



# READY. RELIABLE. RESILIENT.

2013 ANNUAL REPORT



A TEXAS MEDICAL CENTER INSTITUTION



**Paul G. Bell, Jr.**  
Chairman, TECO Board of Directors  
Representative, Texas Medical Center



**Donald DeWalch**  
Vice Chairman, TECO Board of Directors  
Representative, Texas Children's Hospital



**Kevin Dillon**  
Senior Executive Vice President  
Chief Operating and Financial Officer  
The University of Texas Health Science Center at Houston



**Marshall B. Heins**  
Chief Facility Services Officer  
Memorial Hermann Healthcare System



**Harold Johnson**  
Associate Vice President of  
Facilities Management and Construction/Risk Manager  
Texas Woman's University



**Spencer Moore**  
Vice President Operations and Facilities Management  
The University of Texas MD Anderson Cancer Center



**Barry Nelson, Ph.D.**  
Vice President Finance and Administration  
The Texas A&M University System  
Health Science Center



**Bruce Phillips**  
Partner, PinPoint Commercial, LP  
Representative, CHI St. Luke's Health

**David Dixon**  
Executive Director of Program Management  
Office of Facilities Planning and Construction  
The University of Texas System

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Texas Woman's University

**Peter Dawson**  
Texas Children's Hospital

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**Bradley N. Howell**  
Texas Medical Center

**Richard McDermott**  
The University of Texas  
Health Science Center at Houston

**Dwain Morris**  
The University of Texas  
MD Anderson Cancer Center

**Stewart Scott**  
CHI St. Luke's Health

PRESIDENT AND CEO



**Stephen K. Swinson, PE**  
President and Chief Executive Officer

READY. RELIABLE. RESILIENT.  
**THE TECO TEAM**

“Anyone can purchase equipment and build a plant and distribution system. But to operate such a system without disruption of service year in and year out takes a very special group of people with intense focus. We have that group of people here at TECO.”

E. Bruce Turner, PE, CPE, Vice President, Engineering

Key Business Partners

- Burns & McDonnell
- CenterPoint Energy
- ChemTreat Inc.
- DaCott Energy Resources Ltd.
- Frost Bank
- GE Aeroderivative Gas Turbines
- JCI/York
- Lockton Companies
- Stanley Consultants
- Tellepsen
- Toshiba International Corporation
- Twin Eagle Resource Management LLC

- Marsha Ackman
- Henry Barrios
- Rohnald Benfield
- Brandon Brewster
- Clarissa Brewster
- Julian Brewster
- Patrick Brown
- Tim Brown
- Keith Bryant
- Javier Castillo
- John Clark
- Jim Daniel, Jr.
- Charles Darden
- Ruth Davis
- Steve Del Toro
- Ryan Doucet
- Chad Elliott
- Kerry Fischer
- Brett Forward
- Dennis Foster
- Manuel Gamez
- Jose Garcia
- Joseph Garcia
- Kevin Giblin
- Ram Goonie
- Todd Gryseels
- Manny Guerra
- Daryle Hall
- Mike Handorf
- Jess Harper

- Ronald Hendershott
- Troy Hollin
- Steve Hyde
- Linda Irby
- Juan Jimenez
- Brandon Johnson
- Brady Jones
- Denise Karstedt
- Austin Kelly
- William Key II
- Zhanna Kogan
- Nolan Lambert
- Roger Lambert
- Stephen Lehr
- Antonio Lopez
- A.C. Lynch
- Jared Marish
- Joel McCormick
- Lamont McInnis
- Charles Michalak
- Curtis Miller
- Dan Mitten
- Rossi Morris
- Frederick Musil
- Philip Muzar, Jr.
- Stephen Nagy
- Keith Nielsen
- Larry Null
- Aurelio Ortiz
- Walter Pascua

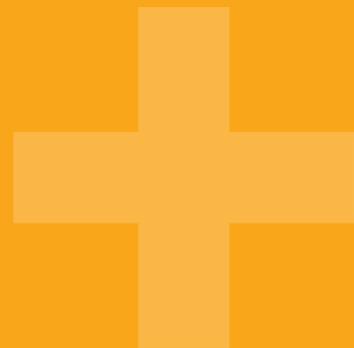
- Thomas Penzi III
- Shelly Pesak
- Kelly Powell
- Sean Price
- Samuel Quinones
- Faustino Quiroz
- Rey Regresado
- Lloyd Rothe
- Johnny Runyan
- Jake Ruttler
- Tong Sahnnon
- Damain Sampson
- Tim Sawyer
- Olin Seago
- Donald Seay
- Ernestine Shepard
- Gregory Smith
- Jeffrey Snover
- Phyllis Sousley
- Cheryle Stapelfeldt
- Don Stowe
- Steve Swinson
- Mike Thamm
- Karen Thomas
- Mark Totten
- Bruce Turner
- James Walker
- Scotty Walker
- Winston Wood



THERMAL ENERGY CORPORATION  
**2013** ANNUAL REPORT

**READY. RELIABLE. RESILIENT.**

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MISSION: Provide reliable and economical thermal services to the institutions of the Texas Medical Center. ■

TO OUR CUSTOMERS AND FRIENDS  
IN THE TEXAS MEDICAL CENTER AND  
OUR ENERGY INDUSTRY COLLEAGUES

Almost every sport has a season and an off-season. During the off-season, teams have some time off and tune up their games for the season to come.

The institutions at the Texas Medical Center (TMC) don't have that luxury. They face a full-court press every day – and night. And they need everyone on their team to pull their weight.

Thermal Energy Corporation (TECO) understands and is dedicated to providing reliable district cooling and heating service to its customers on the Texas Medical Center campus so they can carry out their important missions.

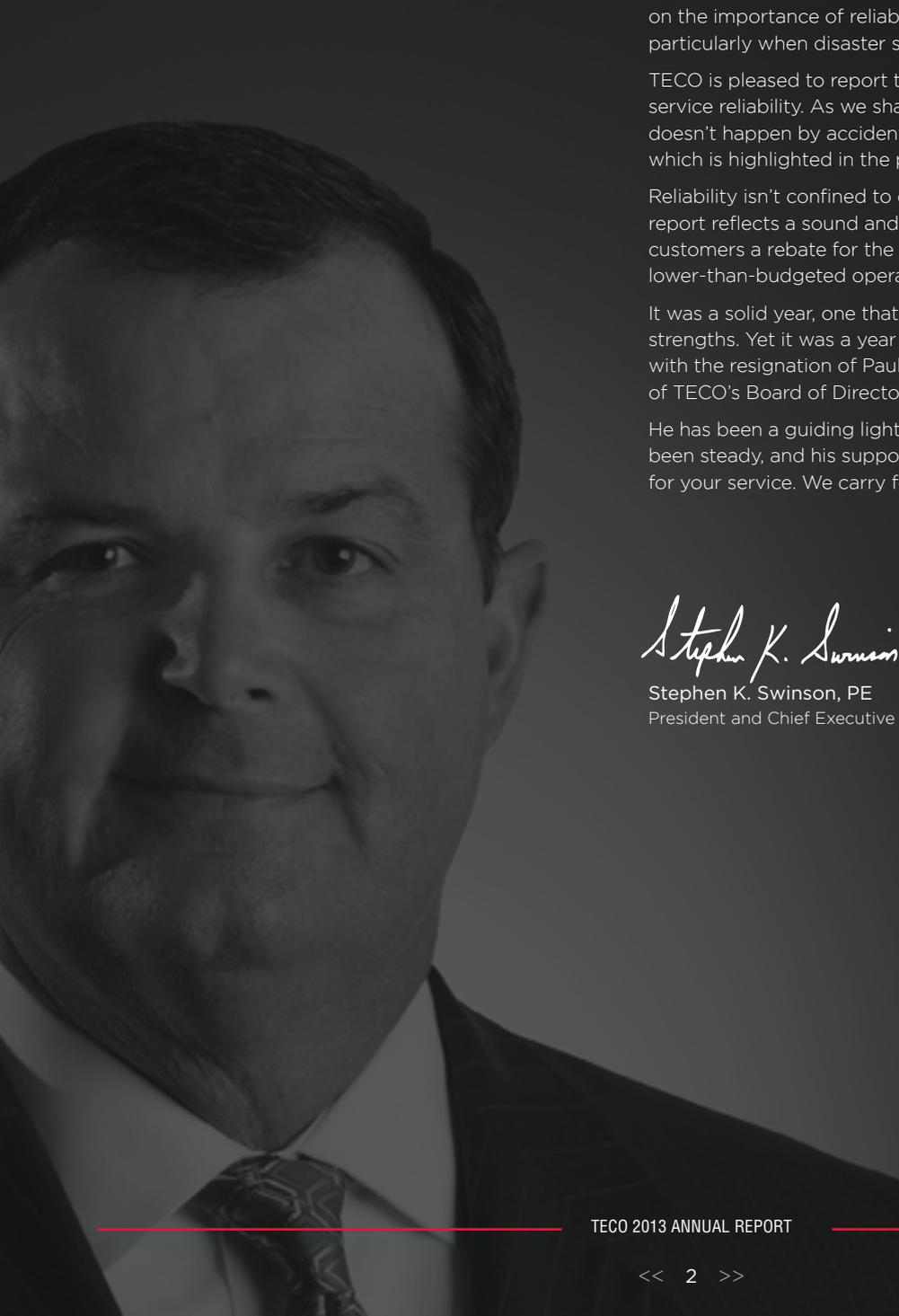
In this year's annual report, "Ready. Reliable. Resilient.", we take you behind the scenes at TECO and several of our customers to reflect on the importance of reliability – not just on a day-to-day basis, but particularly when disaster strikes. We all know what's at stake.

TECO is pleased to report that in FY2013 we once again had 100% service reliability. As we share with you on the following pages, that doesn't happen by accident. It takes a concerted, irrepressible effort, which is highlighted in the profiles of three employees.

Reliability isn't confined to operations, however. Our FY2013 financial report reflects a sound and stable year where we were able to issue customers a rebate for the third year in a row, mainly the result of lower-than-budgeted operating costs.

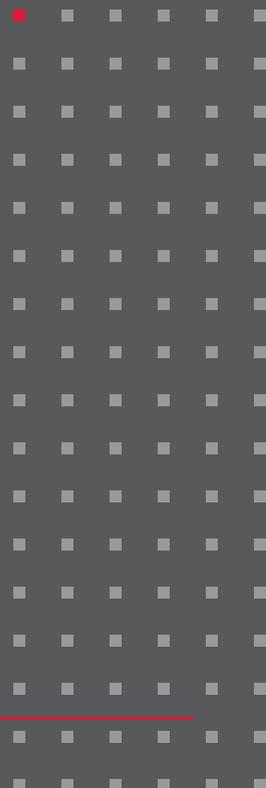
It was a solid year, one that showed our financial and operating strengths. Yet it was a year that brought an exceptional era to a close with the resignation of Paul G. Bell, Jr., who had served as Chairman of TECO's Board of Directors since 1999.

He has been a guiding light to the organization. His leadership has been steady, and his support has never wavered. Thank you, Mr. Bell, for your service. We carry forward your reliability mantra.



*Stephen K. Swinson*

Stephen K. Swinson, PE  
President and Chief Executive Officer



Little did I know in 1966 that an idea to build and operate a central cooling and heating plant at the Texas Medical Center would turn into Thermal Energy Corporation, home to the nation's largest district cooling system.

It is clear that it was meant to be and was a perfect fit for the growing Texas Medical Center. It was a logical, cost-effective and reliable energy solution in the late 1960s and remains so today. We are fortunate to have TECO's operators on the job at all times to meet customers' cooling and heating needs, literally weathering any storms that come their way.

I've seen first-hand the system's exponential growth over the years. The recent startup of TECO's combined heat and power unit was an extraordinary achievement. It was a nod to the visionaries of the past and a firm embrace of what the future holds for Texas Medical Center institutions.

Shortly after FY2013 came to a close, I announced my decision to step down as Chairman of TECO's Board of Directors. While it has been one of the most fulfilling jobs I have had in the Texas Medical Center, it was time to pass the baton.



Bradley N. Howell

I'm extremely pleased that in early FY2014, the Board elected Bradley N. Howell to take over the reins as TECO's Chairman and serve on the Finance and Audit and the Long-Range Planning committees.

Brad is Chairman and CEO of Lodestar Logistics Corporation and brings with him a commendable commitment to the Texas Medical Center, the city of Houston and the great state of Texas.

He is on the Board of Directors of the Texas Medical Center; is a member of its Executive Committee;

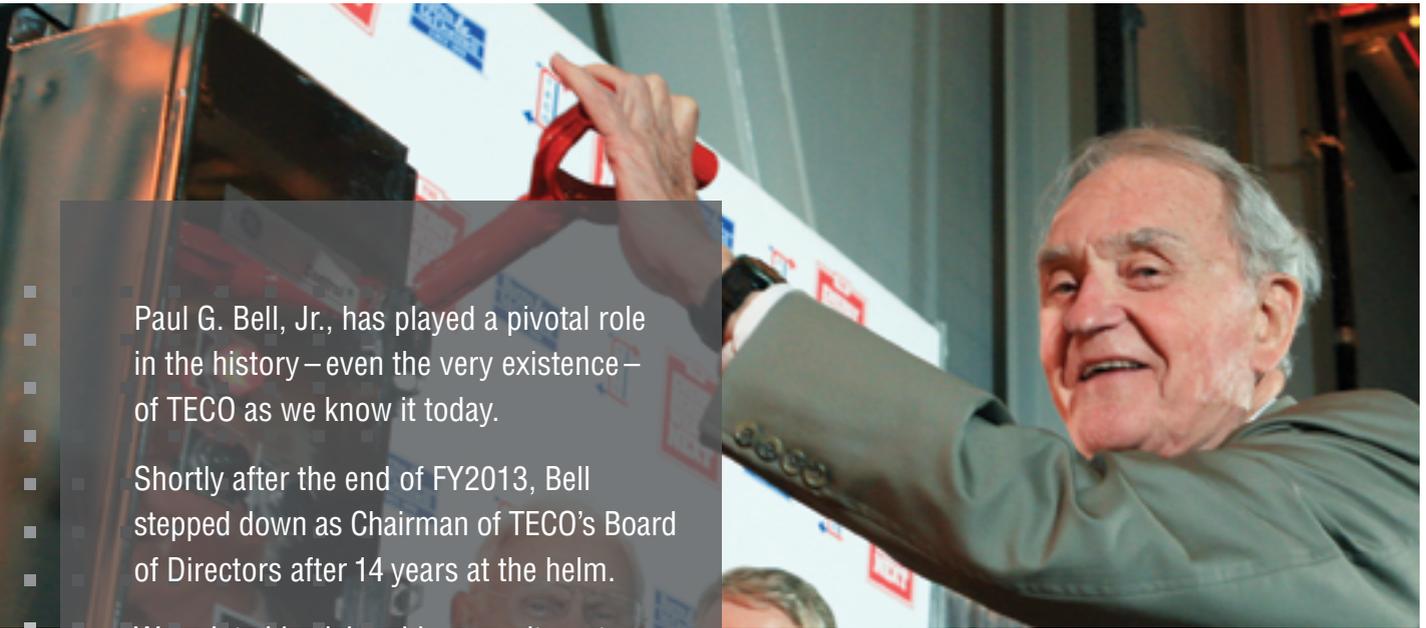
chairs its Member, Building and Lands Committee; and is a member of its Forward Planning Committee. Howell also is a life member of the Greater Houston Partnership and a director and life member of the Development Board at The University of Texas at Austin.

It has been an honor to serve as TECO's Board Chair. The company's future is bright, in large part due to the stellar individuals who have been – and continue to be – a part of TECO's tradition of excellence and reliability. My hat is off to all of TECO's people. I thank each of them for the privilege of serving with them. I remain one of TECO's staunchest supporters.

**"It has been an honor to serve as TECO's Board Chair. The company's future is bright, in large part due to the stellar individuals who have been – and continue to be – a part of TECO's tradition of excellence and reliability."**

A handwritten signature in black ink that reads "Paul G. Bell, Jr." in a cursive style.

Paul G. Bell, Jr.  
Chairman, 1999-2013



Paul G. Bell, Jr., has played a pivotal role in the history – even the very existence – of TECO as we know it today.

Shortly after the end of FY2013, Bell stepped down as Chairman of TECO's Board of Directors after 14 years at the helm.

We salute his vision, his commitment and his passion for TECO and the service it provides to Texas Medical Center institutions. We are grateful.

In 2011, Bell signals the startup of TECO's new East Chiller Building, which adds enough chilled-water capacity to make TECO's district cooling system the largest in the United States.

**1978**

After plant purchase, cooperative representatives select Bell as treasurer of its permanent board of directors.

**1983**

Bell serves on a subcommittee to analyze the overall needs of the cooperative.

**1987**

Bell proposes steps that are approved by the Board to begin moving forward with the South Main project, a major expansion.

**1999**

Bell is appointed just the second Board Chairman in TECO's history.

**2004**

Bell serves on an ad hoc search committee to identify President and CEO to replace Larry Null.

**2006**

Bell guides the Board through the master planning process and acceptance of proposed multiyear construction of a combined heat and power plant, thermal energy storage tank, additional chilled-water capacity and distribution system expansion to serve growing needs of Texas Medical Center.

# A SALUTE

**1966**

As chairman of the building committee for expansion of St. Luke's Hospital, Bell suggests considering an outside organization to provide chilled water and steam to meet increased needs.

Based on results of a preliminary study by Brown & Root, Bell helps prepare specifications for a central cooling and heating facility to determine its feasibility.

**1967**

Bell is on the committee that selects Thermal Systems Inc. (Houston Natural Gas Company) as the preferred contractor for the plant. Houston Natural Gas is to own and operate the plant; the Texas Medical Center retains the right for future purchase.

**1969**

Bell participates in the official inauguration of the company's first plant, the only district energy facility in the Texas Medical Center.

**1975-1976**

As representative of St. Luke's Episcopal Hospital, Bell serves on a subcommittee to evaluate the plant's purchase by the newly formed Texas Medical Center Heating and Cooling Services Cooperative Association.

**1977**

Bell is appointed to a subcommittee to carry out plant acquisition negotiations with Houston Natural Gas.



In 2010, Bell – second from left – celebrates startup of TECO's 48 MW combined heat and power plant.

- Refunded \$1,052,000 to customers from FY2013\* net income. As a result of the rebate, customer rates for FY2013 were reduced by 1.4% compared to FY2012\*. It was the third year in a row that customer rebates were issued.
- Exceeded budget expectations for FY2013 and presented a FY2014\* budget that was approved by the Board of Directors.

## Provided 100% customer reliability in 2013.

- Successfully executed a service agreement to provide chilled-water and steam service to the Harris County Institute of Forensic Science in the Mid Campus. The 200,000-square-foot facility will add 1,050 tons of new chilled-water load and 7,427 pounds per hour of steam of steam load when the building connects to TECO's system in 2015.
- Completed 2013 financial audit. There were no notable comments regarding the 2013 financial results, accounting methods or internal controls.
- Successfully followed its Energy Policy that helps TECO lock in fuel purchases at the lowest-possible cost.
- Continued implementation of Operator's Training Program is on schedule. Program has resulted in five operators receiving or upgrading their City of Houston Operating license.
- Produced and distributed TECO's 2012 Annual Report "Putting Efficiency to Work."
- Prepared accurate forward-year rate forecast for institutions that need the information for their budgeting process early in the year.
- Maintained TECO's financial closing on the third business day of the month.
- Maintained a Workers Compensation Ratio well below the industry average of 1.0, which reflects well on TECO's safety record.
- Had no citations relating to environmental, safety or regulatory requirements.
- Successfully completed several capital projects on schedule and budget to enhance performance, efficiency and reliability.

### FY2013 CAPITAL PROJECTS

- Boiler feedwater pump replacement
- Compressed air system upgrade
- Substation breaker replacement
- Security camera additions
- Piping extensions
- Continuous emission monitoring systems replacement
- Cooper engine emissions compliance

- Continued to fund the Major Equipment Replacement Program (MERP) and the insurance reserve. MERP ensures funding will be available for future equipment replacement as needed assuming normal equipment life cycles. By regularly allocating money to an insurance reserve fund, TECO can raise deductibles and reduce insurance premiums. Funding levels for both programs are evaluated and adjusted annually.
- Continued to operate and maintain The University of Texas Health Science Center's Energy Plant, South Campus. TECO remotely monitors plant operations 24 hours a day, and operators visit the plant three times daily, saving UTHealth nearly \$500,000 annually.
- Continued to serve as the point of contact for monitoring Metro Stray Current issues and their effect on the institutions in the Texas Medical Center.

\* September 1 - August 31

## THE YEAR IN REVIEW

Generated 100% of its own power during the peak power periods recorded by Electricity Reliability Council of Texas (ERCOT). TECO's combined heat and power system eliminated the risk that TECO's chilled-water and steam customers would be negatively affected by a potential power grid failure.

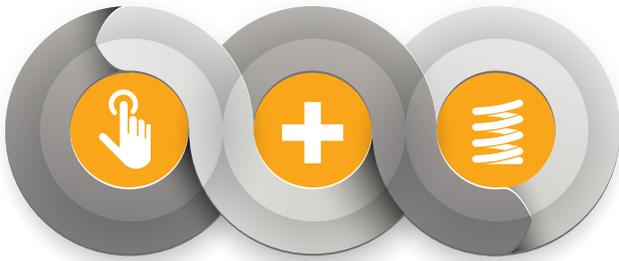
Conducted its annual customer satisfaction survey. When customers were asked what they were particularly pleased about related to TECO's chilled-water and steam service over the past year, one respondent replied, "Consistent reliability of the services is good to have. TECO has been good to invest in their plant to increase capacities to meet the growing needs of the [Texas] Medical Center."

“Before we ever add or modify equipment logic, we spend a lot of time identifying the many ways the system could go down and then figure out how to best avoid those situations. So we are covered for nearly every emergency. We can even make steam with a loss of natural gas.”

Rohn Benfield, Instrumentation & Controls Specialist

# READY. RELIABLE. RESILIENT.

## THERMAL ENERGY CORPORATION



**Ready.** Because of its dedication to customers at the Texas Medical Center.

**Reliable.** Because of extensive planning, investment, preparation and training.

**Resilient.** Because of in-place backup plans that leverage years of experience.

A lab requires chilled water for low-temperature research. A hospital must have steam to sterilize instruments. A birthing room needs a temperate environment to ensure a newborn's health. The list could go on. That's why Thermal Energy Corporation needs to provide reliable district cooling and heating service to its customers on the Texas Medical Center campus every single hour of every single day, all year long.

There can't be exceptions for hurricanes. Or ice storms. Or unimaginable manmade disasters. All must run as planned

- all the time - or irreplaceable research, not to mention the health and welfare of patients, could be in jeopardy.

Everyone at TECO - from the Board of Directors to the operating crews - is committed to serving its customers, no matter the challenges it faces. Every decision, every plan, every procedure, every response reflects that obligation.

### Reliable by Design

From equipment design to precise installation to proper maintenance, TECO engineers optimal system redundancy into all facets of its operations.

The chilled-water distribution systems from TECO's Central Plant and South Main Plant are interconnected, allowing chilled water to flow to customers from either plant if one happens to be compromised. TECO's plants have emergency diesel-fired generators to provide electricity. And the Central Plant features the company's recently installed combined heat and power unit that enables TECO to provide all of its own electricity and continue chilled-water and steam service even if the electricity grid fails.



TECO's massive floodwall around the Central Plant is anchored by 254 reinforced concrete piers that range in diameter from 30 to 40 inches and were installed up to 30-feet deep.

## Plans, Procedures and Protocol

When it comes to reliability, preparation is the byword: Once an emergency hits, it's too late to prepare. TECO thoroughly tests and commissions each piece of equipment installed to ensure it works exactly as specified under trying conditions. It even tests manhole seals within its plant, verifying they can handle 15 head of water and still hold.

TECO's preventive maintenance program lists every single piece of equipment at each plant and details its maintenance protocol, keeping hundreds of parts in inventory for quick repair. Since even a loose wire, a missing bolt or an improperly installed gasket could lead to an operational glitch, attention to detail is key. No piece of equipment – no matter how small – can be overlooked at any time.

TECO has comprehensive contingency plans in place for both natural and manmade disasters. It conducts regular training and emergency drills with employees and contracts with a nationally recognized weather service to provide detailed forecasts for the area. It also participates in special preparedness drills in coordination with the Texas Medical Center, the state of Texas, Harris County and the city of Houston.



TECO's 48 MW combined heat and power unit, operational since August 2010, allows the company to meet all of its own power needs should grid electricity not be available. That allows TECO to continue chilled-water and steam service without a hitch, even if power is out elsewhere.

### Major reliability improvements since 1989

Built South Main Plant and interconnected its chilled-water distribution system with Central Plant's chilled-water system for redundancy.

Added two chillers and two cooling towers at Central Plant.

Added two additional boilers at Central Plant.

Rebuilt substation to add 20 MVA transformers and automatic switching to isolate fault condition at Central Plant.

Added 5 kV ring bus at Central Plant.

Installed four 2 MW diesel emergency generators at Central Plant.

Installed one 250 kW generator and one 2 MW emergency generator at South Main Plant.

Built floodwall to protect Central Plant from 500-year flood, plus two feet.

Added 48 MW gas turbine (CHP) to Central Plant.

Built 8.8 million-gallon thermal storage tank.

Installed four 8,000-ton chillers, with room for six more, in East Chiller Building (ECHB) at Central Plant.

Purchased portable pumps for Central Plant that remove 43,000 gallons of water per minute.

Located Central Plant's computer servers in interior space off the ground floor and connected them to multiple electrical circuits.

Installed multiple layers of computer and Internet security that include intrusion prevention systems on two different Internet service provider connections.

“Maintaining phone and Internet service is vital in emergency situations, not just to stay in close contact with our customers, but so our employees may reach their families. Since our crews are on duty and sheltered in place here, they need peace of mind that their loved ones at home are safe, sound and accounted for.”

Nolan Lambert, IT Manager

### ATTENTION TO DETAIL

TECO has employees test their respirator masks and adjust them annually to accommodate changes in face size or facial hair.



# TEXAS MEDICAL CENTER

2011-2012

Campus-wide research: **\$3.4 billion**  
Campus-wide patient visits: **7.2 million**  
Campus-wide employees: **106,000**

TECO is a Texas Medical Center institution and serves

**133,000** square feet of buildings owned and operated by the Texas Medical Center:

Paul Gervais Bell Jr. Building

John P. McGovern Texas Medical Center Commons

**19 million** square feet of space campus-wide in TMC-member institutions

The Texas Medical Center Corporation strives to promote the highest quality health for all people by assisting member institutions achieve individual and collective goals of superior standards of patient and preventive care; research and education; and local, national and international community well-being.

Founded in 1945, the Texas Medical Center acts as a “municipal government,” enforcing covenants and

restrictions and coordinating activities among 54 member institutions. It moderates campus-wide issues and concerns; oversees emergency preparedness planning; and is responsible for land management, real estate and master planning.

## Reliability. The importance.

“Reliability is mission-critical for institutions at the Texas Medical Center, and I give TECO high marks in that regard. In fact, I can’t say it any stronger. TECO’s customers depend on chilled water to provide a controlled environment for their research labs, and steam is vital for patient care, sterilization and laundry. TECO has redundant resources so it can continue these services without disruption during a natural or manmade disaster.”

Robert C. Robbins, MD

President and Chief Executive Officer, Texas Medical Center

## Planning. A necessity.

One year after devastating Tropical Storm Allison struck the Texas Medical Center and caused nearly \$2 billion in damages at campus institutions in 2001, Texas Medical Center officials issued a Hazard Mitigation Plan designed to lessen future storm-related damage. TMC led the plan's development and ensured its activation. The result has been a robust emergency preparedness approach.

The Texas Medical Center is the central resource communicator, coordinator and liaison for campus institutions in the event of an event, natural or manmade. It directs an incident command system with member institutions, the city of Houston, Harris County and the Texas Office of Emergency Management.

The Texas Medical Center is also charged with ensuring continuous access to all facilities and hospitals during natural disasters. Plus, key contractors now ride out storms right on campus so recovery may begin as soon as storms wane.

As part of its planning and readiness efforts, TMC has also participated in four major U.S. Department of Homeland Security (DHS) programs to test the planning, training,

response and mitigation of unique needs on the TMC campus. In addition, TMC trains annually with SeaTrac and participates in the civil-military operations center and the Urban Areas Security Initiative DHS program.

**“During Tropical Storm Allison, most institutions on the Texas Medical Center campus flooded and lost power. Some patients on ventilators had to be manually respirated. Research labs were inundated with water and hundreds of millions of dollars in research was lost. It was a catastrophic event. There is no doubt that Tropical Storm Allison was a defining moment for the Texas Medical Center. As a result, we’ve experienced a real renaissance when it comes to readiness and resiliency.”**

Robert C. Robbins, MD

President and Chief Executive Officer, Texas Medical Center



## Response. A given.

Since enacting the Hazard Mitigation Plan in 2002, the Texas Medical Center and member institutions have spent more than \$40 million in underground infrastructure improvements to protect against future catastrophes. The actions comply with the Federal Emergency Management Agency's requirement that critical-care facilities must now protect themselves against a 500-year – rather than 100-year – flood.

Campus-wide efforts by TMC, its member institutions, its suppliers and government agencies have transformed the campus and made it a model of storm preparedness:

**Built.** Two backup substations to support CenterPoint Energy's Grant Substation that supplies electricity to TMC.

**Constructed.** Exterior perimeter floodwalls, berms and barriers.

**Installed.** Major drainage outflows to Brays Bayou.

**Formed.** A Texas Medical Center Flood Management Group to protect the inter-institutional tunnel system from flooding.

**Installed.** More than 50 watertight flood doors and floodgates.

**Improved.** Storm drainage on area streets.

**Included.** Pedestrian skybridges in construction plans.

**Constructed.** Cell towers on several TMC parking garage roofs to improve and sustain communications.

**Improved.** Transportation access to the Texas Medical Center during high-water events.

**Included.** TMC in city of Houston's and Harris County's annual hazard mitigation plans.

**Relocated.** Electrical equipment, lab animals and research experiments from basements to upper floors.

**Updated.** TMC/Rice Flood Alert System that monitors area rainfall, the water level in Brays Bayou and storm surge and provides early flood-warning predictions.

**Virtually stopped.** Ground subsidence on campus through coordinated efforts with the city of Houston and Harris Galveston Subsidence District.

**Widened.** Brays Bayou to collect excess water.



Learn more about TMC and Tropical Storm Allison:  
[tinyurl.com/TMCallison](http://tinyurl.com/TMCallison)



# TEXAS CHILDREN'S HOSPITAL

Texas Children's Hospital is a not-for-profit organization dedicated to providing the finest pediatric patient care, education and research.

**1.6 million** patient encounters at Texas Children's Texas Medical Center facility in 2012

TECO serves nearly 5 million gross square feet of Texas Children's Hospital facilities:

- Abercrombie Clinical Care Center
- Feigin Center
- Jan and Dan Duncan Neurological Research Institute
- Pavilion for Women
- West Tower

## Reliability. The importance.

"I'd give TECO a 10 - 10 being high - when it comes to emergency preparedness, implementation and resiliency. It does a really good job. If it wasn't on top of its game, we couldn't serve the children and families who count on us. In the 10 years I've been here, I can probably count the outages we've had in seconds. TECO has been extremely reliable. That frees me up to spend my resources elsewhere."

Peter Dawson  
Senior Vice President - Facilities Services, Texas Children's Hospital

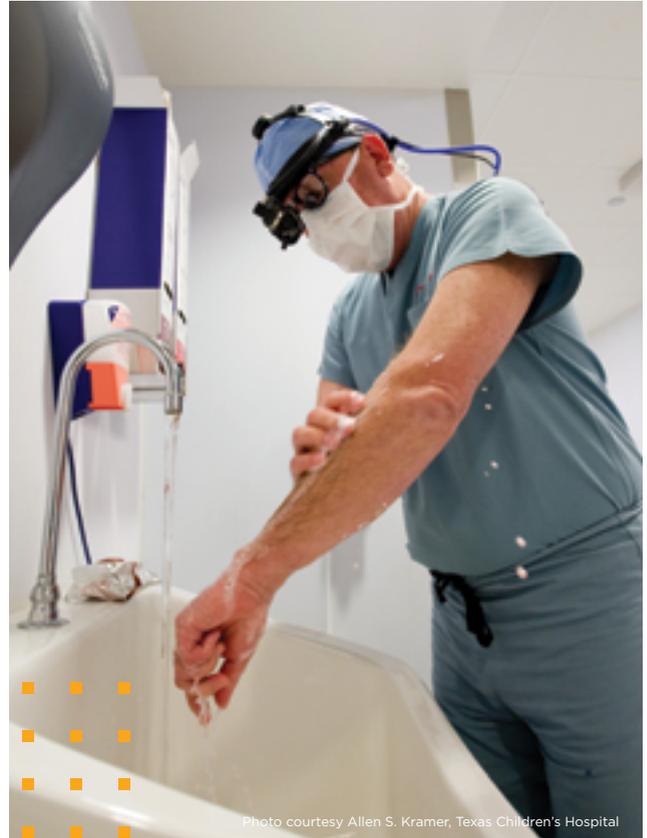
## Planning. A necessity.

Texas Children's annually reviews and updates its extensive emergency preparedness plan, tapping the expertise of multiple departments from throughout the organization: operations, risk management, nursing, surgery and respiratory therapy.

The group brings forward new challenges to be addressed plus verifies all contact names and information inside and outside the organization. Communication is the foundation of each year's plan, providing advice on how and what to communicate and to whom to maintain patient and employee safety.

Texas Children's holds at least two employee emergency drills each year to ensure competencies are in place and core questions have been answered: Where do we send patients if needed? How do we get food in? How do we get fuel in?

How are water and sewage handled? How do we process patients coming in as a result of a disaster? And more. It also includes how to coordinate response with the Texas Medical Center, which serves as the quarterback for member institutions during emergency situations.



### The Flood of 1976

On June 15, 1976, approximately 10.5 inches of rain fell on the Texas Medical Center, flooding most campus hospitals and medical buildings. Local fire departments and businesses sent pumping units, electrical generators and other emergency equipment, but delivery was delayed because deep water and stalled cars blocked the streets. Damages to institutions in the Texas Medical Center reached \$20 million. Although TECO's Central Plant took on some water, the bayou did not overflow into the plant. Staff continued providing cooling service to customers that could receive it.

### Hurricane Alicia 1983

Category 2 Hurricane Alicia made landfall on August 18, 1983. While not a major rain producer, Alicia spawned tornadoes and high winds, which knocked out power to approximately 800,000 people in the greater Houston area. For the most part, medical care at Texas Medical Center institutions continued without major interruption. TECO's crew had prepared well and tied everything down before the storm hit. The plant suffered no major damage, but temporarily lost city-supplied water.

## Response. A given.

Floodwaters have long been a threat in Houston, particularly in the tunnels beneath the Texas Medical Center. Faced with potential disruption of service due to flooding, Texas Children's Hospital took a bold and relatively expensive step in the year 2000: It invested in tunnel flood doors to protect the institution. The move paid off in short order: When the project was only 80% completed, it helped defend the hospital from Tropical Storm Allison in 2001. With only minimal damage sustained, Texas Children's experience convinced many other TMC institutions to follow suit.

But getting potable water in is just as critical as keeping floodwater out. In 2006, Texas Children's contracted with Western Dairy Transport, from just southwest of Fort Worth, to haul tanker trucks full of water to the site in an emergency. Every April, Texas Children's tests the procedure by ordering potable water to be delivered and pumped into the hospital for drinking water and sanitation purposes.

Texas Children's developed a similar program for fuel delivery to maintain its backup power system.



# THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER

As a comprehensive health science university, The University of Texas Health Science Center at Houston (UTHealth) educates health science professionals, discovers and translates advances in the biomedical and social sciences, and models the best practices in clinical care and public health.

**\$224.1 million** research expenditures in 2012

TECO serves nine UTHealth facilities:

- Cyclotron Building
- Fayez S. Sarofim Research Building
- George and Cynthia Mitchell Basic Sciences Research Building\*
- Medical School Building and Expansion
- Reuel A. Stallones Building
- School of Dentistry Building\*
- School of Nursing Building and Student Community Center
- University Center Tower and Parking Garage
- UT Professional Building

\* served from TECO-operated UTHealth plant

## Reliability. The importance.

"Reliability is TECO's most important asset. I cannot remember one time, under any condition, when service from TECO was ever a concern. I appreciate that TECO shoulders that burden. I have served institutions where the institution owned the utility plant and that was the one aspect of operation that kept me up at night. I had to worry about adequate supplies, redundancy in case of a single-unit failure, and having the expertise in place to successfully operate the plant in all conditions. Under our arrangement with TECO, I'm able concentrate on the needs of our campus buildings and not be distracted by tending to critical utility systems."

Richard L. McDermott  
Vice President for Facilities, Planning and Engineering, UTHealth

## Planning. A necessity.

With the need to protect years – even decades – of research that could potentially lead to scientific breakthroughs, UTHealth has justifiably high expectations for reliability and emergency management.

As a result, UTHealth has dedicated significant resources toward a multifaceted emergency preparedness plan. The all-hazards plan is updated annually and includes guidance on preparing laboratories for emergencies, assessing vulnerability risks for key areas, testing emergency power, and following procedures for information technology disaster resiliency. Emergency drills – including fire drills, active shooter drills and hazardous material spill drills – are held throughout the year.



Courtesy UTHealth.  
Photo Phyllis D. Lengyel/UTHealth School of Nursing ©2013

UTHealth School of Nursing anesthesia students intervene as their "SimMan" patient exhibits cardiac arrest during a simulation lab session.

emergency-response experiences. In fact, UTHealth researchers found that 2008's Hurricane Ike caused specific hardships for people with disabilities. Their research results have helped educate people with disabilities and their caregivers, with extensive information posted at [www.disability911.com](http://www.disability911.com).



# THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

Since UTHealth employees and students work at many locations throughout the area, UTHealth carefully coordinates its efforts with TMC and other institutions to ensure employee safety and meet the community's health care needs.

## Response. A given.

During Tropical Storm Allison, some of UTHealth Medical School buildings experienced unprecedented flooding and were unable to take TECO's chilled-water and steam service. Once floodwaters were drained from these facilities, service was soon restored. Service continued to other UTHealth buildings during the event.

Since Allison, UTHealth, along with other TMC member institutions, has further increased its focus on mitigation activities at all levels. The efforts have been successful, as UTHealth has had minimal storm impact over the past decade.

True to its mission, UTHealth shares locally and nationally what it has learned from its – and the community's –

## Tropical Storm Allison 2001

Tropical Storm Allison was one of the worst disasters to ever hit Houston. The 2001 storm came in two surges, dropping 36 inches of rain that flooded homes and businesses. The destruction was unimaginable at the Texas Medical Center, which suffered some \$2 billion in damages. TECO escaped serious flooding with six inches of water flowing from Brays Bayou to the west side of the Central Plant; just an inch or two seeped inside the building.

When the automated South Main Plant unexpectedly tripped off mid-storm, one of TECO's on-duty operators trudged through stormwaters from the Central Plant to South Main to restart it. Both chilled-water and steam service continued to all customers that could accept it.

In the storm's aftermath, TECO temporarily installed a sandbag dike around the entire Central Plant and also purchased large bladder dams to fill in sandbag gaps. It also moved forward with a \$6.2 million Central Plant Flood Protection Project, which included a 500-year plus 2 feet floodwall and floodgates that were installed in 2005.



Started at TECO: 1993

Good example: "Even our tool boxes are on our maintenance list."

Putting his skills to good use: President of his homeowner's association.

He and Ben Franklin agree: "An ounce of prevention is worth a pound of cure."

## DON SEAY Maintenance Planner

While most people only aspire to preventive maintenance – on their cars, their homes, even themselves – Don Seay embraces it as a way of life.

Don and his team are in charge of the health of 2,631 pieces of equipment at TECO's four facilities and distribution system. Each piece of equipment is logged into a comprehensive Computer Maintenance

**"TECO has always been ahead of the curve in terms of preventive maintenance. Its commitment to an excellent PM program is exceptional."**

Management System, with all parts listed, preventive maintenance scheduled, and spare parts ordered for inventory.

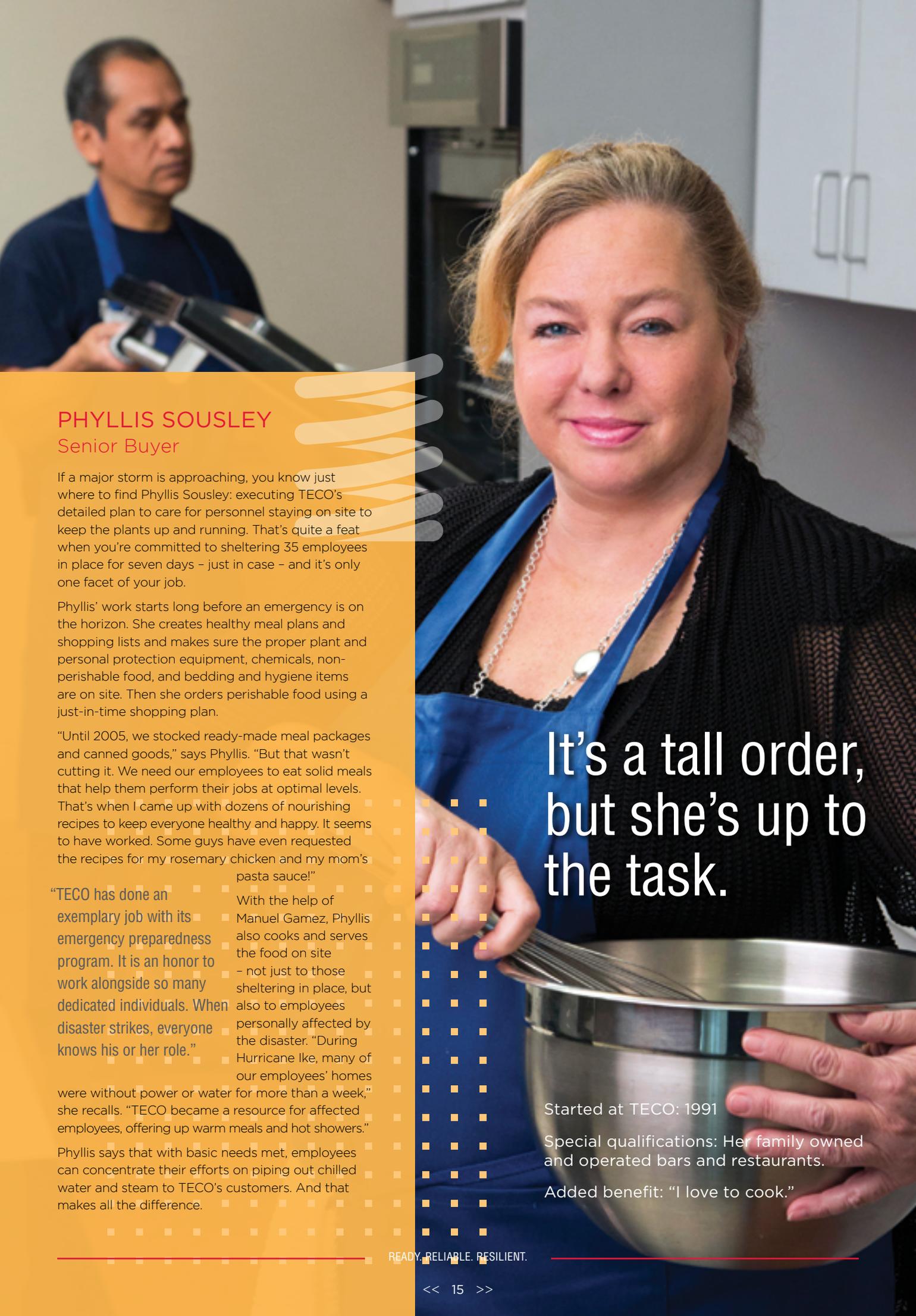
"Even if there's not a physical or manmade disaster," says Don, "an equipment breakdown could become a huge

problem in terms of maintaining service to our customers. So we make sure we're ready for anything. We plan for the unexpected and are prepared to take it on. Our mantra is 'do all the right things and do all the right things right.' Failure is not an option."

In addition to standard maintenance efforts, Don sets up special checks before the tropical storm season hits each year. Crews examine everything from portable flood pumps to manhole covers to electric generators. They also review the shelf life of batteries and other items, rotating them out as needed.

Although the focus on maintenance is paramount, Don also prepares cost analysis and key performance indicator reports that help him analyze what modifications need to be made.

"One of our biggest challenges is keeping up with changing procedures," says Don. "But we have great people here who know it's critical for us to stay on top of preventive maintenance, and they make it work every single day. The coordination is trouble-free because of a team effort focused on reliable service."



## PHYLLIS SOUSLEY

Senior Buyer

If a major storm is approaching, you know just where to find Phyllis Sousley: executing TECO's detailed plan to care for personnel staying on site to keep the plants up and running. That's quite a feat when you're committed to sheltering 35 employees in place for seven days – just in case – and it's only one facet of your job.

Phyllis' work starts long before an emergency is on the horizon. She creates healthy meal plans and shopping lists and makes sure the proper plant and personal protection equipment, chemicals, non-perishable food, and bedding and hygiene items are on site. Then she orders perishable food using a just-in-time shopping plan.

"Until 2005, we stocked ready-made meal packages and canned goods," says Phyllis. "But that wasn't cutting it. We need our employees to eat solid meals that help them perform their jobs at optimal levels. That's when I came up with dozens of nourishing recipes to keep everyone healthy and happy. It seems to have worked. Some guys have even requested the recipes for my rosemary chicken and my mom's pasta sauce!"

**"TECO has done an exemplary job with its emergency preparedness program. It is an honor to work alongside so many dedicated individuals. When disaster strikes, everyone knows his or her role."**

With the help of Manuel Gamez, Phyllis also cooks and serves the food on site – not just to those sheltering in place, but also to employees personally affected by the disaster. "During Hurricane Ike, many of our employees' homes

were without power or water for more than a week," she recalls. "TECO became a resource for affected employees, offering up warm meals and hot showers."

Phyllis says that with basic needs met, employees can concentrate their efforts on piping out chilled water and steam to TECO's customers. And that makes all the difference.

# It's a tall order, but she's up to the task.

Started at TECO: 1991

Special qualifications: Her family owned and operated bars and restaurants.

Added benefit: "I love to cook."

# With his steady guidance, employees prepare to take on any challenge.



## WINSTON WOOD Environmental, Health, and Safety Engineer

Winston Wood may not be a football coach, but he has definitely prepared his team for the big game – with far more at stake than a trophy or ranking. He makes sure TECO employees are trained and well-equipped to respond no matter what natural or manmade disaster may strike the Texas Medical Center campus.

“The most challenging part of maintaining a high level of emergency preparedness is the (fortunately) infrequent occurrence of emergencies,” says Winston. “We guard against complacency by conducting frequent plant-wide drills so employees know how to respond appropriately to a wide range of demanding situations.”

**“How effectively an organization performs under adverse conditions is one of the true marks of its employees’ character.”**

In addition to holding informative training sessions and fire drills, Winston initiates surprise drills where he provides a unique emergency scenario to the shift supervisor. The supervisor

must enact TECO’s response procedures that are designed to safely ensure continued chilled-water and steam service to customers. Afterward, Winston analyzes the results and modifies procedures and resources to optimize future response.

In addition, Winston and his colleagues work closely with Texas Medical Center representatives and regularly attend flood, hurricane and other disaster response conferences to help anticipate the wide variety of threats that may arise.

His emergency preparedness work closely parallels his efforts to maintain TECO’s compliance with safety and environmental guidelines. But Winston realizes that the real test can come at any time: “TECO plays an important role in the well-being of TMC institutions. We take preparedness training seriously and are ready to handle any challenge.”

Started at TECO: 2010

What’s good basic training? Fire evacuation drills that provide universal skills.

Safety goal: “Our employees go home as healthy as when they arrived on the job.”

## REVENUE AND EXPENSES

Fiscal year September 1 - August 31	FY2013	FY2012
<b>OPERATING REVENUE</b>		
Chilled Water .....	\$ 60,874,983	\$ 63,219,703
Steam .....	\$ 16,250,047	\$ 16,444,080
Other .....	\$ 2,849,362	\$ 2,679,682
<b>Total Operating Revenue</b> .....	<b>\$ 79,974,391</b>	<b>\$ 82,343,465</b>
<b>OPERATING EXPENSES</b>		
Fuel		
Electric .....	\$ 8,827,255	\$ 8,341,462
Gas .....	\$ 8,552,484	\$ 9,043,556
Fuel Oil .....	\$ 51,855	\$ 11,864
Other Operating Expense.....	\$ 56,907,540	\$ 56,708,567
<b>Total Operating Expenses</b> .....	<b>\$ 74,339,134</b>	<b>\$ 74,105,449</b>
Customer Rebate .....	\$ (1,052,000)	\$ (2,351,000)
Net from Operations .....	\$ 4,583,257	\$ 5,887,016
Non-Operating Revenue (Expense) .....	\$ 2,343,625	\$ (1,813,434)
<b>Revenue in Excess of Expenses</b> .....	<b>\$ 6,926,882</b>	<b>\$ 4,073,582</b>

## RATES AND UNITS

Fiscal year September 1 - August 31	FY2013	FY2012
<b>CHILLED WATER</b>		
Rate (\$/ton-hr) .....	\$ 0.210	\$ 0.204
Rate (\$/MMBtu) .....	\$ 17.52	\$ 16.97
Peak Demand (tons) .....	63,018	66,357
Average Demand (tons) .....	32,593	34,298
Load Factor .....	52%	52%
Peak (sq ft/ton) .....	297	280
Production (sq ft/ton-hr) .....	0.07	0.06
Production (ton-hr) .....	285,515,670	301,271,822
Cooling Degree-Days (3,308 normal) .....	3,213	3,551
Fuel Consumption (natural gas and electricity) MWh .....	218,190	235,104
<b>STEAM</b>		
Rate (\$/Mlb) .....	\$ 15.02	\$ 15.74
Rate (\$/MMBtu) .....	\$ 12.51	\$ 13.10
Peak Demand (lb/hr) .....	215,418	285,101
Average Demand (lb/hr) .....	121,865	115,542
Load Factor .....	57%	41%
Peak (sq ft/lb) .....	71	65
Production (sq ft/Mlb) .....	14	18.3
Production (Mlb) .....	1,067,541	1,014,921
Heating Degree-Days (1,065 normal) .....	1,187	965
Fuel Consumption (natural gas) MMBtu .....	1,386,217	1,366,568

## FINANCIALS: SOUND AND STABLE

Thermal Energy Corporation completed FY2013 with operating revenues .4% under budget (before a year-end customer rebate) and operating expenses 1.2% under budget. The revenue varied slightly because customers used less energy due to weather conditions and conservation efforts. A majority of the expense variance is because (1) fuel and water costs came in 4.4% below budget due to operating efficiencies and below-budget customer usage and (2) personnel costs finished below budget by 5.6%.

The favorable expense variance allowed for a customer rebate of \$1.052 million (1.4%) in August 2013. TECO realized its below-budget fuel cost without deviating from its energy policy, which provides fuel price stability so that high fuel costs do not affect the company's rates during a budget year.

The company's net income from operations in FY2013 was approximately \$4.6 million; total revenues in excess of expenses were approximately \$6.9 million. The \$2.3 million difference is the result of the required reporting of an unrealized mark-to-market gain associated with an interest rate swap on the company's 2012 bonds. The company met all of its planned cash, internally set financial, and debt covenant mandated requirements for FY2013.

### Nationwide support

Through its membership in the International District Energy Association, TECO is a part of Mutual Assistance for District Energy (MADE). MADE is a voluntary program where member organizations share trained personnel resources and emergency equipment to aid a fellow district cooling and heating system's resiliency after a disaster.



## POWER

### CENTRAL PLANT

48 MW combined heat and power system  
14 MW standby generation

### SOUTH MAIN PLANT

2 MW standby generation

## Did you know?

TECO has  
a locker full of life jackets  
a multi-chamber decontamination tent  
radiation detection equipment  
a specially designed hose to provide  
diesel fuel for customers' generators  
in case of emergency

# TECO: A QUANTITATIVE LOOK

## CHILLED WATER

## STEAM

### CUSTOMERS

Number of customers .....	18	18
Number of buildings served .....	45	36
Square feet served .....	19.0 million	15.8 million
Energy sales .....	269,663,000 ton-hr	851,354 Mlb

### ENERGY SOURCES

#### Central Plant

Number of boilers, chillers/fuels .....	14 chillers	7 boilers
	electricity and natural gas	natural gas and diesel
Thermal storage tank .....	8.8 million-gallon chilled-water storage tank	n/a

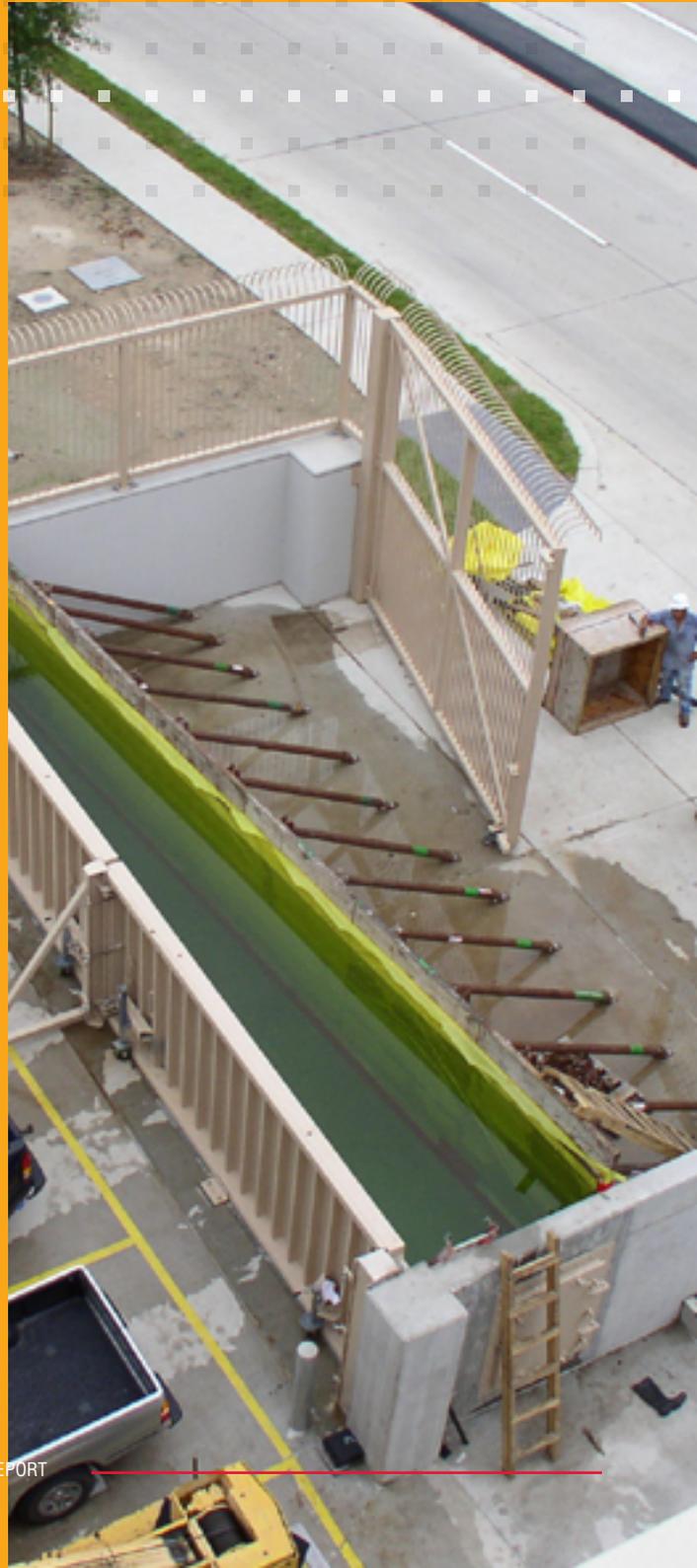
#### South Main Plant

Number of boilers, chillers/fuels .....	13 chillers	2 boilers
	electricity	natural gas and diesel

### OPERATIONS/DISTRIBUTION

Capacity .....	120,170 tons (including thermal storage)	890,000 lb/hr (with heat-recovery steam generator and duct firing)
Supply temperature .....	40 F	450 F
Supply pressure .....	65 psi	250 psi
Return temperature .....	54 F	150 F
Water volume in system .....	12.4 million gallons	n/a
Steam pressure .....	n/a	400 psi
Piping type .....	Welded steel coated with coal/tar epoxy	Welded steel, Schedule 40 with insulation
Piping diameter range .....	.6 to 60 inches	.2 to 16 inches
Piping trench feet .....	7.5 miles	7.5 miles (portions of the line have three pipes)

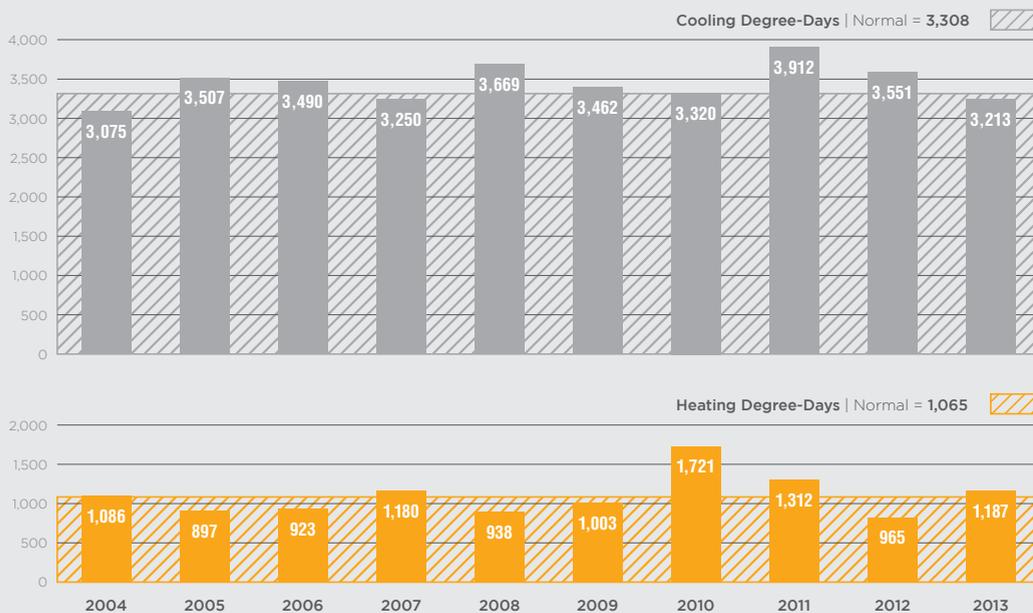
TECO built cofferdams and tested all of its large floodwall doors under actual water pressure when they were installed in 2005. It wanted to be sure the doors were structurally sound and had minimum leakage as these were the largest flood doors the manufacturer had produced up to that time.





TECO regularly tests its ability to lift someone over the floodwall – either going out to a boat to receive medical attention or coming in to escape surrounding floodwaters. A stretcher fits across the man basket's handrails.

## A DECADE OF DEGREE-DAYS\*



\* Degree-days relate each day's temperatures to the demand for fuel to heat or cool buildings. To calculate heating degree-days for a particular day, find the day's average temperature by adding the day's high and low temperatures and dividing by two. If the number is above 65° F, there are no heating-degree days that day. If the number is less than 65°, subtract it from 65° to find the number of heating degree-days. Cooling degree-days are based on the day's average minus 65°. For example, if the day's high is 90° and the day's low is 70°, the day's average is 80°. 80° minus 65° is 15 cooling degree-days. Courtesy National Weather Service.

### Hurricane Ike 2008

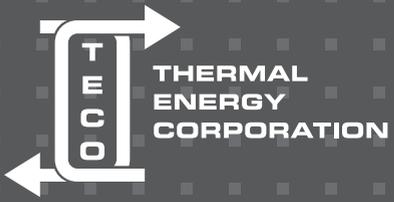
With Hurricane Ike approaching, TECO formally went into emergency preparedness mode on September 11, 2008. TECO opened its command center, and personnel policed the central plant and construction sites to ensure all loose materials were secured. The floodgates surrounding the plant were prepared for closure. Supplies for personnel hygiene and bedding were issued. Preparations were set in motion to daily serve three hot meals and a midnight snack to crews sheltering in place.

On September 12, winds reached 75-85 mph, with gusts approaching 100 mph. Twelve inches of rain fell. In spite of the storm's rapid formation and intensity, TECO safely made it through Hurricane Ike, providing uninterrupted service to every customer on the Texas Medical Center campus.

#### CREDITS

Photos by Paul Howell: pages 4, 5, 6, 7  
 Photos by Bruce Bennett: pages 14, 15, 16  
 Photos by John Everett: pages 2, 3  
 Skyline photo by Aachor: page 9

TECO thanks William Kellar of W.H. Kellar Consulting for historical data on TECO and storm-related events.



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