United States
Environmental Protection
Agency

Office of The Administrator
Washington, DC 20460
Mail Code 1807

EPA 100-R-00-031
January 2001
www.epa.gov/opei

Project XL Progress Report
Intel Corporation

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 50 projects that will test ways of producing superior environmental performance with improved economic efficiencies, while increasing public participation through active stakeholder processes. As of January 2001, EPA has reached its goal of 50 projects in the implementation phase. 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 (formerly the Office of Reinvention) 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. The information and data presented in the January 2001 Progress Report is current as of December 2000.

Background

Intel Corporation, the world's largest semiconductor manufacturer, has operated the Fab 12 facility in Chandler, Arizona since 1996. Fab 12 is Intel's newest chip fabrication facility operating on the 720-acre Ocotillo site. Intel's Project XL agreement applies to the entire Ocotillo site, including any new semiconductor-related facilities that may be built at the site. Intel is striving to reduce the environmental impact of its fabrication process by implementing an environmental management master plan that includes both voluntary and mandatory commitments for environmental performance, and is tailored to meet both the operational needs of the facility and the concerns of the local community.

Intel XL Project
Chandler, Arizona

Major Milestones

- June 30, 1995 — Intel XL Proposal Submitted
- November 19, 1996 — Final Project Agreement Signed
- April, 1998 — First Annual Stakeholder Meeting
- January 1999 — Mid-Course Review Meeting
- December 31, 2001 — Termination/Renewal of FPA

In the highly competitive microprocessor industry, success is directly related to a manufacturer's ability to bring new technologies to the marketplace ahead of domestic and foreign competitors. The dynamic nature of this industry makes it crucial for a company to obtain maximum flexibility in its operations. Each new generation of microprocessors requires continual process experimentation, involving frequent changes in equipment and process chemicals. A typical Intel plant can undertake 35 to 40 process chemical changes annually, and begin manufacturing a complete new generation of chips every 18 to 30 months. Given these operating characteristics, standard Federal air quality permit requirements increase the potential for delays in the development and production of new products and product lines. The Intel XL project has the potential to minimize these delays and provide more flexibility in Intel's operations, by allowing the facility to make operational changes without a permit review for each change, as long as the overall permit limits are not exceeded.

In the FPA and subsequent agreements, Intel has committed to limit emissions of criteria air pollutants and hazardous air pollutants (HAPs), and to meet other environmental goals that are designed to improve the area's air and water quality, conserve water, reduce the generation of hazardous and nonhazardous waste, and improve the general environmental performance of the facility. The anticipated environmental benefits from this project are the following:

- Maintaining a sitewide cap on air emissions for nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter with a diameter less than 10 microns (PM-10), and volatile organic compounds (VOCs) at levels that ensure that the current site, including any future semiconductor manufacturing plants built there, is and remains a minor air emissions source, as defined by the Clean Air Act (CAA).
- Using state guidelines to establish enforceable caps on emissions that may affect the community adjacent to the site. These standards also will be used to voluntarily set lower emissions levels to increase protection for those working at or visiting the facility.
- Conserving city water resources by increasing the amount of recycled manufacturing effluent to 65 percent of the volume of fresh water used, by 2001.
- Reducing the amount of fresh water used by reusing treated effluent for 95 percent of the water used in the semiconductor manufacturing cooling tower and for landscaping.
- Recycling up to 60 percent of the solid waste and up to 70 percent of the nonhazardous chemical wastes the facility generates, by the year 2001.
- Recycling an average of about half of the hazardous waste the facility generates over the five year period between 1997 and 2001.
- Maintaining a minimum setback of 1,000 feet from the closest manufacturing-related building to residential property.
- Reducing vehicle miles traveled by employees through a trip reduction program.
- Participating in equipment donation and environmental education programs.

The Experiment

The Intel project's goal is to implement an Environmental Management Master Plan that includes a facility-wide cap on air emissions to replace individual permit limits for different air emission sources. The Intel project provides a test case for two innovations for improving air permitting: (1) the elimination of case-by-case review of specific manufacturing process changes, if emissions remain under a capped amount; and (2) preapproval of a major plant expansion, if emissions remain below a capped amount for the entire site.

The Flexibility

The Intel XL Project establishes a long-term plan to minimize the Ocotillo facility's environmental impact on local air, land, and water quality, to minimize both its use of fresh water and its generation of waste, and to undertake a number of other actions to enhance the overall environmental quality of the community. As an incentive to achieve environmental performance at the Ocotillo facility, EPA, the Arizona Department of Environmental Quality (ADEQ), the Maricopa County Bureau of Air Pollution Control, and the City of Chandler will provide a more flexible and cost-effective process for regulatory management. The FPA provides regulatory flexibility in the areas of air quality permitting, environmental performance reporting, and innovative technology.

The statutory programs, and the EPA offices administering the programs, that affect the Intel XL project are the:

- Clean Air Act (CAA) programs administered by EPA's Office of Air Quality Planning and Standards;
- Clean Water Act (CWA) programs administered by EPA's Office of Wastewater Management and EPA's Office of Wetlands, Oceans, and Watersheds;
- Resource Conservation and Recovery Act (RCRA) programs administered by EPA's Office of Solid Waste; and
- Pollution Prevention Act (PPA) programs administered by EPA's Office of Prevention, Pesticides, and Toxic Substances.

The parties to the FPA have designated the ADEQ as the coordinating agency for the FPA. This role includes maintaining public records, coordinating implementation issues such as the conduct of inspections, and considering compliance issues or enforcement actions. The signatories anticipated that consolidating the coordination into one agency would enhance the effective administration of the FPA, streamline regulatory oversight, and help to coordinate approaches to environmental issues that arise at the Ocotillo site. The oversight of the air quality permit conditions is delegated to the Maricopa County Environmental Services Department (MCESD). The oversight of the industrial user wastewater discharge permit is designated to the City of Chandler.

Air Quality Permitting. The FPA and the revised air quality permit provide Intel with the flexibility to make equipment and process changes and construct new facilities at the site without air quality permit reviews, as long as the Plant Site Emission Limits (PSELs) are not exceeded and all other FPA and permit limits are met. To provide an additional safety factor, Arizona Ambient Air Quality Guideline (AAAQG) limits for HAPs will not be exceeded at the Intel facility property line or elsewhere on the site. This flexibility in air quality regulation allows Intel to eliminate potentially 30 to 50 permit reviews a year and bring new products to market faster. The benefits of this flexibility are exemplified by Intel's plan to build a new production manufacturing facility. Early this year, Intel announced it will build its first 300 millimeter, high volume production manufacturing facility at the Chandler site. The company said it will invest $2.0 billion to build and equip the water fabrication facility. It is expected that Intel will seek this expansion under its existing air emissions cap for the Chandler facility that was provided under the original Project XL permit in 1996. Intel has noted that the new facility will allow the company to maintain its leadership in the extremely competitive world of semiconductors. For example, the facility will provide more manufacturing capacity, which will help Intel to better address customers' growing need for high performance microprocessors.

Environmental Performance Reporting. Compliance with PSELs will be verified through periodic emissions reporting. EPA and Arizona are allowing Intel the flexibility to consolidate routine reports into four quarterly reports and one annual report. The effluent discharge limitations, which are contained in a separate permit, are incorporated into the FPA by reference. The reporting of these discharges is incorporated into the quarterly and

annual reports submitted under the FPA. This reporting system provides Intel with a more flexible reporting format, and makes a consolidated environmental report available to the signatory agencies and the public. Also, such periodic reporting will allow the public to verify that Intel has fully complied with the PSELs in the air quality permit. These reports are available on the Internet via EPA's Project XL web site at http://www.epa.gov.ProjectXL.

Promoting Innovation and System 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 Intel XL project are described below.

Consolidated Reporting. The XL project allows Intel to consolidate the reporting for Federal, state, and local permitting and regulatory programs into one annual and four quarterly reports and to make these reports available on the Internet. Internet reports cover air emissions quality, water and wastewater use and quality, and solid and hazardous waste management, with the exception of the Toxic Release Inventory (TRI) reports which, under the Emergency Planning and Community Right-to-Know Act (EPCRA), are required to be prepared and submitted separately. EPA anticipates that this innovation in consolidated reporting will be incorporated into future XL projects, as EPA will work with sponsors, other regulatory authorities, and stakeholders to develop similar reporting formats and to make them available on the Internet. This project will serve as a test for sectorwide collection of higher quality information from regulated industries, and directly influence the development of the comprehensive information management plan to be developed by EPA's Office of Environmental Information.

Enhancing Public Access: Internet Reporting and Stakeholder Input. The Intel project has two innovations designed to improve public access to information: (1) using stakeholder input to help redesign the content and format of the reports on the environmental performance of the Ocotillo facility; and (2) making these reports available on the Internet. This reporting format was designed in conjunction with the EPA, the Arizona DEQ, the Maricopa County Bureau of Air Pollution Control, the City of Chandler, and area residents who are part of the stakeholder team. Based on input from the team, Intel agreed to put routine environmental reports and accountability measures into a single, integrated report that is publicly available on the Internet via Intel's Project XL Web site. The site also includes the project's historical information, such as minutes of previous public meetings, and public comments and responses. Now citizens, as well as regulatory officials, can routinely monitor the facility's progress towards its environmental commitments. This approach tests the value of getting comprehensive environmental information directly from the company. Although the long-term goal is to merge Intel's Internet form directly into the state and local agency information systems, for the time being, all data must be reentered. The multi-stakeholder input approach and the Internet access to information have proven so innovative that EPA has incorporated Intel's approach into the "Guide to XL Project Teams - Project Tracking and Reporting," which strongly encourages all future projects to develop similar Internet reporting formats with interested stakeholders. The Agency has a number of efforts under way to improve public access to facility environmental information. The experience gained through this reporting approach will contribute to the development of a process for disseminating high quality information to regulatory authorities and the public.

Computer Based Emergency Planning and Preparedness. The emergency requirements will be incorporated within the Chandler Fire Department Hazardous Materials Management Plan (HMMP) for Intel. The information in the HMMP will be integrated into the computer-based Emergency Information System maintained by Intel and the Chandler Fire Department. The benefits associated with this innovative approach are:

- Enhanced preparedness and prevention activities by Intel and the Chandler Fire Department due to increased clarity of requirements, and;
- Enhanced emergency response by the City of Chandler Fire Department due to an on-board HMMP Emergency Information System computer on emergency response vehicles.

With a single consolidated emergency plan, Intel's preparedness and prevention activities will be more effective. Moreover, emergency response by qualified responders is enhanced because of their greater familiarity with the Ocotillo Site and being able to respond to all emergencies with consistent information. As a result, such a plan will provide greater protection of human health and the environment. This plan also will reduce the administrative burden associated with developing and maintaining several plans for essentially the same types of risks.

Air Permits. The Intel XL project is testing two of several alternatives for improving air permitting. These include preapproval and elimination of review of specific manufacturing process changes, if emissions remain under a capped amount; and preapproval of a major plant expansion, if emissions remain below a capped amount for the entire site. These emission caps are set at levels low enough for the entire site to remain a minor source of criteria and hazardous air pollutants under the CAA. These tests will directly influence EPA's sector-based action plan and the Agency's permit reform efforts.

Project Commitment Summary

This table and the environmental performance section that follows summarize progress in meeting commitments described in the FPA for Intel's facility in Ocotillo, Arizona.

Commitment	Status
Plant Site Emission Limits (PSELs)	
Limit the emissions of the following: volatile organic compounds (VOCs), inorganic hazardous air pollutants (HAPs), organic HAPs, nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM-10), phosphine, sulfuric acid, and any new chemical that is brought onsite that produces air emissions.	All PSELs have been achieved through 1999 and the first quarter of 2000.
Limit the level of emissions of total VOCs and aggregate HAPs so that air emissions per unit of production will not increase in the future. To enable Intel and the public to monitor progress in meeting this commitment, Intel has voluntarily agreed to establish a production-based performance standard.	In 1996, Intel voluntarily established a standard based on the "production unit factor" (PUF). The PUF is a measure of annual semiconductor output. The standard is expressed annually as tons of emissions (VOCs or HAPs) per PUF. A baseline value was established for 1997 emissions and production levels. Each year Intel reports the annual value for the reporting year relative to the 1997 baseline value. Performance measures for 1998 and 1999 were compared to the 1997 baseline and included in the 1998 and 1999 Annual Reports. Both results indicate lower values then the previous year.

Commitment	Status
Air Quality Evaluation and Management	
Screen modeling whenever Intel uses a new chemical for which Arizona Ambient Air Quality Guidelines (AAQG) have been established. For new chemicals introduced to the site that generate air emissions, that have not been evaluated under the air permit or AAAQG screen modeling procedures, and that present potential concerns for human health or the environment, there must be a special analysis of the chemicals performed, and the Maricopa County Environmental Services Department and the Arizona Department of Health Services must be consulted.	In the fourth quarter of 1997, screen modeled four new chemicals associated with the 0.25 micron manufacturing process. No consultation has been required since the new chemicals that have been introduced have been evaluated.
Reporting of Air Emissions	
Quarterly report of actual air emissions of all pollutants subject to PSELs or limits otherwise identified.	Quarterly reports through 1999 and the first quarter of 2000 have been filed on schedule.
Annual summary of actual aggregate emissions of all pollutants subject to PSELs or limits otherwise identified.	Annual summary for 1998 and 1999 filed on schedule. Quarterly reports include summaries for previous 12 months.
Annual summary of known actual individual HAP emissions above 1,000 pounds per year.	The 1998 and 1999 annual report indicates there were no individual HAP emission above 1,000 pounds.
Annual list of known individual HAPs emitted in quantities less than or equal to 1,000 pounds per year.	The 1998 and 1999 annual reports include aggregate amounts of emissions of known HAPs, and lists four organic and four inorganic HAPs that fall into this category.
Annual report of VOCs & HAPs per unit of production (PUF), expressed as a ratio to the 1997 value.	The VOC and HAP PUFs for 1998 relative to 1997 were 0.3 and 0.7, respectively. This means that the VOC and HAP emissions released in 1997 per unit of production for 1997. The value for VOCs for 1999 relative to 1997 was 0.26. This means that the VOC emissions released in 1999 per unit of production in 1999 was less than that for 1998.
General Reporting	
Prepare consolidated reports quarterly for signatory agencies, and make the reports available to the public.	Completed all quarterly reports through 1999 and the first quarter of 2000.
Prepare annual summary report.	Completed 1998 and 1999 annual reports.

Commitment	Status
Water and Wastewater Use	
Manufacturing effluent will be treated for reuse or reinjection into the groundwater supply, according to the following timetable: 45% of freshwater volume intake in 1997, 55% in 1999, and 65% in 2001.	Achieved 66% for 1997, 61% for 1998, and 61% for 1999.
The Mid-course Review of January 1999 established a goal requiring using treated effluent water for 95% of water used for cooling tower makeup and landscaping. This goal was revised from 100% in the FPA.	Achieved 80% for 1997, 97% for 1998, and 98% for 1999.
Management of Stormwater	
Use secondary containment areas, best management practices, and retention basins.	Achieved prior to signing of FPA.
Management of Waste	
Recycle substantial portions of solid, hazardous, and nonhazardous chemical waste, according to a schedule in the FPA.	Achieved through 1999.
Intel Corporate Design for the Environment Program (DFE)	
Implement the corporate DFE program, which seeks to develop environmentally compatible processes and products.	Being implemented as part of Intel's corporatewide effort to design improvements for environmental management and performance into manufacturing processes during the development stage.
Chemical Spill Contingency Planning	
Implement a single emergency plan for the facility that integrates all applicable environmental requirements as they relate to emergency planning.	Emergency plan was implemented in the first quarter of 1997.
Trip Reduction Program for Intel Employees	
Implement and maintain ongoing car pool and other trip reduction activities.	Ride share registration increased by 3.02% in 1999.
Property Setback for the Site	
Maintain a minimum setback of 1,000 feet from the closest manufacturing-related building to residential property, and use contoured landscaping to add to the aesthetic appeal of the setback.	The 1,000 foot setback has been maintained for all plant expansions.

Commitment	Status
Environmental and Education in the Community	
Ongoing participation in environmental mentoring and educational activities targeted at various groups in the community.	Community volunteer activities included assuming a leadership role in coordinating ozone alert program; participating in the Arizona Nature Conservancy; assisting in refurbishing a community center; participating in the annual EarthFest celebration; presenting a program to over 31,000 students emphasizing math, science, and technology; and providing Arizona State University with reusable/recyclable materials for campus projects.
Donation of Computers and Manufacturing Equipment	
Ongoing program to donate new and used computers to schools and libraries, and used manufacturing equipment to universities.	Donated 1,663 personal computers in 1998. Donated 2,060 personal computers in 1999.

Environmental Performance

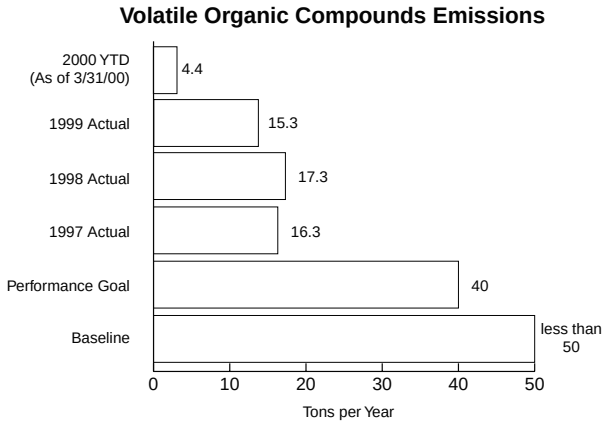
This section summarizes progress in meeting the environmental performance commitments described in the FPA for Intel. It compares the FPA goals to what would have been required under conventional environmental regulations for minor sources in National Ambient Air Quality Standards (NAAQS) nonattainment areas. Because the plant was new at the time the FPA was developed, there were no data upon which to establish a baseline. Therefore, the "baseline" used in this section is based on what a conventional minor source permit might have allowed. All the air quality permit and wastewater discharge permit commitments are enforceable under various environmental laws. There are no regulatory requirements for the other commitments.

Ocotillo Plant Environmental Performance

TPY= tons per year
T-YTD=tons-year to date (9/30/99)

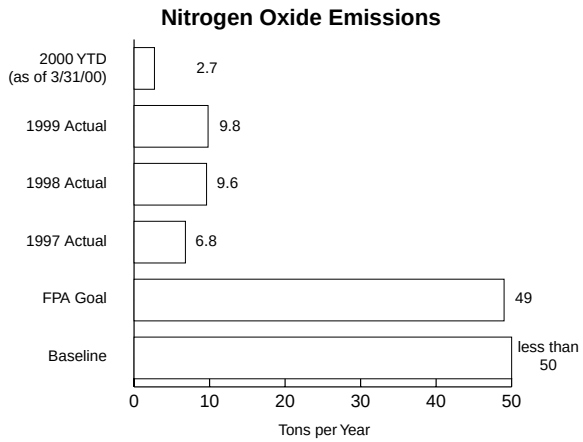
Volatile Organic Compounds (VOCs): Intel has committed to capping the emissions of VOCs at 40 tons per year (TPY) for the entire facility. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire Ocotillo site stays within this and other established limits. The baseline shown is based on an estimate of what would have been allowed under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



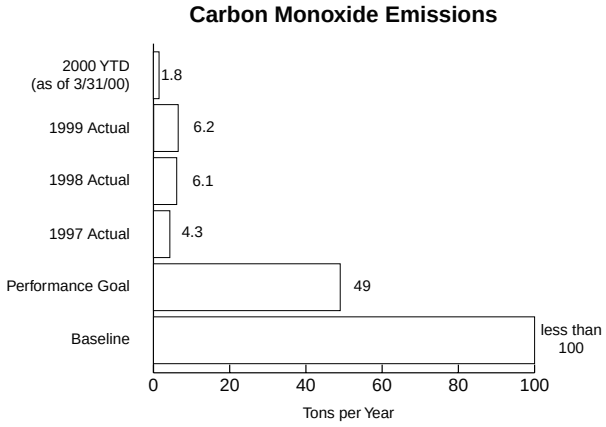
Nitrogen Oxides (NO_x): Intel has committed to capping the emissions of NOx at 49 TPY for the entire site. The FPA provides Intel the flexibility to make changes to existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline shown is based on an estimate of what would have been allowed under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



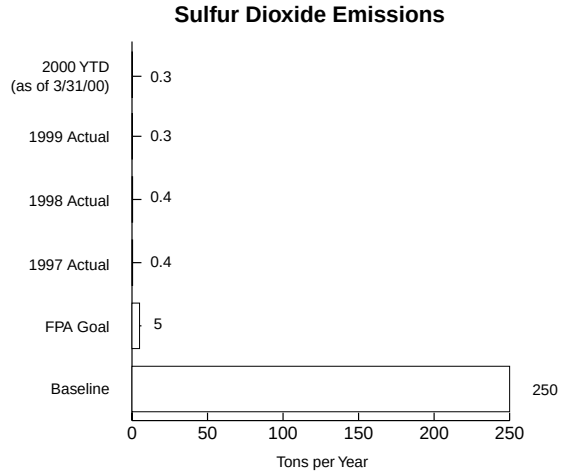
Carbon Monoxide (CO): Intel has committed to capping the emissions of CO at 49 TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline shown is based on an estimate of what would have been allowed under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



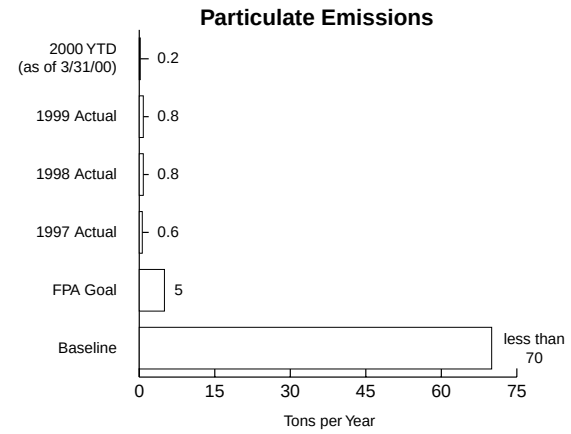
Sulfur Dioxide (SO_2): Intel has committed to capping the emissions of sulfur dioxide at five TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline shown is based on an estimate of what would have been allowed under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



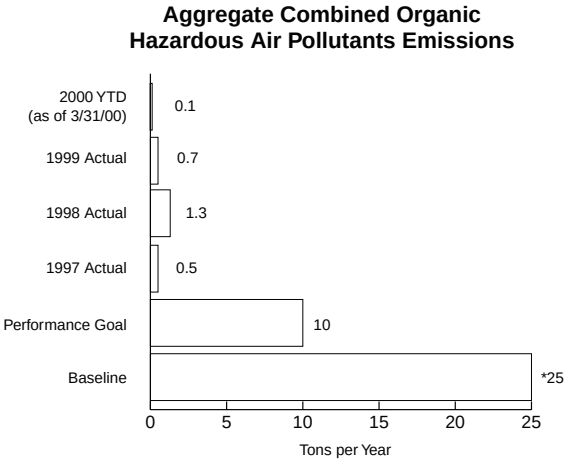
Particulates (PM-10): Intel has committed to capping the emissions of particulate matter at five TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline shown is based on an estimate of what would have been allowed under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



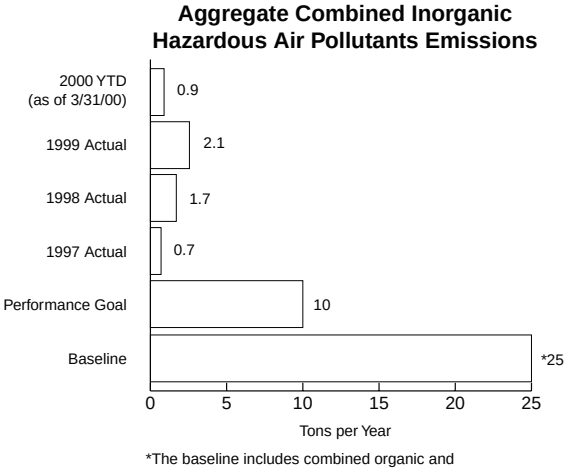
Aggregate Combined Organic Hazardous Air Pollutants (HAPs): Intel has committed to capping the emissions of organic HAPs at ten tons per year for the entire site. Organic HAPs include methanol, xylene, and ethylene glycol. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline of 25 TPY refers to a total of organic and inorganic HAPs, which is what would have been allowed under a conventional minor source air quality permit. (The combined total commitment for organic and inorganic HAPs under the XL permit is now 20 TPY.)

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



Aggregate Combined Inorganic Hazardous Air Pollutants (HAPs): Intel has committed to capping the emissions of inorganic HAPs at 10 TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline of 25 TPY refers to a total of organic and inorganic HAPs, which is what would have been allowed under a conventional minor source air quality permit. (The combined total commitment for organic and inorganic HAPs under the XL permit is now 20 TPY.)

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.



Phosphine: Intel has committed to capping the emissions of phosphine at four TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline of 10 TPY is based on what the CAA would allow for a specific HAP under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.

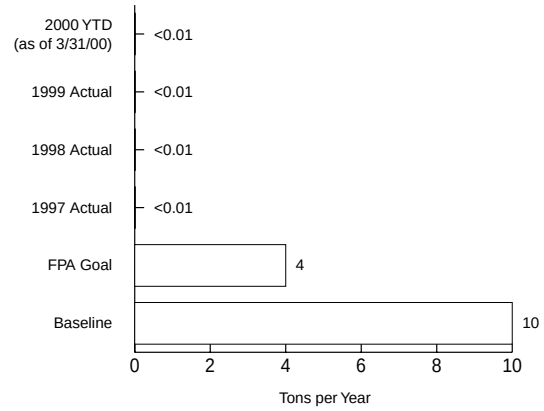
Sulfuric Acid: Intel has committed to capping the emissions of sulfuric acid at nine TPY for the entire site. The FPA provides Intel the flexibility to make changes to the existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits. The baseline of ten TPY is based on what the CAA would allow under a conventional minor source air quality permit.

Progress: The facility has remained well under the limit for 1997, 1998, 1999, and for the first quarter of 2000.

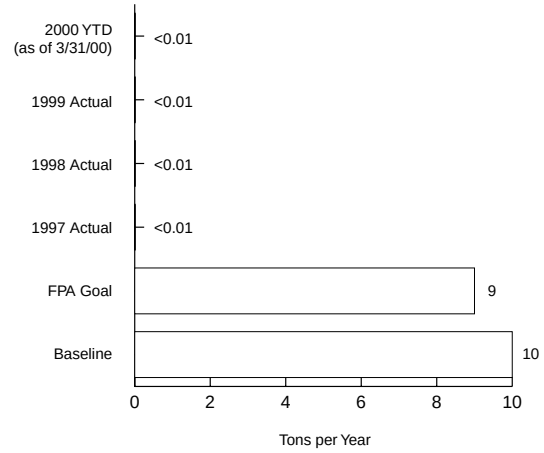
Arsine: Intel has committed to capping emissions of arsine at less than 14 pounds per year for the entire site. Arsine was added to the list of chemicals in late 1998, and Intel began reporting it in the first quarter of 1999. The FPA provides Intel the flexibility to make changes to existing manufacturing operations and to expand the plant, as long as the entire site stays within this and other established limits.

Progress: The facility has remained well under the limit for 1999, and for the first quarter of 2000.

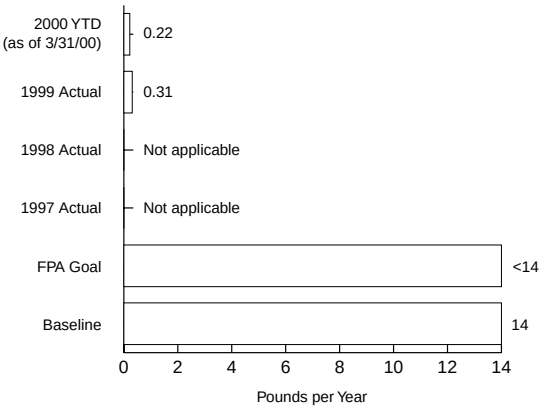
Phosphine Emissions



Sulfuric Acid Emissions



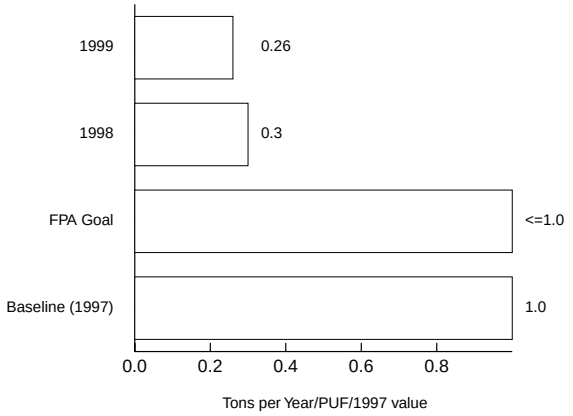
Arsine Emissions



VOC Emissions Per Unit of Production: Intel has committed to limit the level of emissions of total VOCs so that air emissions per unit of production will not increase in the future. The 1997 emissions and production levels were used to establish a baseline ratio of emissions per unit of semiconductor production. To enable Intel and other stakeholders to monitor progress in meeting this commitment, Intel has voluntarily established a production measure called a "production unit factor" (PUF). A PUF is a measure of annual semiconductor output (square inches of silicon processed divided by feature size; the feature size is the width of the smallest transistor, which was 0.35 microns in 1997). The performance is measured annually as tons of emissions of VOCs divided by the PUF divided by the 1997 value for this ratio. The 1997 value for VOCs, which was $1.28E^{-06}$, is set equal to 1.0 to express the baseline in the form an index. Each year Intel reports the annual value relative to the baseline value.

Progress: The value for VOCs for 1998 relative to the baseline value was 0.3. This means that the VOC emissions released in 1998 per unit of production in 1998 was less than the baseline value. The value for VOCs for 1999 relative to the baseline was 0.26. This means that the VOC emissions released in 1999 per unit of production in 1999 was less than that for both 1998 and the baseline year.

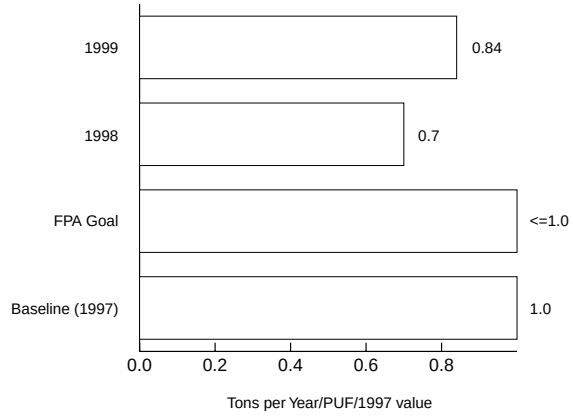
Total VOC Emissions Per Unit of Production



Aggregate HAPs Emissions Per Unit of Production: Intel has committed to limit the level of emissions of total HAPs, so that HAP emissions per unit of production will not increase in the future. The 1997 emissions and production levels were used to establish a baseline ratio of emissions per unit of semiconductor production. As with VOCs, Intel has voluntarily established a production measure called a PUF, to enable Intel and other stakeholders to monitor progress in meeting this commitment. The performance is measured annually as tons of emissions of HAPs divided by the PUF divided by the 1997 value for this ratio. The 1997 value for HAPs, which was $9.40E^{-08}$, is set equal to 1.0 to express the baseline in the form of an index. Each year Intel reports the annual value relative to the 1997 baseline value.

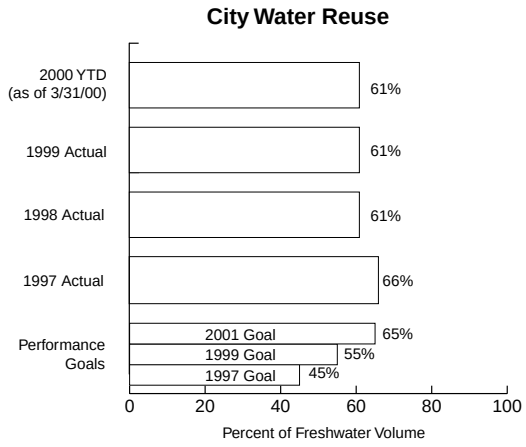
Progress: The value for HAPs for 1998 relative to 1997 was 0.7. This means that the HAP emissions released in 1998 per unit of production in 1998 was less than that for 1997. The value for HAPs for 1999 relative to 1997 was 0.84. This means that the HAP emissions released in 1999 per unit of production in 1999 was slightly greater than that for 1998, but less than the HAP emissions released in 1997.

Aggregate Hazardous Air Pollutant Emissions Per Unit of Production



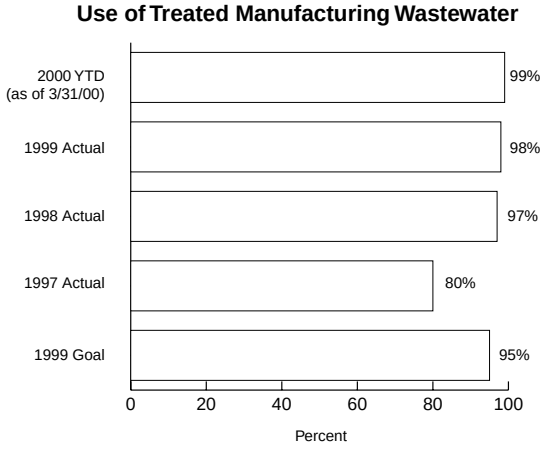
City Water Reuse: Intel has committed to increase the amount of water sent for recycling to the city's effluent treatment and recharge facility, according to the following timetable: 45 percent of freshwater volume in 1997, 55 percent in 1999, and 65 percent in 2001. There is no regulatory requirement or previous standard that might be considered a baseline, although water conservation is a priority environmental goal in this arid region.

Progress: For 1998 and 1999, the facility exceeded the agreed-upon goal for 1999. In 1998, Intel recycled 399 million gallons and, in 1999, 422 million gallons.



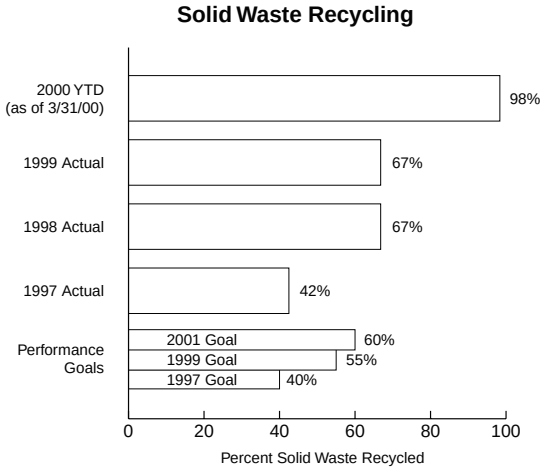
Use of Treated Wastewater: Intel has committed to using treated effluent water for semiconductor manufacturing cooling tower makeup and landscaping. The treated effluent will come from the city's wastewater reclamation facilities and treated wastewater from its manufacturing operations. There is no regulatory requirement or previous standard that might be considered a baseline, although water conservation is a priority environmental goal in this arid region.

Progress: The facility was able to use the treated effluent to meet 97 percent of its needs in 1998, and reports that it used 98 percent in 1999. The original goal set in the FPA was 100 percent. However, based on a review of the system design and after spending $300,000 annually for phosphate treatment, the company informed the stakeholders that it would not likely be able to achieve more than 95 percent, without spending significant resources on additional treatment systems. The 95 percent goal was approved at the Mid-Course Review in January 1999. In 1998 Intel reused 183 million gallons and, 205 million gallons in 1999.



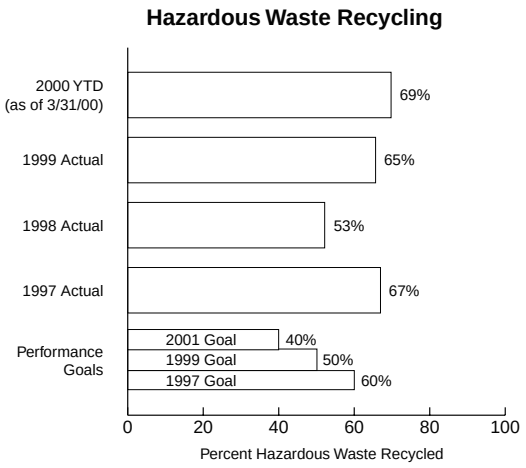
Solid Waste Recycling: Intel has committed to recycle substantial portions of solid and hazardous waste according to the following schedule: 40 percent in 1997, 55 percent in 1999, and 60 percent in 2001. There is no regulatory requirement or previous standard that might be considered a baseline.

Progress: In 1998 and 1999, the facility recycled more solid waste than was required in the FPA. In 1998, Intel recycled 1,284 tons of solid waste and; 1,468 in 1999. This total indicates that Intel recycled 67 percent of its solid waste, which exceeds its goal of 55 percent.



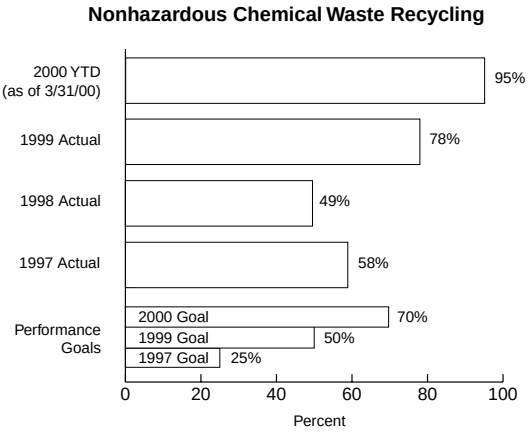
***Hazardous Waste Recycling*:** Intel has committed to recycle substantial portions of hazardous waste generated at the plant complex according to the following schedule: 60 percent in 1997, 50 percent in 1999, and 40 percent in 2001. Intel anticipates that the percentage of hazardous waste to be recycled will decrease because it expects to reduce the amount of hazardous waste generated at this site through pollution prevention measures. There is no regulatory requirement or previous standard that might be considered a baseline.

Progress: In 1998 and 1999, the facility recycled more hazardous waste than was required in the FPA. Actual tons recycled were 342 in 1998 and 337 in 1999. The 1999 total indicates that Intel recycled 65 percent of its hazardous waste, which exceeds its goal of 65 percent.



***Nonhazardous Chemical Waste*:** Intel has committed to recycle substantial portions of nonhazardous chemical waste according to the following schedule: 25 percent in 1997, 50 percent in 1999, and 70 percent in 2001. There is no regulatory requirement or previous standard that might be considered a baseline.

Progress: The facility almost achieved the 1999 goal for all of 1998, and exceeded that goal in 1999. Intel recycled 415 tons of nonhazardous chemical waste in 1998, and 704 tons during 1999.



Stakeholder Participation

Intel has worked to involve stakeholders in the design of its XL project. Stakeholder involvement efforts during negotiation of the FPA included

- use of a Community Advisory Panel (CAP) consisting of area residents to serve as a full partner in the project's development;
- an outreach effort to local citizens (including 25,000 hand-delivered notices);
- the involvement of national, regional, and local nongovernmental organizations that provided substantial comments on the project; and
- the use of EPA and Intel web sites to enhance accessibility to project development and implementation information.

Intel has established a Stakeholder Team to ensure the involvement of national, regional, and local regulatory authorities and citizens in the project's implementation. This team meets once a quarter to review the project's progress reports. The most recent meeting was held in May 2000. A third annual stakeholder and general public meeting was held in April 2000. All quarterly and annual reports are published on Intel's web site to make its environmental data publicly available as part of a standard reporting mechanism.

Six-Month Outlook

- Complete quarterly progress report for the third and fourth quarter reports of 2000, within 60 days after the close of the quarter.
- Plan and implement semi-annual stakeholders and general public meeting in April 2001.
- Plan quarterly stakeholder meetings for November 14, 2000 and February 13, 2001.

Stakeholder Team

- Len Drago, Intel Corporation, (480) 715-0132
- Jim Fullmer, Intel Corporation, (480) 715-0342
- Alex Heard, Intel Corporation, (480) 715-4798
- Tim Mohin, Intel Corporation,(480) 554-3465
- Jim Larsen, Intel Corporation, (480) 715-0206.
- Beverly Westgaard, Arizona Department of Environmental Quality, (602) 207-4249
- Colleen McKaughan, EPA Region 9, (520) 498-0118.
- Jo Crumbaker, Maricopa County Bureau of Air Pollution Control, (602) 506-6705.
- Pat Sampson, City of Chandler, (480) 786-2396.
- Pat Mariella, Gila River Indian Community Department of Environmental Quality, (520) 562-2234.
- Steve Brittle, local citizen, (602) 268-6110.
- Barbara Knox, local citizen, (480) 963-3802.
- Jim Lemmon, local citizen, (480) 941-5517.
- Dave Matusow, local citizen, (480) 899-9425.

Information Sources

The information sources used to develop this progress report include: (1) discussions during a teleconference among representatives of the U.S. EPA, Intel Corporation, Arizona DEQ, Maricopa County, City of Chandler, and local residents serving on the Intel CAP; (2) the FPA for the Intel XL project; and (3) annual, quarterly, and midcourse review reports prepared by Intel Corporation. The information sources are current through July 2000.

Glossary

Arsine (AsH3): Arsine is a colorless flammable, poisonous gas with an odor like garlic. It is used, among other things, in the processing of semiconductors.

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

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

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

Clean Water Act (CWA): The CWA sets the basic structure for regulating discharges of pollutants to waters of the United States. The law gives EPA the authority to set technology-based effluent standards on an industry

basis and continues the requirements to set water quality standards for all contaminants in surface water. The CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a National Pollutant Discharge Elimination System (NPDES) permit is obtained under the Act.

Community Advisory Panel (CAP): An advisory group consisting of area residents.

Criteria Air Pollutants: The CAA requires EPA to set NAAQS for certain air pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six criteria air pollutants -ozone, carbon monoxide, total suspended particulates, sulfur oxide, lead, and nitrogen oxide.

Effluent: Treated or untreated wastewater that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface water.

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

Final Project Agreement (FPA): The FPA outlines the details of the XL project and each party's commitments. The project's sponsors, EPA, state agencies, tribal governments, other regulators, and direct participant stakeholders negotiate the FPA.

Hazardous Air Pollutants (HAPs): Air pollutants that are not covered by NAAQS but that may have an adverse effect on human health effects or the environment. Such pollutants include asbestos, beryllium, mercury, benzene, coke-oven emissions, radionuclides, and vinyl chloride. Organic HAPs include methanol, xylene, and ethylene glycol.

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

Hazardous Waste Recycle: Materials that are specifically designated as hazardous waste under EPA's Resource Conservation and Recovery Act (RCRA) regulations. The percentage recycled is calculated by dividing the quantity of hazardous waste sent off for beneficial recycle and energy recovery by the total quantity of hazardous waste generated and shipped offsite.

Media: Specific environments—air, water, soil—which are the subject of regulatory concern and activities.

Multi-media: Several environmental media, such as air, water, and land.

National Ambient Air Quality Standards (NAAQS): Standards established by EPA under the Clean Air Act applicable to outdoor air throughout the country.

National Pollutant Discharge Elimination System (NPDES): A provision in the CWA that prohibits the discharge of pollutants into the waters of the United States unless a special permit is issued by EPA, a state, or where delegated, by a tribal government or Indian reservation.

Nitrous Oxides (NOx): An air pollutant that is the result of photochemical reactions of nitric oxide in ambient air. Typically, it is a product of combustion from transportation and stationary sources. It is a major contributor to the formation of tropospheric ozone, photochemical smog, and acid deposition.

Nonattainment Area: A designated geographic area that does not meet one or more of the NAAQS for the criteria pollutants designated in the CAA.

Nonhazardous Chemical Waste Recycle: Used chemical materials which are collected for the purpose of returning them into beneficial reuse. They are classified as nonhazardous based upon EPA's definition set forth under RCRA. The percentage recycled is calculated by dividing the amount of material in this category by the total quantity of waste generated.

Particulate Matter (PM-10): Fine liquid or solid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Phosphine: Phosphine occurs as a colorless, flammable gas that is slightly soluble in water. It is used as an intermediate in the synthesis of flame retardants for cotton fabrics, as a doping agent for n-type semiconductors, a polymerization initiator, and a condensation catalyst.

Plant Site Emissions Limits (PSELs): Plant site emissions limits are facility-based emission caps that allow production changes and facility expansion without recurring air quality permit reviews.

Pollution Prevention Act (PPA): This 1990 law was passed to reduce or eliminate industrial pollutants through technology transfer, education, and public awareness. The programs developed under the PPA are administered by EPA's Office of Prevention, Pesticides, and Toxic Substances.

Production Unit Factor (PUF): A measure of annual semiconductor output. The PUF = square inches of silicon processed/feature size. Feature size is the width of the smallest transistor.

Resource Conservation and Recovery Act (RCRA): Passed in 1976, RCRA gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of nonhazardous waste. RCRA enables EPA to address environmental problems that could result from underground storage tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned sites.

Solid Waste: Nonliquid, nonsoluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Solid Waste Recycle: Includes materials designated under RCRA as nonhazardous waste such as paper, plastics, aluminum, glass, and wood. The percentage recycled is calculated by dividing the quantity of materials within this category that are sent to beneficial recycle by the total volume of solid waste shipped offsite.

Sulfur Dioxide (SO_2): SO_2 gases are formed when fuel containing sulfur (mainly coal and oil) is burned and can be formed during metal smelting and other industrial processes. SO_2 is associated with acidification of lakes and streams, accelerated corrosion of buildings and monuments, reduced visibility, and such adverse health effects as inhibition of breathing, respiratory illness, and aggravation of existing cardiovascular disease.

Toxic Release Inventory (TRI): Database of toxic releases in the United States compiled from Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III Section 313 reports.

Volatile Organic Compounds (VOCs): Any organic compound that easily evaporates and participates in atmospheric photochemical reactions, except those designated by EPA as having negligible photochemical reactivity.

Wastewater: Spent or used water from a home, community, family, or industry that contains dissolved or suspended matter.