

CITY OF PHOENIX INDUSTRIAL PRETREATMENT COMPLIANCE ACADEMY



Pollution Prevention (P2)



PHX WATERSMART

Pollution Prevention Compliance Academy

DANIEL BOJORQUEZ II, SENIOR WATER QUALITY INSPECTOR
SAMANTHA FORNOFF, SENIOR WATER QUALITY INSPECTOR
CITY OF PHOENIX – WATER SERVICES DEPARTMENT



SEPTEMBER 22, 2026

Mc Cluskey, Chelsey PCC 495-5926 chelsey.mccluskey@phoenix.gov
O'Day, Christie WSPP 495-5925 christie.o'day@phoenix.gov
Sanchez, Milton ESS (CWQI) 495-7412 milton.sanchez.@phoenix.gov
Smith, Kyle EQS 534-2085 kyle.smith@phoenix.gov

Uribe, Elyse SWQI 534-2078 elyse.uribe@phoenix.gov
Bojorquez II, Daniel SWQI 534-2915 daniel.bojorquez@phoenix.gov
Swayne, Tyler SWQI 534-2905 tyler.swayne@phoenix.gov
Fornoff, Samantha SWQI 534-1362 samantha.fornoff@phoenix.gov
Vacant WQI
Vacant WQI
Vacant WQI

- *WQI – Water Quality Inspector
- *SWQI – Senior Water Quality Inspector
- *WSPP – Water Services Projects Planner
- *PCC – Pretreatment Compliance Coordinator
- *ESS (CWQI) – Environmental Services Supervisor (Chief Water Quality Inspector)
- *EQS – Environmental Quality Specialist



Registration Information

Link for registration:
<https://www.phoenix.gov/IPPCompAcademy>

Next Class is:
[Stormwater Compliance Overview](#)
On November 17, 2026 at 9:00 a.m.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Registration opens about a month prior to the course. Contact our PCC Chelsey Mc Cluskey at chelsey.mccluskey@phoenix.gov for registration information.

Check out our new flyer on our website



Webinar/Hybrid Rules

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- Please respect the other attendees and speakers by keeping yourself muted during the webinar presentation
- 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
- We may 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
- Please access our booklet at the Compliance Academy website:
phoenix.gov/ippcompacademy
- If there are chlorine or fire alarms, we will direct you whether to group inside, outside in the triangle or exit the plant
- Restrooms are past the break room down the hallway



Syllabus

- Definitions
- 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.

Definitions

- IU
- SIU
- Categorical SIU
- NSCIU
- Non-Categorical SIU
- Special Discharges



IU - “Industrial User” Non-residential sewer user

SIU - “Significant Industrial User” Operates a federally regulated process, or, discharges > 25,000 gpd process wastewater

An SIU is regulated by the City under the Industrial Pretreatment Program and holds a Class A Wastewater Discharge Permit. Compliance status must be reported to the EPA and ADEQ.

NSCIU – An industrial user subject to categorical pretreatment standards that the Director determines has an industrial discharge that does not cause or have the reasonable potential to cause harm or damage to the POTW...the IU never discharges either at all, or more than 100 gallons per day of total categorical wastewater

Categorical SIU - An SIU that operates any one of the more than 60 different manufacturing processes such as Metal Finishing, Electroplating, Aluminum Forming, Copper Forming, etc., for which the EPA has established performance criteria, i.e., numeric effluent limits (see page 2 of your permit). All Categorical industries are SIU’s.

Non- categorical SIU - An SIU that does not operate one or more of the manufacturing processes for which the EPA has established performance criteria.

Special Discharger - An IU that is not classified as an SIU. These IUs may be zero discharger (NSCIU), users which discharge the equivalent strength of 25,000 gallons per day of domestic waste as measured by BOD and TSS, or users that discharge remediated groundwater. The IU in this category will be required to obtain a “Class B” or “Class C” permit.

(These definitions may also appear within the Standard Permit Conditions or Phoenix City Code Chapter 28 “Sewers”.)

Definitions

- Categorical Limits
- Local Limits
- Pollutants of Concern
- Compliance Sample
- TTO
- Slug



Categorical Limits – Standards promulgated by the U.S. Environmental Protection Agency (EPA) under the authority of the Clean Water Act that apply to a specific category of industrial user based on the processes that are performed at the user's facility.

Local Limits – Wastewater discharge limits developed by the City to protect;

- Health and safety of the public and sewer treatment plant workers,
- The biological wastewater treatment plant processes,
- The quality of biosolids so that they can be beneficially used, and
- The environment where the treatment plants discharge their effluent

Pollutants of Concern – Include pollutants that:

- Have an applicable technology-based effluent limit
- Have a total maximum daily load waste load allocation
- Have water quality-based effluent limits
- Are present in the effluent through monitoring
- Are expected to be present in the discharge

Compliance Sample – A wastewater sample that is:

- Collected from the Permit authorized compliance sampling point,
- Collected using proper sampling methods,
- Is analyzed using EPA-approved analytical methods in accordance with 40 CFR 136

TTO – Total Toxic Organics

Slug – Any untreated discharge of a non routine, episodic nature, including but not limited to an accidental spill or a non customary batch discharge.



PHX WATER SMART

A Brief History of Pollution

- 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)
 - I-10 Nitric Acid Spill in Tucson, AZ (February 2023)
 - Cuyahoga River Rebound!
- Early History Environmental Milestones
 - **Silent Spring**
 - EPA Formed
 - **Clean Water Act**
 - 1st Wastewater Permit Issued
 - **Safe Drinking Water Act**
- John Snow & Drinking Water (1850's)



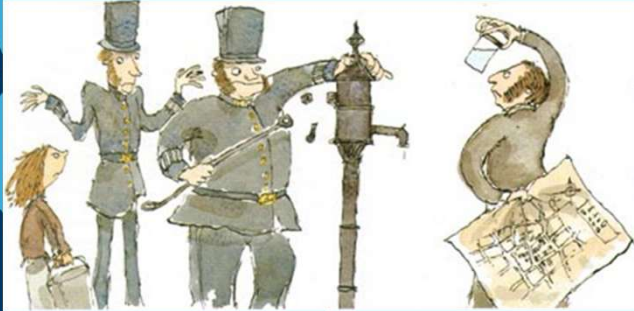
DUMPING
SEWAGE
UNLAWFUL

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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!)

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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)



PHX WATER SMART

Cuyahoga River (1952)



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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



PHX WATER SMART



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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".



PHX WATER SMART

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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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 ever recovered.
-
- Source: <https://owlcation.com/stem/-Ten-Worst-Man-Made-Environmental-Disasters-in-American-History>



PHX WATER SMART

EPA Gold King Mine Wastewater Spill (2015)



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

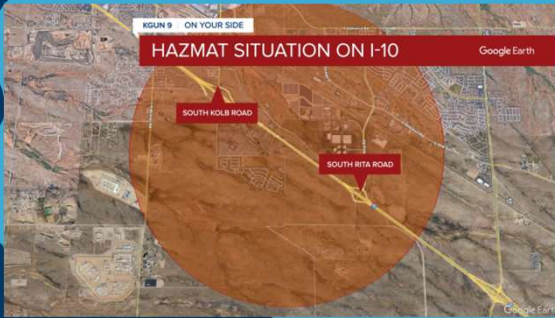
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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 at this time.
- There were social impacts because a downstream Reservation was unable to irrigate its crops after the spill.
- Although there does not appear to be long-lasting damage, it is possible that in the future there may be consequences not yet discovered.



PHX WATER SMART

I-10 Nitric Acid Spill in Tucson, AZ (February 2023)



In 2023, an impaired driver hauling a truckload of Nitric Acid crashed resulting in a release; a 3-mile radius shelter in place order was issued.

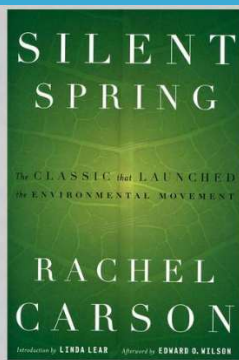
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- The driver was determined to have a BAC of 0.312, nearly eight times the legal limit. The individual was the only fatality.
- Sources: ([What to do if you've been exposed to toxic fumes associated with nitric acid spill on I-10](#)), ([Nitric acid spill evacuation order rescinded, I-10 reopens](#))



PHX WATER SMART

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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- The American conversation about protecting the environment began in the 1960s. Rachel Carson had published her attack on the use 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



PHX WATER SMART

Clean Water Act (CWA) – 1972

- Comprehensive changes spurred after creation of the Environmental Protection Agency (EPA) on December 2, 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)



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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



PHX WATER SMART

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.”



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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



PHX WATER SMART

Cuyahoga River (2021)



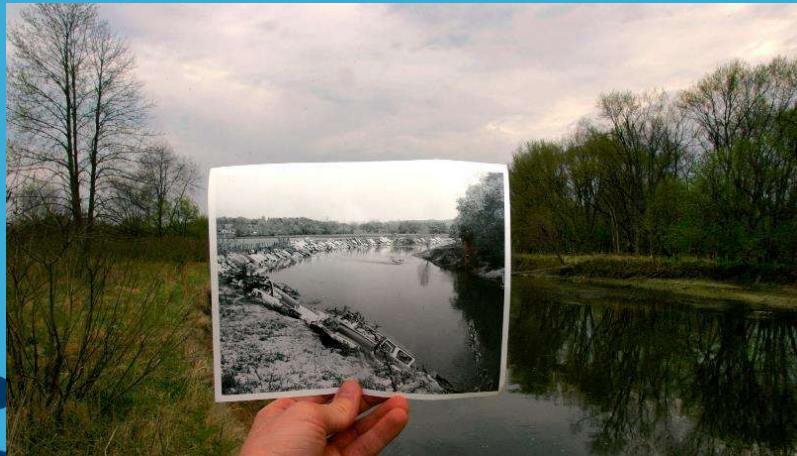
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 50 years after the 1969 fire (13th 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)



PHX WATER SMART

Cuyahoga River & Water Quality



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

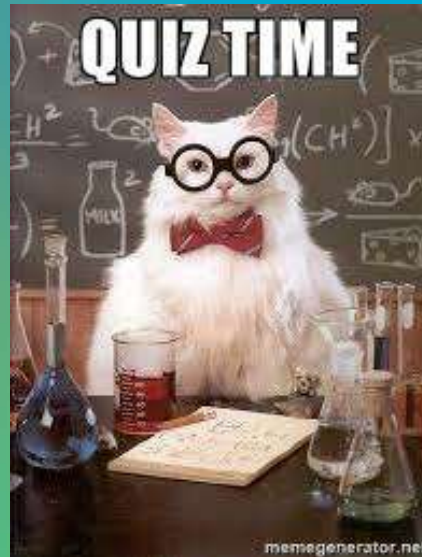
- A 1967 photograph, showing cars used as rip-rap along the Cuyahoga River to protect it from erosion, is held in front of its banks decades later
- We need to keep rivers and streams flowing and recognize that we have to reinvest in some of the technologies that brought us to where we are today. An 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.
- Source: <https://news.harvard.edu/gazette/story/2019/04/gina-mccarthy-on-climate-change-earth-day-and-striking-down-epa-rules/>



PHX WATER SMART

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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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>



PHX WATER SMART

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...)



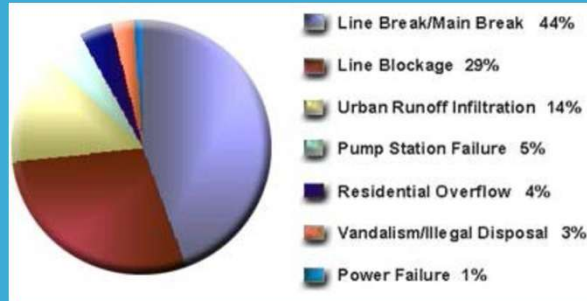
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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



PHX WATER SMART

Sanitary Sewer Overflows (SSOs)



How does this relate to P2?

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

-What are SSOs? An SSO is essentially an overflow of raw sewage due to a blockage in the Sanitary Sewer System.

-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.

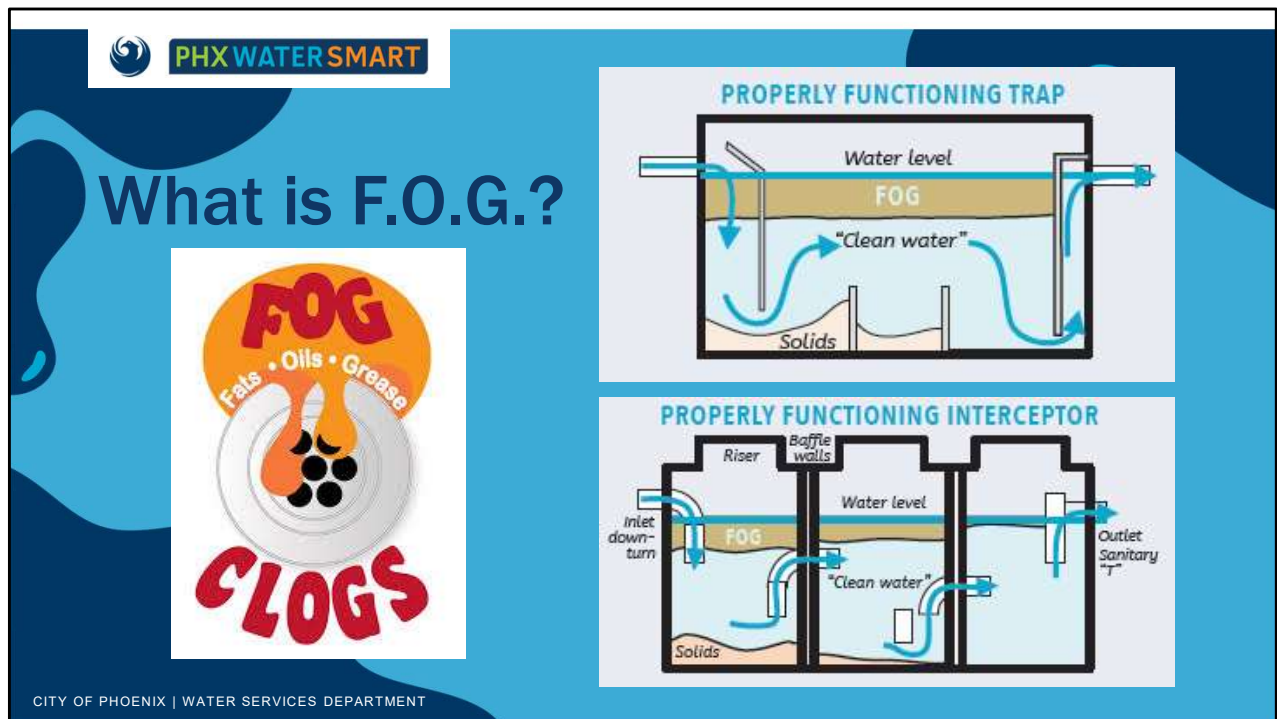
-Think of the health impacts that SSOs have on the community and environment.

-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



A grease interceptor, sometime referred to as a grease trap, has chambers and baffles designed to capture fats, oils, grease (FOG). FOG will float to the top and solids/debris will settle towards the bottom. “Clean” water passes through each chamber by pipes in the center of the device.

Note: water requires sufficient time to cool down; hot water reduces the efficiency of the device to capture FOG

Interceptors may be found at food and beverage manufacturers, laundry facilities, or businesses with vehicle maintenance/fleet vehicle washing.

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

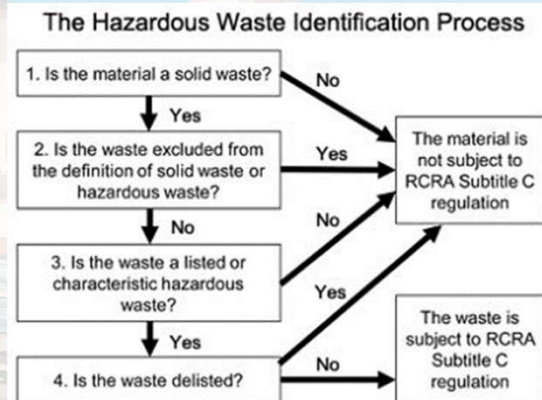
- The IPP program needs to be assured that a facility's hazardous waste is being appropriately managed.
- Is hazardous waste being discharged to the sewer incidentally through spills or leaks?
- Is hazardous waste being disposed of in the sewer?

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."



CITY OF PHOENIX | WATER SERVICES DEPARTMENT



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



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 2.96 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>)

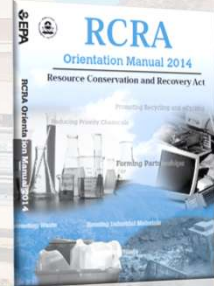
Picture: <https://www.epa.gov/hw/learn-basics-hazardous-waste>



PHX WATER SMART

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)



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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>)



PHX WATER SMART

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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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>



PHX WATER SMART

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



HAZARDOUS WASTE PHARMACEUTICALS &
AMENDMENT TO THE NICOTINE LISTING (P075)
FINAL RULE
PUBLIC WEBINAR PRESENTED BY EPA

APRIL 2019

Introduction to
Part 266 Subpart P



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

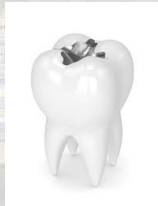
Source: <https://www.epa.gov/hwgenerators/frequent-questions-about-management-standards-hazardous-waste-pharmaceuticals-and>

*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/



Dental Amalgam & P2

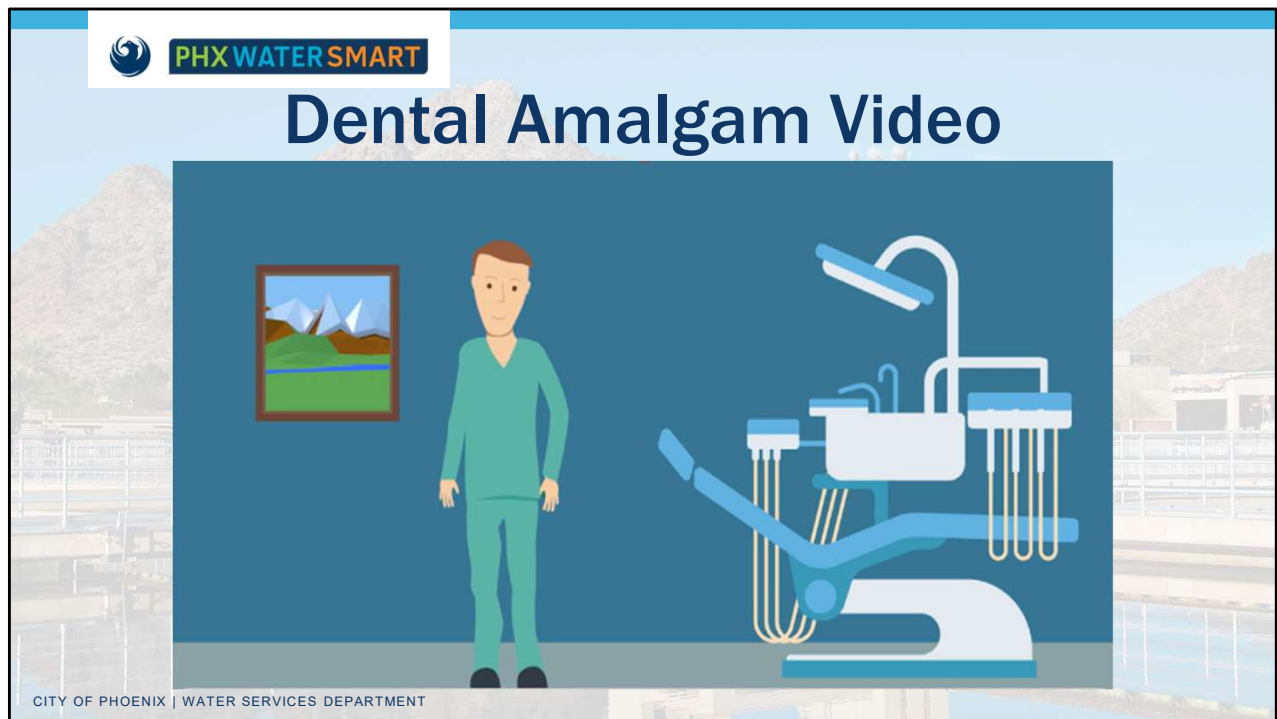


- Dental Amalgam is a liquid mercury and metal alloy mixture used to fill cavities.
- Why are dental offices a focus for P2 efforts?
 - Dental clinics are the main source of mercury discharges to POTWs.
 - EPA estimates about 103,000 dental offices use or remove amalgam in the United States; almost all 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.



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.
- 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.
- 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>



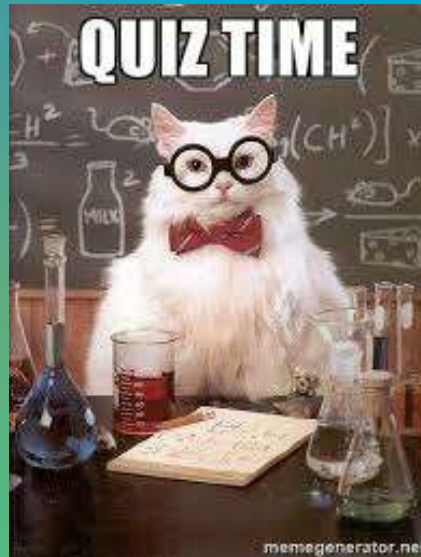
- The American Dental Association has provided BMP manuals for dentists to help them comply with the new rule – it's a lot more complicated than the video presents due to maintenance requirements, logs, inspection, etc.
- Source: <https://www.youtube.com/watch?v=0Kb1-eGtvk8>



PHX WATER SMART

Quiz Question

- What is allowable to discharge to the Sewer?





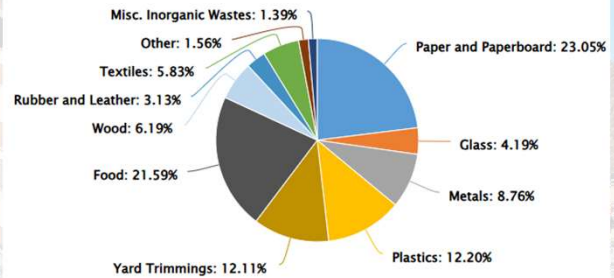
What is a Solid Waste?



Sewage filter press cake

Total MSW Generated by Material, 2018

292.4 million tons



- 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: <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>



Solid vs. Hazardous Waste

Subtitle D

Solid Waste

Hazardous
Waste

Subtitle C

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- Hazardous waste must be a solid waste first before it can become 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” treatment, storage, or disposal of waste may also become 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>



PHX WATER SMART

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- The regulations in 40 CFR §261.3 states a solid waste that meets any of the following characteristics 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)

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- Waste can be considered hazardous if it exhibits one of the four characteristics:
- **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>



PHX WATER SMART

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)

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Listed Wastes

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

By definition, the 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>



PHX WATER SMART

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)

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.

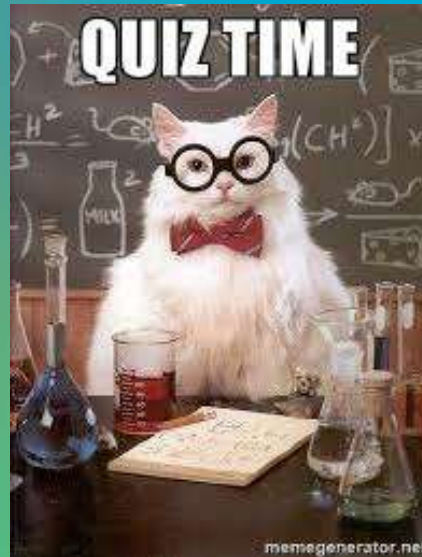
Key Resources

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?





PHX WATER SMART

Who is regulated by Hazardous Waste Regulations?

Generators

Transporters

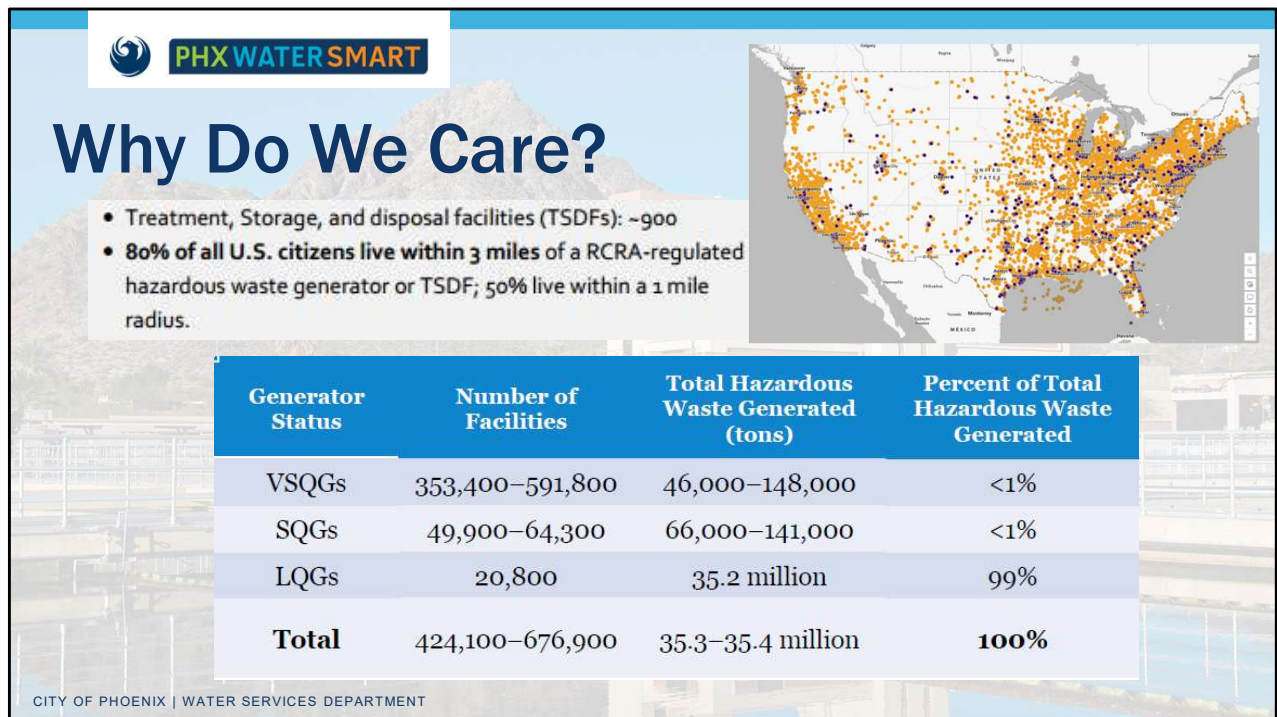
TSDF*

*TSDF = Treatment Storage & Disposal Facility

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Some Hazardous Waste TSDFs in Arizona:

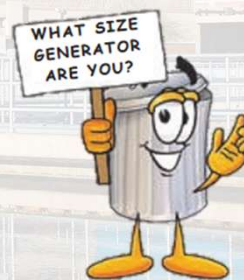
- Clean Harbors Arizona, LLC (CHA)
- Conn-Selmer, Inc. (CSI)
- Heritage Environmental Services, LLC
- Safety-Kleen Corp. (Chandler)
- Veolia ES Technical Solutions, LLC
- World Resources Company



- 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
- This web map displays the location of active Resource Conservation and Recovery Act (RCRA) hazardous waste handlers and Toxic Substances Control Act (TSCA) Polychlorinated Biphenyls (PCB) facilities that store, transport, or dispose of PCBs. (TSDFs are in purple, LQGs are in orange)(as of May 14, 2025).
- <https://www.arcgis.com/apps/mapviewer/index.html?webmap=154ed2246ebd4708b97e7ac6164cb29d>

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) >2,200 lbs/Month
 - ✓ Small Quantity Generators (SQGs) between 220 lbs and 2,200 lbs/Month
 - ✓ Very Small Quantity Generators (VSQGs), 220 lbs/Month or less



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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

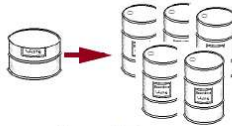
To determine your generator category, count all waste generated in a calendar month:

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>



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	
Any amount	Any amount	> 100 kg	
≤ 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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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 [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)]).



PHX WATER SMART

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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>



PHX WATER SMART

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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

- A VSQG may send its waste to an LQG, as long as both are under the control of the same person.
- The VSQG must clearly mark and label its waste containers with “Hazardous Waste” and the appropriate hazard information.
- The LQG must notify the state on the Site ID Form that it is participating in this consolidation activity and list the VSQGs involved.
- The LQG is responsible for sending the consolidated waste to a permitted TSDF for proper disposal.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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



PHX WATER SMART

Labeling of Containers

2016 Rulemaking:

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

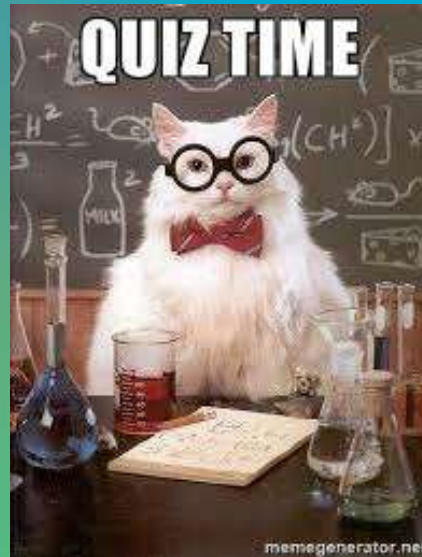
- ADEQ is the local authority for RCRA requirements. Regarding City inspections, we are primarily concerned with identifying the contents of a container and ensuring they do not pose a threat to the sanitary sewer, municipal separate storm sewer system, or the environment. However, ADEQ and EPA requirements 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).



PHX WATER SMART

Quiz Question

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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	_____

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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/enviro/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 on site for 3 years

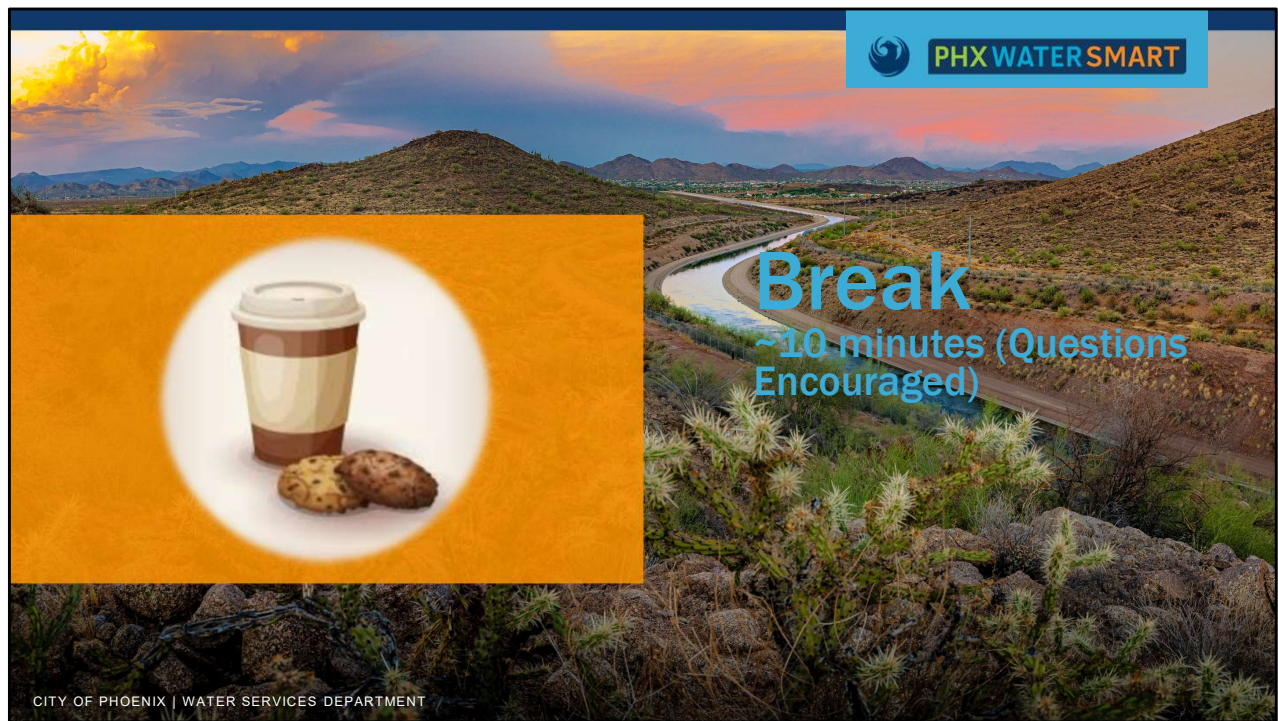
The image shows a sample hazardous waste manifest form. It includes fields for generator information (name, address, EPA ID #), transporter information (name, address, license #), and waste details (quantity, description, hazard codes). There are also sections for emergency contacts and a table for tracking waste movements. The form is titled 'HAZARDOUS WASTE MANIFEST' and has a reference number '000000000 GRI'.



Hazardous Waste Manifest Form

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

[illegible]



Questions encouraged



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”

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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

- On July 15, 2025, Eagle Ship Management, LLC pleaded guilty to violating the Act to Prevent Pollution from Ships after the M/V Gannet Bulker discharged about 10,000 gallons of oily bilge water into U.S. waters near New Orleans.
- A crew member reported the illegal discharge to the U.S. Coast Guard through social media.
- Eagle will pay a \$1.75 million fine and serve four years of probation under an environmental compliance plan.
- The vessel's Chief Engineer, Kirill Kompaniets, had already been sentenced to a year and a day in prison, six months of supervised release, and a \$5,000 fine for obstructing justice and ordering the discharge.
- The U.S. Coast Guard investigated the incident.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Let's look at some case studies for Pollution is expensive. I will talk briefly for each of them we included in this course.

Recently, this year, A member of Eagle ship management reported the illegal discharge via social media to the U.S. Coast Guard. At that time, the Gannet Bulker was at an anchorage near Mississippi river in New Orleans, within U.S. waters. Eagle has agreed to pay \$1,750,000 fine and serve a four-year term of probation subject to the terms of an environmental compliance program.



PHX WATER SMART

Pollution is Expensive

- On July 15, 2025, a federal grand jury indicted Kayla Hartley for conspiracy and Clean Water Act violations. Trial is set for September 30, 2025.
- Hartley was Director of Operations at a slurry processing facility in Hillsboro, Oregon, run by Northwest Slurry Solutions for Bay Area Concrete LLC.
- Investigators allege that between August 2019 and December 2020, Hartley and others discharged pollutants into the sanitary sewer at a location not authorized for industrial wastewater.
- Hartley submitted a permit application that falsely claimed the facility would only send “clean slurry” and “oily slurry” to the sewer.
- She also accepted industrial wastewater from multiple businesses— including about 500,000 gallons from Precision Castparts Corp.—and discharged it without the required permit between February and September 2020.
- The EPA Criminal Investigation Division conducted the investigation.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Similar to previous case study during 2019 and 2020, Kayla Hartley, the director and others from construction slurry dewatering facilities are alleged to have conspired to operate the Hillsboro facility in violation of a pretreatment standard, by introducing pollutants to a sewer system at a discharge point not designated to receive these wastes.

During this period, Hartley submitted a permit application to CWS that falsely claimed the facility would only discharge “clean slurry” and “oily slurry” to the sanitary sewer. She also entered into agreements with industrial wastewater producers who paid for the Hillsboro facility to properly treat and dispose of their industrial wastes. One such business, Precision Castparts Corp., (PCC), arranged for Northwest Slurry to receive wastewater generated from etching titanium parts for airplane engines. Between February and September 2020, the Hillsboro facility received approximately 500,000 gallons of industrial wastewater from PCC and discharged industrial wastewater to the sanitary sewer without a permit.



Pollution is Expensive

- On April 29, 2025, Tribar Technologies, Inc. was sentenced to a \$200,000 fine, five years of probation, an environmental compliance plan, and \$20,000 restitution to the City of Ann Arbor.
- The company pleaded guilty to negligently violating a Clean Water Act pretreatment standard.
- Tribar operates several automotive parts plants in Michigan, including Plant 5 in Wixom, a chrome-plating facility that generates wastewater containing chromium, including hexavalent chromium.
- In late July 2022, Plant 5 accumulated about 15,000 gallons of highly contaminated wastewater. Employees attempted treatment, but pollutant levels remained high.
- On July 29, 2022, an employee sent roughly 10,000 gallons of inadequately treated wastewater into the plant's treatment system, then disabled about 460 alarms and discharged it to the Wixom sewer system without completing required treatment.
- The EPA Criminal Investigation Division, Michigan EGLE, and the FBI investigated the case.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

On April 29, 2025, a court sentenced Tribar Technologies, Inc. (Tribar), to pay a \$200,000 fine, complete a five-year term of probation and enact an environmental compliance plan. Tribar also will pay \$20,000 in restitution to the City of Ann Arbor, Michigan for violating a pretreatment standard under the clean water act.

During the week beginning July 25, 2022, Plant employees attempted to treat this wastewater in a holding tank to reduce the amount of hexavalent chromium before putting it into the Plant wastewater treatment system. By the end of the week, the wastewater still contained high concentrations of hexavalent chromium.

On July 29, 2022, an employee discharged approximately 10,000 gallons of insufficiently treated wastewater from the holding tank into the Plant wastewater treatment system. This discharge activated wastewater treatment system alarms, indicating that the wastewater required further treatment before it could be discharged to the Wixom sanitary sewer system. The employee disabled approximately 460 alarms and discharged the wastewater to the Wixom sanitary sewer system, and ultimately to the Wixom publicly owned treatment works, without completing the treatment necessary to remove chromium from the wastewater, as required by Tribar's Industrial Pretreatment Program Permit.



Dispose of Waste Properly

- On August 6, 2020, CG Roxane LLC — the maker of Crystal Geyser Natural Alpine Spring Water — was sentenced to three years of probation and fined \$5 million for illegally storing and transporting hazardous waste containing arsenic at its Olancho, California facility.
- The company had generated the waste through a treatment process used to remove arsenic from spring water but failed to properly store and transport it.
- CG Roxane pleaded guilty to one count of unlawful storage and one count of unlawful transportation of hazardous waste. Each count resulted in a \$2.5 million fine.
- The court also ordered the company to establish a compliance program within 90 days, including annual inspections by an independent environmental auditor.



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)



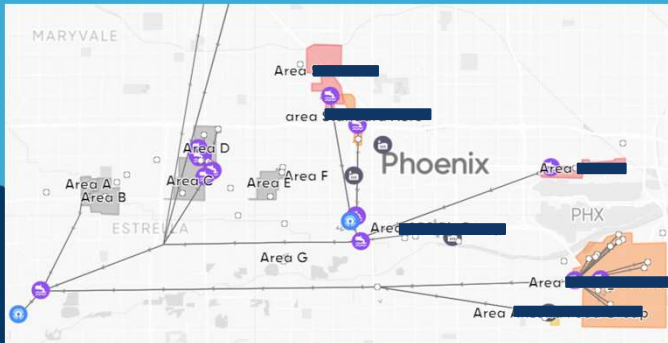
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- “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)



Remote Sewer Monitoring

- What is the City of Phoenix doing to monitor pollution in the sewer system?



- The City is using a smart wastewater intelligence system that uses the 'internet of things' (IOT) data gathering units throughout our collection system in order to detect abnormalities like pollution events which can trigger alerts and/or sampling. There are probes that measure ORP, conductivity, pH, temperature and Pollution Events (via a Pollution Index) and there are samplers that can be installed too
- If we suspect an Industrial User is contributing to events – we will hone in on the areas upstream, downstream, at the tap, etc. and make contact with the company to investigate as circumstances dictate



PHX WATER SMART

Introduction to P2

POLLUTION PREVENTION

101

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- Hierarchy
- Terms
- Examples (entire process)



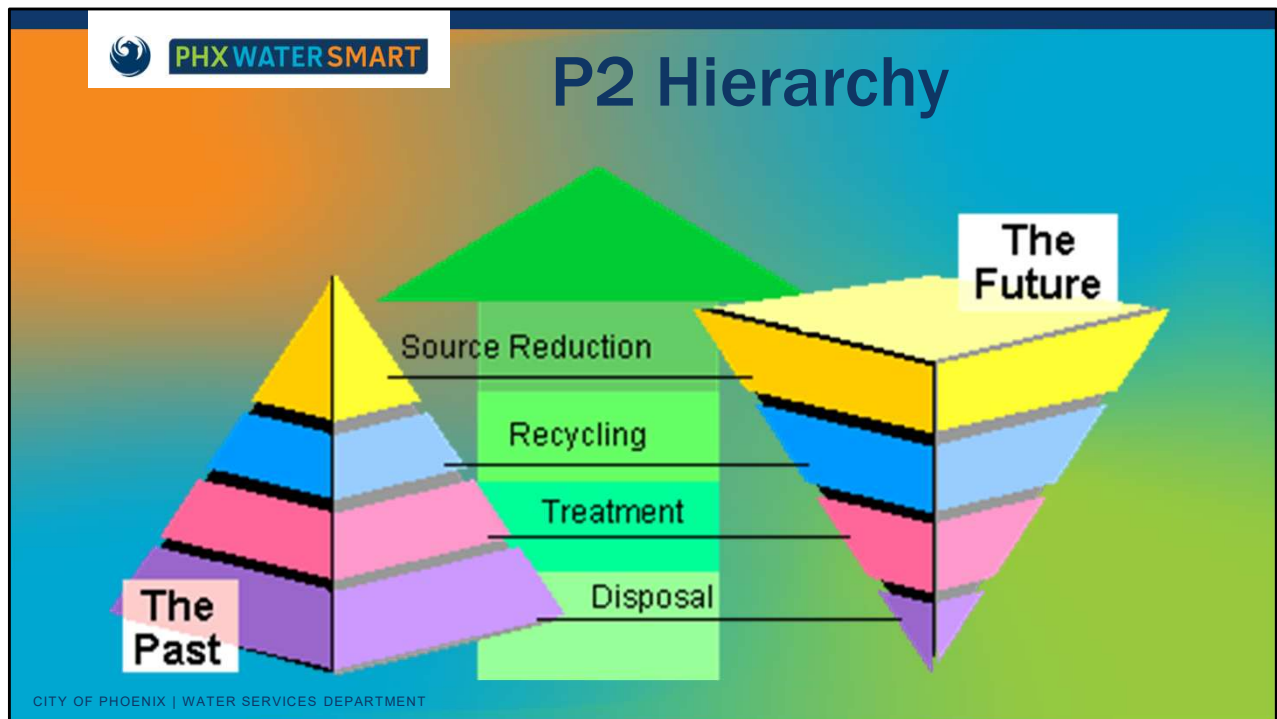
PHX WATER SMART

Introduction to P2 Video



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.



PHX WATER SMART

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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.



PHX WATER SMART

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)

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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>



PHX WATER SMART

Question

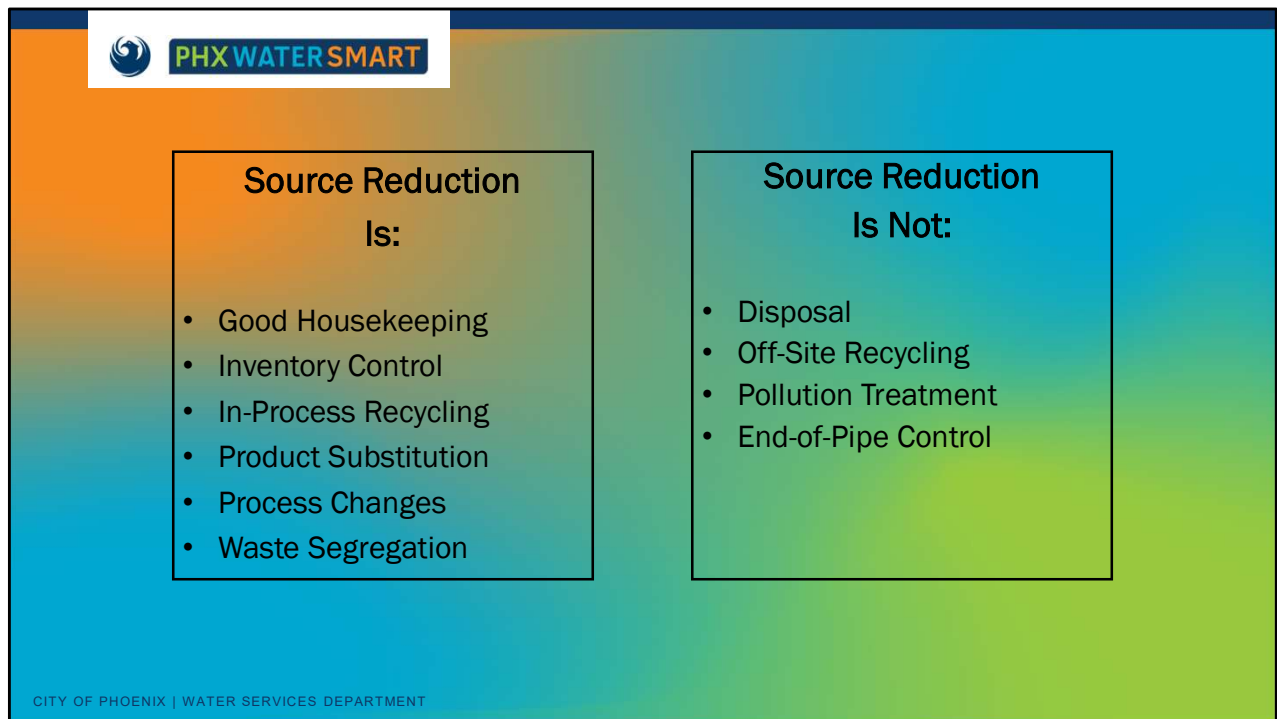
- Give an example of a P2 policy at your company (official or unofficial).



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.



PHX WATER SMART

Why P2?

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.



PHX WATER SMART

Reduce Pollution At Its Source By:

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- Source: Directly from ADEQ Basic P2 Training May 2014:
(<https://legacy.azdeq.gov/enviro/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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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), as required by A.R.S. § 49-962(C)



PHX WATER SMART

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).^②

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^②



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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Note: 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>



PHX WATER SMART

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



PHX WATER SMART

Question

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.

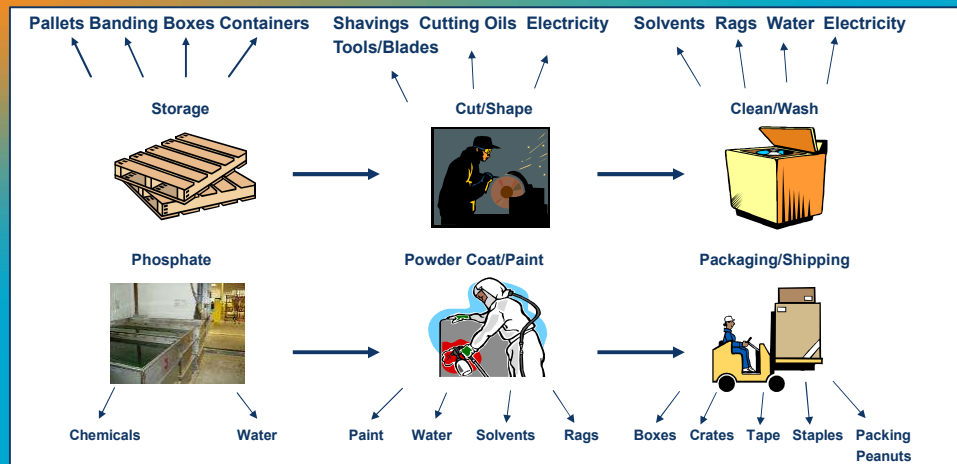


CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.

Process Mapping

Phosphate/Powder Coat/Paint



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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 floorboards of his model "T"s.
- This saved him the price of the wood and the wages of men to make floorboards.
- How is this an example of Reduce and Reuse?





PHX WATER SMART

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.



PHX WATER SMART

Re-evaluate

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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.

Perceived Obstacles to P2

- Cost
- Customer demand/requirements
- Regulations
- Space
- Time
- Management attitude



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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>



PHX WATER SMART

Question

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

For reference:

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



PHX WATER SMART

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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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



PHX WATER SMART



RESOURCE SUMMARY

Publication number: TM-17-13

Food Manufacturing P2

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

Pollution Prevention (P2) for Janitorial Services

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

- Substitution
- Prevention
- Reduction



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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.



PHX WATER SMART

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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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



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.

CITY OF PHOENIX | WATER SERVICES DEPARTMENT

Celgene's newer (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)



PHX WATER SMART

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>

CITY OF PHOENIX | WATER SERVICES DEPARTMENT



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

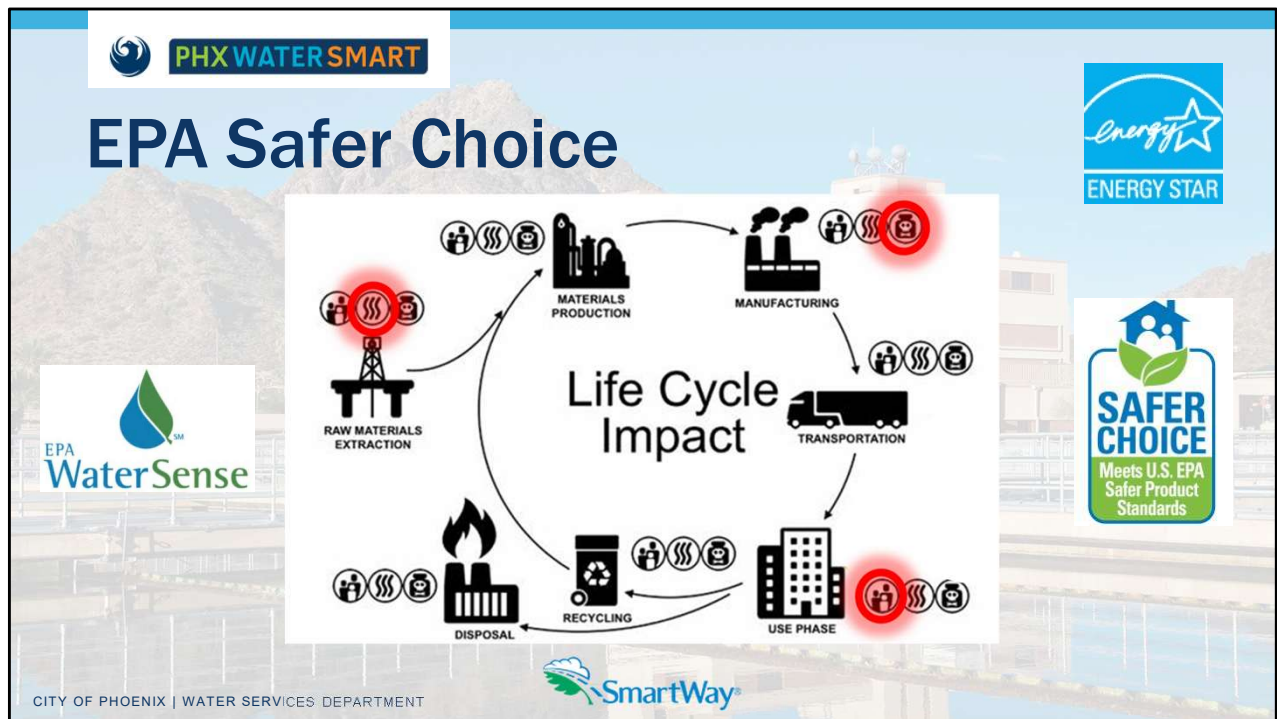
CITY OF PHOENIX | WATER SERVICES DEPARTMENT

<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 work well and use ingredients that are safer for human health and the environment. It is an EPA Pollution Prevention (P2) program focused on reducing pollution at its source, such as by using safer chemical ingredients. Currently, about 2,000 products qualify to carry the Safer Choice label.

Before a product can use the Safer Choice label, EPA reviews every chemical ingredient, regardless of amount. Each ingredient must meet strict safety criteria for human health and environmental impacts, including carcinogenicity, reproductive/developmental toxicity, aquatic toxicity, and environmental persistence.

It is important to consider these impacts over a product's entire life cycle: Sourcing of raw materials, Manufacturing, Packaging, Transportation, Distribution, Retailing, Product use, and End-of-life management through repair, reuse, recycling, or safe disposal.

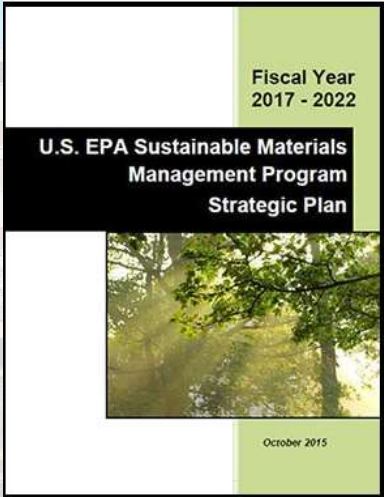
Another example that can be used as a cautionary tale: Microbead ban could have been prevented if pollution prevention was implemented and an alternative material used....instead, companies were forced to switch involuntarily.

Sources: <https://www.epa.gov/saferchoice>;
<https://www.epa.gov/greenerproducts/institutional-purchasers-greener-products-and-services>;
<http://lawdigitalcommons.bc.edu/ealr/vol44/iss1/6>



Sustainable Materials Management

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

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)



PHX WATER SMART

ADEQ P2 Week & Contacts

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT



PHX WATER SMART

ADEQ Resources

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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>
- P2 Automotive Maintenance and Repair Training Portal: [azdeq.gov/P2AutoTraining](https://www.azdeq.gov/P2AutoTraining)
 - There is an introduction to Pollution Prevention module (geared toward automotive however it may be useful for carwashes, collision repair shops, etc)



PHX WATER SMART

Additional P2 Resources

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



CITY OF PHOENIX | WATER SERVICES DEPARTMENT

- 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?



PHX WATER SMART

Questions?



CITY OF PHOENIX | WATER SERVICES DEPARTMENT



City of Phoenix

Water Services Department
Environmental and Safety Division

www.phoenix.gov/waterservices/envservices/indpretreatmentprog

602-262-1859 (Front Desk)

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