

A G U I D E T O
POLLUTION
PREVENTION

P L A N N I N G

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P
A

Save Money, Reduce Risks, and Eliminate Waste

T E X A S C O M M I S S I O N O N E N V I R O N M E N T A L Q U A L I T Y

A G U I D E T O
POLLUTION
PREVENTION
P L A N N I N G

*Meet the Regulator
Waste Reduction Policies*

Save Money, Reduce Risks,
and Eliminate Waste



Texas

Austin TX 78711

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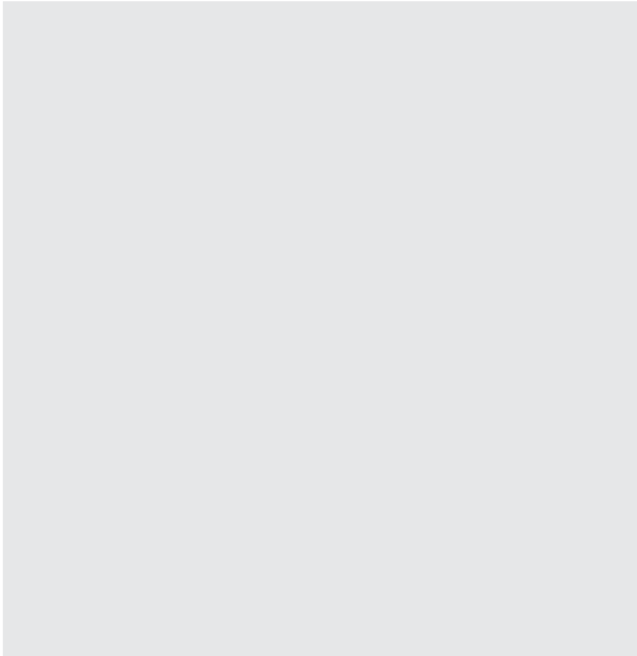
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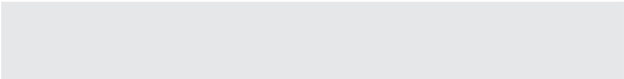
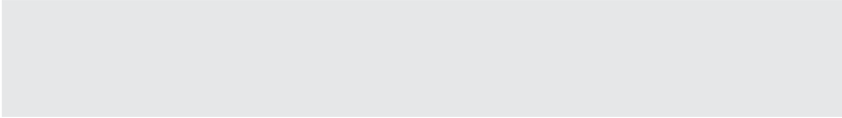
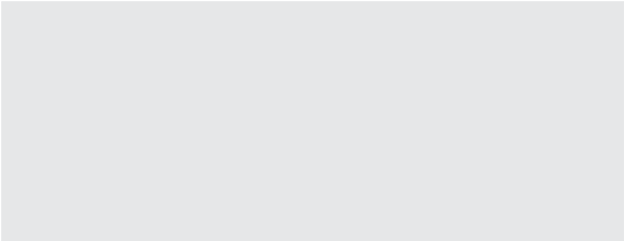
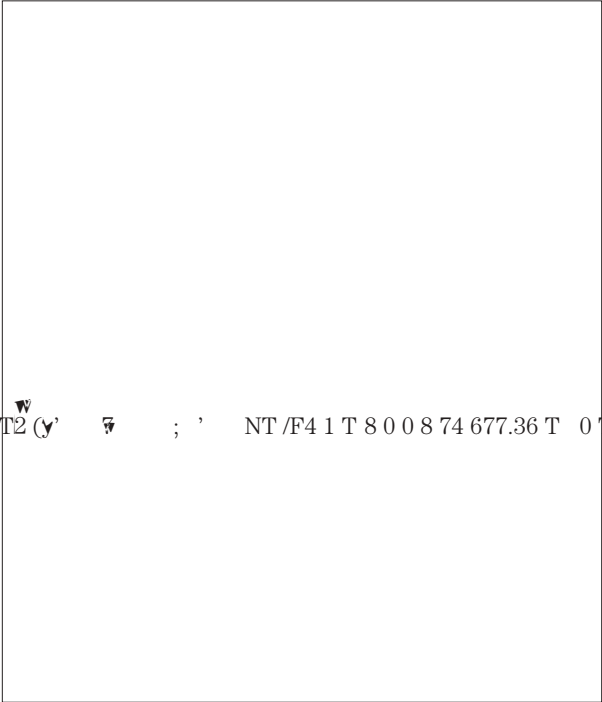
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of Commitment for Clean Texas, Cleaner World certi-
fied leader levels, F TCEQ 20032.

Fast Facts

- ▼WRPA is a state law with specific requirements for hazardous waste generators and TRI Form R reporters.
- ▼Pollution Prevention saves you money, protects the environment, and reduces your liability and regulatory burden.

CHAPTER 2:

Complying with the Waste Reduction Policy Act

Texas Resource Policy Act (WRPA) -
Texas Waste Strategy (TCEQ-

40 CFR 261, Subpart D.
EPA Web site: www.epa.gov.

Characteristic Hazardous Wastes

The EPA has identified 28 hazardous waste characteristics that are used to determine if a waste is hazardous. These characteristics are listed in 40 CFR 261.23. The characteristics are:

- **Toxicity**—Waste that is acutely or chronically toxic to humans or the environment.
- **Reactivity**—Waste that is unstable under normal conditions, reacts with water, or is otherwise unstable.
- **Ignitability**—Waste that is flammable, combustible, or otherwise ignitable.
- **Corrosivity**—Waste that is corrosive to metals or humans.

Getting Information on Hazardous Waste

For more information on hazardous waste, contact the Texas Commission on Environmental Quality (TCEQ) at 512/239-6413; or visit the TCEQ website at www.tceq.texas.gov.

TRI BASICS

The TRI program is a key component of the Superfund Amendments and Reauthorization Act (SARA) Title III. It requires certain facilities to report the amount of hazardous waste they generate, store, transfer, or dispose of each year. The reporting requirements are based on the facility's size and the types of hazardous waste it handles.

- **Large Quantity Generators (LQGs)**—Facilities that generate 10,000 pounds or more of hazardous waste per year.
- **Intermediate Quantity Generators (IQGs)**—Facilities that generate 1,000 to 10,000 pounds of hazardous waste per year.
- **Small Quantity Generators (SQGs)**—Facilities that generate 100 to 1,000 pounds of hazardous waste per year.

100 pounds per year of hazardous waste, or 1,000 pounds per year of PCBs, or 1,000 pounds per year of PBTs.

You can only report PBTs on Form R's.

The TRI list includes about 650 chemicals. If you think you use one of these chemicals, check the EPA's Web site, www.epa.gov/tri/chemical.

Form R Versus Form A

Form R is used to report the amount of hazardous waste generated, stored, transferred, or disposed of at a facility. Form A is used to report the amount of hazardous waste generated, stored, transferred, or disposed of at a facility that is also a Superfund site. Form R is required for all facilities that are required to report under the TRI program. Form A is required for facilities that are also Superfund sites.

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

Getting Help with the TRI

For more information on the TRI program, contact the EPA at 1-800-424-9346, or visit the EPA website at www.epa.gov/tri.

WRPA REQUIREMENTS

The Waste Reporting and Prevention Act (WRPA) requires certain facilities to report the amount of hazardous waste they generate, store, transfer, or dispose of each year. The reporting requirements are based on the facility's size and the types of hazardous waste it handles. The P2 Plan is the core of WRPA requirements and should be an intricate part of your facility's operating procedures.

Who Is Required to Report?

The reporting requirements apply to certain facilities that generate, store, transfer, or dispose of hazardous waste. The requirements are based on the facility's size and the types of hazardous waste it handles.

Table 2. Basic WRPA 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 WRPA	Prepare a P2 Plan, keep it on site. Submit the Executive Summary and a signed Certificate. Submit APRs.
CESQG	No requirements under WRPA	
SQG	Prepare a P2 Plan, keep it on site. Submit the Executive Summary and a signed Certificate. No APRs required.	
LQG	Prepare a P2 Plan, keep it on site. Submit the Executive Summary and a signed Certificate. Submit APRs.	

WRPA
 P2 Plan
 APR
 TCEQ
 LQG
 SQG
 CESQG
 Do not report

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 \$10,000 per violation per day.

Using Worksheets in P2 Planning

Worksheets
 TCEQ
 APR
 LQG
 TRI
 WRPA

THE P2 PLANNING PROCESS

WRPA
 TCEQ
 APR
 LQG
 TRI

- Seven Steps to Pollution Prevention Planning**
- Step 1—Identify your processes and wastes
 - Step 2—Prioritize your wastes
 - Step 3—Identify your options
 - Step 4—Prioritize projects and set goals
 - Step 5—Train employees on P2 awareness
 - Step 6—Document the P2 Plan
 - Step 7—Report annually

DUE DATES

WRPA
 P2 Plan
 APR
 TCEQ

New to WRPA

WRPA
 P2 Plan
 APR
 TCEQ

- Hazardous waste 2000 P2 Plan
- Solid waste 28, 2000.
- Resource conservation 28, 2000.
- Resource conservation P2 Plan July 1, 2005.

WRPA Renewal

WRPA
 P2 Plan
 APR
 TCEQ

Annual Reporting Requirements

LQG
 TRI
 APR
 TCEQ
 July 1, 2003, D 31, 2003.

Identifying Your Processes and Wastes

Why Should You Read 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.

WRPA, TRI, P2

FORMING A SITE ASSESSMENT TEAM

Although not required by WRPA, 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.

WRPA, P2

Directions for Worksheet 1: Assessment Team

An Example of an Assessment Team Assignment

Example 1. Example of a Completed Worksheet 1

P2 Plan Assessment Team			
Company: <u>XYZ Corporation</u>		Site: <u>Austin Facility</u>	Date: <u>12/5/03</u>
P2 Function	Team Member	Department/Telephone	Responsibilities
Team Leader	Fred Smith	Environmental/x0056 Setting up monthly meetings Project monitoring	Project implementation
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 <u>1/1/2004</u> through <u>12/31/2008</u> . Next revision due <u>1/1/2009</u> .			

CONDUCTING THE SITE ASSESSMENT

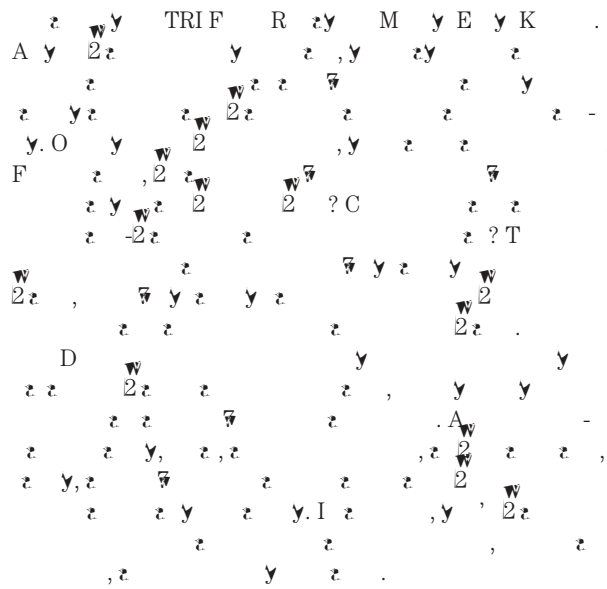
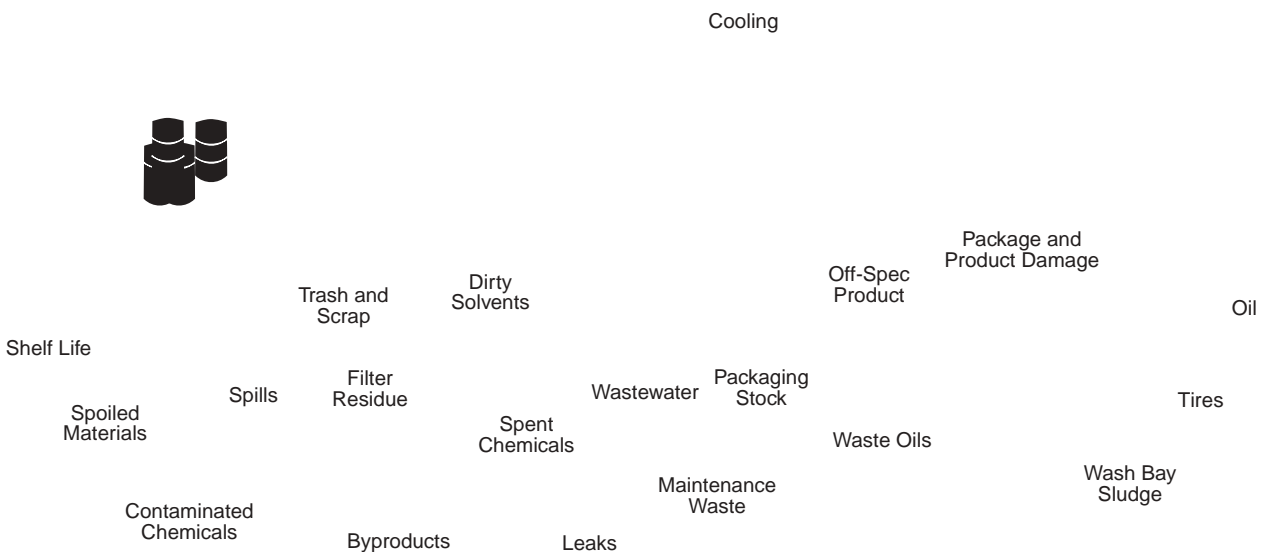


You may find it helpful to diagram facility processes or create a flow chart of operations, services, and products in order to identify areas for inspection.



Figure 1. Avenues of Waste

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DIAGRAMMING YOUR PROCESSES

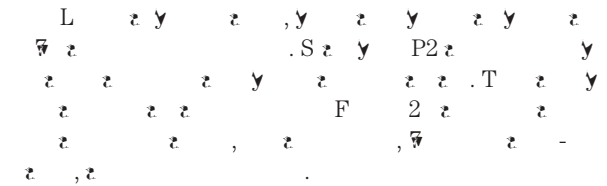
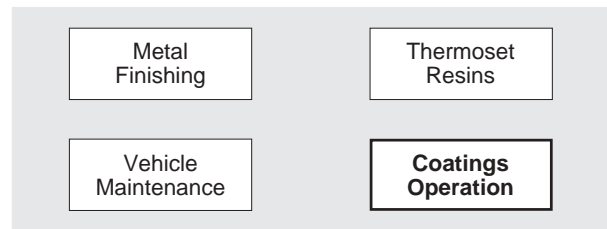
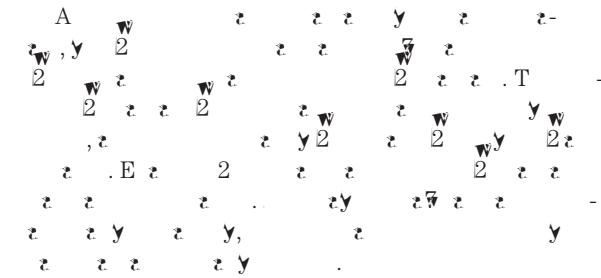


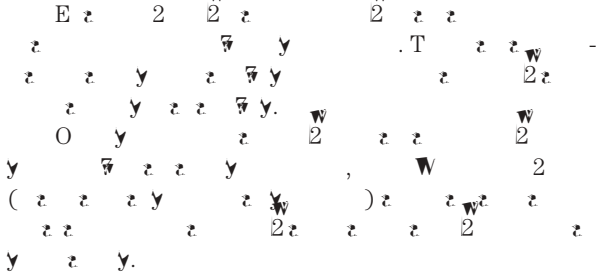
Figure 2. A Facility with Several Processes, Focusing on One Process at a Time



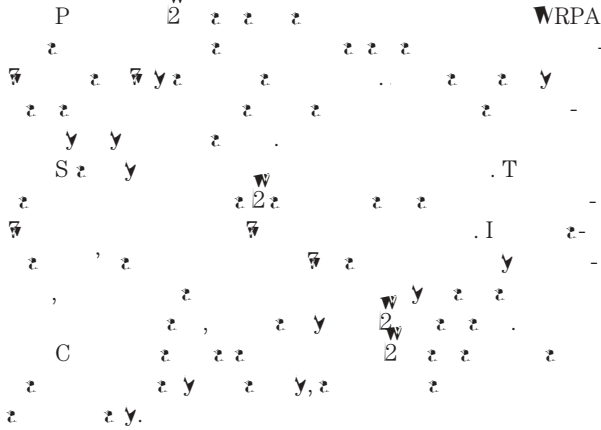
The Annual Progress Report form is the only required form. You are only required to have the elements listed in Table 3. The worksheets are examples you can use. Facilities can choose their own unique style and format for writing a P2 Plan, follow the worksheets in this guide, or combine their approach with the TCEQ examples.



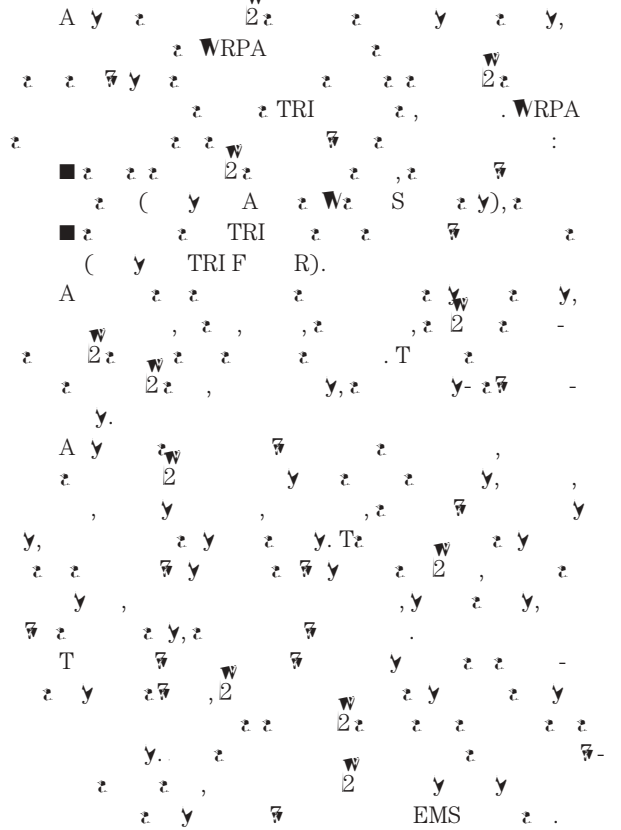
An Example of a Process Flow Diagram



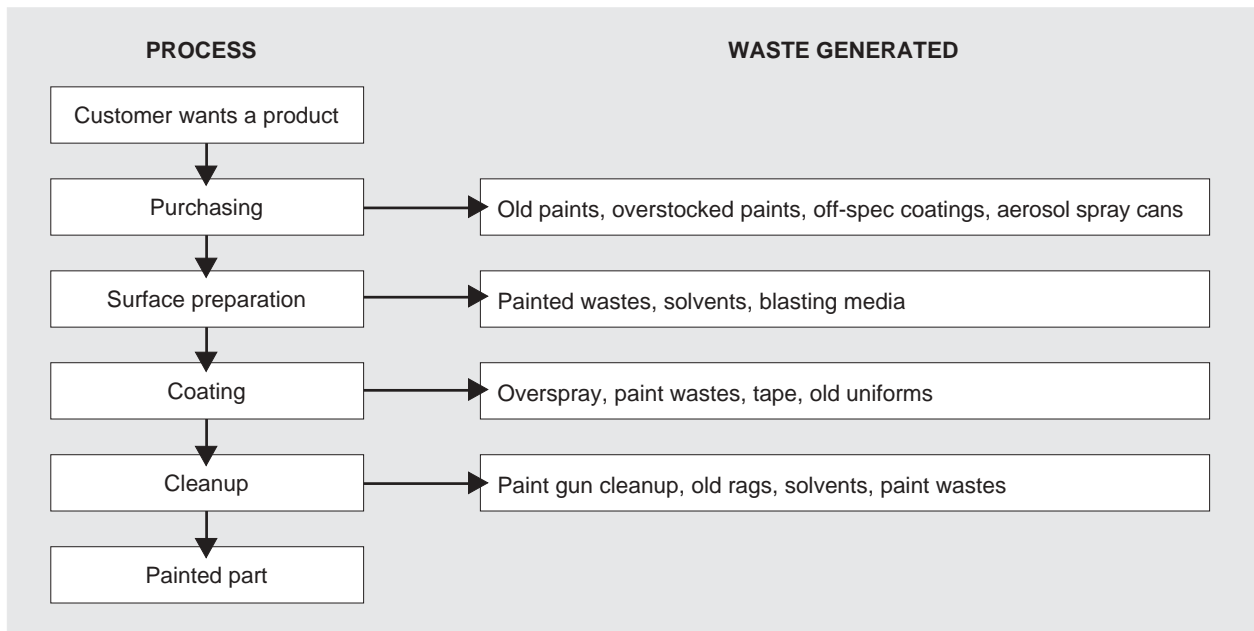
Directions for Worksheet 2: Process Flow Diagram



IDENTIFYING WASTE FROM ACTIVITIES



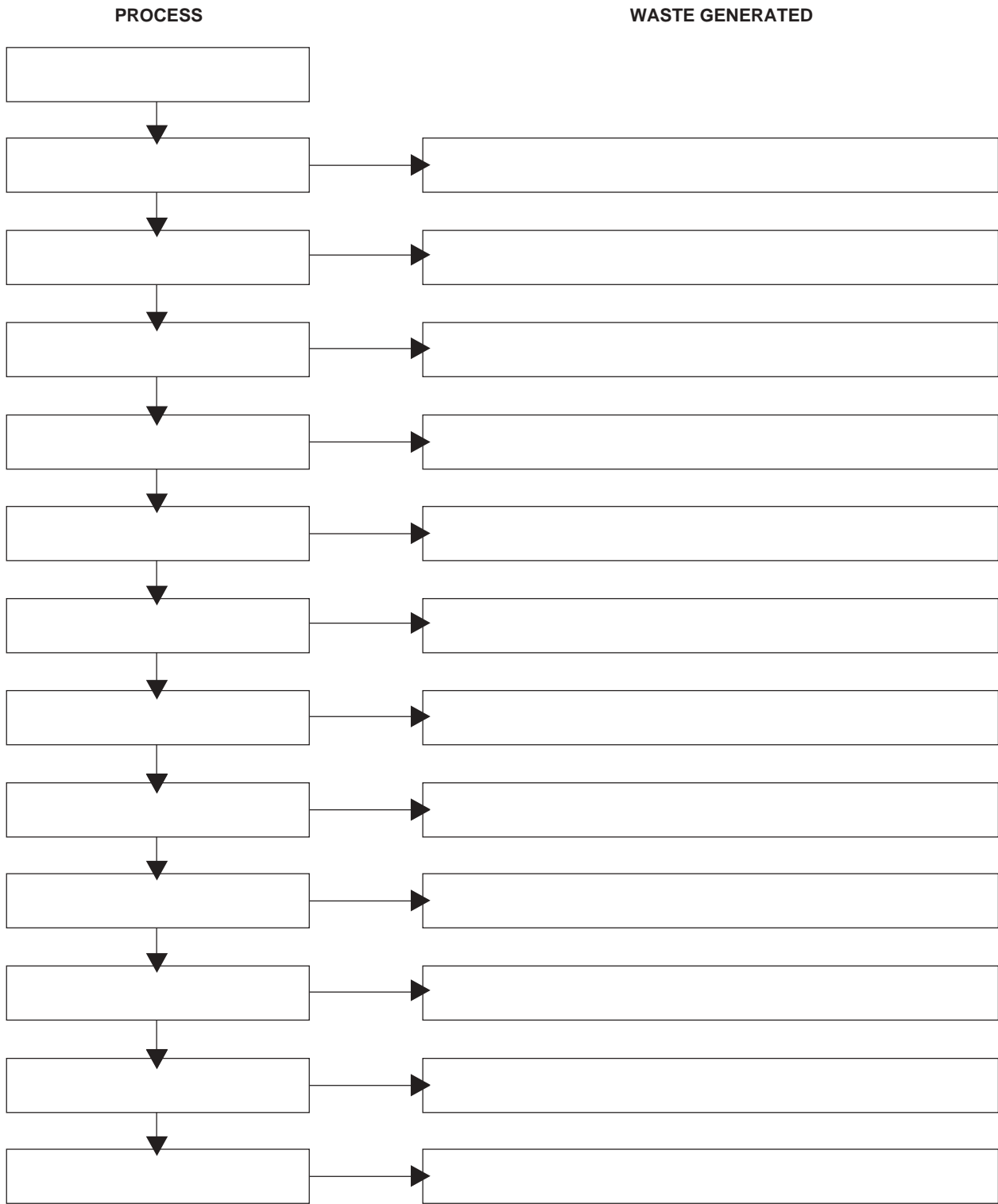
Example 2. An Example of a Process Flow Diagram



WORKSHEET 2: PROCESS FLOW DIAGRAM

Facility: _____ Date: _____

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



Prioritizing Your Waste

Why Should You Read This Chapter?

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

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

Fast Facts

- ▼ WRPA requires that facilities provide a complete list of:
 - ▼ all hazardous waste generated and the volume of each; and
 - ▼ all reportable TRI releases and the volume of each.
- ▼ Companies typically only account for 20 percent of the cost of managing a waste. Identifying the true cost can point the way to money savings.

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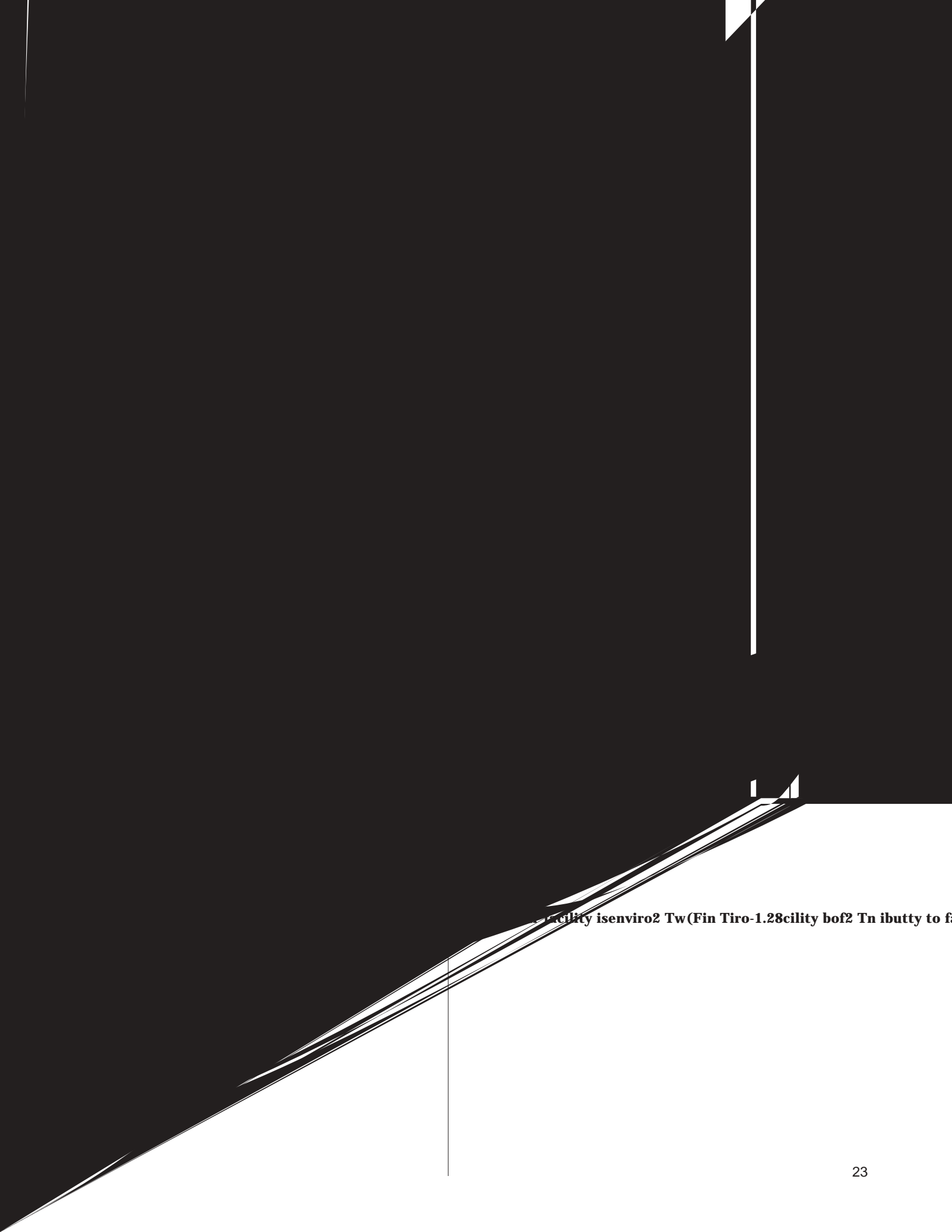
Estimating Cost

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Example 3. Example of True Cost Analysis

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



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Lone Star Success

As part of their Pollution Prevention Plan, a lubricant testing lab in San Antonio began segregating and recycling. They reduced their hazardous waste generation by 11 tons and saved over \$36,000 per year. "It's a win-win situation," according to the lab director.

Solvents and Coatings

The *Solvent Alternative Guide* (SAGE), is a free database of solvent alternatives. Visit <http://sage.rti.org/es/index.cfm>.

For more information, visit <http://cage.rti.org/es/>.

Industry-Specific Information

The EPA's industry-specific compliance information is available at www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/index.html. Additionally, the P2 Plan provides industry-specific information at www.P2Plan.org.

- www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/index.html
- www.P2Plan.org

Pollution Prevention Vendors

The International Waste Recycling Center (IWRC) provides information on vendors. Visit www.iwrc.org/.

- EPA's Pollution Prevention Vendor List at <http://es.epa.gov/vendors/>

Pollution Prevention Experts on the Web

The Great Lakes National Program Center (GLNPC) provides information on experts. Visit www.great-lakes.net/lists/p2tech/.

- Search for experts at www.great-lakes.net/lists/p2tech/.
- For more information, visit nppr@great-lakes.net.

Search Engines

Use search engines like Google, Bing, or Yahoo to find more information. Visit www.google.com.

www.google.com

POLLUTION PREVENTION OPTIONS

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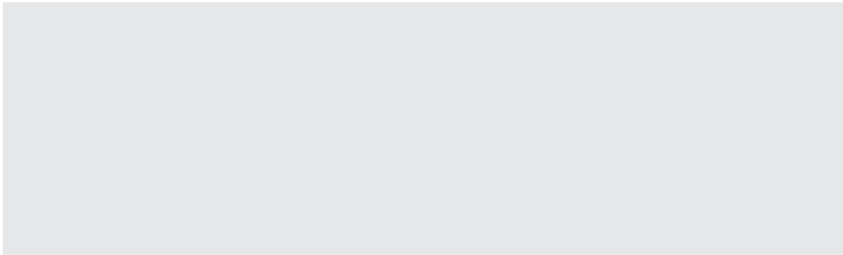
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Product Modification

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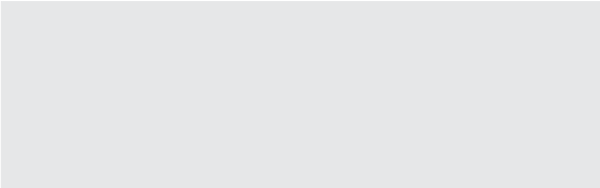
Prioritizing Your Projects and Setting Goals

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**Directions for Worksheet 4:
Project Description and Goals**

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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 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: _____

Training Employees on P2 Awareness

Why Should You Read This Chapter?

- Learn the importance of employee awareness and training.
- Learn how to meet WRPA's requirement for employee awareness and training.

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QUESTIONS YOUR ASSESSMENT TEAM CAN ADDRESS

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 WRPA z w z z LQG z
 TRI F R z w 2 z z z -
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 z . SQG w
 TRI F R z z w z z 2
 z z y z2z z z z
 z , y z w z z .

EVALUATING YOUR TRAINING PROGRAM

O z z y w z z z z
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 z y z y z w 2 z z (W 2)
 z y z 2 z z z z -
 w 2 . T z z z z -
 2 z z z y z z z -
 I , y ' z y z z
 z w . R y z z z z z -
 2 z y z w y w z z z
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 P2 w w . Fz 2 z z z -
 z z z z z z z z
 w y z w z z z y w w .
 H 2 y z z y w w
 w z z z z z y . W 5
 2 y z 2 y z z w z w
 z z z y z . A z2z y , 2
 z w y w z z z y
 y 2 z .

Directions for Worksheet 5: Employee Awareness and Training

T 2 z z y LQG z TRI -
 WRPA P2 P z z z z -
 y z2z z z z . C y z z z
 z y z w 2 (z z z w),
 z z z z z z z z
 L 2 z z y z z w , z z
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 N , z z w y 2 z z z z y
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 y z z z z y

W z . T 2
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 . A z W y z z W z z -
 F z y, 2 y z z z 2 z
 W W z z z z W
 2 z z z z
 y P2 z z .

Fast Facts

- ▼ Employee awareness is ensuring 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 facilities Pollution Prevention Plan, you can achieve maximum benefits.

T z S 6, z
P2 P z . W
F 2 z z W
y z
Wz R P y A . T z 2 y
z :
■ P P W (P2) P z
■ E S z y
■ ~~_____~~ z C
■ A z P R (LQG z / TRI
F R y)

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.

z z P2 P z z z W
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WRPA.
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z / 2 EPA' TRI F R.

DOCUMENTATION OF THE POLLUTION PREVENTION PLAN AND EXECUTIVE SUMMARY W
2-
z y z z y z :
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■ z ;

|

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:	Fax:
Phone:	E-mail:
TCEQ SW ID:	Customer reference number: <i>(Always begins with CN)</i>
EPA ID:	Regulated entity number: <i>(Always begins with RN)</i>
TRI ID:	
Primary SIC Code:	Secondary SIC Codes:
NAICS code: <i>(to convert SIC to NAICS, go to: www.census.gov/epcd/www/naics.html)</i>	

General description of facility: _____

EXECUTIVE SUMMARY, PART 2: FACILITY'S GENERATION AMOUNT

List 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 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.** _____

* Base year is the year prior to the 1st year of your plan
** Not required for SQG that are non-TRI Form R reporters

CERTIFICATE OF COMPLETENESS AND CORRECTNESS

Certificate of Completeness and Correctness

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 §§335.471-335.480, 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.

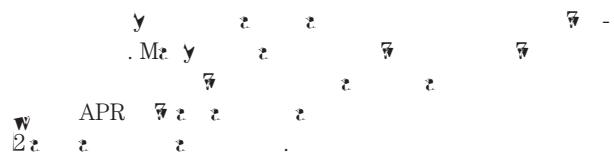
This document also certifies that the person whose signature appears below has the authority to commit the corporate resources necessary to implement this plan.

Name _____ Title _____
(please print clearly)

Position (check one): Facility Owner Corporate Officer

Signature _____ Date: _____

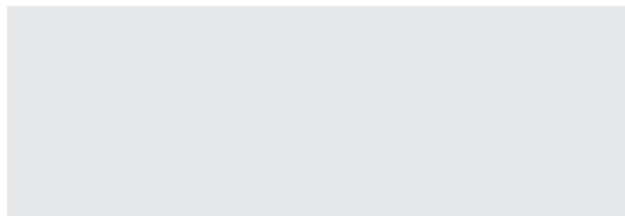
Reporting Annually



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 provided in the introduction. To get the best results out of your P2 Plan, visit the technical assistance resources available at www.P2Plan.org.

ONLINE APR



INSTRUCTIONS FOR COMPLETING THE APR FORM

S APR (A F). U
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 z y z z z w , 2
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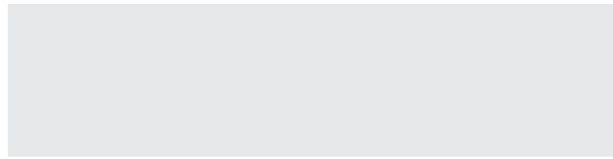
Part 1—Facility Description

Part 1 APR z y z z -
 z . C y z 2 z z
 y w y w APR . W -
 z y z , 2 z y z z z
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 R y z E z z y z
 APR. R z z z y
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 z w y z .
 R z z E z z z
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 w APR, w z z z
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 . I - z z z y 2 -
 w TCEQ w I .
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 Fz y I z N I z z
 w S Wz , EPA z TRI z -
 . I y w z z z ID ,
 y z y z y w
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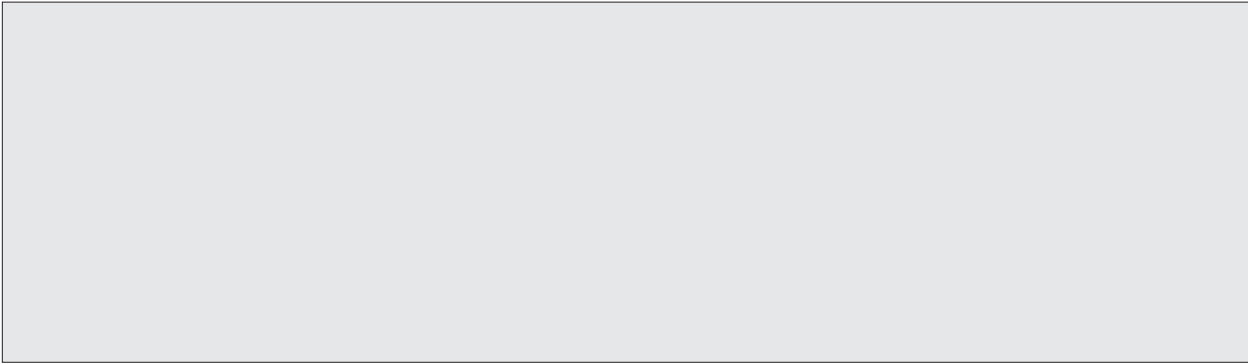
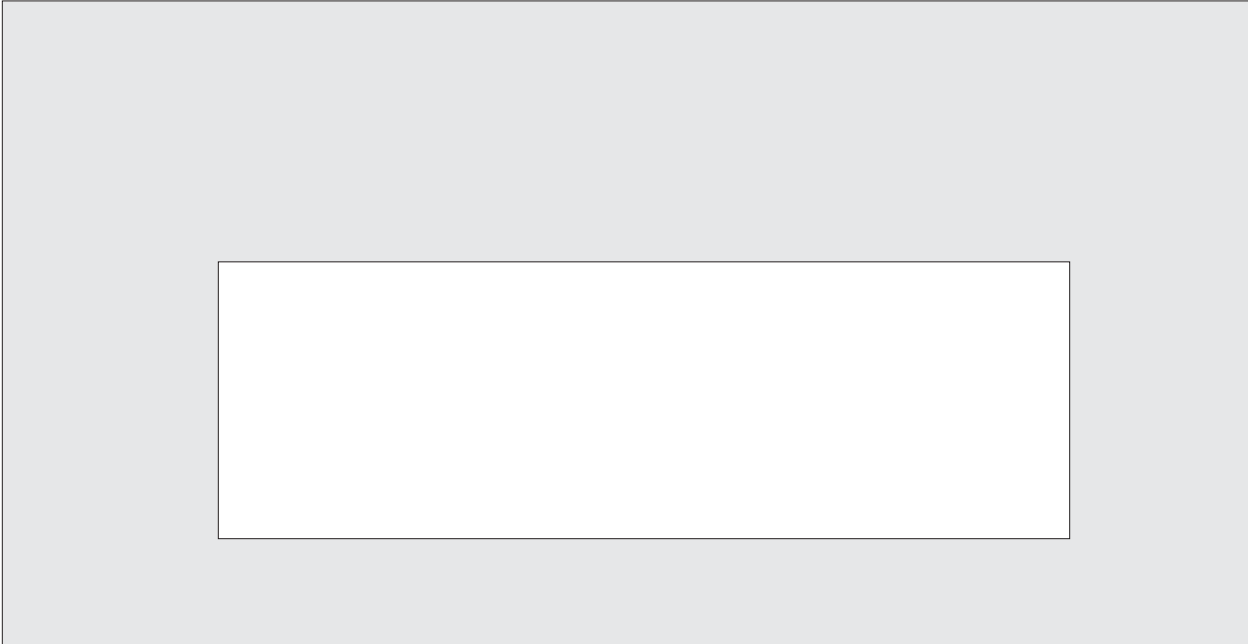
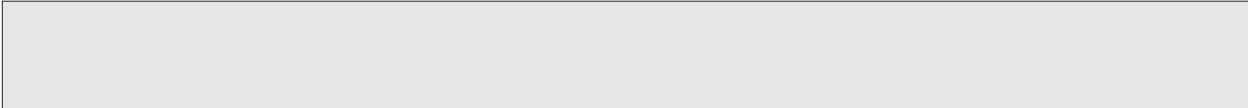
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 y w . I y 2 z -
 z , 2 z z z , z z y
 C z T z , C z W z z 512/239-3100,
 y - z z : ppc@tceq.state.tx.us.

Part 2—Projected Amounts for Goal Year

I , 2 2 z y
 y z y z . I w z
 z , z z y z 2 -
 z z , y z y z z z z -
 y z z z z z z
 . z z z y P2 P z .
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 z 2003, y z z z 2007.
 w R 2 1 E z z z z
 2 z - 2 R T D - 2 y z z z / - y z z



Example 6. Estimating the Number of Employees



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 because the benzene was disposed of in a water-benzene mixture. Under the hazardous waste regulations, when a nonhazardous substance is mixed with a hazardous substance, 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 material source reduced, as reported in Column A of Part 3, will differ from the amount of TRI material source reduced, as reported in Column B of Part 3 re-

WORKSHEET 7: CASE STUDY, SUCCESS STORY

1. GENERAL INFORMATION.

Company Name: _____ Location: _____

Contact Name: _____ Phone Number: _____

E-mail: _____

Waste Reduced: _____ Independently Owned: Yes No

Industry Type: _____ Number of Employees: _____

Process/activity where waste is generated: _____

Was this project part of your WRPA five-year Pollution Prevention Plan: Yes No

Can we publish this case study? Yes No

2. DESCRIPTION OF THE PROJECT—Describe the environmental problem, waste stream, or emission of concern and explain the source reduction or waste minimization process used. In general terms, describe the techniques, equipment (including vendor if applicable), processes, procedures, or management programs developed or utilized in your pollution prevention project.

3. INNOVATIVE APPLICATION OF TECHNOLOGY—Describe any novel or innovative advances in technology or management. Feel free to identify sources of equipment or services used.

4. ENVIRONMENTAL BENEFITS—Describe the environmental or safety benefits resulting from implementation of your project. Include quantitative information about the total reductions (weight or volume) of waste, raw materials, energy or emissions. In addition, indicate any regulatory requirements that have been reduced or eliminated by implementation of this P2 project.

5. COST SAVINGS (OPTIONAL)—Quantify the following: (1) payback period of the project, (2) cost savings due to avoided disposal cost, (3) savings from reduced material or energy usage, and (4) savings from reduced regulatory requirements, reduced environmental liability, or other hidden costs. Cost savings information is essential in promoting pollution prevention. Use the environmental accounting guidance in Chapter 4 to simplify your calculations.

SUBMITTING THE EXECUTIVE SUMMARY OR APR

A z P R J y l z
y z y P2 P z . S APR z
J y l z y z y P2 P z . F z ,
z z y z z P2 P z y z
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APR z z -
z w y z .
W C z y E w S z y, z
C z C z C z
z z z z w z , ,
z z . D z y y z , z
z y P2 P z , E w S z , A z
P R y TCEQ z . w
S z P2 A z P R z
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w y z . A w
z y z z E w S z y A z
P R z z :

E w S z y (A z P R)
I z P P w T z , MC 112
T z C E w z Q z y
POB 13087
A , T 78711-3087

APPENDIX A

TCEQ Pollution Prevention Rules

**SUBCHAPTER Q:
POLLUTION PREVENTION:**

(A) equal to or less than 1,000 kilograms but more than or equal to 100 kilograms of hazardous waste in a month; or

(B) equal to or less than one kilogram of acute hazardous waste in a month.

(13) **Source reduction**. Has the meaning assigned by the federal Pollution Prevention Act of 1990, Publication Law 101 - 508, §6603, 104 Stat. 1388. The term "source reduction" means any practice which:

(A) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and

(B) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of less hazardous materials, or changes in housekeeping, maintenance, training, or inventory control.

(14) **Short ton**. 2,000 pounds, also referred to as short tons.

(15) **Toxic chemical**. A program which includes those chemicals on the list in Committee Print Number 99 - 169 of the United States Senate Committee on Environment and Public Works, titled "Toxic Chemicals Subject to the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA, 42 United States Code, §11023), 313" including any revised version of the list as may be made by the administrator of the EPA.

(16) **Waste minimization practice**. A practice that reduces the environmental or health hazards associated with hazardous wastes, pollutants, or contaminants. Examples may include reuse, recycling, neutralization, and detoxification.

§335.472. Pollutants and Contaminants.

The following pollutants and contaminants are subject to pollution prevention planning:

(1) all hazardous wastes generated that are reportable in accordance with §335.9 of this title (relating to Recordkeeping and Annual Reporting Procedures Applicable to Generators); and

~~(2) all hazardous wastes generated that are reportable in accordance with §335.9 of this title (relating to Recordkeeping and Annual Reporting Procedures Applicable to Generators); and~~

(J) an executive summary of the plan submitted to the commission that shall include at a minimum:

- (i) a description of the facility that shall include:
 - (I) name of facility;
 - (II) mailing and physical address;
 - (III) point-of-contact, including phone number and electronic mail (e-mail) address, if available;
 - (IV) a general description of the facility;
 - (V) applicable identification numbers, including: Texas Commission on Environmental Quality (TCEQ) solid waste registration number, EPA identification number, and TRI identification number;
 - (VI) primary standard industrial classification (SIC) code and, if applicable, North American Industry Classification System (NAICS); and
 - (VII) the specific time period the five-year plan is in effect;
- (ii) a list of all hazardous wastes generated and the volume of each;
- (iii) a list of all reportable TRI releases and transfers and the volume of each;
- (iv) a prioritized list of pollutants and contaminants to be reduced;
- (v) a statement of measurable reduction goals;
- (vi) an explanation of environmental and human health risks considered in determining reduction goals;
- (vii) a list of source reduction and waste minimization projects with an associated schedule toward implementation;
- (viii) an implementation schedule for future reduction goals; and
- (ix) identification and description of cases where the implementation of source reduction or waste minimization activity designed to reduce risk to human health or the environment may result in the release of a different pollutant or contaminant or may shift the release to another medium. Included in this description shall be a discussion of the change in characteristic of the normal waste stream or release and how it will be managed in the affected medium.

(K) The executive summary of the plan may include:

- (i) a discussion of the person's previous efforts at the facility to reduce risk to human health and the environment or to reduce the generation of hazardous waste or the release of pollutants or contaminants;
- (ii) a discussion of the effect changes in environmental regulations have had on the achievement of the source reduction and waste minimization goals;
- (iii) the effect that events the person could not control have had on the achievement of the source reduction and waste minimization goals;
- (iv) a description of projects that have reduced the generation of hazardous waste or the release of pollutants or contaminants; and
- (v) a discussion of the operational decisions made at the facility that have affected the achievement of the source reduction or waste minimization goals or other risk reduction efforts.

(2) Small quantity generators/non-TRI Form R reporters. For facilities that are small quantity generators

as defined in §335.471(12) of this title and are not TRI Form R reporters as defined in §335.471(15) of this title, the plan shall include, at a minimum:

- (A) a description of the facility which shall include:
 - (i) name of the facility;
 - (ii) mailing and physical address;
 - (iii) point-of-contact, including phone numbers and electronic mail (e-mail) address, if available;
 - (iv) general description of the facility; and
 - (v) applicable identification numbers, including: TCEQ solid waste registration number and EPA identification number;
- (B) a list of all hazardous wastes generated and the volume of each;
- (C) a prioritized list of pollutants and contaminants to be reduced;
- (D) a statement of measurable reduction goals;
- (E) information on environmental and human health risks, such as material safety data sheets or other available documentation, considered in determining reduction goals;
- (F) A list of source reduction and waste minimiza-



APPENDIX B:
Example of a Pollution Prevention Plan
and Executive Summary

POLLUTION PREVENTION PLAN EXECUTIVE SUMMARY PLAN YEAR 2003 TO 2007

Occidental Chemical Corporation
P.O. Box CC
Ingleside, Texas 78362

Occidental Chemical Corporation
4133 Hwy 361
Gregory, Texas 78359

Mark Evans
Environmental Superintendent
(361) 776-2222
Mark@oxy.com

The facility is located off Texas Highway 361, approximately 1 mile west of Ingleside on the northern shore of Corpus Christi Bay in San Patricio County. The general area is a mix of agriculture and industry with Du Pont, Sherwin Alumina and OxyChem being the largest industries in the area. The OxyChem operations encompass approximately 890 acres. The northern side contains the Chlor/Alkali, EDC and VCM production facilities. The southern side contains bulk storage, railcar, barge and ship loading facilities. A Cogen unit (450 MW) is in operation at the western side of Edwards Road. The plant produces chlorine, sodium hydroxide, hydrogen, EDC and VCM, using brine ethylene and electricity.

38280

TXD982286932

78359CCDNTHWY36

2869, 2812

HAZARDOUS WASTE GENERATED 1997 TO 2001:

Waste Description	Texas Waste Code	1997 (tons)	1998 (tons)	1999 (tons)	2000 (tons)	2001 (tons)
-------------------	------------------	-------------	-------------	-------------	-------------	-------------

TRI RELEASES 1997 TO 2001:

CHEMICAL NAME	RELEASES 1997 TOTAL (LB/YR)	RELEASES 1998 TOTAL (LB/YR)	RELEASES 1999 TOTAL (LB/YR)	RELEASES 2000 TOTAL (LB/YR)	RELEASES 2001 TOTAL (LB/YR)
AMMONIA	1,370	2,040	2,099	1,769	1,461
ASBESTOS	0	0	0	0	0
BENZENE	5	5	5	6	0
BIS (2-CHLOROETHYL) ETHER	12	4	7,727	35	20
CARBON TETRACHLORIDE	9,596	9,460	8,149	8,422	128
CHLORINE	5,785	6,727	6,281	6,646	5,867
CHLOROETHANE	75	61	159	222	146
CHLOROFORM	260	246	216	471	267
CHLOROPRENE	5	0	5	5	0
1,2 DICHLOROETHYLENE	71	93	69	78	62
ETHYLENE	6,222	7,799	9,535	7,912	1,661
1,2 DICHLOROETHANE	16,585	29,915	173,041	62,052	9,225
HYDROCHLORIC ACID	4,291	3,207	3,212	464	5,908
PROPYLENE	1,830	1,905	1,931	1,866	618
1,1,2,2-TETRACHLOROETHANE	14	11	10	432	11
TETRACHLOROETHYLENE	57	34	31	34	14
1,1,2-TRICHLOROETHANE	225	104	10,885	594	169
TRICHLOROETHYLENE	14	7	256	404	5,583
VINYL CHLORIDE	1,620	3,854	2,274	2,005	2,075
VINYLDENE CHLORIDE	1	0	1	2	2
1,3-DICHLOROBENZENE	--	--	0	1	0
HEXACHLOROBENZENE	--	--	0	22	0
CHLOROBENZENE	5	0	0	8	9
CHLOROMETHANE	0	0	0	5	0
HCFC 22	14,000	15,500	0	17,041	28,755
PCB's	--	--	0	21	0
DIOXINS	--	--	0	1	1
MERCURY	--	--	0	0	0
LEAD COMPOUNDS	--	--	--	--	48
NAPHTHALENE	--	--	--	--	0
1,1,1 TRICHLOROETHANE	0	0	0	--	0
HEXACHLOROETHANE	1	1	9	--	0
HEXACHLORO-1,3-BUTADIENE	1	1	1	--	0
PHOSPHORIC ACID	0	0	0	--	0
METHANOL	3	0	0	--	0
HYDROQUINONE	--	--	--	--	0
FORMALDEHYDE	--	--	--	--	0
SULFURIC ACID	0	0	0	--	0
TOTAL (LB/YR)	62,048	80,974	225,896	110,518	62,030

Pollutant reduction list:

1. Over 20 chlorinated chemicals found in the heavy ends and light ends waste streams.
2. Trichloroethylene from spray can degreaser.
3. EDC and other chlorinated organic chemicals in process trench waste.
4. R-22 and 134a refrigerants which are ozone depleting substances.
5. Biosludge and limestone sludge wastes.

Reduction goals:

The goal of the facility is to continually reduce hazardous waste generation and TRI emissions through process improvement and recycling. It is anticipated that hazardous waste generation can be reduced to less than 100,000 tons per year and that TRI releases can be reduced to less than 50,000 pounds by 2005.

Environmental and human health risks considered:

The hazardous wastes generated at the Occidental Chemical Corporation Ingleside Plant may be detrimental to the environment and human health. Therefore reduction in the amount of waste generated will reduce human health and adverse environmental impact.

Project implementation schedule:

- Third Quarter 2003 - Convert C-210 column to caustic.
- First Quarter 2003 - Begin use of alternate degreaser.
- First Quarter 2003 - Installation of trench washing system in EDC area.

APPENDIX C:
**Resources Available for Your
Pollution Prevention Plan**

APPENDIX D:
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	
<p>Row 1 Good Operating Practices</p>	<p>Segregate hazardous waste from non-hazardous waste Segregate waste to increase recycling Improve maintenance scheduling, record keeping, or procedures Change production schedule to minimize equipment and feedstock changeovers</p>
<p>Row 2 Inventory Control</p>	<p>Institute procedures to eliminate expired materials Test outdated material—continue to use if still effective Institute better labeling procedures Impr Tc 701.31raw materials when they arrive</p>

APPENDIX E:
Full Cost Accounting Worksheet

Worksheet 8 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*



After you have completed these steps, you will:

- notice costs that were *hidden* in your overhead,
- see things 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, and
- find places where you can improve your business, *lower* your costs, save money and be a cleaner business.

The following steps will help you understand how to use Worksheet 8 to figure out costs. The front of the worksheet lists steps 1-5. The back of the worksheet covers step 6, "Comparing Costs Using a Waste Reduction Option Versus Doing Business as Usual." Table 6 shows a calculation of cost savings using a waste reduction option. After reading the example, you should be able to use the worksheet to identify areas in YOUR business where you are spending most of your money.

Step #1 – Drawing a "Picture" of What You Do

You will want to track the inputs (supplies) used and outputs (wastes) created during each step or process in your business. For example, imagine that *one process* in your business involves cleaning the presses with petroleum-based solvent. You may have many processes in your operation, but for the example, we will look only at one process. On the next page, there is an example of how the worksheet is used to track the inputs and outputs for the press cleaning step. Once the inputs and outputs are identified in STEP #1, how the outputs are disposed of is recorded in the far right corner of STEP #1.

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 example, notice that there is a total cost for doing this one process throughout the year () Your calculations will vary depending on the process.

N : You will have to calculate the costs for each process in your operation separately. You will need a separate worksheet for each process. **Mak** €

b a k k €

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. The

example in STEP #3 demonstrates the amount spent *on each type of disposal method* for this process and then adds them all up for a total cost to dispose of all wastes from this process ().

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 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 cost 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 were estimated and totaled for the year ().

Step #5 – Total Costs per Year

Add up the cost of materials going into the process (), the cost of disposal of excess materials and controlling materials (), and any hidden costs (). In the example worksheet, 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.

Now that you have done the example for STEPS #1 - 5, you can use this information to find ways to save money. We'll continue using the press cleaning example. Step 6 is to compare the cost of doing business *as it is now* with alternatives *designed to reduce your waste at the source and save you money*. After reading the example, use the back of the worksheet to identify areas in YOUR business where you can save money.

**Step #6 – Comparing Costs
Using a Waste Reduction Option**

After going through step 5, you now want to see if you can reduce, reuse or recycle any of those left over materials. 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 to 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 a solvent recycling unit. It reduces raw

materials and labor needed to do clean up (Table 6). Other processes may need different waste reduction options.

Table 6 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 (see below)*. Even with a solvent recovery unit, some new solvent must be purchased. Usually machines recover between 50-70% of the original solvent, so additional solvent that will need to be purchased will range from 30-50% of the initial amount.

The information from the front of the worksheet (STEPS #1-5) was used. It appears in the “Before” column of the second worksheet. Next, the new information from the waste reduction option table (Table 6) was written in the “After” column. Finally, the current operating costs are compared to the costs of using the new waste reduction option (see second page of the worksheet).

At the bottom of second page of the worksheet, there is a comparison calculation which 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, and
- how quickly you can start to save money.

Table 6: Waste Reduction Option – Installing a Two-gallon Solvent Distillation Unit

A. Amount of solvent you use in a year for this process (# of times you do process x amount used each time)	117 gals.
B. Annual costs to use this much solvent for this process (\$0.53/half pt = \$8.48/gal.) (117 gal. x \$8.48/gal.)	\$ 992.16
C. Annual disposal costs to dispose of this much solvent as hazardous waste (Step #3, from the front of Form 1)	\$ 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 (A. x .65) – with 65% recovery rate	76.05 gals.
F. Additional solvent purchases required for this process, above the amount of solvent recovered with a solvent distillation unit (A - E)	40.95 gals.
G. Average amount (gals.) of still bottom sludge disposed of per year with a two-gallon solvent distillation unit	110 gals.
New cost to purchase solvent for this process (B x .35) – 65% recovery rate means only need to buy 35% as much new solvent	\$ 347.26
Cost to dispose of 110 gals. of still bottom sludge per year for this process (contact your local hazardous waste hauler)	\$ 185.00

Inputs (materials, supplies)

Process Name

Outputs (what's left other than the finished product)

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

- _____
- _____
- _____
- _____
- _____

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____

B

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.

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

APPENDIX F:
P2 Annual Progress Report 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. #
Telephone:	TRI ID #
Fax:	EPA ID #
E-mail (optional):	NAICS:
Primary SIC Code:	Number of Employees:
Secondary SIC Code:	Independently owned? <input type="checkbox"/> Yes <input type="checkbox"/> No
First year of your current plan:	
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 fifth year of your plan): _____
--

	Estimate Quantity	
	HW (A)	TRI (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	

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

If your project was successful please complete the Optional Case Study Form at the end of this document and send it to us. TCEQ likes to recognize companies who have had great successes.

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. SQG's 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.



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