Ortho-McNeil Pharmaceutical Company

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 22, 2000

Background

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

The Experiment: OMP is testing a unique technology that treats a waste byproduct (consisting of both organic and radioactive components) of its pharmaceutical research and development. In order to meet the Food and Drug Administration's requirements for studying the safety and efficacy of new pharmaceuticals in the human body, PRI uses drugs labeled with radioisotopes, which enable the drugs' bioabsorption and metabolism in the body to be tracked with precision. As a result of these studies, a waste mixture consisting of radioactive material and an organic compound are produced. EPA regulates low-level mixed waste (LLMW) under the Resource Conservation and Recovery Act (RCRA), and the radioactive component is regulated by the Nuclear Regulatory Commission (NRC) as a low-level waste under the Atomic Energy Act of 1954.

The high temperature catalytic oxidation (HTCO) process uses catalytic oxidation to destroy the hazardous component and capture the radioactivity from the waste mixture. This bench-top oxidation process will allow OMP to process LLMW in the same, secure laboratory where it is created, limiting lab worker exposure and reducing the risk from releases during storage, transportation, and handling. In addition, the process captures the radioactive components of the waste rather than releasing it through the incineration process, which makes these waste products amenable to recycling and reuse. This XL project would allow OMP to transition the treatment process from an initial testing phase to a long-term development phase, with the ultimate goal of providing this technology and the permitting provision exclusion to similar generators of small quantities of LLMW.

The Flexibility: Assuming OMP's LLMW is a RCRA hazardous waste, the HTCO process meets RCRA's definition of treatment, because the oxidation destroys the organic components of the samples. With few exceptions, under RCRA, a process that is considered treatment typically triggers a requirement to obtain a RCRA Treatment, Storage, and Disposal Facility (TSDF) permit. With this project, OMP will be able to treat small volumes of LLMW on-site with its HTCO process without a RCRA TSDF permit. To encourage use of the oxidation process, the OMP XL project excludes the small volumes of LLMW created and treated using OMP's HTOC process within a NRC-licensed pharmaceutical research and development laboratory from RCRA's regulatory definition of hazardous waste in 40 CFR§ 261.4(b). However, OMP's LLMW remains a solid waste and subject to other RCRA authorities, including EPA's authority under RCRA Section 7003, which addresses situations of "imminent and substantial endangerment to health or the environment." The State of Pennsylvania Department of Environmental Protection (PADEP) has been authorized to administer and implement most of the hazardous waste program in lieu of EPA, including the "mixed waste" portion of the regulatory program.

Other Innovations: *(1) Innovative Recovery of Radioactive Waste.* The HTCO process enables the capture of the radioactive component of OMP's LLMW as a uniform, consistent waste stream that is amenable to recovery and reuse. *(2) Improved Waste Handling and Safety.* The OMP HTCO

process is designed to handle all LLMW on-site in the NRC-regulated, controlled laboratory environment in which it was generated, thereby further reducing the minimal potential for spills or releases during the on-site and off-site handling and transportation. *(3) Technology Transfer.* If this project is determined to be successful and this regulatory flexibility is adopted at a national level, the HTCO technology developed by OMP may be transferable to other organizations that generates or treats small amounts of mixed wastes, such as pharmaceutical companies, research institutions, and colleges and universities. While testing its technology, OMP has decided not to patent the technology and has made it available to all interested parties. By enabling OMP and other organizations to utilize this technology, the technology and its environmental and economical benefits may be made available to a much larger number of users.

The Superior Environmental Performance: As a result of the expanded regulatory flexibility granted through Project XL, OMP will be able to continue developing and testing the HTCO process. By treating LLMW on-site where it is generated, the HTCO process results in several environmentally superior and transferable benefits as compared to presently available commercial treatment and disposal alternatives involving incineration or land disposal. For example, the radioactive component of OMP's LLMW is captured and made available for recovery and reuse, as opposed to being lost during incineration. In addition, OMP will handle all LLMW on-site in the controlled laboratory environment in which it is generated, thereby limiting lab worker exposure and reducing the minimal potential for spills or releases during on-site and off-site handling and transportation. The use of the technology among generators of small amounts of mixed wastes may create a more economically favorable environment for the commercial development of low-level waste recycling.

Progress in Meeting Commitments
(As of August 2001)

- EPA committed to propose and issue a site-specific rule, amending 40 CFR § 261.4, which applies to the OMP Spring House facility, allowing the facility to run its LLMW catalytic oxidation process without obtaining a permit under RCRA.
  - EPA published the Notice of Proposed Rulemaking in the Federal Register on July 24, 2001, allowing for the site-specific exclusion under RCRA that would enable OMP to utilize the HTCO process to treat LLMW on-site without a RCRA permit.
- PADEP committed to propose and issue a permit by rule as necessary under state law, 25 Pennsylvania Code 270a.60, or use other legal mechanisms to allow for the implementation of this XL project.
  - PADEP action by rule is pending publication of the final rule by EPA.
- OMP committed to monitor and report biannually: (1) destruction removal efficiencies for all organic components of the LLMW subject to treatment and (2) capture efficiencies for the radioactive component of the LLMW subject to treatment.
  - The *2000 Treatability Study Annual Report* for OMP's Spring House facility, outlining both the destruction removal efficiencies (DREs) and capture efficiencies for the radioactive component of LLMW subject to treatment, was submitted to both PADEP and EPA on March 12, 2001. A second report is due September 15, 2001.
  - OMP reported that in 2000 it generated a total of nine samples of LLMW subject to two treatability studies in their research facility. Both studies were conducted using a HTCO process to destroy the organic components of the mixed waste in order to reclassify the waste as low-level radioactive waste for disposal. The first study

resulted in a DRE of approximately 99.998 percent and a destruction removal recovery rate of 99.3 percent (+/– 3 percent). The second study resulted in a DRE of approximately 99.999 percent and a destruction removal recovery rate of 96.8 percent (+/– 3 percent).

- OMP committed to make available its HTCO technology to all companies and institutions that generate research-and-development quantities of LLMW.
  - OMP scientists continue working with a number of outside organizations, which include several international and domestic corporations and the Lawrence Berkeley National Laboratory, to develop the HTCO technology, provide technical assistance, and share data.
  - OMP presented information on the catalytic oxidation treatment process to interested parties at a symposium sponsored by the International Radioisotope Society in Mason, Ohio, on May 17, 2001. The symposium was co-organized and co-chaired by representatives from OMP. At the symposium, a representative from PRI reviewed current and developing treatment and disposal techniques, while focusing on the HTCO process being utilized by PRI.
- OMP committed to meet quarterly with the Lower Gwynedd Township (LGT) Industrial Compact, an environmental group, to provide a regular forum for public discussion.
  - OMP provides quarterly status reports at its regular meetings with the LGT Industrial Compact. In addition, the OMP site manager attends monthly LGT supervisor meetings and is available to answer any questions raised by LGT or township citizens during these meetings.
- OMP committed to meet quarterly with members of the Community Advisory Council (CAC) sponsored by Rhom & Haas Corporation to discuss environmental issues.
  - At this time, the Council's activities have been discontinued due to reorganization and downsizing at the Rhom & Haas Corporation, which heads the CAC.
- OMP will host annual stakeholder meetings.
  - OMP meets with the LGT quarterly, and will hold larger, annual stakeholder meetings as needed.

Benefits for the Environment

- OMP's processing of LLMW in the same laboratory in which it is created limits lab worker exposure and enables the capture of radioactive components of the waste rather than losing it to the incineration process.
- To date, the OMP process is effectively capturing the radioactive components of the waste rather than losing it to the incineration process, making these waste products amenable to recycling and reuse.

Benefits for Stakeholders

- OMP is sharing the environmentally beneficial HTCO technology freely with other research institutions and government agencies that also generate LLMW. Through extensive outreach to state and federal regulatory agencies; the local community, local, state, and national environmental groups; and other interested parties, including government laboratories, domestic and international pharmaceutical research companies, and commercial pharmaceutical manufacturers, OMP has increased information sharing and learning about the HTCO process and its potential environmental benefits. The company is collaborating with these outside organizations that are working to develop the HTCO technology, providing technical assistance, guidance, and data sharing.

Benefits for the Project Sponsor

- By enabling OMP to use this technology, the company not only will be able to treat LLMW in a much more environmentally beneficial manner, but will also achieve significant economic savings as a result of reduced transportation and disposal costs. OMP reported that during FY 2000, it generated a total of nine samples on three separate occasions. Given that a minimum charge of $35,000 would have been incurred for each shipment to dispose of the waste off-site, the on-site processing of the waste saved OMP an estimated $105,000 in 2000 (3 × $35,000).

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Ortho-McNeil Pharmaceutical Project, signed September 22, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Pennsylvania Department of Environmental Protection Coal Remining and Reclamation Project

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 22, 2000

Background

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

The Experiment: PADEP proposed this XL project to explore a new approach to encourage the remining and reclamation of abandoned coal mine sites. The approach would be based on the implementation of best management practices (BMPs) instead of compliance with in-stream pollutant concentration limits and implementation of compliance with the National Pollutant Discharge Elimination System (NPDES) numeric effluent limitations measured at individual discharge points. This XL project will test this approach in up to eight watersheds with significant acid mine drainage (AMD) pollution. The project will collect data to compare overall in-stream pollutant concentrations versus the loading from individual discharge points and provide for the evaluation of the performance of BMPs and this alternate strategy in PADEP's efforts to address AMD.

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

Under this project, PADEP will continue to apply current effluent limitations and permitting requirements to preexisting discharges that are comingled with discharges from active remining operations. PADEP will require in-stream compliance monitoring rather than point-of-discharge compliance monitoring for preexisting, non-encountered discharges and all preexisting discharges after active remining operations.

Other Innovations: *(1) Alternative Approaches to Reducing AMD through Regulatory Innovation.* The use of BMPs without numeric limits is an innovative approach that focuses on preventing pollution at the source(s) in the abandoned mine land areas of the watershed regardless of whether they will be disturbed (encountered) during the remining. NPDES permits for remining currently establish site-specific numeric effluent limitations representing best available technology. PADEP is implementing its alternative permit approach so that reminers may comply with non-numeric limitations in the form of specific BMPs, as well as in-stream monitoring requirements to measure the performance of reclamation activities on water quality in the watershed. *(2) Gaining Experience with Remining BMPs.* This XL project will also allow PADEP, EPA, and the reminers to gain more experience in implementing, developing, and

refining the application of new and existing BMPs. It will also provide data on the most effective BMPs and information on possible improvements in their use.

The Superior Environmental Performance: This pilot project is expected to provide superior environmental performance by encouraging coal operators to undertake remining projects that otherwise would have been too risky or expensive because of the potential to have to treat preexisting acidic discharges following the remining. In return for this lessening of the risk associated with potential treatment costs, the reminers would implement more reclamation activities in the watershed than existing Pennsylvania regulations or federal law require. With this proposal, the reminers would still be responsible for an equally protective standard of maintaining overall water quality in the stream but would accomplish this via BMPs. Under this project, treatment of discharges would be undertaken only as a last resort if the BMPs fail (or were not implemented) and water quality is degraded. Remining (with reclamation to present-day standards) is an effective way to reclaim abandoned mine lands and improve water quality, at little or no cost to taxpayers. These pilots are designed to increase the number of remining operations providing reclamation and to enhance the degree of reclamation and AMD-abatement measures taken on remining operations.

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

Progress in Meeting Commitments
(As of February 2001)

The project is in its initial stages and activities are just getting underway. The following commitments have been made in the FPA.

- PADEP will collect data to compare in-stream pollutant concentrations with the loading from individual discharge points to provide for the evaluation of the performance of BMPs.
- PADEP will test the BMPs approach in up to eight watersheds with AMD pollution.
  - On February 7, 2001, Sky Haven Corporation signed the first PADEP Mining Permit and Consent Order and Agreement for a remining project in the Surveyor Run watershed in Clearfield County, Pennsylvania. The remining started in late February. Four other projects are currently in development.
  - BMPs that will be applied at the Surveyor Run Watershed project include revegetation of 50 acres, blending acid forming strata with alkaline strata, and eliminating 16,300 linear feet of dangerous highwall.
- Reminers will meet or improve water quality at an in-stream monitoring point (or points) rather than at each individual discharge to the stream.
- PADEP will continue to apply current effluent limitations/permitting requirements to preexisting discharges that are physically encountered and collected with discharges during active remining operations.
- PADEP and EPA will make all project information available to stakeholders in a form that is accessible and easy to understand.
- PADEP inspection frequencies will be increased appropriately to ensure the BMPs have been fully implemented.
- PADEP will submit periodic reports and updates regarding the activity on these pilot sites and water quality monitoring results to EPA.

- Reminers have applied to use the Project XL permit approach at several other sites. PADEP is currently working with reminers to develop these permits.

Benefits for the Environment

- Each remining site selected in this XL project is an abandoned area that was left unreclaimed and was not expected to be remined under the existing permitting program. Under mining laws, a mine operator engaging in remining must reclaim the area once remining activities are complete.

- Reclamation activities, including regrading and revegetating the sites, are expected to result in both improved surface water quality and a reduction in erosion and sedimentation in adjacent streams, while also creating habitat for flora and fauna, eliminating physical hazards such as highwalls and pits, and improving aesthetics through restoration of a barren landscape.

Benefits for Stakeholders

- This project has the potential to benefit all the stakeholders. The reminer will be able to remove and sell the coal with a lessened risk of long-term liability to treat discharges. Local, state, and federal stakeholders will benefit since more land in the watershed will be reclaimed at no cost to the taxpayer.

Benefits for the Project Sponsor

- PADEP will be able to test an innovative approach designed to reclaim abandoned mines in Pennsylvania. If successful, PADEP may update their remining regulations to provide for greater use of this pollution prevention/ BMP approach.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Pennsylvania Department of Environmental Protection XL project, signed September 22, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

PPG Industries, Inc.

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 14, 2000

Background

The Project Sponsor: PPG Industries, Inc., (PPG) is a leading global supplier of coating, continuous-strand fiberglass, flat and fabricated glass, and chemicals. As a technological leader for 116 years, PPG has introduced many new products and process innovations, especially in the area of new chemical development. These new chemical substances are developed in PPG's research and development (R&D) facilities located in Monroeville, Allison Park, and Harmarville, Pennsylvania, in the greater Pittsburgh area.

The Experiment: EPA's Pollution Prevention (P2) Framework is a new screening methodology, based on a set of computerized risk screening tools, to assist in characterizing the fate and hazards likely to arise from the manufacture, use, and disposal of new chemicals. The P2 Framework, developed by EPA's Office of Prevention, Pesticides and Toxic Substances, was created to calculate or estimate important risk-related properties based on analyses of chemical structures and to design safer chemicals, reduce waste generation, and identify other pollution prevention opportunities. In chemical manufacturing, companies invest substantial resources into new product development before seeking EPA approval, which is necessary under the Toxics Substances Control Act (TSCA) for new industrial chemicals. As a result, chemical product developers would like to minimize costs and risks associated with worker exposure, reporting, testing, recalls, and product liability. Recognizing the potential environmental and economic benefits, EPA is making the P2 Framework methodologies available to the chemical manufacturing industry to help promote the selection and application of safer chemicals and processes during the early stages of decision making regarding chemical development. Applying the P2 Framework, PPG will incorporate environmental and health information into the early stages of its chemical development operations, as well as identify opportunities for pollution prevention. In addition, PPG believes that many other companies can develop environmentally preferable products by applying the P2 Framework, especially at the R&D stage of product development.

The Flexibility: TSCA governs the manufacture, importation, processing, distribution, use, and disposal of industrial chemical substances, including new chemicals. Annually, EPA evaluates approximately 1,500 to 2,000 new chemical notices submitted by industry. Section 5 of TSCA requires prospective manufacturers (or importers) to wait 90 days after submitting a premanufacture notice (PMN) before they can begin to manufacture (or import) a new chemical substance. Within the 90-day period, EPA must evaluate the report, identify potential risks of the new chemical substance, and specifically determine whether the substance may present an unreasonable risk to human health or the environment. Unless the requirements for an exemption are met, a PMN submitter may not manufacture a new chemical substance until 90 days after it has submitted a PMN to EPA.

Under this project, because PPG is using the P2 Framework, EPA has agreed that PMN substances submitted by PPG, which EPA determines to present a low risk, can be manufactured prior to day 90 of the review period pursuant to a test marketing exemption (TME). Additionally, for chemical substances for which PPG uses the P2 Framework, PPG may submit combination TME applications and PMNs for concurrent review by EPA. Although EPA generally discourages simultaneous submittals, for the purposes of Project XL, EPA will allow such concurrent submissions to be sustained when the TME is granted and the corresponding PMN is dropped from further review during the first 30 days of the review period.

Other Innovations: *(1) Pollution Prevention.* EPA expects that PPG's use of the P2 Framework to prescreen its product development options will result in increased opportunities for pollution prevention by preventing the generation of pollution rather than controlling pollution once it has been created. *(2) Reducing the Regulatory Burden.* The use of the P2 Framework allows PPG to anticipate and address EPA's concerns prior to PMN submission, greatly decreases the probability of adverse

regulatory action later, and improves the efficiency of EPA's PMN review process. *(3) Stakeholder Involvement.* Directly involving business and technical stakeholders in the project is key to the goal of encouraging use of the P2 Framework during development of new chemicals submitted as PMNs to EPA. The sharing of this new technological tool by EPA and the communication of its benefits by PPG with other stakeholders represents an unprecedented cooperative approach to pollution prevention.

The Superior Environmental Performance: PPG's commitment to use the P2 Framework and promote its use within the industry reflects a commitment to pollution prevention, as companies are not required to test new chemical substances under TSCA prior to submission to EPA. New product research and development can be a very expensive process. Therefore, it is cost-effective to shepherd the "best" chemical candidate through later phases of the product development process. By using the P2 Framework, it is expected that PPG will develop innovative, cleaner, and more environmentally benign products and processes because it will be able to identify early on any problems with the chemical development and it will avoid carrying problem chemicals through product development cycles which could result in irrecoverable costs. In addition, it is expected that PPG's manufacturing processes and waste handling processes will operate at higher levels of environmental performance due to an increased emphasis on pollution prevention.

Progress in Meeting Commitments
(As of August 2001)

- Overall, PPG has been able to meet all of its environmental commitments to date for the project.

- PPG committed to applying the P2 Framework in its new product development program and submitting PMNs to EPA based on P2 Framework analysis data.

  – PPG has used the P2 Framework successfully on approximately 20 new products in the coatings division, primarily paints and resins. All of the products have been evaluated using the P2 Framework assessment. Of the 20 products, 14 have been submitted to EPA. Of the 14 submissions, five have been submitted as simultaneous TME/PMN notifications. In addition, three more products will be submitted as PMNs to EPA in the near future.

  – In the chemicals division, PPG has applied the P2 Framework to five chemicals. These chemicals will be submitted to EPA for PMN review.

- PPG committed to conduct a validation study to compare measured aquatic toxicity data with structure activity relationships (SARs) predictions from ECOSAR (Ecological SAR), which is a personal computer software program designed to estimate the toxicity of chemicals used in industry and discharged into water. ECOSAR uses SARs to predict the aquatic toxicity of chemicals based on their structural similarity to chemicals for which aquatic toxicity data are available. SARs express the correlations between a compound's physicochemical properties and its aquatic toxicity. SARs measured for one compound can be used to predict the toxicity of similar compounds belonging to the same chemical class.

  – PPG committed to work with EPA to validate certain SAR predictions with the ECOSAR program. PPG submitted to EPA an SAR validation report in December 2000. SAR predictions were generated for 38 polymeric chemicals submitted by PPG to EPA as PMNs. These predictions using SAR data were compared to actual measured data on the same set of chemicals.

  – The results indicate 87 to 90 percent agreement between the predictions and measured data. Data were considered to be in agreement if SAR predictions were within the same order of magnitude (less than a tenfold difference) as measured data, or there were no effects at saturation and the measured data showed no effects at the maximum attainable or limit test values. The actual data are classified as TSCA

Confidential Business Information and cannot be released; however, an abstract of the SAR study was presented as a poster at the March 2001 annual meeting of the Society of Toxicology in San Francisco.

  - PPG, independent of the FPA, conducted a second SAR study on chlorinated benzenes. This study was presented at the October 2000 Allegheny-Erie Society of Toxicology meeting in Pittsburgh.

- PPG committed to communicating with other industries on the uses and benefits of the P2 Framework and to promote understanding about the P2 Framework through outreach to industry and other stakeholders.

  - PPG has conducted outreach by giving several presentations about the beneficial uses of the P2 Framework at the following meetings: (1) Allegheny-Erie Society of Toxicology, fall meeting in Pittsburgh, October 13, 2000; (2) Pittsburgh Chapter of the Society for Risk Analysis, meeting in Pittsburgh, December 11, 2000; (3) Society of Toxicology, National Meeting in San Francisco, March 2001; and (4) Green Chemistry and Engineering Conference in Washington, D.C., June 2001.

  - PPG also will assist EPA, as necessary, with its own outreach on the P2 Framework and a similar innovative idea known as the PBT Profiler, which is a new risk screening methodology that is designed to help companies identify chemicals that are persistent (P), bioconcentrate (B), and present toxicity (T) issues of concern. PPG will conduct an evaluation of the PBT Profiler and make suggestions for improvement and comment on its utility in PPG's product stewardship efforts.

- Key focus areas for the PPG project over the next six months will mostly likely include PPG submitting five PMNs for new chemicals that have successfully passed the P2 Framework and PPG reviewing, commenting on, and making suggestions for improving EPA's PBT Profiler in PPG's product stewardship efforts.

Benefits for the Environment

- As chemical screening is not required under TSCA, the use of the P2 Framework represents a huge step in effectively trying to minimize the environmental impacts of new chemical and product development. Use of the P2 Framework highlights areas and opportunities for pollution prevention during the beginning R&D phases of new chemical development, which decreases the toxicity and pollution potential of chemicals.

- PPG's use of the P2 Framework to successfully screen chemicals has allowed them to submit PMNs to EPA with the knowledge that they have, to the extent possible, been able to reduce environmental impacts and make their chemicals and products safer.

- Through extensive outreach, PPG will be able to share their experiences with the P2 Framework and help more chemical manufacturers use and understand this tool to produce more environmentally sound products.

Benefits for Stakeholders

- Through the outreach component of this project, more informal partnerships between chemical manufacturers, EPA, state agencies, and the public have been created to increase information sharing and learning about new tools to minimize environmental impacts of chemicals.

Benefits for the Project Sponsor

- Generally, early screening of new chemicals presents a definite competitive edge for PPG. For example, with the P2 Framework in use, there is more effective decision making on chemical products and chemical candidates for use, which helps PPG avoid potential regulatory delays. Without regulatory delays, PPG will see a faster time to market in a highly competitive industry and can experience reduced manufacturing costs for its products.

Information Resources: The information in this summary comes from the following sources: (1) the Project XL FPA for the PPG Industries, Inc., Project, September 14, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Progressive Auto Insurance Company

FINAL PROJECT AGREEMENT SIGNED JULY 27, 2000

Background

The Project Sponsor: Progressive Auto Insurance is the fourth largest auto insurer in the United States, insuring more than 5 million people and operating more than 350 offices nationwide. In August 1998, Progressive began a limited marketing test in Houston, Texas, of a new product, Autograph[SM], which bases auto insurance premiums in part on when, where, and how much a vehicle is driven. In August of 1999, the company expanded the test throughout the State of Texas. Progressive has piloted this voluntary insurance policy using Autograph[SM] to determine a consumer's auto insurance rate. With the use of a global positioning system installed in the consumer's vehicle, actual vehicle usage, including when and how much the vehicle is driven, can easily be monitored.

The Experiment: With the Autograph[SM] system, Progressive seeks to create and test a variable insurance cost that will be influenced by the customer's driving activity and will provide a financial incentive for customers to drive less and choose alternative forms of transportation, such as public transportation or walking. Auto insurance rates are traditionally based on variables, including vehicle age; vehicle manufacturer and value; driver's age, sex, marital status, place of residence, and driving record; types of coverage; and deductibles selected. However, more specific information about customer driving patterns, such as mileage driven and time of day and location of driving, are generally not taken into account because of the difficulty involved in monitoring and tracking the information. Progressive's piloted insurance program using Autograph[SM] will determine a consumer's auto insurance rate based on actual vehicle usage, including when and how much the vehicle is driven. This system is designed not only to lower costs for Progressive's customers, but also to encourage positive driving behaviors, leading to a reduction in accidents and thefts. In addition, by offering this system, Progressive is helping to reduce the negative environmental impacts that are the result of vehicle miles traveled (VMT).

In this XL project, EPA is working cooperatively with the U.S. Department of Transportation on an analytical study to determine the environmental impact of Progressive Auto's usage-based auto insurance product to determine if drivers are motivated to drive less, and thereby reduce VMT. As a part of this XL project, Progressive will make available to EPA aggregated data on participants' driving mileage gathered throughout the duration of the study. These data will be used to make certain correlations between offering customers financial incentives to drive less and corresponding environmental impacts of lower VMT associated with Autograph[SM] customers.

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

The Superior Environmental Performance: EPA's interest in the Progressive pilot program derives from the possibility that insurance pricing plans like Autograph[SM] might alter driving habits, as well as distinguish existing differences in habits, as drivers learn how their driving habits affect their costs. With this program, EPA can collect data on whether people who sign up for a voluntary program like Autograph[SM] will reduce their total driving or their driving during congested periods, as understanding total VMT is essential to promoting and crafting EPA's policies dealing with congestion, smog, vehicle emissions, and "smart growth" concerns. For more information on the innovative concept behind the Progressive pilot program please contact Edmund Coe in EPA's Office of Air and Radiation, Office of Transportation and Air Quality, at *coe.edmund@epa.gov.*

Information Resources: The information sources used to develop this summary include: (1) the FPA for the Progressive Auto Insurance XL Project, July 27, 2000; (2) the Final rule adopted by EPA on September 22, 2000; (3) the *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000; and (4) EPA Progressive Auto Insurance Fact Sheets.

Steele County Project

XLC[9] Final Project Agreement Signed May 31, 2000

Background

The Project Sponsor: A group of nine industrial facilities in Steele County, Minnesota (Wenger Corporation, Cybex International, Inc., SPX Corporation-Service Solutions Division, Josten's, Inc., Truth Hardware Corporation, Uber Tanning, Viracon, Inc., Crown Cork & Seal Company, Inc., and Atofina), primarily small- to medium-sized facilities, including some metal finishers, have agreed to work together to reduce the levels of industrial pollutants and water flow discharging to the local wastewater treatment facilities. Eight of the facilities are located in the Town of Owatonna, a growing community of 30,000 residents including 40 industrial firms. Atofina is located in nearby Blooming Prairie.

The Experiment: The project has been divided into two phases. In Phase I, Owatonna participants will specifically address reducing the discharge of four priority metals (chromium, nickel, zinc, and copper) by 20 percent and total water flow by 10 percent within five years. Atofina, the Blooming Prairie participant, committed to reduce the concentration of biological oxygen demand (BOD), total suspended solids (TSS), and total Kjeldahl nitrogen (TKN) by 20 percent in the first five years. The industrial participants also made commitments to reduce stormwater runoff from their facilities and assist the Owatonna Wastewater Treatment Facility (WWTF) in educating the community about stormwater-related problems such as improper residential sump pump connections.

This project is also testing whether the use of mass-based limits (e.g., overall amount of pollutant being discharged by a facility, measured in pounds per day) rather than the current concentration-based limits (e.g., concentration of a pollutant, measured in parts per million) might serve as an incentive for facilities to conserve water. Concentration-based limits can be a disincentive for water conservation since the greater the volume of water discharged, the less concentrated the pollutant will be in the wastewater. The facilities have also committed to participate in a training to learn how to develop an ISO 14000-based environmental management system (EMS) to promote continual improvements in environmental performance and compliance.

In Phase II, which is not covered by the current FPA, these industrial partners would aim to expand their efforts to a multimedia approach to environmental permitting, based on overall community performance, rather than individual facility performance, in the areas of air emissions, solid waste, hazardous waste, chemical storage, and community sustainability. They will test to see if this community approach to environmental permitting based on overall performance for the nine companies (rather than individual facility performance) will be more effective in reducing environmental impacts and more economically efficient for the companies and the local government.

The Flexibility: The FPA outlines five key areas of regulatory flexibility needed for the Steele County XLC project to proceed with Phase I. On October 6, 2000, EPA promulgated a site-specific rule (65 FR 59738) giving flexibility described in the FPA to the Owatonna WWTF for six Owatonna project sponsors (Viracon, Wenger and Atofina do not discharge to the Owatonna WWTF and therefore are not covered by the site-specific rule). The site-specific rule covers the following four areas:

- *Monitoring Frequency Reduction.* The site-specific rule gives the Owatonna WWTF the discretion to reduce monitoring requirements to once per year for the six participating facilities after the first metals reduction goal of 20 percent has been met.

- *Mass Based Limits.* The site-specific rule provides discretion to the Owatonna WWTF to convert concentration-based limits to mass-based limits for the Owatonna sponsors currently subject to concentration-based categorical standards.

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

- *Elimination of Monitoring for Pollutants not Discharged.* The rule gives discretion to the Owatonna WWTF to not require participants to monitor for pollutants not expected to be present at levels greater than influent background levels following comparison with three years of effluent data.

- *Alternative Significant Noncompliance Approach.* The rule gives discretion to the Owatonna WWTF to publish notices of significant noncompliance events, where the violations did not cause a pass-through or interference violation and the sponsors have acted to promptly to correct them, on the Minnesota Pollution Control Agency's (MPCA's) Web site rather than in the local newspaper.

The FPA provides flexibility to the Blooming Prairie WWTF to use its discretion to evaluate the recent performance of the Atofina facility and may reduce monitoring requirements to twice per month on the basis of a satisfactory compliance record. After the Atofina facility has reached the 20 percent reduction goal for BOD, TSS, and TKN, the Blooming Prairie WWTF may reduce monitoring frequency to once per month.

Finally, several participating facilities also plan to use non-regulatory flexibility available from MPCA to self-certify that their industrial materials and operations are not exposed to stormwater. Following this self-certification, sponsors will no longer be required to obtain stormwater permits. Qualifying sponsors, however, agree to maintain their stormwater pollution prevention plan to ensure continued non-exposure to stormwater.

Other Innovations: *(1) Industry-Organized and Community-Based Environmental Protection Model.* This collaborative approach may: (a) lead to greater cooperation and creativity in approaching environmental regulations by regulators and industrial participants; (b) set an example of environmental stewardship for other commercial interests throughout Steele County; and (c) educate the public in Owatonna and Blooming Prairie about environmental impacts of their actions. This industrial partnership model could be exported to other industrial facilities in Steele County and throughout the United States. *(2) Testing the Use of Mass-based Limits.* The project will test whether mass-based limits are an effective incentive for reducing water usage. It will provide valuable information to EPA, who is considering allowing publicly owned treatment works (POTWs) to set equivalent mass-based limits as an alternative to concentration-based limits to meet concentration-based categorical pretreatment standards on a national scale through the proposed rule: Streamlining the General Pretreatment Regulations for Existing and New Sources of Pollution (July 22, 1999 64 FR 39564). *(3) Reduced or Eliminated Monitoring for Regulated Pollutants Not Present.* By testing the flexibility to waive or reduce monitoring for categorical standard pollutants not expected to be present in the waste stream, the Steele County project approach could be applied broadly by POTWs. This reduced monitoring approach was proposed as part of the July 22, 1999, proposed rule affecting the National Pretreatment Regulations. *(4) Peer Group Approach to Correcting Noncompliance.* This project tests the value of having a non-biased group of peers assist a noncompliant facility's return to compliance. The goal of the peer group is that peers will help a noncompliant facility better understand the nature and causes of the violation and assist in identifying actions for quickly returning to compliance and staying in compliance. Further, the peer group experiment shows promise in "leading by example" and can thereby promote and spread environmental stewardship to the greater Steele County industrial community.

The Superior Environmental Performance: The 20 percent reduction in the four metals and other priority pollutants will be made within the first five years of the project. These reductions will reduce treatment loads at the local WWTF's. Flow reductions, should result in fewer sewer overflow events into the nearby Straight River. When there is excess water volume beyond capacity due to a storm event and overflow does occur, pollutants in that effluent reaching the river should be reduced, causing less environmental harm. In addition, more environmental benefits should be realized because of participating Owatonna facilities' commitments to develop environmental management systems and pollution prevention audits and to assist the city in alleviating the problem of storm sewer overflow.

Progress in Meeting Commitments
(As of October 2001)

- EPA promulgated a federal site-specific rule on October 6, 2000, (65 FR 59783) that provides regulatory flexibility for the participating industrial facilities (participating industrial users) in Owatonna and the Owatonna WWTF.
- The Owatonna WWTF has submitted a pretreatment program modification to the MPCA, which will be incorporated into the Owatonna WWTF's National Pollutant Discharge Elimination System permit.
- The Owatonna WWTF has issued amended pretreatment permits containing mass limits to each of the participating facilities in Owatonna.
- MPCA has worked with several of the facilities in Owatonna to utilize existing state flexibility to provide an exemption from stormwater permitting (following an on-site inspection) for two facilities in Owatonna.
- MPCA provided training for participating facilities in development of an Environmental Management System on October 15, 2001.
- Preliminary data for 2000 and early 2001 (January – First Quarter 2001) show that average reductions in the discharge for chromium, copper, and zinc exceeded the 20 percent reduction goal compared to the five-year baseline. Nickel flows were 17 percent below baseline in calendar year 2000 (see Figure 47). The Owatonna WWTF will continue to monitor and evaluate the metal discharge levels from participating facilities in exercising its discretion to use the flexibility provided for in the FPA and in the federal XLC site-specific rule.
- Preliminary data in Owatonna demonstrate that total water flow rates decreased 6 percent on average in calendar year 2000 (see Figure 48) compared to the five-year baseline and 4 percent in the first quarter of 2001.

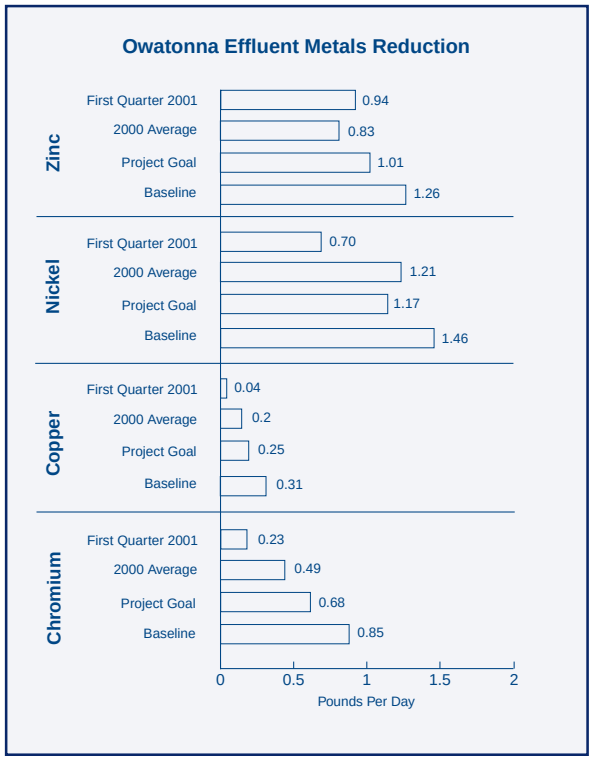

Figure 47
Owatonna effluent metals reduction.

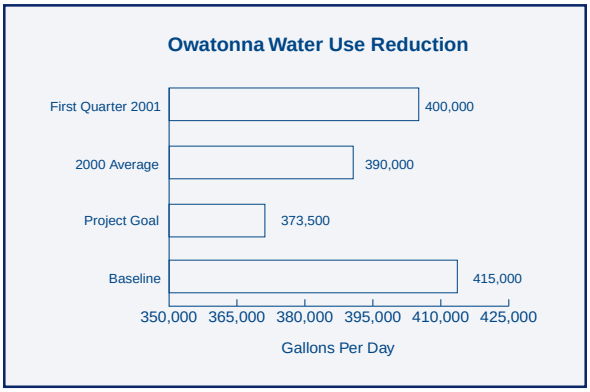

Figure 48
Owatonna water use reduction.

Benefits for the Environment

- This collaborative approach may lead to greater cooperation and creativity in approaching environmental regulations by regulators and industrial participants and set an example of environmental stewardship for other commercial interests throughout Steele County.
- Several of the industrial participants have reported that this XLC project has helped raise environmental awareness in their companies, especially at the upper management level.
- The facilities will address reducing the total flow by 10 percent and the discharge of chromium, nickel, zinc, and copper by 20 percent within five years.

Benefits for Stakeholders

- This collaborative approach may educate the public in Owatonna and Blooming Prairie about the environmental impacts of their actions.
- Water conservation by businesses and industry will benefit the community economically by increasing the projected life span of the existing wastewater treatment facility. Both residential and commercial expansions could continue at an increased rate if additional wastewater treatment capabilities existed due to water reduction efforts.

Benefits for the Project Sponsors

- Reduced or eliminated monitoring for regulated pollutants not present.
- This project tests the value of having a nonbiased group of peers assist a noncompliant facility return to compliance.
- Savings and efficiencies resulting from the EMS and pollution prevention efforts as part of the companies' participation in the XLC project.
- Increased environmental awareness on behalf of employees.

Information Resources: The information sources used to develop this progress report include: (1) the FPA for the Steele County Community XL Project, dated 31 May 2000; (2) *Project XL 2000 Comprehensive Report, Volume 1: Directory of Regulatory, Policy, and Technology Innovations; and Volume 2: Directory of Project Experiments and Results*, November 2000; (3) information from EPA's Office of Wastewater Management Web page, *http://www.epa.gov/owm/*; and (4) Information provided at a project participants meeting held on July 17, 2001, at the Steele County Administration Center in Owatonna, Minnesota.

United Egg Producers

FINAL PROJECT AGREEMENT SIGNED OCTOBER 25, 2000

Background

The Project Sponsor: United Egg Producers (UEP) is a farmer cooperative representing more than 300 egg producers in more than 20 states. Most farms are integrated from the point of production through the final marketing of the eggs. The commercial egg production industry is significantly concentrated, and approximately 318 companies now produce 96 percent of the nation's 80 billion eggs annually. Most farms (approximately 80 percent) are solely dry litter operations, in which chicken litter is collected and stored in watertight cement pits below the bird cages; dried for several months; and annually removed to be sold or given to third parties (65 percent), spread on nearby farmland owned or controlled by the egg producer (15 percent), or composted into mulch or pellets for sale into the nursery or retail garden markets (20 percent). Small egg production operations (EPOs) are more likely (75 percent) to sell their eggs to larger operations for washing and processing, where collection and disposal of egg wash water is often a permitted activity. Most large EPOs store egg wash water and spread it on land they own or control. Although egg wash water lagoons are most common among those who wash eggs on-site, some operators collect egg wash water in large tanks and haul it weekly to water treatment centers. Most UEP farmers are large enough (having more than 100,000 birds) to be defined as concentrated animal feeding operations (CAFOs) under the Clean Water Act (CWA). Under current permitting procedures and CWA regulations, only 12 percent of egg production farms operate under the federal National Pollution Discharge Elimination System (NPDES) permits (although the majority operate under state and/or local permits and requirements).

The Experiment: The XL project proposed by UEP uses a less costly and less complex mechanism—a general permit and an environmental management system (EMS)-based program—to secure superior environmental results. This project is designed in anticipation of EPA's final NPDES CAFO regulations, which were proposed in January 2001 (public comment period closed July 30, 2001) and are slated for promulgation in 2003. It is UEP's understanding that the final CAFO regulations may well require most UEP members, due to their size, to obtain individual NPDES permits. In lieu of obtaining an individual permit, this project includes a comprehensive program to help participating facilities achieve superior environmental performance by implementing an EMS through a general permit issued by individual states or EPA. Because the new CAFO rules are not due to be promulgated until 2003, this project brings egg-producing facilities under an NPDES general permit that includes superior environmental performance through the implementation of EMSs several years earlier than otherwise would have occurred. This innovative project, which will also include a third-party auditing component, will utilize those common procedures and on-farm management practices most likely to result in superior environmental performance. EPA, working with UEP, states, and others, developed a model general permit that states can choose to adopt where they are the permitting authority. EPA will use the general permit and the EMS program requirements in states where it continues to administer the program.

The Flexibility: In exchange for implementation of an EMS subject to third-party audits on an annual basis, participating egg-producing facilities will be subject to NPDES general permits rather than individual permits anticipated under EPA's new CAFO rules to be promulgated in 2003.

The Superior Environmental Performance: It is anticipated that the superior environmental performance from this project will result from egg-producing facilities participating in a more comprehensive program that is based on (1) compliance with a NPDES general permit, including appropriate land application of manure; (2) development and implementation of a multimedia EMS that helps reduce environmental impacts from activities that are not regulated under conventional NPDES permits; and (3) ongoing audits of EMSs by an independent third party, in addition to routine NPDES compliance inspections.

Progress in Meeting Commitments
(As of October 2001)

- Participants in this project committed to collecting, analyzing, and presenting information that examines the effectiveness of using best management practices to help protect water quality. All parties committed to environmental performance indicators that will help indicate the degree to which the project is succeeding in meeting its superior environmental performance goals. These goals are listed in the Table 16.

In addition, the UEP, EPA, and the states have made the following commitments.

UEP

- UEP committed to develop detailed guidance to assist individual facilities in developing all of the elements of an acceptable EMS. One component of the guidance will be a "Model EMS Template for Egg Producers."
  - UEP has completed the guidance for individual egg producers entitled: "Designing and Implementing an EMS: A Step-by-Step Instruction for Egg Producers Participating in the UEP XL Project to Develop and Implement an Environmental Management System."
- UEP committed to developing an EMS Training and Technical Assistance Action Plan.
  - UEP provided training workshops on the XL project and on developing an EMS at their October 2001 annual meeting. UEP will also co-host Regional Workshops on the XL project, as necessary, across the country that will provide additional information and project support for egg producers. The first of these workshops was held on September 28, 2001, in Dallas, Texas.
- UEP committed to developing a third-party EMS auditing program. At a minimum, this program will include (1) necessary qualifications of auditors, (2) training to ensure auditor competency, (3) protocols and other written tools used to conduct the audits, (4) sample audit finding reports to be used when sharing information with regulatory agencies and local stakeholders, and (5) the method UEP will use to oversee the operation of the auditing program.
  - Working with EPA and America's Clean Water Foundation, UEP has completed a *Third-Party Audit Checklist for the UEP XL Project* and *Training Guide for XL Auditors.* Trained auditors employed by the non-governmental organization, America's Clean Water Foundation, will conduct the audits and oversee the auditing program.
- UEP committed to develop an outreach program designed to help off-site users of manure from egg producers manage this manure in an environmentally responsible manner.
  - UEP has drafted *Know How Much You Haul and Use*, a worksheet and manure nutrient credit calculator for determining off-site manure spreading rates. This tool will be field-tested and improved as needed for use in 2002. This tool also will be demonstrated in the UEP training workshops and featured in UEP newsletters.

EPA

- EPA committed to offer NPDES general permits to qualified facilities in states that are not authorized to administer the NPDES program.
  - EPA is developing a general permit for two states, New Mexico and Oklahoma, that have not been delegated the NPDES program. Additional non-delegated states may also participate in this manner.
- EPA committed to perform a national compliance screen of all egg-producing facilities to identify those facilities that would not be eligible to participate in the program.
  - The national compliance screen is underway for all egg producing facilities.

Table 16: Environmental Performance Indicators for the UEP XL Project

Indicator	Measure	Source(s)	Frequency	Status
1. Extent of state participation	Number of states issuing XL general permits	Association of States and Water Interstate Pollution Control Administrators, Regional EPA Administrators, UEP	Annually, on anniversary of FPA signing	Several states have committed to moving forward with the process to issue a general permit for egg producers in their states.
2. Extent of egg producer participation	Number of egg producers granted XL NPDES general permits	America's Clean Water Foundation (ACWF)	Annually	In August 2001, more than 80 egg producers signed a petition, circulated by UEP, indicating a commitment to participate in the project.
3. Value of UEP expanded industry education program	UEP promotion of an education program through: -number of fact sheets and employee training materials; -number of seminars, workshops and XL presentations; -number of seminars, workshops and XL presentations; -number of newsletters and articles on key XL topics; -survey indications that third-party manure users program is perceived as valuable	UEP	Annually	To date, UEP has featured the XL project at its Area Meetings (held in August 2001) and discussed the project at its Annual Meeting in October 2001. A training session on the XL project took place at the UEP Annual Meeting in October 2001.
4. Value of on-farm assessments	First-time audit success rate for producers who underwent pre-audit assessments vs. those who did not	ACWF, UEP	Annually	Data are pending.
5. Environmental improvements	Evidence that EMS systems and practices have reduced negative impacts on the environment and enjoyment of property by surrounding locale of farms	States, UEP, ACWF	Annually	Data are pending.
6. Continued MS implementation among XL participants	Absence of: follow-up audit, failures, state actions, loss of general permits	States, UEP, ACWF	Annually	Data are pending.
7. More rapid adoption of Comprehensive Nutrient Management Plans (CNMPs) by participating facilities vs. others	Number and percentage of UEP manure/ egg wash user facilities with CNMPs	UEP, ACWF	Annually	Data are pending.
8. Regulatory compliance by XL participants	Compliance rates of XL participants	States, EPA	Annually	Data are pending.

- EPA committed to provide advice to UEP to assist in achieving the objectives of the FPA.
  - EPA has agreed to co-host a series of regional workshops to educate producers about the UEP XL project and solidify their participation. The first of these workshops took place on September 28, 2001, in Dallas, Texas. Additional workshops will take place, as necessary, in late 2001 and early 2002.

The States

- The participating states in this program committed to issuing NPDES general permits under their applicable state statutes and regulations that are consistent with the model NPDES general permit and will use the EMS guidance developed under this project to supplement their NPDES general permits.
  - Several states have begun the process for developing a general permit for egg producers in their state. These states include Illinois, Minnesota, Colorado, Florida, and Utah.

Benefits for the Environment

- EMS requirements for this project will help egg-producing facilities to remain in compliance and improve areas of their production that need attention. It will also help ensure that well-functioning facilities continue to perform at high levels and continue to address environmental issues of concern, and not just those issues related to water quality.

- By utilizing trained independent auditors, more oversight of egg-producing facilities can take place than would be possible with just federal and state resources. The results of audits, including areas where improvements are needed, will be shared by UEP with other smaller facilities that may fall below the regulatory threshold but nonetheless could use the information to reduce their environmental impacts.

- UEP urges all egg producers to undergo a voluntary, comprehensive on-farm assessment by America's Clean Water Foundation prior to commencement of EMS development under the XL project. Thirty percent of UEP members have already undergone these comprehensive assessments and are using the information to reduce their environmental impacts.

- The inspection and oversight of environmental management will be expanded to a new and previously unregulated set of EPOs. Currently, only a portion of EPOs are fully inspected by regulatory agencies. Facilities participating in this program will be subject to EMS audits on a regular basis.

Benefits for Stakeholders

- This project brings together a number of diverse groups—EPA, states, UEP, and a variety of non-governmental organizations—to help plan the appropriate tools and guidance necessary for egg producers to promote and achieve superior environmental performance at their facilities. UEP continues to work with key egg production states to educate them on the program and encourage them to participate by issuing general NPDES permits for egg producers.

- This project provides for greater local input than is available under EPA's existing NPDES general permitting regulations. A requirement of participation in the XL program is to maintain ongoing communications with neighbors and the public. Local communities surrounding egg-producing facilities will be able to access environmental performance information about the egg producing facilities in their community on an ongoing basis from their respective states through EMS audit results.

Benefits for the Project Sponsor

- The XL program, complete with an EMS, third-party auditing, and a general NPDES permit, will ultimately be a less complex mechanism and less costly system than obtaining individual NPDES permits for each facility. Initially some facilities may incur additional costs in making improvements to their facilities in order to qualify for participation.

- The continuous improvement aspect of the XL program is tailored to meet the long-term needs of the egg-producing industry and provides incentives for the industry's large egg producers to maintain superior facilities and practices.

Information Resources: The information in this summary is taken from the following sources: (1) The United Egg Producers FPA, signed October 25, 2000; (2) The *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000; and (3) the United Egg Producers Project XL Proposal.

U.S. Postal Service Denver

FINAL PROJECT AGREEMENT SIGNED MAY 22, 2000

Background

The Project Sponsor: With more than 200,000 vehicles nationwide driving more than 1.1 billion miles annually, the U.S. Postal Service (USPS) has the nation's largest civilian fleet of vehicles. USPS has been working for many years to test and pilot alternative fuels and technologies across the country, including electric vehicles, vehicles that run on compressed natural gas (CNG), and flexible fuel vehicles (FFVs) that can run on either gasoline or ethanol. Nationwide, the USPS currently has more than 7,500 vehicles that use CNG, and they have purchased more than 21,000 FFVs. By 2002, the USPS expects its fleet of alternative fuel vehicles to exceed 30,000. The USPS is undertaking efforts to maximize the amount of clean fuels they use in order to reduce their contribution to air pollution, particularly in urban areas. They are in a position to establish greater visibility and infrastructure growth for clean fuels because of the size of their fleets.

Denver, Colorado, including parts of six adjacent counties (Adams, Arapahoe, Boulder, Denver, Douglas and Jefferson) is currently classified as a nonattainment area for carbon monoxide (CO) under the Clean Air Act (CAA), but the region is in the process of petitioning for attainment status. In accordance with CAA regulations, states with ozone and CO nonattainment areas are required to implement a Clean Fuel Fleet Program (CFFP). CFFPs aim to improve air quality by encouraging institutions with fleets of vehicles, such as the USPS, to use cleaner-burning and less-polluting vehicles.

The Experiment: This project is examining an innovative approach to managing a new fleet of FFVs for the USPS. The Colorado CFFP requires that new vehicle fleet purchases consist of at least 50 percent low-emitting vehicles (LEVs). The USPS was unable to find a supplier when it requested bids for the required number of LEVs.

Because LEVs are not available to meet the USPS's special needs, the Postal Service has proposed they replace current fleet vehicles with FFVs that can run on either gasoline or E-85, a mixture of 85 percent ethanol and 15 percent gasoline, or any combination of the two. Compared with gasoline-fueled vehicles, most E-85-fueled vehicles produce lower CO and carbon dioxide (CO_2) emissions (as much as 39 to 46 percent lower CO_2). Emissions of hydrocarbons and nitrous oxides are generally the same as, or even lower than, gasoline-powered vehicles. While these FFVs do not meet federal standards as LEVs, they are certified as Transitional Low-Emitting Vehicles (TLEVs) that have lower emissions than standard vehicles, but not as low as the LEVs.

The USPS will test whether FFVs can effectively meet the goals of the CFFP. The USPS expects to demonstrate lower overall emissions, because 100 percent of vehicles replaced will be TLEVs, instead of only 50 percent of the replacements being LEVs. The USPS plans to concentrate 810 FFVs in the City of Denver. For each E-85 vehicle that the USPS deploys in Denver, it has agreed to remove either a pre-1984 vehicle or a 1987–1991 vehicle from service in the Denver area. The USPS projects that, as a result of this project, 512 pre-1984 delivery vehicles will be destroyed.

The Flexibility: The FFVs being acquired by the USPS do not meet current Colorado CFFP requirements as LEVs. Therefore, the USPS has requested flexibility in meeting the standards and acquiring pollution credits from the Colorado Department of Public Health and Environment's (CDPHE's) Air Pollution Control Division (APCD). Under current pollution credit requirements, USPS would not be eligible to receive credits for the purchase of non-LEV vehicles even though substantial pollution will be prevented with the FFVs (TLEVs) and retirement of older vehicles. With this XL project, the APCD will offer the USPS credits for the purchase of TLEVs accompanied by the removal of existing vehicles. No federal flexibility is required for the implementation of this project.

Other Innovations: *(1) Demonstration of Ethanol Tank Conversion.* The USPS has developed

technical specifications for modifying an existing underground storage tank to properly house E-85 fuel and converted one of its fuel underground storage tanks to hold E-85 fuel in January 2001. This modified underground storage tank can provide fuel for approximately 70 vehicles and will serve as a demonstration project for public evaluation of alternative fuel storage. *(2) Encouraging Development of an Ethanol Infrastructure.* The USPS is committed to helping stimulate the development of a Denver-area E-85 infrastructure to support its vehicles. This infrastructure will also be available to the public. The addition of over 800 vehicles in the Denver region that use E-85 fuels will provide a significant market incentive for individual fuel stations to provide E-85 fuels. The USPS will work with the National Ethanol Vehicle Coalition to identify and encourage fueling stations to install E-85 fueling tanks. *(3) Public Education and Awareness.* The use of over 800 FFVs in a relatively small area will provide an active and visible demonstration of this emerging technology. USPS delivery vehicles will be present in hundreds of neighborhoods on a daily basis. FFV technology will generate media attention that can be used to inform the public about the availability of this new technology and its flexibility of operation using different fuels. *(4) Transferability.* The USPS project could serve as a model for vehicle fleets across the country in replacing older vehicles with alternative fuel vehicles and developing an E-85 infrastructure. As the project proceeds, there will also be an opportunity to examine and evaluate the opportunities and barriers in developing and maintaining an E-85 fueling infrastructure.

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

- A significant decrease in USPS's contribution to vehicle emissions within the Denver metropolitan area. The model year 2000 vehicle engines are cleaner burning and more fuel-efficient than the older model year vehicle engines they are replacing. For example, each of the vehicles to be replaced emits 250 pounds per year more CO than each of the replacement FFVs. The net emissions reduction over a 20-year life cycle is estimated to be 432 tons of CO, 24 tons of hydrocarbons, and 10 tons of nitrogen oxides.

- Reduction in evaporative emissions of hazardous chemical constituents (e.g., benzene) associated with unleaded fuel dispensing.

- Increased market demand for E-85 fuel, both through the USPS's addition of the approximately 800 vehicles and the publicity that the project will provide regarding alternative fuel vehicles. These two factors will provide economic incentives for retail fuel providers to convert existing gasoline storage tanks to E-85 storage tanks. The USPS's involvement in Project XL and the Colorado Environmental Leadership Program (CELP) are expected to increase the visibility and promote the uses of E-85 and alternative fuel vehicles. Additionally, as the commercial availability of E-85 increases, the purchase of dedicated alternative fuel vehicles, including FFVs and those that meet LEV or cleaner emissions standards, by vehicle fleets and private individuals will increase, thereby reducing mobile source emissions further.

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

Progress in Meeting Commitments *(As of August 2001)*

- The USPS committed to joining CELP.
  - USPS joined the CELP in May 2000.

- The USPS committed to taking delivery of at least 794 USPS FFVs certified as TLEVs capable of operating on either unleaded gasoline or E-85. For each E-85 vehicle deployed in the Denver area, the USPS will remove or transfer an older, more polluting vehicle within 120 days. Furthermore, 512 pre-1984 vehicles will be scrapped, and 282 1987–1991 vehicles will be relocated outside the Denver nonattainment area.
  - Delivery of vehicles began in November 2000; 500 new FFV vehicles have been delivered to date.

  - To date, 278 vehicles have been destroyed and 208 vehicles have been relocated.

- The USPS committed to helping stimulate the development of a Denver area E-85 infrastructure to support its vehicles, which would also be available to the public.
  - Conversion of a USPS underground storage tank to accommodate E-85 was completed in January 2001. The USPS intends to use the tank to operate at least 71 postal vehicles on E-85.

- Whenever purchased, replacement vehicles will meet or exceed California TLEV certification standards. If the fleet size is expanded, new vehicles will meet or exceed federal Tier 1 certification standards.
  - 500 replacement vehicles have been delivered. No fleet expanding vehicles have been purchased at this time.

- Six months after delivery of the first E-85 vehicles, the USPS committed to submitting a semiannual report to CDPHE and the EPA. Thereafter, the USPS will submit an annual report.
  - The USPS submitted a semiannual report in May 2001.

- CDPHE committed to proposing an amendment to the Air Quality Control Commission Regulation Number 17 that will clarify the provision of emission credits as an incentive for the CELP.
  - The amendment was adopted March 16, 2000, and went into effect May 30, 2000.

- EPA will consider the submission of certain parts of this project by the CDPHE as a substitute for the Clean Fuel Vehicle Program prescribed under part C of subchapter II of the CAA as a revision of the Colorado State Implementation Plan (SIP) after the USPS has received at least 794 FFV vehicles.
  - EPA published a proposed rule in the Federal Register on August 22, 2001. The rule proposed the acceptance of the SIP revision and the substitution of the USPS project for Colorado's CFFP.

Benefits for the Environment

- The USPS conversion to E-85 vehicles will result in significantly lower emissions. Net emissions reduction over a 20-year life cycle is estimated to be 432 tons of CO, 24 tons of hydrocarbons, and 10 tons of nitrogen oxides.

- The increased visibility of E-85 vehicles concentrated in the Denver region may increase market demand for alternatively fueled vehicles.

Benefits for Stakeholders

- Denver area residents will benefit from cleaner air and fewer emissions from USPS delivery vehicles.

- Residents with FFVs may benefit from expanded E-85 infrastructure in the region.

Benefits for the Project Sponsor

- With the flexibility offered by this project, USPS can purchase new fuel-efficient vehicles (TLEVs) instead of continuing to operate its existing older, more polluting, vehicles.

- If purchased FFV vehicles run on ethanol rather than gasoline, USPS may accumulate emissions credits that can be applied toward fleet expansion.

Information Resources: The information in this summary was obtained from the following sources: (1) the FPA for the USPS Denver XL Project, signed May 22, 2000; (2) supplementary proposal materials; (3) Regulation Number 17: Clean Fuel Fleet Program, Colorado Air Quality Control Commission (last adopted 1/11/01 and effective 3/2/01); (4) U.S. Department of Energy Alternative Fuel News stories; (5) USPS press releases and Web site; and (6) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

USFilter Recovery Services, Inc.

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 21, 2000

Background

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

The Experiment: In most electroplating and metal-finishing manufacturing processes today, wash and rinse water is used once, treated on-site, and then discharged to a publicly owned treatment works (POTW) or surface water under permits issued pursuant to the Clean Water Act. Metal sludges are generally disposed of off-site. USFilter proposes to install an ion exchange system at certain approved facilities that removes metal contaminants from the water, making them available for reuse. The system consists of ion exchange canisters that USFilter would install on the customer's (primarily metal finishers and electroplaters) process lines that contain wastewaters. The ion exchange, or deionization, process causes the metals in the wastewater to adhere to the resin material in the canister, rendering the water free of metal contaminants. The water can then be reused in the customer's process lines. USFilter would periodically collect the spent canister containing the metals (using Minnesota Department of Transportation hazardous waste licensed transporters), replace it with a fresh one at the generator facility, and treat the spent resin at USFilter's facility to regenerate it. Recovered acid and hydroxide from resin regeneration would then be used at USFilter, and a secondary metals recovery company would recover the resulting metal sludge.

The Flexibility: In order to promote use of this system, flexibility has been granted to allow participating generators and transporters of the USFilter ion exchange wastes to replace certain existing Resource Conservation and Recovery Act (RCRA) requirements for hazardous waste generators and transporters with an alternative system of controls implemented by USFilter. EPA published a site-specific rule for the USFilter project on May 22, 2001, effective November 23, 2001. The State of Minnesota must implement a rule adopting the federal regulations before the project can be implemented. New regulations will ensure that generators and transporters properly store and transport the USFilter water treatment ion exchange resins, but reduce the burden of RCRA regulations that would likely be triggered by on-site recycling and treatment. Any new requirements are enforceable in the same way that current RCRA standards are enforceable. If the approved generator, transporter, or USFilter fails to comply with the new requirements, then it will have violated RCRA and may be subject to enforcement action for such violations.

The Superior Environmental Performance: This XL project will test an integrated waste stream process that will likely result in an increase in the recovery and recycling of metals from electroplating operations, a reduction in the amount of hazardous chemicals that are discharged to the local POTWs, and a reduction in the amount of water used in the manufacturing process. The project expects to realize over the next three years a reduction in discharge of neutralized effluent to the POTW by approximately 2.3 million gallons and recovery of approximately 2,250 pounds of copper, nickel, and zinc that would have been landfilled otherwise.

Progress In Meeting Commitments
(As of September 2001)

- The federal site-specific rule enabling this XL project was finalized on May 22, 2001. It will become effective November 23, 2001.
- The State of Minnesota is currently working toward implementation of state regulations that would enable the project to move forward.

Once finalized, the State of Minnesota will issue permits under the Minnesota's XL statute to electroplating manufacturers and transporters that have signed the FPA and agreed to the conditions of the regulations.

- Electroplating waste generators and transporters will commit to conditions spelled out in the site-specific rule.

- USFilter has committed to the following as the project is implemented:

  – USFilter will submit an annual report on October 1 on all USFilter XL wastes. It will provide information separately for each USFilter XL waste generator.

  – USFilter will submit a quarterly report to EPA, Minnesota Pollution Control Agency, and the county agencies on October 1, January 1, April 1, and July 1. It will include information regarding superior environmental performance of the project, financial information, an updated list of all USFilter XL Waste Approved Customers and Generators, and a list of all USFilter XL Waste Approved Transporters. USFilter will also report on the extent to which communication with public stakeholders has been maintained throughout the project.

  – USFilter will collect baseline performance information from each customer's facility participating in the project.

  – USFilter will use a Transportation Tracking Document for tracking of waste shipments from customer facilities to USFilter's facility.

Benefits for the Environment

- Implementation of the ion exchange system can result in an increase in the recovery and recycling of metals from electroplating operations, a reduction in the amount of hazardous chemicals that are discharged to the local POTWs, and a reduction in the amount of water used in the electroplating manufacturing process.

Benefits for Stakeholders

- For communities with industrial participants in this project, off-site discharge and disposal of wastewater and sludge containing heavy metals would be reduced.

Benefits for the Project Sponsor

- Through this XL project, USFilter will be able to offer its customers a means of reducing their water consumption and increasing the recovery of metals from their industrial processes, while removing the trigger of increased regulatory burden.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the USFilter XL Project, signed September 21, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Waste Management, Inc., Virginia Landfills Bioreactors Project

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 29, 2000

Background

The Project Sponsor: Waste Management, Inc., (WMI) provides comprehensive waste management services to more than 10 million residential customers and 1 million businesses. Based in Houston, Texas, WMI operates a network of service facilities throughout the United States, Canada, Mexico, and Puerto Rico and is the largest company in its industry. As a part of this XL project, USA Waste of Virginia and King George Landfills, Inc., wholly owned subsidiaries of WMI, will implement and operate different bioreactor operations (involving the addition and/or recirculation of bulk liquids, including landfill leachate) at the Maplewood Recycling and Waste Disposal Facility (Maplewood) in Amelia County, Virginia, and the King George County Landfill and Recycling Center (King George) in King George County, Virginia. The Maplewood facility is located approximately 30 miles southwest of Richmond, Virginia, and the King George facility is located approximately 50 miles north-northeast of the city. Both landfills receive similar waste streams.

The Experiment: WMI will operate test areas of the Maplewood and the King George County landfills as bioreactors, recirculating or adding controlled quantities of liquids, primarily leachate, to accelerate the biodegradation rate of waste and the stabilization of the waste relative to what would occur within a conventional landfill. (See Figure 49.)

The design goal of a "traditional" landfill is to minimize the quantity of water introduced into the landfill, thus minimizing leachate generation (leachate is liquid that drains from the waste). The disadvantage to this approach is that the lack of liquid causes the biodegradation process to occur very slowly, thus leaving waste in a relatively undecomposed state for a long period. In this case, waste continues to be a potential source of groundwater contamination throughout the post-closure period of the landfill. Because biodegradation occurs slowly, the liner system is potentially exposed to leachate for a relatively long period of time.

The purpose for implementing the bioreactor projects is to increase the rate of biodegradation in the landfills and to facilitate the management of leachate and other liquid wastes. This project will test two different methods for recirculating and adding leachate to the waste at the different landfills in order accelerate waste decomposition. The Maplewood bioreactor predominately will involve the recirculation of leachate generated at the facility, and the King George bioreactor will involve addition of a quantity of liquid at a rate of about twice that applied at the Maplewood landfill. Operating these landfills using two different application rates will allow the relative performance and cost-saving benefits of the two bioreactor approaches to be compared. Moreover, the waste received at these landfills is primarily municipal solid waste, making this experiment unique when compared to other bioreactor projects in the XL program.

The Flexibility: As part of this project, WMI will be granted regulatory flexibility from the requirements of the Resource Conservation and Recovery Act (RCRA) that prohibit application of bulk liquids in municipal solid waste landfills (MSWLFs) and prohibit the placement of liquid waste other than leachate/gas condensate and nonseptic household waste in any MSWLF with alternative liner systems, as presented in 40 CFR Section 258.28. This regulatory flexibility will allow Amelia and King George counties to recirculate leachate in test areas in the Maplewood and King George facilities. Both landfills were constructed with alternative liner systems.

Other Innovations: *Exploring leachate recirculation rates for bioreactors.* The key innovation of the WMI Virginia landfills project is the information it will provide about the impact of different rates of leachate recirculation on landfill waste

settlement and other environmental parameters. This project will also provide EPA with the opportunity to obtain data on the differing impacts that geography, climate, construction, design, maintenance, and waste streams may have on the performance of a bioreactor system.

The Superior Environmental Performance: WMI's commitment to develop and test bioreactor technologies at its Maplewood and King George facilities strives to demonstrate improved pollution prevention methodologies in comparison to current RCRA-permitted municipal solid waste disposal methods currently in use. The following superior environmental benefits are expected with this project:

- Landfill Life Extension: The life of a landfill, when operated as a bioreactor, should be extended due to the biodegradation of the waste. This more rapid biodegradation increases the apparent density and decreases the volume of the in-place waste remaining in the landfill. Reducing the volume of the waste translates into either longer landfill life in place and/or less of a need for additional landfill space.

- Minimizing Long-Term Leachate, Groundwater, and Surface Water Concerns: Research has shown that bioreactor processes tend to reduce the concentration of many pollutants in leachate, including organic acids and other soluble organic pollutants. Since a bioreactor operation brings pH to near-neutral conditions, metals of concern are largely precipitated and immobilized in the waste.

- Increasing Landfill Gas Control: While adding liquids to the landfills will increase the rate of the gas generation, the period of landfill gas generation will be compressed. WMI plans to take advantage of this by exploring use of the landfill gas as a fuel for producing electrical power. This is expected to further minimize fugitive methane and volatile organic compound emissions from the landfills.

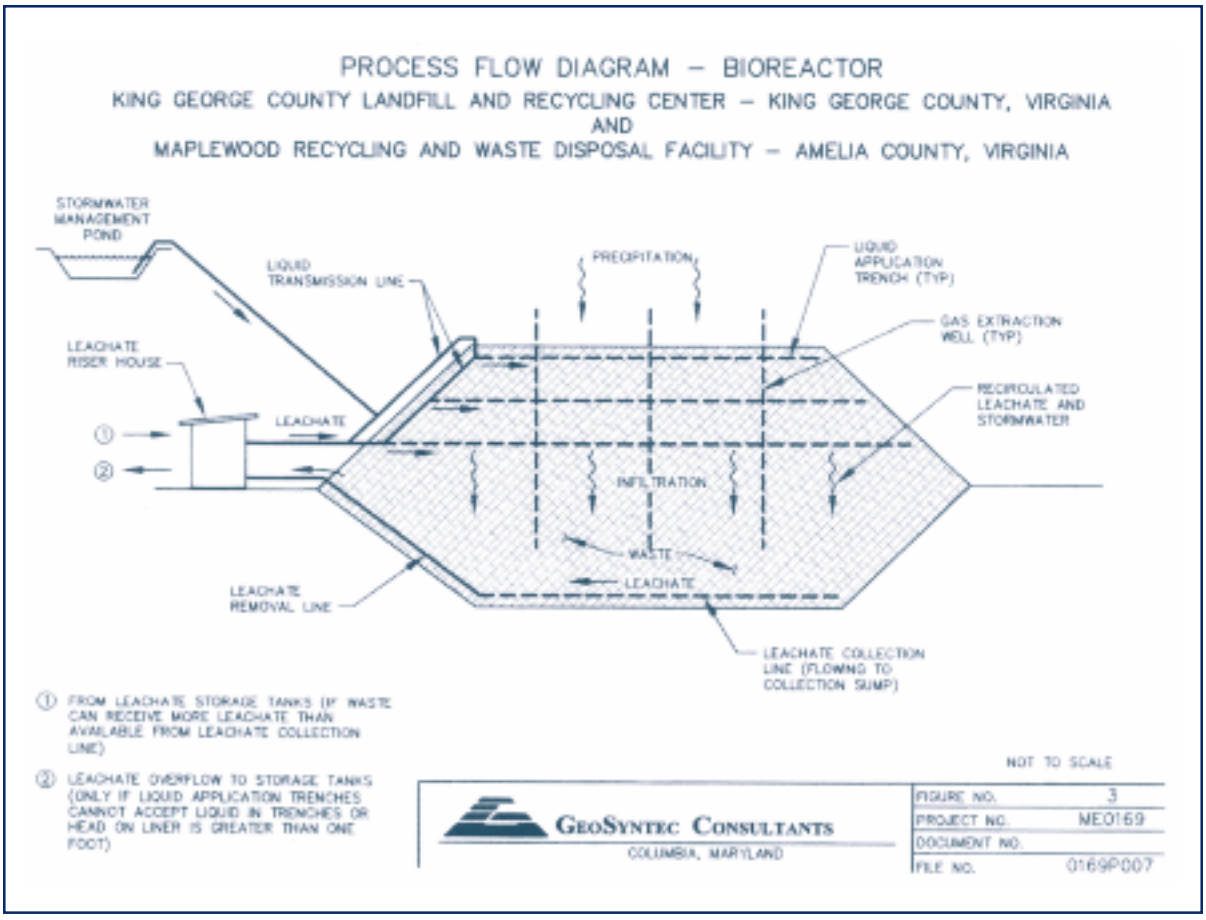

Figure 49
Bioreactor process flow diagram for King George and Maplewood.

Progress in Meeting Commitments
(As of August 2001)

WMI, EPA, and the Virginia Department of Environmental Quality (VADEQ) are in the preliminary stages of complying with the environmental commitments for this project. They have agreed to the following commitments in the FPA:

- EPA committed to propose and issue a site-specific rule amending 40 CFR Part 258.28 for Amelia and King George counties to allow recirculation of leachate over cells constructed with an alternative liner.
- VADEQ committed to hold public hearings in respective localities as part of the amendment process for the current solid waste permits.
- VADEQ committed to provide for landfill gas monitoring, record keeping, and reporting requirements, for the bioreactor testing under their Title V air permitting program. The Title V Permit for the King George landfill was signed on July 31, 2001. The Title V Permit for the Maplewood landfill is under development.
- WMI committed to install trench systems and gas management structures at the Maplewood and King George landfills. This will be done during implementation of the bioreactor testing.
- WMI committed to provide semiannual and annual groundwater, surface water, and gas monitoring reports to VADEQ for review.
- WMI committed to meet periodically with representatives from each stakeholder group to discuss issues of concern and to disseminate information.

Benefits for the Environment

- By utilizing the bioreactor technology, WMI will be able to accelerate the biodegradation of organic constituents in wastes at its facilities, thereby reducing source contamination in the landfills and minimizing the threat to groundwater sources and surface water.
- The bioreactor technology will result in an increased rate of waste stabilization, resulting in increased waste disposal capacity and the delay or avoidance of siting a new waste disposal facility.

Benefits for Stakeholders

- Throughout the evolution of the project, stakeholders have been involved in and informed about this project and have been encouraged to share their ideas and concerns through written comments and meetings open to the general public, providing residents access to information and decisions regarding the project.
- The information obtained from this project will provide EPA and the waste disposal industry with more data on bioreactors and their use as a potentially integral part of long-term operations at these and other municipal solid waste landfill sites.

Benefits for the Project Sponsor

- Implementing bioreactor operations at the Maplewood and King George facilities will result in several direct economic benefits to WMI through: (1) decreased leachate management costs resulting from an increase in the amount of leachate being consumed in bioreactor landfill, and (2) increased disposal capacity due to an increased and more rapid stabilization of waste in a bioreactor system.

Informational Resources: The information in this summary comes from the following sources: (1) the FPA for the Waste Management, Inc., Virginia Landfills Bioreactors Project, signed September 29, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Weyerhaeuser Company, Flint River Operation

FINAL PROJECT AGREEMENT SIGNED JANUARY 17, 1997

Background

The Project Sponsor: The Weyerhaeuser Company 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. "Minimum impact manufacturing" (MIM) contains the elements of a comprehensive pollution prevention program designed to minimize the use of raw materials and to stop waste generation rather than to rely on "end-of-pipe" remedies. MIM involves multidisciplinary teams employing a systems engineering approach, waste reduction, and a commitment to continuous improvement rather than the more traditional "project" focus. Specifically, the Weyerhaeuser project tests a facility-wide permitting approach addressing water effluent discharges, air emissions, and solid waste generation that is designed to promote the MIM concept.

The Flexibility: EPA Region 4 and the State of Georgia have revised Weyerhaeuser's National Pollution Discharge Elimination System (NPDES) permit both to include more stringent effluent limits on biological oxygen demand (BOD), total suspended solids (TSS), and absorbable 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 (a type of industrial kiln), 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 (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and total reduced sulfur (an 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 prepared an alternative compliance plan that presented 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 used a site-specific rule making 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 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 EMSs. *(3) Best Management Practices.* Weyerhaeuser will also reduce solid and hazardous waste generation and improve forest management practices in more than 300,000 acres of timberland. EPA will participate in review and evaluation of feasibility studies with potential applicability of results across the pulp and paper industry.

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

Progress in Meeting Commitments
(As of September 2001)

- Overall, Weyerhaeuser has been very successful in meeting its environmental commitments under the project.
  - Weyerhaeuser's site-wide air quality permit for the Flint River facility in Olgethorpe, Georgia, includes dual emission caps for air pollutants. The following caps are based on a 60 percent reduction from the levels a standard permit would allow—PM 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: PM 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. In 1999, the Flint River facility's actual emissions were the following: PM 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 632

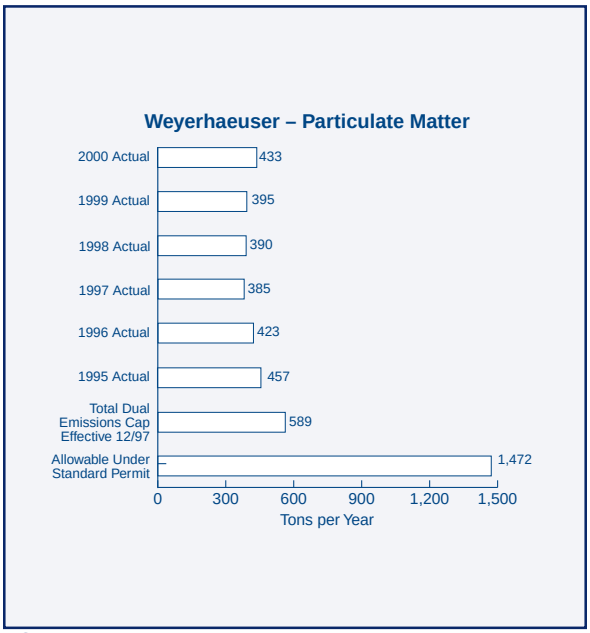

Figure 50
PM emissions data.

tons. In 2000, the Flint River facility's actual emissions were the following: PM at 443 tons, total reduced sulfur at 35 tons, SO_2 at 405 tons, NO_x at 826 tons, CO at 1612 tons, and VOCs at 646 tons (See figure 50). Weyerhaeuser will report the 2001 actual emission values at the end of 2001.

– Weyerhaeuser will (1) reduce the allowable air emissions by 60 percent under the dual emission caps and (2) continue to look for new developments that may help reach the goal of reducing bleach plant effluent by 50 percent over a 10-year period. Weyerhaeuser has committed to researching the feasibility of implementing future technological developments in the industry that may allow the facility to reduce its bleach plant effluent flow by 50 percent to 10 cubic meters per air dried metric ton (ADMT) of finished product (fluff pulp used to make diapers) by the year 2006 (see Figure 51). The environmental benefits projected include a reduction in water usage (the bleach plant accounts for approximately half of the plant's water usage) and reductions in effluent limits on BOD, TSS, and AOX. To reach its goal, Weyerhaeuser has conducted feasibility studies on reducing its water use. Although attainment of this goal is not currently feasible, technological innovations continue to be assessed. An ultrafiltration pilot test has been completed at another Weyerhaeuser facility. The results of the pilot study are being evaluated for possible further feasibility in reducing bleach plant effluent flow at the Flint River facility. Weyerhaeuser already has modernized several components of the pulping process, reducing the amount of BOD and TSS in bleach plant wastewater. The facility's January 1998 NPDES permit allows the discharge of 3.8 pounds of BOD per ADMT of finished product and 4.09 pounds of TSS per ADMT of finished product. In 1998, the facility reduced BOD in its effluent to 2.13 pounds per ADMT and TSS in its effluent to 2.80 pounds per ADMT. In 1999, the BOD in effluent

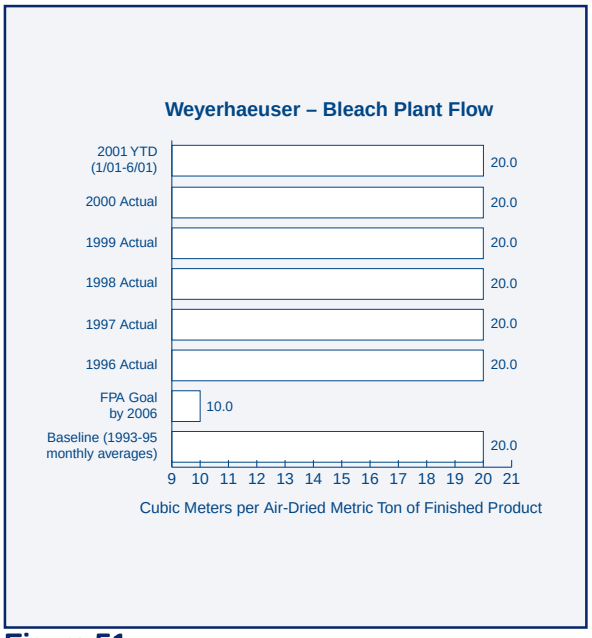

Figure 51
Bleach plant flow data.

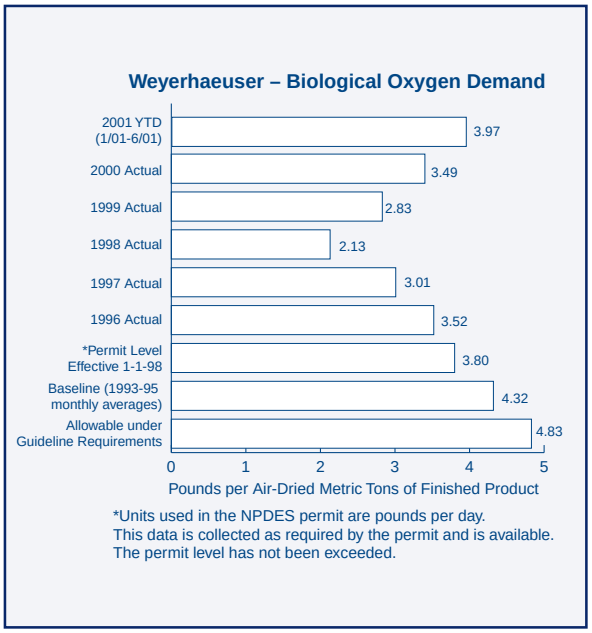

Figure 52
BOD in effluent discharge.

slightly increased to 2.83 pounds per ADMT and TSS in effluent increased to 3.87 pounds per ADMT. In 2000, the BOD increased to 3.49 pounds per ADMT and TSS increased to 3.92 pounds per ADMT. For the first half of 2001, Weyerhaeuser reported discharging 3.97 pounds per ADMT of BOD and 5.21 pounds per ADMT of TSS (see Figures 52 and 53). Both BOD and TSS were higher than the Phase IV goals during these six months as they usually are for the first half of the year. During the late summer and fall of the year, the holding pond is steadily filled to remain within the NPDES permit for effluent color while the river flow is extremely low. In January the holding pond begins to be emptied over several months when river volume returns. This causes the effluent volume to increase, which causes an increase in the BOD and TSS. Even though the results for these parameters are higher than the Phase IV goal on a pounds per ADMT basis, the NPDES permit limits have not been exceeded (which are in pounds per day units).

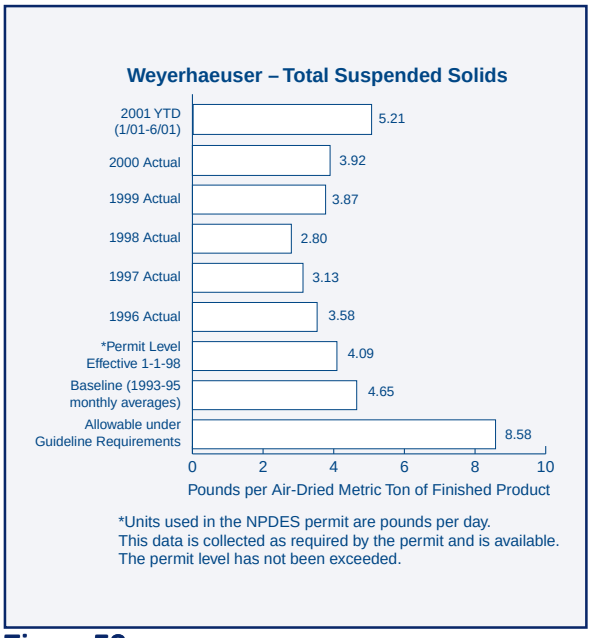

Figure 53
Total suspended solids in Flint River effluent.

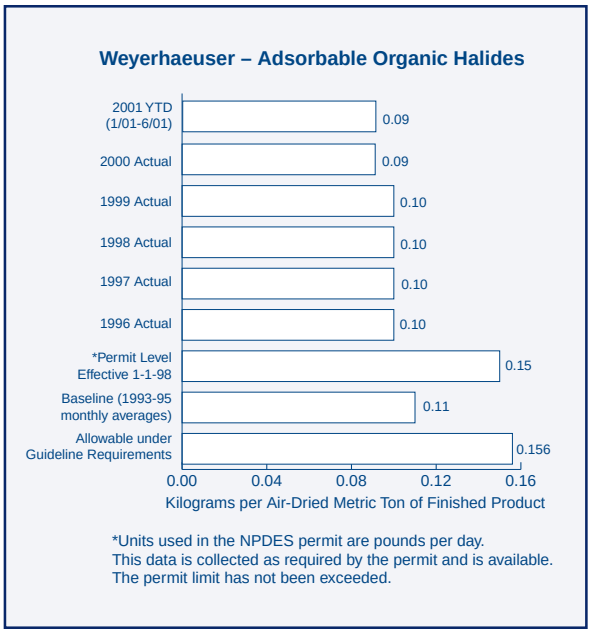

Figure 54
Adsorbable organic halides in effluent discharge.

– AOX results continued at a low rate (see Figure 54). The permit also allows the discharge of 0.15 kilograms of AOX per ADMT. In the first half of 1998, absorbable 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 was able to regain the project average of 0.10 kilograms of AOX per ADMT for 1998 overall. In 1999, AOX remained at 0.10 kilogram per ADMT. In 2000, Weyerhaeuser has decreased AOX to 0.09 kilogram per ADMT. For the first half of 2001, AOX values have remained at 0.09 kilogram per ADMT.

– Weyerhaeuser also committed to reduce the facility's use of water from the Flint River to an 11.5-MGD monthly average, which, in turn, will reduce the quantity of treated wastewater discharged back into the river. Weyerhaeuser's long-term goal

is to further reduce total water withdrawal voluntarily (see Figure 55). Baseline water withdrawal at the facility was a 11.18 MGD monthly average based on average monthly values for 1993 through 1995. Water use reductions anticipated from modernization projects were not sufficient to offset increased water usage from other facility process areas, which resulted in 1997 raw water use of a 11.74 MGD monthly average. In 1998, the total usage returned to a 11.49 MGD monthly average through the daily water conservation focus of the production operators. In 1999, the water use increased to a 11.92 MGD monthly average. The primary cause for this increase was a customer demand for a higher-brightness pulp. In January 2000, the Flint River facility initiated several water usage reforms that have reduced average daily water usage. In 2000, the total water usage was 11.11 MGD. In August 2000, the plant submitted an application to the Georgia Environmental Protection Division to lower the Surface Water Withdrawal Permit limit by 1.0 MGD. This application was approved. Water usage was 11.28 MGD for the first half of 2001. In the second half of 2001, Weyerhaeuser will be evaluating a project that may lower water usage by another 0.75 MGD.

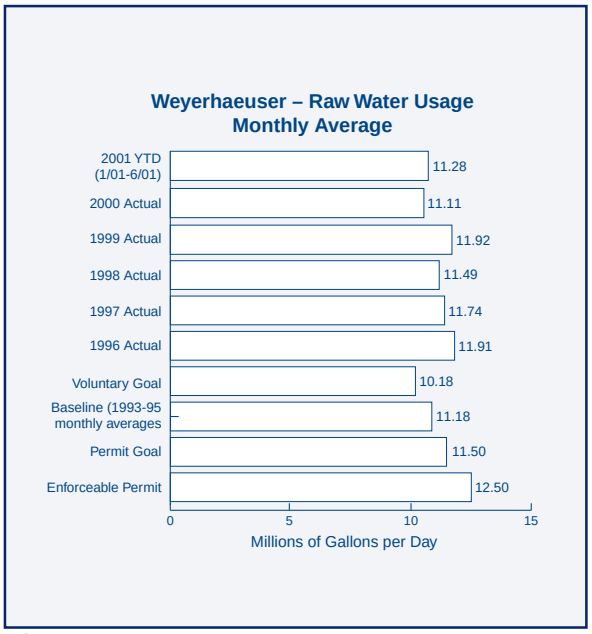

Figure 55
Raw water usage data based on monthly averages.

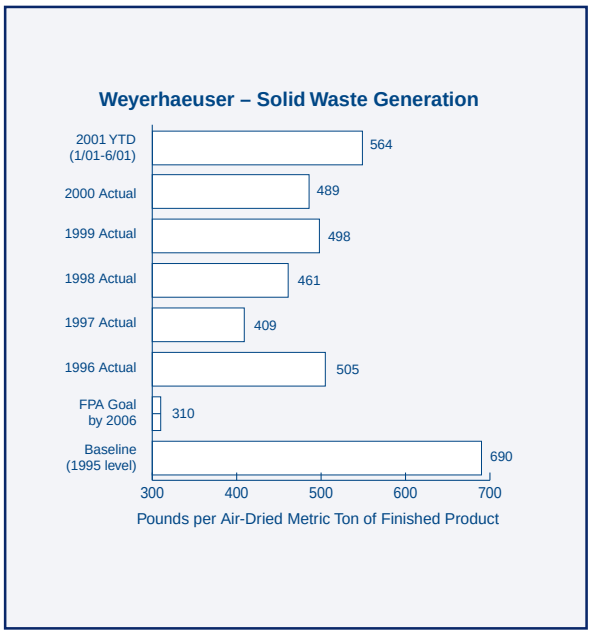

Figure 56
Solid waste generation from Flint River facility.

– Weyerhaeuser's goal is to reduce its 1995 level of solid waste generation by 50 percent by the year of 2006 (see Figure 56). This goal will be accomplished through source elimination and byproduct recycling and reuse. Weyerhaeuser has modernized several components of its pulping process, which has generally reduced the amount of solid waste generated by the plant. The facility has begun recovering and reusing lime mud used in its manufacturing processes. In 1999, waste generation was 498 pounds per ADMT, a decrease from the baseline of 690 pounds per ADMT. The solid waste generation for 2000 was 489 pounds per ADMT of production. For the first half of 2001, most waste streams were at historically low

levels. However, solid waste generation for the first half of 2001 increased to 564 pounds per ADMT. Part of this increase is due to continued problems with the calciner. The calciner continues to run unreliably and the frequency of descaling operations, which produce lime mud, have been increased, resulting in the increase in lime mud waste product. Replacing the calciner with a different piece of equipment would greatly reduce lime mud solid waste and overall solid waste amounts. Weyerhaeuser is considering replacing the calciner in long-term capital planning. The Weyerhaeuser study of application of compost and some process wastes on small test plots as forest amendments continue.

- On June 27, 2001, EPA published a final rule (66 FR 34119)[10], approving revisions to the National Emission Standards for Hazardous Air Pollutants, which concerns the control of HAP emissions from the pulp and paper industry. These revisions are one of EPA's steps to implement the FPA for Weyerhaeuser's XL project. Operation of the plant continues under this rule, which ensures that fewer HAPs are released than if the plant operated under the standard MACT rule. This completes the administrative procedures for implementing this project in the FPA.

- Weyerhaeuser has feasibility studies in progress on composting facility byproducts and applying the composted material on timberlands. This trial is continuing into the third growing season. In addition, composting of solid waste materials has been evaluated and successfully tested in recent years. Early in 2001, a new company policy on land-application of residuals and solid wastes with the potential to contain detectable concentrations of dioxins and furans was implemented. The policy discourages new endeavors in land application of process residuals where the company does not retain control of the use of the residuals or the land where the residuals are applied. The company will continue to explore beneficial uses of the solid waste materials in controlled settings. Further investigations of the viability and economics of composting mill wastes is planned to start in the second half of 2001.

- Weyerhaeuser has completed a facility-wide energy conservation study as well as three small-scale energy conservation studies. As an outcome of the Energy Conservation Study, an energy goal of 20,000 pounds of steam/ADMT has been set. For the first half of 2001, the recovery boiler has been running with a new soot blower strategy. Weyerhaeuser decreased steam usage in the first half of 2001 to 20,140 pounds of steam/ADMT. In 2002, Weyerhaeuser plans to replace the steam driven chiller in the pulping unit with a more efficient unit.

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

- Weyerhaeuser reorganized and documented the Flint River EMS to conform to the ISO 14001 standard. In November 2000, an audit of the EMS was conducted. The Lands & Timber organization received confirmation in early 2001 that their registration audit was successful and that organization is now certified to ISO 14001. This resulted from an independent audit by the Quality Management Institute, which is a division of the Canadian Standards Association. This achievement is an enhancement to the completed Phase V project titled "Timberlands Resource Strategies." In addition to certification under the ISO 14001 EMS standard, Georgia Weyerhaeuser forest practices have been certified to the American Forest and Paper Association's Sustainable Forestry Initiative standard.

[10]Inadvertently when EPA published the final rule on June 27, 2001, the date April 16, 2001 was used in two sections of the rule instead of the date April 16, 2002 which had been used in the proposed rule. EPA published a technical correction on October 16, 2001 (66 FR 52537) to correct these two typographical errors.

- In the next six months, Weyerhaeuser plans to identify and implement water conservation measures to drive towards the goal of 10.18 MGD total water usage. In addition, Weyerhaeuser will continue efforts in energy conservation to make progress toward the goal of 20,000 pounds of steam/ADMT for total steam usage and continue to operate the EMS and schedule a certification audit.

Benefits for the Environment

- As of June 2001, the amount of solid waste generated has been reduced by 30 percent.
- Over the course of the project, actual air emissions of PM, total reduced sulfur, NO_x, and CO, have been reduced with decreases ranging from 17.7 percent for total reduced sulfur to 8.3 percent for NO_x.
- After initiating several energy conservation measures by June 2001, the total plant steam usage has decreased by 3.4 percent and the power boiler steaming rate has decreased by 20.3 percent.

Benefits for Stakeholders

- Stakeholders have a better understanding of facility operations.
- Stakeholders continue to have better access to project information directly from the facility in a simplified, consolidated report.
- Stakeholders also continue to have the opportunity to learn more about the project and its progress in meeting project goals status by attending Weyerhaeuser Company's annual stakeholder meeting.
- 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 mud) 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.

Benefits for the Project Sponsor

- Weyerhaeuser achieved an estimated savings of $176,000 in reporting burden costs during the first year of operation as a result of the successful revision and reissue of the facility's air quality and wastewater discharge permits.
- Weyerhaeuser foresees avoiding $10 million in capital spending on air pollution control equipment throughout the term of the agreement, although the actual savings is not quantifiable.
- The "bubble" concept for air emission regulations (i.e., the dual emissions cap) allows the company to avoid costly unnecessary permit reviews.
- The MACT applicability assessment and site-specific rule will allow the company to meet or exceed the environmental benefits that would have resulted from new regulations in a manner that is less costly for the facility.
- EMS implementation has begun to increase staff education and awareness of the environmental aspects of their jobs.

Information Resources: The information in this summary comes from the following sources: (1) the December 2000 *XL Project Progress Report—Weyerhaeuser Flint River Operations* (EPA 100-R-00-006); (2) focus group discussions on December 1998 with representatives of the federal and state regulatory agencies, Weyerhaeuser Flint River Operations, and a local stakeholder involved in the project; (3) annual and midyear reports prepared by Weyerhaeuser Corporation available through June 2001; (4) focus group discussions in January 2000 with representatives of

the federal and local regulatory agencies, Weyerhaeuser, and a local stakeholder; (5) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000; and (6) a press release from January 29, 2001.

Yolo County Bioreactor

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 14, 2000

Background

The Project Sponsor: The Yolo County Central Landfill (YCCL) is a 722-acre landfill operated by Yolo County Planning and Public Works Department. It is located two miles northeast of the City of Davis in northern California. Adjacent to the site are the City of Davis' Wastewater Treatment Plant lagoons, a highway bypass, and agricultural crops. There are also approximately 28 residences within a two-mile radius of the landfill, the closest one being 1,600 feet to the south. The YCCL originally opened in 1975 for the disposal of construction debris and non-hazardous liquid and solid waste. Current onsite operations include an 11-year-old landfill methane gas recovery and energy generation facility, a drop-off area for recyclables, a metal recovery facility, a wood and yard waste recovery and processing area, and a concrete recycling area. Under the Resource Conservation and Recovery Act (RCRA), the site is characterized as a Class III non-hazardous municipal landfill (i.e., it accepts most types of solid and liquid waste, most of which comes from households).

The Experiment: Yolo County is proposing a 20-acre module of the YCCL for use as a controlled bioreactor landfill. A bioreactor landfill converts and stabilizes decomposable waste in an accelerated manner. The process requires a liquid addition to the waste, which can include recycled leachate (i.e., water that collects contaminants as it trickles through wastes) from the landfill itself. A bioreactor landfill uses controlled quantities of liquid to accelerate the otherwise slow decomposition of the waste. This acceleration increases the biodegradation of the solid waste and can decrease the composting time from over 30 years down to 5 to 10 years. In this type of landfill system, liquids are added and circulated through the waste, as appropriate, to accelerate the natural biodegradation rate of waste and therefore decrease the waste stabilization and decomposition time relative to what would occur in a conventional landfill. Conventional landfills do not use liquid additions, and landfill operators must receive regulatory flexibility from EPA in order to operate a bioreactor. This acceleration in the decomposition process is beneficial because it can increase landfill capacity and subsequent landfill life, improve opportunities for treating the leachate liquid draining from the landfill, reduce landfill post-closure management activities, and produce a methane gas byproduct that can be captured and used as a renewable energy resource.

In the first phase of this 20-acre project, Module D has been constructed. This 12-acre module contains one 9.5-acre cell, which will be operated anaerobically, and a 2.5-acre cell to be operated aerobically. The county will construct the second phase of Module D in two years and, depending on the results of the first phase of Module D, the county may operate the second phase either anaerobically or aerobically. The monitoring and reporting of the second phase of Module D are not discussed in this proposal as the county intends to revise the FPA in two years when more data become available from phase one of the project. The county decided to construct this 20-acre cell in two phases to reduce the construction cost of the project and to apply what is learned from the first phase to the second phase.

This project is testing whether the following environmental and waste management benefits can be accrued with a bioreactor landfill:

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

The Flexibility: Yolo County requested and has been granted regulatory flexibility for liquid additions, which is the addition of liquid waste to a landfill and is generally a prohibited activity under federal waste laws and waste laws for the State of California. EPA issued a site-specific rule to amend 40 CFR §258.28 for Liquid Restrictions on August 13, 2001. The county plans to supplement the liquid additions at the bioreactor with groundwater and also wants the flexibility to utilize gray water, which is typically domestic wastewater or water from the wastewater treatment plant, and food-processing wastes that are currently land applied. Due to the existing high water table, Yolo County regularly extracts groundwater, which may be used in the bioreactor. While these types of liquid wastes are not normally beneficial, the county believes that they may be useful in accelerating the biodegradation process of solid waste in the bioreactor.

Figure 57
Control Cell—Note how pile is still raised in the center.

Figure 58
Test Cell – Note how pile is sagging in the center. This is due to the accelerated decomposition.

The county also requested flexibility on liquid additions under several sections of California laws governing waste management under the California Code of Regulations, Title 27, Environmental Protection, which addresses the recirculation of liquids in lined municipal landfills.

Other Innovations: *(1) Evaluating Innovative Approaches to Solid Waste Management.* This project assists in understanding how the performance of bioreactor landfills and liquid additions affect operations under anaerobic and aerobic decomposition conditions. *(2) Exploring RCRA Flexibility for Landfills.* Under RCRA, liquid additions are prohibited at landfills, but the bioreactor system requires the use of liquids to properly function. EPA has been requesting information on the liquid additions and is currently considering revising 40 CFR Part 258 to allow for leachate recirculation in bioreactor landfills with the proper liner. Through this XL project, EPA can further evaluate whether allowing leachate recirculation in landfills can prove beneficial.

The Superior Environmental Performance: The full-scale Yolo County Bioreactor Project will combine the acceleration of waste decomposition and the efficient capture of methane gas. The acceleration of the waste decomposition will be accomplished through the addition of liquids to the waste pile, which speed up the composting, stabilization, and generation of methane (see Figures 57 and 58). The methane will be captured at a slight vacuum from a freely gas-permeable shredded tire collection layer beneath the low-permeability cover. Near complete extraction using this approach has already been demonstrated at a test cell where YCCL has been operating a smaller bioreactor demonstration project for over three years.

The demonstration test cell project is a an anaerobic controlled bioreactor landfill, which consisted of two demonstration landfill cells, each filled with approximately 9,000 tons of curbside garbage. The "test" cell, or enhanced cell, received controlled liquid additions and recirculated leachate, while the "control" cell served as a control or baseline to represent a conventional landfill. The demonstration project showed close to a 10-fold increase in methane recovery rate and an 18 percent decrease in the volume of solid waste compared to conventional landfills. The full-scale bioreactor project proposed in the Project XL program is a larger-scale replication of this demonstration project.

Progress in Meeting Commitments
(As of October 2001)

- Many of Yolo County's commitments will be met after testing is completed. The testing was scheduled to begin in summer 2001. The construction of the aerobic liner was completed in August 2001, and waste is currently being placed into the cell. Waste was placed in the cell until October 2001. Yolo County worked toward meeting all of its commitments as testing progresses throughout the fall of 2001.

- EPA committed to propose and issue a site-specific rule, amending 40 CFR Part 258.28, that applies specifically to this landfill.

  – The rule was proposed on May 9, 2001. The final rule was published in the Federal Register on August 13, 2001.

- In October 2000, Yolo County submitted an application to Yolo-Solano Air Quality Management District (YSAQMD) requesting a federally enforceable state operating permit (FESOP) regarding gas monitoring requirements. In addition, YSAQMD has been notified by Yolo County regarding the progress that is being made at the landfill. The gas collection and control system is scheduled for completion by the end of November 2001 and water additions are scheduled to begin in December. YSAQMD stated that they would have the draft revised FESOP permit completed by mid November 2001.

- Alternatives in energy generation systems to minimize nitrogen oxides are being explored as the testing occurs.

- Accurate data for the bioreactor landfill is being generated and a record-keeping system is being established as the testing occurs.

Benefits for the Environment

- Accelerating the decomposition process is beneficial because it can increase landfill capacity and subsequent landfill life, improve opportunities for treating the leachate liquid draining from the landfill, reduce landfill post-closure management activities, and produce a methane gas byproduct that can be captured, which decreases emissions and can be used as a renewable resource. The bioreactor will be able to accept more waste over its lifetime making its environmental performance superior to that of a conventional landfill.

Benefits for Stakeholders

- Present landfill capacity at YCCL is sufficient until the year 2040, but with successful implementation of the bioreactor, the county and its residents could see that lifespan extend, thereby reducing the need for additional landfills in the county.

Benefits for the Project Sponsor

- Along with stakeholders, project sponsors will benefit from the extended life of the landfill and the decreased long-term risks associated with the landfill. Additionally, the effective and efficient capture of methane gas and its subsequent conversion to electricity could be sold to the local grid, farmers, or the City of Davis.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Yolo County Bioreactor Landfill Project, signed September 14, 2000; and (2) the *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.