PPG Industries, Inc. Pollution Prevention Framework
Project XL Progress Report - 2001

In 1995, the U.S. Environmental Protection Agency (EPA) embarked on a series of innovative initiatives in an effort to test new ways to achieve greater public health and environmental protection at a more reasonable cost. Through Project XL, which stands for eXcellence and Leadership, EPA enters into specific project agreements with public or private sector sponsors to test regulatory, policy, and procedural alternatives that will produce data and experiences to help the Agency make improvements in the current system of environmental protection. The goal of Project XL is to implement projects that will test ways of producing superior environmental performance with improved economic efficiencies, while increasing public participation through active stakeholder processes. EPA Project XL Progress Reports provide overviews of the status of XL projects that are implementing Final Project Agreements (FPAs). The progress reports are available on the Internet via EPA's Project XL Web site at http://www.epa.gov/Project XL. Hard copies may be obtained by contacting the Office of Policy Economics and Innovation's Project XL general information number at 202–260–5754. Additional information on Project XL is available on the Web site or by contacting the general information number.

Background

PPG Industries, Inc. (PPG) is a leading global supplier of coatings, continuous-strand fiberglass, flat and fabricated glass, and chemicals. PPG produces the following chemical products: automotive replacement glass, automotive coatings and refinishes, aerospace products, architectural coatings, industrial coatings, packaging coatings, fine chemicals, optical products, silica products, electronics specialty fiberglass, and reinforcement fiberglass. PPG has about 50 production facilities in the United States and 110 worldwide, including subsidiaries, joint venture and equity affiliates. The company employs approximately 32,000 people.

As a technological leader for 116 years, PPG has introduced many new products and process innovations. Accordingly, PPG submits many new chemical notifications to EPA each year pursuant to Section 5 of the Toxic Substances Control Act (TSCA). These new chemical substances have been developed in PPG's Research and Development (R&D) facilities located in Monroeville, Allison Park, and Harmarville, which are located in the greater Pittsburgh area.

PPG's environment, health, and safety policy is to market, distribute and manufacture products globally in a responsible manner that protects employees, neighbors, customers and the environment. In fulfilling its policy, PPG has made a commitment to continuous improvement and sustainability. Following its policy, PPG's committed itself to EPA's Project XL program.

The Experiment

Under TSCA, EPA's Office of Pollution Prevention and Toxic Substances (OPPTS) is responsible for ensuring new chemicals do not pose an "unreasonable risk" to workers, consumers, and the environment. Consequently, EPA has developed a 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. This screening methodology is known as the Pollution Prevention Assessment (P2) Framework. The framework allows EPA 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. It is quick and easy to use, relatively inexpensive, and can be applied before a chemical is even synthesized.

The P2 Framework has been developed over a 20-year period by the EPA's OPPTS and others in the scientific community to screen new chemical substances in the absence of data. Annually, EPA evaluates approximately 2,000 Pre-manufacture Notifications (PMNs) that are submitted to the Agency pursuant to Section 5 of TSCA. The act requires that persons who manufacture (or import) a new chemical substance provide such notice to EPA 90 days prior to commencing nonexempt commercial manufacture. However, the law does not require that the submitter conduct laboratory tests to evaluate the potential hazard and risk of the new chemical substance. Operating under this time limitation, and often lacking sufficient data, EPA developed the P2 Framework methodologies to quickly screen new chemical substances.

Chemical manufacturers invest substantial resources in new product development before seeking EPA approval. 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 industry for their internal use to assess new chemicals during product development. EPA's goal is to demonstrate how these tools can help design safer chemical substances, reduce waste generation and identify other P2 Framework opportunities.

In this project, PPG has applied the P2 Framework early in its new product development process to help it identify and develop products and processes that can be sustained both environmentally and economically. Applying the P2 Framework, PPG incorporated environmental and health information into the early stages of its chemical development operations, as well as identify opportunities for pollution prevention. PPG has used the P2 framework at three of its R&D facilities near Pittsburgh. PPG believes many other companies can develop environmentally preferable products by applying the P2 Framework, especially at the R&D stage of product development.

The use of the P2 Framework has assisted PPG when it is designing new chemical substances and products by enabling PPG to conduct an analysis similar to that performed by EPA for each PMN that is submitted to EPA. The process allows PPG to determine early in the R&D process which chemicals are less toxic and incorporate them into their new products. PPG has

incorporated information obtained from use of the P2 Framework methodologies into its TSCA Section 5 submissions, which should allow EPA to approve the new substances quicker.

PPG, in partnership with the EPA, entered into this Project XL Agreement to pilot the application of the P2 Framework, to validate selected P2 Framework models, and to disseminate information about the P2 Framework to other chemical companies and industries. Each initiative is designed to make other industry representatives aware of the source reduction, pollution prevention and economic benefits that can be realized by using the P2 Framework.

PPG and EPA expected the following environmental benefits with the use of the P2 Framework in this project:

- Identification of health and environmental hazards/risks and pollution prevention opportunities at an early stage in new product development;
- Selection of fewer hazardous materials for use in a final product, thereby reducing the production of both hazardous and solid waste materials; and
- Application of the necessary tools to compare alternative product decisions involving chemical substances that lack environmental, health and safety data.

The Flexibility

All new industrial chemicals are strictly regulated by the EPA under TSCA. Section 5 of TSCA requires prospective manufacturers (or importers) to wait 90 days after submitting a PMN before they can begin to manufacture (or import) a new chemical substance. Within the 90-day period, EPA must evaluate the report and identify potential risks of the new chemical substance. 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 the EPA. During the 90-day PMN review period, EPA determines whether the substance may present an unreasonable risk to human health or the environment. If EPA determines during its initial review that a PMN chemical substance does not present an unreasonable risk to the environment or human health, the substance is not likely to be regulated by EPA.

Under this XL project, PPG and EPA have agreed that PMN substances reported by PPG that meet EPA's criteria may be manufactured prior to day 90 of the review period pursuant to a Test Marketing Exemption (TME). Furthermore, 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 such simultaneous submittals, for purposes of encouraging the use of the P2 Framework, PPG has been permitted to make such submissions pursuant to the agreement. EPA allows such concurrent submissions to be sustained when the TME is granted and the corresponding PMN is dropped from further review (meaning the chemical substance is determined to present no unreasonable risk) during the first 30 days of the review period.

Promoting Innovation and Systems Change

Project XL provides EPA opportunities to test and implement approaches that protect the environment and advance collaboration with stakeholders. EPA is continually identifying specific ways in which XL projects are helping to promote innovation and system change. The innovations and system changes emerging from the PPG XL project are described below.

Three clear areas where the project is promoting innovation and system change are in pollution prevention, reducing the regulatory burden, and stakeholder involvement. These are described below.

Pollution Prevention

EPA expects that PPG's use of the P2 Framework to pre-screen its product development options results in increased opportunities for pollution prevention by preventing the generation of pollution rather than controlling pollution once it has been created. For example, PPG can use the P2 Framework to compare potential hazards and risks of product alternatives during product research and development. This effort allows PPG to identify environmentally preferable products and processes. Further, the P2 Framework is expected to allow companies to improve the environmental performance (i.e., lower health hazard, lower environmental hazard, and lower exposure potential) for products, possibly reducing costs, decreasing potential liability, and improving market share — resulting in a competitive advantage.

Reducing the Regulatory Burden

EPA and PPG predict that the early use of the P2 Framework's screening tool by companies that submit PMNs discourages the submission of PMNs for substances that might present an unreasonable risk to human health or the environment. Anticipating and addressing 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.

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 technology by EPA and the communication of its benefits by PPG with other industrial stakeholders represents an unprecedented cooperative approach to pollution prevention.

Project Commitment Summary

Commitment	Status
Commitment #1 **Applying P2 Framework in New Product Development**	
Apply the P2 Framework in PPG's new product development programs.	PPG has appropriately applied the P2 Framework on twenty new chemicals. PPG submitted five simultaneous TME/PMN submissions.
Commitment #2 **Publish a Validation Report**	
Publish a validation report and/or present the results of the validation effort at scientific or technical meetings, in a joint effort with EPA, which will evaluate the P2 Framework models used to predict aquatic toxicity of polymeric substances based on the analysis of the structure.	• PPG has completed a Structure Activity Relationships (SAR) validation study on 38 polymeric chemicals. • PPG has also completed an SAR validation study on Chlorinated Benzenes, independent of the Final Project Agreement.
Commitment #3 **Communicating with Other Industries on the Uses and Benefits of the P2 Framework**	
Communicate with, reach out to, and work with scientific and technical staff from a variety of chemical companies and Stakeholders, to support their implementation of the P2 Framework by participating in two to three meetings or workshops per year.	PPG has held four presentations at professional societies meeting to discuss the implementation, use and benefits of the P2 Framework, and their validation study.
PPG will work with Stakeholders and the appropriate local, regional and state and federal agencies to facilitate the process, as appropriate.	PPG held public meetings to inform the general public about this project and invited comments and participation.

Environmental Performance

This section summarizes progress in meeting the environmental performance commitments described in the Final Project Agreement (FPA) for PPG. It compares the goals of the project to what would have been required under conventional environmental regulations for pollution prevention under section 5 of TSCA.

Under TSCA, companies are not required to test new chemical substances prior to submission to EPA. Prior to the development of the P2 Framework by EPA, there were no tools based on environmental regulations by which industry could test chemicals for potential environmental

and health risks. PPG's commitment to use the P2 Framework and promote its use within the chemical industry represents a major commitment to pollution prevention.

Under this project, PPG committed to improve environmental performance in three significant ways:

1) *Applying P2 Framework in New Product Development*—to use the P2 Framework in its own product development program and submit PMNs to EPA based on P2 Framework analysis data;
2) *Publish a Validation Report*—to conduct a validation study to compare measured aquatic toxicity data with SAR predictions from ECOSAR (Ecological Structure Activity Relationships), a personal computer software program that is used to estimate the toxicity of chemicals used in industry and discharged into water.
3) *Communicating with Other Industries on the Uses and Benefits of the P2 Framework*—to promote understanding about the use and benefits of the P2 Framework through outreach to industry and other stakeholders.

Applying P2 Framework in New Product Development
PPG has used the P2 Framework successfully on approximately 20 new products in the coatings division, primarily paints and resins. All the products have passed the P2 Framework assessment. Of the 20 products, fourteen have been submitted and three will be submitted as PMNs to EPA. Of the 14 submissions, five have been submitted as a simultaneous TME/PMN notification.

In the chemicals division, PPG has applied the P2 Framework to five chemicals. All have passed the assessment and will be submitted to EPA for PMN review soon.

Publish a Validation Report
PPG submitted to EPA a Structure Activity Relationships (SAR) validation report in December 2000. SAR is a technique routinely used by EPA to estimate aquatic toxicity of chemicals reviewed by the EPA in response to PMNs.

As part of their Project XL commitments, PPG, working with EPA, conducted a validation study to compare measured aquatic toxicity data with SAR predictions from ECOSAR, a personal computer software program that is used to estimate the toxicity of chemicals used in industry and discharged into water. The program estimates a chemical's acute (short-term) toxicity and, when available, chronic (long-term or delayed) toxicity based on known properties of chemicals that resemble or match the same set of PPG chemicals. 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 percent 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 ten-fold 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.
Also, 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.

Communicating with Other Industries on the Uses and Benefits of the P2 Framework
PPG has conducted outreach efforts by giving several presentations about the use and benefit of the P2 Framework. Specifically, the company presented papers at the following meetings:

- Allegheny-Erie Society of Toxicology, Fall Meeting in Pittsburgh, Oct.13, 2000;
- Pittsburgh Chapter of the Society for Risk Analysis, meeting in Pittsburgh, Dec. 11, 2000;
- Society of Toxicology, National Meeting in San Francisco, March 2001; and
- Green Chemistry and Engineering Conference, June 2001

In addition, public meetings were held to inform the general public about this project and invite their comments and participation. PPG conducted public meetings at its Allison Park, Pennsylvania, and Monroeville, Pennsylvania, facilities.

Stakeholder Participation

Most of the new product development activities occur at PPG R&D facilities centers located in the Pittsburgh area. PPG is reaching out to interested local and national environmental groups and local affected communities. Further, PPG's public communication committee will keep Stakeholders informed of any significant activities related to this project.

Public meetings were held to inform the general public about the project and to invite their comments and participation. The first public meeting was held on July 27, 2000, in Pittsburgh to introduce the public to the project and the FPA development process. Other public meetings may be held during implementation of the FPA based on public interest or as decided by the direct participants. Public meeting locations will be chosen to provide adequate size and accessibility to all who wish to attend.

Stakeholder input has been and will continue to be considered throughout implementation of the Project. PPG will maintain and update the Stakeholder Implementation Plan, if needed, to provide for continued Stakeholder involvement over the duration of the XL Project.

Another stakeholder is the Pennsylvania Department of Environmental Protection (PADEP), which is not a direct project participant because states do not have a delegated role in the implementation or enforcement of TSCA, which governs manufacturing of new chemical substances. However, even though PADEP does not have jurisdiction over this program, it is committed to efforts that advance pollution prevention concepts and will support the PPG XL project in any way it can.

Six Month Outlook

- EPA and PPG forecast that PPG will submit five PMNs for new chemicals using the P2 Framework in the next six months.

- EPA and PPG also anticipate that PPG will give two additional presentations about the P2 Framework in the next six months.

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Information Sources

The information sources used to develop this progress report include discussions with representatives of EPA and PPG, and the FPA for the PPG XL project.

Glossary

Toxic Substances Control Act (TSCA): TSCA was enacted by Congress in 1976 to give EPA the ability to track the 75,000 industrial chemicals currently produced or imported into the United States. EPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

Premanufacture Notification (PMN): A notice to EPA of a new chemical material as required under Section 5 of TSCA. Prospective manufacturers (or importers) of a new chemical material

must submit a Premanufacture Notice to EPA and wait 90 days before they can begin manufacture or import of a new chemical substance. EPA has 90 days to analyze the structure of the submitted chemical to identify potential risk to health or environmental risk.

Toxicology: The study of the nature, effect and detection of poisons and the treatment of poisoning.

Major Milestones

May 25, 2000 – EPA accepts PPG's Project XL
July 27, 2000 – First public meeting held on Project XL
Sept. 14, 2000 – Final Project Agreement signed by EPA and PPG
Oct.13, 2000 – Presentation of P2 Framework at Allegheny-Erie Society of Toxicology, Fall Meeting in Pittsburgh
December 2000 – PPG completes its Validation Study
Dec. 11, 2000 – Presentation of P2 Framework at Pittsburgh Chapter of the Society for Risk Analysis, meeting in Pittsburgh
March 2001 – Presentation of P2 Framework and Validation Study at Society of Toxicology, National Meeting in San Francisco
June 2001 – Presentation of Lead-free Electrodeposition (ED) Coating at Green Chemistry and Engineering Conference in Washington DC. Lead-free ED Coating was the first PPG product developed using P2 framework.
September 14, 2003 – FPA termination date