

**CITY OF PHOENIX  
INDUSTRIAL PRETREATMENT  
COMPLIANCE ACADEMY**



**Pollution Prevention (P2)**

**City of Phoenix  
Water Services Department  
Industrial Pretreatment Section**

**Welcome to the  
September 25, 2024  
Pollution Prevention  
Compliance Academy!**



The P2 class is the fifth of the six Compliance Academy classes held each year.

## Meet the Team

- Your Instructors:
  - Daniel Bojorquez II, Water Quality Inspector (WQI)
  - Ayodele Agunbiade, Water Quality Inspector (WQI)
- The IPP Section:

Chelsey Mc Cluskey, Pretreatment Compliance Coordinator

Milton Sanchez, Environmental Services Supervisor

Kyle Smith, Environmental Quality Specialist

Christie O'Day, Water Services Projects Planner

Daniel Bojorquez II, WQI

Gita Kothari, SWQI

Ayodele Agunbiade, WQI

Richmond Lauvai, SWQI

Daniel Snyder, SWQI

Jesse Flores, Principal Engineering Technician

- Tip: For most City of Phoenix employees their email address is simply their first and last names separated by a period with @phoenix.gov appended to the end of the last name.
- Email Address = FirstName.LastName@phoenix.gov
- EXAMPLE: Milton Sanchez: milton.sanchez@phoenix.gov

## Flyer & Social Media



Register today: [phoenix.gov/water](http://phoenix.gov/water)



### ENSURE YOUR BUSINESS COMPLIES

#### WASTEWATER DISCHARGE LAWS

Attend the 2024 Pretreatment Compliance Academy to learn how to maintain compliance with the requirements of the Industrial Pretreatment Program.

- Phoenix has nearly 170 permitted Industrial Facilities that have Wastewater Discharge permits.
- Since 2000, hundreds of participants have graduated from the City of Phoenix Industrial Pretreatment Compliance Academy.

#### WHAT IS PRETREATMENT AND WHY IS IT IMPORTANT?

Pretreatment means the treatment of wastewater by commercial and industrial facilities to remove harmful pollutants before being discharged to a sewer system under the control of a publicly owned treatment works (POTW), like Phoenix Water Dept.

Most POTWs are designed to treat sanitary (domestic) wastes from households, but not to treat toxic pollutants from industrial or commercial facilities.



Industrial or Single Chemical Discharge and/or Stormwater Discharge

History to Release from the Industrial Facility

Collection of Collection System and/or Treatment Plant

Biogasoline

Interference with Wastewater Treatment Facility

Pass-Through of Oil and Grease to POTW



Collection of Collection System and/or Treatment Plant

Biogasoline

Interference with Wastewater Treatment Facility

Pass-Through of Oil and Grease to POTW

#### 2024 PRETREATMENT COMPLIANCE ACADEMY

This training program is designed for Phoenix's Class A, B and C Permitted Industrial Users staff. Register ahead of time for the free virtual/in-person classes that typically run 2 hours.

Participants are awarded 2-3 Professional Development Hours (PDHs) at the end of each class and those who complete all six classes will receive a diploma.

Class Name	Date	Time	Enrollment Period
Wastewater Discharge Permit	January 24	9 – 11 a.m.	Dec 28 – Jan 23
Wastewater Compliance Sampling	March 27	9 – 11 a.m.	Feb 28 – Mar 26
Laboratory Analytical Issues	May 22	8 – 11 a.m.	April 24 – May 21
Enforcement	July 24	9 – 11 a.m.	June 26 – July 23
Pollution Prevention (P2) Overview	September 25	9 – 11 a.m.	Aug 29 – Sept 24
Stormwater Compliance Overview	November 19	9 – 11 a.m.	Oct 16 – Nov 12

For enrollment status information or confirmations, please contact Principal Engineering Technician - Jesse Flores by phone at (602) 534-7588 or by email at [jessie.flores@phoenix.gov](mailto:jessie.flores@phoenix.gov).

LEARN MORE AND REGISTER BY VISITING:

[phoenix.gov/IPPCompAcademy](http://phoenix.gov/IPPCompAcademy)





[PHOENIX.GOV/WATER](http://PHOENIX.GOV/WATER)






- Check out our new flyer for Compliance Academy!
- Also – PHX Water Smart posts on social media prior to our courses periodically – we have the social media graphic from January’s course shown above.
- Quick link to register: [phoenix.gov/IPPCompAcademy](http://phoenix.gov/IPPCompAcademy)



Join Us For The Next Class:

**Stormwater Compliance Overview**

**Tuesday, November 13, 2024**

**WebEx – Starting Times**  
**9:00 a.m. to 11:00 a.m.**

*Request class registration using our website:*

<https://www.phoenix.gov/waterservices/envservices/indpretreatmentprog>

- See Industrial Pretreatment Compliance Academy 2024 Class Schedule for a complete listing of classes.
- Enrollment for Stormwater Compliance Overview begins October 16 and ends November 12 or until capacity is reached. Enroll early to secure a spot.
- The Compliance Academy is a **free, voluntary program** designed for the staff of Phoenix's Class A, B, or C Permitted Industrial Users. Contractors and government employees may attend on the basis of space availability.
- For enrollment status information or confirmations, please contact **Jesse Flores** by email at **[jesse.flores@phoenix.gov](mailto:jesse.flores@phoenix.gov)**.

# Webinar/Hybrid Rules

- Mute
- Chat Function/Roll Call
- Recording
- Booklet
- Chlorine/Fire Alarms



1. Please respect the other attendees and speakers by keeping yourself muted during the webinar presentation
2. Please type your name/affiliation into the chat function to assist with roll call. If we do not see everyone who enrolled, we will call out the names of those who we haven't seen (virtually). This is for attendance/credit purposes
3. We will be recording the webinar for accessibility on our website – if you do not want your image (web camera) recorded, you can turn off that function
4. Please access our booklet on the green booklet tab at the Compliance Academy website:  
<https://www.phoenix.gov/waterservices/envservices/indpretreatmentprog/compliance-academy>
5. If there are chlorine or fire alarms, we will direct you whether to group inside, outside in the triangle or exit the plant.

## Syllabus

- History & Regulations
- P2 & FOG Overview
- Waste Types Overview
- Break
- How Do I Get Started with P2?
- Case Studies
- ADEQ & Resources



- History & Regulations – The start of our concern with pollution and our journey to enacting laws that regulate it.
- P2 & FOG Overview – How do these relate to our history of pollution?
- RCRA – What you need to know and why.
- How Do I Get Started with P2? – Guidance on what to do and look for when implementing P2 strategies.
- Case Studies – The case studies were taken from Industrial Users and some are more detailed than others.

# A Brief History of Pollution

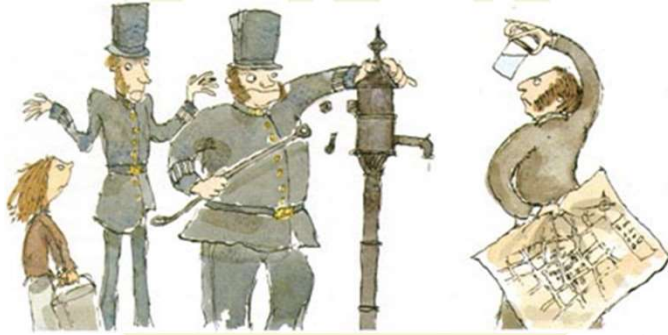
- John Snow & Drinking Water (1850's)
- Environmental Disasters Through the Years
  - Cuyahoga River (1952)
  - Love Canal (50's, 60's, 70's)
  - Louisville Sewer Explosions (1981)
  - Exxon Valdez Oil Spill (1989)
  - EPA Gold King Mine Wastewater Spill (2015)
  - Cuyahoga River Rebound!
- Early History Environmental Milestones
  - **Silent Spring**
  - EPA Formed
  - **Clean Water Act**
  - 1<sup>st</sup> Wastewater Permit Issued
  - **Safe Drinking Water Act**



- Water, wastewater & public health are interrelated concepts.
- Long term: pollution impacts public health and safety, is costly and counterintuitive to progress.
- “The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.” – per EPA



## John Snow & Water Quality



Sewage dumped into channels near town wells led to cholera outbreaks...and eventual improvement of sewer systems in England (pollution is bad for your health!)

- Snow discovered that residents were pouring their dirty water into a channel in front of the houses which then contaminated wells. Many neighborhoods had this practice which contributed to the cholera epidemics of the time; to eliminate these issues, wells and water pipes needed to be isolated from drains, cesspools, and sewers.
- The attitudes at the time seemed to be that the rivers were a dumping ground and there would be no consequences. The idea seems to have been to sacrifice ALL on the altar of “Business and Jobs”.
- Sewer systems in the U.S. were constructed starting in the 1850s, however, most construction began in the 1890s. The early 1900s and onwards introduced further issues of sewer discharges to waterways – 88% percent of the wastewater of the sewered population in waterways was discharged without treatment. Some control efforts by the U.S. Public Health Service (USPHS) began in 1914, and the Water Pollution Control Act of 1948 began to regulate pollution of waterways.
- Sources: (<http://www.ph.ucla.edu/epi/snow/fatherofepidemiology.html>)
- Excerpts from: Infrastructure: Water and Sewers by Joel A. Tarr (2016)

## Cuyahoga River (1952)



- The **Cuyahoga River** is located in Northeast Ohio in the United States and feeds Lake Erie. At times during the 20th century, was one of the most polluted rivers in the United States.
- The river is famous for being "the river that caught fire," helping to spur the environmental movement in the late 1960s. At least 13 fires have been reported on the Cuyahoga River, the first occurring in 1868. The largest river fire occurred on November 3, 1952 and caused over \$1 million in damage to boats, a bridge, and a riverfront office building.
- Partly because of Time Magazine coverage, the 1969 Cuyahoga River fire helped spur an avalanche of water pollution control activities, resulting in the Clean Water Act, Great Lakes Water Quality Agreement, and the creation of the federal Environmental Protection Agency and the Ohio Environmental Protection Agency (OEPA).
- Source: Maag, Christopher (June 20, 2009). "From the Ashes of '69, Cleveland's Cuyahoga River Is Reborn". The New York Times. Retrieved July 25, 2019

## Love Canal (50's, 60's, & 70's)



In 1953, the City of Niagara Falls bought a plot of land called "Love Canal" from a chemical company that used it as a dump. Despite warnings, the City built homes and schools on the land. Between '74 and '78, over half of children in the area were born with defects.

- In the 20's, a short canal dug between the upper and lower Niagara rivers would become a municipal and industrial waste dumpsite. In 1953, Hooker Chemical Company sold the plot of land to the City of Niagara Falls after attempting to cover and contain the waste to the best of their ability. By the late 50's, about 100 homes and a school were built on the land.
- In 1978, the New York Times published an article about chemical dumpsites in general. A few months later, Love Canal "exploded".
- Record rainfall that year exposed drums, rose groundwater levels, and leached chemicals upwards.
  - Trees and gardens turned black,
  - Swimming pools were unearthed from their foundations and sat in a "sea" of chemicals,
  - Basements flooded with puddles of noxious chemicals,
  - Children playing outside would return home with burns on their hands and faces,
  - The air in the immediate area turned toxic.
- Source: Hironaka, Ann (2014-09-15). *Greening the Globe*. Cambridge University Press. ISBN [9781107031548](#), and James, Susan Donaldson (2008-08-11). "Love Canal Kids at 30: 'Ticking Time Bombs'". *ABC News*. Retrieved 2017-02-16

## Louisville, KY (1981)



In 1981, a series of sewer explosions destroyed more than two miles of streets in Louisville, Kentucky.

- The explosions destroyed more than two miles of streets in Louisville, Kentucky. The blasts were caused by the ignition of hexane vapors which had been illegally discharged from a Ralston-Purina soybean processing plant located near the University of Louisville.
- The cause of the explosions was eventually traced to a spark from a car near the intersection of 12th & Hill Streets, which ignited the hexane fumes in the sewers. There was extensive damage to area homes, businesses, and streets (including multiple cars).
- There were no fatalities, but Ralston-Purina paid \$18 million to the Louisville Metropolitan Sewer District and more than \$8.9 million to 16,000 plaintiffs in a lawsuit settled in 1984. The company admitted that it released hexane into the sewers, but denied negligence.
- Source:
  - *"Area of Louisville Damaged by Blasts". The New York Times. Associated Press. February 14, 1981.*
  - Sheeran, Thomas J. (December 31, 1981). "Ralston Purina, indicted in sewer blasts, apologizes".

## Exxon Valdez Oil Spill (1989)



In 1989, a massive oil tanker collided with a reef off the coast of Alaska dumping 11 million gallons of crude oil into the ocean. To this day, much of the oil remains in that environment.

- At the time, a drunken captain was blamed for the spill but it was later determined that the ship's radar system wasn't properly functioning at the time of the wreck.
  - Being that the wreck happened in a remote area, clean up was a logistical challenge. Solvents and dispersants ended up being too toxic to use in this area and mechanical cleanup was not practical given the delicate marine environment.
  - Thousands of wild animals died, the regional seafood industry collapsed, and only an estimated 10 percent of the oil was recovered.
- 
- Source: <https://owlcation.com/stem/-Ten-Worst-Man-Made-Environmental-Disasters-in-American-History>

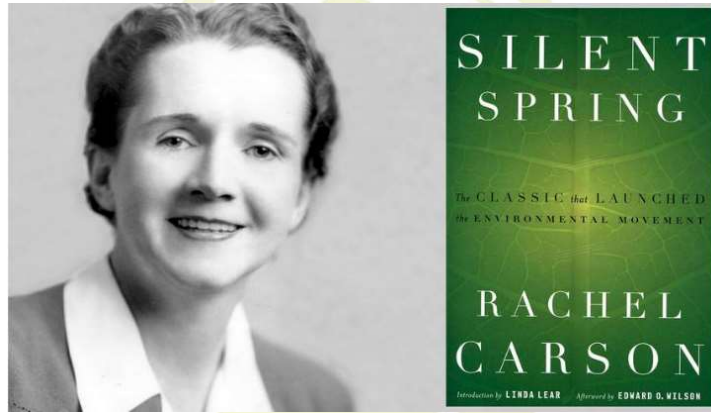
## EPA Gold King Mine Wastewater Spill (2015)



About 3 million gallons of mine wastewater were accidentally discharged into the Animas River watershed.

- EPA personnel and contractors accidentally destroyed a plug holding trapped water inside of a mine. The wastewater contained heavy metals including cadmium, lead, and arsenic among others.
- Despite the immediate increase in concentration of metals in sampled aquatic life, there does not appear to be long-lasting damage to the ecosystem.

## Rachel Carson – Silent Spring (1962)



*Silent Spring* exposed the harm caused by popular insecticides. Her book caused a major shift in public consciousness about the environment.

- The American conversation about protecting the environment began in the 1960s. Rachel Carson had published her attack on the used of pesticides. Concern about air and water pollution had spread in the wake of disasters.
- The book described how DDT, a popular pesticide, entered the food chain and accumulated in animals and humans causing cancer and genetic damage. DDT is very persistent in the environment and very water insoluble.

Source: [epa.org](http://epa.org)

## Clean Water Act (CWA) – 1972

- Comprehensive changes spurred after creation of the Environmental Protection Agency (EPA) in 1970
- The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972 (EPA, 2017)



### 1972 amendments to the CWA:

- Established the basic structure for regulating pollutant discharges into the waters of the United States.
- Gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry.
- Maintained existing requirements to set water quality standards for all contaminants in surface waters.
- Made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions.
- Funded the construction of sewage treatment plants under the construction grants program.
- Recognized the need for planning to address the critical problems posed by nonpoint source pollution.

-EPA (<https://www.epa.gov/laws-regulations/summary-clean-water-act>)

-EPA (<https://www.epa.gov/laws-regulations/history-clean-water-act>)



## Safe Drinking Water Act – 1974

- “The Safe Drinking Water Act (SDWA) is the federal law that protects public drinking water supplies throughout the nation. Under the SDWA, EPA sets standards for drinking water quality and with its partners implements various technical and financial programs to ensure drinking water safety.”



- The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources.
- The Act authorizes EPA to establish minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards.

Source: [epa.org](http://epa.org)

## Cuyahoga River (2021)



- 50 years after the 1969 fire (13<sup>th</sup> fire), the Cuyahoga River has made a comeback! This involved removing 4 dams by 2007 in order to control sediment transport, reducing benthic populations, and removing trapped toxins. Other efforts included regulating industrial and commercial industries (and preventing industry from dumping waste into the river) through the Clean Water Act and EPA. Stormwater pollution was prevented as well by looking at industrial pollution, oil slicks, and the aging sewer system to prevent Combined Sewer Overflows (CSOs).
- \*\*As of 2021 it is now considered safe for fishing!!
- Source: June 2019 – stormh20.com (“River Rebound” by Barbara Hesselgrave)

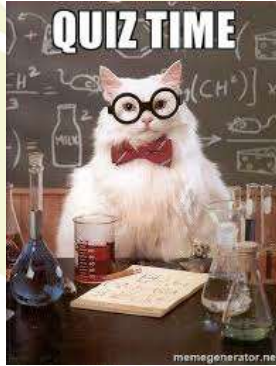
## Cuyahoga River & Water Quality



- A 1967 photograph, showing cars used as rip-rap along the Cuyahoga River to protect it from erosion, is held in front of its banks decades later
- McCARTHY: Climate change and many other things — toxic chemicals, synthetic chemicals that we use in products that end up in our water.
- The epiphany that we had back during the first Earth Day doesn't mean that you could fix it then and not continue the investment. We need continued diligence in terms of the cleanliness of the water we drink.
- We need to keep rivers and streams flowing and recognize that we have to reinvest in some of the technologies that brought us to where we are today. An old wastewater treatment facility may have been great to stop pollution on the Cuyahoga River, but it's not going to be sufficient to deal with the chemicals today.
- McCARTHY: There are some chemicals prominent in the news today, PFOS and PFOAs [used to treat apparel and carpeting, in fire retardants and food can linings], that are showing up in wells and aquifers across the country.
- It's a challenge that will go on for quite some time. It provides a wake-up call that we need to look closely at chemicals before they enter commerce.
- Pharmaceuticals are going to be a big deal. The penicillin used in agriculture today is ending up in our food system, that's creating [drug resistance]. This is a gigantic and growing problem in public health. We see pharmaceuticals in our rivers and streams and our drinking water.
- Source: <https://news.harvard.edu/gazette/story/2019/04/gina-mccarthy-on-climate-change-earth-day-and-striking-down-epa-rules/>

## Quiz Question

- What is the federal law that ultimately regulates your wastewater discharge?



## Pollution Prevention Act – 1990

- Pollution should be prevented or reduced at the source whenever feasible (**source reduction**).
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible.
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible.
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

- The Pollution Prevention Act was enacted by the United States Congress in 1990. It was aimed at private industry and the Federal Government. Part of the Act made requirements of the United States Environmental Protection Agency (EPA).
- The "Findings" section of the Pollution Prevention Act of 1990 explains why Congress passed the P2 Act and are briefly captured below:
  - ✓ The United States annually produces millions of tons of pollution and spends tens of billions of dollars per year controlling this pollution.
  - ✓ There are significant opportunities for industry to reduce or prevent pollution at the source through cost-effective changes in production, operation, and raw materials use.
  - ✓ The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction.
  - ✓ Source reduction is fundamentally different and more desirable than waste management and pollution control.
- Source: <https://www.epa.gov/p2/pollution-prevention-law-and-policies>

## Pollution Prevention (P2) – AZ

- In 1991, Arizona initiated one of the broadest P2 programs in the nation and adopted a P2 policy – Arizona Revised Statutes (A.R.S.) § 49-961 to 49-969
  - ✓ Avoids, eliminates, or reduces generation of hazardous waste and/or the use of toxic substances
  - ✓ Reuse
  - ✓ Recycling
  - ✓ Reclamation
  - ✓ Waste minimization
  - ✓ Substitution
  - ✓ Conservation (natural resources, energy, water)
  - ✓ Business changes (improvements in operating practices, spill and leak prevention...)

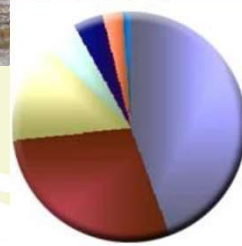


- In 1991, P2 promotion began more locally. ADEQ does require P2 plans for applicable facilities however, everyone is encouraged to implement a P2 plan.

## Sanitary Sewer Overflows (SSOs)



How does  
this relate to  
P2?



Line Break/Main Break	44%
Line Blockage	29%
Urban Runoff Infiltration	14%
Pump Station Failure	5%
Residential Overflow	4%
Vandalism/Illegal Disposal	3%
Power Failure	1%

How can you prevent SSOs?

- What are you putting in your drains? Are you filtering large particles and substances? What about oil and grease?
- Take care of your lines and you are preventing a backup, damage to the structure of the sewer system, and all of the ramifications involved with sewer water flowing into the streets and environment.

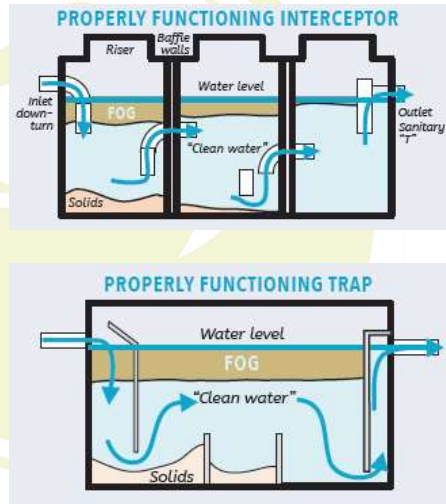
Think of the health impacts that SSOs have on the community and environment. Spend a little \$\$ upfront and consistently and you will prevent negative consequences in the future.

Fats, oils, and grease are the largest cause of SSOs.

Why Control Sanitary Sewer Overflows?:

[http://water.epa.gov/polwaste/npdes/sso/upload/sso\\_casestudy\\_control.pdf](http://water.epa.gov/polwaste/npdes/sso/upload/sso_casestudy_control.pdf)

## What is F.O.G.?



City of Phoenix – Commercial & FOG Program

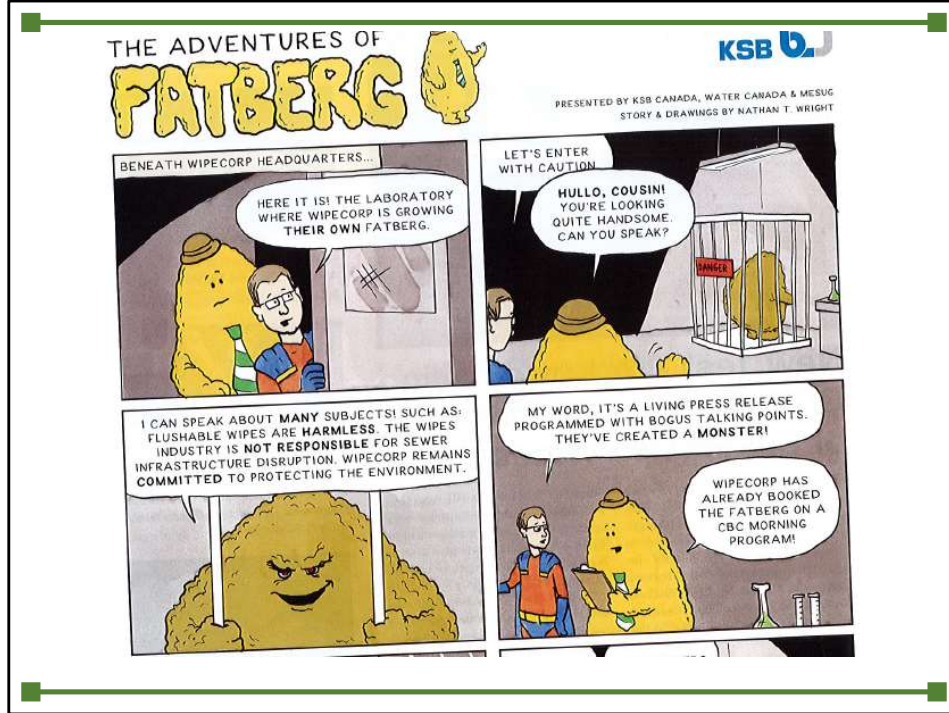
<https://www.phoenix.gov/waterservices/envservices/comminsp>

PHOENIX CITY CODE CHAPTER 28 – SEWERS, requires all pretreatment devices (such as interceptors and traps) to be in continuous and efficient operation at all times.

AZ Water Association – Pretreatment/FOG Committee

<https://www.azwater.org/group/pretreatment>





Only the 3 P's in the toilet! No wipes, no feminine hygiene products, no medications, no cat litter!



Wipes & FOG are not compatible – see <https://newyork.cbslocal.com/2019/02/20/fatberg-nyc-dep-baby-wipes-grease-flushed-down-toilet-sewers/>



If a blockage or overflow is caused by your facility, you may be subject to the following:

- You can be backbilled the cost of the cleanup and any damages incurred from improper maintenance. This can cost several thousand dollars.
- You can be required to pump and jet on a more frequent basis. Depending on your pre-treatment device, you may be required to upgrade or upsize to a more effective pre-treatment device.
- The City's goal for commercial sewer users is compliance with environmental laws and prevention of sanitary sewer overflows, backups, and blockages.

(City of Phoenix Commercial Inspection & FOG Program)

Some BMPs to prevent pollution:

- **Never** dispose of mop water or clean equipment in the parking lot, over a drywell, in a retention basin, in the landscaping, or on the ground outdoors, etc.
- **Do not** perform any cleaning in a location that is not plumbed to a grease trap or a grease interceptor. **Plumb ALL sinks / fixtures** used for disposing of grease-laden wastewater including mop water to a grease trap or a grease interceptor. **Scrape food wastes** into a garbage can before properly cleaning.
- **Additives are prohibited** which interfere with the effective operation of a grease trap or a grease interceptor, or which cause emulsification of grease causing pass through into the City sanitary sewer.

## Waste Types Overview

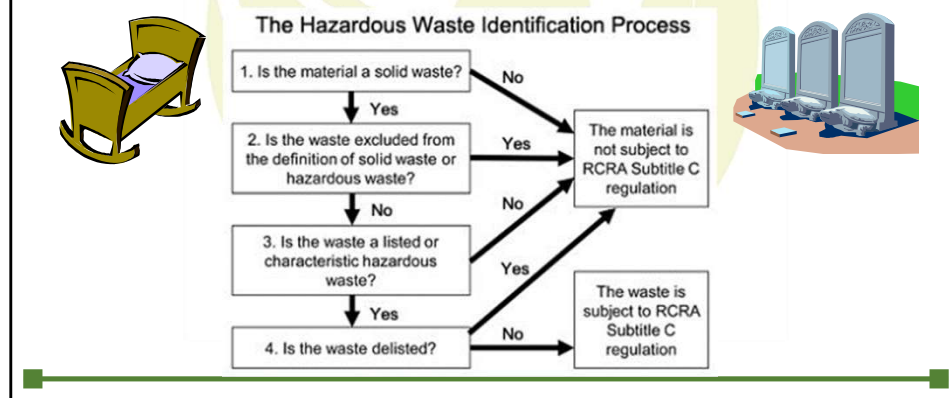
- RCRA Solid Waste
- Hazardous Waste
- Concerns & Requirements
- Universal Waste
- Manifests, Records & Reports



- The IPP program needs to be assured that a facility's hazardous waste is being appropriately managed.
- Is hazardous waste being discharged to the sewer incidentally through spills or leaks?
- Is hazardous waste being disposed of in the sewer?

# Resource Conservation and Recovery Act – RCRA

- The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave."



RCRA is an amendment to the Solid Waste Disposal Act of 1965; further amended in 1984 by the Hazardous and Solid Waste Amendments which expanded RCRA and in 1992 by the Federal Facilities Compliance Act (enforcement of RCRA at federal facilities) and **most recently in 2016 (Hazardous Waste Generator Improvements)**. RCRA establishes the framework for a national system of solid waste control. Subtitle D of the Act is dedicated to non-hazardous solid waste requirements, and Subtitle C focuses on hazardous solid waste. (Source: <https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview>).

More RCRA Subtitles:

A General Provisions

B Office of Solid Waste; Authorities of the Administrator and Interagency Coordinating Committee

E Duties of the Secretary of Commerce in Resource and Recovery

F Federal Responsibilities

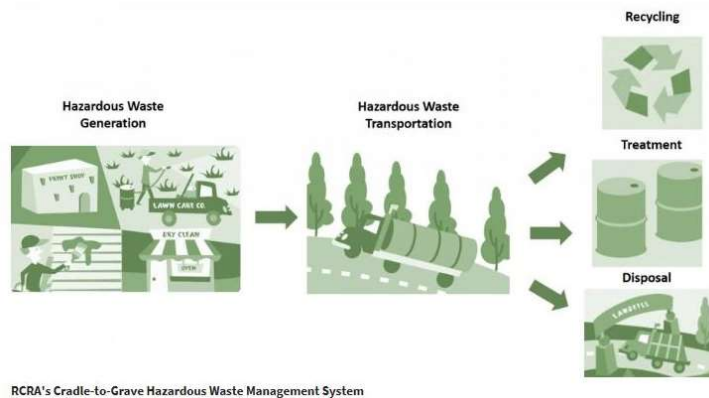
G Miscellaneous Provisions

H Research, Development, Demonstration and Information

I Regulation of Underground Storage Tanks

J Standards for the Tracking And Management of Medical Waste

# Resource Conservation and Recovery Act – RCRA



**RCRA is an approach to manage solid and hazardous waste at facilities that are currently in use.**

RCRA Programs by the Numbers (RCRA Today)

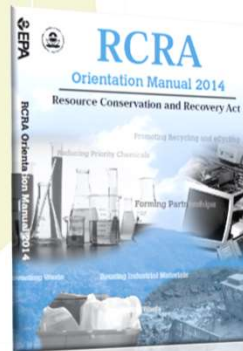
- Managing 2.5 billion tons of solid, industrial and hazardous waste
- Overseeing 6,600 facilities with over 20,000 process units in the full permitting universe
- Working to address more than 3,700 existing contaminated facilities needing cleanup, and reviewing as many as 2,000 possible facilities
- Providing \$97.3 million in grant funding to help states implement authorized hazardous waste programs
- Providing incentives and opportunities to reduce or avoid greenhouse gas emissions through material and land management practices

RCRA Overview – EPA: <https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview>)

Picture: <https://www.epa.gov/hw/learn-basics-hazardous-waste>

## Resource Conservation and Recovery Act – RCRA

- Goals include:
  - Protect human health and the environment from hazards of waste disposal
  - Conserve energy and natural resources
  - Reduce amount of waste generated
  - Ensure wastes are managed in an environmentally sound manner
- Title 40 of the CFR, Parts 239-282 (aka 40 CFR Parts 239-282)



Source: Journal of Environmental Management Arizona Oct/Nov 2016

For more information, see the RCRA Orientation Manual 2014 – EPA (available via .pdf at <https://www.epa.gov/hwgenerators/resource-conservation-and-recovery-act-rcra-orientation-manual>)

## RCRA (Pharmaceutical Updates)

- February 22, 2019 – U.S. EPA published a Final Rule
- August 21, 2019 – Effective Date of Rule
- Regulate pharmaceutical wastes under 40 CFR part 266, subpart P instead of standard 40 CFR part 262
- **PROHIBIT** disposal of haz. waste pharmaceuticals in the Sewer – including controlled substances
- Remove dual regulations (DEA controlled substances + RCRA combined)
- Nicotine replacement therapies are exempt

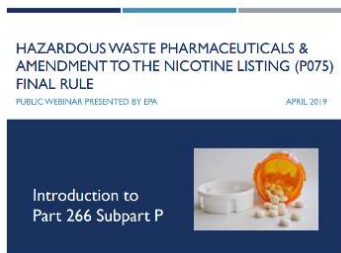
These updates are primarily applicable to hospitals, health facilities, and laboratories. They provide clarifications for how pharmaceutical wastes are disposed of.

Source: <https://www.federalregister.gov/documents/2019/02/22/2019-01298/management-standards-for-hazardous-waste-pharmaceuticals-and-amendment-to-the-p075-listing-for>



## RCRA (Pharmaceutical Updates)

- Healthcare facilities will:
  - Not have to comply with satellite accumulation standards
  - Not have to specify haz waste codes on manifests
  - Be able to accumulate haz waste pharmaceuticals w/o a RCRA permit for 365 days



Source: <https://www.epa.gov/hwgenerators/frequent-questions-about-management-standards-hazardous-waste-pharmaceuticals-and>

\*For more information <https://www.epa.gov/hwgenerators/final-rule-management-standards-hazardous-waste-pharmaceuticals-and-amendment-p075>

\*See this webinar: [https://clu-in.org/conf/tio/HazWastePharmaceuticals\\_040219/](https://clu-in.org/conf/tio/HazWastePharmaceuticals_040219/)

## Dental Amalgam & P2

- Why are dental offices a focus for P2 efforts?
  - Dental clinics are the main source of mercury discharges to POTWs.
  - EPA estimates about 103,000 dental offices use or remove amalgam in the United States; almost all of these send their wastewater to POTWs.
  - Dentists discharge approximately 5.1 tons of mercury each year to POTWs; most of this mercury is subsequently released to the environment.
  - EPA expects compliance with the final rule will annually reduce the discharge of mercury by 5.1 tons as well as 5.3 tons of other metals found in waste dental amalgam to POTWs.



- The Dental Amalgam Rule (it's actually formally called the Dental Office Category regulation and is located in 40 CFR Part 441) went into effect July 14, 2017, and the date for compliance was July 14, 2020.
- Dental amalgam is a great example of waste minimization and substitution that you are likely to encounter in your daily life.
- Some best practices that dentist offices and clinics put in place to reduce the elemental mercury that is discharged to the sewer include:
  - Recycling used disposable amalgam capsules (not throwing them in the biohazard bin)
  - Recycling non-contact (scrap) amalgam
  - Use separators, chair-side traps, vacuum pump filters to retain amalgam and recycle
  - Recycle teeth that contain amalgam restorations (if extracted)
- What does mercury do to the POTW?
  - Mercury partitions into the sludge, the solid material that remains after wastewater is treated. Mercury from waste amalgam therefore can make its way into the environment from the POTW through the incineration, landfilling, or land application of sludge or through surface water discharge.
- Source: <https://www.epa.gov/eg/dental-effluent-guidelines#background>

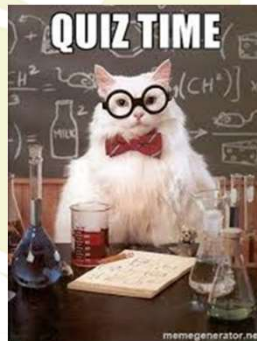
## Dental Amalgam Video



- The American Dental Association has provided BMP manuals for dentists to help them comply with the new rule – it's a lot more complicated than the video presents due to maintenance requirements, logs, inspection, etc.
- Source: <https://www.youtube.com/watch?v=0Kb1-eGtvk8>

## Quiz Question

- What is allowable to discharge to the Sewer?

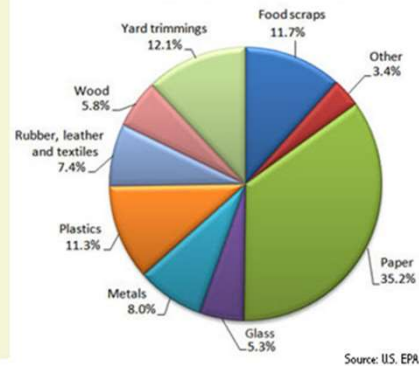


# What is a Solid Waste?

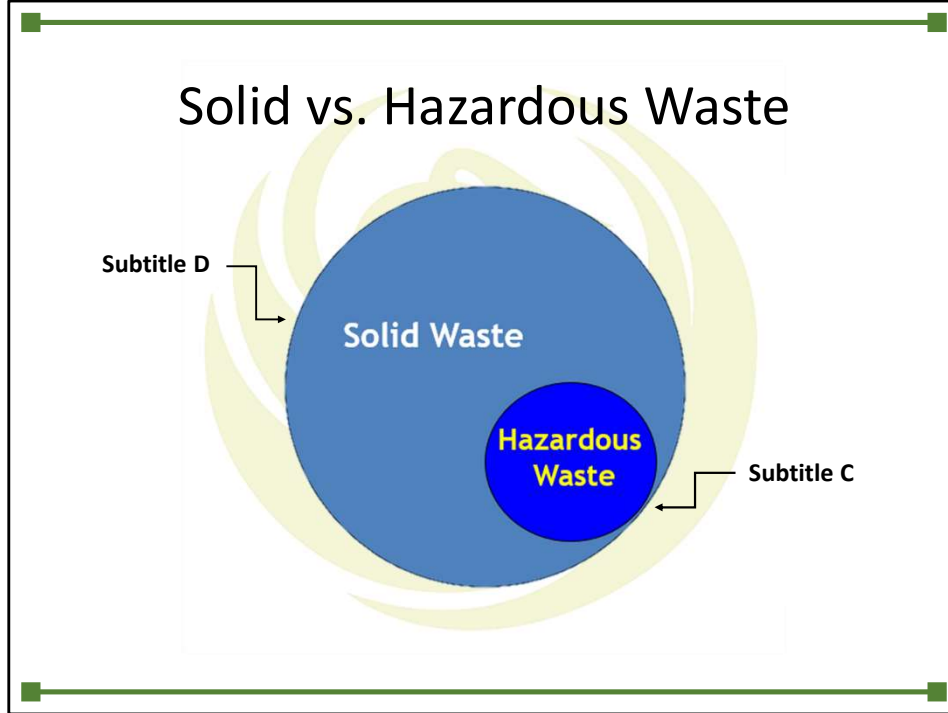


Sewage filter press cake

**U.S. Waste Generation by Category**



- A solid waste is any solid, liquid, or contained gaseous material that is discarded by being disposed of, burned, incinerated, or recycled. There are some exceptions for recycled materials.
- A solid waste can be the by-product of a manufacturing process or simply a commercial product that you use in your business— such as a cleaning fluid or battery acid—that is being disposed.
- Even materials that are recyclable or can be reused in some way —such as burning used oil for fuel— may be considered a solid waste.
- Source: <http://legacy.azdeq.gov/environ/waste/hazwaste/download/managehw.pdf>



- Must be a solid waste first before it can be a hazardous waste.
- A “mixture” of hazardous waste with solid waste (e.g., motor oil, trash, debris) may become a hazardous waste. The waste “derived from” the treatment, storage, or disposal of hazardous waste may also be a hazardous waste.
- Check the Safety Data Sheet (SDS) for all products that are in question—this will help determine what type of waste you are dealing with.
- Source: <http://legacy.azdeq.gov/environ/waste/hazwaste/download/managehw.pdf>

## What is a hazardous waste?

- Must be a solid waste first

**-Plus-**

- Exhibits “characteristics of hazardous waste”

**-Or-**

- Is a “listed waste”



Listed and characteristic waste definitions are in 40 CFR Part 261

- The regulations in 40 CFR §261.3 state that a solid waste that meets any of the following criteria is a hazardous waste:
  - ✓ It appears on one of four lists, F, K, P, and U, published in 40 CFR Part 261 (as incorporated by A.A.C. R18-8-261) and is not otherwise excluded.

Source: <http://legacy.azdeq.gov/envIRON/waste/hazwaste/download/managehw.pdf>

Photo from <http://www.epa.gov/region9/waste/biennial.html>

## Characteristic Wastes

**D001 – Ignitability** (flash point less than 140° F, or oxidizer)

**D002 – Corrosivity** – pH less than or equal to 2 or pH greater than or equal to 12.5

**D003 – Reactivity** – Unstable in water, generates toxic gas, polymerizes

**D004 – D043 Toxicity** (TCLP)

- Can be considered a hazardous waste if it exhibits one of the four characteristics listed below:
- **Ignitability** - Ignitable wastes can create fires under certain conditions, are spontaneously combustible, or have a flash point less than 60 °C (140 °F). Examples include waste oils and used solvents.
- **Corrosivity** - Corrosive wastes are acids or bases (pH less than or equal to 2, or greater than or equal to 12.5) that are capable of corroding metal containers, such as storage tanks, drums, and barrels. Battery acid is an example.
- **Reactivity** - Reactive wastes are unstable under "normal" conditions. They can cause explosions, toxic fumes, gases, or vapors when heated, compressed, or mixed with water. Examples include lithium-sulfur batteries and explosives.
- **Toxicity** - Toxic wastes are harmful or fatal when ingested or absorbed (e.g., containing mercury, lead, etc). When toxic wastes are land disposed, contaminated liquid may leach from the waste and pollute ground water. Toxicity is defined through a laboratory procedure called the Toxicity Characteristic Leaching Procedure (TCLP) (Method 1311) (PDF) (35 pp, 288K).
- Taken from <http://www.epa.gov/wastes/hazard/wastetypes/characteristic.htm>]



## Listed Wastes

Four "Lists": F list, K list, P list, U list:

- F: Hazardous Waste from non specific sources
- Examples:
  - ✓ F001: halogenated solvents used in degreasing:  
Tetrachloroethylene, trichloroethylene,  
methylene chloride
  - ✓ F006: Wastewater treatment sludge from  
electroplating operations

(Common waste streams)

### Listed Wastes

[Hazardous Waste Regulations: User-Friendly Reference Document](#)

By definition, EPA determined that some specific wastes are hazardous. These wastes are incorporated into lists published by the Agency. These lists are organized into three categories:

**The F-list** (non-specific source wastes). This list identifies wastes from common manufacturing and industrial processes, such as solvents that have been used in cleaning or degreasing operations. Because the processes producing these wastes can occur in different sectors of industry, the F-listed wastes are known as wastes from non-specific sources. Wastes included on the F-list can be found in the regulations at 40 CFR §261.31.

Source: <http://www.epa.gov/wastes/hazard/wastetypes/listed.htm>

## Listed Wastes (continued)

- “K” listed wastes: Hazardous Waste from specific process sources
  - Examples:
    - ✓ K001: Wood Treatment waste
    - ✓ K002: Sludge from treatment of chrome yellow and orange pigments
- (Less common waste streams)
- The P-list and the U-list: discarded commercial chemical products (nicotine, warfarin, arsenic)

**The K-list** (source-specific wastes). This list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. Certain sludges and wastewaters from treatment and production processes in these industries are examples of source-specific wastes. Wastes included on the K-list can be found in the regulations at 40 CFR §261.32.

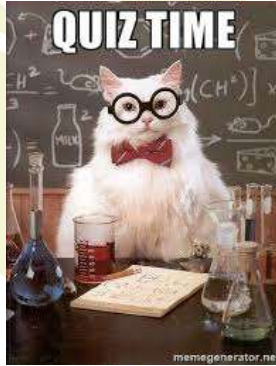
**The P-list and the U-list** (discarded commercial chemical products). These lists include specific commercial chemical products in an unused form. Some pesticides and some pharmaceutical products become hazardous waste when discarded. Wastes included on the P- and U-lists can be found in the regulations at 40 CFR §261.33.

### Key Resources

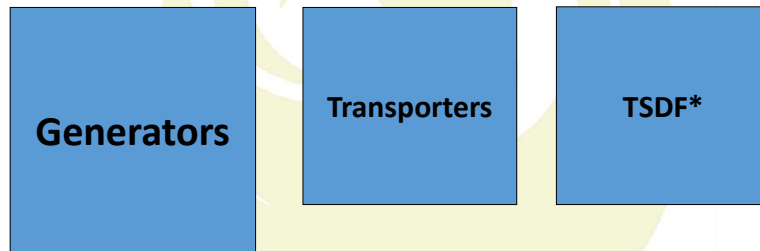
Hazardous Waste Listings - A User-Friendly Reference Document, Draft, March 2008 (PDF)

## Quiz Question

- When categorizing hazardous waste, the EPA breaks it down by which four characteristics?



## Who is regulated by Hazardous Waste Regulations?

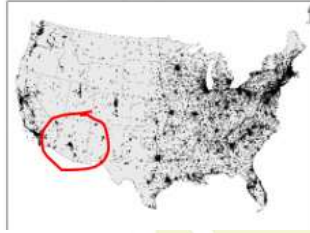


\*TSDF = Treatment Storage & Disposal Facility

### Some Hazardous Waste TSDFs in Arizona:

- Clean Harbors Arizona, LLC (CHA)
- Conn-Selmer, Inc. (CSI)
- Heritage Environmental Services, LLC
- Safety-Kleen Corp. (Chandler)
- Veolia ES Technical Solutions, LLC
- World Resources Company

## Why Do We Care?



- Treatment, Storage, and disposal facilities (TSDFs): ~900
- **80% of all U.S. citizens live within 3 miles of a RCRA-regulated hazardous waste generator or TSDF; 50% live within a 1 mile radius.**

Generator Status	Number of Facilities	Total Hazardous Waste Generated (tons)	Percent of Total Hazardous Waste Generated
VSQGs	353,400–591,800	46,000–148,000	<1%
SQGs	49,900–64,300	66,000–141,000	<1%
LQGs	20,800	35.2 million	99%
<b>Total</b>	424,100–676,900	35.3–35.4 million	<b>100%</b>

- The IPP program needs to be assured that a facility's hazardous waste is being appropriately managed.
- Is hazardous waste being discharged to the sewer incidentally through spills or leaks?
- Is hazardous waste being disposed of in the sewer?
- Source: <https://www.epa.gov/hwgenerators/presentation-slides-workshop-hazardous-waste-generator-improvements-rule>
- Blue table based on 2013 and more recent numbers
- Image and TSDF info from RCRA's Critical Mission & The Path Forward

## Hazardous Waste Generator Info

- Determined by how much hazardous waste is generated per month, plus how much total waste is stored.
- 3 levels of regulation based on how much waste is generated:
  - ✓ Large Quantity Generators (LQGs) >1,000 kg/Month
  - ✓ Small Quantity Generators (SQGs) >100 but <1000 kg/Month
  - ✓ Very Small Quantity Generators (VSQGs), 100 kg/Month or less



### Other Requirements

- VSQGs must comply with three basic waste management requirements to remain exempt from the full hazardous waste regulations that apply to generators of larger quantities (SQGs and LQGs).
  - ✓ Identify all hazardous waste that you generate and keep documentation of your waste determinations.
  - ✓ Cannot store more than 2,200 pounds (1,000 kg) total of hazardous waste, 2.2 pounds (1 kg) of acute hazardous waste, and 220 pounds (100 kg) of acute hazardous residue, debris, or soil on-site at any time.
  - ✓ Ensure delivery of your hazardous waste to an approved off-site treatment or disposal facility.
- LQGs must have an emergency coordinator, test and maintain emergency equipment, have a formal contingency plan to deal with leaks and spills. Personnel must be formally trained in hazardous waste management and record keeping requirements. No limit to amount of hazardous waste stored onsite. May store over 1kg of acute hazardous waste.
- SQGs are not required to have a formal contingency plan but must have specified responses to spills or leaks and have an emergency coordinator on site at all times, no formal training for employees required but they must know how to manage hazardous waste.

(Source: <https://www.epa.gov/hwgenerators/categories-hazardous-waste-generators>)

## Hazardous Waste Generator Info

To determine your generator category, count all waste generated in a calendar month:

### Very Small Quantity Generator (VSQG)



½ Drum or  
27 Gal. Or  
220 lbs. Or  
100 Kg

### Small Quantity Generator (SQG)



½ to 5 Drums or  
27-275 Gal. Or  
220-2200 lbs. Or  
100-1000 Kg.

### Large Quantity Generator (LQG)



>5 Drums or  
>275 Gal. or  
>2200 lbs. or  
>1000 Kg.

Key: 55 Gallon Drum = 440 lbs. = 200 Kg.

Source: <https://www.epa.gov/hwgenerators/presentation-slides-workshop-hazardous-waste-generator-improvements-rule>

**Note: Some wastes are so dangerous that they are called acutely hazardous wastes. If a business generates or accumulates more than 2.2 lb (1 kg) of acutely hazardous waste in a calendar month, all of the acutely hazardous waste must be managed according to the regulations applicable to LQGs.**

# Hazardous Waste Generator Info

**TABLE 1 TO § 262.13—GENERATOR CATEGORIES BASED ON QUANTITY OF WASTE GENERATED IN A CALENDAR MONTH**

Quantity of acute hazardous waste generated in a calendar month	Quantity of non-acute hazardous waste generated in a calendar month	Quantity of residues from a cleanup of acute hazardous waste generated in a calendar month	Generator Category
> 1 kg	Any amount	Any amount	Large quantity generator
Any amount	≥ 1,000 kg	Any amount	Large quantity generator
Any amount	Any amount	> 100 kg	Large quantity generator
≤ 1 kg	> 100 kg and < 1,000 kg	≤ 100 kg	Small quantity generator
≤ 1 kg	≤ 100 kg	≤ 100 kg	Very small quantity generator

Some wastes are so dangerous that they are called acutely hazardous wastes. If a business generates or accumulates more than 2.2 lb (1 kg) of acutely hazardous waste in a calendar month, all of the acutely hazardous waste must be managed according to the regulations applicable to LQGs.

Source: <https://www.epa.gov/hwgenerators/presentation-slides-workshop-hazardous-waste-generator-improvements-rule>



## Waste Accumulation Periods

Generators must ship waste off site within a certain number of days from the start of accumulation:

- Large Quantity Generators (LQG)– 90 days
- Small Quantity Generators (SQG) – 180 days
- Very Small Quantity Generators (VSQG) – no time limit



- SQGs can accumulate no more than 13,228 pounds (6,000 kg) of hazardous waste on-site for up to 180 days without a permit. You can accumulate this amount of waste for up to 270 days if you must transport it more than 200 miles away for recovery, treatment, or disposal.
- VSQGs may not accumulate more than 1,000 kilograms of hazardous waste at any time.

## More on Waste Accumulation

- The hazardous waste accumulation time limit for a Small Quantity Generator (SQG) is 180 days. If the SQG generates 2200 pounds (or more) of hazardous waste in any calendar month, they would become a Large Quantity Generator (LQG). The LQG accumulation time limit is 90 days.
- The facility may request an Episodic Event through myDEQ. SQG or VSQG facilities are allowed one episodic event per year, either planned or unplanned. If they follow all of the requirements correctly, the approved episodic event would allow them to stay as a VSQG or SQG, even if they have one calendar month that year where they exceeded the generation limits for their generator category.
- A small quantity generator must notify ADEQ (through the myDEQ online portal) no later than thirty (30) calendar days prior to initiating a planned episodic event.

- LQG regs are effective the moment the facility becomes an LQG, by generating 2200 pounds or more in a calendar month. They would then need to update their generator status on our myDEQ online portal ([azdeq.gov/mydeq](https://azdeq.gov/mydeq) [[azdeq.gov](https://azdeq.gov)]). They would also need to follow all of the other LQG regulations immediately. A facility's generator status is for a calendar year. If, at any point during the year, they become an LQG, they are required to follow the LQG regulations for the rest of that calendar year.
- In the event of an unplanned episodic event, a small quantity generator must notify ADEQ within 72 hours of the unplanned event via phone, email, or fax, and subsequently through the myDEQ online portal. The regulations related to episodic events can be found in 40 CFR 262 Subpart L (<https://www.law.cornell.edu/cfr/text/40/part-262/subpart-L> [[law.cornell.edu](https://www.law.cornell.edu)]).

## Container Requirements

- Container materials must be:
  - ✓ **Compatible** with the waste
  - ✓ **Closed** unless waste is being added or removed from container
  - ✓ **Good condition** – not leaking, need to be placed in an area that protects the container from damage due to traffic or other activity
  - ✓ stored in central **accumulation area** (LQG and SQG only)
  - ✓ **Labeled**



- Inspect areas where containers are stored at least weekly. Look for leaks and for deterioration caused by corrosion or other factors.
- Do not mix incompatible wastes or materials unless precautions are taken to prevent certain hazards.
- Special storage requirements apply to liquid hazardous wastes containing polychlorinated biphenyls (PCBs).

Source: <http://legacy.azdeq.gov/environ/waste/hazwaste/download/managehw.pdf>

## Satellite Accumulation Containers

- Accumulate waste close to the process
- Maximum 55 gallons & labeled properly
- Located at or near the site of generation
- Once full move to central accumulation area within 3 consecutive days...then date containers



- Many hazardous wastes are liquids and are measured in gallons – not pounds. In order to measure your liquid wastes, you will need to convert from gallons to pounds. To do this, you must know the density of the liquid. A rough guide is 27.5 gallons (half of a 55-gallon drum) of waste with a density similar to water weighs about 220 pounds (100 kg); 275 gallons (five 55-gallon drums) of a waste with a density similar to water weighs about 2,200 pounds (1,000 kg).

Source: <http://legacy.azdeq.gov/environ/waste/hazwaste/download/managehw.pdf>

## Waste Consolidation & Disposal

- May now consolidate waste at an LQG under the control of the same person
- The VSQG marks and labels waste containers with “Hazardous Waste” and the hazards
- The LQG notifies the state on Site ID Form that it is participating in this activity and identifies which VSQGs are participating
- LQG is responsible for disposal at TSDf

- Source: <https://www.epa.gov/hwgenerators/presentation-slides-workshop-hazardous-waste-generator-improvements-rule>

# Labeling of Containers

2016 Rulemaking:

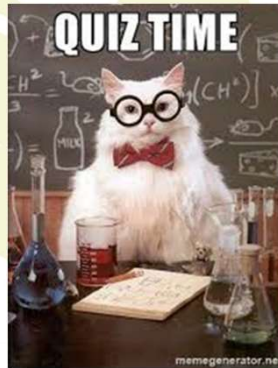
- Container and tank labels must now also indicate the hazards of the contents of the containers.



- ADEQ is the local authority for RCRA requirements. Regarding City inspections, we are primarily concerned with identifying the contents of a container. However, ADEQ and EPA requirements may be more specific regarding labels.
- Label each container with the words “HAZARDOUS WASTE,” and mark each container with the date waste was first added.
- Labeling waste shipments:
  - ✓ Package, label and mark your shipment, and placard the vehicle in which your waste is shipped as specified in Department of Transportation (DOT) regulations.
  - ✓ Prepare a hazardous waste manifest to accompany your shipment.
  - ✓ Include an LDR notice and certification with each waste shipment.
  - ✓ Ensure the proper management of any hazardous waste you ship (even when it is no longer in your possession).

## Quiz Question

- Can a facility be an LQG one month and a SQG another month?



For reference:

<http://legacy.azdeq.gov/environ/waste/hazwaste/download/HazWasteCategories.pdf>

## Universal Waste Rule

- Four specific categories of materials that can be managed as universal wastes: batteries, pesticides, mercury-containing equipment and mercury lamps.
- In general, materials managed as universal waste can be stored for a year and are not required to be shipped with a manifest.



UNIVERSAL WASTE	
SHIPPER	_____
ADDRESS	_____
CITY, STATE, ZIP	_____
CONTENTS	_____
ACCUMULATION START DATE	_____

- Universal waste rule:
  - ✓ Small and large businesses that generate hazardous waste that are in the universal waste categories listed above can use the more streamlined requirements under the universal waste rule.
  - ✓ It eases the regulatory burden on businesses that generate these wastes. Specifically, it has streamlined requirements for: notification, labeling, marking, prohibitions, accumulation time limits, employee training, response to releases, off-site shipments, tracking, exports, and transportation.
  - ✓ Companies can transport them with a common carrier, instead of a hazardous waste transporter, and no longer requires companies to obtain a hazardous waste manifest.

Sources: <https://www.epa.gov/hw/universal-waste> and <http://legacy.azdeq.gov/environ/waste/hazwaste/download/managehw.pdf>



## Recordkeeping & Reporting Requirements

- Manifests must list:
  - ✓ Generator and Generator's EPA ID #
  - ✓ Type of Waste and quantity
  - ✓ Transporter
  - ✓ Destination
  - ✓ Emergency Contacts
- Copies must be kept for 3 years



The image shows a sample of a hazardous waste manifest form. It is a multi-page document with various fields for recording information. The top section includes fields for the generator's name, address, and EPA ID number. Below that, there are sections for describing the waste, including its quantity and characteristics. The form also has sections for the transporter's information and the destination. At the bottom, there are fields for emergency contacts and a section for signatures and dates. The form is presented as a scan of a physical document with a perforated edge on the right side.



And Now...



## What are the Consequences?

- “Arizona man sentenced for dumping grease, wastewater in violation of Clean Water Act”
  - ✓ A manager of a local grease waste removal company was sentenced March 6, 2017 to 3 years’ probation and a \$55,000 fine for instructing employees of the company to dump grease and wastewater into the Phoenix Sewer in violation of the CWA
  - ✓ “Trucked or hauled grease and wastewater is a pollutant under the Clean Water Act and may not be discharged into a publicly-owned treatment works (POTW) except at designated discharge locations”

- The manager “pleaded guilty to a felony violation of the Clean Water Act on Sept. 29, 2016. He acknowledged that in 2008 and 2009 he instructed a company driver to discharge grease and wastewater pumped from the interceptor of various restaurants into different restaurant interceptors, which caused it to flow into the sewer systems and POTWs across the greater Phoenix area. Grease wastewater has the potential to cause sewer backups by clogging the pipes and disrupting the POTW’s waste cleaning processes.”
- The company “had previously pleaded guilty to a misdemeanor Clean Water Act violation associated with the discharges on Nov. 19, 2015. The court sentenced the company to pay a \$200,000 fine, serve three years of probation, and implement a comprehensive environmental compliance and training program.”
- The EPA’s Criminal Investigation Division conducted the investigation.

-Excerpt from the Sierra Vista Herald (March 6, 2017)

# Pollution Is Expensive

## Man Pleads to Storing Toxic Waste

CEDAR FALLS IA (8/9/2016) – A Cedar Falls man has agreed to pay at least **\$789,138 in cleanup costs** after pleading guilty to allegations he stored toxic waste at his closed electroplating company, according to court records.

In addition to the costs, Richard Delp, 62, also agreed to pay a \$100 special assessment and faces up to five years in prison and a fine of up to \$50,000 per day of the violation, according to court records and the U.S. Attorney's Office for the Northern District of Iowa, which prosecuted the case.

Delp pleaded guilty to one count of storing hazardous waste without a permit on Wednesday in U.S. District Court in Cedar Rapids.

Delp was the owner of Cedar Valley Electroplating at 5611 Westminster Drive, and the business plated steel parts with zinc between 2004 and 2011. Authorities allege he stored hazardous waste at the site without the required permits and continued despite warnings from Environmental Protection Agency officials in 2005 and 2010.

The chemicals were left in the building when the operation closed in September 2011, court record state, and EPA officials searched the property in February 2012 and found hundreds of gallons of chromium, zinc, ferrous sulfate, sulfuric acid, hydrochloric acid and other substances. The EPA undertook a \$789,138 cleanup in October 2012.

A federal grand jury returned an indictment against Delp in May 2016. Sentencing will be at a later date, Delp remains free until then.

Contact: JEFF REINITZ [jeff.reinitz@wfcourier.com](mailto:jeff.reinitz@wfcourier.com)

## Dispose of Waste Properly

Crystal Geyser Water Bottler Ordered to Pay \$5 Million Criminal Fine for Illegal Storage, Transportation of Arsenic-Laced Waste

LOS ANGELES CA (8/6/2020) - The company that produces "Crystal Geyser Natural Alpine Spring Water" was sentenced today to three years of probation and ordered to pay criminal fines totaling \$5 million for illegally storing and transporting hazardous waste created from filtering arsenic out of spring water at its facility in Olancho, California. United States District Judge Dolly M. Gee also ordered CG Roxane LLC to implement a compliance program within 90 days to ensure it complies with federal and state environmental laws and implement that program within 180 days of today's sentencing hearing. The compliance program includes the company's retention of a qualified and experienced third-party environmental auditor to conduct annual audits of CG Roxane's Olancho facility. The company pleaded guilty on January 9 to one count of unlawful storage of hazardous waste and one count of unlawful transportation of hazardous material. The financial penalty Judge Gee imposed today consisted of a \$2.5 million criminal fine for each count.

## Industrial Facilities & Waste

- Approximately 7.6 billion tons of industrial solid waste are generated and disposed of in the U.S. each year

(U.S. EPA, Guide for Industrial Waste Management)



- “To effectively manage your waste and ensure proper handling (e.g., preventing the mixing of incompatible wastes, use of incompatible liners or containers), knowledge of the chemical and physical composition of the wastes is important.” (8-8 of the Guide for Industrial Waste Management, EPA)

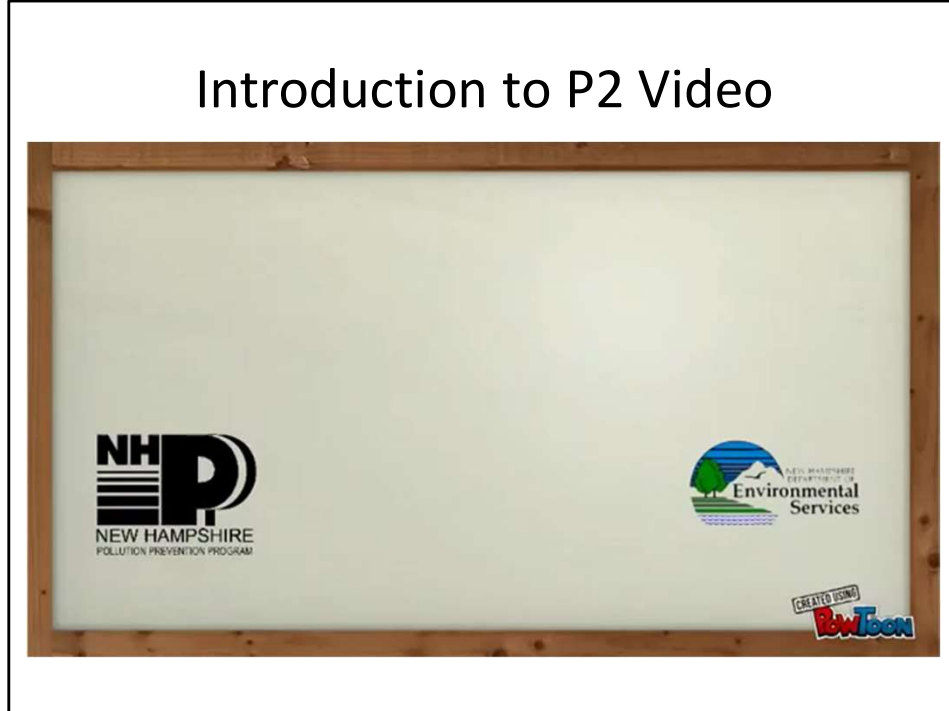
## Introduction to P2



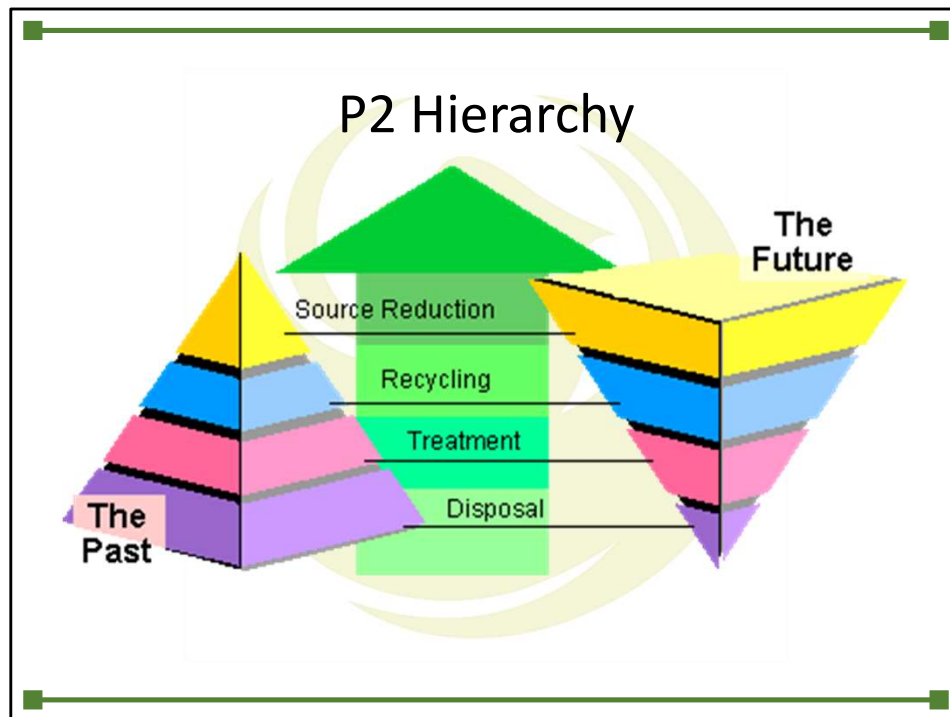
- Hierarchy
- Terms
- Examples (entire process)



## Introduction to P2 Video



- Credit: The New Hampshire Pollution Prevention Program and New Hampshire Department of Environmental Services



- Notice that in the past Pollution Prevention (P2) was primarily concerned with how waste was dealt with after it was generated. This stage of P2 may be thought of as the nascent stage in that it recognized that the way that one disposed of a waste might have a serious impact on one's life / health and environment but it seems to have taken little or no thought of limits or constraint. A more mature approach is necessitated by the fact that there are limits and constraints (amount / volume) on the space available for land disposal and the cost of disposal continually increases.
- The more mature stage of P2 emphasizes that consideration be given to limiting the amount of waste generated. Thus we see that in the nascent stage the largest portion of resources were dedicated to disposal while in the more mature stage more resources are devoted to avoiding the need for disposal if possible.

## What is P2?

### **EPA DEFINITION:**



Pollution Prevention (P2) is **reducing or eliminating waste at the source** by:

- Modifying production processes.
- Promoting the use of non-toxic or less-toxic substances.
- Implementing conservation techniques.
- Re-using materials rather than putting them into waste.

- The simple working definition of Pollution Prevention is: Buy only what you need and use all that you buy. If no waste is generated then no disposal is needed.
- The Arizona P2 Plan Program can be found in the Arizona Revised Statutes (A.R.S.) § 49-961 through 973.


## Goal of P2


- You're there when you:
  - Buy ONLY what you need.
  - Use ALL that you buy.
- ZERO Waste: Is this attainable?
- Reuse of materials in lieu of placing them into the waste streams (ADEQ)

**Reimagine Phoenix**

Transforming Trash Into Resources





Another goal of pollution prevention is the reuse of materials in lieu of placing them into the waste streams (ADEQ)

Check out the City of Phoenix Public Works Zero Waste & Reimagine Phoenix Programs!

- In order to reach the Zero Waste goal by 2050, the Zero Waste Team uses education and community outreach to teach the community about waste diversion.
  - ✓ <https://www.phoenix.gov/publicworks/zero-waste>
- Reimagine Phoenix is the city's initiative to increase the city's waste diversion rate to 40 percent by 2020 and to better manage its solid waste resources. As of June 2019, they reached 36 percent.
  - ✓ <https://www.phoenix.gov/publicworks/reimagine>

LEED Certifications:

Phoenix Convention Center (Our West building is certified by the U.S. Green Building Council with a Leadership in Energy and Environmental Design (LEED) Silver rating and our North building incorporates LEED standards and city of Phoenix green criteria.)

- <http://www.phoenixconventioncenter.com/planner/sustainability.php>

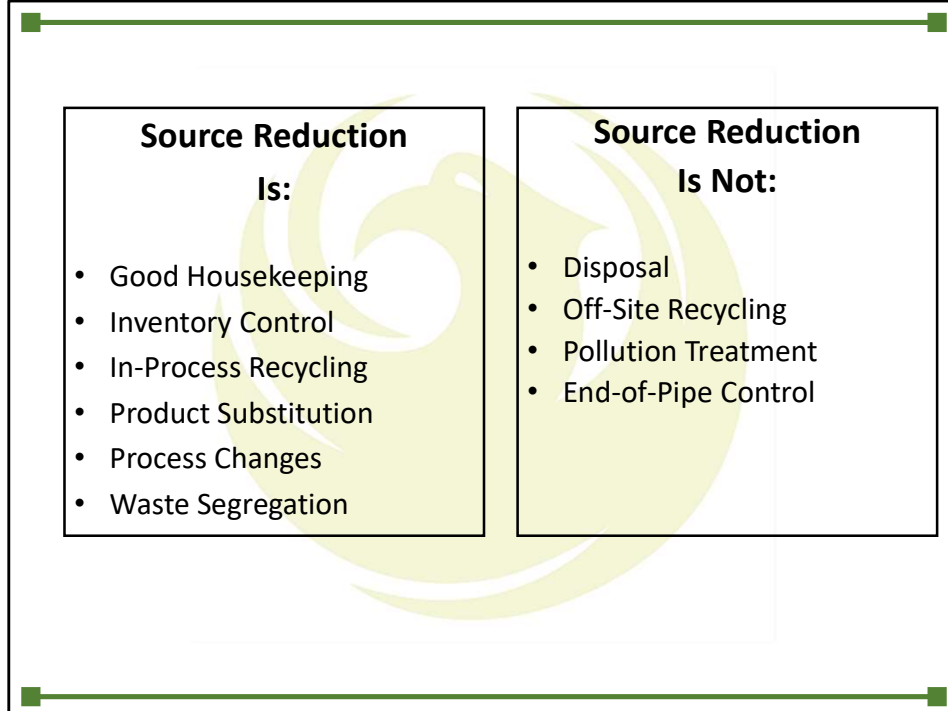
## Question

- Give an example of a P2 policy at your company (official or unofficial).



For reference:

<https://legacy.azdeq.gov/envIRON/waste/p2/download/ADEQ%20Basic%20P2%20Training%20May%202014.pdf>



- Note that the left panel depicts things that are useful in Waste Minimization or Waste Reduction.
- The right panel is not intended to imply that there is anything negative about the activity, rather its purpose is simply to indicate that these activities are employed AFTER the waste has been generated.
- Please remember that source Reduction is primarily concerned with minimizing the amount of waste generated.
- Another way to look at it might be the analogy that you can practice good health habits such as proper diet and exercise or you can choose to ignore your health and perhaps have to deal with extra pounds and other adverse health effects that accompany a lack of proper diet and exercise. In other words, you can practice good habits now and prevent potential problems in the future or you can deal with the future consequences as they arise.

## P2 Terms

### EPA Terms:

- **Waste Reduction** means the reduction of volume, and or toxicity, of waste after the waste has been generated and prior to disposal.
- **Waste Minimization** means the reduction, to the extent feasible, of any solid or hazardous waste prior to any treatment, storage, or disposal.



This slide focuses on additional EPA terms and definitions as a result of the Act.

With Reduction the emphasis is on dealing with waste AFTER it has been generated.

With Minimization the emphasis is on limiting the amount waste Prior To it being generated.

## Why P2?

- Cost Benefit
- Reduction in workplace exposures to hazardous materials
- Protect the environment
- Protect the Publicly Owned Treatment Works (POTW)



- By preventing pollution one avoids the need to clean up that which would have been polluted. Generally it is more cost effective to prevent a problem than to repair that problem.



## Reduce Pollution At Its Source By:

- Improving operations
- Substituting materials
- Modifying equipment
- Reduce
- Reuse materials
- Promoting P2



- This slide highlights some helpful ways to reduce pollution by -
  - Improving operations by looking at industry Best Management Practices (BMPs)
  - Improving operations by understanding what is necessary to perform the operations and seeking ways to streamline
  - Creative ways to repurpose materials
  - Seeking ways to improve

## Who Needs P2?

- Per ADEQ:
  - Those who have filed a Toxic Release Inventory (TRI) form in the previous year
  - Those who generated an average of 1 kg/month of acutely hazardous waste (or 1,000 kg/month of haz waste)
  - Those who use more than 10,000 lbs of a TRI listed toxic substance in the previous year
  - Specifics on next slide



- Source: Directly from ADEQ Basic P2 Training May 2014: (<https://legacy.azdeq.gov/environ/waste/p2/download/ADEQ%20Basic%20P2%20Training%20May%202014.pdf>)
- P2 Thresholds: <https://azdeq.gov/node/1690>
- A voluntary P2 Plan is always welcomed even if no thresholds are met!

**Plan Requirement Threshold(s) Met**  
 (Please check all P2 plan filing threshold(s) the facility met which requires it to file and maintain a P2 Plan). Update the dates below with the most recent calendar year.

Generated or shipped offsite, for purposes other than recycling, a monthly average of 2,200 pounds (1,000 kg) of hazardous waste in 20\_\_\_\_. List these hazardous waste streams and amounts in **pounds**: (e.g. chromium -1,000, lead -200 etc.)

\_\_\_\_\_

Generated or shipped offsite, for purposes other than recycling, a monthly average of 2.2 pounds (1 kg) per month of acutely hazardous waste in 20\_\_\_\_. List these waste streams and amounts in **pounds**: e.g. warfarin – 50, sodium cyanide-10, etc.)

\_\_\_\_\_

Filed Toxic Release Inventory (TRI) form(s) (form R or A) in 20\_\_\_\_. List TRI toxic substances: \_\_\_\_\_

Used in excess of 10,000 pounds of a TRI listed toxic substance in 20\_\_\_\_. For additional clarification on "use," review the [Pollution Prevention Plan - Interpretation of "Use" of Toxic Substances in Excess of 10,000 Pounds](#) policy. List these TRI listed toxic substances: \_\_\_\_\_

**This facility did not meet any Plan Requirement Threshold(s) but would like to:**

File a voluntary P2 Plan

Page 4 of 8

- P2 Plans are now paperless: <https://azdeq.gov/mydeq/p2>
- Online you can: Submit and amend P2 Plans and Annual Progress Reports — including your P2 Plan Toxic Data Report (TDR) due July 1, 2019, as required by A.R.S. § 49-962(C)

# P2 Filing & Screening

## POLLUTION PREVENTION THRESHOLD SCREENING

You will need the following items to complete this application and determine if you are required under Arizona Revised Statutes to complete a Pollution Prevention Plan (P2).<sup>②</sup>

Please have this information ready and click CONTINUE.

- 1 Facility Information
- 2 Contact Information
- 3 A Valid Treater, Storer or Disposer of Hazardous Waste (TSDF) Permit Number (if you are TSDF)
- 4 Agricultural General Permit Number (if applicable)
- 5 Hazardous Waste Generation/Shipping Information
- 6 Facility Chemical Usage Information<sup>②</sup>

 Warning: Your session will time out in 20 minutes of non-activity on a single screen.

Note: As of April 2019, ADEQ no longer accepts paper submissions for P2 reporting. Everything is handled in MyDEQ.

## P2 Plans By the Sections

- Section 1: General Info
- Section 2: Facility Info
- Section 3: Scope, Objectives, Analysis & Opportunity Identification
- Section 4: P2 Performance Goal
- **\*\*Steps 3 & 4 repeat for each item you add\*\***
- Amendment or New – still have above sections

\*Per ADEQ P2 - <https://azdeq.gov/node/273>

## P2 Opportunity Examples

- Metal Finishing
  - Hexavalent chromium is used in chrome plating
  - P2 Opportunity: Install a complete sealed liner as a primary containment system on top of concrete flooring to capture drips and spills (hex chrome) and prevent contamination of groundwater (infiltration of concrete)
  - P2 Opportunity: Reduce or eliminate free standing chrome solution in retention sumps to reduce contamination of environment



## Question

- Does your company have a P2 plan? If yes, what is one of the goal statements?



Example statements: Reduce emissions by 35%, reduce use of chrome through filtration by 20% in the next 5 years, etc...

## How Do I Get Started?

**Step 1** - First and most importantly one has to make a determination to take that first step.

**Step 2** - Assess all of the issues and processes involved.

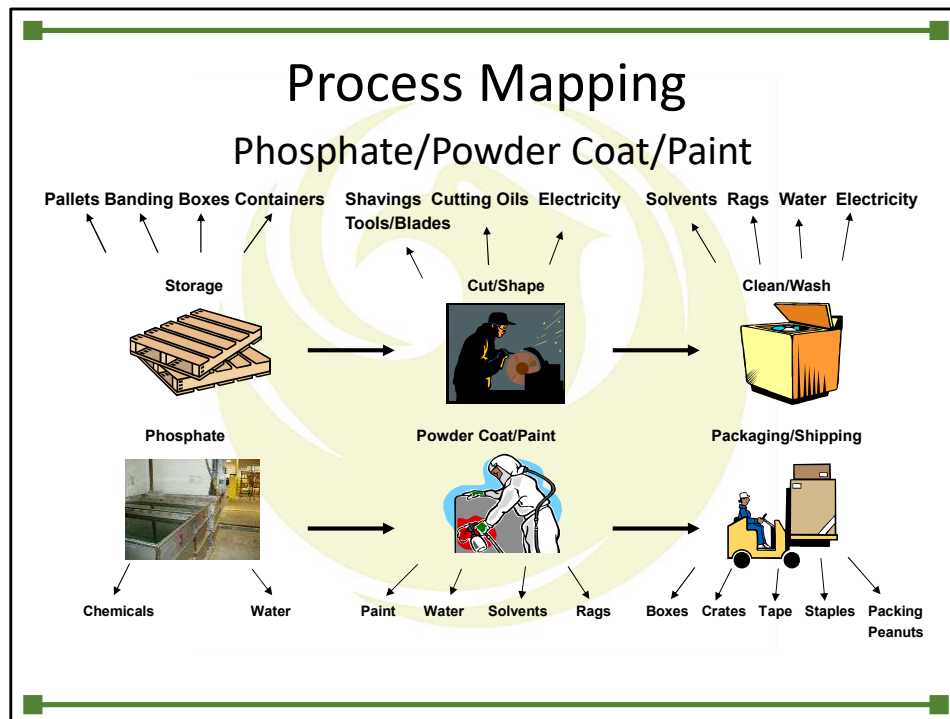
**Step 3** - As a rule one should “pick the lowest hanging fruit”.

**Step 4** – Repeat Step 1 thru 3



- Some ways to get started...
- Characterize and Document your wastes - process wastes, hazardous; non-hazardous wastes, solid wastes, and wasted energy or water.
- Examine energy and water consumption and look for high and low usage trends in your water and electric bills.
- Consider costs of each material stream, including the cost to purchase, dispose of, treat, or control it.





This is a process map for a metal finishing operation.

To create the map you must take the following steps at each stage of the process:

- 1) Identify the raw materials
- 2) Identify ALL wastes that are generated
- 3) Identify possibilities for minimizing or eliminating those wastes

## Henry Ford

- At one time he bought all his motors from the Dodge brothers. He would only accept them if they came in a crate that was made to his specifications. He used the crates for the floor boards of his model "T"s.
- This saved him the price of the wood and the wages of men to make floor boards
- How is this an example of Reduce and Reuse?



## Measure Progress

Quantify and track reductions and cost savings in:

- Volumes of waste produced.
- Hauling/Handling/Treating/Disposing of wastes.
- Energy and water use.
- Raw materials consumed.
- Toxics, emissions and effluents.



Document your successes because they can serve as encouragement.

Document your failures because you should reap the benefits of the education you have already paid for.

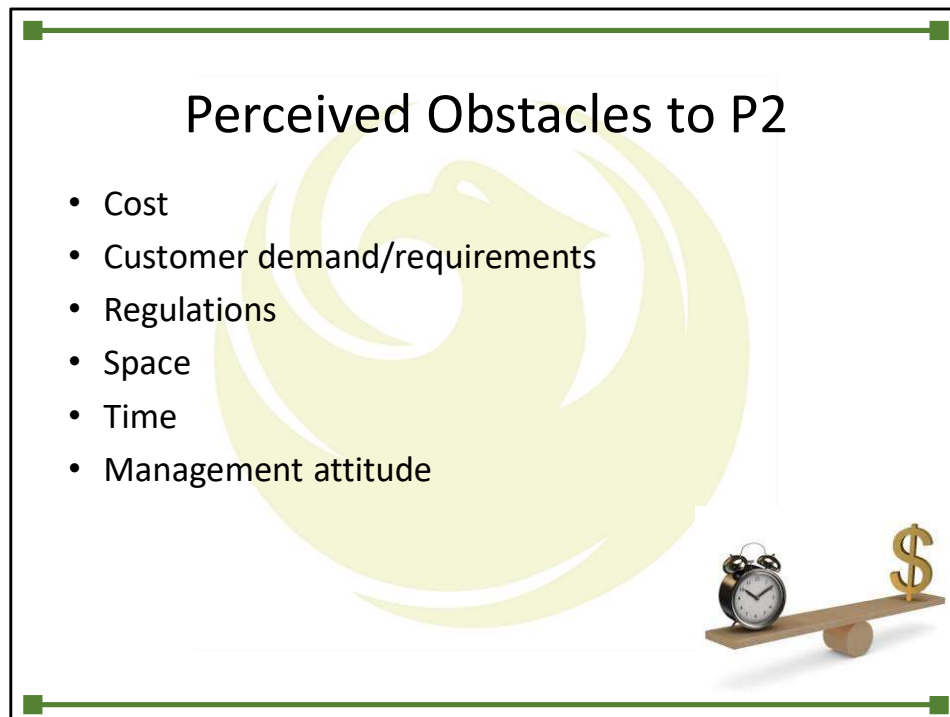
Remember that everything is a learning experience.

## Re-evaluate

- Make efforts on a regular basis.
- Conduct regular assessments to identify additional waste prevention opportunities.



- The Toyota Way is a set of principles and behaviors that underlie the [Toyota](#) Motor Corporation's managerial approach and production system. Toyota first summed up its philosophy, values and manufacturing ideals in 2001, calling it “The Toyota Way 2001.”
- It consists of principles in two key areas: continuous improvement, and respect for people.



A study presented at the *Environmental Behavior and Decision-Making: Corporate Environmental Behavior and Benefits of Environmental Information Disclosure Meeting*, January 14-15, 2008 in New York, NY concluded..

“...that environmental regulations are a complement to voluntary business environmental management (BEM), not a substitute. The findings also demonstrate the powerful role of management attitudes toward the environment in BEM decisions. These two factors, along with selected market forces and facility characteristics, significantly and differentially affect voluntary environmental programs (VEP), environmental management practices (EMP), or P2 decisions. The findings suggest that effective policies must identify the most influential factors for the policy target, VEP participation, EMP adoption or EP, and the synergistic relationships between BEM decisions”

Source: <http://www.epa.gov/ncer/publications/workshop/decisionmakingmeet0108.pdf>

## Question

- What is an example of an obstacle to P2 that your company experiences?




## Food Manufacturing P2 Examples

- Toxic Substance Use Reduction
  - Dry ice cleaning in lieu of manually scrubbing
  - Sanitizing with ozone, dry steam, UV disinfection
- Energy Conservation
  - Energy audits
  - Improve building lighting with LED; replace machinery with higher efficiency equipment – Energy Star
- Water Conservation
  - Use dry clean-up methods like brooms, scrapers and vacuums to reduce water waste
  - Close looped system to reuse process wastewater or in cooling, heating operations

Credit to ADEQ - <https://www.azdeq.gov/food-manufacturing-p2>

## Facilities Management P2

- Energy Efficiency
- Heating and Cooling
- Green Buildings
- Water Efficiency
- Safer Cleaning
  - SDSs
  - Dirt trapping mats
  - Refillable spray bottles
  - Low-maintenance flooring



**ADEQ**  
Arizona Department  
of Environmental Quality


**RESOURCE SUMMARY**

Publication number: TAI-17-13

**Pollution Prevention (P2) for Janitorial Services**

Janitorial services can promote employee health and safety and minimize these risks through:

- Substitution
- Prevention
- Reduction



Credit to ADEQ - <https://www.azdeq.gov/facilities-management-p2>

Replace hazardous products with safer options that exhibit the following qualities:

- Low corrosivity
- Low flammability
- Low toxicity to humans and marine life
- Non-carcinogenic
- Low ozone-depleting compound (ODC) content
- Low volatile organic compound (VOC) content
- Biodegradable

The EPA Safer Choice program and the Toxics Use Reduction Institute (TURI) Cleaner Solutions database can also be searched for specific products that have been identified as less toxic and are effective for different types of cleaning.



## Metal Finishing P2 Examples

- P2 efforts in the 1990s can still be applicable today!
- EPA Region 9, the Metal Finishing Association of Southern California, and the California Manufacturing Technology Center cooperated on the Pollution Prevention Project for Metal Finishers.
- EPA Region 9 has also implemented a metal finishing P2 program in South Phoenix, AZ
- Example: RO system for filtration can save thousands of dollars a month (initial investment earned back in 2 years) – Perfection Plating in 2000

Sources: <https://www3.epa.gov/region9/waste/p2/projects/metal.html>  
<https://www3.epa.gov/region9/waste/p2/projects/metal-reverseosmosis.pdf>

## Metal Finishing P2 Examples

P2 method/technology	Result
Process control	60% decrease in nickel acetate use
Electrodialysis	37% decrease in electroless nickel chemical use
Chrome plating/cooling	10% reduction in chromic acid use
Conductivity control systems	43% water use reduction
Spray systems	60% water use reduction
Tank layout modifications	50% water use reduction
Chrome plating/cooling	Decreased reject rates from 10 to 1 percent and associated wastes

Source: <https://www3.epa.gov/region9/waste/p2/projects/metal.html>

## Case Study: Rexam

- Recycles all of their waste including incineration for energy recovery of general waste.
  - Pallet strapping, plastic
  - Aluminum, cardboard
  - Filter cake
  - Used oil
  - Ink
  - Have switched from wood to plastic pallets.
- Wastewater is re-used to make up lime slurry in the metals precipitation process.

Rexam is one of our class A permitted facilities. They are a manufacturer of beverage cans (soda, juice, iced tea, etc).

## Case Study: Rexam Goals

- Reduce diesel, gas, and water usage.
- Achieve zero landfill contribution (lime cake is disposed as non-RCRA)
  - Dispose of general waste by energy recovery incineration.
- Achieve 100% recycling of manufacturing waste by the end of 2019.



Their goals were to reduce diesel, gas, and water usage, achieve zero landfill contribution and have 100% recycling of manufacturing waste by the end of 2019.

As of 2021, Rexam achieved Zero Waste generation.

## Case Study: Celgene & Reuse

### Reuse system reduces water and chemical use in Phoenix

Since November 2018, Atlantis Technologies' radial deionization (RDI™) system installed in global biopharmaceutical firm Celgene's flagship facility in Phoenix, Arizona, United States (US), has been reusing up to 87,000 liters (23,000 gallons) per day of wastewater from various streams for reuse in the facility's cooling towers.

The new wastewater reuse system supports the company's global strategic initiatives of reducing water usage at its plants. Celgene projects annual cost savings of at least US\$28,400 and up to \$50,000, including reduced chemical use in towers.

"One of Celgene's corporate sustainability goals is to reduce total water withdrawals by 10 percent by 2020, so the installation of this system helps meet our environmental stewardship efforts," says Anthony J. Benenati, manager of aseptic manufacturing support at Celgene. "We chose to start in Phoenix where the clean water supply is so limited and water stewardship is a critical com-

munity issue. We plan to expand the current system to reuse excess reclaimed water for other water needs around this facility and others within the company," he adds.

The 12-cylinder, vertically mounted RDI system reduces the salinity of the feed water to the cooling tower, reducing chemical usage by as much as 50 percent. Developed by Atlantis Technologies, radial deionization is an improved and patented form of capacitive deionization.

With the Atlantis RDI system, water is passed between two oppositely charged supercapacitors that remove salt. Once full, the capacitor polarity is switched, and a low-volume, high-concentration brine is produced. Cylinders and the system can be placed in parallel to increase volume or in series to process high salinity water. The system can also partially desalinate water, known as TDS shaving, further improving economics for applications such as cooling towers and waste discharge.



Celgene's new (November 2018 – present) system allows reuse of up to 23,000 gallons per day in biopharmaceutical wastewater with repurposing for the facility's cooling towers  
Cost savings? \$28,400 – 50,000 annually (including chemical usage)!!  
Other benefits? Zero discharge at one sampling point (less potential for pollution)

## P2 in the City of Phoenix

- Phoenix Zero Waste team
  - New Master Recycler program to help Phoenix achieve zero waste by 2050
  - Waste reduction, correct recycling, eco-friendly habits
  - <https://www.phoenix.gov/publicworks/zero-waste>
- Phoenix Green Business Leader
  - <https://www.phoenix.gov/greenbusiness>
  - Free water efficiency check-ups
  - 3 levels of certifications
- Phoenix Climate Action Plan
  - <https://www.phoenix.gov/oep/cap>



## LEED Certification

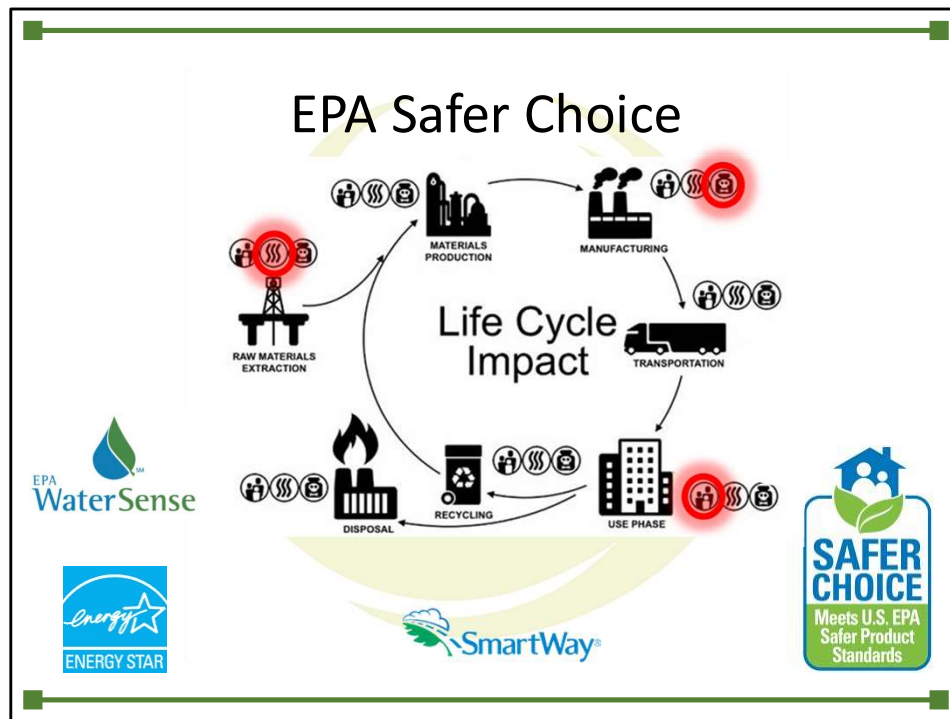
- Buildings use significant energy – pumping and treating water, heating and cooling, disposal of waste, etc.
- LEED building certification – creating better buildings
  - Promotion of sustainable and regenerative material cycles
- LEED Credits – climate change, human health, water resources, biodiversity, green economy, community and natural resources

<https://www.usgbc.org/leed>

<https://www.usgbc.org/articles/role-leed-climate-change-mitigation>

LEED encourages life cycle assessment (LCA) of building materials and products, and, in turn, whole buildings. Assessing alternatives based on life cycle GHG is a critical first step to selecting lower-impact approaches and providing market feedback.

According to a 2018 [assessment by the U.S. General Services Administration](#), its portfolio of high-performing buildings—many of them LEED-certified—used 23% less energy and 28% less water, and they generated 9% less landfill waste than GSA’s legacy stock buildings.



Safer Choice helps consumers, businesses, and purchasers find products that perform and contain ingredients that are safer for human health and the environment. Safer Choice is an [EPA Pollution Prevention \(P2\) program](https://www.epa.gov/p2), which includes practices that reduce, eliminate, or prevent pollution at its source, such as using safer ingredients in products. About 1,900 products currently qualify to carry the Safer Choice label.

Every ingredient is reviewed: Before a product can carry the Safer Choice label, EPA reviews all chemical ingredients, regardless of their percentage in the product. Every ingredient must meet strict safety criteria for both human health and the environment, including carcinogenicity, reproductive/developmental toxicity, toxicity to aquatic life, and persistence in the environment.

Source: <https://www.epa.gov/saferchoice>

It is important to consider these impacts over a product's entire life cycle:

Sourcing of raw materials, Manufacturing, Packaging, Transportation, Distribution, Retailing, Use of the product, and Management of the product when it is broken or no longer needed – through repair, reuse, or safe recycling and/or disposal.

Source: <https://www.epa.gov/greenerproducts/institutional-purchasers-greener-products-and-services>

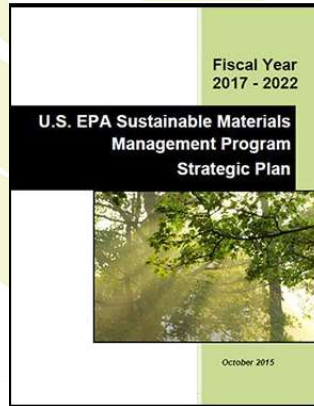
Another example that can be used as a cautionary tale: Microbead ban could have been prevented if pollution prevention was implemented and an alternative material used....instead, companies were forced to switch involuntarily.

For more info: Davis Truslow, *Microbeads and the Toxics Use Reduction Act: Preventing Pollution at Its Source*, 44 B.C. Env'tl. Aff. L. Rev. 149 (2017), <http://lawdigitalcommons.bc.edu/ealr/vol44/iss1/6>



# Sustainable Materials Management

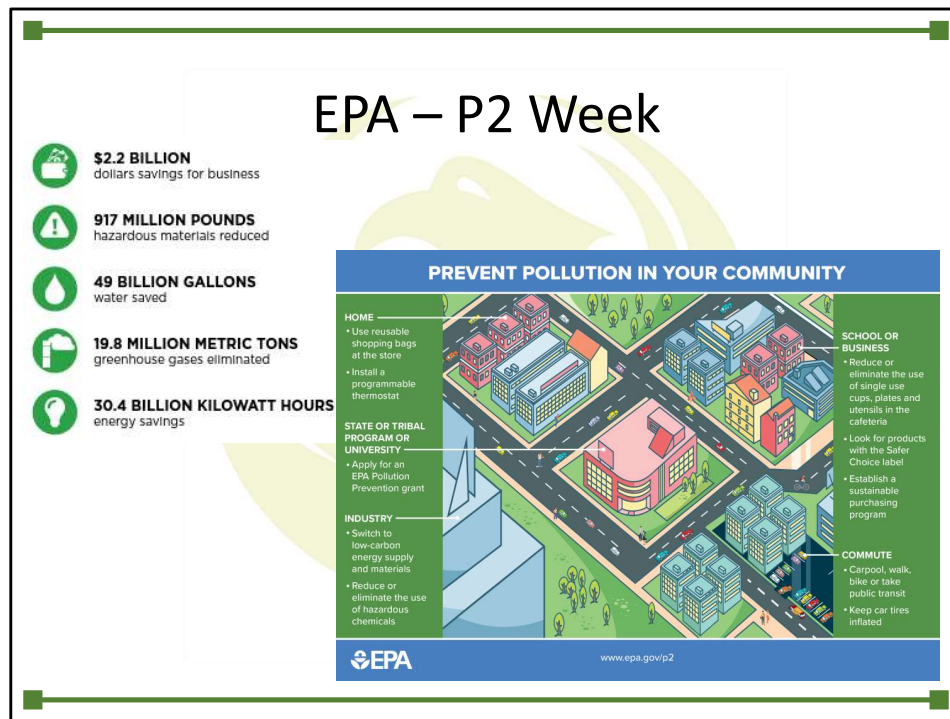
- EPA encourages waste minimization, P2, energy recovery and recycling through many programs:



EPA's Sustainable Materials Management: <https://www.epa.gov/smm>

More programs:

Community Action for a Renewed Environment (CARE)  
Coal Combustion Products Partnership (C2P2)  
Electronic Product Environmental Assessment Tool (EPEAT)  
Environmental Management System (EMS)  
GreenScapes  
Industrial Materials Recycling  
National Partnership for Environmental Priorities (NPEP)  
Pay As You Throw (PAYT)  
Plug-In To eCycling  
Responsible Appliance Disposal Program  
Responsible Recycling (R2)  
Recycling On The Go (ROGO)  
School Chemical Clean-out Campaign (SC3)



Source: <https://www.epa.gov/p2/p2-resources-business>

Grant webinar link: <https://www.epa.gov/p2/epa-pollution-prevention-webinar-series-past-webinars>

The Environmental Protection Agency's (EPA) Pollution Prevention (P2) Program provides grants to states and tribes to provide technical assistance services to American businesses to help them prevent pollution at its source before it is even created.

Examples: Pollution Prevention Grant; Bipartisan Infrastructure Law Pollution Prevention Grant.

Currently there are 2 grants that just closed: Pollution Prevention Grant: Environmental Justice in Communities and Pollution Prevention Grant: Environmental Justice Through Safer and More Sustainable Products

Between 2011-2021, EPA issued P2 grants that helped American businesses identify P2 approaches that resulted in all of these savings and reductions for businesses! Note, these numbers were calculated over a 4-year rolling period to account for recurring benefits

There are even internship program for P2! See <https://www.epa.gov/p2/internship-programs-pollution-prevention>

# ADEQ – P2 Week



Source: <https://azdeq.gov/press-releases/press-release-adeq-celebrates-30-years-achievements-during-arizona-pollution>

September 19-25, 2021 was proclaimed P2 Week – started in 2018 we recall. Generally, a week at the end of September is dedicated P2 Week every year.

# ADEQ P2 Week & Contacts

- P2 Program Coordinator  
602-771-8083  
p2@azdeq.gov



## ADEQ Resources

- P2 in Arizona
  - ADEQ provides resource summaries for many different industries on their page: <https://www.azdeq.gov/p2-resource-summaries>



- For National Pollution Prevention Week (3rd week of September) every year, the Arizona Department of Environmental Quality Pollution Prevention (P2) Program hosts webinars featuring examples of successful P2 goals implemented by a few of their program facilities. The reduction of hazardous waste generation and toxic substance use is a requirement of the P2 planning program. Currently, over 300 facilities participate in ADEQ's P2 program.
- ADEQ P2 resource summaries: <https://www.azdeq.gov/p2-resource-summaries>

## Additional P2 Resources

- <http://wsppn.org/>
  - ✓ ADEQ webinar found at the above site
- <http://www.dtsc.ca.gov/scp/>
  - ✓ Safer Consumer Products (SCP) Program



- Western Sustainability & Pollution Prevention Network: Many resources from several states, tribes and territories, including other webinars, publications and research.
- SCP Program asks: 1) Is this chemical necessary? 2) Is there a safer alternative?

Questions?





City of Phoenix

Water Services Department  
Environmental and Safety Division

[www.phoenix.gov/waterservices/envservices/indpretreatmentprog](http://www.phoenix.gov/waterservices/envservices/indpretreatmentprog)

602-262-1859 (Front Desk)

602-261-8000 (WSD After Hours Emergency Contact)