

Lead Safe Boston

FINAL PROJECT AGREEMENT SIGNED AUGUST 29, 2000

Background

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

Over the past five years, the LSB program has used a combination of federal, state, and local resources to abate LBP hazards in 707 privately owned housing units, while undertaking an aggressive community outreach and education campaign to make residents aware of the severe risks of lead in the living environment. During the next 36-month phase of its program, LSB is targeting the neighborhoods of Roxbury and Dorchester. These neighborhoods have a concentration of older housing, the vast majority of which is likely to have lead contamination. LSB will complete lead hazard control or abatement activities in a minimum of 180 housing units in one- to four-unit buildings, occupied by low- or moderate-income families with children aged six years and younger. Funding will be provided by the U.S. Department of Housing and Urban Development (HUD).

The Experiment: In this XL project, LSB seeks to increase the number of housing units that have LBP hazards abated by utilizing provisions in the Resource Conservation and Recovery Act's (RCRA) Household Waste Exclusion (HWE) rule [40 CFR 261.5 (b)(1)] that allow LBP debris from residential housing units to be disposed of as "household waste" instead of hazardous waste. Disposing of LBP debris as a household waste, subject to state regulation, will reduce the cost of

lead abatements in residential housing. As part of this project, LSB has pledged to use the cost savings made available through implementation of this XL project to perform approximately 12 additional residential lead abatements that will reduce lead exposure risks for roughly 30 children in Boston's Dorchester and Roxbury neighborhoods.

The Flexibility: Through RCRA, EPA regulates the disposal of solid and hazardous wastes. Since 1980, EPA has excluded household waste from the universe of RCRA hazardous wastes under 40 CFR 261.4(b)(1). In 1998, EPA clarified that the household waste exclusion applies to "all LBP waste generated as a result of actions by residents of households to renovate, remodel, or abate their homes on their own" [63 FR 70233, 70241 (Dec. 18, 1998)]. In a July 31, 2000, policy memorandum, EPA's Office of Solid Waste and Emergency Response further clarified that lead-based paint debris generated by contractors in households is considered household waste and therefore excluded from the RCRA hazardous waste regulations. On May 4, 2001, Massachusetts Department of Environmental Protection (MA DEP) issued a policy memorandum that endorsed the provisions of EPA's July 2001 memorandum.

LSB will utilize provisions in this July 31, 2000, policy memorandum developed by EPA to extend the use of the RCRA HWE rule to contractors and individuals performing lead abatements in residential housing units. The provisions will enable LSB to treat the architectural lead debris from these projects as household waste in lieu of hazardous waste and, thereby, forego costly toxicity characteristic leaching procedure (TCLP) testing and enable disposal of LBP debris in municipal solid waste landfills. Moreover, to further accelerate the pace of LBP removal from residences, EPA issued on October 22, 2001, a direct final rule enabling residential LBP waste to be sent to construction and demolition landfills as well.

This practice will simplify many lead abatement activities and significantly reduce their costs. By allowing the debris from residential housing units to be disposed of as household waste, EPA's new policy memorandum reduces the disposal cost for LSB by an average of \$286 per project, which is

270 percent lower than its average cost (\$768) of hazardous disposal. This represents significant cost savings to the LSB program, as LSB prepares to complete lead hazard control activities in a minimum of 180 housing units. LSB estimates that it will save approximately \$100,260 in disposal costs and TCLP testing fees.

Other Innovations: (1) *Establishment of a Transferable Model for Other States and Localities.* This project will establish a highly transferable model in two unique and important ways. First, EPA's policy memorandum is nationally applicable as it encourages states to take steps necessary to offer more flexibility at the state level. States retain the discretion to implement this federal policy in a more stringent manner or to be broader in scope than the federal program as they see fit. Second, LSB's program will serve as a model project by encouraging the use of best management practices for handling LBP debris from residential housing as set out by HUD. (2) *Cleanup of Additional Housing Units.* The decreased costs of disposing of LBP as household wastes will allow lead abatement dollars to stretch further, thereby potentially enabling the cleanup of thousands of additional housing units nationally if the flexibility is broadened beyond LSB.

The Superior Environmental Performance: By extending the RCRA HWE rule to allow contractors and individuals to perform lead abatements in residential housing units, EPA will enable LSB to forgo costly testing and disposal of lead debris in solid waste landfills, allowing more lead abatement projects to take place with the funds saved in disposal costs, thus preventing more children from being exposed to lead hazards. In addition to encouraging use of the HWE rule to facilitate residential LBP abatement activities, EPA also strongly encourages individuals and contractors to use best management practices, as set out by HUD when evaluating and controlling LBP hazards in housing units. By ensuring that appropriate safety measures are taken at the time of the removal, worker health will also be protected. LSB's procedures and contract requirements ensure that all contractors undertaking LBP remediation under LSB's auspices must follow all federal, state, and local health and safety precautions that apply to this type of activity.

Progress in Meeting Commitments (As of November 2001)

- EPA committed to issue a policy memorandum clarifying the regulatory status of wastes generated as a result of LBP activities in homes and other residences as non-hazardous waste under the RCRA HWE Rule at 40 CFR 261.4(b)1. To increase awareness about the policy memorandum, EPA committed to circulate the document to all EPA regions, states, tribes, and trade associations, as well as to post it on the EPA Web site.
 - EPA issued the policy memorandum on July 31, 2000.
 - EPA has mailed the policy memorandum to all EPA regions, states, tribes, and trade associations and posted the memorandum on the following EPA Web sites: <http://www.epa.gov/projectxl> and <http://www.epa.gov/lead/fslbp.htm>.
 - On October 23, 2001, EPA published in the Federal Register (Vol. 66, No. 205, pp. 53535-53542) a direct final rule to help accelerate the pace of LBP removal from residences, and thereby reduce exposure to children and adults from the risks associated with lead by revising the definition of "municipal solid waste landfill unit" and by the addition of two new definitions: "construction and demolition (C&D) landfill" and "residential LBP waste." This rule will expressly allow residential LBP waste to be disposed of in C&D landfills and continue to allow the disposal of residential LBP waste in municipal solid waste landfills. This rule will become effective on January 22, 2002, unless EPA receives adverse comment by November 23, 2001.
- MA DEP committed to develop state solid and hazardous waste management strategies consistent with the federal policy memorandum to address the disposal of LBP debris from residential housing.

- MA DEP issued its own solid and hazardous waste management strategies consistent with the federal policy memorandum to address the disposal of LBP debris from residential housing on May 4, 2001.
- In addition to the planned abatement projects at 180 housing units, LSB committed to perform an additional 12 lead abatement projects using the cost savings realized from following EPA's and MA DEP's new policy memorandum.

Benefits for the Environment

- This project will reduce the environmental impact of LBP hazards by encouraging the use of best management practices for handling LBP debris from residential housing units as set out by HUD. Given that the EPA policy memorandum is applicable nationally, the LSB program will serve as a model for other LBP removal and disposal programs across the country.

Benefits for Stakeholders

- The project will provide additional resources for lead abatement to benefit the families and affected children who live in the housing units that are cleaned up under this program. Ultimately, this will result in more low-income families having LBP hazards removed from their homes.

Benefits for the Project Sponsor

- The regulatory flexibility provided by this XL project will allow LSB to perform additional abatements with the same amount of funding as a result of reduced LBP testing and disposal costs.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Lead Safe Boston Project, August 29, 2000; (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000; and (3) final rule published in Federal Register, Volume 66, No. 205.

Louisville and Jefferson County Metropolitan Sewer District

FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 28, 2000

Background

The Project Sponsor: Louisville and Jefferson County Metropolitan Sewer District (MSD) is a nonprofit regional utility service. The Louisville and Jefferson County MSD is responsible for wastewater collection and treatment, a comprehensive public stormwater drainage system for Louisville and Jefferson County, flood management and control, stream monitoring, hazardous materials control, and several other programs. In September 1998, Louisville and Jefferson County MSD was awarded a grant for the development of pretreatment performance measures, designed to quantify the environmental impact of the pretreatment program in the Jefferson County sewer-shed.

The Experiment: Louisville and Jefferson County MSD plans to experiment with a new approach to its pretreatment program at the Jefferson Wastewater Treatment Plant by establishing links between wastewater programs (such as collection systems, stormwater, sludge) and moving toward a more holistic watershed protection strategy. Through information gathering and sharing between wastewater programs, Louisville and Jefferson County MSD will test shifting resources from the pretreatment program and applying resources toward other environmental programs in order to achieve greater environmental gain in the watershed with fewer resources expended. The project is proceeding in three phases: (1) data collection and development of pretreatment performance measures; (2) program redevelopment; and (3) program implementation.

The Flexibility: Louisville and Jefferson County MSD is regulated under the National Pollution Discharge Elimination System. EPA promulgated a rule amending the National Pretreatment Program regulations on October 3, 2001. This rule allows

publicly owned treatment works (POTWs) that have completed the Project XL selection process, including FPA, to modify their approved local pretreatment programs. Potential regulatory flexibility expected will allow Louisville and Jefferson County MSD to (1) change the permitting requirements, (2) use an alternative definition for significant industrial user and significant noncompliance, and (3) allow participating industrial users to not sample for pollutants that are not expected to be present.

Other Innovations: (1) *Innovation/Multimedia Pollution Prevention.* The integration of the pretreatment program with other environmental monitoring and management programs will allow more efficient use of resources. Louisville and Jefferson County MSD will test several of the 18 recommended results-oriented measures for assessing performance of pretreatment programs developed by a special committee from the Association of Metropolitan Sewerage Agencies in 1994, under a cooperative agreement grant with EPA. When appropriate, Louisville and Jefferson County MSD will reinvest cost-savings into pollution prevention activities, including outreach, education, and technical assistance, first within the pretreatment program, then in other watershed-based programs. Louisville and Jefferson County MSD is working with the Kentucky Pollution Prevention Center for input in this area. (2) *Transferability to Other Municipalities.* Other municipalities will be able to draw valuable lessons from Louisville/ Jefferson County MSD's experience, as it relates to implementing a performance-based program in individual facilities and ultimately across a multi-plant, multi-watershed sewer district. Louisville and Jefferson County MSD's XL project confronts the operational, data collection and analysis, and environmental challenges posed by a regulatory structure that compartmentalizes programs that in practice would benefit from a more holistic approach and will attempt to build links between the pretreatment program and the rest of the system. (3) *Focusing Regulatory Flexibility for Maximum Environmental Benefit.* With information gained from the performance measures, and with the regulatory flexibility provided by the pilot project, resources can ultimately be shifted to address the greatest environmental concerns in the watershed.

Louisville and Jefferson County MSD's strategy is to take better information and reallocate resources with this XL program to create environmental benefits according to a specific prioritization strategy.

The Superior Environmental Performance:

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

Progress in Meeting Commitments

(As of October 2001)

Louisville and Jefferson County MSD is in the initial stage of project implementation. They have met the following commitments:

- Louisville and Jefferson County MSD has collected data to establish a baseline for existing pollutant loadings.
- Louisville and Jefferson County MSD and stakeholders developed the criteria for pollutants of concern, pretreatment program modifications, superior environmental performance, and project accountability programs to be implemented.
- On October 3, 2001, EPA promulgated a rule amending the National Pretreatment Program regulations to allow POTWs that have completed the Project XL selection process, including FPA development, to modify their approved local pretreatment programs. These POTWs will be allowed to modify their programs, and implement the new local programs as described in their FPAs.

Commitments for the future of the project include the following:

- Louisville and Jefferson County MSD will continue to collect and analyze data in the watershed and develop performance measures in order to move toward a more holistic watershed protection strategy.
- In Phase 2, EPA intends to propose and issue (subject to applicable procedures and review of public comments) a site-specific rule should one prove necessary, amending 40 CFR 403, that applies specifically to MSD's Jefferson wastewater treatment plant. Then EPA intends to work with the Commonwealth of Kentucky to issue a permit or a permit modification under 40 CFR Part 1222, Clean Water Act Section 402 and Title 401 of the Kentucky Administrative Regulations.
- Louisville and Jefferson County MSD will prepare and submit progress reports to EPA and the Kentucky Department of Environmental Protection every six months and submit a performance assessment report every year.

Benefits for the Environment

- The implementation of a sewer-shed model incorporates loadings from direct and indirect discharges to allow Louisville and Jefferson County MSD to determine the most environmentally effective management responses.
- Environmental targeting of resources allows Louisville and Jefferson County MSD to target the most significant threats to water quality and allocate resources accordingly.
- Louisville and Jefferson County MSD will look within, as well as beyond, their pretreatment program to reduce pollutants of concern toward target thresholds.

Benefits for Stakeholders

- Regulated stakeholders that can demonstrate minimal or non-existent impacts will have the opportunity to reduce required sampling, leading to cost savings.
- Stakeholders will have the opportunity to approve programs to be funded by the reinvestment of saved compliance and monitoring expenses.

Benefits for the Project Sponsor

- Through this XL project, Louisville and Jefferson County MSD will receive flexibility in determination of significant industrial users, significant non-compliance, and sampling requirements.
- This flexibility will free up Louisville and Jefferson County MSD resources, which will then be targeted towards addressing sources of the highest-priority pollutants rather than sources proven to be insignificant.

Information Resources: The information sources used to develop this progress report include: (1) the FPA for the Louisville and Jefferson County Metropolitan Sewer District XL Project, dated September 28, 2000; (2) information from the Louisville and Jefferson County MSD home page, <http://www.msdlouky.org>; (3) information from the EPA Office of Wastewater Management Web site, <http://www.epa.gov/owm>; and (4) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Lucent Technologies

FINAL PROJECT AGREEMENT SIGNED AUGUST 19, 1998

Background

The Project Sponsor: The Microelectronics Group of Lucent Technologies, Inc., (Lucent) designs and manufactures integrated circuits and other electronic components for the computer and communications industries.

The Experiment: The Lucent project goal is to operate an International Organization for Standardization's (ISO) 14001 environmental management system (EMS) that will manage multimedia environmental impacts for all of the company's facilities (see Figure 28). Through the implementation of its EMS, Lucent seeks to achieve environmental performance superior to that required by its current permits. Specifically, this project will test whether the use of a high-quality EMS creates a system that is more efficient, more transparent, more understandable, and more flexible. The project uses a unique strategy of integrating regulators into the EMS process to set environmental goals and to track performance. Also, as part of its EMS approach, Lucent has committed to obtaining input from a facility-based Local Environmental Advisory Group (LEAG) composed of local stakeholders, including environmental or-

ganizations, community groups, employees, and other interested citizens. Ultimately, over the five-year period the Lucent project will identify whether a high-quality EMS can serve as the basis for an integrated environmental management approach, using a single document to govern environmental management in at all of Lucent's Microelectronics facilities.

The project consists of two implementation mechanisms: (1) umbrella FPA and (2) site-specific addenda. The umbrella FPA, which applies to all U.S.-based Lucent microelectronics facilities, provides overarching goals for the project, identifies concepts to be potentially tested over the term of the FPA, and provides broad tools for project implementation. The site-specific addenda would govern implementation of a XL project at an individual Lucent facility. To date, Lucent and EPA have yet to develop a site-specific project.

The Flexibility: Under the umbrella FPA, Lucent anticipates using the EMS to provide a vehicle for consolidation of all federal and state permits into a single Microelectronics-wide, multimedia permit, based on annual targets set jointly by the company and regulators. This would result in an annual review of one permit rather than the current system of multiyear renewals of individual permits. In addition, the EMS could provide Lucent with a

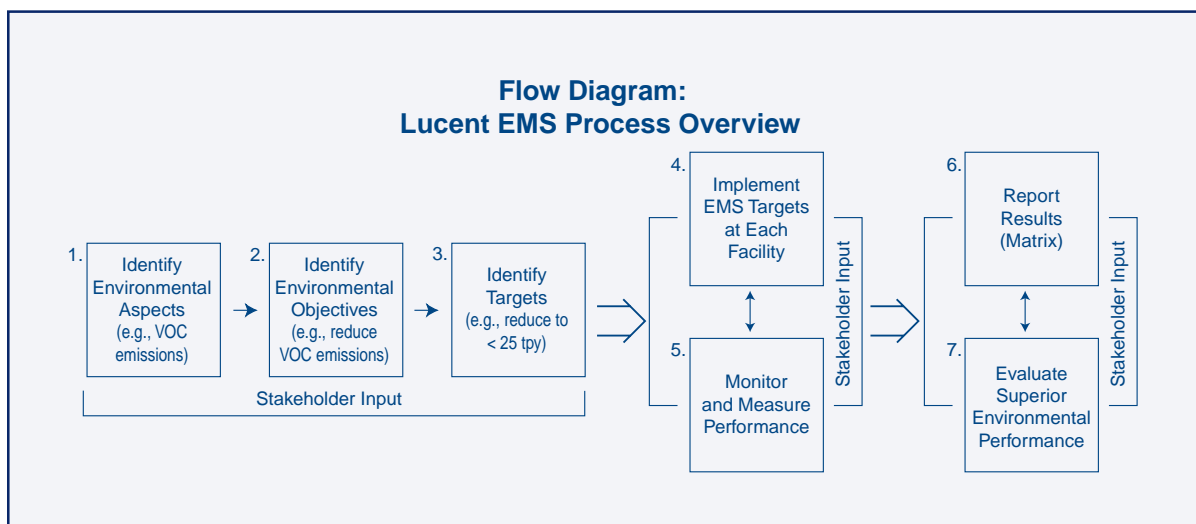


Figure 28

Lucent EMS process overview.

streamlined process for incorporating new regulatory flexibility approaches and consolidating reporting requirements.

The Superior Environmental Performance: The umbrella FPA is a multi-regional attempt to incorporate high-quality environmental management practices on a corporate-wide level. Lucent's EMS fosters superior environmental performance by identifying opportunities to reduce environmental impacts in a variety of areas, both regulated and non-regulated. Any future site-specific projects negotiated under the umbrella agreement will serve as vehicles for achieving superior environmental performance and considering regulatory flexibility at the individual facilities.

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

Massachusetts Department of Environmental Protection Environmental Results Program

FINAL PROJECT AGREEMENT SIGNED OCTOBER 6, 1998

Background

The Project Sponsor: In 1996, the Massachusetts Department of Environmental Protection (MA DEP) initiated a new program known as the Environmental Results Program (ERP). The ERP institutes a cost-effective approach that improves environmental performance and environmental protection while increasing flexibility for companies in the Commonwealth of Massachusetts. The ERP is one of 15 finalists chosen for the Innovations in American Government awards, a program of the Institute for Government Innovation at Harvard University's John F. Kennedy School of Government, administered in partnership with the Council for Excellence in Government.

The Experiment: This project is testing an initiative to improve environmental performance in specific industry sectors by streamlining permitting and reporting and to improve and better measure environmental performance across the state. MA DEP developed the ERP, a multimedia, whole sector-based regulatory system that replaces case-by-case state permits with industry-wide environmental performance standards and an annual certification of compliance. It is a mandatory program in Massachusetts for three small-business sectors—printers, photo processors, and dry cleaners. Facilities in these sectors receive compliance assistance material to help conduct their own environmental self-audit. Based on the results, the facility either certifies compliance, or if problems are found, develops a Return-to-Compliance plan. Senior-level company officials are required to annually self-certify that the participating companies are, and have systems in place to ensure that they

will continue to be, in compliance with all applicable air, water, and hazardous waste management performance standards throughout the facility.

Industry representatives have cooperated with MA DEP in establishing criteria for reporting compliance with state standards without developing permits for each facility. The project reduces the reporting burden for affected facilities and MA DEP while fostering superior environmental performance by identifying and encouraging opportunities for pollution prevention. One of the goals of the ERP is to reduce the number of state permits applied for, renewed, and issued, and to make more informed decisions about how to focus state resources on high-priority environmental problems. Additional goals of the ERP are to increase the number of facilities in compliance and to expand the universe of companies identified in the regulatory system. The ERP applies three innovative tools to enhance and measure environmental performance. These tools supplement MA DEP's traditional compliance inspection and enforcement efforts:

1. Compliance assistance from the agency through outreach and innovative workbooks to clearly explain facilities' environmental obligations;
2. An annual self-certification of compliance by companies to increase self-evaluation and accountability, which requires a senior company official's certification; and
3. A new performance measurement methodology to track results, determine priorities and strategically target inspections and compliance assistance efforts. The methodology includes a tool known as Environmental Business Practice Indicators (EBPIs) as a key way to confirm facility performance in the three industry sectors currently in the ERP. EBPIs are industry-specific measures that provide a snapshot of a facility's environmental performance. They are unique in that they include measurement of adherence to traditional regulatory standards (e.g., level of compliance with labeling, record keeping, and monitoring, such as putting labels on barrels of hazardous waste) and "beyond compliance" measures such as

voluntary pollution prevention (P2) activities (e.g., recommending that facilities have signs above sinks warning employees about the dangers of pouring toxic chemicals down sinks). The goal in using EBPIs is to “benchmark” and evaluate facility/sector performance and use that information to determine industry-wide compliance rates and actual environmental performance, focus compliance assurance and enforcement resources, and evaluate the ERP’s programmatic effectiveness.

The Flexibility: MA DEP and EPA signed an umbrella FPA to establish an expedited EPA review process for any changes to federal regulations or policies that MA DEP may propose to ensure effective ERP implementation. The umbrella FPA will be expanded through addenda that will provide the necessary regulatory flexibility and specify requirements for superior environmental performance for each sector. Currently, EPA and MA DEP are working on providing flexibility to the dry cleaning sector under the maximum achievable control technology rule applicable to dry cleaners under the Clean Air Act by delegating to the state authority to reduce record retention time.

Other Innovations: *EPA and State Joint Partnership for ERP Expansion:* EPA and MA DEP also are working together to expand the ERP to other interested states through the ERP Partnership Project. EPA’s Office of Enforcement and Compliance Assurance, Office of Policy, Economics, and Innovation, and Region 1, have joined with MA DEP to investigate whether the ERP approach and its tools can be transferred to other states and other environmental management issues. This partnership is interested in creating opportunities for other states to learn about the ERP approach and its tools, facilitating information sharing among states, and supporting use of the ERP to solve environmental problems. For more information on this partnership please visit: <http://www.epa.gov/permits/masserp.htm>.

The Superior Environmental Performance: The ERP intends to achieve superior environmental performance by:

- Promoting P2 through outreach and assistance;
- Giving MA DEP a better understanding of regulated industries; and
- Increasing the number of facilities operating within MA DEP’s regulatory programs.

Progress in Meeting Commitments (As of November 2001)

Overall, MA DEP has successfully met their commitments through the implementation of ERP components to achieve superior environmental performance. The ERP provided extensive outreach and technical assistance to participating sectors to promote pollution prevention, and successfully eliminated a significant number of permits in the printing sector. A summary of the ERP commitments in the initial FPA is provided below. The preliminary graphical information and supporting data that are presented below on the status of the ERP are taken from a draft user’s guide for the ERP (November 2001), which is under development by the EPA and MA DEP.

- MA DEP committed to provide clear performance standards and compliance assistance to companies in the participating sectors through outreach and technical assistance.
 - In order to set up a performance measurement system for the ERP, MA DEP identifies the universe of facilities and conducts pre-certification inspections to establish a baseline against which progress under the ERP could be compared. By employing a statistical approach to performance measurement, MA DEP can base its performance measurement on a statistically valid sample of facilities in each sector that reliably indicate the performance of the whole group rather than needing to obtain data from all facilities in a group.
 - The ERP measurement system evaluates the environmental performance of ERP sectors using MA DEP inspection checklists and facility self-certification forms. MA DEP inspectors complete a statistically valid number of on-site inspections

and complete detailed inspection checklists during both random and targeted on-site inspections before implementation of the ERP and after facilities complete self-certification forms. The MA DEP inspection checklist and self-certification form questions are designed to assess compliance with regulatory requirements and include questions for each sector that relate to beyond compliance and P2 activities. The subset of regulated and non-regulated practices contained in the checklists, the EBPIs, are also included in the inspector's checklists and are used to (1) calculate facility and sector compliance "scores" before and after ERP outreach and certification, (2) determine the statistical significance of changes in specific environmental indicators or of whole groups, and (3) evaluate the accuracy of self-certification forms submitted by ERP facilities. The number of EBPIs developed for each sector is different. Printers have 18 EBPI measures, dry cleaners have 16, and photo processors have 8. The number of indicators is based on the complexity of the industry and the number of multimedia discharges.

- MA DEP has promulgated regulations with additional performance standards with extensive review by the public and industry sectors. During the first year of implementation in each sector in 1997 and 1998, respectively, MA DEP conducted workshops to provide guidance and assistance to industry representatives in understanding and complying with the standards.
- The ERP provides the compliance assistance tools that enable businesses in the participating sectors to determine what rules are applicable to them and what is required to comply. MA DEP designed and implemented its compliance efforts in close collaboration with organizations and associations representing and interested in the covered sectors. Compliance assistance efforts include workbooks and workshops for each sector that clearly explain all of a facility's applicable environmental obligations. ERP sector workbooks include regulatory compliance requirements, environmental practices that are beyond compliance, and information about environmental, worker, and public health impacts of facility operations. Compliance assistance workbooks are designed as a basis for self-certification and are written from a facility-operator's point of view in an easy-to-read format. The workbooks are meant to be stand-alone documents, which present all covered compliance standards for all media. Background information on the ERP process is underway for the dry cleaners, photo processors, and printers sectors and can be found at the MA DEP Web site (<http://www.state.ma.us/dep/erp>). Compliance assistance workshops are also conducted by MA DEP, which works closely with trade associations to determine how many and in what locations the workshops should be held to reach the greatest number of facilities. MA DEP holds initial workshops after the ERP kickoff for each ERP sector and then holds additional workshops, as needed, based on problem areas identified by MA DEP from inspections, certification reviews, and data analyses to update the regulated community on any changes in requirements.
- MA DEP committed to promote corporate accountability and self-evaluation of environmental performance by requiring annual compliance self-certification.
 - Under the ERP, MA DEP established a self-certification process for each of the three sectors. Because firms must certify annually, the ERP requires companies to conduct an environmental review annually. The ERP includes similar components to an environmental management system where compliance obligations are specified/detailed and audited on a regular basis. Because the certification forms require the signature of a high-level owner or

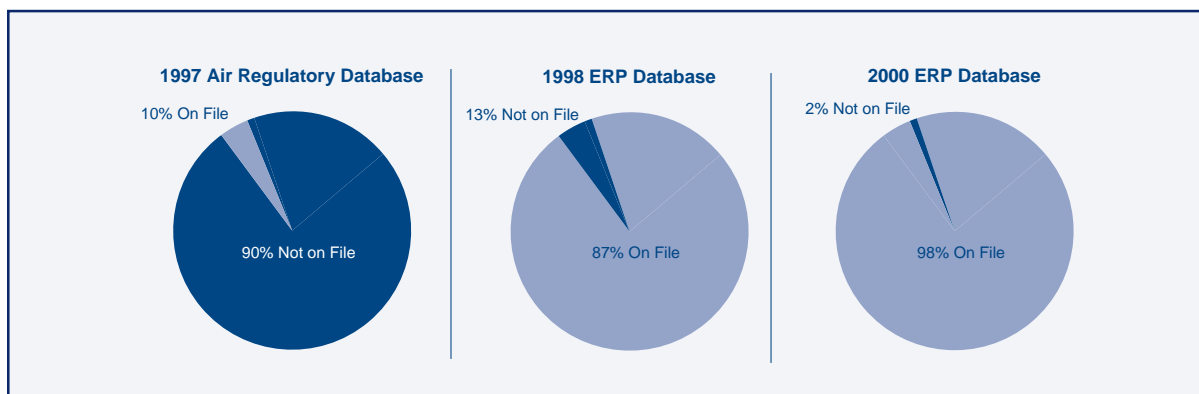


Figure 29
Percentage of dry cleaners in MA DEP databases from 1997 to 2000.

- manager, the process has improved senior management’s attention to environmental management.
- Each ERP Certification Plan contains instructions, a Non-Applicability Statement, a Compliance Certification Form, a Return to Compliance Form, and a Spill or Release Summary Form. As an additional tool for printers, MA DEP provides a free interactive training CD-ROM. The CD-ROM is a companion to the Printers Environmental Certification Workbook and provides multimedia instructions to print shop employees about what they can do to comply with ERP requirements, evaluate P2 alternatives, and keep the environment safe.
- MA DEP committed to encourage the adoption of P2 techniques via sector-specific guidance and implementation manuals and inclusion in performance standards.
 - MA DEP developed workbooks that provide step-by-step guides to compliance and P2 techniques. These outreach efforts were developed through extensive interaction with related industry experts. For example, 40 percent of dry cleaners in Massachusetts are Korean, so MA DEP worked with the Korean Dry Cleaners Association to translate the workbook to overcome any possible language barriers.
 - Nine specific P2 measures have been incorporated into EBPIs for the printer sector.
- MA DEP committed to improve compliance assurance and enforcement by better identifying the universe of firms in each sector, conducting random inspections, and targeting non-reporters and deficient certifiers.
 - As a result of MA DEP’s efforts, using this ERP approach, small business coverage within this regulatory system has expanded by 340 percent (*2001 Draft User’s Guide*). MA DEP applied the ERP to three small business sectors for which it had little information, yet working with trade associations and other sector stakeholders, MA DEP identified a more complete universe of firms. It is estimated that the ERP allows MA DEP to track environmental performance for 80 to 90 percent of the firms in a sector compared to the 33 percent prior to ERP. To date, based on data collected by MA DEP, the ERP program has over 2,200 participating companies—approximately: 1,100 printers, 600 dry cleaners, and 500 photo processors. The number of companies exceeds those that were traditionally accounted for by MA DEP prior to the implementation of the ERP (see Figure 29). The inclusion of a more complete universe of firms in the ERP leads to greater sector-wide compliance. The most notable increase in coverage for a single sector has been in the dry cleaning sector.

Due to the large number of small businesses and the rapid turnover of business ownership in this industry, it has been historically difficult to track them under conventional permitting and enforcement programs. Between 1997 and 2000 the percentage of dry cleaners on file at MA DEP increased from 10 percent to 98 percent of the estimated total number of dry cleaning facilities.

- Under the ERP, MA DEP’s strategy to ensure compliance includes continued field presence by way of targeted and random inspections, review, analysis of certification data (including Return-to-Compliance forms), and use of the agency’s enforcement protocols as appropriate. Based on EBPI data, MA DEP targets a variety of business activities. These activities include those that have not filed certifications, firms whose certifications are incomplete or technically deficient, and companies that have been the subjects of complaints.
- MA DEP committed to conduct an evaluation of the program to measure and evaluate compliance and environmental results.
 - EBPIs are used to measure, track, and assess compliance through evaluation of program results and sector performance. Specifically, they compare baseline inspection data (which include EBPIs) collected during random inspections *before* implementation of the ERP to data collected during random inspections *after* outreach and certification under the ERP. Environmental results analyses are based on the data from MA DEP inspection checklists and the facility self-certification forms. The facility and sector agreement scores are based on the percentage of indicators

for which an “in agreement” answer was noted on the checklist, normalized to a 1 to 10 scale. For example, a facility with an overall environmental performance score of 7.8 adhered with 78 percent of the EBPIs. As a result of the ERP’s performance measurement tools, MA DEP is able to reliably report on environmental results and progress in the ERP’s sectors in a unique way, based on statistically sound data, and because it includes insights into compliance status as well as environmental performance. MA DEP is able to use performance metrics to examine ERP outcomes by individual facility, environmental medium, overall performance for a sector, and performance on key environmental practices. The results presented below are based on three years of data for the dry cleaning and photo-processing sectors (baseline measurement in 1997; post self-certification measurements in 1998 and 2000), and over two years for the printing sector (baseline in 1998; post self-certification in 1999).

Dry Cleaning Sector

- The dry cleaning sector’s overall environmental performance was measured by the 16 EBPIs from inspection checklists applicable to each facility. For example “in agreement” was marked on the checklist for EBPI number 10a, “Is there no odor of perchloroethylene readily detectable in the facility?” if the inspector’s checklist matches the facility self-certification form and as stating that no odor of perchloroethylene is readily noted. The number of “in agreement checks” are totaled for all of the EBPIs per facility and then aggregated for the whole sector. This aggregate score is a reflection of how well the sector is performing using EBPIs as

Table 10: Dry Cleaning Aggregate Sector Performance

YEAR 1-1997 (PRIOR TO SELF-CERTIFICATION)	YEAR 2-1998 (ONE YEAR AFTER INITIAL SELF-CERTIFICATION)	YEAR 3-2000 (TWO YEARS AFTER SELF-CERTIFICATION)
8.3	8.6	9.0

indicators. The aggregate sector performance for the dry cleaning sector increased from 83 percent to 90 percent from the baseline assessment in 1997 (Year 1) to a second comparison in 2000 (Year 3), indicating a 7 percent increase in environmental performance (see Table 10).

- Figure 30 illustrates the change in performance from dry cleaners for all indicators over time from the baseline in 1997 to the second comparison in 2000. The chart depicts four outcomes: (1) the percentage of facilities that had an increase in performance from 1997 to 2000; (2) the percentage of facilities that had a decrease in performance from 1997 to 2000; (3) the percentage of facilities that had no statistically significant change in performance and previously had a high level of performance, thus, maintaining their high level of performance; (4) and the percentage of facilities that had no statistically significant change in performance and previously had a low level of performance, thus, maintaining their low level of performance. While these data do not explain why facility behavior is positive or negative, they do indicate trends that inform MA DEP that 86 percent of facility responses show good performance, while 14 percent need further attention.

Printing Sector

- Data for the printing industry are available for two years, as the printers' ERP started one year later than the other two sectors. From Year 1 to 2, the printing sector's overall performance for the 18 EBPIs applicable to each facility in this sector increased from 74 percent to 87 percent from the baseline in 1998 to the first comparison in 1999 (see Table 11).

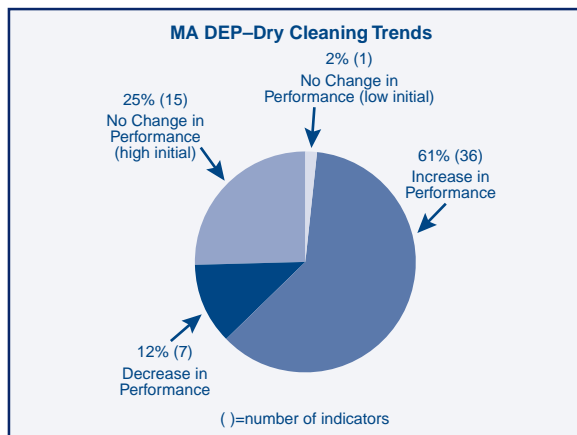


Figure 30
Aggregate indicator trends comparing the 1997 baseline to 2000 comparison evaluation data for the dry cleaning sector.

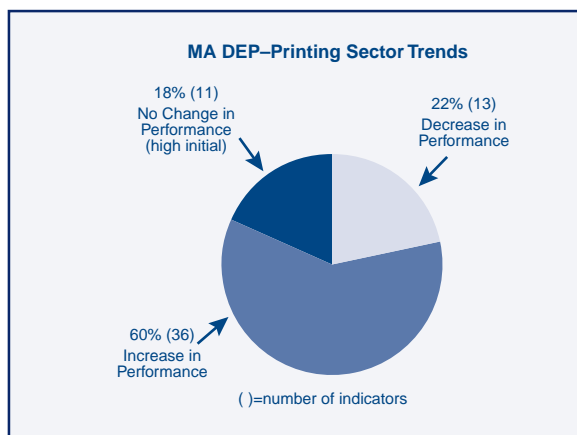


Figure 31
Aggregate indicator trends comparing the 1998 baseline to 1999 comparison evaluation data for the printing sector.

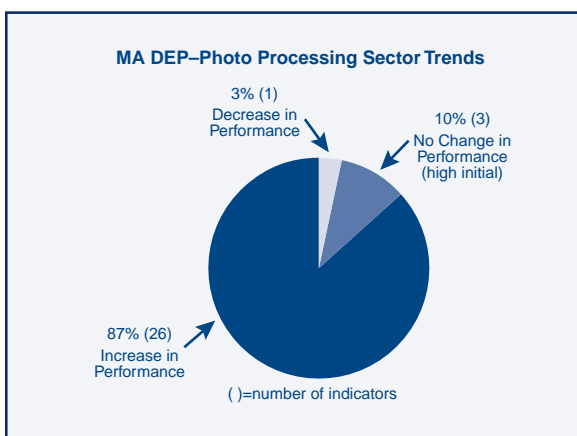


Figure 32
Aggregate indicator trends comparing the 1997 baseline to 2000 comparison evaluation data for the photo processing sector.

Table 11: Printing Aggregate Sector Performance

YEAR 1-1998 (PRIOR TO SELF-CERTIFICATION)	YEAR 2-1999 (AFTER INITIAL SELF-CERTIFICATION)
7.4	8.7

- Figure 31 illustrates the change in performance from printers for all indicators over time from the baseline in 1998 to the first comparison in 1999. The chart depicts three outcomes: (1) the percentage of facilities that had an increase in performance from 1998 to 1999, (2) the percentage of facilities that had a decrease in performance from 1998 to 1999, and (3) the percentage of facilities that had no statistically significant change in performance and previously had a high level of performance, thus, maintaining their high level of performance. While the data do not explain why facility behavior is positive or negative, they do indicate trends that inform MA DEP that 78 percent of facility responses show good performance while 22 percent need further attention.

Photo Processing Sector

- The aggregate photo processing results show the largest increase in EBPI performance across the three sectors, increasing overall by 34 percent (from 53 percent in Year 1 to 92 percent in Year 3) (see Table 12). MA DEP speculates that this increase in performance between the baseline (1997) and the second comparison in 2000 may be a result of a meeting held in early 2000 with the Photo Processing Associations to identify low performance results for the sector and communication of those results to facility operators.
- Figure 32 illustrates the change in performance from photo processors for all indicators over time from the baseline in 1997 to the second comparison in 2000. The figure depicts three outcomes: (1) the percentage of facilities that had an increase

in performance from 1997 to 2000, (2) the percentage of facilities that had a decrease in performance from 1997 to 2000, and (3) the percentage of facilities that had no statistically significant change in performance and previously had a high level of performance, thus, maintaining their high level of performance. While the data do not explain why facility behavior is positive or negative, they do indicate trends that inform MA DEP that 97 percent of facility responses show good performance while 3 percent need further follow-up.

- In addition to calculating facility and industry wide scores, MA DEP also conducts an accuracy analysis. During random inspections, MA DEP compares results of data collected from those facilities before the ERP was launched to the answers on the certification forms from facilities *after* the ERP to determine the overall level of accuracy of the certification data. MA DEP also conducts targeted inspections based on its review of facilities’ self-certification forms. The purpose of these inspections is to determine whether a facility and MA DEP agree about a facility’s compliance status.
- The current ERP information technology system is not automated. Business certifications are submitted manually, and MA DEP reviews the data manually. EPA has provided the ERP with automation system support. It is expected that this support will allow MA DEP to automate portions of its ERP system within the next year.
- Information on the progress of the ERP is posted on the MA DEP Web site: <http://www.state.ma.us/dep/erp>. The site includes publications, ERP sector regulations, and certification packets, press releases, and other

Table 12: Photo Processing Aggregate Sector Performance

YEAR 1-1997 (PRIOR TO SELF-CERTIFICATION)	YEAR 2-1998 (AFTER INITIAL SELF-CERTIFICATION)	YEAR 3-1999 (TWO YEARS AFTER SELF-CERTIFICATION)
5.3	6.0	9.2

background material. It does not include specific information on facilities participating in the program or any data from the certifications. However, these data are available in the state's public reading room.

- MA DEP is currently expanding the ERP and developing program tools and regulations for two more sectors—firms that discharge industrial wastewaters (IWW sector) to sewers and firms installing or modifying boilers (combustion sector). In September 2001, MA DEP launched the industrial boiler ERP initiative. The IWW ERP initiative is expected to be launched in mid-2002.

Benefits for the Environment

- The ERP is mandatory for targeted business sectors. Participating Massachusetts firms must evaluate their environmental compliance annually and certify adherence to ERP performance standards. MA DEP believes that the ERP's requirements will have several facility-specific impacts. Some examples of these are changes in practices regarding waste handling, equipment maintenance and operation, and leak checking to reduce emissions and minimize the likelihood and impact of spills and workplace exposure.
- The ERP requires printers to use low-volatile organic compound (VOC) press cleaning solutions that reduce VOC emissions. MA DEP estimates that this approach in the printing industry will reduce statewide VOCs by 10 percent.
- The ERP requires dry cleaners to use leak test equipment to conduct leak checks weekly, a stricter requirement than the pre-ERP monthly sniff test requirement. It is estimated that using this leak detection technique and conducting repairs as needed could reduce statewide perchloroethylene emissions.
- The ERP's improved waste-handling practices, especially in the dry cleaning sector, should improve hazardous waste management, yielding benefits such as reduced perchloroethyl-

ene-laden waste disposal that has contributed to the creation of numerous hazardous waste sites and water supply closings in the state.

- For the photo-processing sector, the ERP includes standards to reduce silver discharges to publicly owned treatment works, as well as reduce illegal discharges to septic systems, the ground, or surface water. Silver recovery equipment is estimated to reduce silver discharges by 99 percent. Photo processors have reduced silver discharge through more frequent replacement of silver recovery canisters. Approximately 15 percent of photo processors had no silver recovery equipment prior to the ERP.

Benefits for Stakeholders

- ERP eliminated all permits for small source facilities in the printer sector. Printers that are classified as large air emissions sources still must receive a permit. For small sources, the ERP gives printers the flexibility to add or modify certain equipment without waiting for MA DEP approval.
- Building on the success of the Massachusetts Printing Partnership, MA DEP's effort to include a more complete universe of firms in each sector has leveled the playing field between firms complying with regulations and those that have gained a competitive advantage by ignoring their regulatory responsibility. Firms in all three current ERP sectors are no longer required to obtain permits for industrial wastewater discharges. Prior to the ERP, many of the firms in these sectors were required to have IWW permits, yet very few did or even knew of these requirements. Under the ERP, these firms are regulated more equally through the flexibility of the self-certification process.
- The ERP is similar to an environmental management system (EMS). The ERP's annual certification requirement and well-designed workbooks help firms establish procedures, accountability, and records similar to components of a small-scale EMS. As firms conduct the frequent compliance reviews documented

in ERP workbooks, they help ensure that their business is in compliance with all applicable multimedia regulations.

- Business environmental costs are reduced. Participating firms that were already in the MA DEP system have recognized net savings through the ERP. For example, prior to the ERP, a midsize printer paid a \$300 small-quantity generator-fee, \$150 to \$450 for air permits, and \$1,300 for an IWW permit. Under ERP, those fees were replaced with an annual fee of \$200 (printers have gradation in fees depending on the size).
- MA DEP and business collaboration is enhanced. Massachusetts firms in participating ERP sectors have the opportunity to assist in the development of performance standards, workbooks, and workshops, as well as comment and review regulations proposed for their sector.
- ERP applicability has expanded. The ERP has brought the federal-state partnership and its opportunities, to a wider, national audience. It brings to all states the possibility for great environmental gains through an adoption of an ERP-type program.

Information Resources: The information sources used to develop this project summary include (1) the FPA for the MA DEP XL project; (2) a draft of a user's guide for government agencies entitled, *The Massachusetts Environmental Results Program* (November 2001); (4) *Learning from Innovations in Environmental Protection*, Research Paper Number 1, Evaluation of the Massachusetts Environmental Results Program (June 2000) by Susan April and Tim Greiner of Kerr, Greiner, Anderson & April, Inc., prepared for the National Academy of Public Administration; (5) the January 2000 Project XL Progress Report MA Department of Environmental Protection (EPA 100-R-00-013); and (6) *The Project XL 2000 Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Benefits for the Project Sponsor

- Through the ERP, MA DEP created a more complete database of the universe of firms identified in each sector.
- MA DEP now has the capability to track the environmental performance for 80 to 90 percent of the firms in the dry cleaning, photo-processing, and printing sectors. This is a significant increase in the universe of firms identified prior to the ERP (which is estimated to be less than one-third).
- MA DEP will be able to focus their enforcement resources on non-responding entities and problematic certifications, thus targeting entities that are more likely to be in non-compliance with environmental standards.

Merck & Company, Inc.

FINAL PROJECT AGREEMENT SIGNED DECEMBER 15, 1997

Background

The Project Sponsor: Merck & Company, Inc., is a worldwide, research-intensive, health products company that discovers, develops, manufactures, and markets human and animal health products. Merck's Stonewall plant near Elkton, Virginia, was established in 1941. The plant employs more than 900 people in a range of pharmaceutical manufacturing activities such as fermentation, solvent extraction, organic chemical synthesis, and finishing and packaging operations. The Stonewall plant is located 1.5 miles from the Shenandoah National Park, which has experienced substantial air quality degradation and related resource impacts over the past several decades.

The Experiment: Because of its proximity to Shenandoah National Park, Merck has volunteered to convert its coal-burning powerhouse to natural gas, a much cleaner-burning fuel, at the Merck Stonewall plant. The company's conversion to natural gas has significantly reduced emission levels for sulfur dioxide (SO₂) and nitrogen oxides (NO_x), pollutants associated with visibility impairment and acid deposition, which have been observed in nearby Shenandoah National Park. In this XL project, the Virginia Department of Environmental Quality (VADEQ) has issued a site-specific permit for Merck's Stonewall plant. Merck's air quality permit includes a site-wide cap on the facility's total emissions of criteria air pollutants [volatile organic compounds (VOCs) as a surrogate for ozone, particulate matter-10 (PM-10), carbon monoxide, SO₂, and NO_x]. The permit also contains individual pollutant emission caps on SO₂, NO_x, and PM-10. As long as emissions remain below the caps, Merck will no longer need to obtain prior approval from EPA or VADEQ for changes at the facility that cause changes in emissions.

The Flexibility: Under the Project XL initiative, EPA and the Commonwealth of Virginia collaborated on implementing flexibilities, including a

site-specific rule, variance, and permit under the Clean Air Act's Prevention of Significant Deterioration (PSD) program to authorize site-wide caps and an innovative best achievable control technology approach. Existing New Source Review (NSR) and air permitting regulations required that most changes to the manufacturing process at the Merck Stonewall plant be reviewed and approved by the VADEQ prior to being implemented. This requires a considerable effort by the facility as well as the regulators to frequently prepare and review permit applications for many process modifications. In addition to the permit flexibility, EPA also provided flexibility in complying with Resource Conservation and Recovery Act air emission requirements that apply to certain existing hazardous waste management units.

Other Innovations: (1) *Limited Preapprovals for Air Permits.* Pharmaceutical industries change their product lines frequently. Usually, such changes require a time-consuming preconstruction permit exercise potentially resulting in delays in getting new products to market. By focusing on the total emissions of a facility, XL is testing and confirming flexible emission reduction strategies that may be both duplicated at similar facilities across the country and integrated into EPA's existing regulatory regime. (2) *Tiered Reporting—Building Incentives into Data Collection Requirements.* A key innovative feature of Merck's XL project is that the monitoring, record keeping, and reporting requirements for the PSD permit increase in stringency as the site's actual total criteria pollutant emissions come closer to the total emissions cap. Annual reporting is required when facility-wide emissions are less than 75 percent of the cap. Semiannual reporting is required when facility-wide emissions are between 75 percent and 90 percent of the cap. Monthly reporting is required when emissions are equal to or greater than 90 percent of the total emissions cap. Since data collection and reporting are expensive, this provides an additional incentive for the facility to minimize its emissions.

The Superior Environmental Performance: Merck will improve air quality in the Shenandoah National Park and surrounding community by operating under the site-wide emissions caps and

permanently reducing total criteria air pollutant emissions by approximately 300 tons per year, a 20 percent reduction versus recent actual emissions, as required by the facility-wide cap. Criteria pollutants such as SO₂ and NO_x emissions can damage plant life, reduce visibility, contribute to acid rain, and cause adverse health effects. In addition, NO_x reacts with VOCs to create ground-level ozone, which can damage vegetation and structures and also have harmful effects on the respiratory system of people. The emission subcaps guarantee at least a 25 percent reduction of SO₂ and 10 percent reduction of NO_x versus recent actual emission levels.

Progress in Meeting Commitments

(As of September 2001)

- EPA has met its commitment to propose a site-specific PSD and NSR rule, which provides an alternative means of compliance with state and federal air standards for the Merck Stonewall plant. EPA promulgated the final rule on October 8, 1997. In addition, EPA delegated full authority to Virginia for implementing and enforcing the PSD rule on November 24, 1997.
- The State Air Pollution Control Board of Virginia issued a variance on September 10, 1997, consistent with EPA's rule; VADEQ granted the PSD permit to the Merck Stonewall plant on January 7, 1998, with an effective date of February 10, 1998.
- The Title V permit for the facility was issued on September 7, 2001, with an effective date of October 1, 2001.
- The Merck Stonewall plant has met its commitment to replace its coal-fired boilers with natural gas boilers. The conversion was completed in July 2000.
- The facility's actual emissions averaged over 1992 and 1993 were used to establish a baseline level of 1,503 tons per year for total criteria pollutants. Under the new facility-wide cap, total criteria pollutant emissions will be maintained at levels below 1,202 tons per year.

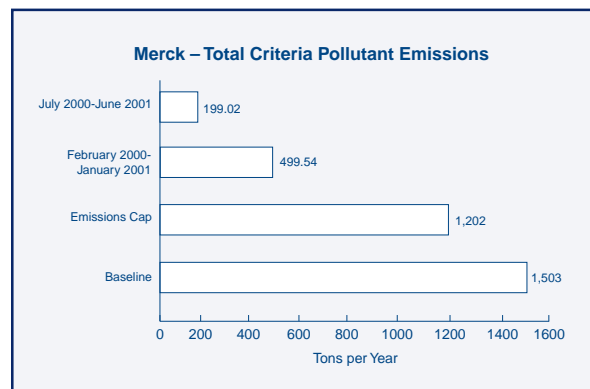


Figure 33
Merck Stonewall facility total criteria air pollutants emissions data, baseline, and emissions cap data for 2000-2001.

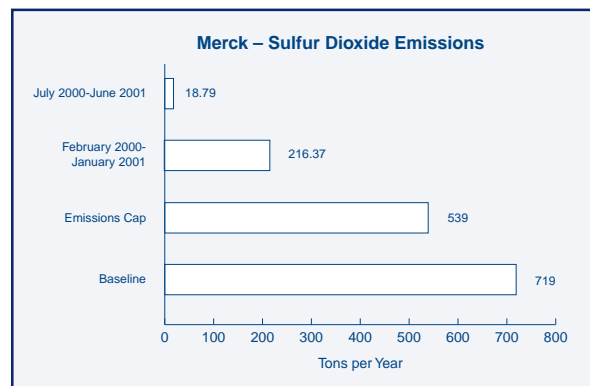


Figure 34
Merck Stonewall facility sulfur dioxide emissions for 2000-2001.

- The 12-month total for facility-wide criteria pollutant emissions from July 2000 to June 2001 was 199.02 tons, nearly an 87 percent reduction from the baseline emissions. (See Figure 33.)
- In addition to the facility-wide cap on total criteria pollutants, subcaps were placed on Merck's emissions of SO₂, NO_x, and PM-10. Baseline levels for these criteria pollutants are the average actual emissions during 1992 and 1993. The new subcaps will limit SO₂ emissions to 539 tons per year (a 25 percent reduction) and NO_x emissions to 262 tons per year (a 10 percent reduction). The PM subcap, adjusted based on the stack test of the new boilers in accordance with the PSD permit, stands at a level of 46 tons per year. Facility-wide total and individual criteria pollutant air emissions will be determined monthly.
 - In its semiannual report, Merck reported a 12-month total of SO₂ emissions from July 2000 through June 2001 of only 18.79 tons, a 97 percent reduction from baseline emissions. (See Figure 34.)
 - The 12-month total of NO_x emissions from July 2000 through June 2001 was 39.63 tons, an 86 percent reduction from baseline emissions. (See Figure 35.)
 - Merck reported a 12-month total of PM-10 emissions from July 2000 through June 2001 of 6.25 tons, an 85 percent reduction from baseline emissions. This reduction in PM-10 emissions exceeded the expectations outlined in the FPA. (See Figure 36.)
- The new PSD permit and associated caps became effective on November 9, 2000, when Merck reported that its facility-wide emissions were below the caps described in the PSD permit.
 - Since November 2000, Merck has been allowed to make changes to their processes that could result in air emissions increases without prior approval, as long as the emissions remain below the caps. Additionally,

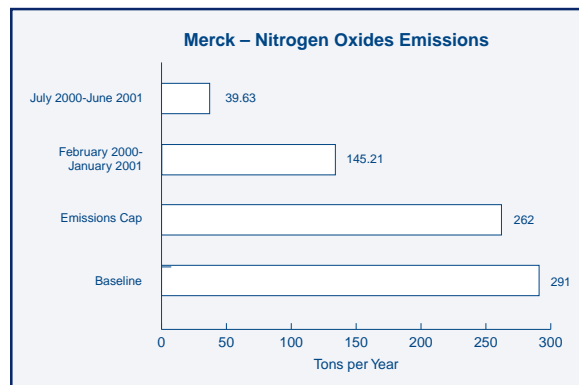


Figure 35

Merck Stonewall facility nitrogen oxides emissions data for 2000-2001.

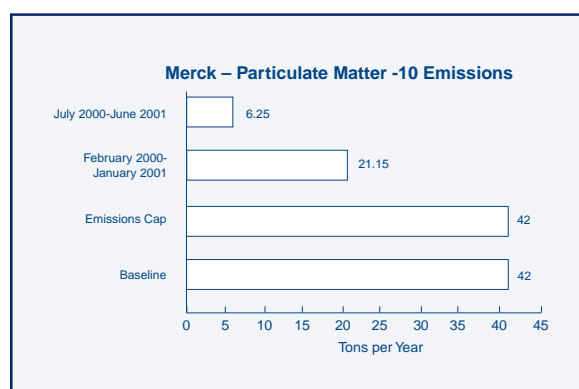


Figure 36

Merck Stonewall facility PM-10 emissions data for 2000-2001.

- the Stonewall plant is required, under the FPA, to operate under the caps and increase the frequency of their monitoring, record keeping, and reporting if criteria pollutant emissions trigger more frequent data-collection requirements. Part of the project is a comprehensive monitoring, record keeping, and reporting system that increases in stringency as actual emissions approach the cap.
- Because of concerns expressed by stakeholders about VOC emissions and the potential reduced visibility and increased vegetation impacts caused by greater ozone formation, Merck will assess air quality impacts on nearby Shenandoah National Park if VOC emissions reach certain specified levels. Because VOC levels have remained well below baseline levels, additional assessments have not been necessary.
 - Merck will continue to monitor facility-wide air emissions. Merck submitted an annual progress report on March 1, 2001, and a semi-annual emissions report on August 31, 2001.
 - A comprehensive monitoring, record keeping, and reporting program will increase in stringency as actual criteria pollutant emissions approach the cap. This provides an incentive for Merck to minimize air emissions.
 - This XL project has the potential to improve air quality and visibility in the Shenandoah National Park and vegetation damage in the park should be lessened by reducing SO₂ and NO_x air emissions.
 - Merck will assess the air quality impacts in Shenandoah National Park if VOC emissions reach specified levels.

Benefits for the Environment

- The conversion to natural gas has reduced total criteria air pollutant emissions for the powerhouse by approximately 1,300 tons per year. The conversion has also virtually eliminated lead emissions and reduced the emissions of the hazardous air pollutants, hydrogen chloride, and hydrogen fluoride.
- The facility-wide cap will limit total emissions of criteria air pollutants to levels 20 percent below baseline levels, SO₂ emissions to levels 25 percent below baseline levels, NO_x emissions to levels 10 percent below baseline levels, and particulate matter to levels approximately equal to baseline levels. These caps became effective on November 9, 2000, when Merck notified VADEQ that its emissions had been reduced below the caps. The first 12 months of operation after the conversion to natural gas resulted in an 87 percent reduction of total criteria emissions.
- Stakeholders will have better access to environmental information through Merck's comprehensive monitoring, record keeping, and reporting program.
- Stakeholders will receive information on an ongoing basis that enables them to evaluate Merck's performance under the facility-wide emission caps and the impact of incentives to minimize facility air emissions.
- The Merck stakeholder group can participate in periodic reviews of performance in meeting limits set under Merck's PSD permit. The stakeholder group will meet every five years to evaluate the project's implementation and to mutually agree on whether project changes are needed.

Benefits for Stakeholders

Benefits for the Project Sponsor

- Merck expects to avoid millions of dollars worth of potential production delays in the competitive first-to-market pharmaceutical industry by eliminating repetitive permit reviews.
- Merck is provided flexibility to make production changes without first obtaining permitting approval, as long as emissions remain below capped levels.

- The permit streamlined content requirements of the application for Merck's Title V operating permit and compliance certification.

Information Resources: The information in this summary comes from several sources, including (1) the FPA for the Merck & Company, Inc., Stone-wall Plant XL Project, December 15, 1997; (2) the *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000; (3) Merck's Project XL Annual Progress Report, March 1, 2001; (4) Merck's Project XL: Semiannual Report, August 31, 2001; and (5) focus group discussions in December 1999 with representatives of EPA and the Merck Stone-wall plant.

Metropolitan Water Reclamation District of Greater Chicago

FINAL PROJECT AGREEMENT SIGNED AUGUST 30, 2000

Background

The Project Sponsor: The Metropolitan Water Reclamation District (District) of Greater Chicago is a publicly owned treatment works (POTW) that treats wastewaters from domestic, commercial, and industrial sources in Chicago and 126 surrounding communities. Located in Cook County, Illinois, the District has maintained an industrial waste pretreatment program for more than 30 years. Through its industrial pretreatment program, the District regulates process wastewater discharges from approximately 535 significant industrial users (SIUs), including approximately 362 categorical industrial users (CIUs) as of June 1, 2000. In 1996, EPA awarded the District the National Excellence Award for Pretreatment Programs in the Large Category (greater than 100 SIUs).

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

The saved resources from the program flexibility described above would be reallocated within the District to advance environmental protection. The District aims to create strategic performance partnerships with industrial sector facilities meeting the goals of the national strategic goals program

(SGP). The SGP establishes both facility-specific and sector-wide performance goals that extend beyond traditional compliance with environmental regulations. The strategic performance partnerships would develop and evaluate alternative monitoring systems that would hopefully prove superior to the current traditional monitoring systems. The District intends to begin addressing local pollutants that have not been regulated, through the development of toxic reduction action plans (TRAP). The District also intends to revise the pretreatment program annual report format to include detailed information regarding environmental performance not currently required.

The Flexibility: The District is requesting regulatory flexibility from EPA and the Illinois Environmental Protection Agency (IEPA) from the oversight requirements (i.e., inspection and sampling) of the Clean Water Act's General Pretreatment Regulations to regulate discharges from small (*de minimus*) CIUs that have very low potential to violate pretreatment standards and requirements or adversely impact the operations of the district's waste reclamation plants (WRPs) and the environment. This project will be implemented following EPA's promulgation and IEPA's subsequent adoption of a rule amending the National Pretreatment Program regulations. On October 3, 2001, EPA promulgated a rule amending the National Pretreatment Program to allow POTWs that have completed the Project XL selection process, including FPA development, to modify their approved local Pretreatment Programs. These POTWs will be allowed to modify their programs and implement the new local programs as described in the FPA.

Other Innovations: (1) *Alternative Effluent Monitoring Systems: Strategic Performance Partnerships.* The creation of strategic performance partnerships would enable the District to further work with demonstrated sector leaders to develop, test, and implement alternative measurement systems demonstrating environmental performance. These alternative measurement systems have the potential to be more accurate and precise, allowing for improved process performance and decreased loadings of regulated pollutants. Rather than the traditional effluent discharge sampling, the District will use statistical process control data,

collected by the SIU at critical points along its process line, at frequent intervals. These data are used to regularly track process performance and product quality at the SIU and could also serve to assess pretreatment performance and wastewater quality. (2) *Encouraging Pollution Reduction and Water Conservation*. Because of the oversight flexibility of *de minimus* and non-significant CIUs, other facilities that currently do not meet the criteria for these classifications may implement pollution reduction and water conservation measures in order to obtain *de minimus* or non-significant CIU status. This may result in decreased loadings of regulated pollutants into the WRPs.

The Superior Environmental Performance:

This project has the potential to achieve environmental performance that is superior to the current system. The reduced oversight of smaller CIUs may provide incentives for facilities to reduce pollutant loadings and water usage and improve facility performance; similarly, the opportunity to participate in the strategic performance partnerships may serve as an incentive for sector industries to participate in the SGP. Regulatory flexibility would allow the District to reallocate currently committed resources to other activities with greater potential for environmental benefit.

The TRAP program will identify and address currently unregulated pollutants of local concern. Under TRAP, the District, EPA and IEPA will use existing environmental data to identify priority pollutants that are documented to be present in quantities or concentrations that may be a risk to the District's facilities or the ambient environment but not currently subject to regulation. A greater quality of water effluent will be achieved and the District will be well prepared should these pollutants become regulated in the future.

As part of this XL project, the District will include in its newly formatted annual pretreatment program report additional data about the quality of the wastewaters being discharged and the quality of the waters in the receiving surface water bodies. The additional data and analysis may include up to 18 performance measures not currently reported.

Progress in Meeting Commitments

(As of October 2001)

- EPA has committed to proposing and promulgating a site-specific modification to the Clean Water Act General Pretreatment Regulations providing oversight and reporting flexibility to the District.
 - The final rule was published October 3, 2001.
- IEPA has committed to adopting the regulatory modifications of the federal rule.
- Once the appropriate regulatory flexibility is in place, the District will:
 - Report on 18 performance measures not currently included in the pretreatment program annual report, which are listed below.
 1. Trends in mass loadings of metals and other toxic and non-conventional pollutants in POTW effluent; and comparisons to allowable levels in National Pollutant Discharge Elimination System (NPDES) permits.
 2. Trends in emissions of hazardous pollutants to the air, particularly for volatile pollutants from unit processes and metals from incineration.
 3. Trends in mass loadings of metals and other toxic contaminants to POTW influent, as a total and, where possible, divided into domestic, commercial, industrial, and storm contributions to the total; and comparison to allowable loadings as calculated during the headworks analysis, where such analysis is available.
 4. Reductions in annual average metals levels in biosolids, with an indication of any trend towards or compliance with the most stringent nationwide biosolids standards.

5. Percentage of compliance with NPDES permit discharge requirements.
 6. For each POTW, whether the POTW is failing whole effluent toxicity discharge criteria due to industrial sources.
 7. Percentage of compliance with non-pathogen biosolids quality limits for the management method currently used, with sites divided into categories based on applicable regulations, calculated as the number of samples in compliance out of all samples (i.e., the average for that calendar year).
 8. Percentage of compliance at each industrial user (IU) with categorical discharge limits.
 9. Percentage of compliance at each IU with all permit discharge limits.
 10. Percentage of IUs in compliance with reporting requirements.
 11. Number and percentage of IUs in SNC for the current year that were also in SNC for the previous year.
 12. Whether an effective method is being used to prevent, detect, and remediate incidents of violations of the specific prohibitions attributable to industrial or commercial sources (e.g., fire, explosion hazards, fume toxicity, etc.).
 13. Whether an effective procedure is being used to identify non-domestic users and to update the list of regulated users.
 14. Number of sample events conducted by the Control Authority per SIU per year, and percentage of all sample events that were conducted by the Control Authority.
 15. Number of inspections per SIU per year.
 16. Whether the Control Authority has site-specific, technically based local limits, based on the most recent regulatory changes and latest NPDES permit requirements; or a rationale for the lack of such limits.
 17. Whether the POTW or Control Authority has significant activities or accomplishments that demonstrate performance beyond traditional goals and standards.
 18. Whether or not the POTW has an effective public involvement program in place.
 - Identify which CIUs are eligible to be classified as *de minimus* or non-significant CIUs; and
 - Develop Strategic Performance Partnerships with facilities participating in the SGP.
- In June 2001, after five months of collaboration, the stakeholders selected mercury in effluent discharges, hexavalent chromium in air emissions, nitrogen and phosphorus in effluent discharges, and dioxin, dibenzofurans, and polychlorinated biphenyls in sludge as the non-regulated pollutants for the TRAP initiative.

Benefits for the Environment

- The project expects to reduce the amount of hazardous and toxic waste generated and released, decrease water and energy consumption, decrease demand for raw materials, and improve quality of influent, effluent, and biosolids.

Benefits for Stakeholders

- Workers in industrial facilities may benefit from decreased exposure to toxic materials if they are phased out or treated in a more environmentally friendly way.

- CIUs that meet compliance and capacity criteria will be subject to reduced self-monitoring, reduced reporting, and fewer inspections. Qualifying CIUs will also be issued non-expiring Discharge Authorizations.

Benefits for the Sponsor

- With the flexibility, the District will be able to shift limited resources from certain less productive requirements, such as monitoring industries that have excellent or very good records of compliance, to more proactive pollution reduction strategies.
- Reduced overall loading to the District system will ease the burden on water treatment and discharge, resulting in cost savings for the District.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Metropolitan Water Reclamation District of Greater Chicago, signed August 30, 2000; and (2) the *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Molex Incorporated

FINAL PROJECT AGREEMENT SIGNED AUGUST 8, 1998
PROJECT COMPLETED AS OF AUGUST 2000

Background

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

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

The Flexibility: EPA, pursuant to RCRA Section 3005(b), has authorized the State of Nebraska's Department of Environmental Quality (NDEQ) to carry out Nebraska's Hazardous Waste Management Program in lieu of the federal program. Under this authority, the NDEQ issued a variance to Molex granting it a temporary exemption from the classification as hazardous waste of segregated

sludges generated during wastewater treatment. Without this variance, the sludge materials would be subject to the NDEQ's generator requirements for storage and shipment of hazardous wastes. By obtaining approval from the NDEQ under RCRA to classify its segregated process sludge as a "commodity-like" material rather than as a hazardous waste, Molex can ship the sludges using common carriers rather than hazardous waste haulers, who are subject to additional RCRA regulations. Additionally, Molex is permitted to ship the hazardous materials on an as-needed basis, rather than every 90 days, as is typically required for hazardous waste.

On July 10, 2000, Molex requested a two-year extension of the temporary variance, which had remained in effect for two years and was set to expire August 7, 2000. In the request for this extension, Molex noted that it is expanding the production area of the plating department at the Uplands facility. This expansion, Molex stated, may offer an opportunity to continue to gather data under a greater process flow. In response, on August 2, 2000, EPA and NDEQ issued a six-month extension of the variance. The additional six months allowed Molex time to complete the final report. Molex submitted the final report at the end of 2000. The FPA for this project terminated in August 2000; the company submitted a final report in December 2000. In February 2001, NDEQ granted an additional variance extension, not to exceed 18 months.

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

The Superior Environmental Performance: In the Molex project, the treatment of segregated wastewater streams should result in at least a 50 percent reduction in mass loadings of metal contaminants in wastewater effluents, as well as in

lower tin/lead composite sludge disposal costs because pure metal sludges can be sold directly to processors. Molex is making a significant up-front investment for longer-term benefit. The pure tin/lead composite sludge does not require disposal and thus, no disposal fee; however, the operational and compliance costs of a segregated waste treatment system are higher than those associated with a single wastewater treatment process.

Progress in Meeting Commitments (As of September 2001)

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

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

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

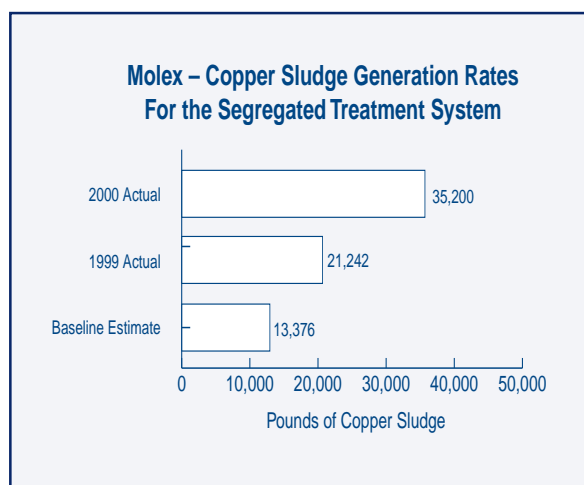


Figure 37

Copper sludge generation rates for 1999 and 2000.

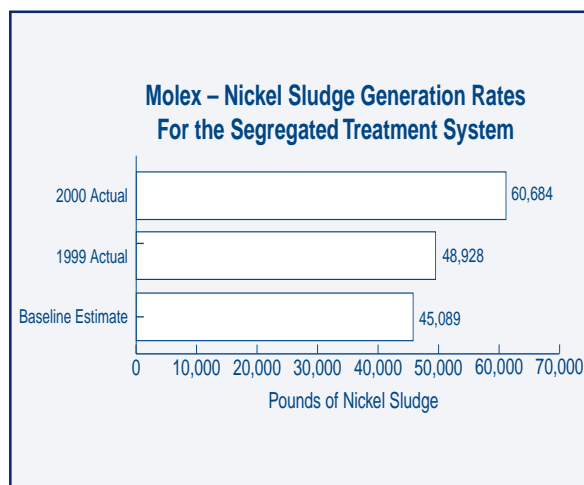


Figure 38

Nickel sludge generation rates for the segregated treatment system.

- Molex estimated that 13,376 pounds of copper sludge would be generated with the segregated treatment system. However, 1999 actual generation rates were 59 percent higher (21,242 pounds) than the estimated baseline. For 2000, Molex has generated 35,200 pounds of copper sludge, a 163 percent increase from the baseline data. Based on the quarterly reports, and since this sludge is recycled, it is estimated that the use of the segregated system has resulted in a 66 percent reduction in copper concentrations in the POTW's effluent in 1999 and an average 76 percent reduction in 2000, compared to baseline (see Figure 37).

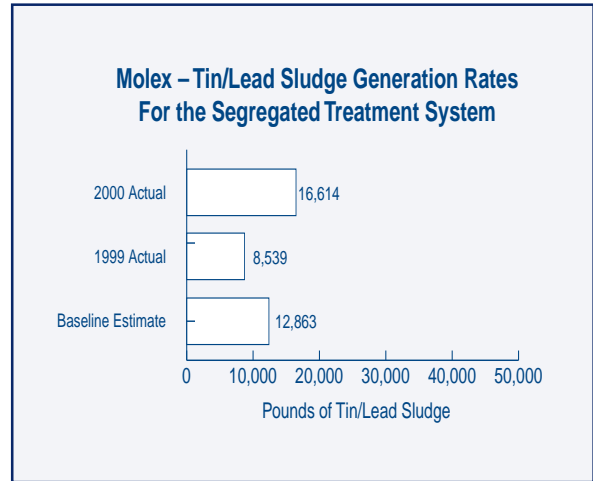


Figure 39
Tin/lead sludge generation rates for the segregated treatment system.

- Molex estimated that 45,089 pounds of nickel sludge would be generated with the segregated treatment system. However, 1999 actual generation rates were 8.5 percent higher (48,928 pounds) than the estimated baseline. In 2000, a total of 60,694 pounds of nickel sludge have been generated. Based on the quarterly reports, and since this sludge is recycled, use of the segregated system has resulted in decreased nickel concentrations in the POTW's effluent by 67 percent in 1999 and 82 percent in 2000 (see Figure 38).

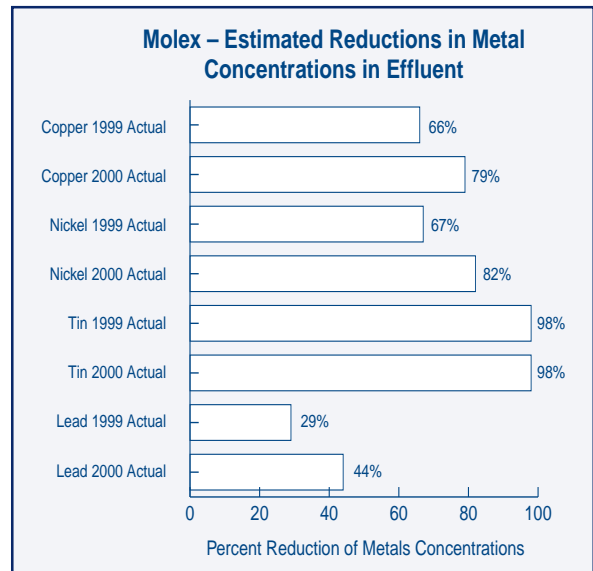


Figure 40
Estimate reductions in metal concentrations in effluent.

- Molex estimated that 12,863 pounds of tin and lead sludges would be generated with the segregated treatment system. Actual generation rates in 1999 were 34 percent lower (8,539 pounds) than the estimated baseline. However, in 2000, Molex has generated 16,614 pounds of tin and lead sludges. Based on the quarterly reports, and since this sludge is recycled, use of the segregated system in 1999 has resulted in estimated decreased concentrations of tin (98 percent) and lead (29 percent) in the effluent being discharged by the POTW. In addition, in 2000 the use of the segregated system has resulted in estimated decreased concentrations of tin (98 percent) and lead (44 percent) in the effluent (see Figures 39 and 40).

- Molex estimated that it would be able to recycle 71,328 pounds of metals sludges in a year. However, the quarterly reports indicate that between August 1998 and August 1999, a total of 78,709 pounds of sludge were sent to the recycler, 10.3 percent more than estimated. In addition, in 2000, a total of 134,988 pounds of sludge were sent to the recycler, 89 percent more than expected (see Figure 41).
- In January 2001, Molex requested a second extension of the temporary variance that had been granted on August 2, 1998, and extended on August 2, 2000. On February 6, 2001, the NDEQ extended the variance for a period of time not to exceed 18 months.

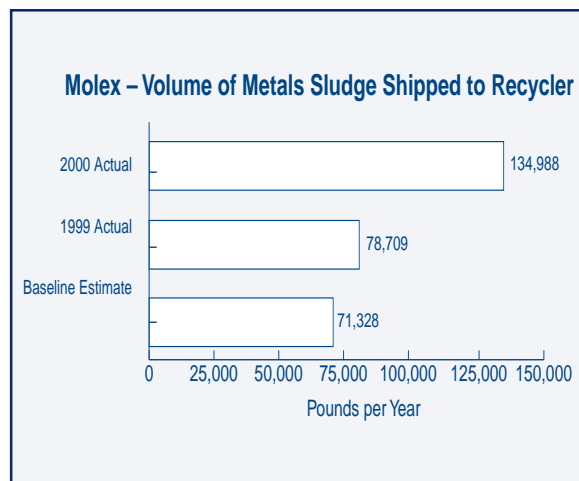


Figure 41

Volume of metals recovered from sludge shipped to recycler.

Benefits for the Environment

- The amount of metals discharged to Lincoln, Nebraska's POTW have been reduced.
- A total of 213,697 pounds of sludge have been sent to the recycler since project inception. This direct recycling of mono-metal-bearing sludges by reclamation facilities has decreased the need for mining of ores and the use of other virgin materials. In addition, Molex noted that the variance allows them to make two truck shipments of sludge per year, rather than 12 partially full truck shipments, reducing fuel consumption and emissions.

Benefits for Stakeholders

- Stakeholders were involved in the environmental design and impact assessment of the XL project and were given opportunity to participate fully in project development.
- The public has access to periodic reports submitted by Molex to EPA through the Project XL Web site.

Benefit for the Project Sponsor

- Molex has been allowed to handle the nonprecious mono-metals-bearing sludges as precious metals-bearing sludge and not as a

RCRA hazardous waste. This results in a reduced cost of storing and shipping the sludge. Molex has estimated that this new system has saved the company approximately \$45,320 a year over the unsegregated treatment technology.

Information Resources: The information in this summary comes from several sources: (1) the December 2000 *Project XL Progress Report—Molex Incorporated*; (2) focus group discussions in December 1999 with representatives of the Molex Company, EPA Regional and Headquarters staff, World Resources (a national environmental group), Nebraska Department of Environmental Quality, and the City of Lincoln; (3) Molex Project XL quarterly reports from August 1998 through September 2000; (4) Final Report for Project XL at Molex, 2000; and (5) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.