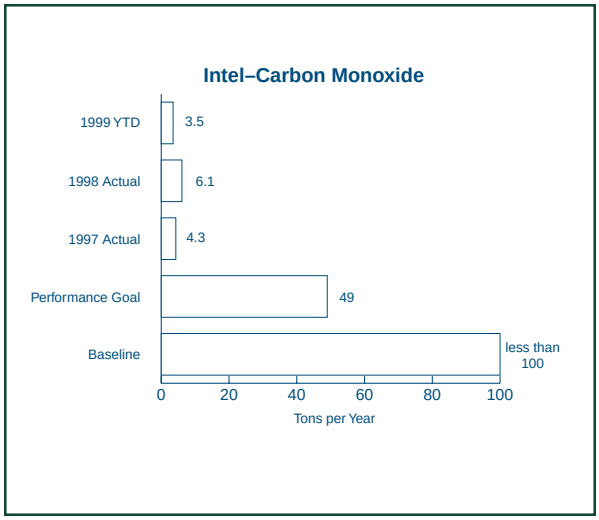


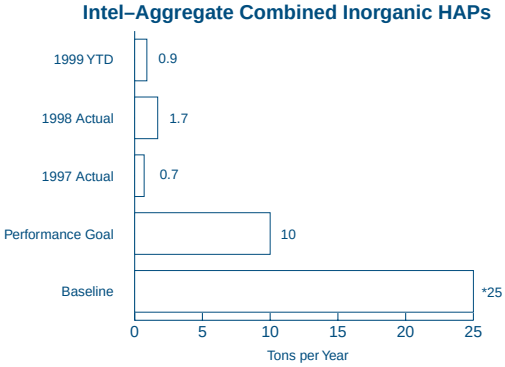
Graph 1



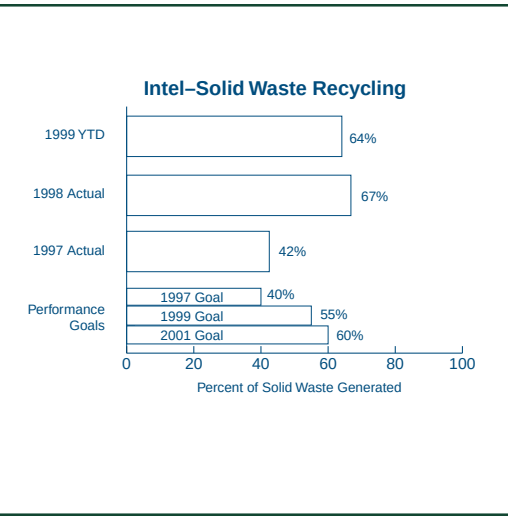
Graph 2



Graph 3



Graph 4



Graph 5

Graph 6

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ditional treatment systems. Stakeholders agreed to change the goal from 100 percent to 95 percent.

—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. 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 transforms packaging wood into landscaping tree boxes.

—Intel's goals are to recycle 60 percent of hazardous wastes generated at the facility in 1997, 55 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 40 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 exceeded the 1999 goal by the end of 1998 (it achieved a 53 percent recycling rate).

—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 achieved its 1997 goal. The company is on track to achieving its 1999 goal of 50 percent (it achieved 49 percent recycling rate in 1998).

- In addition to the sitewide 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. A baseline PUF was established for 1997 emissions and production levels. Each year Intel reports the annual PUF for the reporting year relative to the 1997 baseline PUF. For example, the VOC and HAP PUFs for 1998 relative to 1997 were 0.3 and 0.7, respectively. This means that the VOC and HAP emissions released in 1998 per unit of production for 1998 are less than the VOC and HAP emissions released in 1997 per unit of production for 1997.

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.

Benefits for Stakeholders and the Local Community

- 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. 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 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.

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- 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.

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

- 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

- FPA development could have been expedited if public stakeholders had received earlier in the process 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.

Information Resources

The information in this summary comes from the following sources: (1) the March 1999 *XL Project Progress Report— Intel Corporation* (EPA-100-F-99-005); (2) focus group discussions in December 1998 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 and 1998 Annual Reports; and (4) the *Project XL Preliminary Status Report* (EPA-100-R-98-008).

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Weyerhaeuser 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 facilitywide 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 (SO2), 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 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 feasi-

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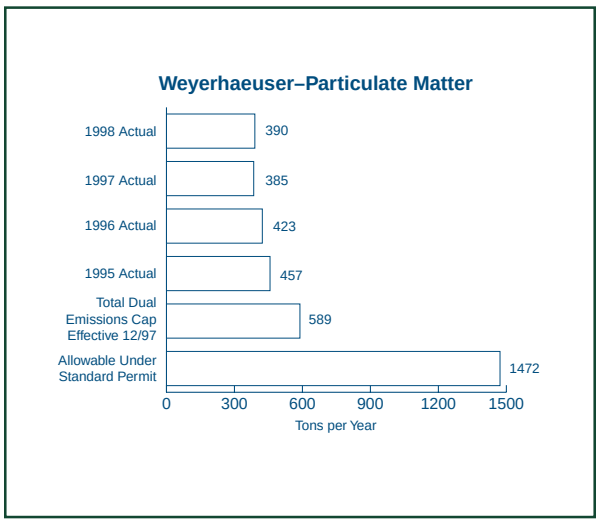
bility studies with potential applicability of results across the pulp and paper industry.

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 one million gallons a day; (4) cutting solid waste generation by 50 percent over a 10-year period; and (5) prepare and implement a facilitywide plan to reduce energy use.

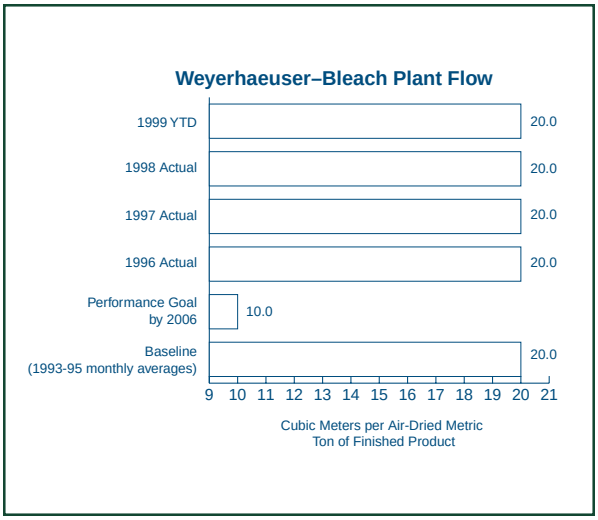
Progress in Meeting Commitments (As of March 1999)

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

  —Under the project, Weyerhaeuser's sitewide 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 390 tons; total reduced sulfur at 33 tons; SO_2 at 582 tons; NO_x at 795 tons; CO at 1,573 tons; and VOCs at 652 tons.



Graph 7



Graph 8

—Weyerhaeuser has committed to reducing its bleach plant effluent flow by 50 percent to 10 cubic meters 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 plans to conduct feasibility studies on its water use.

The results of these studies will be used by EPA, the State of Georgia, and Weyerhaeuser to negotiate an NPDES permit to be issued in 2002. An ultrafiltration pilot test has been initiated at another Weyerhaeuser 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. The permit also allows the discharge of 0.15 pounds of AOX per ADMT. In 1998, adsorbable organic halide levels peaked at 0.13 pounds 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 pounds of AOX per ADMT.

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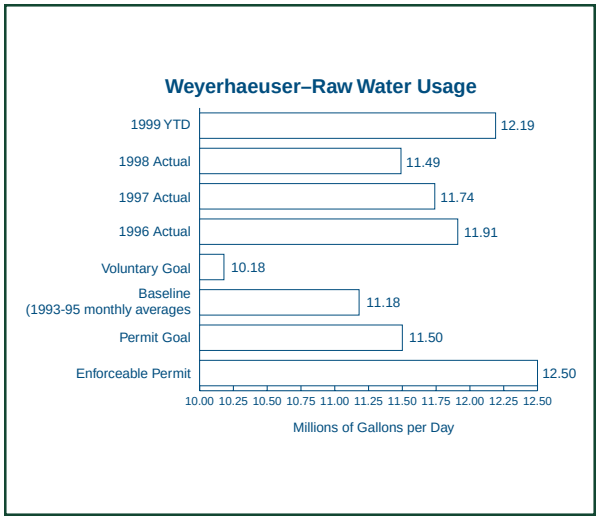
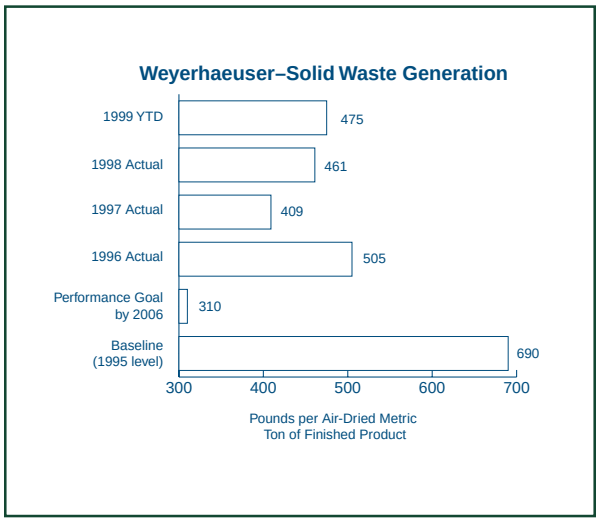
—Weyerhaeuser also committed to reduce the facility's use of water from the Flint River to 11.5 million gallons a day (MGD) monthly average which, in turn, will reduce the quantity of treated wastewater discharged back into the river. Weyerhaeuser's goal is to reduce water withdrawal from the Flint River to a voluntary limit of 10.18 MGD monthly average by January 1, 2000. Baseline water withdrawal at the facility is 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 the 1997 raw water use of 11.74 MGD monthly average. In 1998, the total usage has returned to 11.49 MGD monthly average through the daily water conservation focus of the production operators. Water use reductions will continue to be a focus area within the MIM Phase V feasibility studies. For example, a feasibility study to reuse excess machine wastewater was initiated in the fall of 1997. Reuse of this wastewater is expected to recover approximately 1.0 MGD monthly average.

—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 and by-product 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 1998 was 461 pounds per ADMT of production. This is an increase over the 1997 level of 409 pounds per ADMT, but below the baseline of 690 pounds per ADMT generated. This increase was caused primarily by more than 9,200 tons of additional lime mud from two calciners operating simultaneously as well as from mechanical incidents resulting in increased calciner downtime. Other reductions were about 400 tons in sludge from enhanced performance of the finish fiber cleaners, and about 1,150 tons in other wastes (e.g., fly ash, debris).



Graph 9



Graph 10

- Weyerhaeuser also will be required to reduce hazardous air pollutant emissions under the new Maximum Achievable Control Technology (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 hosted two meetings in 1998 with EPA and the State of Georgia to begin developing the plan. Weyerhaeuser already has modernized several components of the pulping process, which has reduced emissions from its pulp bleach plant.

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- Weyerhaeuser has feasibility studies in progress on composting facility by-products and applying the composted material on timberlands. It has completed three small-scale energy conservation studies, and it has initiated a facilitywide energy conservation study.
- 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.
- The facility has fallen behind its schedule to revise its EMS to conform to the ISO 14001 standard because of the need to involve all facility employees and to integrate across media, and because of other studies competing for facility resources. The facility has been focusing on implementation of procedures rather than documentation of the ISO 14001 EMS.

Benefits for the Environment

- By 1998, The amounts of BOD and total suspended solids per ton of finished product have been reduced to 50 percent and 39 percent respectively from the baseline.
- The amount of solid waste generated has been reduced by 34 percent.
- Over the course of the project, actual air emissions of particulate matter, total reduced sulfur, NO_x, CO, and VOCs have been reduced, with decreases ranging from 20 percent for particulate matter to 12 percent for VOCs.

Benefits for Stakeholders

- Stakeholders have better access to more information directly from the facility in a simplified, consolidated report.
- Stakeholders have a better understanding of facility operations.

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.
- Solid waste recycling saved the facility $200,000 in 1998 because the recycling of lime mud requires the company to purchase less of it. (The company did incur a one-time cost of $150,000 in 1998 for related sampling and analysis costs.)
- 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 permit reviews.
- The MACT applicability assessment and site-specific rule will allow the company to meet or exceed 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 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.
- The energy reduction feasibility study is underway and has so far identified potential steam savings of 35,900 per hour. The continuation of the study will determine which projects are economically feasible and provide a good return on energy savings. One or more of these projects will be selected during the next year and will form the basis of the plant's energy conservation plan.

- To set priorities for the staff and budget, Weyerhaeuser has focused on putting ISO 14001 work procedures in place, but the written framework has been delayed. The company believes that putting the integrated environmental management procedures in place is more important than documenting an EMS framework.
- 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 March 1999 *XL Project Progress Report—Weyerhaeuser Flint River Operations* (EPA-100-F-99-004); (2) Focus group discussions in December 1998 with representatives of the Federal and State regulatory agencies, Weyerhaeuser Flint River Operations, and a local stakeholder involved in the project; and (3) annual and midyear reports prepared by Weyerhaeuser Corporation available through January 1998.

Vandenberg Air Force Base XL/ENVVEST[1] 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 ozone precursor sources to reduce annual emissions of ozone precursors. In the short term, Vandenberg AFB has focused on obtaining reductions from boilers, furnaces, and process heaters. In the long term, Vandenberg AFB will focus 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.

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,

[1]As part of the Administration's reinvention initiative, EPA and the Department of Denfense (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.

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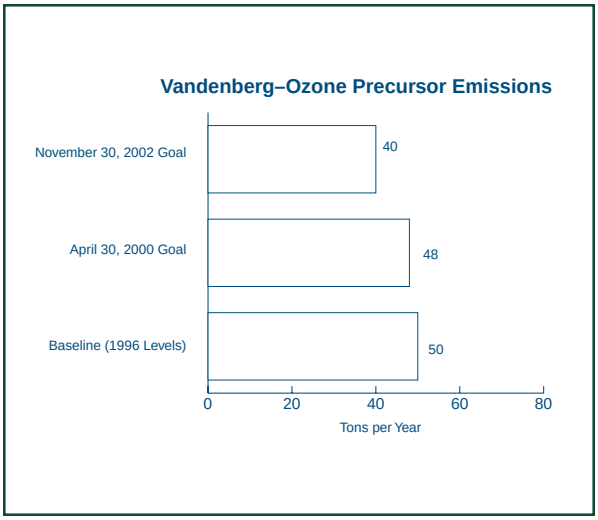
shopping centers, industrial maintenance facilities, airfield operations, and various other mission-related activities. Therefore, Vandenberg AFB creates criteria pollutants normally associated with residential, commercial, and light industrial operations. Most of the stationary source ozone precursor emissions (primarily nitrogen oxides(NOx) are generated by boilers, furnaces, process heaters, and internal combustion engines. For purposes of permitting, 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 guidance to group different base activities (for example, hospital services and base amenities) as separate stationary sources for purposes of Title V applicability only. 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 January, 1999)

- Vandenberg AFB has 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-NOx technology; (3) submit a Rule 1301 emission reduction plan to the District; and (4) prepare progress reports every 6 months. Vandenberg AFB also has begun to meet its commitment to assess emission reduction potential from solvents, surface coatings, and other sources of volatile organic compounds (VOCs).
- Vandenberg AFB committed to reducing annual emissions of ozone precursors (NOx and VOCs) by two tons per year by April 30, 2000, and by 10 tons per year or more by November 30, 2002. Reductions in nitrogen oxides will be accomplished by retrofitting or replacing those boilers with high potential for emission reductions. Actual emissions data have been collected from the 29 preselected candidate boilers to determine baseline emission levels and the potential emission reduction resulting from a boiler retrofit or replacement project. Six boiler projects have been initiated. Data on the reduction of nitrogen oxide emissions (in tons per year) from these boiler retrofit/replacement projects will be available in the next Vandenberg AFB progress report. Targeted VOC reductions will entail the application of low- and zero-VOC coating substitutions for both architectural coating and corrosion-control operations.



Graph 11

Benefits for the Environment

- Emissions of the ozone precursor, NOx, will be reduced by retrofitting or replacing those boilers with the highest potential for emission reductions.

- Emissions of the ozone precursors, VOCs, will be reduced by the application of low- and zero-VOC coating substitutions for both painting and corrosion-control operations.
- Reduction of ozone precursor emissions may help to prevent Santa Barbara County from being reclassified as a ozone nonattainment area.

Benefits for Stakeholders

- Stakeholders have access to progress reports from the base and will be invited to public meetings.

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-NOx 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. Of the emission reduction sources submitted by Vandenberg AFB, the District has approved sources that account for only 4.5 tons of reductions. Vandenberg AFB is uncertain about the definition of "surplus" emissions and needs guidance from regulators in order to prepare an emissions reduction plan that meets the goal of reducing annual emissions by 10 tons.
- Vandenberg AFB tested 44 boilers to establish a baseline, then found that most of the boilers were not suitable because their retrofitting would not be cost effective per unit of emission reduction.
- Vandenberg AFB supported research and development by a nonprofit organization on a burner design to reduce NOx emissions. But when the research was completed and the equipment installed, it got unexpected, and sometimes problematic, results.

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 up until the last 6 months, 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

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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.

Information Sources

The information in this summary comes from the following sources: (1) the March 1999 *XL Project Progress Report—Vandenberg Air Force Base—ENVVEST* (EPA-100-F-99-008); (2) focus group discussions in January 1999 with representatives of EPA, DoD, the "District," and Vandenberg AFB; (3) interviews with members of the Citizens Advisory Board and a Community Advisory Council about the stakeholder process; and (4) annual and semiannual status reports prepared by Vandenberg AFB.

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 U.S. 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 impove 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 committed to recycling copper dust which is another by-product of its operations, and to examining the potential of installing sludge dryers to reduce the volume of sludge wastes.

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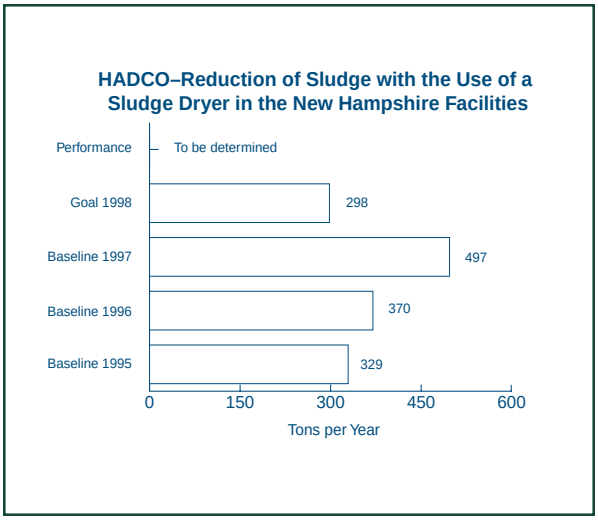
Progress in Meeting Commitments
(As of March 1999)

- 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. The company plans to file for a solid waste variance in the State of New York. The company fell behind schedule in submitting its petition due to the need for additional analysis tests on the sludge. Once the petitions are reviewed and approved by the States and EPA, HADCO will begin to implement its commitments to improve environmental performance.
- HADCO must submit to EPA and the States the details of the company's contracts with smelters that can accept the sludge for recycling. However, HADCO has experienced significant delays in receiving the details from smelters needed to complete the contracts.
- 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:
  - —HADCO has committed to reducing by 75 percent, mobile source air emissions associated with the direct recycling of the copper sludge from three facilities. The baseline data will be developed from rail and truck sludge shipment records from 1995 through 1997. The company will calculate the reduction of air emissions based on reductions in transportation miles and fuel consumed. 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 committed to investigating ways it can use the cost savings generated from the project to improve pollution prevention efforts at three facilities located in New Hampshire and New York. HADCO is evaluating sludge dryers as a means of reducing the quantity of sludge transported from its New Hampshire facilities by 40 percent. The company's New York facility currently is operating a sludge dryer, and HADCO has also installed one sludge dryer at its Derry, New Hampshire facility. HADCO will begin the installation of additional sludge dryers 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 8 months of the date that each facility is granted regulatory flexibility.
- The company will be increasing its current level of stakeholder communication through mailings and inviting stakeholders to visit and tour the facilities.



Graph 12

Benefits for the Environment

- HADCO will reduce mobile source air emissions associated with waste disposal.
- HADCO has improved its pollution prevention efforts by 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.

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- 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 offsite releases by recycling much of its copper dust wastes which were formerly landfilled.

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.
- HADCO was one of the earliest XL projects, and those involved consider it to be a part of the "research and development" efforts for the evolving XL program.
- 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 decisionmaking process should be established early on in the negotiations and should be understood and accepted by all project participants.
- As a sector, the PWB industry is gaining experience in building stakeholder involvement to resolve environmental issues.
- Stakeholder outreach and education should be as extensive as possible to attract stakeholders and assure their continued participation.
- 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 decisionmaking processes.
- Building consensus among the involved EPA offices at critical junctures of a project must be effectively facilitated by EPA Headquarters in order to sustain project momentum.

Information Sources

The information in this summary comes from the following sources: (1) the March 1999 *XL Project Progress Report— HADCO Corporation* (EPA-100-F-99-006); and (2) focus group discussions in January 1999 with representatives of the Federal and State regulatory agencies, HADCO Corporation, and stakeholders involved in the project.

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Witco Corporation (formerly OSi Specialties)

Final Project Agreement Signed October 17, 1997

Background

The Project Sponsor: Witco Corporation (Witco) (formerly known as OSi Specialties, a whollyowned subsidiary of Witco) is a specialty chemical manufacturer. This XL project focuses on Witco's chemical manufacturing plant located 6 miles south of Sistersville, West Virginia, where Witco 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 Witco XL 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 RCRA organic air emission standards through a site-specific rule applicable to two Witco surface impoundments. EPA plans to promulgate National Emission Standards for Hazardous Air Pollutants (NESHAPs) that would be applicable to miscellaneous organic processes. EPA plans to promulgate the Miscellaneous Organic NESHAPs, called "the MON," in 2000. 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 Witco under the XL project. Therefore, the project will provide superior environmental performance only until the MON is in effect. The project provides for its reevaluation following the proposal of the MON. Witco 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.

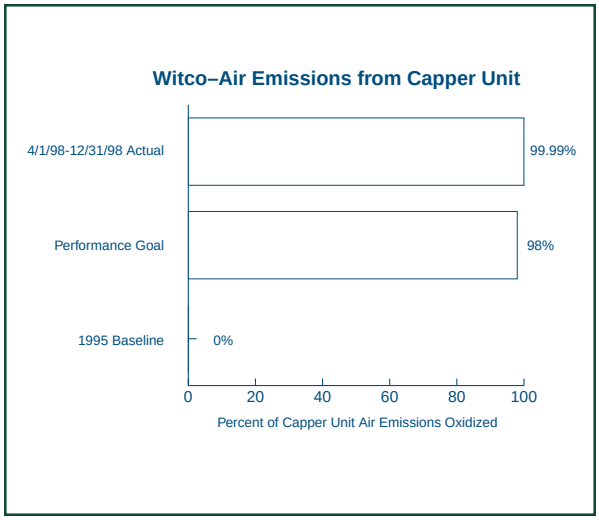
Other Innovations: *Waste Minimization and Pollution Prevention:* Witco committed to conducting a waste minimization/pollution prevention (WM/PP) study to identify opportunities for additional reductions in waste generated by the facility. *Case-by-Case Deferrals:* EPA and West Virginia consider the WM/PP initiatives to be an important contribution to the superior environmental performance offered by the Witco project. The applicability of the WM/PP initiatives could be limited if they are subject to the requirements proposed in CAA Subpart YYY. As proposed, CAA Subpart YYY would apply if Witco begins recovering substances listed in the proposed CAA Subpart YYY. If Witco 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, Witco 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: Witco will install a process vent incinerator that will destroy 98 percent by weight of "capper unit" air emissions, and Witco will also recover an estimated 500,000 pounds of methanol per year from the facility's wastewater treatment unit.

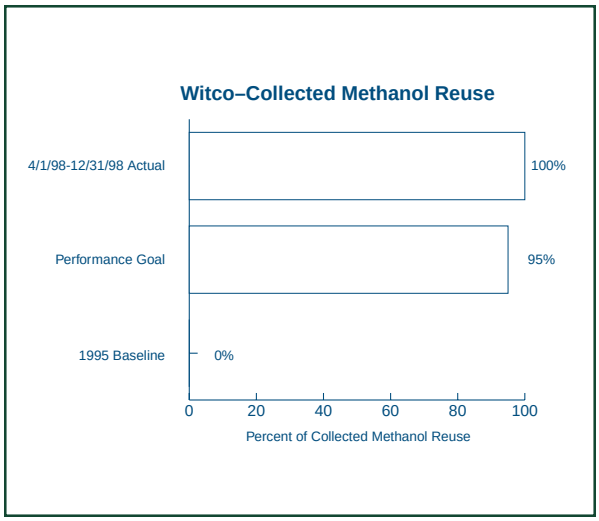
Progress in Meeting Commitments (As of July 1999)

- Witco has met its commitment to purchase, install, test, and monitor a process vent incinerator on its methyl capper unit.
- Witco has met its commitment to begin collection of methanol from the condenser unit.
- Witco 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.
- Witco has met the following environmental commitments:

  —Witco has committed to reducing air emissions that are a by-product of its operations at the Sistersville, West Virginia facility. These by-products (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, Witco found that the oxidizer is reducing the total organics in the vent stream by 99.99 per-



Graph 13



Graph 14

cent. This is better than 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 23,590 pounds per year, for a total air emissions reduction of 152,217 pounds per year.

—Excess methanol produced in the methyl capper unit during the production of methyl-capped polyether currently is condensed, collected, and either disposed of in the facility's wastewater treatment unit or incinerated. Under the XL project, Witco reuses, recycles, or thermally treats a minimum of 95 percent of this collected methanol. This minimizes the biotreatment of methanol in the facility's wastewater treatment units. An estimated 500,000 pounds of methanol that otherwise would be treated in the wastewater system is to be transferred to tank trucks or rail cars for reuse or recycling each year. In 1998, Witco recovered and reused 424,254 pounds of methanol, while none was sent to thermal recovery treatment or biotreatment – thus exceeding the 95 percent recycling goal.

Benefits for the Environment

- In 1998, Witco reduced air emissions by 152,217 pounds, reduced wastewater treatment sludge by 542,783 pounds, and reused 424,254 pounds of methanol.

Table 4: Witco Waste Minimization/Pollution Prevention Study Results

Witco Waste Minimization/Pollution Prevention Study		Potential Cost Savings	Potential Waste/Emission Reductions
One-time pollution prevention options - completed in 1998		$ 42,000	26,000 pounds
Expected recurring/ongoing savings	XL project air emissions reduction and methanol recycle (excludes capital savings).	$ 16,000 per year	1,100,000 pounds per year
	Other pollution prevention options.	$620,000 per year	730,000 pounds per year
	TOTAL savings*	$636,000 per year	1,830,000 pounds per year

*Witco has not yet assigned the expense of implementing these projects, and when it does the net cost savings will be less.

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- 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 "feasibility 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 been already determined to be technically and economically feasible are underway, and they have the potential to reduce generated waste by 1,800,000 pounds per year, as shown in Table 4.

Benefits for Stakeholders

- A Sistersville Plant, Project XL contact at the facility has been appointed to serve as a resource for the community.
- Public files on the project have been established at both the Sistersville Public Library and the EPA Region 3 (Philadelphia) office.

Benefits for the Project Sponsor

- As a result of WM/PP efforts, Witco saved $58,000 in 1998 and identified potential future cost savings of $636,000 per year.
- As a result of the RCRA deferral, Witco expects future savings of about $800,000 over five years.

Issues Needing Resolution

- Witco 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.
- Witco needs to evaluate additional WM/PP opportunities identified in the study relative to other facility projects competing for capital funds.

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.

Information Sources

The information in this summary comes from the following sources: (1) the March 1999 *XL Project Progress Report—OSi Specialties* (EPA-100-F-99-009); (2) Witco's January 31, 1999 and July 30, 1999 reports; (3) focus group discussions in December 1998 with representatives of the Federal and State regulatory agencies, Witco, and public stakeholders involved in the project; and 4) the final report from Witco's WM/PP study dated December 1998.

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Merck Stonewall Plant

Final Project Agreement Signed December 15, 1997

Background

The Company: 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 two kilometers of the Shenandoah National Park, which has experienced substantial air quality degradation and related resource impacts over the past several decades.

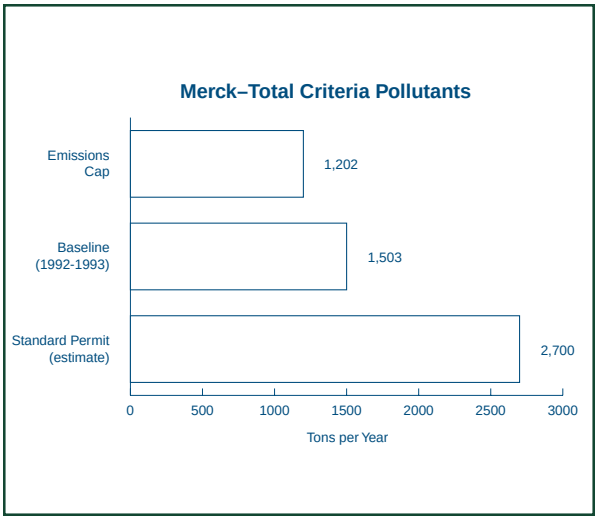
The Experiment: In this project, Merck's air quality permit includes a sitewide cap on the facility's total emissions of criteria air pollutants, except for lead. The company aims to reduce emission levels for sulfur dioxide (SO_2) and nitrogen oxide (NOx) to protect visibility and reduce acid deposition 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 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 CAA's Prevention of Significant Deterioration (PSD) program to authorize sitewide caps and an innovative Best Available Control Technology approach. 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: (1) permanently reducing certain air pollutant emissions by about 300 tons per year (20 percent); (2) operating under the site-wide emissions cap; and (3) reducing SO_2 and NOx emissions by 900 tons per year (about 35 percent), and hazardous air pollutants by 47 tons per year (65 percent), by converting the facility's coal-burning powerhouse to natural gas.

Progress in Meeting Commitments (As of January 1999)

- Merck is in the process of meeting its commitment to replace its coal-fired boilers with natural gas boilers. The conversion is scheduled for completion in August 2000.
- The Merck Stonewall Plant near Elkton, Virginia 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 facilitywide cap, total criteria pollutant emissions will be maintained at levels below 1,202 tons per year. In addition to the facilitywide cap on total criteria pollutants, subcaps will be placed on Merck's emissions of SO_2, NOx, 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 NOx Merck total criteria pollutants 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 1-10 tons per year to account for condensable particulate matter emissions that the new gas-fired boil-



Graph 15

ers could generate at their full capacity. The cap on total criteria pollutant emissions will not be changed by this automatic increase in the particulate matter subcap. Facilitywide and subcap air emissions will be determined monthly following conversion of the facility's powerhouse to natural gas, which is anticipated for completion in 2000. 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.

Benefits for the Environment

- The facilitywide cap limits 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 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, 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.
- 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, recordkeeping, and reporting program.
- Stakeholders will be involved in 5-year permit reviews to a greater degree than with the typical permit process.
- Stakeholders will regularly be provided information on Merck's performance under the facilitywide caps and the impact of incentives to minimize facility air emissions.

Benefits for the Project Sponsor

- Merck expects to avoid millions of dollars worth of 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 Achievable Control Technology (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 facilitywide 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 was issued by the State of Virginia a year before, and conversion of the powerhouse was not yet complete.

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.

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- Community stakeholders felt they were not included in some crucial negotiations.

Information Sources

The information in this summary comes from several sources, including: (1) the March 1999 *XL Project Progress Report—Merck Stonewall Plant* (EPA-100-F-99-007); (2) focus group discussions in January 1999 with representatives of the Federal and State regulatory agencies, Merck Stonewall Plant, and local stakeholders; (3) PSD permit issued by the Commonwealth of Virginia, Department of Environmental Quality; and (4) a January 1997 report prepared by Merck & Co., Inc., *Merck Project XL PSD Permit Support Document*.

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 on 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 multi-media 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 ISO 14000 EMS program as a means to systematically manage continuous environmental performance, including pollution prevention and source

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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 VOCs, SO_2, and NOx 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.,[2] 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 terminate the agreement in June 1999. Therefore, the LaBelle, Florida 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 onsite.
- Because the COP had not been completed, there was no progress by Berry on:
  - —preparing an emissions reduction strategy for SO_2, NOx, 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 onsite, 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.
  - —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.

[2]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.

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- 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 occured.

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 have 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).

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Molex Incorporated

Final Project Agreement Signed August 8, 1998

The Project Sponsor: Molex Incorporated (Moles) 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 metals 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 tin and lead 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. The temporary variance, which will remain in effect for 2 years, allows Molex sufficient time to collect information demonstrating that separate treatment of its wastestreams significantly reduces metal content in wastewater effluents and that the sludges can be reused or recycled in an economically beneficial manner.

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 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 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 removed by a single wastewater treatment process.

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Lucent Technologies

Final Project Agreement Signed August 19, 1998

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 5-year period through site-specific demonstration projects at Lucent facilities in Allentown and Reading, Pennsylvania, and Orlando, Florida.

The Experiment: The Lucent project 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, which 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 5-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 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 addendum" 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. The EMS will provide a vehicle for consolidating all Federal and State permits over time into a single Microelectronicswide multi-media 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.

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 multi-media 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.

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Massachusetts Department of Environmental Protection

Final Project Agreement Signed October 6, 1998

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 small business sectors. Massachusetts DEP developed the Environmental Results Program (ERP) to reduce the number of State permits applied for, renewed, and issued, through a facilitywide, performance-based, self-certification program. 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 self-certify annually 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 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, record retention; Photo Processors, no flexibility needed; and Printers, expedited State Implementation Plan (SIP) approval and the 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 from photo processors, and to achieve a 43 percent reduction in emissions of perchlorethylene from dry cleaners.

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Atlantic Steel Redevelopment

Phase One Project Agreement Signed April 13, 1999
Final Project Agreement signed September 7, 1999

The Project Sponsor: Jacoby Development, Inc. is a privately held real estate company started in 1979. It specializes in property development, financing, brokerage, leasing, and management. Jacoby has proposed redevelopment of a 138-acre former steel mill 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 City of Atlanta is currently out of compliance with Federal transportation requirements because it has failed to demonstrate that its transportation activities are conforming to Clean Air Act (CAA) requirements. The CAA generally prohibits construction of new transportation projects that use Federal funds or require Federal approval in noncompliant areas. 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). 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. 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 nontraditional 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 the EPA study 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 Atlantic Steel 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 At-

lantic Steel site would create less travel and fewer emissions than developing those alternative sites.

The Superior Environmental Performance: This project encompasses the entire redevelopment project and will reduce vehicle miles traveled; accelerate cleanup of hazardous waste; use environmentally friendly building practices, building design, and transit linkages; conserve water and energy; and implement 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.

Exxon Company USA

Final Project Agreement Signed May 25, 1999

The Project Sponsor: Exxon Company USA (Exxon), a subsidiary of Exxon Corporation, 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. Exxon 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.

The Experiment: To facilitate and increase the likelihood that interested developers will use the site after cleanup for commercial or industrial development, Exxon proposes to: (1) demolish buildings onsite, 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; (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. Exxon 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, Exxon 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 onsite 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.

The Flexibility: EPA and the State of West Virginia will provide Exxon 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

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validation reporting requirements; and (4) the risk assessment criteria and analyses.

The Superior Environmental Performance: Exxon will clean up the site in approximately half the time a normal cleanup would take. Exxon will continue to work actively to ensure and maintain involvement of key stakeholders and the general public during the site cleanup. Exxon 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.

Andersen Corporation

Final Project Agreement Signed June 30, 1999

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 at 100 Fourth Avenue North in Bayport, Minnesota (Fourth Avenue Site), along the St. Croix River, a federally designated "Wild and Scenic River" that forms the border between Minnesota and Wisconsin. Manufacturing and related processes at Andersen include wood cutting and milling, wood preservative application, painting, vinyl processing, adhesive operations, by-product 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: the "performance ratio." While providing incentives for better performance, the performance ratio will essentially lock-in Andersen's current production methods and processes and will 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 facilitywide VOC cap.

The Flexibility: EPA and the State of Minnesota Pollution Control Agency (MPCA) agreed to develop both a site-specific rule under the Clean Air Act's Prevention of Significant Deterioration (PSD) program and a streamlined Minnesota Project XL multi-media 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.

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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 objection 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 and certain VOCs. The new permit establishes emission caps for these compounds on a "per standard measure of production" basis and on a facilitywide basis. Andersen will be allowed to modify or add VOC units and modify or add certain PM/PM_{10} units as long as they remain below the caps established in the permit. 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 which should drive down Andersen's per unit emission of VOCs. In addition to the per unit measure, emisison 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.

New York State Department of Environmental Conservation

Final Project Agreement Signed July 12, 1999

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

The Experiment: The NYSDEC 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. This project will minimize unnecessary paperwork and more efficiently use time and labor resources. It will also increase public safety by facilitating and requiring the expeditious removal of hazardous wastes that cannot be properly secured and that can create traffic hazards in urban areas. Public utilities should realize considerable direct-cost savings through more efficient transportation use from centrally consolidating hazardous wastes and thereby reducing the number of lengthy trips by waste transporting vehicles. The project 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. This 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.

The Flexibility: Resource Conservation and Recovery Act (RCRA) regulations have required utility companies that generate hazardous wastes at

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remote locations (e.g., manholes) to transport within 90 days 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 central collection facilities where they may consolidate waste for up to 90 days. In addition, participating utilities will be allowed to submit a single Biennual 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; and 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.

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