

Pollution Prevention Report

A.R.S. §49-966

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Pollution Prevention Report

A.R.S. §49-966

The Pollution Prevention Program is proactive in its unique approach to environmental protection. Rather than using a “control by permitting and enforcement approach,” pollution prevention allows industry and government to work together to find ways to use fewer or smaller quantities of toxic chemicals, save money, and protect public health and the environment. The Pollution Prevention Program’s mission is to protect public health and the environment by eliminating or reducing the use of toxic substances and the generation of hazardous waste. While this program is administratively located in the Waste Programs Division, it is a multimedia program, that addresses hazardous substance releases to air and water in addition to hazardous waste generation.

The Pollution Prevention Program’s multimedia approach helps Arizona’s large hazardous waste generators and toxic substance users to reduce hazardous waste, toxic substance use and pollutant releases. The program helps the state meet its federal hazardous waste management capacity assurance requirements by directly reducing hazardous waste. Also, the program helps Arizona meet the statewide waste minimization goal mandated by A.R.S. § 49-963.A.

Pollution prevention (P2) is an innovative environmental management practice within the department. By successfully creating new methods for reducing toxic chemical use and reducing hazardous waste before it is generated, pollution prevention methods are frequently proving to be the best environmental management options available. Using P2 to improve production processes can be quite affordable, save money and provide a rapid return on investment. In contrast, pollution control solutions always remain an operating cost, provide no investment return and imposes liabilities.

In summary, the purpose of the department’s Pollution Prevention Program is to promote and encourage this visionary and innovative management strategy through a variety of goals, objectives, initiatives and strategies to enhance

The program certifies acceptable comprehensive pollution prevention plans and annual reports from regulated facilities and maintains information on toxic use, pollutant releases, hazardous waste generation, pollution prevention plans, goals and methods. The department works directly with businesses to develop and pursue methods to:

- , eliminate chemicals
- , substitute with less hazardous substances
- , change or improve manufacturing processes
- , increase recycling
- , improve control of chemical inventory or purchasing and prevent spills and leaks before they occur

acceptance of the P2 process by regulated facilities.

The Pollution Prevention Program has these objectives:

- , To promote the visionary paradigm of achieving environmental compliance through pollution prevention.
- , To foster the development of strategic partnerships, innovative programs, outreach and technical assistance to convey information to pollution prevention practitioners.
- , To promote the social and economic advantages of pollution prevention as a good management practice for all sectors of business, including public and private manufacturing and service industries.
- , To support the elimination of barriers to pollution prevention in environmental legislation and regulations.
- , To promote the integration of pollution prevention concepts into educational programs, forums, environmental stewardship meetings and regulatory programs.

To meet these objectives the department must ensure that facilities can perform facility assessments, implement pollution prevention and benefit from resultant cost savings. In this context, the department has implemented these multifaceted initiatives:

- , Promoting strategies to minimize the quantity of toxic substances used or hazardous waste generated. This includes on-site pollution prevention assistance to industry and government and technical information sharing with the regulated facilities.
- , Initiating partnerships to encourage pollution prevention.
- , Conducting pollution prevention training.
- , Creating and distributing pollution prevention guides, videos, booklets and brochures.
- , Providing incentives for facilities with pollution prevention plans (50 percent fee discount for hazardous waste shipped off-site or disposed)
- , Focusing on multimedia environmental issues (e.g., P2 in building construction, boating and marina P2 on the Verde and Colorado watersheds, and P2 along the Arizona-Mexico border)
- , Competing for EPA's pollution prevention grants to increase pollution prevention success.

To implement the pollution prevention initiatives the Pollution Prevention Program encourages businesses to use following P2 strategies:

- , Process or equipment modifications
- , Production planning and sequencing
- , Raw material substitution or elimination
- , Loss, spill and leak prevention and housekeeping
- , Waste segregation and separation

- , Closed-loop and other recycling
 - , Training of environmental managers and their staff members
- Arizona's successful Pollution Prevention Program continues to reduce the exposure of industry workers, the public and the environment to health and safety hazards by facilitating the reduction of 180 million pounds of hazardous waste since 1991. In addition, the implementation of pollution prevention has:
- , Created a positive problem solving atmosphere for participating stakeholders
 - , Saved Arizona businesses thousands of dollars
 - , Reduced the regulatory burden for agencies and businesses who have achieved and implemented P2
 - , Improved the environment

As shown in Figure 1, pollution prevention can be compared to other concepts of environmental management. The figure shows that the higher up the hierarchy of environmental management, the better the result in achieving sustainable development. Practices higher up also include the practices below it but add additional elements of scope and complexity. Although P2 and cleaner production (CP) are very similar, they are separated here because CP includes a focus on product design and life cycle rather than just the manufacturing process. Figure 1 also shows that P2 represents a major milestone to achieve a sustainable economy.

Within the context of sustainable development, it is relevant to see the Arizona trends in hazardous waste generation and chemical releases. The trends can be used to indicate the direction P2 implementation is heading.

Arizona Trends in Hazardous Waste Generation and Chemical Releases

The EPA's Toxic Release Inventory (TRI) reports and department data from pollution prevention plans were used to identify trends in pollution prevention. Because the TRI program has been adding more facilities and chemicals to the program, it is now more difficult to use them as a comparative measurement tool. The reports are useful because they still contain information that shows decreases in air releases for Arizona.

Additional data reported on Arizona's pollution prevention plan annual reports show a decrease in hazardous waste generation.

The data provide positive indications of reductions in toxic chemicals released to air, especially considering the industrial growth since 1991. As Arizona's industry base grows, new facilities and increased production from existing facilities will continue to challenge the environment and increase the quantities of new chemicals used. To sustain these gains, the department must continue to educate new industries in pollution prevention and sustainable techniques.

The TRI reports also show the states that receive Arizona TRI wastes, show the TRI wastes that Arizona sent to other states and show facility on-site air releases.

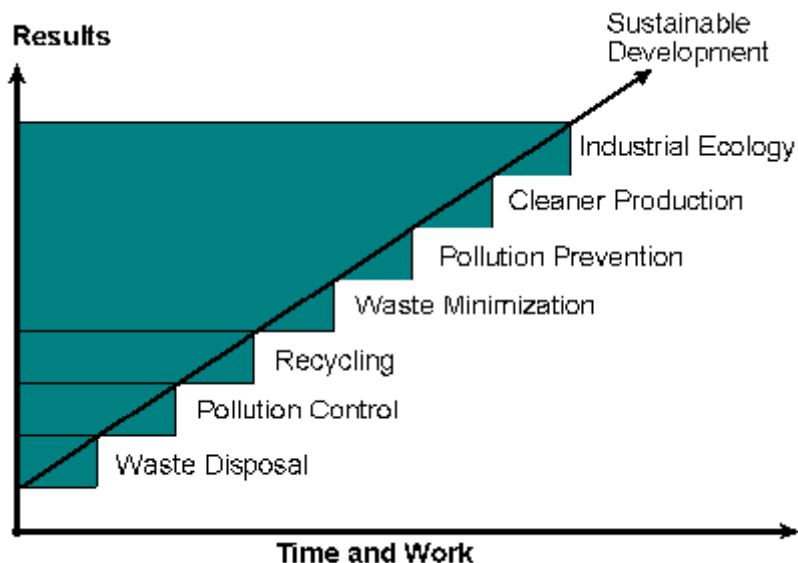


Figure 1. Concepts in Industrial Environmental Management

(Adopted from W. Burton Hamner, MBA, MMA Adjunct Professor, Operations and Environmental Management, Asian Institute of Management)

Pollution Prevention

Because an ounce of prevention is worth a pound of cure, pollution prevention works. Existing pollution control approaches, such as treatment and permits, assume that safe standards can be set with confidence. However, with new knowledge often comes the identification of health risks that were previously not factored into the development of an environmental standard. Pollution prevention methods simply assume that “less is better.” At first glance, generating hazardous waste in some service and industrial operations may appear unavoidable, but with P2 focus, interventions often prove to be technically and economically discoverable and feasible. The following sections describe the activities of the Pollution Prevention Program to encourage P2, the status of the toxic data reports and other information pertinent to pollution prevention in Arizona.

Pollution prevention is a long term program that requires educating industry about this innovative concept and sharing information between companies and between the department and industry. Pollution prevention education is provided through workshops, seminars, partnership formation, hosting site visits, classroom training and telephone help.

Activities to Encourage Pollution Prevention

Workshops and Conferences

The department recognizes that information sharing about pollution prevention accomplishments will promote greater success in carrying out pollution prevention. To produce such success, the department encourages, develops and participates in pollution prevention workshops and conferences. Many environmental and business professionals attended the pollution prevention workshops and conferences listed in Table 1.

Event/Audience	Topic(s)/Activities	Location	Date
Western Regional Pollution Prevention Network Roundtable	, Clean boating , Integrated pest management for whitefly control – presentation of results of a P2 study funded by an EPA Pollution Prevention for States Grant and conducted by University of Arizona staff on how cotton farmers can reduce pesticide use and save money (\$9.5 million was saved, an average of \$28,484 per adopting grower) , Green building, clean boating and clean marinas display booth	San Diego, Calif.	10/01
National P2 Roundtable	Presentation entitled <i>Measuring a State Pollution Prevention Program, an Arizona Case Study</i>	Chicago, Ill.	01/20/01
National Park Service	Two-day pollution prevention workshop	Grand Canyon	02/01
Intertribal Council	P2 automotive repair workshop	Phoenix	03/01
	Fleet vehicle pollution prevention workshop	Tucson	03/01
Yuma Auto Service Association	Pollution prevention workshop	Yuma	03/01
Agricultural Regional Conference	The University of Arizona's Pesticide Information and Training Office presented results and methods used in a P2 study funded by an EPA Pollution Prevention for States Grant on how farmers can reduce pesticide use and save money	Berkeley, Calif.	03/01

Speakers Bureau

The department encourages pollution prevention efforts and provides pollution prevention training to industry by speaking at environmental events, and displaying information regarding pollution prevention, waste minimization and environmental leadership including:

Table 2. Speakers Bureau Activities			
Event/Audience	Topic(s)/Activities	Location	Date
Town of Maricopa	Benefits of Arizona's Pesticide Reporting Form 1080 (presented by the University of Arizona's Pesticide Information Training Office as part of activities for an EPA Pollution Prevention for States Grant for integrated pest management studies)	Maricopa	07/00
Rocky Mountain Fleet Management Association	Fleet vehicle pollution prevention techniques	Flagstaff	09/00
Lower Verde River/Lower Salt River	Integrating P2 into watershed stewardship	Mesa	09/00
Colorado River Sewerage and Septic Coalition (CRISSCO)	High performance building and auto/fleet repair	Lake Havasu City	09/00
Cotton Field Day (for Arizona farmers)	Integrated pest management (presented by the University of Arizona's Pesticide Information Training Office as part of activities for an EPA Pollution Prevention for States Grant)	Maricopa	10/00
	Exhibited data on a display board in a booth (presented by the University of Arizona's Pesticide Information Training Office as part of activities for an EPA Pollution Prevention for States Grant)	Safford	09/00
U.S. Coast Guard	Pollution prevention workshop	Tempe	10/00
City of Scottsdale's Green Building Conference	High Performance buildings display and information booth	Scottsdale	11/00
Arizona State University Hazardous Waste Education Seminar	Presentation	Mesa	11/00

Table 2. Speakers Bureau Activities			
Event/Audience	Topic(s)/Activities	Location	Date
Arizona Game and Fish Department	P2 presentation	Phoenix	11/00
Governor's Pride in Arizona annual environmental awards	Conference and technical information booth	Phoenix	11/00
Lake Powell Technical Advisory Committee meeting	Presentation clean boating video	Lake Powell	12/00
U.S. Coast Guard Auxiliary annual meeting	Clean boating and environmental safety data slide show enhanced by P2 staff		01/01
Arizona Department of Corrections fleet staff	Pollution prevention fleet workshop	Phoenix	02/01
Arizona State University Hazardous Waste Regulations Seminar	P2 presentation	Mesa	04/01

P2 Plan Development Training for Industry

To conduct successful pollution prevention analyses, businesses need P2 training. Department staff provides free classroom training upon request and sponsors many different types of other training seminars. During FY 01, P2 training included pollution prevention plan training and assistance for industry (Phoenix, December 1999) and pollution prevention plan amendment training for industry (Phoenix, February 2000).

On-Site Regulatory Assistance Visits

Businesses are sometimes unable to attend department training or seminars off-site, or do not submit a plan as required. These businesses need on-site help to conduct required pollution prevention analysis. On-site visits allow ADEQ to help businesses do P2 analyses and provide more information about regulatory requirements. An on-site visit is also an opportunity for the department to share P2 information, help the business learn P2 by participating in the analysis, and provide P2 training. The department wants to increase the use of on-site visits when the opportunity is available. The on-site visits offer opportunities to help companies meet compliance requirements or resolve compliance problems. Staff conducted 27 on-site regulatory visits during FY 2001.

Table 3. On-Site Regulatory Assistance Visits			
Business	Purpose/Topic	Location	Date
Tucson Medical Center	Site visit	Tucson	07/01
Courier Graphics (printing company)	Site visit	Phoenix	07/00
Tucson Medical Center	Voluntary mercury red.	Tucson	08/00
Thermal Engineering		Tucson	08/00
Allied Tube		Phoenix	08/00
Chaparral Water		Fountain Hills	08/00
United Dairymen		Tempe	09/01/00
Allied Tube		Phoenix	09/00
United Dairymen		Tempe	09/15/00
L & M laminates	Site visit	Phoenix	09/00
Tucson Roll-Off (construction debris recycling)		Tucson	09/00
Arizona Department of Transportation	Automotive P2	Kingman	10/00
Kingman Regional Hospital	Voluntary mercury reduction	Kingman	10/00
Wickenburg Hospital	Mercury reduction assistance	Wickenburg	10/00
United Dairymen	Site visit	Tempe	12/00
Adobe Air Site		Tempe	12/00
Oberg		Phoenix	01/01
Boswell Hospital	Mercury reduction	Sun City	01/01
Schreiber Foods		Tempe	01/01
Heraeas		Phoenix	01/01
Professional Chemicals Corp		Prescott	02/01
U.S. Air National Guard		Tucson	03/01
WalMart regional warehouse and truck fleet maintenance operations		Buckeye	04/01
Chandler Hospital	Mercury reduction	Chandler	05/01
ProChem		Chandler	04/01
Fiber Fab Inc.		Gilbert	05/01

Off-Site Regulatory Assistance Meetings

To ensure that businesses understand P2 reporting requirements, the staff is available to answer one-to-one questions and provide information in meetings at the department's offices or by telephone. The off-site meetings held at the department are listed in Table 4.

Business	Location	Date
Ultra Installations	Phoenix	02/01
Arizona Portland Cement	Phoenix	02/01
Larson Company	Phoenix	02/01
Chem Research	Phoenix	03/01

Pollution Prevention Promotion

Another aspect of the program is to introduce and promote pollution prevention concepts to other agencies and businesses. Staff continues efforts to focus on special P2 programs for boats and marinas, rivers and lakes, automotive and fleet repair, green high performance homes and buildings (energy efficient and materials wise), mines, and watershed stewardship groups.

These efforts will continue well into the future. Since 2000, ADEQ staff have organized or participated in more than 90 meetings other related environmental issues. The meetings are listed in Table 5.

Business/Agency	Purpose/Topic	Location
<i>July 2000</i>		
Arizona Department of Transportation Technical Advisory Committee		Phoenix
Maricopa County Small Business Assistance Program	Pollution prevention consultation	Phoenix
Arizona Clean & Beautiful		Phoenix
Arizona State University Industrial Assessment Group		Phoenix
U.S. Army – Yuma Proving Ground	P2 meeting	Yuma

Table 5. Pollution Prevention Promotion		
Business/Agency	Purpose/Topic	Location
Green building workshop	Building for energy performance and indoor air quality	Scottsdale
August 2000		
Luke Air Force Base	P2 presentation	Yuma
Arizona Clean & Beautiful		Phoenix
Environmental Professionals of Arizona	Meeting with board members	Phoenix
None	Meeting on green building, deconstruction and demolition	Scottsdale
Arizona Industry Strategic Alliance Partnership	Event planning meeting	Phoenix
Verde Watershed Association	Education and outreach committee meeting	Cottonwood
Verde Watershed Association	General meeting	Clarkdale
State Watershed Alliance	meeting	Phoenix
National Park Service	P2 meeting	Page
Colorado River Sewerage and Septic Coalition (CRISSCO)	Meeting	Lake Havasu City
September 2000		
America West Airlines	Meeting	Phoenix
None	Pollution prevention in building construction (green building) meeting	Phoenix
Governor's Pride	preparation meeting for pollution prevention recognition	Phoenix
Green Building pollution prevention	Program committee meeting	Scottsdale
Arizona Industry's Strategic Alliance partnership	Event planning meeting	Phoenix
Pollution prevention industry partnership	Aerospace team meeting at America West Airlines	Tempe
Environmental Professionals of Arizona	Board Meeting	Mesa

Table 5. Pollution Prevention Promotion		
Business/Agency	Purpose/Topic	Location
Verde Watershed Association	Meeting	Camp Verde
Hot Topics, Cool Solutions Conference	Planning meeting	Tucson
CIVANO (planned residential community using sustainable development)	Visit	Tucson
U.S. Department of Defense	Military P2 partnership planning meeting	Phoenix
Arizona Department of Commerce	Meeting on the state waste minimization goal	Phoenix
October 2000		
City of Phoenix	Planning meeting	Phoenix
Northwest Watershed Advisory Group	Ad hoc meeting	Kingman
Northwest Watershed Wildcat Dumping Project	Meeting	Dolan Springs
Integrated Pest Management	Pollution prevention for Arizona agriculture	Maricopa
City of Phoenix	Consultation on pollution prevention in materials purchasing	Phoenix
Verde Watershed	Meeting	Cottonwood
Western Regional Pollution Prevention Network Roundtable	Presentation of the Arizona Game and Fish Department and ADEQ's video – "Clean Boating" – and green building and clean marina display	San Diego, Calif.
Regulatory Roundup Workshop	P2	Scottsdale
November 2000		
Environmental Professionals of Arizona	Board of directors meeting	Phoenix
U.S. Department of Defense	Regional environmental coordinators' meeting	
Mining Team	Pollution prevention partnership meeting	
December 2000		
National Park Service	Meeting	Lake Powell

Table 5. Pollution Prevention Promotion		
Business/Agency	Purpose/Topic	Location
U.S. Coast Guard Auxiliary	Meeting with liaison	Lake Havasu City
City of Kingman	Pollution prevention wildcat (waste) dumping event	Kingman
Arizona Game and Fish Department	Pollution prevention consultation meeting	Phoenix
January 2001		
None	Green building meeting	Scottsdale
Arizona Department of Commerce	Consultation with the to discuss state goals	Phoenix
Arizona Clean & Beautiful	Meeting	Phoenix
City of Tucson	Meeting	Tucson
City of Yuma	Consultation	Yuma
Rocky Mountain Fleet Managers Association	Consultation	Yuma
University of Arizona Agricultural and Biosystems engineering staff	Consultation	Yuma
February 2001		
Maricopa County	Environmental management system workshop	Phoenix
Governors Pride	Environmental pollution prevention conference	Phoenix
CIVANO (sustainable residential construction)	Site visit	Tucson
March 2001		
Environmental Professionals of Arizona	Board of directors meeting	Phoenix
BHP Copper	Pollution prevention partnership mining team meeting	San Manuel
Environmental Professionals of Arizona	Meeting	Mesa
U.S. Department of Defense	Pollution prevention partnership meeting with state military bases	Phoenix

Table 5. Pollution Prevention Promotion		
Business/Agency	Purpose/Topic	Location
April 2001		
None	Pollution prevention for laboratories (“green chemistry”) education workshop	San Diego, Calif.
City of San Diego	Pollution prevention consultation to visit the city of San Diego’s Environmental Services Department Ridgehaven Building	
U.S. Coast Guard MSO	Pollution prevention consultation	San Diego, Calif.
Arizona Association of Industries’ Joint Training Committee	Environmental leadership through mentoring workshop	Phoenix
ADEQ	Green building meeting	Phoenix
Maricopa County Small Business Environmental Assistance Program	Pollution prevention in buildings (“green building”) meeting	Phoenix
City of Scottsdale	Pollution prevention in buildings (“green building”) meeting, distributed information on high performance schools	Scottsdale
Arizona Clean & Beautiful	Prescott event planning	Phoenix
Environmental Professionals of Arizona	Meeting	Tempe
None	Environmental management system training	Glendale
Chandler Regional Hospital	Initial visit to give materials to facilities management about mercury reduction	Chandler
May 2001		
Chandler Regional Hospital	Mercury reduction audit proposal meeting with facilities management	Chandler
City of Phoenix wastewater treatment plant	Metal finishing workshop	Phoenix

Table 5. Pollution Prevention Promotion		
Business/Agency	Purpose/Topic	Location
Arizona Clean & Beautiful	Meeting	Phoenix
University Medical Center	Mercury audit	Phoenix
None	Metal finishing pollution prevention workshop	Phoenix
Plating industry	Environmental management systems workshop	Phoenix
Environmental Professionals of Arizona	Meeting	Mesa
None	Northern Arizona conference held at Lake Valley Elementary School	Prescott
Southern Arizona environmental management system hazardous waste conference	Pollution prevention booth	Tucson
June 2001		
None	Military partnership formation meeting	Phoenix
State of Arizona School Facilities Board	Introduction of P2 and meeting	
City of Yuma	Auto fleet P2 workshop	Yuma
Idaho Department of Environmental Quality	Meeting about P2 for automotive shops and green Schools	Idaho
Arizona State School Facilities Board	High performance schools meeting	Phoenix
None	Green Buildings General Committee meeting	Scottsdale
Tucson Unified School District and others	Green schools promotional meeting	Tucson

Outstanding Work Products

This category includes important reports or videos that the department developed to teach others about pollution prevention.

Training Videos

- , *Clean Boating*. Educational videocassette. Produced by ADEQ and the Arizona Game and Fish Department.
This video began circulating in boating classes and on television and boating shows throughout the state beginning in October 2000.
- , *Wildcat Dumping*. Educational videocassette. Produced by the Arizona Department of Environmental Quality and the Northwest Arizona Watershed Group under a Water Quality Improvement Grant. February 2001.

Published or Presented Papers

- , University of Arizona Pesticide and Information Training Office. "Using Integrated Pest Management to Thwart Resistance to Insect Growth Regulators and Other Insecticides in Arizona Cotton." October 2000.
This field study proved pollution prevention saved participating farmers \$9.5 million, an average of \$28,484 per adopting grower, by using growth regulators instead of pesticides.
- , Soesilo, J. Andy, Eberhardt, Sandra and Quinn, William. "Measuring A State Pollution Prevention Program: An Arizona Case Study." Presented at the U.S. National Pollution Prevention Roundtable in Chicago, Illinois on Jan. 20, 2001.
- , Frisvold, G., Agnew, Ken and Baker, Paul. "Public-Private Research Collaboration in Pest Control." Presented in Berkeley, Calif. in March 2001.
Developed from data generated through Pollution Prevention in States passthrough grant to the University of Arizona.
- , EPA Grant Report. "Persistent Bioaccumulative and Toxic (PBT) Chemicals." June 2001.

Unpublished Papers

- , ADEQ, Pollution Prevention Unit staff. "Aviation Gasoline Sampling – Dilemmas and Solutions."
- , ADEQ, Pollution Prevention Unit staff. "Biodiesel."
A compendium of articles on biodiesel fuels.
- , ADEQ, Pollution Prevention Unit staff. "Engine Two Stroke Engine Analysis."
A compendium of previous articles that was distributed to other agencies and stakeholders.

Booklets and Brochures

- , “Searching for Mercury at Your Medical Facility.” June 2001.
A pollution prevention assistance guide to locate mercury sources at medical facilities.
- , “Medical Facilities – Ideas for Pollution Prevention.” May 2001.

Pollution Prevention Partnership (P3)

The department began formulating a new partnership with Arizona’s military stations to improve communications and cooperation, share technical P2 successes between the posts and to reduce hazardous wastes generation and toxic chemical use. Several joint meetings between representatives of the posts, ADEQ and the Department of Defense Regional Environmental Coordinators were held to discuss the benefits of a formal military partnership and to discuss which facilities and representatives would participate. A formal partnership charter is being developed and will be reviewed in August 2001.

The mining team partnership completed development of a mining P2 Web site. The mission of this Web site is to promote pollution prevention in the Arizona mining industry through networking, mutual assistance, and information exchange. This Web site is supported by ADEQ through a Pollution Prevention Incentives for States Grant from EPA. The Arizona mining Web site is working. New information will be added as needed. The Web site is located at www.azp2mining.org.

Arizona Pollution Prevention Practice Recognition

Arizona Clean & Beautiful, a nonprofit volunteer-driven organization, includes pollution prevention practice recognition in their annual *Governor’s Pride in Arizona Awards* program and requests technical assistance from the Pollution Prevention Program. This recognition of industry is not based on any level of regulatory compliance but instead recognizes individual outstanding pollution prevention projects. Arizona Clean & Beautiful’s program included awards in the categories of pollution prevention, criminal justice, environmental leadership, water conservation, community achievement, environmental education, recycling, environmental technology, transportation enhancement, and distinguished community leadership. The November 17, 2000 recognitions were presented by Ms. Betsy Bayless, Arizona Secretary of State. A brief description of the pollution prevention award winners provides an idea of the importance of pollution prevention in these businesses:

ARCH Chemicals, Inc processes and supplies ultra-high-purity chemicals for the semiconductor and silicon wafer industries. Two of the primary ingredients are ammonia and hydrofluoric acid, and these, or formulations involving them,

account for millions of pounds processed by ARCH Chemicals every year. As a result of pollution prevention, the company now collects residuals in returnable containers for reuse or sale to secondary markets; processes have reduced flushes and draining by improved planning; scheduling “like” products in the same blend tanks to reduce rinsing, and other water-saving steps. The result saved the company millions of dollars in capital and annual costs, retained quality levels, reduced ammonia wastewater discharges by an average of 93 percent and reduced fluoride discharge levels by 86 percent.

Courier Graphics Corporation provides lithographic web printing, sheet fed printing, and binding operations. The processes generate volatile organic compounds (VOCs), ink and solvent waste streams. The company’s main environmental concern is VOC emissions. As a result of this focus, VOCs have been reduced by over 95 percent. While Courier has grown in sales and employees since 1985 by 3 times, total VOC emissions were less in 1999 than in 1980. Courier became the first printer in Arizona to adapt and install catalytic incinerators to reduce air emissions. The two incinerators burn off exhausted solvents and fumes, and have a 95 percent to 98 percent efficiency rating, thus reducing all VOC emissions from web ink by 95 percent to 98 percent, a level that exceeds any regulatory requirement.

Oberg Arizona does metal stamping, precision grinding, plating and plastic injection molding, all of which generate a variety of hazardous wastes. Since 1993, Oberg Arizona has pursued its pollution prevention opportunities under a pollution prevention plan filed with the department. Among the innovations to reduce pollution is a reel-to-reel ultrasonic cleaner for each of two plating lines. At a total cost of \$25,000, this change increased line speed by 25 percent, eliminated two 60 gallon cleaning tanks, and the associated hazardous waste, and reduced plating sludge by 8,640 pounds per year. This unique system is the only one of its type in Arizona. The return on investment will take only one year.

Pollution Prevention Publications

The department publishes P2 documents as another P2 educational opportunity. The following documents were developed or updated in FY 2001.

- , Pollution Prevention Program (brochure)
- , Mining P3 Team (brochure)
- , Aerosol Cans (brochure)
- , AMIGO program brochure (English and Spanish versions)
- , Fiber Reinforced Plastic (brochure)
- , Tank Storage of Volatile Organic Liquids (brochure)
- , How Does My Company Score? (brochure)
- , P2 for the Residential Construction Industry (brochure)
- , P2 Amendment Guidance Manual (booklet)
- , P2 Guidance Manual (booklet)

- , 60 Things You Can Do At Your Workplace To Encourage Pollution Prevention (brochure)
- , 1999 Addendum – Summary of P2 Plans, Goals and Target Chemicals (booklet)
- , Sample P2 Employee Awareness and Training Program (slide presentation)

Toxic Data Reports

The department receives annual copies of reports from each regulated facility required to complete a toxic chemical release inventory (TRI) form as part of the EPA's Community Right-to-Know Program. The TRI forms are summarized by the EPA and published on the internet in a TRI public data release each year. Facilities filing the reports are generating and handling wastes, and/or creating environmental emissions. Reports are due each July 1 for the previous calendar year. The most recent reports are for reporting year 1999.

For 1998 reporting year, EPA expanded the filing requirements so that many new facility types were required to file TRI forms. Therefore, the number of filers and forms increased beginning in 1998. Arizona facilities required to file TRI forms are also required to perform a pollution prevention analysis and submit a pollution prevention plan under Arizona's pollution prevention policy and law.

The number of chemicals being reported on the TRI forms has also been rising due to adding additional chemicals to the reporting list. The number of Arizona manufacturing and non-manufacturing facilities filing TRI reports are shown in Table 6.

<i>Table 6. Total TRI Facilities and TRI Reports Filed by Year</i>									
Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Forms Filed	663	638	624	566	542	583	593	820	822
Facilities	222	218	216	214	202	221	217	252	246

Transfers and Releases of Hazardous Waste from Arizona Facilities

Arizona continues to make strides in managing its own wastes related to those chemicals on EPA's toxics release inventory (TRI) list. However, reported TRI hazardous wastes transferred off-site from Arizona businesses in 1999 increased about 41 percent (13 million pounds). About 59 percent of Arizona generated TRI waste was shipped out of state.

States receiving TRI hazardous waste from Arizona businesses are shown in Table 7. Arizona also received 11.8 million pounds of TRI hazardous waste from other states as shown in Table 8. In Tables 7, 9 and 10, 9 means a decrease from 1998; 8 means an increase.

Table 7. States Receiving Arizona TRI Waste (TRI Section 6)

	Pounds		Pounds
Arizona	18,838,1668	Nebraska	95,9258
California	8,539,8768	North Carolina	89,9898
Texas	6,143,5019	Iowa	79,8818
Kansas	1,640,8318	Tennessee	45,1869
Indiana	1,627,0669	New York	37,3669
Montana	1,605,2339	Pennsylvania	24,8298
Wisconsin	813,9608	Alabama	20,0808
Utah	600,6399	Germany	11,8768
Nevada	530,3798	Georgia	11,4058
Ohio	353,3798	Louisiana	6,6079
Illinois	279,8218	Massachusetts	9558
Virginia	229,9519	South Carolina	6058
New Jersey	203,3318	Michigan	1789
Arkansas	97,1098	1999 Total ¹	46,425,8419

¹ The 1998 total was 33,021,742 pounds

Table 8. States Sending Hazardous Wastes Into Arizona (TRI Section 6)

	Pounds		Pounds
New Mexico	6,450,675	Colorado	27,626
California	3,102,112	Iowa	8,425
Nevada	619,387	Louisiana	7,653
Connecticut	403,393	Kansas	4,900
Minnesota	308,176	Mississippi	970
Arkansas	204,284	Delaware	542
Missouri	228,057	New York	349
Ohio	133,723	Idaho	326
Alabama	112,029	Maryland	250
Indiana	83,040	New Jersey	10
Illinois	71,290	Total into Arizona from all states	11,817,297
Massachusetts	29,620		
Nebraska	20,460		

	Pounds		Pounds
Sahuarita	233,650,0918	Goodyear	209,6618
Claypool	207,121,0008	Chandler	171,3938
Morenci	126,380,5819	Eloy	115,4119
Bagdad	105,521,5558	Benson	86,2208
Kearny	105,230,7868	Casa Grande	69,9549
Green Valley	85,613,3889	Tempe	58,4339
Hayden	46,362,7768	Glendale	20,7308
San Manuel	31,957,2499	Buckeye	17,0008
Marana	5,667,3408	Yuma	15,3389
Miami	3,435,7039	Kingman	11,9738
Page	2,463,7619	Sommerton	10,0308
Springerville	1,704,5788	Gilbert	8,5158
St. Johns	1,553,9819	Prescott Valley	7,2398
Phoenix	1,244,9839	Prescott	6,9169
Joseph City	1,128,3899	Flagstaff	5,0938
Bisbee	830,1769	Scottsdale	2608
Cochise	438,0059	Nogales	1569
Mesa	287,7628	Rillito	239
Tucson	225,5859	Arlington	108
Snowflake	213,9139	Parker	10
		Total for all cities	961,850,9209

	Pounds		Pounds
Styrene	776,5038	Toluene	69,8178
Glycol Ethers	267,9798	Nitric Acid	58,3778
N-Hexane	188,7879	Xylene	57,5008
Methyl Ethyl Ketone	134,1049	N-Butyl Alcohol	53,2729
Methanol	119,9869	Dichloromethane	52,1829
Hydrogen Fluoride	93,8908	Chlorodifluoromethane	51,0008
1,1-Dichloro-1-Fluoroethane	86,5588	Sulfuric Acid (aerosols)	44,0589
Ammonia (aqueous)	71,4609	Top 15 Air Subtotal ²	2,125,4739

² This total compares to 2,686,259 pounds in 1998, which is a 21 percent reduction

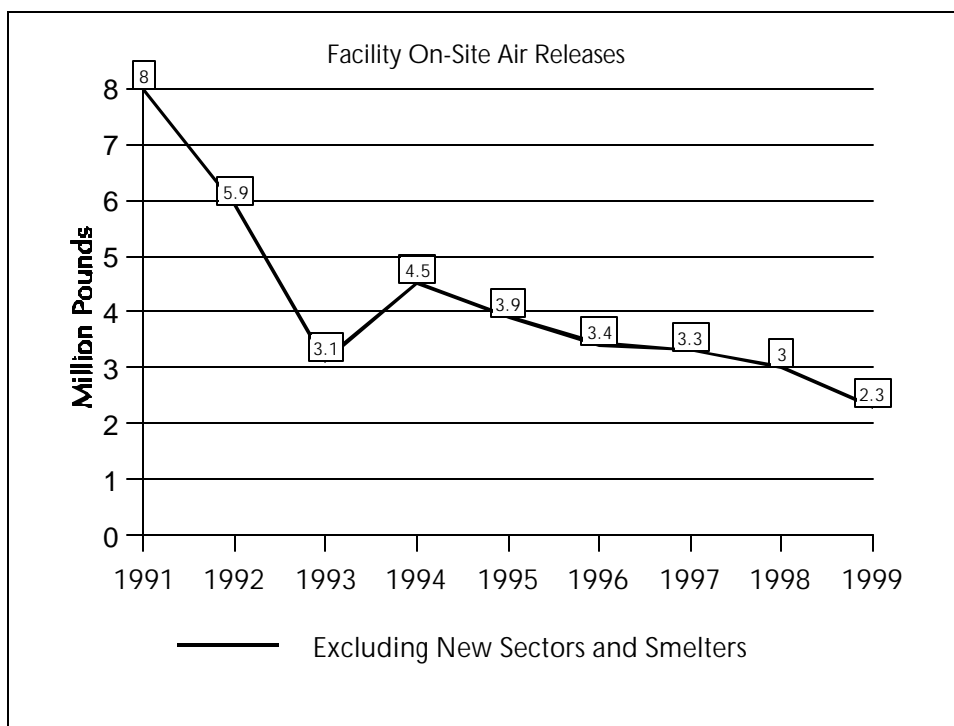


Figure 2: Core Facility On-site Air Releases 1991-1999

On-Site Air Releases

Figure 2 shows the trend in releases of the TRI chemicals. About 39 facilities reported for the first time in 1998 (new facilities) due to EPA reporting revisions. This resulted in an overall increase of releases for all facilities beginning in 1998. This increase was due mostly to new reporting by six electrical generating facilities. The top the facilities generating air releases are the Coronado Generating Station (St. Johns), the Navajo Generating Station (Page), and the Cholla Power Plant (Joseph City). These facilities which reported for the first time in 1998 have been excluded from Figure 2 because they would cause a sudden step in the data for 1998 and obscure any long term trends.

Figure 2 shows that 1999 Arizona TRI air releases continued a downward trend since 1991. The new facilities excluded from this data were discussed in the previous paragraph and are facilities in the industry codes that were first required to report in 1998. The facilities under the category of “excluding new facilities and smelters” are those reporting facilities typically found in Arizona’s metropolitan areas and are part of ADEQ’s Pollution Prevention Program. These facilities are the typical manufacturing facilities in standard industrial codes (SIC) 20-39.

Facilities Reporting and Filing Pollution Prevention Plans

<i>Table 11. Pollution Prevention Plans</i>		
	Before 7/1/2000	7/1/2000 to 6/30/2001
Plans Received	359	22
Certificates Issued	327	20
Amendments Received	446	84
Progress Reports	1055	242

As of June 30, 2001, ADEQ had received 381 pollution prevention plans. The department approved 91 percent of the 381 plans. New plans received during this reporting period are listed in Table 12.

<i>Table 12. Plans submitted between July 1 and December 31, 2000</i>	
ARCO Products – Phoenix Terminal	Motorola RFI Operation
Arizona Air Force National Guard, Phoenix	Opto Power Corporation
BOC Edwards Kachina	Palm Harbor Homes – Casa Grande
Great Western International	Polyone Corporation
ITI Finishing	Prochem – Prescott

<i>Table 13. Plans submitted between January 1 and June 30, 2001</i>	
Arizona Air Force National Guard, Tucson	Hartson Kennedy Cabinet Top Company
Arizona Pacific Spas	Phelps Dodge Mining, Morenci
Aspen Furniture, LLC – Clarendon	Pro Petroleum
Casa Grande Regional Medical Center	Proclean of Arizona, Inc.
City of Scottsdale	Schuff Steel Company
Desert Valley Care Center	
Earl's Fiberglass, Inc.	

Synopsis of Annual Progress

The department publishes annual addendums to our document titled “Summary of Arizona Pollution Prevention Plans: Goals, Methods and Target Chemicals.” This addendum is a compilation of the annual progress report goals and reduction methods received in the year.

In 1994 the department joined with external stakeholders and established a state waste minimization goal to reduce hazardous waste generation by 25 percent by 2000, using 1992 as the base year. The data are calculated from waste generation reductions that is referenced to the economy, using a combined index of gross state product for manufacturing, mining and utilities in terms of tons per dollar of production. Because of a two year lag in the gross state product calculation the latest data available for 1998 and shows a 47.54 percent reduction. By continuing to work with industry will help maintain and improve upon this goal.

The department collects data derived from pollution prevention plans and annual progress reports submitted by facilities. Each plan covers a time frame, typically a two-year period, to complete specified pollution prevention goals. After the two years, additional goals are proposed in plan amendments. Table 13 shows quantity reductions of wastes, materials and resources from 1991 through 2000.

<i>Table 13. Reduction of Wastes, Materials and Resources, Ranked by Quantity Reduced</i>				
No.	Waste, Material, Resources	Baseline Quantity	Quantity Reduced	Reduction from Total
1	Wastewater	6,230,722,699 lbs	2,030,951,791 lbs	69.1462 %
2	Water	3,328,813,976 lbs	690,924,296 lbs	23.5233 %
3	Hazardous Materials and Wastes	133,335,043 lbs	103,455,270 lbs	3.5222 %
4	Corrosive Materials and Wastes	333,727,216 lbs	58,009,384 lbs	1.9750 %
5	Solid Materials and Wastes	96,731,092 lbs	27,044,292 lbs	0.9207 %
6	Ignitable Materials and Wastes	37,069,559 lbs	17,171,106 lbs	0.5846 %
7	Toxic Materials and Wastes	20,229,102 lbs	6,961,208 lbs	0.2370 %
8	Oils and Used Oils	3,163,842 lbs	2,302,818 lbs	0.0784 %
9	Reactive Materials and Wastes	474,883 lbs	187,343 lbs	0.0063 %
10	PCB	179,564 lbs	133,633 lbs	0.0045 %
11	Antifreeze	58,651 lbs	40,829 lbs	0.0013 %
	Total	10,184,505,627 lbs	2,937,181,959 lbs	100.000 %
	Note: Energy	37,418,538 kwh	3,092,122 kwh	

Table 13 shows that during 1991 through 2000, a total of 2.93 billion of pounds of wastes and resources have been reduced by the 217 facilities. The reduction in water usage was 690 million pounds which represents 24 percent of the total reduction, and the reduction in wastewater was 2.03 billion pounds which represents 69 percent of the total. The remaining 7 percent (or 215 million pounds) represents the quantity of wastes and materials reduced.

Table 14 shows that the utilization of 3.1 million kwh of electricity has been prevented. The rate of energy use reduction is 8.3 percent (baseline quantity of 37 million kwh).

Among various categories of wastes and materials, unspecified hazardous materials and wastes (Item 1 in Table 14) represents the group with the highest reduction rate, i.e., 77.59 percent. This is shown in Table 14. Hazardous materials and wastes (unspecified) include, for example, laboratory packs or mixtures of chemicals with different hazard characteristics (i.e., ignitability, reactivity, corrosivity, toxicity).

The next categories ranked high in the table are PCBs (74.41 percent), oils and used oil (72.78 percent), and antifreeze (69.61 percent). The group of ignitable materials and wastes achieves 46.32 percent reduction rate, followed by reactivities (39.45 percent), toxics (34.41 percent), wastewater (32.59 percent), solid waste (27.95 percent) and corrosives (17.38 percent).

No.	Waste, Material, Resources	Baseline Quantity	Quantity Reduced	Reduction from Total
1	Hazardous Materials and Wastes	133,335,043 lbs	103,455,270 lbs	77.5904
2	PCB	179,564 lbs	133,622 lbs	74.4146
3	Oils and Used Oils	3,163,842 lbs	2,302,818 lbs	72.7854
4	Antifreeze	58,651 lbs	40,829 lbs	69.6134
5	Ignitable Materials and Wastes	37,069,559 lbs	17,171,106 lbs	46.3213
6	Reactive Materials and Wastes	474,883 lbs	187,343 lbs	39.4503
7	Toxic Materials and Wastes	20,229,102 lbs	6,961,208 lbs	34.4118
8	Wastewater	6,230,722,699 lbs	2,030,951,791 lbs	32.5957

Table 14 – Reduction of Wastes, Materials and Resources Ranked by Percent of Reduction From the Baseline				
No.	Waste, Material, Resources	Baseline Quantity	Quantity Reduced	Reduction from Total
9	Solid Materials and Wastes	96,731,092 lbs	27,044,292 lbs	27.9582
10	Water	3,328,813,976 lbs	690,924,296 lbs	20.7558
11	Corrosive Materials and Wastes	333,727,216 lbs	58,009,384 lbs	17.3822
12	Energy	37,418,538 kwh	3,092,122 kwh	8.2636

Facilities with Inadequate Plans or Reports

Toxic data reports are due on July 1 of each year. A toxic data report includes the pollution prevention plan amendment and the annual progress report which are due on July 1, 2001. A plan amendment is required when the time frame of the plan expires. These reports are inadequate when not submitted by the required date. The following lists those facilities that submitted their toxic data reports at least 90 days late or have not submitted any reports.

Table 15. Reports Submitted at Least 90 Days Late	
Abitibi Consolidated Sales Corporation	L and M Laminates and Marble Litton
Abobear, Inc.	Electro-Optical Systems
City of Goodyear	Schuff Steel Company
Columbus Chemical Industries	Sonora Quest Laboratories
Cutler-Hammer	The Pepsi Bottling Group
Desert Sun Fiberglass	U.S.A.F. – Luke
Dole Fresh Vegetables	United Dairymen of Arizona
Honeywell International (Tucson)	University Medical Center
ISOLA Laminate Systems	

Table 16. Reports Not Submitted	
Metco Metal Finishing	V.A.W. of America
Patterson Labs West	Fiber Fab, Inc

Recommendations for Form R Filers That Do Not Generate Hazardous Waste

The following typical Arizona facilities file a TRI form but do not file a hazardous

waste generator report:

AACCO Cast Products	Fiber Fab. Inc.
Advanced Construction Products	GreenStone Industries
Air Products/Chemicals	Ironite Products Co.
Allied Precious Metals	Insulated Shipping
Allied Tool and Die	LandM Laminates and Marble
American Fiberglass	Marlam Industries, Inc.
American National Can	Maxx Spas, Inc.
Arizona Castings, Inc.	Mesa Fully Formed
Arizona Marble	Monsey Products Co.
Badger Meter, Inc.	Patterson Laboratories
Baja Products, Ltd.	PAX Company
Borden Pasta Group	Patrician Marble
Casa Grande Enterprise	Royal Sterilization
Creamette Co.	Sunland Beef Company
Desert Sun Fiberglass	Thermal Engineering
Distinctive Marble	Ultra Installations
DQC Manufacturing	Valley Marble
Earl's Fiberglass, Inc.	

Pollution prevention is multimedia, so even when there may be no hazardous waste reduction opportunities, there may be reduction opportunities in air emissions or wastewater.

A few of these facilities requested a pollution prevention plan exemption because they do not generate hazardous waste and therefore believe they have nothing to reduce, for example, ammonia used in closed loop chillers (such as dairy and meat processors), machining chromium-laden stainless steel, extruding copper rods into wire, and using styrene in cultured marble manufacturing.

Only a pollution prevention opportunity analysis, as required by the statute, can determine whether opportunities exist. Facilities that are unable currently to reduce toxic chemical use are still certified in the program once they do an analysis, even if no opportunities exist. These facilities are provided "no opportunities" status with the realization that this status may change with new technology or when new processes are added.

Several facilities that completed analyses found pollution prevention opportunities when none were thought to exist. The department believes that requiring these facilities to do the analysis, rather than giving an exemption, is fair treatment and is in the best interest of the public. The department recommends no change in the requirements.

Statutory and Regulatory Recommendations

Pollution prevention implementation has shown opportunities for achieving significant reductions in toxic chemical use, hazardous waste generation, wastewater, process water and energy conservation while reaping significant financial rewards to businesses. The department has recognized that the lack of knowledge of technical pollution prevention information continues to be an impediment to accelerating P2 at many smaller companies. As a result, technical assistance to industry to identify P2 opportunities has continued as much as possible within staff and budget limits. Besides regulatory assistance efforts, having an Arizona statute that requires pollution prevention planning and reporting has helped to advance the implementation of pollution prevention in industry.

Concurrently, there continues to be a dominance of technology-based, end-of-pipe regulations that continue to drive business decisions toward single-medium, pollution control compliance.

Future challenges exist to help facilities structure multimedia and regulatory reinvention efforts that have P2 as their fundamental design component. Also, challenges exist to expand our pollution prevention assistance program to help new filers to submit pollution prevention plans that can be approved the first time.