

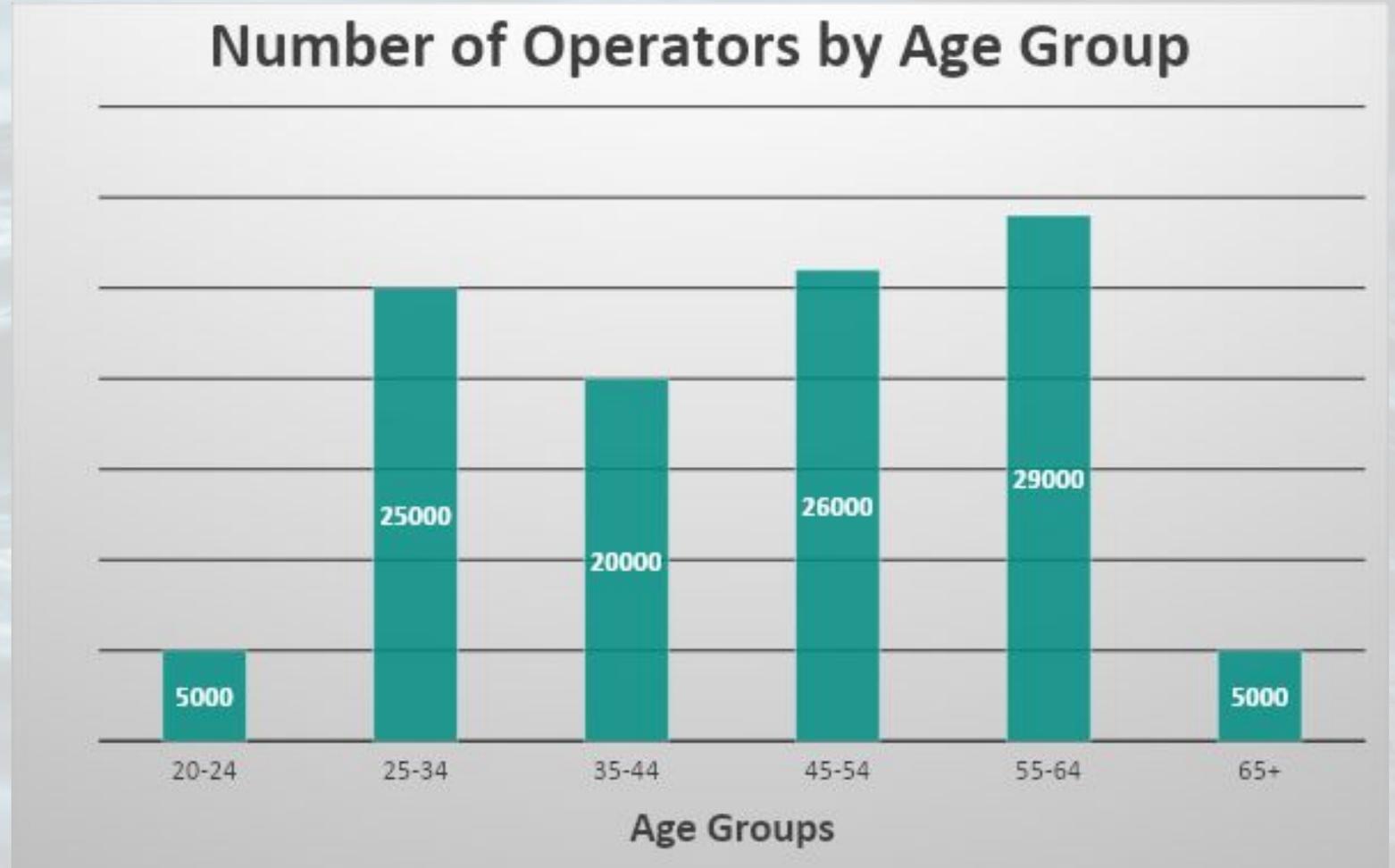
TCEQ:

Advancing your operator training with
customized curriculum



National Operator Statistics

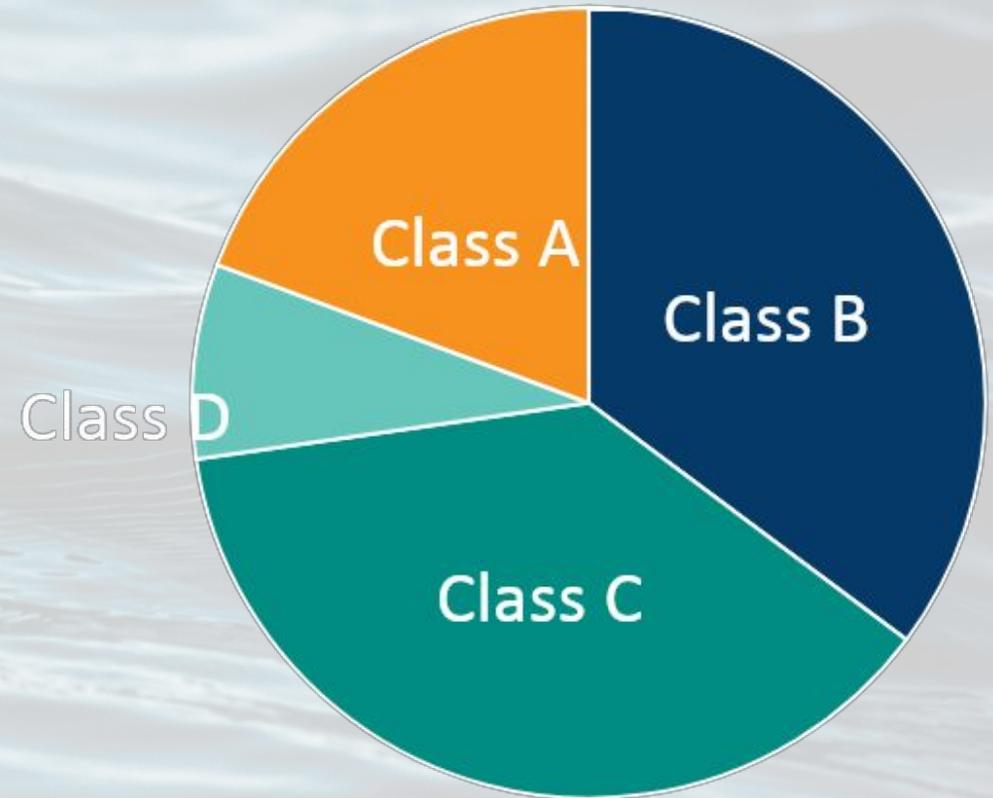
- 110,000 Employed Water and Wastewater Operators in 2021
- Projected Growth Need is ~10,800 Openings a year
- Projected rate of growth per year is -7%



Source: Bureau of Labor Statistics 2021

SAWS Operator Background

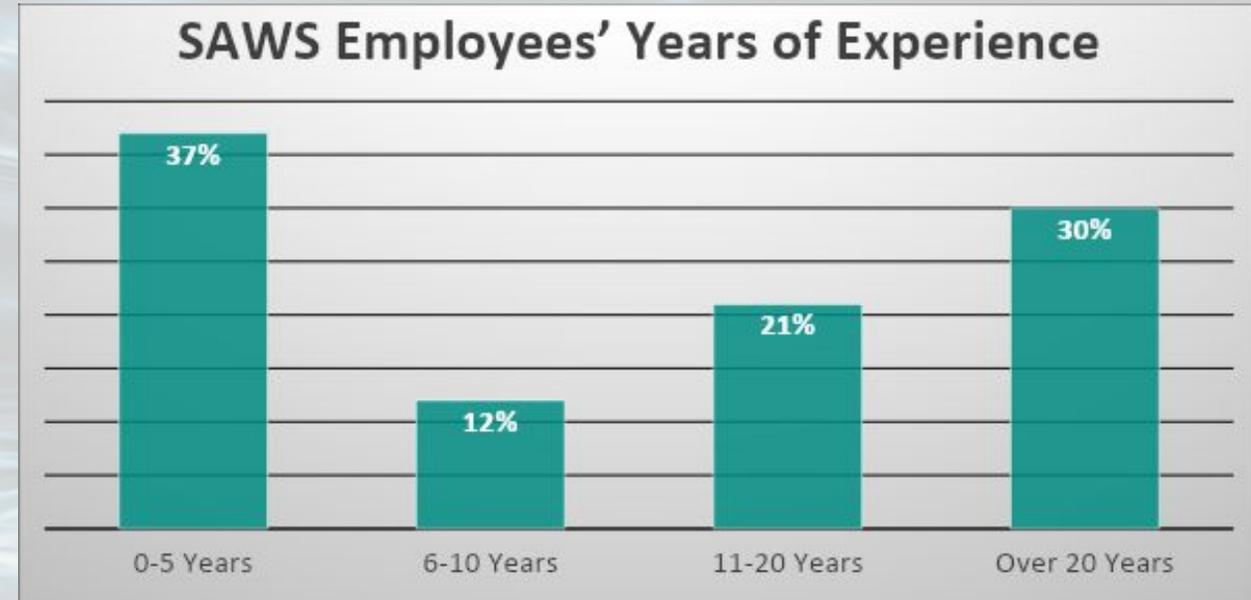
- SAWS Wastewater Class Employees *
- Class A- 17 Employees
- Class B- 31 Employees
- Class C- 33 Employees
- Class D- 7 Employees
- Average age of Class A WW License is 54
- Eligible Employees for Retirement-30



* Production and Treatment Operations

Vision of Knowledge Transfer

- SAWS Employees' Years of Experience has Foreseeable Gaps
- 30%+ of SAWS Licensed Operators are retirement eligible which could leave SAWS with a steep learning curve for the less experienced employees
- Knowledge of the plant's history, process and mechanical knowledge, etc. could be lost relatively soon.



TCEQ Operator License Eligibility

Operator License Classification	Minimal Requirements (Hours)	Testing for Licenses
Class A Wastewater Operator	<ul style="list-style-type: none"> • 5 Required Courses (100) + 1 Elective (20)* <i>Must have a total of 160 hours of TCEQ Approved Training for Wastewater*</i> • 8-Years of Work Experience 	<ul style="list-style-type: none"> • Application Fee \$111 • Test Location: Austin Region or any TWUA Regional School (Except for Fort Worth Stockton)
Class B Wastewater Operator	<ul style="list-style-type: none"> • 4 Required Courses (80) + 1 Elective (20) • 5-Years of Work Experience 	<ul style="list-style-type: none"> • Application Fee \$111 • Online Base Test at Acceptable Location
Class C Wastewater Operator	<ul style="list-style-type: none"> • 2 Required Courses (40) + 1 Elective (20) • 1-year of Work Experience 	<ul style="list-style-type: none"> • Application Fee \$111 • Online Base Test at Acceptable Location
Class D Wastewater Operator	<ul style="list-style-type: none"> • 1 Required Course (20) • No Work Experience Required 	<ul style="list-style-type: none"> • Application Fee \$111 • Online Base Test at Acceptable Location

TCEQ Operator Experience Substitutes

- Operators are Permitted to Substitute Experience with...
 - Extra TCEQ CE Credits
 - College Credit
 - Must received degree
 - Major Must be in Chemistry, Biology, or a similar discipline

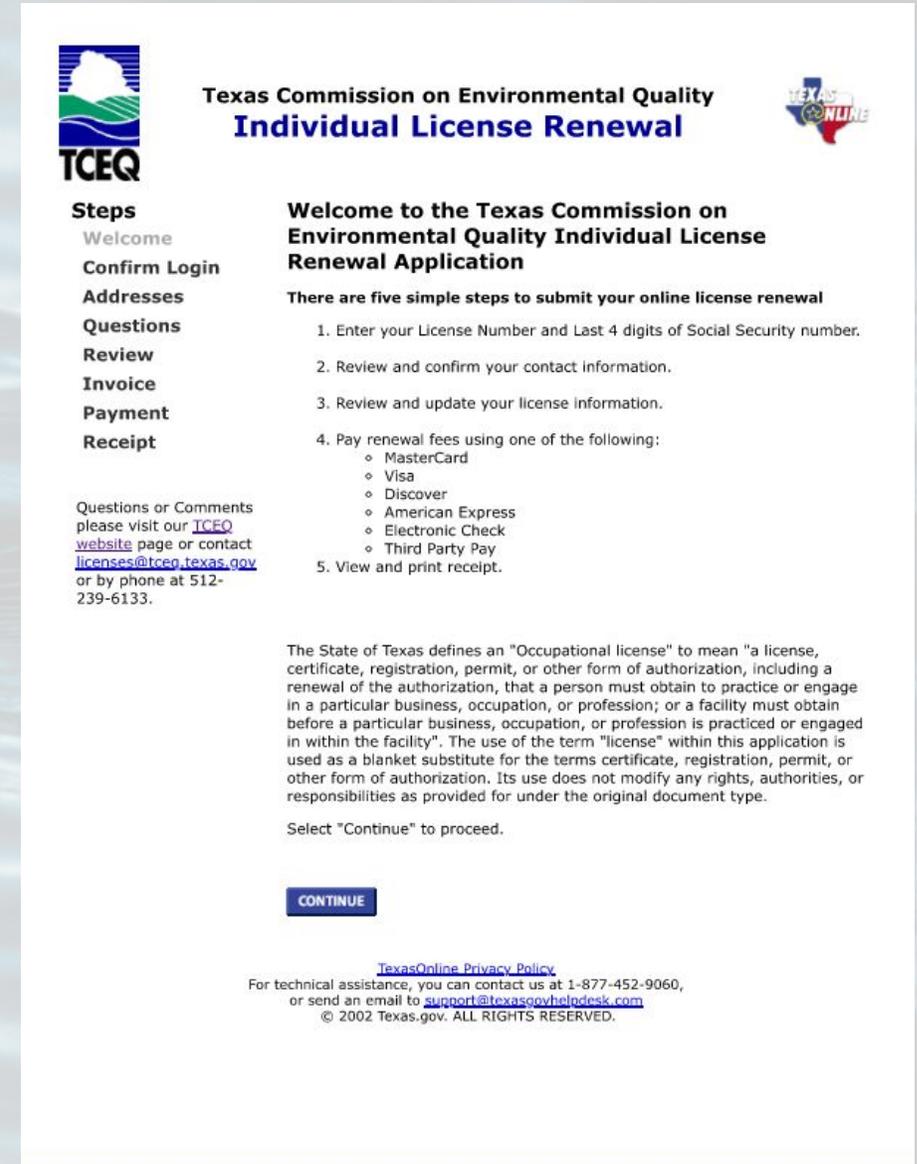
CE/College Credit Experience Substitute

- 40Hours of TCEQ CE Credits = 1 Year of Experience.
- 20Hours of TCEQ CE Credits = ½ Year of Experience.
- 32Hours of College Credit = 1 Year of Experience.
- 16Hours of College Credit = ½ Year of Experience.

Operator License Classification	Maximum Experience Substitute
Class A Wastewater	TCEQ CE Credit: 3 Years College Credit: 4 Years
Class B Wastewater	TCEQ CE Credit: 2 Years College Credit: 2.5 Years
Class C Wastewater	TCEQ CE Credit: 1 Year College Credit: 1 Year

TCEQ Operator Renewal License Requirements

- All Wastewater Licenses are valid for 3 years
- Class D Wastewater Licenses are not renewable (In most Cases)
- 30 CE Credits are required for renewal
- License cannot be renewed...
 - 90 Days Prior to Expiration
 - 30 Days After Expiration



The screenshot shows the Texas Commission on Environmental Quality (TCEQ) Individual License Renewal application page. The page features the TCEQ logo on the left and the Texas state logo on the right. The main heading is "Texas Commission on Environmental Quality Individual License Renewal". Below this, there is a "Steps" menu with options: Welcome, Confirm Login, Addresses, Questions, Review, Invoice, Payment, and Receipt. The "Welcome" step is selected, and the page displays a "Welcome to the Texas Commission on Environmental Quality Individual License Renewal Application" message. This message includes five simple steps to submit the online license renewal: 1. Enter your License Number and Last 4 digits of Social Security number. 2. Review and confirm your contact information. 3. Review and update your license information. 4. Pay renewal fees using one of the following: MasterCard, Visa, Discover, American Express, Electronic Check, or Third Party Pay. 5. View and print receipt. Below the steps, there is a definition of an "Occupational license" and a "CONTINUE" button. At the bottom, there is a "TexasOnline Privacy Policy" link and contact information for technical assistance, including a phone number (1-877-452-9060) and an email address (support@texasgovhelpdesk.com). The page is copyrighted by Texas.gov in 2002.

TCEQ

**Texas Commission on Environmental Quality
Individual License Renewal**

Steps
Welcome
Confirm Login
Addresses
Questions
Review
Invoice
Payment
Receipt

Questions or Comments
please visit our [TCEQ
website](#) page or contact
licenses@tceq.texas.gov
or by phone at 512-
239-6133.

**Welcome to the Texas Commission on
Environmental Quality Individual License
Renewal Application**

There are five simple steps to submit your online license renewal

1. Enter your License Number and Last 4 digits of Social Security number.
2. Review and confirm your contact information.
3. Review and update your license information.
4. Pay renewal fees using one of the following:
 - MasterCard
 - Visa
 - Discover
 - American Express
 - Electronic Check
 - Third Party Pay
5. View and print receipt.

The State of Texas defines an "Occupational license" to mean "a license, certificate, registration, permit, or other form of authorization, including a renewal of the authorization, that a person must obtain to practice or engage in a particular business, occupation, or profession; or a facility must obtain before a particular business, occupation, or profession is practiced or engaged in within the facility". The use of the term "license" within this application is used as a blanket substitute for the terms certificate, registration, permit, or other form of authorization. Its use does not modify any rights, authorities, or responsibilities as provided for under the original document type.

Select "Continue" to proceed.

CONTINUE

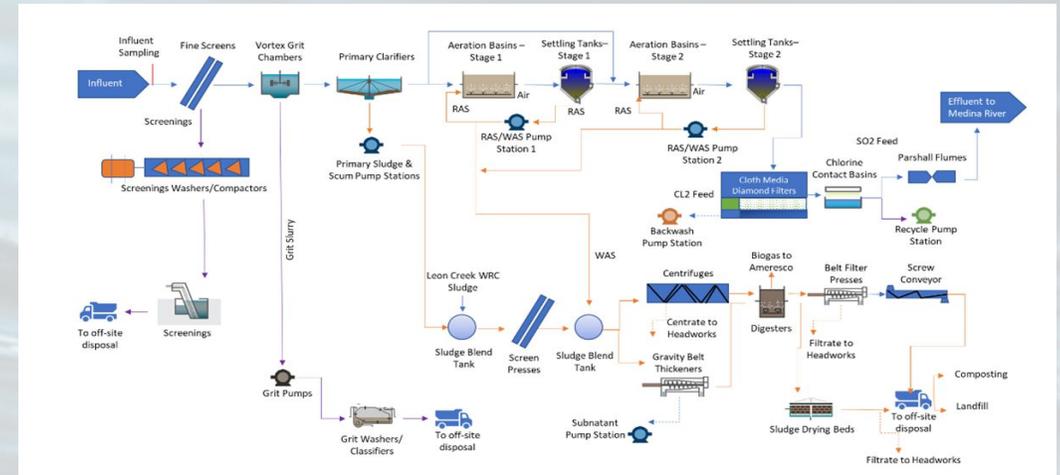
[TexasOnline Privacy Policy](#)
For technical assistance, you can contact us at 1-877-452-9060,
or send an email to support@texasgovhelpdesk.com
© 2002 Texas.gov. ALL RIGHTS RESERVED.

Available Resources

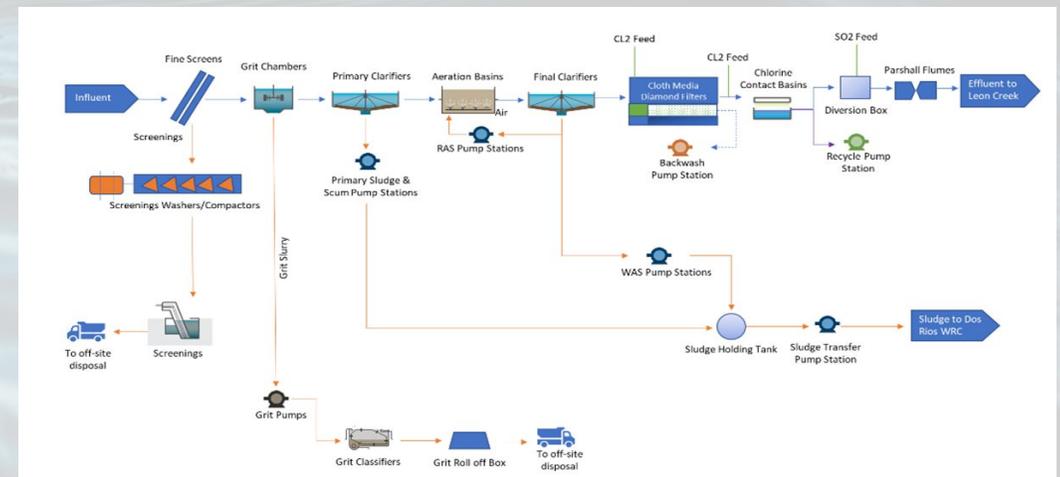
- Organizations
 - TCEQ
 - WEAT
 - TEEEX
 - TRWA
 - TWUA
- Various College Campuses
 - University of Texas at Arlington
 - Tarrant County College
- Online Courses
- Neighboring Utilities



- Tailored Training to SAWS Operations
 - Bridges the Gap for Knowledge Transfer
 - Provides Team Building Opportunities
 - Provides CE Renewal Credits for Operator Licenses
 - Provides Specific Equipment, Treatment, and Safety to SAWS Operators



STEVEN M. CLOUSE WATER RECYCLING CENTER



LEON CREEK WATER RECYCLING CENTER

TCEQ Approval Process

- Application Must Comply with General Standards, Requirements, and Delivery Standards
- Provide TCEQ with the following:
 - Course Overview and Goals
 - Course Agenda
 - Prerequisite Statement
 - Learning Objectives
 - Instructional Plan
 - Instruction Material
 - Training Manuals
 - Proposed Instructor's & Expert's Resume
 - Technical-Writing Expert
 - Fee

RG-373

Approval of Training for Occupational Licensing

- using current TCEQ-qualified instructors from the industry.

Contact the TCEQ to discuss this option, or for additional options to meet the TCEQ training and initial licensing requirements.

Checklist 1: Classroom Training

When submitting classroom training for review and approval, you must address the first checklist item, pay the fee, complete an application (Form TCEQ-10152) and submit it together with the supplemental information and materials as listed in this checklist.

- **Ensure the application complies with General Standards and Requirements and classroom training's delivery standards:**
 - Make additions or other changes to your training materials, procedures, or instructor(s) to ensure they meet all the delivery standards for classroom training and all [General Standards and Requirements](#).
- **Course Overview and Goals**—a statement of what the learning experience is designed to accomplish, its length in hours, the setting, the manner of instruction, and testing (if any).
- **Course Agenda**—for the students' use: a description of the time periods devoted to each major portion of the course, showing all breaks and scheduled events.
- **Prerequisite Statement**—a description of the skills and knowledge, or other required training (if any) needed for students taking the course.
- **Learning Objectives**—a description of the knowledge and skills the student should have after the training. Each chapter or section of the course manual should have at least three learning objectives.
- **Instructional Plan or Lesson Plan**—for the instructor's use: a description of the learning objectives and the means by which those objectives are attained as a result of the activities in the class. The plan shows the orderly sequence for each day's activities and should correspond to the agenda. It should revolve around a four-step teaching process, or similar process, that involves:
 - **preparation and interactivity** (motivation of the learner),
 - **presentation** (relate new information to previously acquired knowledge using various methods for different learning styles),
 - **application** (practice), and
 - **testing or checking** for understanding (evaluation of learning).
- **Instructional Materials**—the equipment and other materials to be used during course presentation, such as paper copies of slides, overhead projections, or handouts and identification of videos. Electronic slide presentations, such as PowerPoint presentations, should be submitted on a CD or on paper with multiple slides per page. The lesson plan should reflect specifically when and where the materials are used.
- **Training Manuals**—Textual or other published materials used as the primary instructional reference during the course. The use of manuals or publications already approved is acceptable so long as they are purchased or copied only with permission of the copyright holder.

SAWS Training Classes

- 3 Courses
 - Liquids Treatment
 - Solids Treatment
 - Disinfection
- CP&Y Provided...
 - Hard Copies of Sides
 - Electronic Copies of Training Material
 - Electronic Recording of Training Sessions
 - SAWS WW Training Program Material that was Approved by TCEQ
- TCEQ Approved Trainers
 - Dawn Anderson, PE, Class A Operator
 - Felipe Gutierrez, PE, PhD



- 2 Days– 8 Hour Courses and 1 Day- 4 Hours Course (20 Hours)
- SAWS System Overview, Collection System, and Discharge Permits (Day 1)
- Wastewater Characterization (Day 1)
- Preliminary Treatment (Day 1)
- Primary Treatment (Day 1)
- Secondary Treatment (Day 1 and 2)
- Filtration and Disinfection (Day 3)

» Discharge Permits

	Leon Creek WRC	SM Clouse WRC	Medio Creek WRC
Total Suspended Solids			
Daily Average Concentration (mg/L)	15	12	15
Daily Average Loading (lbs/day)	5,755	12,510	2,002
7-day Average (mg/L)	25	20	20
Daily Maximum (mg/L)	40	40	30
Single Grab (mg/L)	60	60	40

SAWS SCREENS

Medio Creek WRC



Plant 1 – Headworks Screens



Plant 2 – Headworks Screens

- 2 Days– 8 Hour Courses (16 Hours)
- Introduction to Solids Handling (Day 1)
- Solids Conditioning (Day 1)
- Thickening (Day 1)
- Digestion (Day 2)
- Dewatering (Day 2)
- Sidestream Treatment (Day 2)

SAWS SOLIDS MANAGEMENT PROCESSES

>> Anaerobic Digesters

- Type: Mesophilic – 92 °F (33 °C)
- Diameter: 110 ft.
- SWD: 30 ft.
- Capacity: 2.2 MG
- # Tanks: 9



TROUBLESHOOTING

>> Troubleshooting

- Process upsets can have several different root causes. Upset symptoms, on the other hand, are nearly universal once an upset has begun.
- The first indicator of a process upset is almost always an increase in the digester volatile acids concentration, an increase in the VA/ALK.
- This may or may not be accompanied by a decrease in methane production.

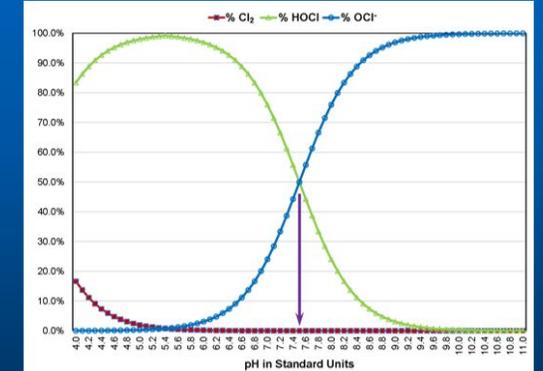
Process Upset Indicators	Possible Causes
● Decrease in gas production	Loading
● Decrease in percent CO ₂	
● Rise in VA concentration	Heating
● Rise in VA/ALK ratio	Mixing
● Decreasing pH	
● Decreasing VS reduction	Gas System
● High solids in supernatant	Toxicity
● Poor digested sludge quality	

- 1 Day– 8 Hour Course
- Purpose and Function
- Indicator Organisms
- Chlorine Disinfection
 - Theory of Operation
 - Equipment and O&M
 - Process Variables and Controls
 - Troubleshooting
 - Safety
- UV Disinfection
 - Theory of Operation
 - Equipment and O&M
 - Process Variables and Controls
 - Troubleshooting
 - Safety
- Data Collection, Sampling, and Analysis

THEORY OF OPERATION

» Effect of pH

- Equilibrium between hypochlorous acid (HOCl) and hypochlorite ion (OCl⁻) is strongly pH dependent.
- Hypochlorous acid is a more effective disinfectant than hypochlorite ion, so disinfection takes less time at low pH.



Calculated from equations and constants in Morris, J. (1966) The Acid Ionization Constant of HOCl from 5 °C to 35 °C. J. Phys. Chem., 70 (12), 3798–3806. Reprinted with permission by Indigo Water Group

EQUIPMENT

» UV Systems

- UV lamps are submerged directly into passing wastewater.
- Lamps must be completely submerged when operating.
- Lamps may be oriented vertically, horizontally, or at an angle relative to flow.
- Lamps may be placed parallel to flow or across the flow path.



Courtesy of TrojanUV

SAWS Operators' Secondary Benefits

- Course satisfied annual renewal training requirements for licenses
- Training discussions were tailored to SAWS plant's system
- Achieved multiple goals including
 - Knowledge Transfer
 - Operational Troubleshooting
 - Team Building



Summary



Demand is outweighing the increase in experienced operators



SAWS is experiencing a knowledge gap due to operators retiring



Provides SAWS with the benefit of receiving required training while teaching to their own systems



Developed a TCEQ approved course that tailored the knowledge transfer needs for SAWS



Aspiration is to use this as a basis for Advanced Operator Training across the State



an STV Company