

**APPENDIX L**  
**MODEL WATER CONSERVATION PLANS FOR MUNICIPAL AND NON-MUNICIPAL USE**



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Appendix L includes one model municipal and three model non-municipal water conservation plans:

- Model Municipal Water Conservation Plan
- Model Manufacturing Water Conservation Plan
- Model Irrigation Water Conservation Plan
- Model Steam Electric Power Water Conservation Plan

**REGION C WATER  
PLANNING GROUP**

**MODEL WATER  
CONSERVATION AND  
DROUGHT  
CONTINGENCY PLAN  
FOR MUNICIPAL WATER  
USER GROUPS**

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**OCTOBER 2010**

**Prepared for:**

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## ACKNOWLEDGEMENTS

This model water conservation and drought contingency plan for the fictional City of Poca Agua was prepared by Freese and Nichols, Alan Plummer Associates, and CP&Y for the Region C Water Planning Group. It is a template for municipal water user groups to use as they develop their own water conservation and drought contingency plans. Each municipal water user group should customize the details to match its unique situation. The model plan was prepared pursuant to Texas Commission on Environmental Quality rules. Some material is based on the existing water conservation plans listed in Appendix A. The water conservation and drought contingency plans for the North Texas Municipal Water District<sup>1</sup>, the City of Fort Worth<sup>2</sup>, and the City of Dallas<sup>3</sup> were used extensively.

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<sup>1</sup> Superscript numbers match references listed in Appendix A.

**CITY OF POCA AGUA**

**WATER CONSERVATION  
AND DROUGHT  
CONTINGENCY PLAN**

**OCTOBER 2010**

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**APPENDIX A List of References**

**APPENDIX B Texas Commission on Environmental Quality Rules on Municipal Water Conservation and Drought Contingency Plans**

- Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.1 – Definitions (Page B-1)
- Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.2 – Water Conservation Plans for Municipal Uses by Public Water Suppliers (Page B-4)
- Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.20 – Drought Contingency Plans for Municipal Uses by Public Water Suppliers (Page B-7)

**APPENDIX C Water Utility Profile**

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**CITY OF POCA AGUA**  
**Water Conservation and Drought Contingency Plan**  
October 2010

**1. INTRODUCTION AND OBJECTIVES**

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development in Region C have led to growing demands for water. At the same time, local and less expensive sources of water supply are largely developed. Additional supplies to meet higher demands will be expensive and difficult to develop. Therefore, it is important that we make efficient use of existing supplies and make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed guidelines and requirements governing the development of water conservation and drought contingency plans for public water suppliers<sup>4</sup>. The TCEQ guidelines and requirements for water suppliers are included in Appendix B. The City of Poca Agua has adopted this water conservation and drought contingency plan pursuant to TCEQ guidelines and requirements.

The objectives of the water conservation plan are:

- To reduce water consumption.
- To reduce the loss and waste of water.
- To identify the level of water reuse.
- To improve efficiency in the use of water.
- To extend the life of current water supplies by reducing the rate of growth in demand.

The objectives of the drought contingency plan are:

- To conserve the available water supply in times of drought and emergency
- To maintain supplies for domestic water use, sanitation, and fire protection
- To protect and preserve public health, welfare, and safety
- To minimize the adverse impacts of water supply shortages
- To minimize the adverse impacts of emergency water supply conditions.

## **2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES**

### **2.1 Conservation Plans**

The TCEQ rules governing development of water conservation plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, a water conservation plan is defined as:

“A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s)<sup>4</sup>.”

According to TCEQ rules, water conservation plans for public water suppliers must have a certain minimum content (Section 3), must have additional content for public water suppliers that are projected to supply 5,000 or more people in the next ten years (Section 4), and may have additional optional content (Section 5).

### **2.2 Drought Contingency Plans**

The TCEQ rules governing development of drought contingency plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.20 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, a drought contingency plan is defined as:

“A strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s)<sup>4</sup>.”

The drought contingency plan for the City of Poca Agua is contained in Section 6 of this water conservation and drought contingency plan.

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### 3. MINIMUM REQUIRED WATER CONSERVATION PLAN CONTENT

The minimum requirements in the Texas Administrative Code for water conservation plans for public drinking water suppliers covered in this report are as follows:

- §288.2(a)(1)(A) – Utility Profile – Section 3.1 and Appendix C
- §288.2(a)(1)(B) – Specification of Goals Before May 1, 2005 – Section 3.2
- §288.2(a)(1)(C) – Specification of Goals After May 1, 2005 – Section 3.2
- §288.2(a)(1)(D) – Accurate Metering – Sections 3.3 and 3.4
- §288.2(a)(1)(E) – Universal Metering – Section 3.4
- §288.2(a)(1)(F) – Determination and Control of Unaccounted Water – Section 3.5
- §288.2(a)(1)(G) – Public Education and Information Program – Section 3.6
- §288.2(a)(1)(H) – Non-Promotional Water Rate Structure – Section 3.7
- §288.2(a)(1)(I) – Reservoir System Operation Plan – Section 3.8
- §288.2(a)(1)(J) – Means of Implementation and Enforcement – Section 3.9, Appendix D, and Appendix E
- §288.2(a)(1)(K) – Coordination with Regional Water Planning Group – Section 3.10 and Appendix F

#### 3.1 **Utility Profile**

*[The utility profile must include information regarding population and customer data, water use data, water supply system data, and wastewater system data.]*

Appendix C to this water conservation plan is a water utility profile for the City of Poca Agua, based on the format recommended by the TCEQ<sup>5</sup>. Table 3.1 summarizes key facts from the Water Utility Profile.

#### 3.2 **Specification of Water Conservation Goals**

*[This section must include specific, quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day.]*

Table 3.2 shows historical and projected per capita municipal water use for the City of Poca Agua. Water use is shown in units of gallons per capita per day (gpcd). Municipal water use is total use less wholesale sales to other municipal suppliers less sales to industrial users. Per

capita municipal water use is municipal water use divided by population. The per capita municipal water use does not include industrial use.

Projected per capita municipal uses were obtained from the Texas Water Development Board (TWDB)<sup>6</sup> and interpolated to match the appropriate years for the 5-year and 10-year goals. The TWDB projections are applicable for a dry year, in which outdoor water use would be high. Per capita municipal water use in a year with normal or high precipitation during the summer should be less than projected here.

**Table 3.1 Summary of Water Utility Profile for the City of Poca Agua**

<b>Water Service Area</b> = ___ square miles					
<b>Miles of Distribution Pipe</b> = ___ miles					
<b>Population:</b>					
Current Population = _____ in _____					
2000 Population = _____					
Projected 2060 Population = _____					
<b>Connections:</b>					
Current Connections = _____ in _____					
Total Increase in Connections in Last 5 Years = _____					
<b>Information on Water Use for the Last Five Years:</b>					
Year	Use (Million gallons)	Estimated Population*	Municipal per Capita	Unaccounted Water	Peak Day to Average Day
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
*Source of population estimate is _____.					
<b>Water Supply Source(s)</b> = <u>Poca Agua Reservoir</u>					

**Treatment and Distribution System:**

Treatment Plant Capacity = \_\_\_\_ million gallons per day

Elevated storage = \_\_\_\_ million gallons

Ground storage = \_\_\_\_ million gallons

**Current Total Annual Wastewater Flow** = \_\_\_\_ million gallons in \_\_\_\_\_.

The TWDB projections include the impact of low-flow plumbing fixtures and water conservation measures that have been in effect since at least 2000 but do not include the effect of water conservation measures recommended in this plan. The impact of low-flow plumbing fixtures has been itemized to show the total amount of projected water conservation in the City of Poca Agua. Table 3.2 shows the projected per capita water use after implementation of this water conservation and drought contingency plan. Table 3.2 also shows how much of the projected per capita water use is supplied by reclaimed water.

**Table 3.2**

**Projected Per Capita Use Without Implementation of Water Conservation Measures Beyond Those in Effect in 2000 and Water Conservation Goals**

Description	Highest Historical		Five-Year Goal	Ten-Year Goal
	Year	Gpcd	Gpcd	Gpcd
Historical Per Capita Municipal Use			-	-
Projected Per Capita Municipal Use Without Low-Flow Plumbing Fixtures	-	-		
Projected Reduction Due to Low-Flow Plumbing Fixtures	-	-		
Projected Per Capita Municipal Use With Low-Flow Plumbing Fixtures <sup>5</sup>	-	-		
Projected Reduction Due to Water Conservation Measures in this Plan	-	-		
Projected Per Capita Water Use Goals	-	-		
Projected Per Capita Use of Reclaimed Water	-	-		
Projected Per Capita Use of Raw Water	-	-		

The City's water conservation goals include the following:

- Achieve \_\_\_\_ [*five years from date of plan*] per capita municipal water use of \_\_\_\_ gpcd or less, as shown in Table 3.2 (five-year target). This represents a reduction of \_\_\_\_ gpcd from the TWDB's projected per capita municipal water use without low-flow plumbing fixtures or other conservation measures.
- Achieve \_\_\_\_ [*ten years from date of plan*] per capita municipal water use of \_\_\_\_ gpcd or less, as shown in Table 3.2 (ten-year target). This represents a reduction of \_\_\_\_ gpcd from the TWDB's projected per capita municipal water use without low-flow plumbing fixtures or other conservation measures.
- Implement and maintain a meter replacement program (Section 3.4).
- Keep the level of unaccounted water in the system less than \_\_ percent in \_\_\_\_ [*target year*] and subsequent years (Section 3.5). [*For most urban and suburban water user groups, the goal should be between 10 and 15 percent. For some rural water user groups with long distances between customers, the goal should be between 10 and 20 percent.*]
- Raise public awareness of water conservation and encourage responsible public behavior through a public education and information program, as discussed in Section 3.6.

*[Note that water conservation goals below this point are based on optional water conservation plan content. Customize this section to represent the measures that you are planning to implement.]*

- *Decrease waste in lawn irrigation through implementation and enforcement of a landscape water management ordinance (Section 5.4).*
- *Decrease indoor water use by implementing the following programs:*
  - *Showerhead and aerator retrofit program (Section 5.2.1)*
  - *Water-efficient toilet replacement program (Section 5.2.2)*
  - *Residential customer water audit (Section 5.6)*
  - *Water-efficient clothes washer rebate program (Section 5.7).*
- *Decrease outdoor water use by implementing the following programs:*
  - *Residential customer water audit (Section 5.6)*
  - *Landscape irrigation systems rebate program (Section 5.9)*
  - *Landscape design and conversion program (Section 5.10)*

- *Decrease industrial, commercial, and institutional (ICI) water use by implementing the following programs:*
  - *General ICI rebate (Section 5.11)*
  - *ICI water audit, water waste reduction program, and site-specific water conservation program (Section 5.12)]*

### **3.3 Accurate Metering of Raw Water Supplies and Treated Water Deliveries**

*[This section must include a description of metering device(s) with an accuracy of plus or minus 5 percent that are used to measure and account for the amount of water diverted from the source of supply.]*

The City of Poca Agua meters all raw water diversions from Poca Agua Reservoir and meters all treated water deliveries to the distribution system from the water treatment plant. Each meter has an accuracy of plus or minus 2 percent. The meters are calibrated on a semiannual basis by City of Poca Agua personnel to maintain the required accuracy and are repaired and/or replaced as needed.

### **3.4 Metering of Customer and Public Uses and Meter Testing, Repair, and Replacement**

*[This section must include a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.]*

Water usage for all customers of the City of Poca Agua, including public and governmental users, is metered. *[If there are unmetered users, describe the current metering situation and outline any plans to achieve universal metering.]*

As part of this water conservation plan, the City of Poca Agua will implement a meter replacement program that will replace every meter on a 15-year cycle. Initial efforts will focus on the oldest meters in the system.

In addition, meters registering any unusual or questionable readings will be tested and repaired to restore full functionality.

### **3.5 Determination and Control of Unaccounted Water**

*[This section must include measures to determine and control unaccounted uses of water. In 2003, the Texas Water Code (Chapter 16.0121) was amended to require that every five years, a retail public utility that provides potable water shall perform and file with the TWDB a water*

*audit computing the utility's most recent annual system water loss. The audit shall account for the various components of system water loss, including loss from distribution lines, inaccuracies in meters or accounting practices, and theft. At this time, the TWDB is developing the rules for water system audits.]*

Unaccounted water is the difference between raw water drawn from Poca Agua Reservoir and metered deliveries to customers. (This includes authorized but unmetered uses such as fire fighting and releases for flushing of lines.) Unaccounted water can include several categories:

- Inaccuracies in customer meters (customer meters tend to run more slowly as they age and under-report actual use).
- Losses due to water main breaks and leaks in the water distribution system.
- Losses due to illegal connections.
- Other.

The City of Poca Agua will conduct an annual water audit using the American Water Works Association (AWW) / International Water Association (IWA) format. The AWWA/IWA format divides water losses into apparent losses and real losses. Apparent water losses include water that was actually used but not accounted for, such as customer meter errors or theft. Accounting for apparent losses increases the city's utility revenue but does not reduce water usage. Real losses include leakage and overflows at the water treatment plant. Identifying and preventing real losses decreases a utility's costs and decreases water usage. The City will target real losses under this water conservation strategy.

*[Note that the annual water audit discussed above exceeds the requirement for a water system audit every five years. For a public water supplier that has not been performing water system audits, it may be helpful to perform annual audits for the first few years and to refine different parts of the audit each year.*

*As an example, the first year audit might involve gathering all available data and estimating quantities that have not been measured. Between the first and second year audits, the supplier might investigate distribution system leaks to refine and reduce the estimated leakage in the second year audit. Between the second and third audits, the supplier could investigate apparent losses, such as meter or accounting errors, to refine and reduce the estimated apparent losses in the third year audit. The actual implementation of this strategy may be different for different suppliers.*

*In addition, although the IWA format is discussed above, the TWDB has not yet published rules that identify the required audit format.]*



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As shown in Appendix C, unaccounted water for the City of Poca Agua has varied from \_\_\_ percent to \_\_\_ percent in the last five years. With the measures described in this plan, the City of Poca Agua intends to maintain the unaccounted water below \_\_\_ percent in \_\_\_ [target year] and subsequent years. If unaccounted water exceeds this goal, the City of Poca Agua will implement a more intensive audit to determine the source(s) of water loss and reduce the unaccounted water.

### **3.6 Continuing Public Education and Information Campaign**

*[This section must include a program of continuing public education and information regarding water conservation.]*

The continuing public education and information campaign on water conservation for the City of Poca Agua includes the following elements:

- Promote the City’s water conservation measures (presented in Sections 3, 4, and 5).
- Include inserts on water conservation with water bills at least twice per year. Inserts will include material developed by City of Poca Agua staff and material obtained from the TWDB, the TCEQ, and other sources.
- Encourage local media coverage of water conservation issues and the importance of water conservation.
- Notify local organizations, schools, and civic groups that City of Poca Agua staff is available to make presentations on the importance of water conservation and ways to save water.
- Make the *Texas Smartscape CD*, water conservation brochures, and other water conservation materials available to the public at the City of Poca Agua Utility Department and other public places.
- Make information on water conservation available online at [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us) and will include links to the *Texas Smartscape* website and to information on water conservation on the TWDB and TCEQ web sites.

### **3.7 Non-Promotional Water Rate Structure**

*[This section must include a water rate structure that is not “promotional,” i.e., a rate structure which is cost-based and which does not encourage excessive use of water.]*

With the intent of encouraging water conservation and discouraging waste and excessive use of water, the City of Poca Agua has adopted an increasing block rate water structure where

the unit price of water increases with increasing water use. Current water rates are shown in Tables 7.1 and 7.2.

**Table 3.3****Monthly Customer Charges**

<b>Meter Size (in)</b>	<b>Total Charge</b>	<b>Meter Size (in)</b>	<b>Total Charge</b>
5/8	\$___	2	\$___
3/4	\$___	3	\$___
1	\$___	4	\$___
1 1/4	\$___	6	\$___
1 1/2	\$___		

**Table 3.4****Volume Unit Charges**

<b>Water User</b>	<b>Type/Volume</b>	<b>Volume Unit Charge (\$/1,000 gal)</b>
Single-Family	0-2,000 gallons	\$___
	2,001-9,000 gallons	\$___
	9,001-15,000 gallons	\$___
	More than 15,000 gallons	\$___
Multi-Family		\$___
Commercial		\$___
Large Volume/Industrial		\$___
Golf Courses		\$___

*[An increasing block rate structure, where the unit cost increases as water usage increases, is recommended. The price difference between blocks is very important in influencing water usage. Prices between blocks should increase at least 25 percent; for maximum effectiveness, consider a price increase between blocks of at least 50 percent<sup>7</sup>. Also consider peak and off-peak rates for non-residential uses to encourage water conservation.]*

### **3.8 Reservoir System Operation Plan**

*[This section must include a reservoir system operation plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies. Attach a copy of the reservoir system operation plan if available.]*

The City of Poca Agua has the following rights to divert water from Poca Agua Reservoir:

- Up to 8,000 ac-ft/yr based on the natural yield of the reservoir
- Up to 2,000 ac-ft/yr based on the reclaimed water discharge from the City's North Wastewater Treatment Plant

Poca Agua Reservoir is not operated in coordination with any other raw water supply sources; therefore, no additional yield can be gained through system operation.

### **3.9 Implementation and Enforcement of the Water Conservation Plan**

*[This section must include a means of implementation and enforcement of the plan. This shall be evidenced by a copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the water supplier and a description of the authority by which the water supplier will implement and enforce the conservation plan.]*

Appendix D contains a copy of the resolution of the City of Poca Agua City Council adopting this water conservation and drought contingency plan. The resolution designates responsible officials to implement and enforce the water conservation and drought contingency plan. Appendix E, the landscape water management ordinance for the City of Poca Agua, also includes information about enforcement.

### **3.10 Coordination with Regional Water Planning Group**

*[This section must include documentation of coordination with the Regional Water Planning Group(s) for the service area of the public water supplier in order to insure consistency with the appropriate approved regional water plan(s).]*

Appendix F includes a copy of a letter sent to the Chair of the Region C Water Planning Group with this water conservation and drought contingency plan.

#### 4. ADDITIONAL REQUIRED WATER CONSERVATION PLAN CONTENT

*[Section 4 does not apply if you are not projected to supply a population of 5,000 people or more in the next ten years.]*

The Texas Administrative Code also includes additional requirements for water conservation plans for public drinking water suppliers that serve a population of 5,000 people or more and/or a projected population of 5,000 people or more within the next ten years:

- §288.2(a)(2)(A) – Leak Detection, Repair, and Water Loss Accounting – Sections 3.5 and 4.1
- §288.2(a)(2)(B) – Record Management System – Section 4.2
- §288.2(a)(2)(C) – Requirement for Water Conservation Plans by Wholesale Customers – Section 4.3

##### 4.1 **Leak Detection and Repair; Pressure Control**

*[If you are projected to supply 5,000 people or more in the next ten years, this section must include a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted-for uses of water. Water loss accounting is also discussed in Sections 3.5 and 5.5.]*

Measures to control unaccounted water are part of the routine operations of the City of Poca Agua. Meter readers watch for and report signs of illegal connections so they can be addressed quickly. Crews and personnel look for and report evidence of leaks in the water distribution system. Maintenance crews respond quickly to repair leaks reported by the public and city personnel. The City of Poca Agua spends \$\_\_\_ per year to repair and replace water distribution lines and uses \_\_\_ [number] distribution line maintenance crews. Areas of the water distribution system in which numerous leaks and line breaks occur are targeted for replacement as funds are available.

To reduce real water losses, the City of Poca Agua will maintain a proactive water loss program. As part of this program, the City will implement the following actions:

*[No actions have been specified here. Customize this section to fit your situation. Potential actions include<sup>8</sup>:*

- *Conduct regular inspections and soundings of all water main fittings and connections;*
- *Use a leakage modeling program;*
- *Meter individual pressure zones;*
- *Establish district metering areas and measure monthly flows;*
- *Conduct intermittent night-flow measurements;*
- *Install temporary leak noise detectors and loggers;*
- *Reduce repair time on leaks by adding repair staff;*
- *Control pressure to just above the minimum standard-of-service level including fire requirements;*
- *Operate pressure zones based on topography;*
- *Limit surges in pressure; and*
- *Reduce nighttime pressure where feasible to reduce losses from background leaks.]*

#### **4.2 Record Management System**

*[If you are projected to supply 5,000 people or more in the next ten years, this section must include a record management system to record water pumped, water deliveries, water sales, and water losses which allows for the desegregation of water sales and uses into residential, commercial, public and institutional, and industrial user classes.*

*If you are required to have such a record management system and you do not, please describe your plan to meet this requirement within the next five years.]*

As required by TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2(a)(2)(B), the record management system for the City of Poca Agua records water pumped, water delivered, and water sold; estimates water losses; and allows for the separation of water sales and uses into residential, commercial, public/institutional, and industrial categories. This information will be included in an annual conservation report, as described in Section 5.5 below.

#### **4.3 Requirement for Water Conservation Plans by Wholesale Customers**

*[If you are projected to supply 5,000 people or more in the next ten years, this section must include a requirement that every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in TAC Title 30, Part 1, Chapter 288. If the customer intends to resell*

*the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of TAC Title 30, Part 1, Chapter 288.]*

At this time, the City of Poca Agua is not a wholesale water provider. After adoption of this plan, each contract for the wholesale sale of water by the City of Poca Agua will include a requirement that the wholesale customer develop and implement a water conservation plan meeting the requirements of Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code. This requirement will also extend to each successive wholesale customer in the resale of the water.

## 5. OPTIONAL WATER CONSERVATION PLAN CONTENT

*[Any combination of the following optional strategies shall be selected by the water supplier, in addition to the requirements of Section 3 and Section 4, if they are necessary to achieve the stated water conservation goals of the plan.]*

TCEQ rules also list optional (not required) conservation strategies, which may be adopted by suppliers to achieve the stated goals of the plan. The following optional strategies are listed in the rules and included in this plan:

- §288.2(a)(3)(A) – Conservation Oriented Water Rates – Section 3.7
- §288.2(a)(3)(B) – Ordinances, Plumbing Codes or Rules on Water-Conserving Fixtures – Section 5.1
- §288.2(a)(3)(C) – Programs for the Replacement or Retrofit of Water-Conserving Plumbing Fixtures in Existing Structures – Section 5.2
- §288.2(a)(3)(D) – Reuse and Recycling of Wastewater – Section 5.3
- §288.2(a)(3)(E) – Pressure Control and/or Reduction – Section 4.1
- §288.2(a)(3)(F) – Landscape Water Management Ordinance – Section 5.4 and Appendix E
- §288.2(a)(3)(G) – Monitoring Method – Section 5.5 and Appendix G
- §288.2(a)(3)(H) – Other Conservation Methods – Sections 5.6 through 5.11
- §288.2(b) – Water Conservation Plan Updates – Section 5.12

*[The final optional water conservation strategy listed in the TCEQ rules is “any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.” Several more optional conservation methods have been listed below to assist you in conservation planning.]*

In addition, the City of Poca Agua will also pursue the following optional water conservation strategies that exceed those suggested in the rules:

- Residential Customer Water Audit – Section 5.6
- Water-Efficient Clothes Washer Rebate Program – Section 5.7
- Landscape Irrigation System Rebate Program – Section 5.8
- Landscape Design and Conversion Program – Section 5.9

- General ICI Rebate Program – Section 5.10
- ICI Water Audit, Water Waste Reduction Program, and Site-Specific Water Conservation Program – Section 5.11

### **5.1 Ordinances, Plumbing Codes, or Rules on Water-Conserving Fixtures**

*[OPTIONAL STRATEGY: If you have a plumbing ordinance that requires water-conserving fixtures, please describe the ordinance here and include a copy in an appendix.]*

The State of Texas has required water-conserving fixtures in new construction and renovations since 1992. The state standards call for flows of no more than 2.5 gallons per minute (gpm) for faucets, 3.0 gpm for showerheads, and 1.6 gallons per flush for toilets. Similar standards are also required under federal law. These state and federal standards assure that all new construction and renovations in the City of Poca Agua will use water-conserving fixtures.

In addition, federal rules requiring energy-conserving clothes washers by 2007 are expected to assure that new clothes washers in the City of Poca Agua will be water-efficient.

### **5.2 Programs for the Replacement or Retrofit of Water-Conserving Plumbing Fixtures in Existing Structures**

*[OPTIONAL STRATEGY: If you are planning programs to implement the replacement or retrofit of water-conservation plumbing fixtures in existing structure, please describe these programs below. Such programs might include distribution of free fixtures, vouchers for discounted fixtures, rebates on fixtures, etc.]*

#### **5.2.1 Showerhead and Faucet Aerator Retrofit Program**

As discussed previously, state and federal plumbing standards require water-efficient plumbing fixtures for new construction and remodel projects. However, there are still a significant number of water-inefficient plumbing fixtures in use in the City of Poca Agua. Under this program, the City will provide free retrofit kits to City residents for their installation. High quality, low flow plumbing devices to be distributed under this program include: showerheads (2.0 gpm or less), kitchen faucet aerators (2.2 gpm or less), and bathroom faucet aerators (1.5 gpm or less). The showerhead and faucet aerator retrofit program is targeted toward single- and multi-family homes constructed before 1992 that have not been retrofitted with water-efficient plumbing fixtures.



The projected reduction in per capita use from a showerhead and faucet aerator retrofit program is \_\_\_ gpcd in \_\_\_\_ [*five years from date of plan*] and \_\_\_ gpcd in \_\_\_\_ [*ten years from date of plan*].

### **5.2.2 Water-Efficient Toilet Replacement Program**

As discussed previously, state and federal plumbing standards require water-efficient toilets for new construction and remodel projects. However, there are still a significant number of water-inefficient toilets in use in the City of Poca Agua. Under this program, the City will provide free water-efficient toilets (1.6 gallons per flush) to City residents, along with a \$\_\_\_ rebate for installation. The City of Poca Agua is targeting single- and multi-family residential customers with homes constructed before 1992 that have not been retrofitted with water-efficient toilets.

The projected reduction in per capita use from the water-efficient toilet replacement program is \_\_\_ gpcd in \_\_\_\_ [*five years from date of plan*] and \_\_\_ gpcd in \_\_\_\_ [*ten years from date of plan*].

### **5.3 Reuse and Recycling of Wastewater**

*[OPTIONAL STRATEGY: If you are planning to reuse or recycle wastewater, please describe this program below.]*

The City of Poca Agua operates two wastewater treatment plants: the North Wastewater Treatment Plant (WWTP) and the South WWTP. The North WWTP discharges approximately 2,000 ac-ft/yr of reclaimed water to Poca Agua Creek upstream of Poca Agua Reservoir, where it is mixed with ambient water. Based on its water right, the City of Poca Agua withdraws up to 2,000 ac-ft/yr of this reclaimed water from Poca Agua Reservoir for water treatment and potable use. This reuse project provides approximately 20 percent of the City's total water supply.

The South WWTP discharges approximately 3,000 ac-ft/yr of reclaimed water to Poca Agua Creek downstream of Poca Agua Reservoir. Reclaimed water discharged from the South WWTP is used to satisfy downstream water rights and to maintain instream flows.

### **5.4 Water Waste Prohibition**

*[OPTIONAL STRATEGY: If you have an ordinance that prohibits water waste, please describe the ordinance below and attach a copy of the ordinance.]*

As part of the development of this water conservation plan, the City of Poca Agua adopted a landscape water management ordinance (Appendix E). This ordinance is intended to minimize waste in landscape irrigation. The ordinance<sup>8</sup> includes the following elements:

- Prohibition of outdoor watering with sprinklers from 10:00 a.m. to 6:00 p.m. every day from June 1 through September 30. *[Optional -Year round 10:00 a.m. to 6:00 p.m. prohibition of outdoor watering]* (Watering with hand-held hoses, soaker hoses, or dispensers is allowed.)
- Requirement that all new irrigation systems include rain sensors capable of multiple programming.
- Requirement that all new irrigation systems be in compliance with state design and installation regulations (Texas Administrative Code Title 30, Part 1, Chapter 344 and House Bill 1656).
- Prohibition of designs and installations that spray directly onto impervious surfaces such as sidewalks and roads or onto other non-irrigated areas.
- Prohibition of use of poorly maintained sprinkler systems that waste water.
- Prohibition of outdoor watering during any form of precipitation.
- Enforcement of the ordinance by a system of warnings followed by fines for continued or repeat violations.

#### **5.5 Monitoring of Effectiveness and Efficiency - Annual Conservation Report**

*[OPTIONAL STRATEGY: If you are planning to monitor the effectiveness and efficiency of the water conservation plan, please describe how you will do so.]*

Appendix G is a form that will be used in the development of an annual conservation report for the City of Poca Agua. This form will be developed by March 31 for the preceding calendar year and will be used by the City of Poca Agua to monitor the effectiveness and efficiency of the water conservation program and to plan conservation-related activities for the next year. The form records the water use by category, per capita municipal use, and unaccounted water for the current year and compares them to historical values.

*[The remainder of Section 5 includes “other” optional water conservation strategies that are not specifically enumerated in the TCEQ rules.]*

## 5.6 **Residential Customer Water Audit**

*[OPTIONAL STRATEGY: If you are planning a program to provide audits of residential water use, please describe the program below.]*

The City of Poca Agua will conduct water audits for single- and multi-family residential customers. The four main purposes are: to educate customers about conservative water use habits and replacement of inefficient toilets, clothes washers, and dishwashers; to install water-efficient showerheads and faucet aerators; and to identify (and possibly repair) leaks; and to optimize irrigation water usage. The City's auditor will review the current watering schedule and recommend any appropriate changes to the watering schedule, will inspect the system operation, and will recommend any equipment repairs or changes to increase the efficiency of the irrigation system.

The projected reduction in per capita use from the customer indoor water audit program is \_\_ gpcd in \_\_\_\_ *[five years from date of plan]* and \_\_ gpcd in \_\_\_\_ *[ten years from date of plan]*.

## 5.7 **Water-Efficient Clothes Washer Rebate Program**

*[OPTIONAL STRATEGY: If you are planning a program to encourage the use of water-efficient clothes washers, please describe the program below. Such programs generally include rebates on the purchase of water-efficient clothes washers. In addition, since water-efficient clothes washers are also energy efficient, water utilities can sometimes partner with energy providers in offering rebates.]*

New, high-efficiency clothes washers use up to 40 percent less water than older, traditional clothes washers. Under this program, the City of Poca Agua will provide a \$\_\_\_ rebate toward the purchase of residential clothes washers with a water efficiency factor (gallons per load divided by tub size in cubic feet) of 9.5 or less. In addition, the City of Poca Agua will provide a \$\_\_\_ rebate toward the purchase of commercial clothes washers with a water efficiency factor (gallons per load divided by tub size in cubic feet) of 9.5 or less.

The projected reduction in per capita use from the water-efficient clothes washer rebate program is \_\_ gpcd in \_\_\_\_ *[five years from date of plan]* and \_\_ gpcd in \_\_\_\_ *[ten years from date of plan]*.

## 5.8 **Landscape Irrigation System Rebate Program**

*[OPTIONAL STRATEGY: If you are planning a program to encourage the use of water-efficient landscape irrigation equipment, please describe the program below.]*

The City of Poca Agua will offer a rebate to residential and industrial, commercial, and institutional (ICI) customers to improve the efficiency of their existing irrigation system. By improving the efficiency of irrigation system, outdoor water usage can be reduced while maintaining a healthy landscape. Irrigation system equipment that could qualify for a rebate includes: irrigation controllers that allow percentages of programmed amounts for use with evapotranspiration-based water budgets, low-precipitation-rate sprinkler heads, drip irrigation equipment, pressure regulators, soil moisture sensors, and rain sensors.

The City of Poca Agua will offer the following rebates, with a total not to exceed \$\_\_\_:

- \$\_\_\_ rebate on a new evapotranspiration-based irrigation controller
- \$\_\_\_ rebate on a pressure reducing valve
- \$\_\_\_ rebate on a rain shut-off device
- Other equipment such as sprinkler heads and valves are eligible.

The projected reduction in per capita use from the landscape irrigation system rebate program is \_\_\_ gpcd in \_\_\_ [five years from date of plan] and \_\_\_ gpcd in \_\_\_ [ten years from date of plan].

## 5.9 **Landscape Design and Conversion Program**

*[OPTIONAL STRATEGY: If you are planning a program to encourage the use of water-wise landscaping, please describe the program below.]*

The City of Poca Agua will provide a rebate of \$\_\_\_ per square foot (up to 800 square feet) to residential and ICI customers that convert existing high-water-use landscaping to water wise landscaping. In addition, the City of Poca Agua encourages new construction to follow water wise landscaping principles on all or part of the property.

The seven principles of water wise landscaping include:

- Planning and design,
- Soil analysis and improvement,
- Appropriate plant selection,
- Practical turf areas,

- Efficient irrigation,
- Use of mulches, and
- Appropriate maintenance.

Customers must agree to refund the rebate to the City if water use does not decline after installation of water wise landscaping or if water use returns to previous levels within five years.

The projected reduction in per capita use from the landscape design and conversion program is \_\_ gpcd in \_\_\_\_ [*five years from date of plan*] and \_\_ gpcd in \_\_\_\_ [*ten years from date of plan*].

#### **5.10 General ICI Rebate Program**

*[OPTIONAL STRATEGY: If you are planning a general rebate program to encourage ICI water conservation, please describe the program below.]*

The City of Poca Agua will encourage its industrial, commercial, and institutional (ICI) customers to convert to water-saving equipment and practices by rebating a portion of the acquisition and installation cost of new water-saving equipment. Examples of equipment changes that might be eligible for a rebate are:

- Replacement of single-pass cooling systems with recirculating or air-cooling systems.
- Reuse of high quality rinse water for landscape irrigation or for wash cycles in laundry equipment.
- Improvements in cleaning processes.
- Installation of water-savings equipment in a car wash.

The City will rebate the lesser of the following:

- Half the purchase price of the equipment (up to \$\_\_\_\_) or
- \$\_\_ for each gallon per day saved up to \_\_\_\_ gallons and then \$\_\_ per gallon saved per day for the next \_\_\_\_ gallons up to a maximum rebate of up to \$\_\_\_\_\_.

The projected reduction in per capita use from the general ICI rebate program is \_\_\_ gpcd in \_\_\_ [five years from date of plan] and \_\_\_ gpcd in \_\_\_ [ten years from date of plan].

**5.11 ICI Water Audit, Water Waste Reduction Program, and Site-Specific Water Conservation Program**

*[OPTIONAL STRATEGY: If you are planning a program to assist ICI water users in performing on-site water audits, identifying water waste, and developing a site-specific water conservation program, please describe the program below.]*

The City of Poca Agua realizes that its ICI customers use water for a wide variety of purposes and have a wide variety of usage patterns. As such, the most feasible water conservation strategies for an individual ICI customer may be highly site-specific. The ICI water audit, water waste reduction program, and site-specific water conservation program is a strategy intended to serve as a way to identify, evaluate, and implement water conservation for individual ICI customers.

With the assistance of the customer, an ICI water audit will:

- Accurately measure all water entering the facility
- Inventory and calculate all on-site water uses
- Identify any unused water sources or waste streams available
- Calculate water related costs
- Identify potential water conservation measures within a facility

Potential water efficiency measures may include water waste reduction and/or best management practices. ICI water-wasting activities may include wasteful irrigation practices and scheduling, single-pass cooling, non-recycling decorative fountains, discharge of process water, inefficient use of water softeners, and wash and rinse processes. In addition to water waste reduction, ICI best management practices may include sub-metering, cooling tower audits, cooling system audits, rinsing/cleaning, boiler and steam systems, water treatment, refrigeration, management and employee programs, landscape, and alternative sources and reuse of process water.

The projected reduction in per capita use from the ICI water audit, water waste reduction program, and site-specific water conservation program is \_\_ gpcd in \_\_\_\_ [*five years from date of plan*] and \_\_ gpcd in \_\_\_\_ [*ten years from date of plan*].

**5.12            Water Conservation Plan Updates**

As required by TCEQ rules (§288.2(b)), the City of Poca Agua will review this water conservation plan every five years, beginning in \_\_\_\_ [*five years from date of plan*]. The plan will be updated as appropriate based on new or updated information. As the plan is reviewed and subsequently updated, a copy of the revised Drought Contingency Plan will be submitted to the TCEQ and the RCWPG for their records.

**6. DROUGHT CONTINGENCY PLAN**

**6.1 Introduction**

The purpose of this drought contingency plan is as follows:

- To conserve the available water supply in times of drought and emergency
- To maintain supplies for domestic water use, sanitation, and fire protection
- To protect and preserve public health, welfare, and safety
- To minimize the adverse impacts of water supply shortages
- To minimize the adverse impacts of emergency water supply conditions.

**6.2 State Requirements for Drought Contingency Plans**

This drought contingency plan is consistent with Texas Commission on Environmental Quality (TCEQ) guidelines and requirements for the development of drought contingency plans by public drinking water suppliers, contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.20 of the Texas Administrative Code. This rule is included in Appendix B.

TCEQ’s minimum requirements for drought contingency plans are addressed in the following subsections of this report:

- 288.20(a)(1)(A) – Provisions to Inform the Public and Provide Opportunity for Public Input – Section 6.3
- 288.20(a)(1)(B) – Provisions for Continuing Public Education and Information – Section 6.4
- 288.20(a)(1)(C) – Coordination with the Regional Water Planning Group – Section 6.9
- 288.20(a)(1)(D) – Criteria for Initiation and Termination of Drought Stages – Section 6.6
- 288.20(a)(1)(E) – Drought and Emergency Response Stages – Section 6.6
- 288.20(a)(1)(F) – Specific, Quantified Targets for Water Use Reductions – Section 6.6
- 288.20(a)(1)(G) – Water Supply and Demand Management Measures for Each Stage – Section 6.6
- 288.20(a)(1)(H) – Procedures for Initiation and Termination of Drought Stages – Section 6.5
- 288.20(a)(1)(I) - Procedures for Granting Variances – Section 6.7



- 288.20(a)(1)(J) - Procedures for Enforcement of Mandatory Restrictions – Section 6.8
- 288.20(a)(3) – Consultation with Wholesale Supplier – Not applicable
- 288.20(b) – Notification of Implementation of Mandatory Measures – Section 6.5
- 288.20(c) – Review and Update of Plan – Section 6.10

*[If you receive water from a wholesale supplier, you must include in your plan appropriate provisions for responding to reductions in the wholesale water supply.]*

### **6.3 Provisions to Inform the Public and Opportunity for Public Input**

The City of Poca Agua provided opportunity for public input in the development of this drought contingency plan by the following means:

- Providing written notice of the proposed plan and the opportunity to comment on the plan by newspaper, posted notice, and notice on City of Poca Agua’s web site, [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us).
- Making the draft plan available on City of Poca Agua’s web site, [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us).
- Providing the draft plan to anyone requesting a copy.
- Holding a public meeting at the City of Poca Agua City Hall at \_\_\_\_\_ [time] on \_\_\_\_\_ [date].

### **6.4 Provisions for Continuing Public Education and Information**

The City of Poca Agua will inform and educate the public about its drought contingency plan by the following means:

- Preparing a bulletin describing the plan and making it available at city hall and other appropriate locations.
- Making the plan to the public available through the City of Poca Agua web site at [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us).
- Including information about the drought contingency plan on the City of Poca Agua’s web site, [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us).
- Notifying local organizations, schools, and civic groups that City of Poca Agua staff members are available to make presentations on the drought contingency plan (usually in conjunction with presentations on water conservation programs).

At any time that the drought contingency plan is activated or the drought stage changes, the City of Poca Agua will notify local media of the issues, the drought response stage, and the specific actions required of the public. The information will also be publicized on the City of Poca Agua web site, [www.ci.pocaagua.tx.us](http://www.ci.pocaagua.tx.us). Billing inserts will also be used as appropriate.

## **6.5            Initiation and Termination of Drought Response Stages**

### **6.5.1            Initiation of Drought Response Stages**

The Utility Director or his/her official designee may order the implementation of a drought response stage or water emergency when one or more of the trigger conditions for that stage is met. The following actions will be taken when a drought stage is initiated:

- The public will be notified through local media.
- Wholesale customers (none at present) will be notified by telephone with a follow-up letter or fax.
- If any mandatory provisions of the drought contingency plan are activated, the City of Poca Agua will notify the Executive Director of the TCEQ within 5 business days.

For other trigger conditions, the Utility Director or his/her designee may decide not to order the implementation of a drought response stage or water emergency even though one or more of the trigger criteria for the stage are met. Factors that could influence such a decision include, but are not limited to, the time of the year, weather conditions, the anticipation of replenished water supplies, or the anticipation that additional facilities will become available to meet needs.

### **6.5.2            Termination of Drought Response Stages**

The Utility Director or official designee may order the termination of a drought response stage or water emergency when the conditions for termination are met or at his/her discretion. The following actions will be taken when a drought stage is terminated:

- The public will be notified through local media.
- Wholesale customers will be notified by telephone with a follow-up letter or fax.

- When any mandatory provisions of the drought contingency plan that have been activated are terminated, the City of Poca Agua will notify the Executive Director of the TCEQ within 5 business days.

The Utility Director or his/her designee may decide not to order the termination of a drought response stage or water emergency even though the conditions for termination of the stage are met. Factors that could influence such a decision include, but are not limited to, the time of the year, weather conditions, or the anticipation of potential changed conditions that warrant the continuation of the drought stage.

## **6.6 Drought and Emergency Response Stages**

### **6.6.1 Stage 1, Mild**

#### **6.6.1.1 TRIGGERING AND TERMINATION CONDITIONS FOR STAGE 1, MILD**

- The water level in Poca Agua Reservoir has fallen below elevation 484.0 feet msl.
- Demand exceeds 90% of the amount that can be delivered to customers for seven consecutive days.
- Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate.
- Supply source becomes contaminated.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Water demand is approaching the limit of the permitted supply.

*[The following are examples of other potential triggering criteria that may be used in one or more successive stages of a drought contingency plan. Select one or more of these if appropriate to your system, or devise additional triggering criteria tailored to your system<sup>9</sup>:*

- 1. Annually, beginning on May 1 through September 30.*
- 2. When the water supply available to the City of Poca Agua is equal to or less than \_\_\_\_\_ (acre-feet, percentage of storage, etc.).*
- 3. When, pursuant to requirements specified in the (name of water supplier) wholesale water purchase contract with (name of wholesale*

*water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.*

- 4. When flows in the (name of stream or river) are equal to or less than \_\_\_ cubic feet per second.*
- 5. When the static water level in the (name of water supplier) well(s) is equal to or less than \_\_\_ feet above mean sea level.*
- 6. When the specific capacity of the (name of water supplier) well(s) is equal to or less than \_\_\_ percent of the well's original specific capacity.*
- 7. When total daily water demand equals or exceeds \_\_\_ million gallons for \_\_\_ consecutive days or \_\_\_ million gallons on a single day (e.g., based on the "safe" operating capacity of water supply facilities).*
- 8. Continually falling treated water reservoir levels which do not refill above \_\_\_ percent overnight (e.g., based on an evaluation of minimum treated water storage required to avoid system outage).]*

Stage 1 can be terminated when the water level in Poca Agua Reservoir rises above 488.0 feet msl or when the circumstances that caused the initiation of Stage 1 no longer prevail.

#### **6.6.1.2 GOAL FOR USE REDUCTIONS AND ACTIONS AVAILABLE UNDER STAGE 1, MILD**

The goal for water use reduction under Stage 1, Mild, is a \_\_\_ percent reduction of the use that would have occurred in the absence of drought contingency measures. The purpose of actions under State 1, Mild is to raise public awareness of potential drought problems. The Utility Director or his/her designee can order the implementation of any of the actions listed below, as deemed necessary:

- Request voluntary reductions in water use by the public and by wholesale customers.
- Increase public education efforts on ways to reduce water use.
- Review the problems that caused the initiation of Stage 1.
- Notify major water users and work with them to achieve voluntary water use reductions.
- Intensify efforts on leak detection and repair.
- Reduce non-essential city government water use. (Examples include street cleaning, vehicle washing, operation of ornamental fountains, etc.)

- Reduce city government water use for landscape irrigation.
- Ask the public to follow voluntary landscape watering schedules.
- Notify wholesale customers of actions being taken in the City of Poca Agua and request implementation of similar procedures.

## **6.6.2 Stage 2, Moderate**

### **6.6.2.1 TRIGGERING CONDITIONS FOR STAGE 2, MODERATE**

- The water level in Poca Agua Reservoir has fallen below elevation 481.0 feet msl.
- Demand exceeds 95% of the amount that can be delivered to customers for 3 consecutive days.
- Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate.
- Supply source becomes contaminated.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Water demand is approaching the limit of the permitted supply.

*[If applicable select one or more of the additional triggering criteria discussed in Section 10.6.1.1, or devise additional triggering criteria tailored to your system.]*

Stage 2 can terminate when the water level in Poca Agua Reservoir rises above elevation 485.0 feet msl or when the circumstances that caused the initiation of Stage 2 no longer prevail. Stage 1 becomes operative on termination of Stage 2.

### **6.6.2.2 GOAL FOR USE REDUCTION AND ACTIONS AVAILABLE UNDER STAGE 2, MODERATE**

The goal for water use reduction under Stage 2, Moderate, is a \_\_\_ percent reduction of the use that would have occurred in the absence of drought contingency measures. The Utility Director or his/her designee can order the implementation of any of the actions listed below, as deemed necessary:

- Continue or initiate any actions available under Stage 1.
- Initiate engineering studies to evaluate alternatives should conditions worsen.
- Further accelerate public education efforts on ways to reduce water use.

- Halt non-essential city government water use. (Examples include street cleaning, vehicle washing, operation of ornamental fountains, etc.)
- Encourage the public to wait until the current drought or emergency situation has passed before establishing new landscaping.
- Notify wholesale customers of actions being taken in the City of Poca Agua and request them to implement similar procedures.

### **6.6.3 Stage 3, Severe**

#### **6.6.3.1 TRIGGERING CONDITIONS FOR STAGE 3, SEVERE**

- The water level in Poca Agua Reservoir has fallen below elevation 478.0 feet msl.
- Demand exceeds 98% of the amount that can be delivered to customers for 3 consecutive days.
- Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate.
- Supply source becomes contaminated.
- Water supply system is unable to deliver water due to the failure or damage of major water system components.
- Water demand is approaching the limit of the permitted supply.

*[If applicable select one or more of the additional triggering criteria discussed in Section 10.6.1.1, or devise additional triggering criteria tailored to your system.]*

Stage 3 can terminate when the water level in Poca Agua Reservoir rises above elevation 482.0 feet msl or when the circumstances that caused the initiation of Stage 3 no longer prevail. Stage 2 becomes operative on termination of Stage 3.

#### **6.6.3.2 GOAL FOR USE REDUCTION AND ACTIONS AVAILABLE UNDER STAGE 3, SEVERE**

The goal for water use reduction under Stage 3, Severe, is a reduction of \_\_\_ percent of the use that would have occurred in the absence of drought contingency measures. If the circumstances warrant, the Utility Director or his/her designee can set a goal for greater water use reduction.

The Utility Director or his/her designee can order the implementation of any of the actions listed below, as deemed necessary. Measures described as “requires

notification to TCEQ” impose mandatory requirements on retail and wholesale customers. The City of Poca Agua staff must notify TCEQ within five business days if these measures are implemented.

- Continue or initiate any actions available under Stages 1 and 2.
- Implement viable alternative water supply strategies.
- **Requires Notification to TCEQ** – Initiate mandatory water use restrictions as follows:
  - Prohibit hosing of paved areas, buildings, or windows.
  - Prohibit operation of ornamental fountains.
  - Prohibit washing or rinsing of vehicles by hose.
  - Prohibit using water in such a manner as to allow runoff or other waste.
- **Requires Notification to TCEQ** – Limit landscape watering at each service address to once every five days based on the last digit of the address. (Exceptions: Foundations, azaleas, new plantings (first year) of trees and shrubs may be watered for up to 2 hours on any day by a hand-held hose or a soaker hose. Golf courses may water greens and tee boxes without restrictions. Restrictions do not apply to locations using treated wastewater effluent for irrigation.)
- **Requires Notification to TCEQ** – Prohibit draining and filling of existing pools and filling of new pools. (Pools may add water to replace losses during normal use.)
- **Requires Notification to TCEQ** – Prohibit establishment of new landscaping.
- Initiate a 10% rate surcharge for all water use over 4,000 gallons per connection per month.
- Discontinue city government water use for landscape irrigation, except as needed to prevent foundation damage, keep golf course greens and tee boxes alive, and preserve new plantings.
- Notify wholesale customers of actions being taken in the City of Poca Agua and request them to implement similar procedures.

#### 6.6.4 Stage 4, Emergency

##### 6.6.4.1 TRIGGERING CONDITIONS FOR STAGE 4, EMERGENCY

- The water level in Poca Agua Reservoir has fallen below elevation 475.0 feet msl.

- Demand exceeds the amount that can be delivered to customers.
- Water demand for all or part of the delivery system seriously exceeds delivery capacity because the delivery capacity is inadequate.
- Supply source becomes contaminated.
- Water supply system unable to deliver water due to the failure or damage of major water system components.
- Water demand is approaching the limit of the permitted supply.

*[If applicable select one or more of the additional triggering criteria discussed in Section 10.6.1.1, or devise additional triggering criteria tailored to your system.]*

Stage 4 can terminate when the water level in Poca Agua Reservoir rises above elevation 479.0 feet msl or when the circumstances that caused the initiation of Stage 4 no longer prevail. Stage 3 becomes operative on termination of Stage 4.

#### **6.6.4.2 GOAL FOR USE REDUCTION AND ACTIONS AVAILABLE UNDER STAGE 4, EMERGENCY**

The goal for water use reduction under Stage 4, Emergency, is a reduction of \_\_\_ percent of the use that would have occurred in the absence of drought contingency measures. If circumstances warrant, the Utility Director or his/her designee can set a goal for greater water use reduction.

The Utility Director or his/her designee can order the implementation of any of the actions listed below, as deemed necessary. Measures described as “requires notification to TCEQ” impose mandatory requirements on retail and wholesale customers. The City of Poca Agua staff must notify TCEQ within five business days if these measures are implemented.

- Continue or initiate any actions available under Stages 1, 2, and 3.
- Implement viable alternative water supply strategies.
- **Requires Notification to TCEQ** – Prohibit washing of vehicles except as necessary for health, sanitation, or safety reasons
- **Requires Notification to TCEQ** – Prohibit commercial and residential landscape watering, except that foundations may be watered for 2 hours each day with a hand-held hose or a soaker hose.
- **Requires Notification to TCEQ** – Prohibit golf course watering except for greens and tee boxes.



- **Requires Notification to TCEQ** – Prohibit any filling of private pools. Commercial and public pools may refill to replace losses during normal use.
- **Requires Notification to TCEQ** – Require all commercial water users to reduce water use by a percentage established by the Utility Director or his/her designee.
- Initiate a 25% rate surcharge over normal rates for all water use over 4,000 gallons per month.
- Notify wholesale customers of actions being taken in the City of Poca Agua and request them to implement similar procedures.

**6.7 Procedure for Granting Variances to the Plan**

The Utility Director or his/her designee may grant temporary variances for existing water uses otherwise prohibited under this drought contingency plan if one or more of the following conditions is met:

- Failure to grant such a variance would cause an emergency condition adversely affecting health, sanitation, or fire safety for the public or the person requesting the variance.
- Compliance with this plan cannot be accomplished due to technical or other limitations.
- Alternative methods that achieve the same level of reduction in water use can be implemented.

Variances shall be granted or denied at the discretion of City of Poca Agua staff or his/her designee. All petitions for variances should be in writing and should include the following information:

- Name and address of the petitioner(s)
- Purpose of water use
- Specific provisions from which relief is requested
- Detailed statement of the adverse effect of the provision from which relief is requested
- Description of the relief requested
- Period of time for which the variance is sought
- Alternative measures that will be taken to reduce water use

- Other pertinent information.

### **6.8 Procedure for Enforcement of Mandatory Restrictions**

Mandatory water use restrictions may be imposed in Stage 3 and Stage 4 drought stages. These mandatory water use restrictions will be enforced by warnings and penalties as follows:

- On the first violation, customers will be given a written warning that they have violated the mandatory water use restriction.
- On the second and subsequent violations, citations may be issued to customers, with fines not less than \$\_\_ and not to exceed \$\_\_\_ per incident.
- After two violations have occurred, the City of Poca Agua may install a flow restrictor in the line to limit the amount of water that may pass through the meter in a 24-hour period.
- After three violations have occurred, the City of Poca Agua may cut off water service to the customer.

### **6.9 Coordination with the Regional Water Planning Group**

The City of Poca Agua is located within the Region C water planning area. Appendix F includes a copy of a letter sent to the Chair of the Region C Water Planning Group (RCWPG) with this water conservation and drought contingency plan.

### **6.10 Review and Update of Drought Contingency Plan**

As required by TCEQ rules, the City of Poca Agua will review this drought contingency plan every five years, beginning in \_\_\_\_ [*five years from date of plan*]. The plan will be updated as appropriate based on new or updated information. As the plan is reviewed and subsequently updated, a copy of the revised Drought Contingency Plan will be submitted to the TCEQ and the RCWPG for their records.

**REGION C WATER  
PLANNING GROUP**

**MODEL WATER  
CONSERVATION PLAN  
FOR MANUFACTURING  
WATER USES**

---

**FEBRUARY 2010**

**Prepared for:**

**REGION C WATER  
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**Prepared by:**

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## **ACKNOWLEDGEMENTS**

This model water conservation plan was prepared by Freese and Nichols, Alan Plummer Associates, and CP&Y for the Region C Water Planning Group. It is intended as a template for manufacturers within Region C as they develop their own water conservation plans. Manufacturers should customize the details to match their unique situation. The model plan was prepared pursuant to Texas Commission on Environmental Quality rules. The rules do not require a drought contingency plan for manufacturers.

The other Region C model water conservation plans (for municipal, steam electric power, and irrigation users) include example text for a fictional water user that can be edited to match a real-life situation. However, there are a large number of manufacturers in Region C with widely varying processes and water uses, and it is difficult to generate example text that is applicable to most manufacturers. This template provides a plan structure and instructions for the type of content that belongs in each section.

Questions regarding this model water conservation plan should be addressed to the following:

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**POCA AGUA  
MANUFACTURING  
COMPANY**

**WATER CONSERVATION  
PLAN**

**FEBRUARY 2010**

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**Letter to the Region C Water Planning Group**

# **Poca Agua Manufacturing Company**

## **Water Conservation Plan February 2010**

### **1. INTRODUCTION AND OBJECTIVES**

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development in Region C have led to growing demands for water supplies. At the same time, local and less expensive sources of water supply are largely developed. Additional supplies to meet higher demands will be expensive and difficult to develop. It is therefore important that we make efficient use of our existing supplies and make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed guidelines and requirements governing the development of water conservation plans for industrial or mining uses (Appendix B). The Poca Agua Manufacturing Company has adopted this water conservation plan pursuant to TCEQ guidelines and requirements.

The objectives of this plan are:

- To reduce water consumption from the level that would prevail without conservation efforts.
- To reduce the loss and waste of water.
- To improve efficiency in the use of water.
- To document the level of recycling and reuse within the manufacturing processes and for non-potable uses.

The plan lists the TCEQ rules; describes the manufacturing process at the Poca Agua Manufacturing Company and associated water uses; sets a water conservation goal; describes water measurement devices and methods; discusses leak detection, repair, and water loss accounting; and reports existing and future water use efficiency practices.

*[This model water conservation plan was developed for the Region C Water Planning Group to assist manufacturers in preparing a site-specific water conservation plan. It contains a plan*



*structure that meets all Texas Commission on Environmental Quality rules for industrial or mining use water conservation plans, along with recommendations on content to include in each section.]*

## 2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

The TCEQ rules governing development of water conservation plans for industrial or mining use are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.3 of the Texas Administrative Code (TAC). Applicable TAC rules are presented in Appendix B. A water conservation plan is defined as “A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s)<sup>2</sup>.”

### Conservation Plan Requirements

The minimum requirements in the TAC Title 30, Part 1, Chapter 288 for water conservation plans for industrial or mining uses are shown below.

<b>TAC Reference</b>	<b>Subject</b>	<b>Plan Location</b>
30 TAC §288.3(a)(1)	Water Use in the Production Process	Section 3
30 TAC §288.3(a)(3)	Water Conservation Goals	Section 4
30 TAC §288.3(a)(4)	Accurate Metering	Section 5
30 TAC §288.3(a)(5)	Leak Detection, Repair, and Water Loss Accounting	Section 6
30 TAC §288.3(a)(6)	Water Use Efficiency Process and/or Equipment Upgrades	Section 7
30 TAC §288.3(a)(7)	Other Conservation Practices	Section 8
30 TAC §288.3(b)	Review and Update of Plan	Section 9

*[TCEQ rules do not require a drought contingency plan for industrial or mining water users.]*

### **3. DESCRIPTION OF WATER USE IN THE PRODUCTION PROCESS**

*[Insert a description of water use in the production process. Show a schematic of the production process with all water use locations and flowrates in Appendix C.*

*This section must include a description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal.*

*In typical manufacturing processes, water is used for cooling tower makeup water, steam generation, rinsing, washing, plating and metal finishing baths, conveyance of materials, wet scrubbers, and as an ingredient in products. Typical water sources include potable water purchased from a municipal water supplier, groundwater from wells, raw water diverted from lake or river, captured stormwater runoff, reclaimed wastewater purchased from a wastewater treatment plant, and reclaimed process water.]*

#### 4. SPECIFICATION OF WATER CONSERVATION GOALS

The Poca Agua Manufacturing Company has set a five-year goal of reducing water use to \_\_\_ ac-ft/yr by \_\_\_ [*five years from date of plan*] and a ten-year goal of reducing water use to \_\_\_ ac-ft/yr by \_\_\_ [*ten years from date of plan*]. These goals will be achieved using the following water conservation methods:

*[Edit the water conservation goals and describe how they will be achieved.*

*This section must include specification of 5-year and 10-year water conservation goals and the basis for development of such goals.*

*To determine feasible water conservation goals, to provide the basis for these goals, and to identify a schedule for conservation savings, a four-step water conservation implementation process should be completed:*

- 1. The first step consists of a water audit for the manufacturing facility. A water audit consists of an inventory of all water supplied to the site and all on-site water uses, including the amount of water used for each purpose. A comparison of the water supplied to the water used will reveal the amount of unaccounted-for water. Unaccounted-for water should be no more than 5 percent of total water supplied.*
- 2. The second step is to identify sources of water waste and to design procedures to reduce water waste and minimize unaccounted-for water. Water waste reduction measures may include reducing flow to process equipment, installing pressure-reducing valves, installing control or limit switches, or other measures.*
- 3. The third step is to identify methods to conserve water use in the manufacturing process, landscape irrigation, and other water uses. Emphasize water conservation methods that address the largest water uses identified in the audit step. Conservation methods could involve upgrading to water-efficient process equipment, water-wise landscaping, retrofit of domestic plumbing fixtures with water-efficient fixtures, employee education, and other methods.*
- 4. The fourth step is to identify opportunities to reuse process water. At the end of the process, is the water quality suitable for other uses? Is it economical to provide water treatment to improve the water quality to make it suitable for other uses?*

*For each water conservation method, please provide a description of how the method will save water, a schedule for when the method will be implemented, and the projected water savings for each method.]*

## 5. ACCURATE METERING TO MEASURE AND ACCOUNT FOR WATER

One of the key elements in water conservation is careful tracking of water use and control of losses. In order to carefully track and control losses, the Poca Agua Manufacturing Company meters water usage at several locations in the productions process.

*[Insert a description of meter locations; meter types; meter calibration frequency; meter calibration tolerance; and meter data collection, tabulation, and storage. Refer to the water use diagram in Appendix C as necessary.]*

*This section must include a description of the device(s) and/or method(s) within an accuracy of plus or minus five percent to be used to measure and account for the amount of water diverted from the source of supply.*

*To assist in tracking of water usage, consider installing additional meters at key locations in the manufacturing process, particularly if unaccounted-for water is greater than 5 percent.]*

## **6. LEAK DETECTION, REPAIR, AND WATER LOSS ACCOUNTING**

At the Poca Agua Manufacturing Company, plant personnel observe, operate, and maintain facilities throughout the day. Inspection of aboveground piping and pump packing is a normal part of employee duties. In addition, flow meter readings are logged on a daily basis.

If a water leak is indicated by any of the above means, the source of the leak is investigated and a work order for repairs is issued as necessary.

*[This section must include a description of leak-detection, repair, and water loss accounting in the water distribution system. Please amend the above description to match operations at your facility.]*

*Consider implementing an active leak detection and repair program if unaccounted-for water is greater than 5 percent.]*

## **7. WATER USE EFFICIENCY PROCESS AND/OR EQUIPMENT UPGRADES**

*[This section must include a description of equipment and/or process modifications to improve water use efficiency.*

*It is suggested that you also include a description of existing water-efficient equipment or processes to demonstrate any water conservation savings that is already being achieved.*

*Equipment upgrades or process modifications should be a result of the third step in the four-step process recommended in Section 4.]*

## 8. OTHER CONSERVATION PRACTICES, METHODS, OR TECHNIQUES

*[This section must include any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal(s) of the water conservation plan.]*

*Other sections emphasize process water usage, equipment upgrades, and process modifications. This section should report on proposed conservation practices, methods, or techniques that address other water uses, such as domestic water use, housekeeping water use, and landscape irrigation. Potential conservation methods include retrofit of water-efficient toilets, showerheads, and faucet aerators; water-wise landscaping; employee education; and other methods. Each of these is described below.*

*The water audit in Section 4 should include a survey of landscape irrigation water use. This includes measurement of the landscape area, measurement of the total irrigable area, irrigation system checks and distribution uniformity analysis, and review or development of irrigation system scheduling. The water use survey should identify currently irrigated areas where irrigation can be discontinued due to low visibility or the plant materials that do not need supplemental irrigation. The survey should also identify areas with the opportunity for process water reuse, stormwater reuse, and reuse of treated effluent for landscape irrigation.*

*State and federal water efficiency standards require water-efficient plumbing fixtures for new construction and remodeling projects. Replacing older plumbing fixtures with water-efficient plumbing fixtures will conserve water. Other methods include retrofitting toilet tank displacement devices (toilet dam), early closure toilet flappers, and installation of a dual-flush adapter.*

*An employee education program is important to reducing water waste and conserving water. The manufacturer should inform and educate employees about the adopted water conservation program through inserts in the monthly paychecks, with letters detailing program successes and goals, and through posters and pamphlets posted throughout the facility. Additional educational opportunities exist through employee water conservation seminars and workshops, email, company newsletter, and memos<sup>1</sup>.*



**9. IMPLEMENTATION AND UPDATE OF THE WATER CONSERVATION PLAN**

Appendix D contains a copy of the Board of Directors of the Poca Agua Manufacturing Company resolution adopting this water conservation plan. The resolution designates responsible officials to implement and enforce the water conservation plan.

Appendix E contains a copy of a letter to the chairman of the Region C Water Planning Group to inform the planning group of this water conservation plan.

This water conservation plan will be reviewed and updated every five years.

**REGION C WATER  
PLANNING GROUP**

**MODEL WATER  
CONSERVATION AND  
DROUGHT  
CONTINGENCY PLAN  
FOR IRRIGATION USERS**

**FEBRUARY 2010**

**Prepared for:**

**REGION C WATER  
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## ACKNOWLEDGEMENTS

This model water conservation and drought contingency plan for the fictional Poca Agua Golf Club and Turfgrass Nursery was prepared by Alan Plummer Associates, Freese and Nichols, and CP&Y for the Region C Water Planning Group. It is a template for large-scale irrigation water users to use as they develop their own water conservation and drought contingency plans. Each irrigation water user should customize the details to match their unique situation. The model plan was prepared pursuant to Texas Commission on Environmental Quality rules.

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**POCA AGUA GOLF  
CLUB AND TURFGRASS  
NURSERY**

**WATER CONSERVATION  
AND DROUGHT  
CONTINGENCY PLAN**

**FEBRUARY 2010**

**Prepared by:**

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	<ul style="list-style-type: none"> <li>• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.1 – Definitions</li> <li>• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.4 – Water Conservation Plans for Agricultural Use</li> <li>• Texas Administrative Code Title 30, Part 1, Chapter 288, Subchapter A, Rule §288.21 – Drought Contingency Plans for Irrigation Use</li> </ul>
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## **Poca Agua Golf Club and Turfgrass Nursery**

### **Water Conservation and Drought Contingency Plan February 2010**

#### **1. INTRODUCTION AND OBJECTIVES**

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development in Region C have led to growing demands for water supplies. At the same time, local and less expensive sources of water supply are largely developed. Additional supplies to meet higher demands will be expensive and difficult to develop. It is therefore important that we make efficient use of our existing supplies and make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed rules<sup>1</sup> governing the development of water conservation and drought contingency plans for irrigation users (Appendix B). The Poca Agua Golf Club and Turfgrass Nursery has adopted this water conservation and drought contingency plan pursuant to TCEQ rules.

This plan lists the TCEQ rules; describes the irrigation process at the Poca Agua Golf Club and Turfgrass Lawn Nursery; sets water conservation goals; describes water measurement devices and methods; discusses leak detection, repair, and water loss accounting; and reports existing and future water use efficiency practices.

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<sup>1</sup> Superscript numbers refer to references in Appendix A.

## 2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

### 2.1 Conservation Plans

The TCEQ rules governing development of water conservation plans for agricultural use (irrigation users) are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.4 of the Texas Administrative Code (TAC), which is included in Appendix B.

A water conservation plan is defined as “A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s)<sup>1</sup>.” The minimum requirements plans for agricultural use (“individual irrigation user”) are as follows:

<b>TAC Reference</b>	<b>Subject</b>	<b>Plan Location</b>
30 TAC §288.4(a)(2)(A)	Description of Irrigation Production Process	Section 3
30 TAC §288.4(a)(2)(B)	Description of the Irrigation Method or System and Equipment	Section 4
30 TAC §288.4(a)(2)(C)	Accurate Metering	Section 5
30 TAC §288.4(a)(2)(E)	Specification of Conservation Goals After May 1, 2005	Section 6
30 TAC §288.4(a)(2)(F)	Description of Water-Conserving Irrigation Equipment and Application System	Section 7
30 TAC §288.4(a)(2)(G)	Leak Detection, Repair, and Water-Loss Control	Section 8
30 TAC §288.4(a)(2)(H)	Irrigation Timing and/or Measuring the Amount of Water Applied	Section 9
30 TAC §288.4(a)(2)(I)	Land Improvements for Retaining or Reducing Runoff and Increasing the Infiltration of Rain and Irrigation Water	Section 10
30 TAC §288.4(a)(2)(J)	Tailwater Recovery and Reuse	Section 11
30 TAC §288.4(a)(2)(K)	Other Conservation Practices, Methods, or Techniques	Section 12

*[The required elements of a water conservation plan are somewhat different for “agricultural users other than irrigation” and a “system providing agricultural water to more than one user.” See Appendix B for guidance.]*



## **2.2 Drought Contingency Plans**

The TCEQ rules governing development of drought contingency plans for irrigation users are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.21 of the TAC, which is included in Appendix B. For the purpose of these rules, a drought contingency plan is defined as “a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s)<sup>1</sup>.” The drought contingency plan for the Poca Agua Golf Club and Turfgrass Nursery is contained in Section 14 of this water conservation and drought contingency plan.

### **3. DESCRIPTION OF THE IRRIGATION PRODUCTION PROCESS**

*[This section must include a description of the irrigation production process which shall include, but is not limited to, the type of crops and acreage of each crop to be irrigated, monthly irrigation diversions, any seasonal or annual crop rotation, and soil types of the land to be irrigated. Please amend the description below to match your situation.]*

The Poca Agua Golf Club and Turfgrass Nursery, located at 8311 Poca Agua Road in the City of Poca Agua, Texas, is an approximately 450-acre complex owned and operated by Golf Course Associates, Inc. on the western shore of Poca Agua Reservoir. The complex consists of two 18-hole golf courses occupying 400 acres with the remaining 50 acres occupied by a bermudagrass sod operation. Both golf courses were constructed in 1978 with the turfgrass nursery going into production in 1983.

The current irrigation supply sources for the operation are:

- Approximately 550 acre-feet per year (ac-ft/yr) of raw water purchased from the City of Poca Agua. This water is diverted from Poca Agua Reservoir under the City's existing water right and pumped to Eagle Lake, the largest of 5 ponds located on the golf course grounds;
- Three groundwater wells; and
- Treated water purchased from the City of Poca Agua.

The wells and the treated water connection to the City of Poca Agua are for emergency purposes and are not used under normal operating conditions.

#### **3.1 Acreage and Type of Vegetation to be Irrigated**

The Poca Agua Golf Club irrigates a total of approximately 300 acres of fairways, rough, tee boxes, greens, and common grounds. The remaining 100 acres is natural and not irrigated. The vegetation located in the fairway, rough, tee boxes, and common grounds consists of a hybrid common bermudagrass with the greens planted in TifSport 319.

The turfgrass nursery irrigates approximately 45-acres of Tifgrass in production. The remaining 5-acres consists of storage and office buildings and a network of maintenance roads. Tifgrass is a hybrid form of bermudagrass suited for landscape lawn purposes.

**Table 3-1 Type of Vegetation and Acreage to be Irrigated**

Type of Crop/Plant	Growing Season	Acres Irrigated/Year
1. Common Bermuda	May - October	290
2. Tifsport 319	May - October	10
3. Tifgrass	May - October	45
Total Number of Acres		345

### 3.2 Monthly Irrigation Diversions

Raw water is diverted from the Poca Agua Reservoir to Eagle Lake through a 10-inch PVC pipe. A pump station is located along the reservoir and houses a variable speed pump that is capable of delivering 600 gallons per minute at maximum efficiency. A variable speed pump was chosen because of its ability to conserve energy by using only the horsepower required to deliver the required amount of water. The water supplied by the Poca Agua Reservoir to Eagle Lake not only supplements water to the remaining 4 ponds but it provides the primary source of water for irrigation purposes for both golf courses and the turfgrass nursery. The following table details the projected amount of water necessary to maintain 495.0 feet mean sea level in Eagle Lake. During an emergency, the Poca Agua Golf Club and Turfgrass Nursery has the ability to utilize three ground water wells located within the premises and treated water from the City of Poca Agua for irrigation purposes.

**Table 3-2 Estimated Monthly Irrigation Diversions from the Supply Source**

Month	Acre-Feet
January	0
February	7
March	7
April	21
May	35
June	102
July	103
August	103
September	102
October	35
November	35
December	0
TOTAL	550

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### 3.3 Description of the Soil Type(s)

The Poca Agua Golf Club and Turfgrass Nursery have five different soil types within the 450-acres as determined by the soil survey for Poca Agua County, published by the United States Department of Agriculture, Soil Conservation Service, in cooperation with the Texas Agricultural Experiment Station. The following table details the soils that can be observed as well as their permeability characteristics.

**Table 3-3 Soil Types and Permeability Classification**

<b>Soil Type</b>	<b>Permeability</b>
Altoga silty clay, 3 to 5 percent slopes	Moderate
Bastrop fine sandy loam, 1 to 3 percent slopes	Moderate
Konsil fine sandy loam, 3 to 8 percent slopes	Moderate
Ovan clay, occasionally flooded	Slow
Wilson clay loam, 1 to 3 percent slopes	Very Slow

#### **4. DESCRIPTION OF THE IRRIGATION METHOD OR SYSTEM AND EQUIPMENT**

*[This section must include a description of the irrigation method or system and equipment including pumps, flow rates, plans, and/or sketches of the system layout. Please amend the description below to match your situation.]*

The Poca Agua Golf Club and Turfgrass Nursery uses a solid set irrigation system with impact sprinkler rotors for both golf courses. The rotors are placed on 60 feet by 80 feet centers and maintain a pressure of 70 psi. The entire system currently operates on a timer configuration with weather patterns monitored. Hand application of water to the greens is used during times of drought.

During normal operations, both golf courses use water that is pumped from Eagle Lake. Under emergency conditions, water is also available from three groundwater wells and through an emergency treated water supply agreement with the City of Poca Agua. Under normal operations, water is pumped from Eagle Lake into the system using a variable speed pump. A variable speed pump is used because of its efficiency and energy savings. Water is distributed to each of the golf courses' lateral lines through a six-inch diameter PVC main line. All of the lateral lines are PVC pipe and range from two to four inches in diameter. Valves, located in valve boxes, distribute water to each zone throughout the golf courses so that pressure is maintained throughout the entire system. An electrically activated solenoid valve is tied to the timer system that engages each zone. The impact sprinkler rotors are pressure-driven once the valve is engaged. All main and lateral lines are buried ten inches or greater to prevent freeze/thawing effects. All sprinkler heads have bleed valves to further prevent damage from freeze/thawing effects.

The turfgrass nursery also uses water from Eagle Lake for irrigation purposes. A variable speed pump pumps water from Eagle Lake to the central valve box. From there, lateral lines distribute the water to a central hose attachment that is attached to a linear move irrigation system. The linear move system distributes the water through a rolling sprinkler apparatus that travels in a straight line over the growing area. The rolling sprinkler apparatus irrigates through an elevated pipe with impact sprinkler rotors attached at 50 foot intervals. The nursery has four growing areas with grasses at various levels of maturity. At each growing area, the irrigation implement operates on a timer. The system maintains a pressure of 70 psi.

A diagram of the irrigation system for the golf courses and the turfgrass nursery is included in Appendix C.

## 5. ACCURATE METERING

*[This section must include a description of the device(s) and/or methods within an accuracy of plus or minus 5.0%, to be used in order to measure and account for the amount of water diverted from the source of supply. Please amend the description below to match your situation.]*

The Poca Agua Golf Club and Turfgrass Nursery uses a totalizing meter at the intake structure located along the Poca Agua Reservoir that is calibrated on an annual basis to within two percent accuracy. Meter readings are logged each day and reported to the City of Poca Agua on a monthly basis.

Meters are also present at each groundwater well and at the treated water connection to the City of Poca Agua. These meters are also calibrated annually to within two percent accuracy. Meter readings are logged each day that these water supplies are used.

Within the irrigation process itself, magnetic flow meters measure the following flows:

- Water distributed to the Eagle Golf Course
- Water distributed to the Hills Golf Course
- Water distributed to the Turfgrass Nursery
- Water distributed to the common grounds for irrigation uses

Each of the magnetic flow meters is calibrated on an annual basis to within two percent accuracy. If the meters appear to be malfunctioning, they are repaired or replaced as necessary.

Meter readings from all of the above meters are logged daily and monitored for any water losses. Any future water supply sources will be metered in a similar fashion.

## **6. SPECIFICATION OF CONSERVATION GOALS**

*[This section must include specification of 5-year and 10-year targets for water savings, including, where appropriate, quantitative goals for irrigation water use efficiency, and a pollution abatement and prevention plan. Please amend the description below to match your situation.]*

This section presents the water conservation goal at the Poca Agua Golf Club and Turfgrass Nursery and describes pollution prevention and abatement.

### **6.1 Water Conservation Goal**

The Poca Agua Golf Club and Turfgrass Nursery has set a five-year water conservation goal of reducing total water usage by 20 percent (from 550 ac-ft/yr to 440 ac-ft/yr) by the year \_\_\_\_ *[five years from date of plan]*. The ten-year goal is the same as the five-year goal. This reduction in water use will be achieved by the following methods:

- Switch to a central, computer-controlled irrigation system with weather monitoring stations located throughout the 450-acre property (golf courses and nursery). This change is projected to save \_\_\_\_ ac-ft/yr.
- Replacement of golf-course sprinkler rotors with more efficient models. This change is projected to save \_\_\_\_ ac-ft/yr.
- Replacement of the linear move irrigation system with a drip/micro-emitter irrigation system. This change is projected to save \_\_\_\_ ac-ft/yr.
- Reduce irrigation to the rough on both golf courses. This change is projected to save \_\_\_\_ ac-ft/yr.

### **6.2 Pollution Prevention and Abatement**

The Poca Agua Golf Club and Turfgrass Nursery is committed to maintaining water quality in its golf course ponds. Potential threats to water quality from golf and turfgrass operations include pesticides, herbicides, and fertilizers. The Golf Club and Nursery minimizes chemical runoff from the golf courses and turfgrass growing areas through the following best management practices:

- Integrated pest management (IPM) approach to controlling pests. This approach includes use of biological pest control agents such as milky spore, bats, and nematodes and limited application of pesticides. When pesticides are applied, only Category III

and IV pesticides (as designated by the U.S. Environmental Protection Agency) are used; these are the least toxic pesticides available.

- Careful limiting of irrigation water application rates.
- Avoiding application of pesticides, herbicides, and fertilizers when rain is in the near-term forecast.
- Use of low-phosphorus, slow-release fertilizers that are applied based on soil analysis.
- Vegetative buffers around each golf course pond.
- Furrow diking around turfgrass growing areas to retain runoff on-site.
- 40-foot “no-spray” zones around each water feature.

Other potential pollutant sources during normal operations include parts washing, golf cart and vehicle maintenance, oil and chemical storage, and waste disposal. These potential sources are managed by following all applicable federal, state, and local regulations and through good housekeeping practices. In this way, the Golf Club and Nursery maintains a clean, organized, environmentally responsible maintenance facility.



## **7. DESCRIPTION OF WATER-CONSERVING IRRIGATION EQUIPMENT AND APPLICATION SYSTEM**

*[This section must include a description of water-conserving irrigation equipment and application system or method including, but not limited to, surge irrigation, low pressure sprinkler, drip irrigation, and nonleaking pipe. Please amend the description below to match your situation.]*

At present, personnel use general information provided by the Texas Agricultural Extension Agency to calculate evapotranspiration rates. With these data, personnel adjust the amount of irrigation applied by reprogramming the timer system. By \_\_\_\_ *[five years from date of plan]*, the current timer system will be upgraded to a centrally-controlled computer system with weather stations placed periodically throughout the 450 acre property. This system is a software-based irrigation control center that will allow for more precision in irrigation management. Weather stations will provide rainfall, high and low ambient temperatures, wind speed and direction, soil temperatures, barometric pressures, relative humidity, and solar radiation data. The control system will analyze data provided by the weather stations and by soil-moisture sensors to estimate the current evapotranspiration rate. Once the evapotranspiration rate is estimated, the system determines an irrigation schedule that will provide only the amount of water needed under existing atmospheric and terrestrial conditions. The system can also shut down irrigation during periods of high wind, rain, or other climatic conditions not favorable to optimal irrigation.

By \_\_\_\_ *[five years from date of plan]*, the Poca Agua Golf Club and Turfgrass Nursery will replace existing impact rotors with higher efficiency rotors from Rain Bird, Inc. These sprinkler heads will apply water more evenly, thereby, reducing water usage.

By \_\_\_\_ *[five years from date of plan]*, the turfgrass nursery will convert from the linear move irrigation system to a micro-emitter irrigation system. The micro-emitter irrigation system will further increase water conservation by reducing the evaporative losses.

## **8. LEAK DETECTION, REPAIR, AND WATER-LOSS CONTROL**

*[This section must include a description of leak detection, repair, and water loss control. Please amend the description below to match your situation.]*

At the Poca Agua Golf Club and Turfgrass Nursery, leaks are identified through the following means:

- Golf course and turfgrass personnel observe, operate, and maintain facilities throughout the day. Inspection of sprinkler heads, piping, and pump stations are a normal component of employee duties.
- Golf course and turfgrass personnel log and aggregate meter readings into a daily log. Abnormal values may signify a leak from the readings.
- Leak detection equipment is used on occasion if a below-ground leak is suspected.

If a water leak is indicated by any of the above means, the source of the leak is investigated and personnel are instructed to repair the leak as necessary.

## **9. SCHEDULING THE TIMING AND/OR MEASURING THE AMOUNT OF WATER APPLIED**

*[This section must include a description of scheduling the timing and/or measuring the amount of water applied (for example, soil moisture monitoring). Please amend the description below to match your situation.]*

The Poca Agua Golf Club and Turfgrass Nursery currently uses a timer system and evapotranspiration-based calculations from weather data collected from the Texas Agricultural Experiment Station to obtain an optimal water schedule. However, by \_\_\_\_ *[five years from date of plan]*, the operation will convert to an automated, computer-controlled system. The centrally-controlled system will analyze data obtained from various weather stations and soil moisture sensors located throughout the 450-acre property. The data obtained will consist of rainfall, high or low temperatures, wind speed and direction, soil temperatures, soil moisture, barometric pressure, relative humidity, and solar radiation. From these data, the program will determine an irrigation schedule that will complement the atmospheric and terrestrial conditions to optimize irrigation scheduling.

When possible, irrigation will not be conducted between the hours of 10 AM and 8 PM to minimize evaporative losses. Furthermore, during periods of high wind, rain, or other climatic conditions not favorable to optimal irrigation, the system will shut down.

In addition to the central control system, meters will be monitored to track and record the amount of water being applied through the system.

**10. LAND IMPROVEMENTS FOR RETAINING OR REDUCING RUNOFF AND INCREASING THE INFILTRATION OF RAIN AND IRRIGATION WATER**

*[This section must include a description of any land improvements for retaining or reducing runoff, and increasing the infiltration of rain and irrigation water including, but not limited to, land leveling, furrow diking, terracing, and weed control. Please amend the description below to match your situation.]*

The Poca Agua Golf Club maintains 100 acres of natural areas surrounding both golf courses as well as 5 ponds on the golf courses. Each course is sloped to allow all excess water from irrigation or storm events to flow to the natural areas or to the water features, thereby retaining and reducing runoff.

The Poca Agua Turfgrass Nursery uses furrow dikes, which are small earthen dams, to retain irrigation/storm water on-site. In so doing, much of the excess water infiltrates into the soil. Surrounding the turfgrass area is a small drainage channel that discharges collected water back into Eagle Lake, which is the primary irrigation water supply.

## **11. TAILWATER RECOVERY AND REUSE**

*[This section must include a description of tailwater recovery and reuse. Please amend the description below to match your situation.]*

The Poca Agua Turfgrass Nursery uses a small drainage channel to route any excess water from the turfgrass area to Eagle Lake, where it is used/reused for irrigation.

## **12. OTHER CONSERVATION PRACTICES, METHODS, OR TECHNIQUES**

*[This section must include information on any other water conservation practice, method, or technique which the user shows to be appropriate for preventing waste and achieving conservation. Please amend the section below to match your situation.]*

No other water conservation practices, methods, or techniques are necessary to achieve the water conservation goals for the Poca Agua Golf Club and Turfgrass Nursery.

### **13. IMPLEMENTATION OF THE WATER CONSERVATION PLAN**

Appendix D contains a copy of the resolution of the Board of Directors of the Poca Agua Golf Club and Turfgrass Nursery adopting this water conservation plan. The resolution designates responsible officials to implement and enforce the water conservation plan.

Appendix E contains a copy of a letter to the chairman of the Region C Water Planning Group to inform the group of this water conservation plan.

## **14. DROUGHT CONTINGENCY PLAN**

### **14.1 Introduction**

The purpose of this drought contingency plan is as follows:

- To conserve the available water supply in times of drought and emergency
- To minimize the adverse impacts of water supply shortages
- To minimize the adverse impacts of emergency water supply conditions.
- To coordinate drought contingency efforts with the City of Poca Agua, the wholesale water supplier for the Poca Agua Golf Club and Turfgrass Nursery.

### **14.2 State Requirements for Drought Contingency Plans**

This drought plan is consistent with Texas Commission on Environmental Quality (TCEQ) guidelines and requirements for the development of drought contingency plans by irrigation users, contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.21 of the Texas Administrative Code. This rule is included in Appendix B.

#### Minimum Requirements

TCEQ's minimum requirements for drought contingency plans are addressed in the following subsections of this report:



<b>TAC Reference</b>	<b>Subject</b>	<b>Plan Location</b>
30 TAC §288.21(a)(1)(A)	Provisions to Inform the Public and Provide Opportunity for Public Input	Section 14.3
30 TAC §288.21(a)(1)(B)	Document Coordination with Regional Planning Group	Section 14.4
30 TAC §288.21(a)(1)(C)	Criteria for Initiation and Termination of Drought Stages	Section 14.7
30 TAC §288.21(a)(1)(D)	Specific, Quantified Targets for Water Use Reduction	Section 14.7
30 TAC §288.21(a)(1)(E)	Procedures for Determining the Allocation of Irrigation Supplies to Individual Users	Section 14.6
30 TAC §288.21(a)(1)(F)	Procedures for Initiation and Termination of Drought Stages	Section 14.5
30 TAC §288.21(a)(1)(G)	Procedures for Use Accounting	Section 14.8
30 TAC §288.21(a)(1)(H)	Procedures for the Transfer of Water Allocations Among Individual Users	Section 14.9
30 TAC §288.21(a)(1)(I)	Procedures for Enforcement of Water Allocation Policies	Section 14.10
30 TAC §288.21(a)(2)	Consultation with Wholesale Supplier	Section 14.11
30 TAC §288.21(a)(3)	Protection of Public Water Supplies	Section 14.12
30 TAC §288.21(a)(3)(b)	Review and Update of Plan	Section 14.13

### **14.3 Provisions to Inform the Public and Opportunity for Public Input**

The Poca Agua Golf Club and Turfgrass Nursery is a private business that uses water for irrigation. It is not a supplier of irrigation water to any other users. Therefore, it is not obligated to inform the public or provide opportunity for public input.

*[If you are a public entity or are otherwise required to inform the public and provide opportunity for public input, alternatives include, but are not limited to:*

- *Providing written notice of the proposed plan and the opportunity to comment on the plan by newspaper and posted notice.*
- *Providing the draft plan to anyone requesting a copy.*
- *Holding a public meeting.]*

#### **14.4 Coordination with the Region C Water Planning Group**

Appendix E includes a copy of a letter sent to the Chair of the Region C water planning group with a copy of this water conservation and drought contingency plan.

#### **14.5 Initiation and Termination of Drought Response Stages**

##### Initiation of a Drought Response Stage

The City of Poca Agua may order implementation of a drought response stage or water emergency if one or more of the trigger conditions for that stage is met, according to the City's Drought Contingency Plan. When a drought stage is initiated, the City's Utility Director will notify the Poca Agua Golf Club and Turfgrass Nursery by telephone with a follow-up letter or fax.

For other trigger conditions, the City of Poca Agua may decide not to order the implementation of a drought response stage or water emergency even though one or more of the trigger criteria for the stage are met. Factors that could influence such a decision include, but are not limited to, the time of the year, weather conditions, the anticipation of replenished water supplies, or the anticipation that additional facilities will become available to meet needs.

*[If you are not subject to a municipal drought contingency plan, include in this section a description of who is authorized to order implementation of drought response stages or water emergencies.]*

##### Termination of a Drought Stage

The City of Poca Agua may order the termination of a drought response stage or water emergency when the conditions for termination are met or at its discretion. When a drought stage is terminated, the City's Utility Director will notify the Poca Agua Golf Club and Turfgrass Nursery by telephone with a follow-up letter or fax.

The City of Poca Agua may decide not to order the termination of a drought response stage or water emergency even though the conditions for termination of the stage are met. Factors that could influence such a decision include, but are not limited to, the time of the year, weather conditions, or the anticipation of potential changed conditions that warrant the continuation of the drought stage.

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*[If you are not subject to a municipal drought contingency plan, include in this section a description of who is authorized to terminate drought response stages or water emergencies.]*

#### **14.6 Procedures for Determining the Allocation of Irrigation Supplies to Individual Users**

The Poca Agua Golf Club and Turfgrass Nursery does not supply water to other water users.

*[If you supply irrigation supplies to other users, include in this section a description of the procedure for allocating supplies during drought response stages or water emergencies.]*

#### **14.7 Drought and Emergency Response Stages**

Upon the implementation of a drought response stage or water emergency, the City of Poca Agua will determine whether to curtail water supply to the Poca Agua Golf Club and Turfgrass Nursery based on the severity of the drought or water emergency and according to the Drought Contingency Plan for the City of Poca Agua. A curtailed allocation would depend on the severity of the drought and/or emergency stage. The following sections of this plan describe the planned response of the Poca Agua Golf Club and Turfgrass Nursery to drought and/or emergency stages as declared by the City of Poca Agua.

*[In this example, the irrigator is subject to a municipal drought contingency plan. If you are not subject to a municipal drought contingency plan, please describe what conditions trigger each of the drought response or water emergency stages below and what conditions allow termination of each drought response or water emergency stage.]*

*The following are examples of other potential triggering criteria that may be used in one or more successive stages of a drought contingency plan. Select one or more of these if appropriate to your system, or devise additional triggering criteria tailored to your system<sup>2</sup>:*

- 1. Annually, beginning on May 1 through September 30.*
- 2. When the water supply available to the City of Poca Agua is equal to or less than \_\_\_\_ (acre-feet, percentage of storage, etc.).*
- 3. When, pursuant to requirements specified in the (name of water supplier) wholesale water purchase contract with (name of wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.*
- 4. When flows in the (name of stream or river) are equal to or less than \_\_\_\_ cubic feet per second.*

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5. *When the static water level in the (name of water supplier) well(s) is equal to or less than \_\_\_ feet above mean sea level.*
  6. *When the specific capacity of the (name of water supplier) well(s) is equal to or less than \_\_\_ percent of the well's original specific capacity.*
  7. *When total daily water demand equals or exceeds \_\_\_ million gallons for \_\_\_ consecutive days or \_\_\_ million gallons on a single day (e.g., based on the "safe" operating capacity of water supply facilities).*
  8. *Continually falling treated water reservoir levels which do not refill above \_\_\_ percent overnight (e.g., based on an evaluation of minimum treated water storage required to avoid system outage).]*

#### **14.7.2 Stage 1, Mild**

According to the City of Poca Agua Drought Contingency Plan, the stated goal for Stage 1 conditions is to reduce water usage by \_\_\_ percent from normal levels, and the emphasis is on public education, voluntary irrigation scheduling, and reducing non-essential water usage.

In Stage 1, the Poca Agua Golf Club and Turfgrass Nursery will voluntarily limit irrigation water usage to the hours of 6 AM to 10 AM and 8 PM to midnight. In addition, watering times for fairway areas will be reduced by \_\_\_ percent.

#### **14.7.3 Stage 2, Moderate**

According to the City of Poca Agua Drought Contingency Plan, the stated goal for Stage 2 conditions is to reduce water usage by \_\_\_ percent from normal levels, and the emphasis is on additional public education and halting non-essential water usage.

In Stage 2, the Poca Agua Golf Club and Turfgrass Nursery will voluntarily limit irrigation water usage to the hours of 6 AM to 10 AM and 8 PM to midnight. Watering times for fairway areas will be reduced to \_\_\_ percent of normal watering times, and watering of rough areas will be discontinued. Greens, tee boxes, and turfgrass growing areas will receive normal water amounts.

#### **14.7.4 Stage 3, Severe**

According to the City of Poca Agua Drought Contingency Plan, the stated goal for Stage 3 conditions is to reduce water usage by \_\_\_ percent from normal levels, and the emphasis is on alternative water supply strategies and mandatory water use restrictions and schedules.

In Stage 3, the Poca Agua Golf Club and Turfgrass Nursery will obtain \_\_\_ percent of its irrigation water from the three on-site wells. Irrigation will be limited to the hours of 6 AM to 10 AM and 8 PM to midnight. In addition, watering times for fairway areas will be reduced to \_\_\_ percent of normal watering times (watering of rough areas will still be discontinued). Greens, tee boxes, and turfgrass growing areas will receive normal water amounts.

#### **14.7.5 Stage 4, Emergency**

According to the City of Poca Agua Drought Contingency Plan, the stated goal for Stage 4 conditions is to reduce water usage by \_\_\_ percent from normal levels, and the emphasis is on alternative water supply strategies and mandatory water use prohibitions.

In Stage 4, the Poca Agua Golf Club and Turfgrass Nursery will obtain \_\_\_ percent of its irrigation water from the three on-site wells. Irrigation will be limited to the hours of 6 AM to 10 AM and 8 PM to midnight. In addition, watering times for fairway areas will be reduced to \_\_\_ percent of normal watering times (watering of rough areas will still be discontinued). Greens, tee boxes, and turfgrass growing areas will receive normal water amounts.

#### **14.8 Procedures for Use Accounting**

As discussed in Section 5, metered flows are logged daily, checked for indications of potential leaks, and reported to the City of Poca Agua on a monthly basis. Upon the initiation of a drought or emergency response stage, the Poca Agua Golf Club and Turfgrass Nursery will report withdrawals from Poca Agua Reservoir on a more frequent basis if requested by the City. This reporting will verify that the allocations provided by the initiation of a drought or emergency response stage are being satisfied.

#### **14.9 Procedures for the Transfer of Water Allocations Among Individual Users**

The Poca Agua Golf Club and Turfgrass Nursery will not transfer any water allocations to individual users.

#### **14.10 Procedures for Enforcement of Water Allocation Policies**

This section is not applicable, because the Poca Agua Golf Club and Turfgrass Nursery does not allocate water to other users.

**14.11 Consultation with Wholesale Supplier**

A draft of this plan was sent to Utility Director of the City of Poca Agua for review and comment, and a copy of the final plan will also be provided to the Utility Director.

Upon initiation of a drought or emergency response state, the Poca Agua Golf Club and Turfgrass Nursery will be in direct communication with the Utility Director for the City of Poca Agua or his/her designee.

**14.12 Protection of Public Water Supplies**

All of the drought contingency measures discussed prior to this section are intended to protect the public water supply in Poca Agua Reservoir. No additional measures are contemplated.

**14.13 Review and Update of Drought Contingency Plan**

The Poca Agua Golf Club and Turfgrass Nursery will update this drought contingency plan every five years, beginning in \_\_\_\_ [*five years from date of plan*]. The plan will be updated as appropriate based on new information.

As the plans are reviewed and subsequently updated, a copy of the revised Drought Contingency Plan will be submitted to the Region C Water Planning Group for their records.

**REGION C WATER  
PLANNING GROUP**

**MODEL WATER  
CONSERVATION PLAN  
FOR STEAM ELECTRIC  
POWER GENERATORS**

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**FEBRUARY 2010**

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**REGION C WATER  
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## **ACKNOWLEDGEMENTS**

This model water conservation plan for the fictional Poca Agua Steam Electric Power Station was prepared by Alan Plummer Associates, Freese and Nichols, and CP&Y for the Region C Water Planning Group. It is a template for steam electric power generators to use as they develop their own water conservation plans. Each steam electric power generator should customize the details to match their unique situation. The model plan was prepared pursuant to Texas Commission on Environmental Quality rules. The rules do not require a drought contingency plan for steam electric power generators.

Questions regarding this model water conservation plan should be addressed to the following:

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**POCA AGUA STEAM  
ELECTRIC POWER  
STATION**

**WATER CONSERVATION  
PLAN**

**FEBRUARY 2010**

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# **Poca Agua Steam Electric Power Station Water Conservation Plan**

**February 2010**

## **1. INTRODUCTION AND OBJECTIVES**

Water supply has always been a key issue in the development of Texas. In recent years, the increasing population and economic development in Region C have led to growing demands for water supplies. At the same time, local and less expensive sources of water supply are largely developed. Additional supplies to meet higher demands will be expensive and difficult to develop. It is therefore important that we make efficient use of our existing supplies and make them last as long as possible. This will delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed rules governing the development of water conservation plans for industrial and mining water use (Appendix B). The Poca Agua Steam Electric Power Station has adopted this water conservation plan pursuant to TCEQ rules.

The plan lists the TCEQ rules; describes the power generation process at the Poca Agua Steam Electric Power Station and associated water uses; sets a water conservation goal; describes water measurement devices and methods; discusses leak detection, repair, and water loss accounting; and reports existing and future water use efficiency practices.

## 2. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

The TCEQ rules governing development of water conservation plans for industrial or mining use are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.3 of the Texas Administrative Code (TAC), which is included in Appendix B.

A water conservation plan is defined as “a strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s)<sup>1</sup>.” The minimum requirements for water conservation plans for industrial or mining use are as follows:

<b>TAC Reference</b>	<b>Subject</b>	<b>Plan Location</b>
30 TAC §288.3(a)(1)	Production Process	Section 3, Appendix C
30 TAC §288.3(a)(3)	Water Conservation Goals	Section 4
30 TAC §288.3(a)(4)	Accurate Metering	Section 5
30 TAC §288.3(a)(5)	Leak Detection, Repair, and Water Loss Accounting	Section 6
30 TAC §288.3(a)(6)	Water Use Efficiency Process and/or Equipment Upgrades	Section 7
30 TAC §288.3(a)(7)	Other Conservation Practices	Section 8
30 TAC §288.3(b)	Review and Update of Plan	Section 9

*[TCEQ rules do not require a drought contingency plan for industrial or mining water users.]*

<sup>1</sup> Superscripted numbers match references listed in Appendix A.

### 3. DESCRIPTION OF THE WATER USES IN THE ELECTRIC GENERATION PROCESS

*[This section must include a description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal. If your facility uses other cooling methods, such as once-through cooling or dry-type cooling, please amend the process description below. Also modify the water sources and water uses to match those at your facility.]*

The Poca Agua Steam Electric Power Station is a natural gas-fired electric generating facility located at 4220 Poca Agua Road in the City of Poca Agua, Texas, on the south shore of Poca Agua Reservoir. The facility consists of one natural gas-fired, 300 megawatt (MW) steam electric generating unit that has been in service since 1972.

Water used for cooling and industrial uses is supplied with surface water from Poca Agua Reservoir, a man-made reservoir that was constructed in part to meet water demands from the generating facility. This water is used for cooling, boiler feed, fire protection, and service water. A water use diagram for the Poca Agua Steam Electric Power Station is presented in Appendix C.

Cooling water is pumped from Poca Agua Reservoir through the condensers and returned to the reservoir (a “once-through” cooling process). Service water is taken from the cooling water and used for boiler feed and miscellaneous purposes. Service water is treated using a reverse osmosis/demineralization process to create a high-purity boiler feed water. Reverse osmosis reject water and boiler blowdown are monitored and treated as necessary before being returned to the reservoir along with the cooling water.

Miscellaneous non-potable water uses include equipment washdown and fire protection. The amount of miscellaneous surface water use is estimated by multiplying the capacity of the service water pumps by their run times. Average flowrates under normal operating conditions are shown on the water use diagram in Appendix C.

Stormwater from the facility is collected and routed through oil-water separators, monitored, and discharged to the reservoir.

Potable water for domestic purposes is supplied by the City of Poca Agua. Wastewater treatment is provided by an on-site septic system.

The largest consumptive water use at the Poca Agua Steam Electric Power Station is forced evaporation from the once-through cooling process. The forced evaporation is estimated to be

0.35 gallons per kilowatt-hour (kWh) of generation<sup>2</sup>. The exact amount varies from year to year depending on the amount of power generated at the facility and climatic conditions. Assuming a 50 percent load factor, approximately 1,411 acre-feet per year (ac-ft/yr) of cooling makeup water is required.

Miscellaneous uses consume approximately 7 ac-ft/yr, and domestic uses consume an average of approximately 2 ac-ft/yr. Because water is used for fire protection on a very infrequent, as-needed basis, no average annual quantity has been estimated.

**4. SPECIFICATION OF WATER CONSERVATION GOALS**

*[This section must include specification of 5-year and 10-year water conservation goals and the basis for development of such goals. Please amend the water conservation goals, basis, and time frame to match those at your facility. Examples of methods that could be used to conserve water include switching to a higher quality source water for cooling tower makeup water, using advanced treatment processes to allow more cycling of process water and to reduce water waste, switching to reclaimed water as a source for most uses, water wise landscaping, retrofit of domestic plumbing fixtures with water-efficient fixtures, and employee education<sup>3,4</sup>.]*

The Poca Agua Steam Electric Power Station has set a five-year water conservation goal of reducing total water usage by \_\_\_ percent (from 1,411 ac-ft/yr to \_\_\_ ac-ft/yr assuming a 50 percent load factor) by \_\_\_\_ *[five years from date of plan]*. The ten-year goal is the same as the five-year goal. This will be achieved by \_\_\_\_\_ *[insert proposed water conservation methods]*.



**5. ACCURATE METERING TO MEASURE AND ACCOUNT FOR WATER**

*[This section must include a description of the device(s) and/or method(s) within an accuracy of plus or minus five percent to be used to measure and account for the amount of water diverted from the source of supply. Please amend the metering description to match those at your facility.]*

The Poca Agua Steam Electric Power Station estimates water usage by multiplying pump run times and pump capacity (from manufacturers' pump curves). This is the best available technology for measuring cooling water flows that can reach 360 million gallons per day when the plant is operating at full capacity. Daily cooling water flows are reported to the Texas Commission on Environmental Quality (TCEQ).

Domestic water supply obtained from the City of Poca Agua is metered by the City. The meter is calibrated according to the City's schedule and specifications.

## **6. LEAK DETECTION, REPAIR, AND WATER LOSS ACCOUNTING**

*[This section must include a description of leak-detection, repair, and water loss accounting in the water distribution system. Please amend the description below to match operations at your facility.]*

At the Poca Agua Steam Electric Power Station, leaks are identified through the following methods:

- Plant personnel routinely observe, operate, and maintain facilities throughout the day. Inspection of aboveground piping and pump packing is a normal part of employee duties.
- Plant personnel collect water samples from various points in the process and have them analyzed for key water quality parameters. Water quality problems can be indicative of water leaks.
- Operators monitor the water level in various ponds and sumps. A large change in water level can also signify a water leak.

If a water leak is indicated by any of the above means, the source of the leak is investigated and a work order for repairs is issued as necessary.

## 7. WATER USE EFFICIENCY PROCESS AND/OR EQUIPMENT UPGRADES

*[This section must include a description of equipment and/or process modifications to improve water use efficiency. Please amend the description below to match operations at your facility.]*

Several water conservation methods are already in use at the Poca Agua Steam Electric Power Station, including the following:

- Cooling water is pumped from Poca Agua Reservoir through the condensers and returned to the reservoir (once-through cooling). Much of the cooling water returned to the reservoir is eventually drawn into the cooling water intake and reused for cooling purposes.
- Water/steam is circulated through the boiler process multiple times to reduce water usage.
- Chemical dosages and concentrations are closely monitored to allow maximum cycling of boiler water/steam without scaling or corrosion.
- Reverse osmosis treatment equipment has been placed ahead of the demineralizer in the boiler feed treatment process to increase the run time of the demineralizer between regeneration events. This has extended the run time of the demineralizer by a factor of ten and has resulted in 90 percent less water wasted from the regeneration process.
- Boiler wash water is recycled.
- Stormwater, floor/equipment drainage, and miscellaneous low-volume wastes are passed through oil-water separators and discharged back to the reservoir under an existing Texas Pollutant Discharge Elimination System (TPDES) permit. Much of this water is eventually drawn into the cooling water intake and reused for cooling purposes.
- Landscape areas around the generating station are not irrigated.

**8. OTHER CONSERVATION PRACTICES, METHODS, OR TECHNIQUES**

*[This section must include any other water conservation practice, method, or technique that the user shows to be appropriate for achieving the stated goal(s) of the water conservation plan. Please amend the description below to match operations at your facility.]*

No other water conservation methods are necessary to achieve the water conservation goals for the Poca Agua Steam Electric Power Station.

**9. IMPLEMENTATION OF THE WATER CONSERVATION PLAN**

Appendix D contains a copy of the resolution of the Board of Directors of the Poca Agua Power Company adopting this water conservation plan. The resolution designates responsible officials to implement and enforce the water conservation plan.

Appendix E contains a copy of a letter to the chairman of the Region C Water Planning Group to inform the planning group of this water conservation plan.

This plan will be reviewed and updated every five years.