

A GUIDE TO



POLLUTION PREVENTION PLANNING

Meeting the Requirements of the
Waste Reduction Policy Act

SAVE MONEY • REDUCE RISK • ELIMINATE WASTE

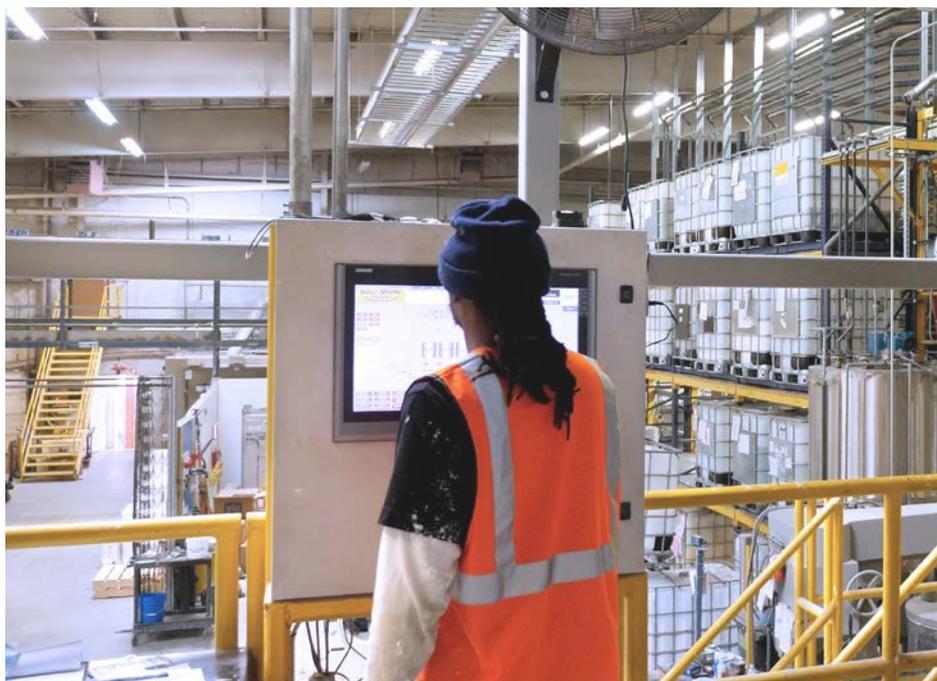
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POLLUTION

PREVENTION

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For additional assistance with P2 regulations, visit
www.P2Plan.org



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Introduction

The Texas Legislature adopted the Waste Reduction Policy Act (WRPA) of 1991 to reduce the volume, toxicity, adverse public health, and environmental effects of pollutants in Texas.

The WRPA pollution prevention planning law is contained in the [Texas Health and Safety Code \(THSC\), Sections 361.501–361.510](#).¹ Rules implementing WRPA are found in Title 30, [Texas Administrative Code \(30 TAC\) Chapter 335, Subchapter Q](#).² The Texas Commission on Environmental Quality (TCEQ) administers these rules.

Waste Reduction is mandated by the U.S. Congress in the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). This and other RCRA provisions have led to more effective waste management and decreases in hazardous waste generation and toxic contaminant releases.

Who Should Read This Guide

This guide discusses the pollution prevention law, takes you through the steps of pollution prevention planning, and includes forms for documenting your P2 Plan and its progress. The intended users for this guide include:

- Large quantity generators (LQGs) of hazardous waste.
- Small quantity generators (SQGs) of hazardous waste.
- Toxics Release Inventory (TRI) Form R reporters.

Facilities that are SQGs of hazardous waste and do not report on the TRI Form R have fewer requirements under the WRPA, but they still must prepare a plan. The Pollution Prevention Planning requirements do not apply to conditionally exempt small quantity generators (CESQGs) if they don't report on the TRI Form R.

How to Use This Guide

The guide will lead you through the following processes:

- Developing a pollution prevention program for your facility.
- Writing your Pollution Prevention (P2) Plan and Executive Summary.
- Completing Annual Progress Reports (APRs).

If your facility does not have a P2 Plan in place but is already incorporating pollution prevention activities into plant operations, the planning process will be useful in documenting existing activities and developing new projects for your plan.

If you have a P2 Plan in place, you may use this guide to verify that all required elements have been covered in your plan, or to guide you through the preparation and submission of the Executive Summary and the Annual Progress Reports.

How to Get Assistance

The Public Education (PE) section of TCEQ provides guidance and technical assistance to companies that are subject to pollution prevention planning. Our goal is to help find innovative approaches to waste reduction and management, while saving time and money, and promoting sustainable economic growth.

The Pollution Prevention staff strive to assist companies in maintaining compliance and reducing waste by offering educational workshops, [access to web-based resources](#),³ and P2 technical assistance over the phone. You can contact us at 512-239-0010. We'll answer your questions about P2 requirements, help you find ways to reduce waste, and tell you more about other opportunities to prevent pollution.

ACRONYMS

APR	Annual Progress Report
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
HAP	Hazardous Air Pollutants
LQG	Large Quantity Generator
P2	Pollution Prevention
RCRA	Resource Conservation and Recovery Act
SDS	Safety Data Sheets
SQG	Small Quantity Generator
STEERS	State of Texas Environmental Electronic Reporting System
TCEQ	Texas Commission on Environmental Quality
TEEA	Texas Environmental Excellence Award
TRI	Toxics Release Inventory
VOC	Volatile Organic Compound
WRPA	Waste Reduction Policy Act
SWPPP	Storm Water Pollution Prevention Plan

¹ statutes.capitol.texas.gov/Docs/HS/htm/HS.361.htm

² www.tceq.texas.gov/goto/view-30tac

³ www.P2Plan.org

Preventing Pollution



In this chapter . . .

- Discover the preferred strategies for waste management.
- Learn how to use your required P2 Plan as a stepping stone to an environmental management system (EMS).

Since its inception in the early 1990s, WRPA has proven that successful pollution prevention begins with planning and making a strong commitment to reducing waste. The first group of facilities to comply with the P2 planning law in the 1990s reduced hazardous waste generation by 25%. Nearly half of these compliant facilities reported annual cost savings of more than \$40,000. By contrast, facilities without P2 Plans increased hazardous waste generation by 7%. The conclusion was obvious: P2 planning reduces waste and saves money.

Since then, facilities throughout the state have used P2 planning to reduce the state's overall generation of hazardous waste and toxic chemicals. According to the P2 Annual Progress Reports (APRs) submitted by facilities from 1998 to 2023, Texas companies have reduced the amount of hazardous waste generated by more than 22 million tons. They also prevented the release and transfer of over 6 million tons of toxic chemicals. Hundreds of case studies show how facilities' innovations in P2 have resulted in both pollution reduction and monetary savings.

There are many reasons to develop a P2 Plan that reduces waste generation and toxic releases and transfers to the environment. Six important reasons to practice pollution prevention are:

1. economic incentives
2. paperwork reduction
3. reduced liability
4. regulatory requirements
5. enhanced public image
6. improved human health and the environment

What Is Pollution Prevention?

Pollution prevention is avoiding the disposal or release of substances into the environment by means of source reduction and waste minimization. However, certain approaches to pollution prevention are preferred over others because they are more effective. The Texas Solid Waste Disposal Act describes a preferred order of waste management strategies, known as the waste management hierarchy, which ranks the strategies from most to least

preferable. The waste management hierarchy applies to both hazardous and nonhazardous waste, as well as to air and water releases. This guide focuses on the most preferred strategies: source reduction, reuse, and recycling.

The Texas definition of pollution prevention highlights source reduction and waste minimization as strategies for preventing pollution. These definitions are found in [30 TAC Chapter 335, Subchapter Q, Section 471 \(8 and 11\)](#):⁴

Source reduction—any practice that “reduces the amount of any hazardous substance, pollutant, or contaminant entering a waste stream, or otherwise released to the environment (including fugitive emissions) prior to recycling, treatment, or disposal.”

Waste minimization—any practice that “reduces the environmental or health hazards associated with hazardous wastes, pollutants, or contaminants. Examples include reuse, recycling, neutralization, and detoxification.”

Source reduction is the most preferable strategy for your bottom line and the environment. Source reduction only occurs when you make a change that allows you to generate the same amount of product with less pollution. This means increased efficiency in the conversion of raw materials to marketable products or services. However, reductions in pollution and waste generation due to plant closures, decreases in production, or regulatory changes do not qualify as source reduction.

Under Texas requirements for P2 planning, companies are asked to make a reasonable search for source-reduction and waste-minimization projects to address all activities that generate reportable hazardous wastes or TRI chemicals. You may also address other wastes, such as water use, solid waste, air emissions, and energy consumption. Evaluation of your other wastes can increase your savings through reduced operating and disposal costs.

Why P2?

Pollution prevention offers many benefits to both the environment and businesses.

⁴ www.tceq.texas.gov/goto/view-30tac

P2 IS TEXAS LAW

In the state of Texas, P2 planning is mandatory for all large and small generators of hazardous waste, as well as all TRI Form R reporters. The goal of the Texas state policy on pollutants and contaminants is to reduce pollution at its source and to minimize the impact of pollution. This can result in reduced risks to public health and the environment, as well as the prevention of penalties and fines accrued from noncompliance with P2 and other environmental laws.

P2 SAVES MONEY

Pollution control and waste management activities cost money. The generation of waste and release of pollution can also trigger additional costs associated with liability and employee time spent on waste-handling and regulatory-compliance activities. Hundreds of facilities have proven that preventing pollution at its source saves industry millions in operating costs and has a quick payback period. Pollution control, which is often more expensive to implement, almost never pays for itself and rarely reduces operating costs.

Despite this trend, many companies are reluctant to try innovative P2 ideas and often choose expensive pollution control methods over money-saving reduction efforts. When all critical decision-making factors are taken into account (see Chapter 6) during the P2 planning process, companies are able to make better management decisions, and they begin saving money almost immediately. Texas facilities have reported big savings from developing practical P2 Plans.

P2 REDUCES YOUR RISK

Once your facility generates a hazardous waste, you are legally responsible for the proper management of that waste. Federal and state laws target hazardous waste generators as being at least partially responsible for the cleanup of wastes that leak from disposal sites.

Hazardous chemicals pose immediate health concerns because they are caustic, flammable, or have some other harmful characteristic. Even a small spill of some chemicals can contaminate the groundwater and lead to costly remediation projects. By reducing your handling of toxic chemicals, you can:

- Reduce your long-term liability and health and safety risks.
- Avoid using off-site treatment, storage, or disposal that could cause financial liability when operators mismanage waste and design improper disposal facilities.
- Gain better insurance options, which may not be available to high-risk facilities with higher treatment and disposal costs.
- Reduce your expenses by reducing the cause of your liability—your hazardous waste and toxic releases and transfers.

REDUCTION OF HAZARDOUS WASTE REGULATORY REQUIREMENTS

It pays to be aware of your generator status and to try to reduce it to a lower level. As you switch to less-hazardous materials, incorporate cleaner processes, and reduce your overall environmental impacts, you can reduce your regulatory burden and may be able to change your generator status, reaping even greater benefits.

For example, if your facility is a large quantity generator (LQG) and becomes a small quantity generator (SQG), you may benefit from increased storage time and fewer pollution prevention requirements (see Chapter 2 for details on P2 planning requirements). If your facility is already an SQG, your P2 planning requirements could be eliminated by becoming a very small quantity generator (VSQG).

REDUCTION OF TRI REQUIREMENTS

Those who report on the Environmental Protection Agency's TRI Form R can also reduce paperwork through P2 planning. Each reportable TRI chemical requires a separate Form R. If your facility reduces reportable chemicals that are managed or released to levels that are below the reporting thresholds, you may be able to use Form A. This form is significantly shorter to complete and is not subject to the P2 planning requirements. For more information on TRI, see "Toxics Release Inventory" in Chapter 2.

No matter what type of waste you generate, release, or transfer, you will find that integrating the planning process into facility operations helps you find ways to reduce or even eliminate the need to report hazardous waste and TRI.

ENHANCING PUBLIC IMAGE

The public is more informed than ever about environmental issues. People are more aware of the potential effects that hazardous waste and other forms of pollution can have on their health.

Companies that are environmentally aware and work toward waste reduction can thereby improve their working relationship with the public, their neighbors, and their customers. In addition, pollution prevention allows you to profit while doing the right thing.

The following outlines a summary of the benefits of voluntary P2 planning:

- Improves your company's environmental image.
- Shows regulators and the community that you care about compliance with Texas laws and the environment.
- Protects our health and our environment.

Complying with the Waste Reduction Policy Act

In this chapter . . .

- Learn WRPA requirements for LQGs, SQGs, and those who report on the EPA’s TRI Form R.
- Understand Texas requirements for P2 planning.

Hazardous Waste

“Hazardous waste” is any waste that is defined as being hazardous in [Title 40, Code of Federal Regulations \(40 CFR\), Section 261.3](#).⁵ There are two different ways that a waste can be designated as hazardous:

- It can be “listed” as hazardous.
- It can have hazardous characteristics.

A complete list of the listed wastes can be found in [40 CFR 261, Subpart D](#).⁶ You can find more information on the [U.S. Environmental Protection Agency \(EPA\) website](#).⁷

There are three categories of hazardous waste generators:

- Very Small Quantity Generators (VSQGs)
- Small Quantity Generators (SQGs)
- Large Quantity Generators (LQGs)

VSQGs generate no more than 220 pounds (100 kg, or about half a 55-gal drum) per month of hazardous waste and less than 2.2 pounds (1 kg, or less than one quart) per month of acutely hazardous waste.

SQGs generate more than 220 pounds but less than

2,200 pounds (100 kg to 1,000 kg, or half of a 55-gallon drum to five 55-gallon drums) per month of hazardous waste and less than 2.2 pounds per month of acutely hazardous waste.

LQGs generate more than 2,200 pounds per month of hazardous waste or more than 2.2 pounds per month of acutely hazardous waste.

GETTING INFORMATION ON HAZARDOUS WASTE

For more information on hazardous waste registration and reporting, you can contact the TCEQ Registration and Reporting Help Line at 512-239-6413; for waste determination and classification assistance, call 512-239-6412.

Toxics Release Inventory (TRI)

Certain facilities that use or produce toxic chemicals above specific thresholds are required to report annually under the federal Emergency Planning and Community Right-to-Know Act (EPCRA). Section 313 of the EPCRA involves the Toxics Release Inventory (TRI). It requires

TABLE 1. HAZARDOUS WASTE GENERATOR CATEGORIES

GENERATOR STATUS	HOW MUCH HAZARDOUS WASTE YOU CAN GENERATE PER MONTH	HOW MUCH ACUTELY HAZARDOUS WASTE YOU CAN GENERATE PER MONTH	HOW MUCH HAZARDOUS WASTE YOU CAN COLLECT IN A WASTE MANAGEMENT UNIT*	LENGTH OF TIME YOU CAN STORE IT IN A WASTE MANAGEMENT UNIT FROM THE TIME ACCUMULATION BEGINS**
VSQG	up to 220 lb (about half a 55-gallon drum of liquid)	up to 2.2 lb (about 1 quart)	up to 2,200 lb (about five 55-gallon drums of liquid)	no time limit
SQG	220 to 2,200 lb	up to 2.2 lb	up to 13,200 lb (about 30 55-gallon drums of liquid)	180 days***
LQG	over 2,200 lb	over 2.2 lb	any amount	90 days

* A waste management unit is an area in your facility where you collect, treat, or store the waste that you generate. It may be a storage shed, a room, an area within a berm, a solvent-distillation unit, etc.

** Accumulation begins when the storage container is placed in the waste management unit. Containers must be labeled “hazardous” and dated.

*** The limit is 270 days if the treatment, storage, and disposal facility (TSDF) is more than 200 miles away.

⁵ www.ecfr.gov/current/title-40/part-261/section-261.3#p-261.3

⁶ www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-261/subpart-D?toc=1

⁷ www.epa.gov/laws-regulations

certain facilities to report chemical releases, whether they be from normal operations or from accidental incidents.

These TRI reports must be sent to both EPA and TCEQ. TRI reports are used to inform the public and government officials of on-site releases, off-site transfers, and other waste management activities at each reporting facility. TRI-reported information, along with reporting materials and instructions, is publicly available at [EPA's TRI website](#).⁸

A facility must file TRI reports if it meets all three of the following criteria:

1. Has 10 or more full-time employees.
2. Has a NAICS code on the EPCRA list.
3. Manufactures, processes, or otherwise uses any EPCRA Section 313 chemicals in quantities greater than the established thresholds within a calendar year. Certain persistent, bioaccumulating, toxic (PBT) chemicals have a very low threshold.

All federal facilities, regardless of their NAICS code, must submit TRI reports as specified by Executive Order 13423.

If you think you use one of these chemicals, visit [EPA's TRI webpage](#).⁹ This list also provides the threshold quantities of the chemicals that trigger TRI reporting.

FORM R VERSUS FORM A

Facilities reporting under the EPA's TRI submit their information on either Form R or Form A. Knowing the differences between the two forms can lead to significant reductions in your paperwork under TRI and WRPA requirements (see Table 2).

The TRI Form R is a five-page document seeking information on the facility and on one specific chemical. One Form R must be submitted for each TRI chemical reported by the company.

If a facility has small amounts of a TRI chemical in its waste, it may be eligible to report on the two-page TRI Form A (also known as alternate threshold). Form A reports do not trigger P2 planning and reporting requirements. In addition, you can report multiple chemicals on a single Form A. Check with the [EPA's TRI website](#) listed above, or the hotline numbers given below, to determine if you can use Form A instead of Form R.¹⁰ Using the techniques in this book, you may be able to get below the Form R threshold, and therefore reduce your EPA and WRPA reporting requirements.

Note: Some facilities report on Form R for some chemicals and on Form A for others. If you submit even one Form R for one chemical, WRPA applies to you for all of your chemicals.

GETTING HELP WITH THE TRI

If you need more help with TRI, call the EPCRA hotline, maintained by EPA, at 800-424-9346. You can also call the Texas TRI hotline, at 512-239-4TRI (4874).

P2 Planning Requirements

Under Texas law, all SQGs, LQGs, and TRI Form R reporters must prepare a P2 Plan, keep a copy of that plan on-site for inspection, and submit an Executive Summary with a signed Certificate of Completeness and Correctness of that plan to TCEQ. The P2 Plan is the core requirement and should be an intrinsic part of your facility's operating procedures.

Failure to have a complete P2 Plan in place is a violation of the Texas Administrative Code and is subject to penalties of up to \$25,000 per violation per day. Companies often make the mistake of completing only the Annual Progress Reports (APRs), without ever completing a P2 Plan. (APRs are based on the P2 Plan and have no meaning without projects and goals to measure.) Other companies misplace their P2 Plan as personnel change or forget to renew their plan at the end of the five-year cycle. If your company grows significantly, causing waste to increase or change, you may need to revise your plan before the end of the five-year cycle. Exact requirements are located in [30 TAC, Chapter 335, Subchapter Q](#).¹¹

LQGs and TRI Form R reporters must also submit APRs to TCEQ. The purpose of the APR is to track progress toward your facility's goals and to quantify the success of your projects. If you are unable to report source reduction in any year, you may need to review your projects to find a more successful pollution prevention option and update your plan.

Due Dates

If you are new to the P2 planning requirements, a summary of due dates for P2 Plans, Executive Summaries, and Annual Progress Reports is laid out in the following sections for your convenience.

FACILITIES NEW TO P2 PLANNING

You have 90 days from the date the first Annual Waste Summary is submitted, or TRI Form R is filed—which ever comes first—to have a five-year P2 Plan in place and on-site for review by an investigator. Once your P2 Plan is completed, submit the Executive Summary of your P2 Plan and signed Certificate of Completeness and Correctness to TCEQ. By the end of the fifth calendar year, you must renew your five-year P2 Plan.

For example, if you submitted a TRI Form R on July 1, 2023, you should:

- Have a five-year P2 Plan, with a begin date of Jan. 1, 2024, in place by Sept. 28, 2023.
- Submit the Executive Summary and signed Certificate to TCEQ by Sept. 28, 2023.
- Renew the five-year P2 Plan by Jan. 1, 2029.

P2 PLAN RENEWAL

Facilities that have completed a five-year reporting cycle must go through the entire planning process again and

⁸ www.epa.gov/toxics-release-inventory-tri-program/

⁹ www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals

¹⁰ www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals

¹¹ www.tceq.texas.gov/goto/view-30tac

develop a new five-year P2 Plan. Then, a new Executive Summary of your P2 Plan, along with a signed Certificate of Completeness and Correctness, must be submitted to TCEQ by Jan. 1 of the first year of the new plan. For example, if the fifth year of your plan is 2024, then you must renew your P2 Plan and submit your Executive Summary to TCEQ by Jan. 1, 2025.

ANNUAL REPORTING REQUIREMENTS

Facilities that are LQGs or TRI Form R reporters must also report annually on the Annual Progress Report (APR), a required TCEQ report, which is due July 1 of each year. Reports are for your source reduction activities from the previous calendar year. For example, if you submit your APR form July 1, 2024, you are reporting source reduction

TABLE 2. BASIC P2 PLANNING REQUIREMENTS BY FACILITY TYPE

GENERATOR STATUS	TRI FORM A OR DO NOT REPORT TRI	TRI FORM R
Do not report Annual Waste Summary	No requirements under WRP A	Prepare a P2 Plan, and keep it on-site. Submit the Executive Summary and a signed Certificate. Submit APRs.
VSQG	No requirements under WRP A	
SQG	Prepare a P2 Plan and keep it on-site. Submit the Executive Summary and a signed Certificate. No APRs required.	
LQG	Prepare a P2 Plan and keep it on-site. Submit the Executive Summary and a signed Certificate. Submit APRs.	

TABLE 3. P2 PLANNING REQUIREMENTS AND WORKSHEETS GUIDANCE

WRPA REQUIREMENTS	WORKSHEETS
Designation of responsibility for achieving goals is not required, but is highly recommended to ensure success	Worksheet 1. Assessment Team
P2 PLAN	
1. Prepare an initial survey of facility's activities that generate hazardous waste and/or release of TRI chemicals, §335.474(1)(A)	Worksheet 2. Facility Process Diagram
2. Prepare a prioritized list of pollutants and contaminants to be reduced, §335.474(1)(J)(iv)	Worksheet 3. Prioritized List of Facility Wastes
3. Prioritize source reduction and waste-minimization projects, §335.474(1)(B) 4. Explain P2 projects to be undertaken, with discussion of technical and economic considerations, and environmental and human health risks in selecting projects §335.474(1)(C) 5. Estimate type and amount of reduction anticipated §335.474(1)(D) 6. Prepare a schedule of implementation for each project §335.474(1)(E) 7. Set measurable pollution prevention goals for entire facility, including incremental goals §335.474(1)(F) 8. Discuss projects that may result in the release of a different pollutant or contaminant, or may shift the release to another medium §335.474(1)(H)*	Worksheet 4. Project Description and Goals
9. Explain employee awareness and training programs to aid in accomplishing P2 goals §335.474(1)(G)*	Worksheet 5. Employee Awareness and Training
DOCUMENTATION	
Five-Year P2 Plan 10. Prepare a five-year Pollution Prevention Plan §335.474	Worksheets 2–5
Executive Summary of Five-Year P2 Plan 11. Submit Executive Summary of the plan to TCEQ §335.474(1)(J) 12. Submit certification that the plan is complete and correct by owner or corporate officer who has authority to commit company's resources to implement the plan §335.474(1)(I)	Worksheet 6. Executive Summary and Certificate of Completeness and Correctness
Annual Progress Report 13. Submit a P2 Annual Progress Report to assess the facility's progress in implementing the plan and achieving goals §335.476(1)**	TCEQ Pollution Prevention Annual Progress Report (Required Form)

* Not required for facilities that are SQGs or non-TRI Form R reporters, but is recommended.

** SQGs or non-TRI Form R reporters may meet annual reporting requirements by submitting an Annual Waste Summary §335.476

activities you have accomplished from Jan. 1, 2023, through Dec. 31, 2023. The first APR is due after the first year of the very first P2 Plan. If the very first P2 Plan covers the years 2023 to 2027, the first APR is due July 1, 2024.

For more information about annual reporting, please see Chapter 10 of this document, or see the “[Online P2 Annual Progress Reporting \(STEERS\)](#)” page online.¹²

BASE-YEAR DATE

The P2 rule requires you to report your base-year waste generation or TRI chemical releases. The base year is the year prior to the first year of your plan. For example, if your P2 Plan covers the years 2020 through 2024, your base year is 2019. Your plan should include a list of your generated hazardous wastes and reportable TRI releases and transfers for the year 2019.

If you do not have this data available, you should use the most recent available data. Many facilities create or renew their P2 Plans to submit their Executive Summary in January and may not have the prior year’s waste data available. In these cases, plans often use the most current, complete data, which may be two years prior to the plan’s first year (e.g., 2018 waste or TRI data for a plan beginning with 2020).

IF YOU ARE LATE

If you have missed a submission deadline, lost your existing plan or Executive Summary, or been subject to P2 regulations for a while but have never developed a plan, contact the TCEQ Pollution Prevention Team at 512-239-0010. Our assistance specialists will help you get back on track and achieve regulatory compliance.

Visit our [P2 Planning website](#) for additional assistance with P2 regulations.¹³

Exemption from P2 Planning

Owners and operators of facilities that are required to report under the P2 planning law may request an exemption from the TCEQ executive director. The exemption request must be resubmitted annually and is not subject to automatic re-approval. To receive an exemption, the facility must provide the following:

- Evidence that the facility has reduced the amount of pollutants and contaminants generated or released by 90% since the base year (the year prior to the first year of your current plan).
- A description of the potential impact on human health and the environment of any remaining hazardous waste generated, or pollutant or contaminant released.
- Demonstration that additional reductions are not economically and technically feasible.

Before pursuing an exemption, consider which will take less time—obtaining an exemption every year, or preparing a P2 Plan once every five years.

Note: Very few exemptions have been granted, and nearly all have been cases in which the facility has ceased operations and is going through remediation. If you believe you qualify for an exemption, please contact the TCEQ Pollution Prevention Team, at 512-239-0010.

Graduating from P2 Planning

Many facilities have graduated from the P2 planning and reporting requirements by reducing their hazardous wastes and TRI chemicals to levels below reporting thresholds. If you no longer report on TRI Form R and have become a VSQG of hazardous waste, you are no longer subject to the P2 planning requirements. This is the ultimate goal of the P2 program.

TCEQ would like to recognize facilities that are no longer subject to P2 planning requirements. If you have instituted a pollution prevention program that resulted in significant reductions, used an innovative process, or incorporated significant educational or community outreach, please tell us your story by applying for a Texas Environmental Excellence Award. For more information and submission instructions please visit the [TEEA website](#) or contact the TEEA Program Coordinator at 512-239-3143.¹⁴



FAST FACTS

- All SQGs, LQGs, and/or TRI Form R reporters are required to prepare a Pollution Prevention Plan.
- All LQGs or TRI Form R reporters are required to report annually on their progress.
- TCEQ worksheets are not required for the P2 Plan, but the TCEQ Annual Progress Report forms are required for the Annual Progress Report.

The P2 Planning Process

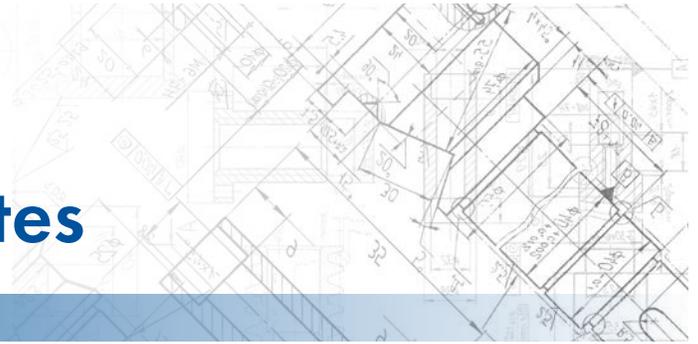
Now that you are familiar with the requirements of the P2 Planning law, you’ll need to understand the overall process of pollution prevention planning. There are many ways to approach the planning process, and each facility may develop its own unique approach if the required elements are covered. TCEQ has developed a practical seven-step approach.

SEVEN STEPS TO POLLUTION PREVENTION PLANNING

1. Identify your processes and wastes
2. Prioritize your wastes
3. Identify your options
4. Prioritize projects and set goals
5. Train employees on P2 awareness
6. Document the P2 Plan
7. Report results annually

CHAPTER 3.

Identifying Your Processes and Wastes



In this chapter . . .

- Learn who should be on your site-assessment team.
- Learn how to conduct a site assessment.
- Find out how to identify all of your activities that generate waste.

This chapter deals with Step 1 of the P2 planning process: identifying your processes and wastes.

The P2 planning law requires that you identify all hazardous wastes, TRI chemicals, and the activities or processes that they result from. The ultimate goal is to generate less waste and fewer toxic pollutants through P2 projects.

Forming a Site Assessment Team

Creating an assessment team is not required, but often proves very useful in increasing employee involvement in pollution prevention activities and ensuring that you do not overlook any significant waste or process during the initial investigation. An assessment team is also an effective way to delegate responsibility and to increase the chances for successful implementation of projects. Worksheet 1 provides a starting point for selecting and recording who will be on your assessment team.

Although not required by P2 planning, forming a team is the best way to truly identify wastes and the activities that generate them. The team is also helpful in identifying options.

DIRECTIONS FOR WORKSHEET 1: ASSESSMENT TEAM

For larger, more complex sites, we recommend involving one representative from each major process at a facility—someone familiar with operational requirements and employees. Smaller facilities may only need two to three people on their assessment team. Companies should use their own judgment to determine the number of team members that will best suit their needs, and who is selected.

A team leader who is familiar with the facility, the people, and the processes should be chosen. It is also very important for the team leader to want to reduce and eliminate wastes.

Conducting the Site Assessment

Conducting an in-depth site assessment is an essential phase of the planning process. All facilities generating hazardous waste or releasing or transferring toxic chemicals can benefit from a thorough look at overall facility operations and processes.

This requires you to go upstream from the point of discharge and see what you are doing at your facility that results in the generation of the waste. This is the first step toward finding a way to reduce your waste.

EXAMPLE 1. A COMPLETED WORKSHEET 1

P2 Plan Assessment Team

Company: XYZ Corporation Site: Austin Facility Date: 12/5/17

P2 FUNCTION	TEAM MEMBER	DEPARTMENT/TELEPHONE	RESPONSIBILITIES
Team Leader	Fred Smith	Environmental / x0056	Project implementation Setting up monthly meetings Project monitoring
Team Employee Training	Dale Crow	Fleets / x0045	Train new employees on P2 issues Retrain old employees (corrective action)

Current five-year WRPA P2 Plan valid 1/1/2018 through 12/31/2022 Next revision due 1/1/2023

Your assessment should cover all process flows and operations, including:

- Any area where you make a product
- Shipping and receiving areas
- Storage areas for raw material and hazardous waste
- Waste generation points
- Product/by-product areas
- Unit processes
- Modes of transportation
- Administrative areas
- Employee service and recreational areas
- Any area with activity

You may find it helpful to diagram facility processes or create a flow chart of operations, services, and products in order to identify areas for inspection.

If you already know the process that is generating the waste, you can examine that process more closely and look for alternative ways of getting the results. For instance, your TRI Form R may list toluene. As you walk through your plant, you may find that this chemical is being used as a solvent in one part of your facility and for parts washing in another part of the facility. Once you know the process, you can examine options: What other solvents could dissolve the chemical you are working with? Could mechanical or sonic parts-washing machines be used instead? There is no “one size fits all” option for every facility to reduce waste, but every facility can benefit from knowing the process that leads to the generation of the waste.

While identifying the sources of your hazardous wastes and toxic releases, keep your eyes open for other areas of environmental concern. Assess potential regulatory, legal, and business risks, as well as health, safety, and environmental risks associated with processes

or operations at your facility. In addition, you’ll want to consider the full range of operating conditions, potential incidents, and emergency scenarios.

Diagramming Your Processes

Like many companies, your facility probably operates several different processes. Start your P2 assessment by creating a simple facility-operations diagram. The diagram outlined in Figure 2, for example, has four major operations: coatings, metal finishing, vehicle maintenance, and thermoset resins.

After completing a general facility-operations diagram, you will need to break each individual process down into a more detailed process flow diagram. The process flow diagram will illustrate the major steps in your process and pinpoint exactly where and when your waste is created. Example 2 at the end of this chapter illustrates a process flow diagram for a coatings operation. You may not have a coatings operation at your facility, but the example should help you create diagrams for any process.

FIGURE 2. A SAMPLE FACILITY OPERATIONS DIAGRAM

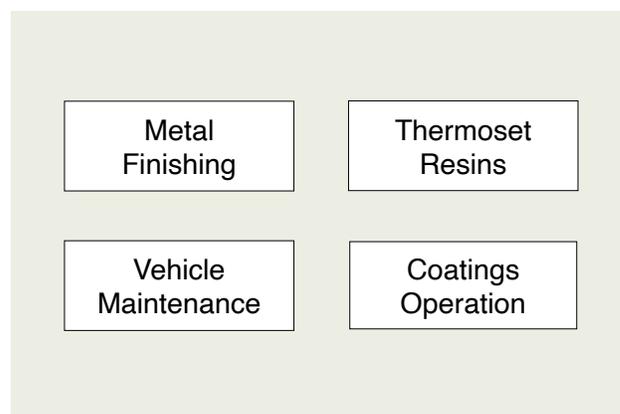
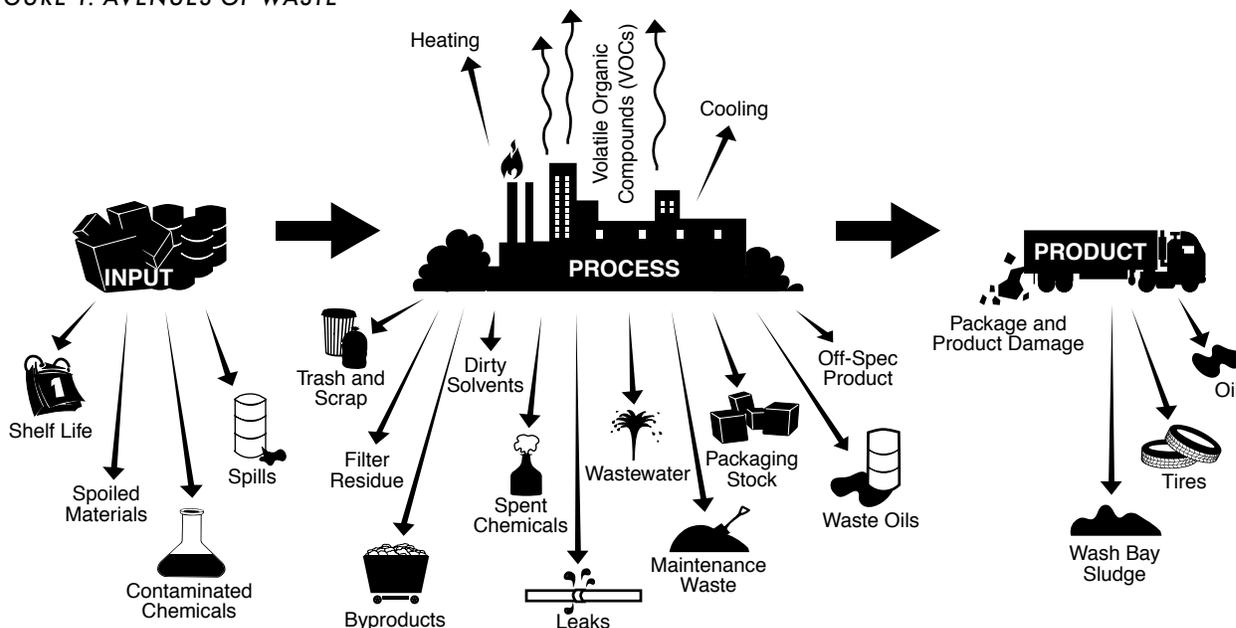


FIGURE 1. AVENUES OF WASTE



DIRECTIONS FOR WORKSHEET 2: PROCESS FLOW DIAGRAM

Process flow diagrams are not required under the P2 planning law but are useful in locating potential areas for pollution prevention activity and site assessment. You can make your diagrams simple or detailed based on the size and complexity of your operations.

If the diagram isn't large enough to cover all the steps in your process, feel free to add boxes in the empty space at the bottom of the page, or to create your own diagrams.

Complete a separate process flow diagram for each major process at your facility, and for smaller processes as necessary.

The Annual Progress Report form is the only required form. You are required to have the elements listed in Table 3, but you do not have to use the worksheets provided in this document. The worksheets are examples that you can use. Facilities can choose their own unique style and format for writing a P2 Plan, follow the worksheets in this guide, or combine their own approach with the TCEQ examples.

Identifying Waste from Activities

As you assess the waste streams for your facility, keep in mind that WRPA requires facilities to describe each activity that either generates hazardous waste or results in the release of a TRI chemical, or both. P2 planning also requires that facilities provide a complete list of:

- all hazardous waste generated, and the volume of each (see your Annual Waste Summary), and
- all reportable TRI releases and the volume of each (see your TRI Form R).

As the team assesses each process at your facility, check for odors, leaks, spills, and drips, as well as discarded waste materials in trash bins. These are excellent indicators of waste, inefficiency, and money-saving opportunities.

As you search for environmental concerns, look for interaction between employees and machinery, inputs, outputs, energy sources, products, and services employed by, or rendered at your facility. Take notice of anything that can positively or negatively interact with or affect employees, surrounding communities, your facility, the overall company, and the environment.

To improve the effectiveness of your plan and increase your savings, we recommend that you expand your efforts to include nonhazardous wastes and all other areas of inefficiency. Finding ways to reduce all forms of waste while improving operational efficiency also makes good business sense and helps the environment.

You will be able to compile a thorough list of wastes to reduce by questioning the operation, efficiency, potential impact, and liability of each process or activity at your facility.

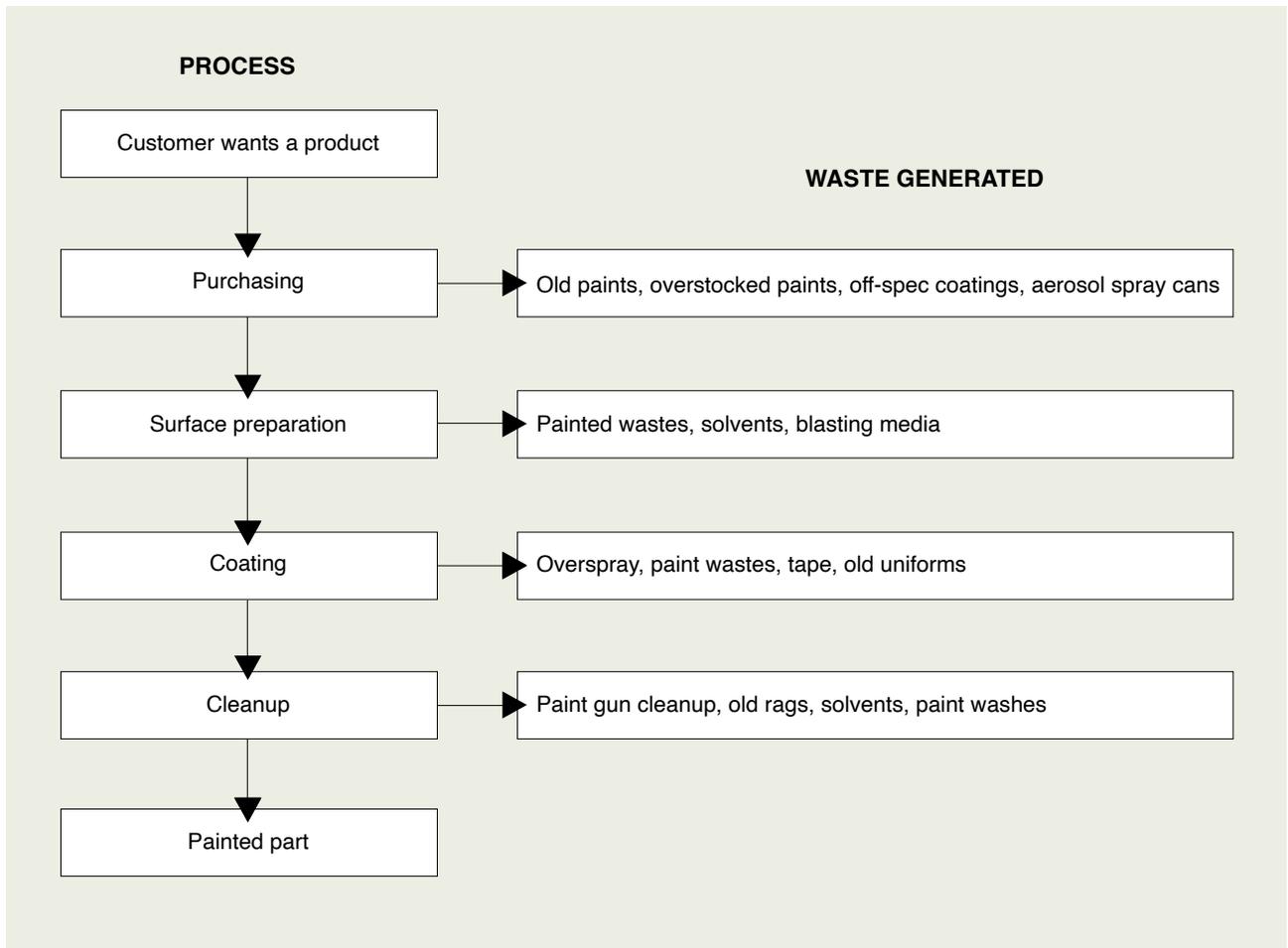
Once you have completed your site assessment and finished diagramming your process flows, you should have all the information you need to list your hazardous wastes and TRI releases and transfers as required by P2 planning. You may want to cross-check the data you collected with your most recent Annual Waste Summary and TRI reports.

By going through these steps, you should be able to look at your facility with a fresh perspective and identify problems that may have previously been overlooked. Now you can proceed with Step 2 in the planning process: prioritizing your wastes for project development.

FAST FACTS

- Discovering the process that generates a waste can point the way to a money-saving reduction.
 - The best way to get results from a Pollution Prevention Plan is to involve many people in the process.
-

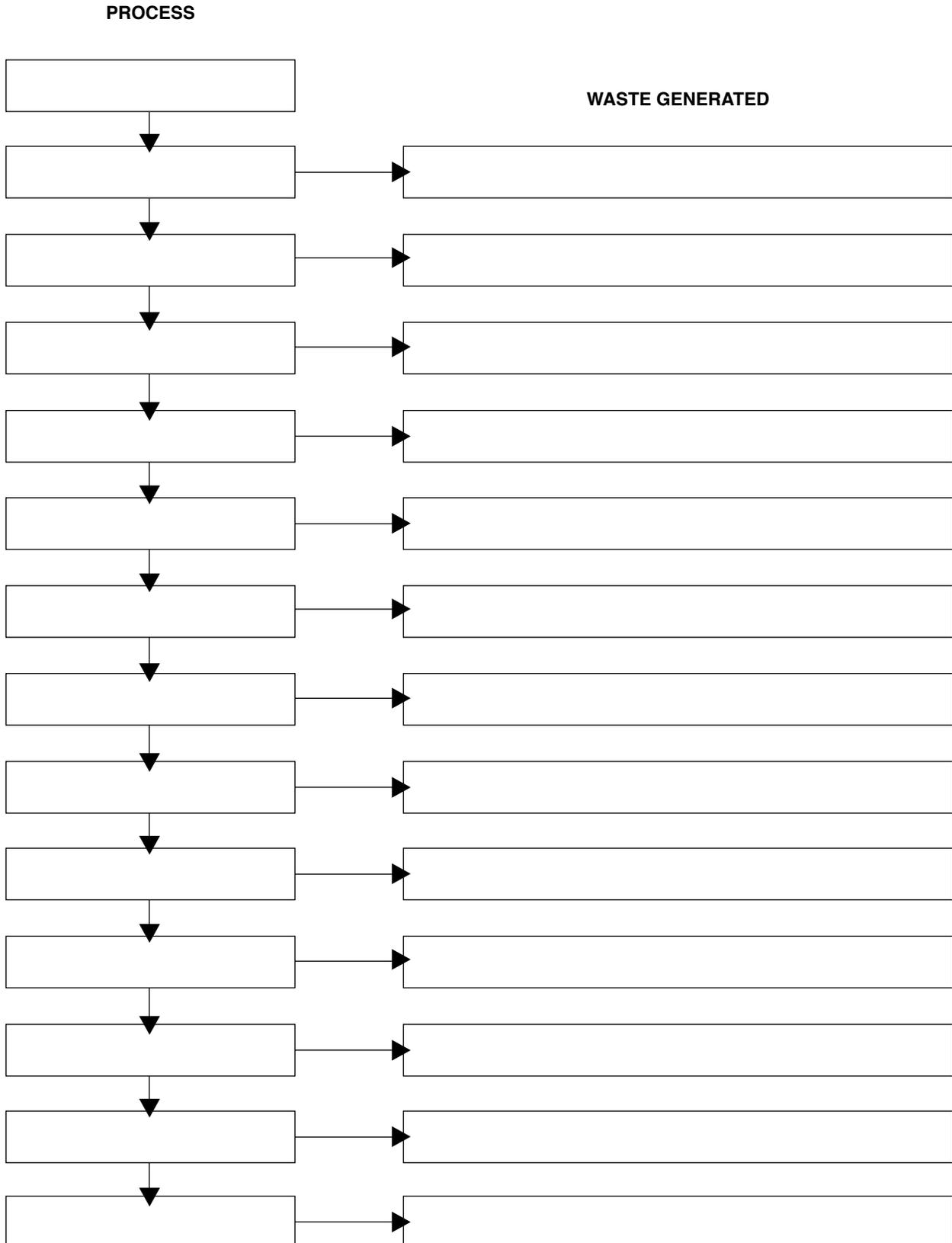
EXAMPLE 2. A PROCESS FLOW DIAGRAM



Worksheet 2: Process Flow Diagram

Make as many copies as you need to cover all the processes at your facility.

Facility: _____ Date: _____



Prioritizing Your Waste

In this chapter . . .

- Learn how to prioritize your waste.
- Discover the real cost of your pollutant and how to reduce it.

This chapter explains Step 2 of the P2 planning process. In this step, you will use Worksheet 3 to list and prioritize your facility's wastes, as required by P2 planning. Every facility will have different ways of prioritizing their wastes. Your assessment team should be able to decide how many waste streams will be targeted for reduction and why those waste streams take priority over others.

Some things to consider when managing the waste are:

- threat to workers, the public, and the environment
- cost of disposal
- amount of waste generated
- environmental regulations
- residual lifetime

There are a number of ways to prioritize your wastes. One way is to determine which wastes are generated in the highest quantities and which wastes are costing you the most money. In addition to quantity and cost, consider the level of environmental and human-health risks associated with the wastes on your list.

Look at waste quantity, cost, and risk when identifying which waste deserves priority at your facility.

By addressing the issue now, you'll save time and money, and avoid planning low-impact projects for waste streams that are of low risk and of less significance. Worksheet 3 will help you prioritize the waste streams, so spend a little time on it and make sure you use accurate information.

Directions for Worksheet 3: Prioritized List of Wastes

P2 planning requires that you list all reportable hazardous waste and TRI chemicals, but you may also list nonhazardous wastes identified during your site assessment. Once you have completed this worksheet, you will have a better idea where to focus your P2 efforts.

FILLING OUT WORKSHEET 3

- List all reportable hazardous wastes and TRI releases and transfers.
- List the activity or activities that generate each waste stream.
- Determine the total volume (tons) of each waste stream. This information can be pulled from your Annual Waste Summary, TRI reports, and site assessment report. If the same waste comes from different activities, record the quantity generated from each activity.
- Determine whether the waste is a low, medium, or high risk to human health and the environment (see the following section on "Assessing the Risk").
- Determine the total cost, including the hidden cost, of managing each of the wastes (see the "Estimating Cost" section).
- After considering the significance of each waste on the list, indicate which wastes will have priority with a check mark when you begin looking for reduction options.

ASSESSING THE RISK

When assessing the risk of a waste stream, you should look at the chemical or compound characteristics, health hazards, and environmental hazards associated with the waste stream. Information that will help you includes:

- Safety Data Sheets (SDSs). SDSs, which accompany all chemicals, describe compound characteristics and health hazards.
- [The National Institute for Occupational Safety and Health \(NIOSH\) Pocket Guide to Chemical Hazards](#).¹⁵ The Pocket Guide helps you recognize and control occupational chemical hazards.

Please note that risk determination is highly variable at different facilities and should be determined by your assessment team according to your facility standards.

ESTIMATING COST

Many facilities only calculate the disposal cost when estimating cost of a waste stream, but there are many hidden costs that you should also consider. It is estimated that waste-stream costs are underestimated by four to seven times, because many times hidden costs are overlooked. By identifying the hidden costs, you can identify opportunities for savings (see Chapter 6). Hidden costs may include:

- inspection and permit fees
- preparation costs

- record-keeping and reporting costs
- liability for accidents and fines
- sampling and testing fees
- safety equipment and secondary containment structures
- storage and containers
- employee training

A simple true cost analysis is shown in the following example:

EXAMPLE 3. A TRUE COST ANALYSIS

TRUE COST ANALYSIS	
Xylene purchase cost	$(\$3.00/\text{gal}) \times (1,500 \text{ gal/yr}) = \$4,500/\text{yr}$
Disposal cost	$(4 \text{ drums/yr}) \times (\$450/\text{drum}) = \$1,800/\text{yr}$
Total	\$6,300/yr
Hidden costs <i>(includes cost of drums, labels, and handling and manifesting the waste)</i>	\$1,000/yr
TRUE COST TOTAL	\$7,300/yr

Identifying Your P2 Projects

In this chapter . . .

- Learn how to develop P2 options.
- Learn what the TCEQ and P2 Program websites have to offer.
- Learn how to be cautious when doing P2 internet research.

This chapter deals with Step 3, the most critical part of the P2 planning process. Step 3 involves the identification of projects that can reduce your waste at the source or minimize its environmental impact. Identification of projects and the various options available to you can be challenging because it varies from facility to facility.

A metal-finishing operation may benefit from reducing its flow rate, while a fleet-maintenance facility may benefit from switching to bypass filters. Even facilities with similar processes can have radically different projects.

P2 planning requires you to have a list of prioritized projects for reducing waste, and also to consider the economic and technical feasibility of these projects. P2 planning gives you flexibility to decide what kind of projects work best for your facility.

Finding an option that reduces waste, saves money, and works for your facility is very challenging. It requires you to question your current way of thinking about how you do business. It also requires you to be creative and to look at what others have done.

Developing Your Options

You can develop options that work for your facility by:

- Consulting with your P2 assessment team. Ask them how they would reduce waste at the facility. The best options often come from line workers who are intimately familiar with the daily operations of the process that generates the waste.
- Researching the internet to find other options. An internet resource list is kept at the [TCEQ Pollution Prevention website](#).¹⁶
- Contacting P2 experts from TCEQ's Pollution Prevention Assistance Team and other groups.

Researching the Internet

One of the best ways to find an option for your facility is to use the internet. The internet has a wealth of

knowledge. Most people who use the internet to look for P2 options find the internet a good starting point. It is a way to locate trade associations throughout the world, to identify potential vendors, or to find a name of an expert who can be contacted in a specific industry. Many people find options for pollution prevention simply by using an internet search engine. The issue with the internet is not whether you can find information, but if you can find information that is relevant to your needs. A simple search on "pollution prevention" using a search engine will yield a lot of information but may not help you find information relevant to your industry. We recommend that you use search engines as a starting point for identification of options. Often searching using more specific search parameters, such as the type of waste you have or the kind of chemical you are trying to eliminate, can lead to more useful results. Once you have identified these options, you should use traditional means of verifying vendor claims and advice from others.

- **TCEQ Pollution Prevention Resources**

The [TCEQ website](#) has links to the various rules, programs, and resources available for pollution prevention.¹⁷

- **Pollution Prevention Program website**

The [TCEQ Pollution Prevention Program](#) maintains a list of resources online.¹⁸ These resources can be a starting point for further resources and tools.

Getting Answers to Permitting Questions

Keep in mind that some of the options presented may require a permit from TCEQ. For example, before installing a solvent distillation unit, check whether you need an air permit or some other form of authorization. If you have permitting questions or other regulatory issues, call the Small Business Assistance Hotline at 800-447-2827, or the Industrial and Hazardous Waste Permits Section at 512-239-2335.

¹⁶ www.P2Plan.org

¹⁷ www.tceq.texas.gov/p2

¹⁸ www.tceq.texas.gov/p2/wrpa/p2planning.html

Prioritizing Your Projects and Setting Goals

In this chapter . . .

- Learn to choose the best projects.
- Find hidden costs when managing your waste.
- Set goals and schedules to ensure successful implementation of projects.

Once you have identified a few P2 options for your wastes, you will need to determine which ones will work best for your facility—Step 4 of the P2 planning process.

P2 planning requires that you:

- Discuss the technical and economic feasibility of each P2 project.
- List the environmental and human-health risks associated with each project.
- Identify cases where implementing your P2 projects will result in the release of a different pollutant or contaminant, or may shift the release to another medium.

The level to which you discuss these three things is up to you. Some options are simple and easy to evaluate, while others require more detailed study.

Technical and Economic Evaluation

During your search for options, you may have discovered more than one way to reduce a particular waste, or too many options to implement all at once. You can approach this difficult decision by looking at six critical decision-making factors to help determine which option is best for your facility:

1. Technical viability of the proposed project (technical feasibility).
2. The cost of implementation (economic feasibility).
3. Compatibility with existing systems.
4. Complexity of the project.
5. Ability to measure and observe results.
6. Ability to test ideas before full implementation (when needed).

The first two factors (technical and economic feasibility) are required steps in the P2 planning process.

Evaluation of the technical and economic feasibility of proposed projects will help you determine which projects to commit company resources to and how to set your reduction goals.

Technical Feasibility

To determine the technical feasibility of a project, your assessment team should ask some basic questions:

- Will product quality be maintained?
- Will installations stop production? If so, how long?
- Will training be required for the new system?
- Will the new equipment work with the old equipment?
- Will production increase, or decrease?

Your team will probably think of many other pertinent questions to help determine if an option is a practical solution for your facility. If the results for a particular option are determined to be unacceptable to the facility, you may want to look for another option. If you cannot find a suitable option for your prioritized waste, you may want to select a different waste to work on instead. Also keep watching for technical innovations that could be incorporated into your plan at a later date.

Economic Feasibility

A critical element of a feasibility analysis is the economic aspect. Economic feasibility has two benefits for your facility.

- Efficiency—you can identify areas to reduce waste and save money.
- Evaluation—you can compare options identified in the technical-feasibility section.

By examining the economic feasibility, companies have saved money while reducing waste. This is possible because waste is, by definition, inefficient use of raw materials. Isolating the costs associated with wastes, instead of adding them into overhead expenses, allows a company to make an informed decision when implementing their plan.

The core elements of evaluating the economic feasibility of a pollution prevention option are:

- Waste cost evaluation—What are the costs of generating waste?
- Project cost evaluation—What will the pollution prevention option cost? What are the savings of the option?

- Comparison—Does the option save money, or cost money?

HOW COMPLEX SHOULD YOUR ANALYSIS BE?

P2 planning requires an analysis of the economic feasibility of your projects but does not specify how detailed your analysis must be. The detail of your analysis depends on a variety of factors, such as the number of projects you have, how much capital is needed, and internal company policies.

As with personal finances, the level of analysis for a business depends on individual needs. Some people never review their credit card statements. They have a rough idea of how much they spend and only look closely at their spending if that amount drastically changes. They may never go into debt, but they aren't always sure where their money goes.

Other people may use some of the popular software to identify exactly how much money they spend and where they spend it. These people can spot waste in their spending habits and to manage their money more efficiently.

Likewise, with P2 planning, your economic analysis may be minimal, ensuring only that the project doesn't cost too much. This is particularly effective on simple projects. However, a simple cost comparison could overlook some of the hidden costs, such as labor, liability, and regulatory compliance. To get the most benefit from your plan, you may wish to sharpen your pencil and do a full-cost accounting of your projects.

SIMPLE ECONOMIC ANALYSIS

If you have several options, you might want to start your economic-feasibility analysis by comparing the costs of the different projects. This simple comparison is a way to identify some of the better projects and to eliminate some of the economically impractical options. A simple analysis is particularly good at identifying the "low-hanging fruit,"

or options that are easy and inexpensive to implement. A review of a hypothetical company, Joe's Paint Shop, offers four quick economic analyses.

Joe's Paint Shop generates hazardous waste as a result of paint-booth operations. Kelly, the shop manager, worked with the employees to develop the four options in Example 4.

Even a simple look at the options shows three things:

- Option 1 saves money. The only costs are for a worker to take a few minutes to rotate the filter. The shop adopted this option immediately.
- Option 2 costs more initially, but the savings are realized quickly, so the shop adopted this option, as well. Options 1 and 2 together saved the shop \$150 initially, and even more money over the long term, due to the reuse potential of the Styrofoam filters.
- Options 3 and 4 looked promising, but Kelly decided to do a more detailed analysis before adopting them.

IDENTIFYING HIDDEN COSTS

As stated in Chapter 4, sometimes people are not aware of how much they are spending on managing waste. These costs are usually counted as overhead. It is estimated that waste-stream costs are underestimated by four to seven times, because many times hidden costs are overlooked. By identifying the hidden costs, you can identify opportunities for savings. Hidden costs may include:

- inspection and permit fees
- preparation costs
- record-keeping and reporting costs
- liability for accidents and fines
- sampling and testing fees
- safety equipment and secondary containment structures
- storage and containers
- employee training

EXAMPLE 4. A SIMPLE ECONOMIC-FEASIBILITY ANALYSIS

OPTION	SAVES \$ BY	SAVINGS	COSTS
1. Rotating filters	Filters last twice as long because ones in low-use areas are switched out with ones in high-use areas.	\$5.00/filter or \$100/yr	minimal
2. Substituting filters with baffled Styrofoam elements	Last four times longer between replacements and can be washed off for reuse.	\$5.00/filter or \$200/yr	\$10/filter or \$100, 1st year
3. Switching to water-based paints	Water-based paints to meet shop needs are more expensive.	?	2.00/gal
4. Switching to an automated paint-gun washing system	Saves on labor and solvent usage. Reduces gun clogging.	\$900/yr	\$800 (one time)

EXAMPLE 5. COMPARISON OF THE COST OF USING HAZARDOUS SOLVENT AT AN AUTO REPAIR SHOP

COST	BAY 1 – HAZARDOUS SOLVENT	BAY 2 – NONHAZARDOUS SOAP SOLVENT
Solvent cost	$(\$3.00/\text{gal}) \times (1,500 \text{ gal/yr}) = \$4,500/\text{yr}$	$(\$5.00/\text{gal}) \times (300 \text{ gal/yr}) = \$1,500/\text{yr}$
Solvent disposal cost	$(4 \text{ drums/yr}) \times \$450/\text{drum} = \$1,800/\text{yr}$	\$0.00/yr
Total costs	\$6,300/yr	\$1,500/yr

FULL-COST ACCOUNTING

For complex projects that may span many years, full-cost accounting is the best option for evaluating a pollution prevention project. You will need to involve your accounting staff, as well as technical staff, to find the true cost of doing business and to evaluate the feasibility of switching to another method.

The advantage of going through this process is that environmental decisions are made like any other business decision; they consider the overall profitability of the project for the company. If you manage an Environmental Health and Safety department at a large facility, you have an opportunity, through accounting, to turn your department into a profit center.

In Example 5, Sally, an auto-shop office manager, attributed the environmental costs to the process area. By doing this, she was able to identify inefficiencies and convince some mechanics to switch to nonhazardous solvents.

Two bays at the automobile repair shop use parts washers. Auto Bay 1 uses a hazardous solvent to clean parts and Bay 2 has switched to a nonhazardous parts washer. The hazardous solvent is picked up by a company and recycled off-site.

Sally, the office manager, would like to switch Bay 1 to the nonhazardous soap solvent, but the Bay 1 repair technicians claim that the soap washers slow work down. The owner agreed with the Bay 1 mechanics, because he saw that they repaired vehicles quicker than the mechanics in Bay 2.

Sally looked at some of the true costs of using a hazardous solvent (see Example 5).

One thing Sally realized when she looked at the costs was that even though the soap costs more per gallon, the mechanics use less of it, so it lasts longer. Over a one-year period, Bay 1 used 1,200 more gallons of hazardous solvents than Bay 2 used of soap, which resulted in an extra \$3,000 dollars in expenses. Additionally, the auto shop spent \$1,800 to dispose of the hazardous waste solvent.

In other words, when you factored in volume used and waste disposal, Bay 1 was costing the service station at least \$4,800 more than Bay 2. It didn't take long for Bay 1 to switch once the owner realized that the costs of using hazardous solvents in Bay 1 actually outweighed the slower pace of Bay 2. Sally got a raise, and now spends a lot less time doing paperwork.

In this example, Bay 1 was originally seen as more profitable, when in fact they were simply shifting the cost of handling the waste out of their area. In other words, both bays were paying for Bay 1's waste expenses.

These are some of the factors to include when going through the process of full environmental cost accounting. If you would like to go through a full environmental cost-accounting process, a detailed worksheet is in Appendix C. This worksheet will guide you through six basic steps to save money by reducing waste.

Environmental Media Shift

P2 planning requires that you document if there is a media shift when you implement your new projects. A media shift is the transfer of a pollutant from one environmental media (air, water, soil) to another. By definition, most source reduction projects don't have a media shift. If your projects will result in a media transfer, you must identify this in your plan (see Worksheet 4).

Risk Evaluation

It is important to remember that hazard and risk are not the same. A hazard is defined as something that can cause harm, such as chemicals and electricity. A risk is the chance that the environment or a person will be harmed by a hazard.

When you are evaluating risks, you are looking for the potential that the hazards you identified will cause harm. It is also beneficial to think about who or what will be harmed: Is this a risk to human health or the environment? Once you have identified your risks, determine if your existing safeguards are sufficient, or if more should be done to minimize risks.

One way to evaluate the health and environmental risks of a possible product substitution is to review the safety data sheet (SDS) for each possible substitute and to weigh the risks.

Setting Goals and an Implementation Schedule

Once you have a good project, you will need to set a schedule for implementation. This will ensure that your projects will be moved from the drawing board into your operations. P2 Plans must establish goals, evaluate environmental impact, and set milestones as required by the P2 Planning law.

Common goals include:

- Percent of hazardous waste to be decreased.
- Tons of toxic chemicals reduced.
- Reduction in releases of volatile organic compounds.
- Gallons of water to be saved.

An implementation schedule includes dates by which critical project steps must be complete. For instance, if you plan to reduce your TRI chemical use to zero over the next five years, your milestones might look like this:

- Eliminate methylene chloride in the machine shop by Feb. 5, 2020.
- Identify alternative solvents for tetrachloroethylene by Feb. 5, 2021.
- Find an alternative, low-level, styrene monomer by July 2, 2022.
- Have no TRI chemicals on-site by 2023.

Note: Failure to meet the reduction goals stated in your facility's plan is not a violation of the P2 planning law, and does not expose you to any penalties.

Worksheet 4: Project Description and Goals

Use a separate worksheet for each prioritized project.

Facility name: _____ 5-year planning cycle: From year _____ to _____

Target waste or TRI chemical: _____ This project is: Source reduction activity?
 Waste-minimization activity?

a. Amount of waste generated at base year: _____

b. Amount of reduction anticipated: _____

c. Amount of waste generated at 5th year (a minus b): _____

Facility goals (5th-year goals): _____

Project description: _____

Implementation schedule and goal of project: _____

Describe human-health and environmental considerations: _____

Small quantity generators that are also non-TRI Form R reporters are not required to complete the following portion.

Will this project result in a new pollutant, contaminant, or waste? YES NO

Will this project result in a shift to another medium? YES NO

If you answered YES to either question, EXPLAIN: _____

Describe technical and economic considerations: _____

DIRECTIONS FOR WORKSHEET 4:
PROJECT DESCRIPTION AND GOALS

Use Worksheet 4 to describe all the required elements of your prioritized projects and facility goals, including:

- Name of waste to be reduced and amount of reduction you expect to achieve by the end of the five-year plan.
- Type of project (source reduction or waste minimization).
- Statement of facility goals.
- Project description.
- Implementation schedule (major steps in project development and implementation).
- Technical, economical, human-health, and environmental considerations.
- Potential for release of a new waste, pollutant, or contaminant, or for a media shift.

Remember, source reduction is reduction of waste at its source. Waste minimization is any activity (such as reuse, recycling, or neutralization) that reduces hazards associated with a waste.

To set your facility goal, estimate the amount of reduction you hope to achieve by the end of the fifth year (base-year waste-generation amount minus the reduction anticipated).

For each project, prepare an implementation schedule that outlines a schedule of major tasks to be accomplished.

FAST FACTS

To choose a P2 project, consider:

- Cost benefits
 - Risks of the pollutant
 - How practical your project is
-

CHAPTER 7.

Training Employees on P2 Awareness

In this chapter . . .

- Learn the importance of employee awareness and training.
- Learn how to meet the P2 planning law requirement for employee awareness and training.

In this chapter, you will learn about Step 5, concerning employee awareness and training.

A successful company is only as strong and successful as its employees. For this reason, managers know how critical employee training and awareness can be to efficient operations.

As one of your company's most valuable resources, employees can influence the quality of operations in general, as well as P2 success in particular. By actively encouraging all employees to get involved in P2 action and awareness, you drastically improve your company's ability to save money and achieve P2 success.

Questions Your Assessment Team Can Address

Gather your assessment team and evaluate your current awareness and training program by asking questions such as the following:

- How do we ensure that our employees properly perform their manufacturing job or other functions that are critical to our company?
- How are people trained in areas that are important to our company?
- What are the largest environmental risks to our company?
- How do we ensure that each employee knows about the risks they are responsible for managing?
- Do employees have a way of bringing environmental issues to our management?
- Do employees know the consequences of failure to follow their environmental training?

Facilities that are LQGs or that report on TRI Form R must have written documentation of an employee awareness and training program that aids in accomplishing pollution prevention goals. SQGs that do not report on TRI Form R are not required to have written documentation of the employee awareness and training program, but it is recommended to have one in place to accomplish your pollution prevention goals.

Evaluating Your Training Program

One method of evaluating your program is to look at employee function by process and waste generation. Refer to your facility process flow diagrams (Worksheet 2) and list employees that work within each major job function throughout the process. Then decide what training would most benefit that employee or operation and determine how that training is currently achieved.

If something is missing, you'll probably see it and be able to correct it. Remind your assessment team that talking with facility employees at every level of operations can stimulate innovative solutions to even the greatest of problems.

Each facility will approach employee awareness and training according to its specific needs and varied levels of P2 involvement. Facilities with the strongest commitment to reducing environmental impacts usually have very active programs and high employee involvement.

How you choose to encourage employee involvement and organize effective training is up to you. Worksheet 5 will help you describe how your program can contribute to the achievement of your goals. As always, worksheets are provided for your benefit, but are not required if you elect to use your own format.

DIRECTIONS FOR WORKSHEET 5: EMPLOYEE AWARENESS AND TRAINING

This worksheet can be used by LQGs and TRI reporters to fulfill P2 Plan requirements concerning employee awareness and training. Copy this sheet for each facility process in Worksheet 2 (process flow diagrams) or combine related activities to cut down on paperwork.

List which process you are describing, the major steps or activities in the process, and the waste generated. Next, list each employee who performs the given activity and determine how their job affects waste generation and reduction.

Based on the employee's activity, decide what type of training would be most relevant and useful to assist the employee in contributing to the facility's pollution prevention goals. This will often require training in more than one subject or method, so list each method on a separate line, followed by the date when the training is completed. See the following worksheet for an example.

Finally, describe how you ensure employee awareness of their environmental impact, and how the training method selected will contribute to the achievement of your P2 projects and goals.

FAST FACTS

- Employee awareness is ensuring that all employees are aware of their environmental responsibilities.
 - Training is only one part of an employee awareness program.
 - By making employees aware of their role in the facility's Pollution Prevention Plan, you can achieve maximum benefits.
-

Documenting the P2 Plan

In this chapter . . .

- Find out which documents are required for your facility.
- Learn how to assess your progress toward facility goals.

This chapter involves Step 6, documentation of the P2 Plan. Following the guidance in the previous chapters will help you meet the documentation requirement of the Pollution Prevention program. This chapter will guide you through documentation of:

- Pollution Prevention (P2) Plan
- Executive Summary
- Signed Certificate of Completeness and Correctness
- Annual Progress Report forms (LQGs and/or TRI Form R reporters only)

Notice: You are required to keep a copy of your plan on-site and available for an inspector. Many companies make the mistake of sending in their Executive Summary, even though they have no plan on-site. This results in a Notice of Violation when they are inspected.

You are required to prepare a P2 Plan and have it available for an investigator. Although you do not send the complete plan to TCEQ, it is the most important requirement in P2 planning. Not having a P2 Plan prepared is the single most common violation.

You are required to submit the Executive Summary and, for some reporters, submit an Annual Progress Report to TCEQ. [Worksheet 6](#), available in this chapter and online, is provided as an Executive Summary template.¹⁹ It is not required that you use this format. As long as the Executive Summary you prepare contains all of the required information, it will be accepted.

Documentation of the Pollution Prevention Plan and Executive Summary

You can document the plan by gathering the following materials you have already completed:

- worksheets
- notes from the site assessment
- P2 options you are considering
- other information that might be useful in supporting your P2 Plan, projects, goals, and decisions
- items like Safety Data Sheets (SDSs)

- invoices, job descriptions, training documents, Annual Waste Summaries, TRI reports, and other important records for use as references

Make sure that several people are aware of the plan and have a copy. If you followed the team approach recommended in earlier chapters, you should have many people who are aware of the plan, following the schedules, and able to produce it if an inspector checks for it.

The Executive Summary should be included in the plan that is kept on-site, and a copy of the Executive Summary and a Certificate of Completeness and Correctness should be sent to TCEQ. Although there are no required forms for the Executive Summary, Worksheet 6 has been provided as a template. Using this worksheet will ensure that TCEQ has the necessary information to track your compliance.

DOCUMENTATION REQUIREMENTS FOR LQGS OR TRI REPORTERS

On the following page is a table showing the minimum documentation requirements for Pollution Prevention Plans of large quantity generators or reporters on TRI Form R.

DOCUMENTATION REQUIREMENTS FOR SQGS WHO ARE NOT TRI REPORTERS

The following table shows the minimum documentation requirements for Pollution Prevention Plans for small quantity generators that do not report on TRI Form R.

P2 Plan Format and When to Revise

Your P2 Plan and Executive Summary can be in any format, as long as it has the elements listed in Tables 4 and 5. P2 Plans must be updated every five years. Many companies revise their plans throughout the five-year period, but you are not required to send additional documentation to TCEQ unless the facility experiences significant changes in operation and scope of work. You should begin planning three to six months before the updated plan is due.

Worksheet 6 provides you with an easy-to-use format for submitting the Executive Summary and Certificate of Completeness and Correctness. This is the part of the plan that you are required to send to TCEQ.

TABLE 4. MINIMUM DOCUMENTATION REQUIREMENTS FOR LARGE QUANTITY GENERATORS OR TRI FORM R REPORTERS

P2 PLAN	EXECUTIVE SUMMARY
<ul style="list-style-type: none"> ■ Facility description ■ List of all hazardous waste generating activities ■ List of all TRI release activities ■ Prioritized list of technically and economically feasible P2 projects ■ Explanation of P2 projects to be undertaken with discussion of: <ul style="list-style-type: none"> • technical and economic considerations • environmental and human-health risks ■ Estimate of type and amount of reduction anticipated ■ Implementation schedule for each P2 project ■ Description of measurable P2 goals ■ Explanation of employee awareness and training programs ■ Discussion of projects that may result in the release of a different pollutant or contaminant, or that may shift the release to another medium ■ Signed certification by owner or corporate officer of commitment and ability to authorize company resources for implementation ■ Executive Summary of the P2 Plan 	<ul style="list-style-type: none"> ■ Facility description, including: <ul style="list-style-type: none"> • facility name • mailing and physical addresses • contact, phone numbers, and email • general description of facility • ID numbers: TCEQ Regulated Entity Number (RN), TCEQ Customer Number (CN), TCEQ Solid Waste Registration (SWR), EPA, Pollution Prevention Number (PNumber), and TRI numbers • SIC code and NAICS • time period the five-year plan is in effect ■ List of all hazardous wastes generated and the volume of each ■ List of all reportable TRI releases and the volume of each ■ Prioritized list of pollutants and contaminants to be reduced ■ Statement of measurable reduction goals ■ Explanation of environmental and human-health risks considered in determining reduction goals ■ List of projects with an associated schedule of implementation ■ Implementation schedule for future reduction goals ■ Discussion of projects that may result in the release of a different pollutant or contaminant, or that may shift the release to another medium <p style="text-align: center;">ANNUAL PROGRESS REPORT</p> <p>Every July 1 an Annual Progress Report must be submitted using TCEQ forms. Forms are available online or in this guide.</p>

TABLE 5. MINIMUM DOCUMENT REQUIREMENTS FOR SMALL QUANTITY GENERATORS THAT DO NOT REPORT ON TRI FORM R

P2 PLAN	EXECUTIVE SUMMARY
<ul style="list-style-type: none"> ■ Facility description ■ List of hazardous wastes generated and volume of each ■ Prioritized list of pollutants and contaminants to be reduced ■ Statement of measurable reduction goals ■ Discussion of environmental and human-health risks considered in determining reduction goals ■ List of P2 projects with implementation schedule ■ Implementation schedule for future reduction goals ■ Signed certification by owner, or officer, of commitment and ability to authorize company resources for implementation ■ Executive Summary of the P2 Plan 	<ul style="list-style-type: none"> ■ Facility description, including: <ul style="list-style-type: none"> • facility name • mailing and physical addresses • contact, phone numbers, and email • general description of facility • ID numbers: TCEQ Regulated Entity Number (RN), TCEQ Customer Number (CN), TCEQ Solid Waste Registration (SWR), EPA, and Pollution Prevention Number (PNumber) • SIC code and NAICS • Time period the five-year plan is in effect ■ Prioritized list of pollutants and contaminants to be reduced ■ List of source reduction activities associated with reduction of prioritized wastes identified in the plan

Worksheet 6: Executive Summary and Certificate of Completeness and Correctness

Planning Cycle: _____ (1st year) to _____ (5th year, 1st year plus 4)

EXECUTIVE SUMMARY, PART 1: FACILITY INFORMATION	
Company name:	Facility name:
Mailing address:	Physical address: <i>(if same as mailing, write "same")</i>
City, State, Zip:	City, State, Zip:
County:	County:
WRPA contact:	Email:
Phone: - - Ext.	Fax: - -
TCEQ SWR ID:	Customer reference number: <i>(Always begins with CN)</i> CN
EPA ID:	Regulated entity number: <i>(Always begins with RN)</i> RN
TRI ID:	P2 Program ID <i>(PNumber)</i> :
Primary SIC Code:	
NAICS Code: <i>(to convert SIC to NAICS, go to: www.census.gov/naics/)</i>	
General description of facility:	

EXECUTIVE SUMMARY, PART 2: FACILITY'S GENERATION AMOUNT

List the amount of all hazardous wastes generated for 20_____.
The data should be taken from your most recent Annual Waste Summary form (base-year data).*

Description of waste and TX waste code number:	Amount generated in tons:

List below all reportable TRI chemicals, CAS numbers, and the amount released or transferred for 20_____.
The data should be taken from your most recent TRI Form R (base-year data).^*

TRI chemicals and CAS number:	Amount released or transferred in tons:

Provide a prioritized list of pollutants and contaminants to be reduced during the five-year period:

EXECUTIVE SUMMARY, PART 3: P2 PROJECTS AND GOALS

Statement of facility's measurable reduction goals:

Explain the environmental and human-health risks considered in determining reduction goals:†

List of pollution prevention projects with an implementation schedule of each project:

Implementation schedule for future reduction goals:

Identify cases in which the implementation of source reduction or waste-minimization activity may result in the release of a different pollutant or contaminant, or may shift the release to another medium.†

* The base year is the year prior to the first year of your plan.

† Not required for SQGs that are non-TRI Form R reporters.

CERTIFICATE OF COMPLETENESS AND CORRECTIONS

The person who signs the Certification of Completion should have the authority to commit the corporation's resources to implement the plan. This is usually the plant manager, owner of the facility, or whoever runs the facility.

This document certifies that the Pollution Prevention Plan has been completed and meets the specified requirements of the Waste Reduction Policy Act of 1991, the Solid Waste Disposal Act, and 30 TAC §335.471–480, and that the information provided herein is true, correct, and complete.

This certificate should not be signed by the environmental health and safety manager. Signatures from consultants or other third parties are not compliant.

This document also certifies that the person whose signature appears below has the authority to commit the corporate resources necessary to implement this plan.

Name: _____ Title: _____
(please print clearly)

Position (check one): Facility Owner Corporate Officer

Signature: _____ Date: _____

Reporting Annually

In this chapter . . .

- Find out the requirements for annual reporting.
- Learn the steps for completing the Annual Progress Report (APR).
- Learn more about the Texas Environmental Excellence Awards.

This chapter deals with Step 7 of the P2 planning process: reporting annually.

Large quantity generators (LQGs) of hazardous waste and facilities reporting on TRI Form R are required to report annually on their progress toward pollution prevention goals laid out in their P2 Plan. The pollution prevention Annual Progress Report (APR) measures this progress and provides an opportunity to review and update your plan and look for new ways to save money by reducing waste. LQGs and TRI reporters must meet the annual reporting requirement by submitting the required APR form (TCEQ-00784) by July 1 of each year. The [APR form](#) is available in this guide, as well as online.²⁰

The most important information collected in the Annual Progress Report is the amount of pollution reduced at the source (Part 3). This is the one piece of information that TCEQ could collect from no other source. It documents the amount of pollution that would have been generated if you did not have a pollution prevention project. Refer to Chapter 1 for a further definition of source reduction.

Small quantity generators (SQGs) of hazardous waste, which do not report on TRI Form R, are not required to submit the required APR forms. However, they are required to submit the Annual Waste Summary to the TCEQ's Industrial Hazardous Waste Registration and Reporting Program.

Purpose of the Annual Progress Report

The purpose of the APR is to assist facilities in monitoring and improving progress toward their pollution prevention goals and to measure statewide progress toward successful pollution prevention. TCEQ analyzes APR data in order to:

- Report the statewide status of pollution prevention to the Texas Legislature.
- Communicate industrial pollution prevention progress to the press and the public.
- Identify facilities for potential success stories.

Through accurate reporting of your P2 progress, you may contribute to the direction of future environmental programs in Texas.

The biggest benefit of the APR is for the facility. Regular reporting of the APR encourages facilities to continuously monitor and reassess their pollution prevention efforts. Many companies improve the effectiveness of their pollution prevention programs because completion of the APR reveals additional opportunities to reduce waste and increase profits.

Need Assistance?

If you need ideas on how to improve the effectiveness of your pollution prevention activities, refer to the P2 options in Chapter 5. If you are unclear about the difference between source reduction and waste minimization, see the definitions listed in Chapter 1. To get the best results out of your P2 Plan, visit the [technical-assistance resources](#) available online.²¹

Reporting Online through STEERS

TCEQ highly recommends submitting the Annual Progress Report through STEERS. You can avoid messy paperwork, last-minute mailing, and lost reports by completing the APR form online. It's fast and easy, and you'll receive a confirmation to let you know that our system has received it. This is the only method of submission that will result in an electronic submission confirmation. You can also print out a copy for your own records.

Submitting the APR online has the added benefit of reducing typographical errors when data is entered. You insert the information and send it on its way. When we receive it, our system automatically enters the data directly into our records, which eliminates data-entry error that may occur during transcription by staff. STEERS will also alert you if there is a problem with the submission and when you should contact P2 Program staff.

Another advantage of STEERS is that you can review past APR submissions or update contact information at any time. The online APR is available in STEERS between

²⁰ www.tceq.texas.gov/p2/wrpa/background.html

²¹ www.P2Plan.org

May 15 and July 1 to report the results of the current reporting period only. During that period it is accessible 24 hours a day, seven days a week. By submitting your APR online, you can rest easy knowing it will arrive on time to meet the July 1 deadline.

If you need to submit APRs from previous reporting periods, you will still need to complete the APR form and submit it to P2 Program staff via email at P2@tceq.texas.gov or by paper copy.

Where to Report Online

You can complete your Annual Progress Report online using STEERS either by [accessing STEERS directly](#)²² or by [visiting the WRPA Program website](#)²³ and using the “Online P2 Annual Progress Reporting (STEERS)” link. This link also gives you step-by-step instructions for submitting through STEERS (including common error messages and what to do), editing a P2 contact, and viewing past APRs. TCEQ prefers online submissions through STEERS.

Instructions for Completing the APR Form

A copy of the required APR form has been provided in this guide, in Appendix D. This form should be completed for each year of your five-year plan. We recommend that you calculate your answers on a separate sheet of paper. Whether you want to submit your Annual Progress Report using paper or through STEERS, the following directions will guide you through the form.

PART 1. FACILITY DESCRIPTION

Part 1 of the APR asks for facility and contact information. Check your answers in this section to ensure that you receive credit for your APR submission. Without correct facility information, we may not be able to locate your records.

Report year. Enter the calendar year being reported on the APR. Remember that although your report is due each July, the reporting period covers January through December of the previous year.

Report date. Enter the date that the report is sent to TCEQ. All reports should be postmarked no later than July 1 of the year following the report year.

Company name. Enter the name of the company or corporation that appears on the notice of registration (NOR) for the facility. If you are a large company with several facilities, you should also enter a site name (for example: ABC Inc., West Texas Plant).

Mailing address, city, state, and zip code. Enter the mailing address of the pollution prevention contact person. The address can be either a street address or a post office box. Use the five-digit zip code and, when known, the four-digit extension (xxxx-xxxx).

Name of pollution prevention contact. Enter the name of the person who can answer questions about the facility’s pollution prevention program from the public,

TCEQ, or other parties. This person does not have to be the one who completed or oversaw completion of the APR, but he or she should be able to answer questions about the facility’s P2 Plan.

Telephone, fax, email. Enter the area code, telephone number, fax, and email for the pollution prevention contact person.

Is your company independently owned or operated?

If your company is part of a larger company, a subsidiary of another company, or is operated by another company, then the answer is “No.”

Facility Identification Numbers. It is essential to provide the correct identification numbers for each facility. If you do not provide accurate ID numbers, your facility may not receive credit for the submitted report. The ID numbers needed are:

- The 5-digit solid-waste number from your TCEQ Notice of Registration (NOR).
- The 12-character EPA ID number.
- The 15-character TRI ID number from your TRI report (if the facility is a TRI reporter).
- The 9-digit Customer Reference Number (always preceded by “CN”).
- The 9-digit Regulated Entity Number (always preceded by “RN”).
- The 5-digit P2 Program ID number (always preceded by “P”).

Number of employees. Enter the estimated total number of full-time employees at all company sites. For the purposes of this form, a full-time employee means 2,000 work hours per year. You may wish to estimate the number of employees based on employee hours in a work week (see Example 6). If your facility is owned by an extremely large company, you may answer “over 1,000.”

Enter the date the P2 Plan was last updated. This would be the year your current five-year plan began. If applicable, attach a brief explanation of why the plan and Executive Summary were revised.

Part 1 of the APR is automatically completed in STEERS with the most current P2 database records. Contact changes can be made through STEERS under “Contacts.” If you see an error with any other information in this section of the STEERS APR form, please contact P2 Program staff at P2@tceq.texas.gov or by calling 512-239-0010.

PART 2. PROJECTED AMOUNTS FOR GOAL YEAR

In this section, report how much waste you expect to reduce by the end of the fifth year of your plan. It is an estimate, and the numbers reported each year will remain the same unless your facility goals are updated during the year to reflect better results or reduced expectations. Your goals can be found in your P2 Plan.

²² www3.tceq.texas.gov/steers/

²³ www.p2plan.org/

Goal year. This is the fifth year of your plan. If your plan begins in 2016, your goal year is 2020.

Row 1. Enter the projected amount of hazardous waste (Column A) that will be generated and the total projected amount of TRI chemicals (Column B) that will be released and transferred during the fifth year of your plan. Estimate this amount based on the base-year waste totals minus the amount stated as the measureable source-reduction goal in the P2 Plan.

Row 2. Enter the estimated source-reduction amount of hazardous waste (Col. A) and/or TRI chemicals (Col. B) that will be achieved over the five-year plan period (see Example 7). This was estimated in the P2 Plan and Executive Summary under “Measureable Reduction Goals.”

Row 3. Enter the projected percent of hazardous waste and/or TRI chemicals remaining in year five of your plan (Row 1) that you plan to recycle, reuse, or treat with other waste-minimization practices (see Example 8).

PART 3. REDUCTION ACHIEVEMENT FOR THE REPORT YEAR

This section is the most important part of the Annual Progress Report. Use this section to report actual reduction amounts achieved for the report year. The report should reflect the previous calendar year’s pollution prevention activities.

If you have difficulty matching your projects to our categories, refer to the “Source Reduction Activities by Category” table in Appendix B. You may not find an exact match, but most projects can be related to one of the categories provided. If you are still unable to list reductions achieved at your facility, describe the reduction and quantity in the box provided.

The amount of source reduction reported in Part 3 is an estimate of the amount of pollution that would have been generated if you had not undertaken a P2 project in the report year.

Rows 1 through 8. Estimate the amount of hazardous waste and TRI reduction achieved as a result of your P2 projects. Try to use one of the eight categories listed. Some projects may fit more than one category, you can use your best judgment in assigning a category.

Report HW reductions (tons) in **Rows 1 through 8**, Column A. Report reductions of TRI chemicals (tons) in Column B. The quantity of source reduction for a reporting year can be determined by measurement, or estimated using activity or production indexing. Example 9 shows a simple source-reduction estimation.

Many companies have changes in pollution generated due to production changes, while simultaneously decreasing the amount of pollution through source reduction. If your production has changed, see Example 10. Some materials are classified as both HW and TRI. Due to different reporting standards, the amount of HW reported for a dual-classified material may be different from the amount of TRI reported for the same waste. When one of these dual-classified materials is reduced, the separate amount (tons) should be reported in Column A (for HW) and B (TRI) with different quantities. Example 11 illustrates this concept.

Row 9. Enter the sum of Rows 1 through 8 in tons.

“Briefly describe . . .” This final area of Part 3 allows you to describe how you achieved your reductions and also share information about waste reductions of nonhazardous and non-TRI chemicals, facility productivity, or any other notes you choose.

EXAMPLE 6. ESTIMATING THE NUMBER OF EMPLOYEES

Ed's Repair Shop has three full-time mechanics (40 hours/week), a part-time custodian who works 10 hours per week, and a part-time secretary who works 30 hours per week. The secretary and the custodian work the equivalent of one full-time employee (total 40 hours/week). Therefore, the number of employees is four.

EXAMPLE 7. CALCULATING FIVE-YEAR SOURCE REDUCTION

A company has a P2 Plan that begins in the year 2020. In the year prior to their plan's start, 2019, they report 20 tons of xylene on the TRI Form R. The xylene is an ingredient in the solvent they use to prepare their product. During the first year of their plan, 2020, they plan to educate their employees on better handling of the solvent: placing lids on containers, minimizing spills, and checking for leaks in the process area. By implementing these inventory-control procedures, they hope to use 5 tons/year less xylene.

In the second year, 2021, they plan to have a solvent reuse/recirculation device in place that will route unused solvent back into the process. This change is projected to result in a source reduction of 10 tons per year. By their third year, 2022, they hope to find an alternate material that does not contain hazardous or TRI-listed chemicals. This change will eliminate their remaining 5 tons of xylene.

Plan Year	Amount Source-Reduced	Amount Generated
2020	5	20 – 5 = 15 tons
2021	10	15 – 10 = 5 tons
2022	5	5 – 5 = 0 tons
2023	0	0
2024	0	0

Adding the amount of xylene that will be reduced each year from the middle column above equals the Total Source Reduction for the five-year plan. This company would then report 20 tons in Part 2, Row 2, Column B.

EXAMPLE 8. CALCULATING PERCENT WASTE MINIMIZATION

A company predicts that they will generate 100 tons of hazardous sludge per year in the fifth year of their P2 Plan. In the fifth year they also plan to treat 30 tons of that sludge such that after treatment the waste will no longer be hazardous. Since $30/100 = 0.3$, or 30%, this company will enter "30%" in Row 3, Column A, of Part 2, for "% Waste Minimization by the Goal Year."

EXAMPLE 9. BASIC SOURCE-REDUCTION ESTIMATION

A facility uses a solvent bath to clean filament wire in a batch process. Facility records document that in 2015, the 500-gallon tank contents were changed 10 times, generating 1 ton of HW each cleaning. In 2016, they began monitoring the solvent's condition, which resulted in only 9 changes of the tank contents. How much source reduction took place in 2016? What source-reduction activity should it be reported under?

Step 1. Determine quantity of waste generated in 2015 and 2016 from the batch process.

$$\text{HW gen. 2015} = (10 \text{ cleanings}) \times (1 \text{ ton HW/cleaning}) = 10 \text{ tons}$$

$$\text{HW gen. 2016} = (9 \text{ cleanings}) \times (1 \text{ ton HW/cleaning}) = 9 \text{ tons}$$

Step 2. Determine the difference in quantities of waste generated between 2015 and 2016. What is the amount of source reduction (the total length of wire cleaned was the same each year)?

$$\text{HW Source Reduced} = 10 \text{ tons} - 9 \text{ tons} = 1 \text{ ton}$$

Answer: Amount Source Reduced in 2016 is 1 ton.

Reported in Part 3, in either Row 1 or Row 6, Column A.

(The monitoring could be considered either "Good Operating Practice," or improvement to "Cleaning and Degreasing.")

EXAMPLE 10. ESTIMATING SOURCE REDUCTION WHEN THERE IS A CHANGE IN THE PRODUCTION RATE

A facility manufactures widgets and generates an amount of hazardous waste (HW) that is directly proportional to the number of widgets produced. In 2020, they made 2,000 widgets and generated 5 tons of HW. In 2021, the facility manufactured 3,000 widgets, implemented a process modification, and generated 7 tons of HW. How much source reduction took place for the 2021 reporting year? What source-reduction activity should it be reported under?

Since waste is proportional to production, you can use the following ratio to help calculate source reduction:

$$\frac{\text{Year 1 HW}}{\text{Year 1 Prod.}} = \frac{\text{Year 2 HW (Calc)}}{\text{Year 2 Prod.}}$$

Thus

$$\text{Year 2 HW (Calc)} = \frac{\text{Year 1 Waste}}{\text{Year 1 Prod.}} \times \text{Year 2 Prod.}$$

And then

$$\text{Source Reduction} = \text{Year 2 Waste (Calc.)} - \text{Year 2 Waste (Actual)}$$

Step 1. For this example, Year 2 is 2021 and Year 1 is 2020. Therefore, the waste that would have been generated if there had not been a process modification would be:

$$2021 \text{ HW (Calc)} = \frac{5 \text{ tons HW}}{2,000 \text{ widgets}} \times 3,000 \text{ widgets} = 7.5 \text{ tons HW}$$

Step 2. Determine the amount of source reduction:

$$\text{Amount Source Reduction} = 7.5 - 7.0 = 0.5 \text{ tons in 2021}$$

Answer: Amount SR in 2021 is 0.5 tons.

Reported on Part 3, Row 5, Column A

EXAMPLE 11. MATERIALS REPORTED UNDER BOTH TRI AND HAZARDOUS WASTE REGULATIONS

ABC Manufacturing reports benzene on its Annual Waste Summary and the TRI Form R. The benzene releases result from leaks in their pipes and connections. In order to prevent the leaks from contaminating groundwater, the floor is washed every night, and the water-benzene mixture is sent to an off-site wastewater treatment plant.

Different Reported Amounts for the Annual Waste Summary and TRI. On the TRI Form R, the total releases and transfers of benzene are reported as 4,000 pounds (2 tons.) On the Annual Waste Summary, the benzene shipped off-site is reported as 50 tons. This difference results from the benzene being disposed of in a water-benzene mixture. Under the hazardous waste regulations, when a nonhazardous substance is mixed with a listed hazardous waste, the entire mixture becomes hazardous. In contrast, the TRI reporting requirements only require facilities to report the amount of toxic chemical released or transferred. Because the reporting requirements are different, the amount of hazardous waste that is source-reduced, as reported in Column A of Part 3, will differ from the amount of TRI chemical that is source-reduced, as reported in Column B of Part 3.

Source Reduction Project. ABC manufacturing installed dry-disconnect couplings on most of their flanges, reducing the accidental leaks and spills, and thus reducing the amount of wastewater needed to handle the benzene. Since installing these dry-disconnect couplings, the amount of benzene-contaminated wastewater reported on the Annual Waste Summary was reduced from 50 tons to only 1 ton. The benzene releases and transfers reported on the TRI Form R dropped from 2 tons per year to 0.2 tons per year.

Reporting on APR Part 3

$$\text{Hazardous Waste Source Reduction} = 50 \text{ tons} - 1 \text{ ton} = 49 \text{ tons}$$

$$\text{TRI Source Reduction} = 2 \text{ tons} - 0.2 \text{ tons} = 1.8 \text{ tons}$$

On the TRI Form R, Section 8, the company noted that their activity has the Source Reduction Activity Code of W39, "other spill and leak prevention," and therefore the activity will be listed on Row 3 of the APR Part 3 for both the hazardous waste and TRI columns.

Note: You may find that your TRI reductions and your hazardous waste reductions are not proportional. In this example, the facility achieved a 98% reduction in hazardous waste, but only an 80% reduction of TRI chemicals.

Submitting Documents

In this chapter . . .

- Discover when and where to mail your documentation to TCEQ.
- Discover where to find additional assistance.

Submitting the Executive Summary

Once every five years, all facilities subject to the P2 planning law are required to submit an Executive Summary of their P2 Plan. The entire plan should not be sent to TCEQ. Only the Executive Summary is required. The comprehensive version of your plan should be kept available on-site so that it may be shown to inspectors when they visit. To help you create a complete Executive Summary, you may use Worksheet 6, found at the end of Chapter 8 of this guide, or [download a Microsoft Word file of the worksheet](#) online.²⁴

When submitting your Executive Summary, make sure that the Certificate of Completeness and Correctness has a signature and provides the printed name and title of the signer, as well as the date. Do not send a copy of your entire plan. It will not be kept by TCEQ. Executive Summaries may be sent by email to P2@tceq.texas.gov or by mail.

If you send it by mail, clearly mark your envelope to indicate an Executive Summary and mail the document, along with the Certificate of Completeness and Correctness, to:

Executive Summary
Pollution Prevention Planning, MC 108
Texas Commission on Environmental Quality
PO Box 13087
Austin, TX 78711-3087

Submitting Annual Progress Reports (APRs)

Your first Annual Progress Report is due on July 1 after the first full year of your P2 Plan. Subsequent APRs are due on July 1 for each year of your P2 Plan. For example, a facility whose P2 Plan begins with the calendar year of 2017 is required to submit an APR by July 1, 2018. Each APR submitted should report information about reduction achievements made in the previous calendar year.

Online submission through STEERS is preferred by TCEQ and is available by accessing [STEERS directly online](#)²⁵ or by visiting the “[Online P2 Annual Progress Reporting \(STEERS\)](#)” link on the P2 website.²⁶ Reports may be submitted online only from May 15 through July 1. All late

reports must be emailed or mailed.

To submit an APR form via email, please send the completed document to P2@tceq.texas.gov.

To submit a paper APR form via mail, send the completed document to:

Annual Progress Report
Pollution Prevention Planning, MC 118
Texas Commission on Environmental Quality
PO Box 13087
Austin, TX 78711-3087

All envelopes should be clearly marked as an Annual Progress Report.

FAST FACTS

- The most important requirement in WRPA is to prepare a P2 Plan and keep it on-site.
- WRPA reporters are required to send an Executive Summary of their plan to TCEQ once every five years.
- Annual Progress Reports are due for LQGs and/or TRI Form R reporters on July 1, and can be completed online or by using paper forms.

Getting Additional Assistance

If you need to order additional forms, guides, or other TCEQ publications, call Publications at 512-239-0028. For additional assistance on submitting your P2 planning documents or completing forms, or for specific inquiries about WRPA requirements, contact the Pollution Prevention Team, at:

Phone: 512-239-0010

Fax: 512-239-7801

Email: P2@tceq.texas.gov

or

Visit one of our websites:

Home page: www.TCEQ.texas.gov

P2 page: www.P2Plan.org

or

Refer to Appendix A for additional resources.

²⁴ www.P2Plan.org

²⁵ www3.tceq.texas.gov/steers/

²⁶ www.tceq.texas.gov/p2/wrpa/onlineform.html

Appendices

APPENDIX A.

Resources for Pollution Prevention Planning

Online Resources for Pollution Prevention

For more detailed information on any of the options below, call the TCEQ Pollution Prevention and Education Section, at 512-239-3143, or email P2@tceq.texas.gov.

TCEQ POLLUTION PREVENTION PROGRAMS

www.tceq.texas.gov/p2

A list of the programs at TCEQ designed to aid in preventing pollution.

TCEQ WASTE REDUCTION POLICY ACT (POLLUTION PREVENTION PLANNING LAW)

www.P2Plan.org

A portal to resources available for the Waste Reduction Policy Act and pollution prevention planning, including workshops, resources, guidance documents, and more.

RESOURCE EXCHANGE NETWORK FOR ELIMINATING WASTE (RENEW)

www.renewtx.org

A materials-exchange network for industries, businesses, and governmental units that promotes reclaiming, recycling, and reuse of materials.

TEXAS ENVIRONMENTAL EXCELLENCE AWARDS

www.teea.org

The most prestigious environmental award in Texas honors the state's most outstanding projects in various categories, including large business, government, education, and individual citizens.

APPENDIX B.

Source Reduction Activities by Category

The following categories will help you classify your source reduction project for the Annual Progress Report.

SOURCE REDUCTION ACTIVITIES BY CATEGORY

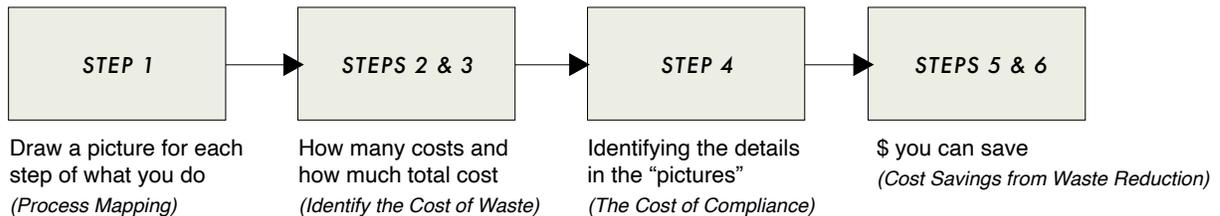
CATEGORY	SOURCE REDUCTION ACTIVITY
1. Good Operating Practices	Segregate hazardous waste from nonhazardous waste Segregate waste to increase recycling Improve the maintenance scheduling, recordkeeping, or procedures Change the production schedule to minimize equipment and feedstock changeovers
2. Inventory Control	Institute procedures to eliminate expired material Test outdated material—continue to use if still effective Institute better labeling procedures Inspect and label raw materials when they arrive Purchase materials only when needed Eliminate shelf-life requirements for stable materials Institute a clearinghouse to exchange waste materials
3. Spill and Leak Prevention	Improve storage and stacking procedures Improve procedures for loading, unloading, and transfer operations Install overflow alarms or automatic shut-off valves Install vapor-recovery systems Implement an inspection or monitoring program of potential spill and leak sources Update the spill response plan
4. Raw-Material Modifications/ Substitutions	Use aqueous cleaners instead of petroleum-based solvents Increase purity of materials Substitute nonhazardous materials for hazardous materials Use low-VOC paints and coatings
5. Process and Equipment Modifications	Institute recirculation within a process Modify equipment, layout, or piping Use a different process catalyst Institute better controls on operating bulk containers to minimize the discarding of empty containers Institute closed-loop recycling Change from small-volume containers to bulk containers Replace obsolete equipment with more efficient models
6. Cleaning and Degreasing	Modify stripping/cleaning equipment Change to mechanical stripping/cleaning devices (from solvents or other materials) Change to aqueous cleaners (from solvents or other materials) Modify containment procedures for cleaning units Improve draining procedures Redesign the parts racks to reduce drag-out Modify or install rinse systems Improve rinse equipment design Improve rinse equipment operation Reduce the number of solvents used, to make waste more amenable to recycling
7. Surface Preparation and Finishing	Modify spray systems or equipment Substitute coating materials used Improved application techniques Change from spray to other system
8. Product Modifications	Change product specifications Modify design or composition of the product Modify the packaging

APPENDIX C.

Full-Cost Accounting Worksheet

WORKSHEET 7 WILL GUIDE YOU THROUGH SIX BASIC STEPS TO SAVE MONEY BY REDUCING WASTE.

1. First, draw an input/output “picture” of each step or process in your business.
2. Next, figure how much the raw materials cost for each process.
3. Calculate your costs to dispose of the waste for each process.
4. Determine how much you spend to comply with laws for waste you generate.
5. Add up all of the costs of managing waste.
6. Look for ways to reuse or recycle materials, lower costs, and save money.



AFTER YOU HAVE COMPLETED THESE STEPS, YOU WILL:

- Notice costs that were hidden in your overhead
- See things that you do in your business that cause waste
- Locate areas of your business where you can reduce your waste
- Be able to determine if your business is operating efficiently and measure what it may be costing you to dispose of reusable or recyclable things
- Find places where you can improve your business, lower your costs, save money, and be a cleaner business

The following instructions will help you understand how to use Worksheet 7 to determine costs. The front (or first page) of the worksheet lists steps 1–5. The back (or second page) of the worksheet covers Step 6, “Comparing Costs Using a Waste-Reduction Option Versus Doing Business as Usual.”

STEP 1. DRAWING A “PICTURE” OF WHAT YOU DO

You will want to track the inputs (supplies) used and outputs (wastes) created during each process in your business. For example, imagine that one process in your business involves cleaning the presses with a petroleum-based solvent. (You may have many processes in your operation but, for the example, we will look at one process only.) Example 13 shows how the worksheet can be used to track the inputs and outputs for the press-cleaning process. Once the inputs and outputs are identified in Step 1, how the outputs are disposed of is recorded on the right.

STEP 2. TRADITIONAL INPUT (SUPPLY) COSTS PER PROCESS PER YEAR

Next, you will want to determine your annual costs for each of the inputs in this process. This includes the cost of labor and materials. In Step 2 of the worksheet, notice that there is a total cost for doing this one process throughout the year (A). Your calculations will vary depending on the process.

Note: You will have to calculate the costs for each process in your operation separately. You will need a separate worksheet for each process. Make copies of the blank worksheet as needed.

STEP 3. TRADITIONAL OUTPUT (DISPOSAL) COSTS PER PROCESS PER YEAR

You also want to determine your annual costs for each output (disposal) connected with this process. Step 3 of the worksheet allows you to calculate the amount spent on each type of disposal method for this process and then add them all up for a total cost to dispose of all wastes from this process (B).

STEP 4. HIDDEN COSTS PER YEAR

This step involves identifying some of the costs for this process that may be hidden in your overhead or other accounts—such as permit fees and training costs—and not normally seen as part of the process in your business. Some hidden costs are the result of the compliance requirements that your business has “triggered.” These additional costs must be paid by you, but usually do not add value to your final product.

Finding the exact dollar amount is not as important as identifying the various compliance costs linked to the process. Just estimate how much you spend, as closely as possible. Or, estimate your total hidden costs and divide by the number of processes. Then distribute the amount equally to each item that affects each process. Accuracy is not as important as identifying these costs, seeing where they come from, and looking at their relationship to your annual revenues and expenses. In the worksheet, the costs are estimated and totaled for the year (C).

STEP 5. TOTAL COSTS PER YEAR

Add up the cost of materials going into the process (A), the cost of disposal of excess materials and controlling materials (B), and any hidden costs (C). In the worksheet sample, Example 13, we calculated the total cost for cleaning the presses. By knowing what each process (press cleaning, for example) costs your business, you can start to manage your costs more effectively and save money.

STEP 6. COMPARING COSTS USING A WASTE-REDUCTION OPTION

Once you have completed Steps 1–5, you can use this information to find ways to save money by reducing, reusing, or recycling any of those leftover materials.

Step 6 allows you to compare the cost of doing business as it is now with the cost of doing business using alternatives designed to reduce your waste at the source and save you money. We'll continue using the press-cleaning example.

To complete Step 6, you will need to:

- Determine the cost of materials that are being lost through disposal, rather than reusing or recycling them.
- Choose a waste-reduction option from the options you have identified in your technical-feasibility study.
- Compare your current costs with the cost of using an alternative method that reduces waste.

- Determine the payback period of any new equipment purchased.

Based on their technical-feasibility study, the company decided to use a solvent-recycling unit. It reduces the amount of raw materials and labor needed to do cleanup (Example 12). Other processes may need different waste-reduction options.

Example 12 makes several assumptions about solvent-distillation units based on information gathered from vendors. Your unit may perform differently than the estimates here. It is important to figure out how much solvent your unit recovers, because other numbers are based on it. Even with a solvent-recovery unit, some new solvent must be purchased. Usually machines recover between 50 and 70% of the original solvent, so additional solvent that will need to be purchased will range from 30 to 50% of the initial amount.

The information from Steps 1–5 was entered in the “Before” column of Step 6 (see Example 13). Next, the new information from the “Waste-Reduction Option” table (Example 12) was written in the “After” column. Finally, the current operating costs are compared to the costs of using the new waste-reduction option.

At the bottom of the Step 6 page of the worksheet, there is a comparison calculation that will tell you how long it will take until you break even on any equipment you had to purchase in the waste-reduction option. This is called the “Payback Period,” and it shows you two things:

- How long it takes to break even on the equipment purchased.
- How quickly you can start to save money.

EXAMPLE 12. WASTE-REDUCTION OPTION: INSTALLING A TWO-GALLON SOLVENT-DISTILLATION UNIT

a. Amount of solvent you use in a year for this process (no. of times you do process × amount used each time)	117 gal
b. Annual costs to use this much solvent for this process (\$0.53/half pt = \$8.48/gal) (117 gal × \$8.48/gal)	\$992.16
c. Annual disposal costs to dispose of this much solvent as hazardous waste (Step 3 from Worksheet 7)	\$231.25
d. Minimum average amount (%) of solvent recovered with a two-gallon solvent-distillation unit	0.65
e. Amount of solvent recovered per year for this process, with 65% recovery rate ($a \times .65$)	76.05 gal
f. Additional solvent purchases required for this process, above the amount of solvent recovered with a solvent-distillation unit ($a - e$)	40.95 gal
g. Average amount (gal) of still-bottom sludge disposed of per year with a two-gallon solvent-distillation unit	110 gal
New cost to purchase solvent for this process ($b \times .35$) (65% recovery rate means you only need to buy 35% as much new solvent)	\$347.26
Cost to dispose of 110 gal of still-bottom sludge per year for this process (contact your local hazardous-waste hauler)	\$185.00

EXAMPLE 13. STEP 6 (OF WORKSHEET 7):

COMPARING COSTS USING A WASTE-REDUCTION OPTION VERSUS DOING BUSINESS AS USUAL

STEP 6. COMPARING COSTS USING A WASTE-REDUCTION OPTION VERSUS DOING BUSINESS AS USUAL

BEFORE WASTE REDUCTION

Process Name: Press Cleaning

Inputs (materials, supplies)

Annual input costs for each of the inputs for THIS process. from the front of your worksheet (Step 2)

1. Solvent	1. \$	<u>992.16</u>
2. Labor	2. \$	<u>7,020.00</u>
3. Rags	3. \$	<u>299.52</u>
4.	4. \$	<u> </u>
5.	5. \$	<u> </u>

What is the OLD annual input total cost from this process \$ 8,311.68

Outputs (what's left)

Annual disposal costs from THIS process. from the front of your worksheet (Step 3)

Dumpster	\$	<u> </u>
Sewer	\$	<u> </u>
Waste Hauler	\$	<u>231.25</u>
Recycle	\$	<u> </u>

The OLD annual disposal total cost from this process \$ 231.25

Annual HIDDEN Costs

from the front of your worksheet (Step 4)

The OLD annual hidden costs from this process \$ 170.00

COST COMPARISON

Your OLD Total cost per year for your INPUTS, OUTPUTS, and HIDDEN Costs \$ 8,712.93

MINUS

NEW Total cost per year for your INPUTS, OUTPUTS, and HIDDEN Costs \$ 8,021.78

EQUALS

Difference in OLD vs. NEW TOTAL COSTS per year \$ 691.15

NEXT

Now subtract the cost of any NEW EQUIPMENT purchased and installed (if applicable) \$ 2,100.00

The difference is: \$ -1,408.05

AFTER WASTE REDUCTION

P2 Option Name: Solvent Distillation Unit

Which INPUT(s) at the left will be affected by selecting a waste-reduction option Solvent

New Input Costs

(including any changes from this P2 Option)

1. Solvent	1. \$	<u>347.26</u>
2. Labor	2. \$	<u>7,020.00</u>
3. Rags	3. \$	<u>299.52</u>
4.	4. \$	<u> </u>
5.	5. \$	<u> </u>

What is the NEW annual input total cost from this process \$ 7,666.78

Which DISPOSAL method(s) at the left will be affected by selecting a waste-reduction option Waste hauler

New Output Costs

(including any changes from this P2 Option)

Dumpster	\$	<u> </u>
Sewer	\$	<u> </u>
Waste Hauler	\$	<u>185.00</u>
Recycle	\$	<u> </u>

The NEW annual output total cost from this process \$ 185.00

New Annual HIDDEN Costs

The NEW annual hidden costs (including any possible changes) \$ 170.00

If you divide the new up-front cost by how much you save per year, you will determine your PAYBACK PERIOD, or how long it will take to pay for the new equipment.

$$\frac{\$ 2,100.00}{\$ 691.15} = 3.03 \text{ yrs.}$$

Worksheet 7: Full-Cost Accounting Worksheet

Use a separate worksheet for each process.

STEP 1. PROCESS INPUT/OUTPUT MAP

PROCESS NAME

Inputs (materials, supplies)	Outputs (what's left other than the finished product)	Disposal Method	OUTPUT NO. 1 2 3 4 5
1. _____	1. _____	Dumpster	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. _____	2. _____	Sewer	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3. _____	3. _____	Waste hauler	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. _____	4. _____	Recycle	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. _____	5. _____		

STEP 2. ANNUAL INPUT COSTS FOR THIS PROCESS

Input costs for doing this process ONCE	Estimated number of times this process is done in a year	Annual input cost for THIS process
1. \$ _____	× _____ times / year	= 1. \$ _____
2. \$ _____	× _____ times / year	= 2. \$ _____
3. \$ _____	× _____ times / year	= 3. \$ _____
4. \$ _____	× _____ times / year	= 4. \$ _____
5. \$ _____	× _____ times / year	= 5. \$ _____

Example: Estimated number of times this process is done in a year for 1 duplicator press and 1 two-color press
(3 washes @ 2 times a day × 6 days a week × 52 weeks = 1,872 times/year)

Total INPUT COSTS per year for this process **A** \$ _____

STEP 3. ANNUAL OUTPUT COSTS FOR THIS PROCESS

Annual disposal AMOUNTS for each disposal method	Estimated % of annual disposal amounts from THIS process	Annual input cost for THIS process	Annual disposal from THIS process
Dumpster _____ loads	_____ %	× \$ _____	= \$ _____
Sewer _____ gals.	_____ %	× \$ _____	= \$ _____
Waste hauler _____ drums	_____ %	× \$ _____	= \$ _____
Recycle _____ lbs.	_____ %	× \$ _____	= \$ _____

Total OUTPUT COSTS per year for this process **B** \$ _____

STEP 4. HIDDEN COSTS

Estimate your annual overhead costs that come from this process.

Inspections & monitoring	\$ _____
Permit fees & preparation	\$ _____
Record keeping & reporting	\$ _____
Sampling & testing	\$ _____
Safety equipment	\$ _____
Training	\$ _____
Labels & labeling	\$ _____
Secondary containment	\$ _____
Storage & containers	\$ _____
Pollution control equipment – maintenance	\$ _____
Pollution control equipment – utilities	\$ _____
Waste collection equipment – maintenance	\$ _____
Waste collection equipment – utilities	\$ _____
Waste pre-treatment	\$ _____

Total HIDDEN COSTS for this process **C** \$ _____

STEP 5. TOTAL COSTS FOR THIS PROCESS

Cost of INPUTS per year for this process	A \$ _____
+	
Cost of OUTPUTS per year for this process	B \$ _____
=	
Total Traditional Costs per year for this process	\$ _____
+	
HIDDEN COSTS per year for this process	C \$ _____
=	
Total cost of THIS PROCESS per year	\$ _____

STEP 6. COMPARING COSTS USING A WASTE-REDUCTION OPTION VERSUS DOING BUSINESS AS USUAL

BEFORE WASTE REDUCTION

Process Name: _____

Inputs (materials, supplies)

Annual input costs for each of the inputs for THIS process. *from the front of your worksheet (Step 2)*

- | | |
|------------|-------------|
| 1. Solvent | 1. \$ _____ |
| 2. Labor | 2. \$ _____ |
| 3. Rags | 3. \$ _____ |
| 4. | 4. \$ _____ |
| 5. | 5. \$ _____ |

What is the OLD annual input total cost from this process \$ _____

Outputs (what's left)

Annual disposal costs from THIS process. *from the front of your worksheet (Step 3)*

- | | |
|--------------|----------|
| Dumpster | \$ _____ |
| Sewer | \$ _____ |
| Waste Hauler | \$ _____ |
| Recycle | \$ _____ |

The OLD annual disposal total cost from this process \$ _____

Annual HIDDEN Costs

from the front of your worksheet (Step 4)

The OLD annual hidden costs from this process \$ _____

COST COMPARISON

Your OLD Total cost per year for your INPUTS, OUTPUTS, and HIDDEN Costs \$ _____

MINUS

NEW Total cost per year for your INPUTS, OUTPUTS, and HIDDEN Costs \$ _____

EQUALS

Difference in OLD vs. NEW TOTAL COSTS per year \$ _____

NEXT

Now subtract the cost of any NEW EQUIPMENT purchased and installed (if applicable) \$ _____

The difference is: \$ _____

AFTER WASTE REDUCTION

P2 Option Name: _____

Which INPUT(s) at the left will be affected by selecting a waste-reduction option _____

New Input Costs

(including any changes from this P2 Option)

- | | |
|------------|-------------|
| 1. Solvent | 1. \$ _____ |
| 2. Labor | 2. \$ _____ |
| 3. Rags | 3. \$ _____ |
| 4. | 4. \$ _____ |
| 5. | 5. \$ _____ |

What is the NEW annual input total cost from this process \$ _____

Which DISPOSAL method(s) at the left will be affected by selecting a waste-reduction option _____

New Output Costs

(including any changes from this P2 Option)

- | | |
|---------------------|----------|
| Dumpster | \$ _____ |
| Sewer | \$ _____ |
| Waste Hauler | \$ _____ |
| Recycle | \$ _____ |

The NEW annual output total cost from this process \$ _____

New Annual HIDDEN Costs

The NEW annual hidden costs (including any possible changes) \$ _____

If you divide the new up-front cost by how much you save per year, you will determine your PAYBACK PERIOD, or how long it will take to pay for the new equipment.

$$\frac{\$ \text{_____}}{\$ \text{_____}} = \text{_____ yrs.}$$

P2 Annual Progress Report Form



Texas Commission on Environmental Quality

P2 Annual Progress Report

Required
APR Form

PART 1. FACILITY DESCRIPTION

Report Year:	Report Date:
Company Name:	
Facility Name:	
Mailing Address:	Physical Address:
Mailing City, State, Zip:	Physical City, State, Zip:
Name of Pollution Prevention Contact:	TCEQ SW Reg. No.
Telephone: - - Ext.	TRI ID No.
Fax: - -	EPA ID No.
Email (optional):	P2 Program ID No. (PNumber):
Primary SIC Code:	Number of Employees:
Primary NAICS:	Regulated Entity No. (RN):
First year of your current plan:	Customer No. (CN):
Does this report revise a previously submitted APR? <input type="checkbox"/> Yes <input type="checkbox"/> No	

PART 2. PROJECTED AMOUNTS FOR GOAL YEAR (FROM YOUR PLAN)

Goal Year (the 5th year of your plan): _____

	Estimate Quantity	
	HW [Column A]	TRI [Column B]
1. Projected amount of HW generation or TRI releases/transfers by Goal Year	Tons	Tons
2. Source reduction anticipated over five-year period	Tons	Tons
3. % Waste minimization by the Goal Year	%	%

Part 3: Reduction Achievement for the Report Year

Source Reduction Activities

Estimate the amount of reduction for hazardous waste generation and TRI release/transfer that your facility experienced in each category below.

	Estimate Quantity	
	HW (Tons) [Column A]	TRI (Tons) [Column B]
1. Good Operating Practices		
2. Inventory Control		
3. Spill and Leak Prevention		
4. Raw-Material Modifications/Substitutions		
5. Process and Equipment Modifications		
6. Cleaning and Degreasing		
7. Surface Preparation and Finishing		
8. Product Modifications		
9. Total Source Reduction (Sum 1 through 8) in Tons		

Briefly describe any modifications to your plan as well as your pollution prevention projects, especially the activity you undertook to reduce waste at its source for the report year:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Note: Submission of waste-minimization information and information about HW generated and TRI released and transferred for the previous reporting year is required by the Waste Reduction Policy Act. SQGs that are non-TRI Form R reporters meet this requirement through submission of their annual waste summary. All hazardous waste generators are required to submit an annual waste summary. Submission of this form does not substitute for submission of the annual waste summary.