CLARIFIER

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SPRING/SUMMER 2015

GCA Expands To Serve Growing Petrochemical Industry

Bayport Facility Upgrades Add Capacity, Enhance Reliability

GCA Helps Make Trash Bash Another Resounding Success

GCA Elects New Board Chairman

GCA Chairman's Letter

I'm honored to have been elected Chairman of the Board of the Gulf Coast Waste Disposal Authority, or GCA.

This is a great organization, doing great work protecting the waters of the state of Texas, supporting other environmental organizations and events, and contributing to the economic development of Texas by providing regional wastewater treatment systems to serve job-creating industries in the state. We also do an excellent job treating municipal wastewater at our facility in Friendswood, Texas, and operate a landfill for non-hazardous industrial waste.

This issue of Clarifier highlights our contribution to the Texas petrochemical industry and how we have grown our existing facilities south of Houston in the Bayport-Pasadena-La Porte area to keep ahead of a number of petrochemical plant expansions.

This is an exciting time to be at GCA. We're having a positive impact, not just on the physical environment of the Great State of Texas, but on the economic environment as well. We've also seen our charter expanded by the Texas Legislature and former Governor Perry to enable us to work on other types of water systems in the state.

I am delighted to be able to serve with such an important organization.

Frank Jones
Chairman of the Board

General Manager's Letter

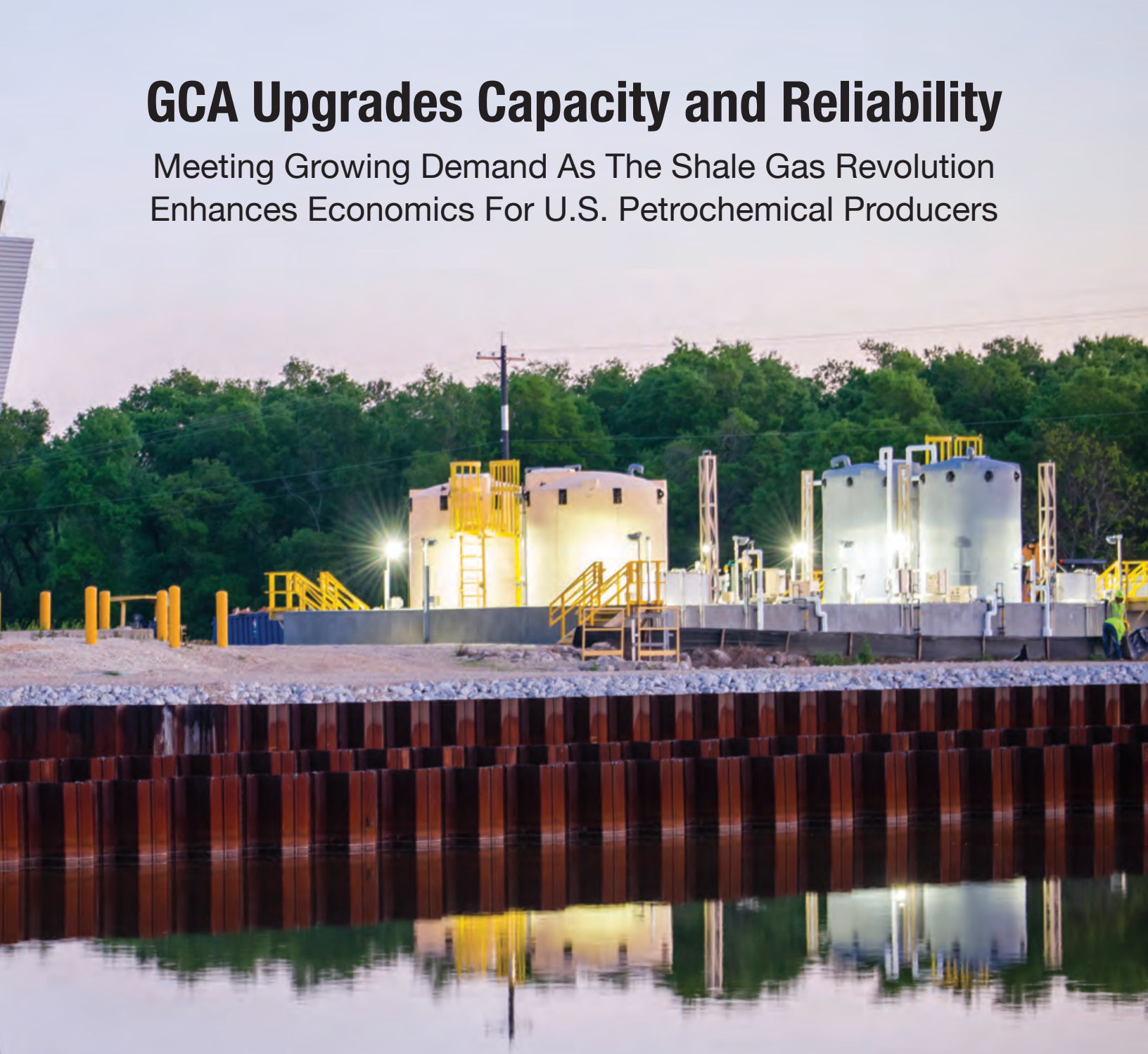
As our new Chairman Frank Jones notes, this is truly an exciting time for GCA and all of us who serve with the Authority. Our managers, personnel and facilities are firing on all cylinders as we expand our operations to serve customers not just in regional wastewater treatment but now through developing and operating other types of water resource infrastructure under our expanded purview.

It's important business in our drought-plagued but rapidly growing state. We're doing our part to help maintain Texas as the nation's economic powerhouse and to ensure that Texans born here and those who are "getting here as fast as they can" have abundant, safe and healthy water resources.

Ricky Clifton
General Manager

GCA Upgrades Capacity and Reliability

Meeting Growing Demand As The Shale Gas Revolution Enhances Economics For U.S. Petrochemical Producers



The Shale Gas Revolution that has turned the global energy industry upside down in recent years also has proven to be a boon to the U.S. petrochemical industry, which represents a significant part of GCA's customer base.

In the '80s and '90s, Houston oilman George P. Mitchell began experimenting with two proven technologies in an attempt to unlock vast natural gas reserves trapped in shale and other tight rock formations. Working in the Boonsville Bend Conglomerate of North Texas, Mitchell and his company combined hydraulic fracturing with directional drilling to intersect and crack

open multiple natural gas formations from a single well bore, making economic development of shale plays possible all across the United States. As the technology spread, gas production soared and prices fell dramatically.

Lower natural gas prices and increased domestic supply have been a boon to the U.S. petrochemical industry, which uses gas and natural gas liquids (NGLs) contained in many gas streams as fuel and feedstocks. Cheaper natural gas has enhanced the competitiveness of U.S. petrochemical companies on the global market. The industry responded with plans to increase production capacity by adding plants and upgrading older facilities.

Seventeen of GCA's 65 industrial customers, or 26 percent, announced or began plant expansions last year. Among them:

- Amsterdam-based AkzoNobel is implementing a new site-wide process control system at its facility in Pasadena, Texas. The new system is expected to significantly improve capacity and operational efficiencies and positions the site to meet the increasing demands of U.S. customers.
- Celanese has teamed up with Japan's Mitsui & Co. to build a new $800 million methanol production unit at Celanese's integrated chemicals complex in Clear Lake, Texas.
- Kuraray America is building a new polyvinyl alcohol plant in La Porte, Texas, and is expanding its ethylene-vinyl production facility in Pasadena.
- Linde North America has announced a $200 million expansion of its La Porte operations, including the addition of a new liquefier, to produce liquid oxygen, nitrogen and argon.
- LyondellBasell plans to expand tri-ethylene glycol (TEG) production capacity at its existing ethylene oxide and ethylene glycol plant in Pasadena. The additional capacity of 50 million pounds per year would more than double the company's current production capacity. The expansion is expected to be operational in late 2016.
- Solvay, the international chemical group, has announced a $55 million large-scale alkoxylation unit at an integrated industrial facility of LyondellBasell's Equistar affili-

ate in Pasadena. Equistar will supply the ethylene oxide raw material to the unit. Alkoxylates are use as emulsifiers, detergents and wetting agents. Operations are slated to begin this year.

What does all this mean for Gulf Coast Waste Disposal Authority? Keeping up with customer demand is an essential part of our business.

Reliability, ensuring our facilities serve customer needs and are safe, compliant and cost-effective, is one of our core values. Planning to ensure continuity of service, innovation, sustainability and financial responsibility is another. And communication with our customers and, indeed with all our stakeholders, is a third core value. Those core values all come into play in our response to accommodate growth in the petroleum industry.

We always have to be forward looking because the permitting requirements are subject to change. We believe in continuous improvement, which means evaluating our facilities in detail, keeping the technology current and cost-efficient and upgrading as needed. Many of the facility improvements described elsewhere in this issue of Clarifier are related to the growth plans of our petrochemical customers.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New pumps at Bayport's lift station

2014 Bayport Facility Improvements Add Capacity, Enhance Reliability

Bayport, GCA's largest facility, began work on a number of improvements in 2014 aimed at increasing capacity while enhancing reliability.

The main construction project completed last year involved upgrading the main lift station to add additional capacity for current and expected growth in the Bayport complex. We installed higher capacity pumps with variable speed drives to allow for more efficient control and replaced the line from the main lift station to the first-step treatment tanks with a larger 42-inch pipeline to provide additional capacity.

Bayport also relocated its disinfection system and added a new dechlorination system. This project was needed to facilitate future construction and to satisfy new regulatory requirements in the facility's next permit cycle. Upgrades included new sodium hypochlorite tanks, sodium bisulfite tanks, control system, and pond configuration to meet design requirements.

The last project we completed in 2014 was the addition of a belt press scale to verify the weight of our biological solids before they are sent to a landfill. The previous scales proved to be unreliable in their operation. This new

Part of the lift station improvements included replacement of the existing line with a larger 42-inch line connecting the station with first-step treatment tanks.

The pond with baffling installed to provide appropriate retention time for the new disinfection system.

scale allows each trailer to be weighed after it is loaded with the solids.

Bayport improvements will continue in 2015 with two new major projects planned. The first is the addition of a new final clarifier that will further increase capacity and reliability. Construction of the new final clarifier began in February and is expected to be completed by mid-2016.

This year's second major project will be the replacement of an internal plant pipeline that conveys water from first-step treatment to our second-step treatment system. This project will replace an older line and provide additional capacity for customer growth.

"Construction projects of this kind involve rather complex scheduling to ensure that we minimize the impact on our customers during the process," said Scott Harris, GCA's Bayport Facility Manager. "We maintain excellent relations and open communications with all the customers who depend on GCA for industrial wastewater treatment services."

GCA's Bayport Facility serves 65 industrial customers and two municipalities via a 2.5-mile BioSan pipeline for process wastewater and contaminated storm water runoff, and a parallel "Clean Stream" concrete channel for streams that require solids removal only, such as cooling tower blow-down water. The original plant was built by Friendswood Development Company, then owned by Exxon, as part of its Bayport Industrial Complex. GCA acquired the facility in 1974 and has expanded and improved it since.

With customers ranging from petrochemical plants, warehouses, transport cleaning stations and bulk storage facilities to the City of La Porte and the City of Shore Acres, Bayport treats one of the most diverse wastewater streams in the GCA system.

Bayport's new scale at the belt press, where solids are weighed prior to being shipped to a landfill.

Before relocation of the disinfection system.

Relocation of the disinfection system, construction under way.

TRASH BASH 2015:
Another Successful Event Supported By GCA

GCA staffers at the Sims Bayou site.

One of GCA's biggest community outreach efforts is… well… kind of trashy. But that's a good thing: The annual River, Lakes, Bays N' Bayous Trash Bash® is a huge Houston-area waterway cleanup event stretching from the north shore of Lake Conroe all the way down to southern Galveston Bay.

The 2015 Trash Bash took place on March 28—an absolutely gorgeous day—as nearly 4,400 volunteers (half under age 18) gathered 37 tons of refuse, 1.3 tons of recyclable materials and 434 old vehicle tires from 162 miles of shoreline in the Greater Houston Area.

The Authority has a rich history of involvement in Trash Bash. GCA has been a sponsor since its inception. GCA Operations Manager Lori Traweek is also president of the Texas Conservation Fund, which organizes Trash Bash, and Executive Secretary Linda Norton is the Fund's treasurer. GCA serves as the site coordinator for two of the event's 15 cleanup sites: Sims Bayou, where new Washburn Tunnel Facility Manager Phyllis Frank joined her predecessor Kelly Nidini, Maintenance Supervisor Dennis Parnell and other staff and volunteers; and Virginia Point in Texas City, where GCA staff and others were led by 40-Acre/Campbell Bayou

Facility Manager Terri Strachan. Trash Bash® 2014 was recognized with two prestigious awards this year, receiving an Environmental Protection Agency Guardian Award and coming in as a finalist in the Governor's Texas Environmental Excellence Awards administered by the Texas Commission on Environmental Quality (TCEQ).

The event was founded in 1994 by the Houston-Galveston Area Council and TCEQ, with seven sites attended by some 3,000 clean up volunteers. That's since grown to 15 sites and an average annual 4,500 volunteers. Since its inception, more than 98,000 volunteers have collected nearly 2,100 tons of trash and more than 9,600 tires.

The 2016 event is slated for Saturday, April 2. You can bet that GCA volunteers will be there.

Another GCA-Outreach Event Announces Top Teams; Academy of Science and Technology wins Texas Envirothon 2015

A five-member team of students from the Academy of Science & Technology in The Woodlands is the winner of the 2015 Texas Envirothon—an environmental competition for high school students. Richardson High School took second place, and the John Cooper School (The Woodlands) placed third. Twenty teams from across Texas took part in this year's competition. The event was held April 11–13 at Schreiner University in Kerrville.

Academy of Science and Technology Team A takes top honors at the 2015 Texas Envirothon at Schreiner University in Kerrville. Pictured (l. to r.) are Colton Nettleton, Andie Tong, Eleanor Shaul, Micheal Bohnet, Horatia Fang and Dean Diana Comuzzie, Trull School of Sciences & Mathematics.

The winning team will travel to Springfield, Mo., to compete at the national competition. Students on the winning team are Michael Bohnet, Horatia Fang, Colton Nettleton, Eleanor Shaul, and Andie Tong. The team advisors are Linda Costanzo and Larry Walker.

Awards were given to the top scoring teams on the field exam by topic and for the top team in the oral presentation during a Monday afternoon ceremony at Schreiner University. The Academy of Science and Technology Team A took first place in Forestry and Soils. Richardson Team A took the top award for Aquatics and Wildlife. The Current Issue winner was Rio Hondo Ocelots. Science Academy of South Texas Team Maroon won first in Oral Presentation. Two special awards were also presented—Richardson Team B received the Extra Mile award and the Rookie Team award was presented to Clear Falls High School and St. John's School for earning the top

field test score among first-time team participants.

Andrew Cortez, team advisor for Science Academy of South Texas, said his students enjoyed their first visit to the hill country and were ecstatic that they did well. “Envirothon has really influenced my students in so many ways,” Cortez said.

Twenty teams from 13 schools participated in the competition. Participating schools were Academy of Science and Technology, The Woodlands; Clear Falls High School, League City; The John Cooper School, The Woodlands; J Frank Dobie High School, Houston; Harmony School of Science, Sugarland; Hallsville High School, Hallsville; Richardson High School, Richardson; Rio Hondo High School, Rio Hondo; St John’s School, Houston; Science Academy of South Texas, Mercedes; South Grand Prairie High School, Grand Prairie; Thomas Jefferson T-STEM Early College High School, Pharr; and Williamson County 4-H, Georgetown.

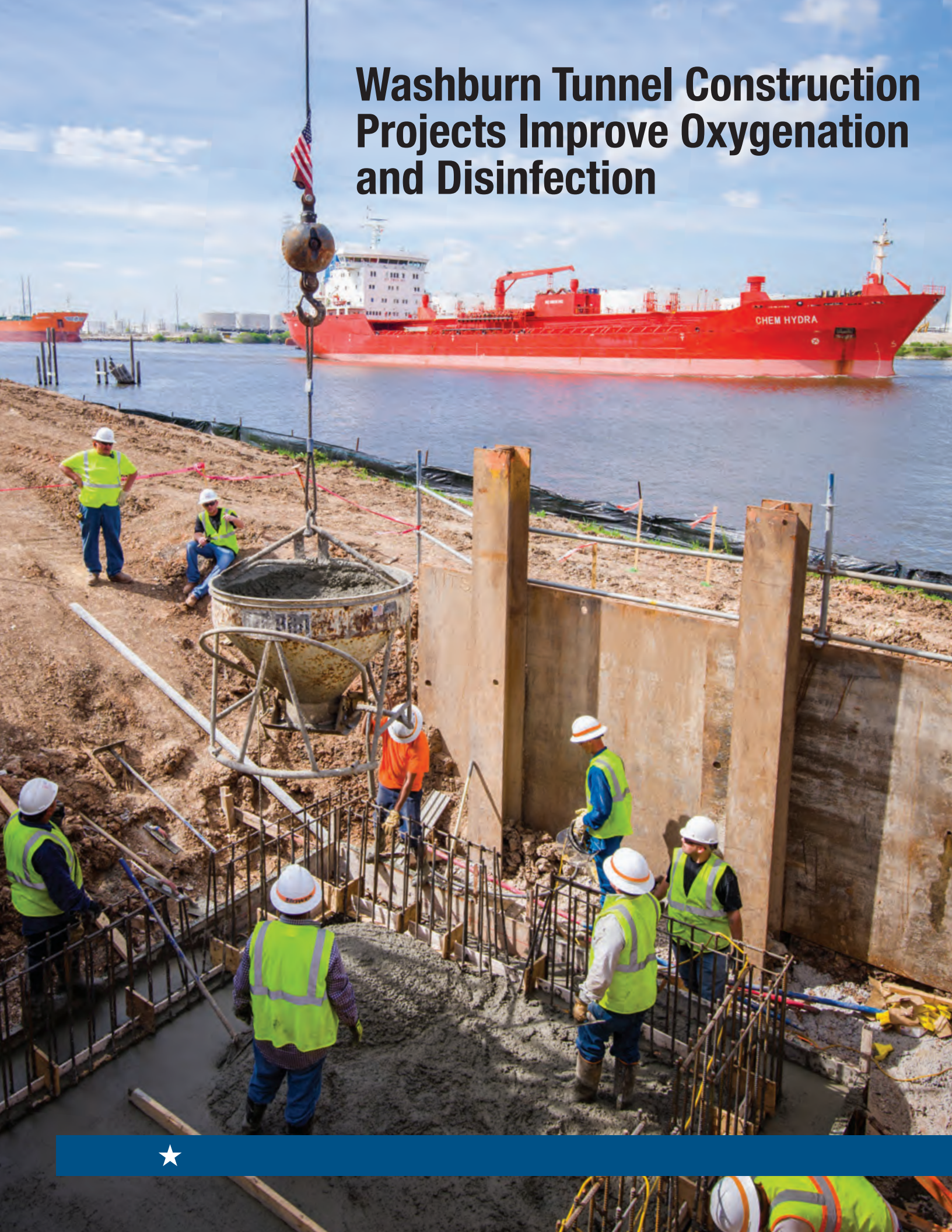
Financial support for the event was provided by conservation districts and natural resource related agencies and businesses from across Texas. Gold level sponsors were Eastman and LyondellBasell.

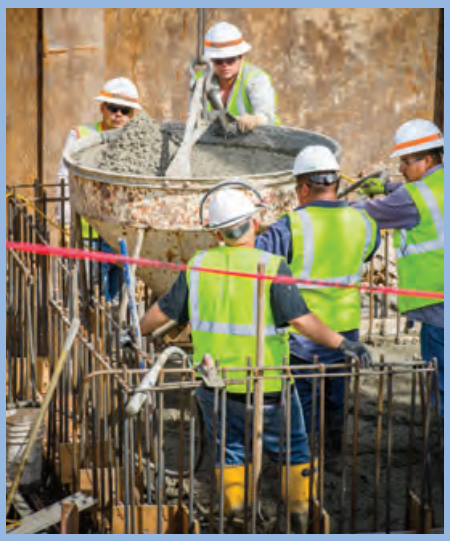
Bronze level sponsors were the Environmental Institute of Houston, Gulf Coast Waste Disposal Authority, the Jacob and Terese Hershey Foundation, NCF Envirothon, Texas Association of Environmental Professionals, Texas Forestry Association and U.S. Forest Service. Other contributors to the event were San Antonio Water System, Texas Association for Environmental Education, Association of Texas Soil & Water Conservation Districts, Harris County Soil & Water Conservation District, and Montgomery County Soil & Water Conservation District. Field trips were hosted by the Riverside Nature Center and the Kerrville Wildlife Management Area.

ABOUT ENVIROTHON

Envirothon is an academic, extra-curricular environmental and natural resource education program and competition designed for high school students. Teams composed of five students answer questions focusing on five areas of study: aquatics, forestry, soils, wildlife, and the current environmental issue. In addition to the field experience, students also participate in an oral component focusing on a real-world environmental problem.

Washburn Tunnel Construction Projects Improve Oxygenation and Disinfection





GCA's Washburn Tunnel Facility has upgraded its aerator control mechanisms and is in the process of constructing a peracetic acid disinfection system. Though not yet widely used in the United States, the effectiveness and reduced retention time of peracetic acid meets the disinfection needs of the facility. (More on the new disinfection system in the next issue of Clarifier.)

Aerators are used to oxygenate the wastewater, providing an oxygen-rich environment for microorganisms to thrive. Microorganisms are integral to the wastewater treatment process. They break down and consume the pollutants in the wastewater prior to final clarification and disinfection.

Primary drivers for the project are improved reliability, safety and operability. Existing controls, manufactured in 1970, are obsolete and becoming unreliable. The new controls are designed to operate on 120 volts, versus the 480-volt starters currently in place. This upgrade will reduce energy consumption and allow operators to monitor and adjust the aerator speeds electronically. It also will allow maintenance personnel to safely troubleshoot the equipment.

The project was completed in March 2015.

Washburn Tunnel was the first facility to be owned and operated by GCA, which acquired the former paper mill wastewater treatment plant in 1973. Modified and improved, the facility provided early demonstration of the effectiveness and viability of industrial wastewater treatment on a regional scale.

Washburn Tunnel is strategically located on the Houston Ship Channel in Pasadena, Texas, amid the refineries, petrochemical plants, bulk storage facilities and other industries it serves. The facility also treats approximately a million gallons per day of municipal wastewater from the City of Pasadena as well as volumes from GCA's nearby Vince Bayou Receiving Station, which receives trucked-in, non-hazardous industrial and portable toilet wastewater.

40-Acre, Odessa South and Bayport Facilities Recognized by National Association of Clean Water Agencies

GCA's outgoing Chairman Mark Schultz presents the NACWA Gold Award to the 40-Acre Facility, with GCA's Manager of Operations Lori Traweek accepting on behalf of Facility Manager Terri Strachan.

Bayport Facility Manager Scott Harris accepts his facility's NACWA Silver Award from outgoing GCA Chariman Mark Schultz.

Charles Harris, Manager of the Odessa South Facility, receives the NACWA Gold Award from former GCA Chairman Mark Schultz.

The National Association of Clean Water Agencies (NACWA), at its mid-July meeting, recognized three GCA facilities for consistently outstanding work.

Our 40-Acre and Odessa South facilities earned Gold Awards for their exemplary National Pollutant Discharge Elimination System (NPDES) permit compliance during 2013. GCA's Bayport Facility received a Silver Award in the same category.

In 2014, 72 facilities at 12 NACWA Member Agencies in Texas were selected for the Association's Peak Performance recognition. GCA is honored to be a part of this level of excellence in environmental protection.

NACWA was established in 1970 by a group of individuals representing 22 large municipal sewerage agencies who met to secure federal funding for municipal wastewater treatment and discuss emerging national interest in improving the quality of the nation's waters. Today, NACWA is a dynamic national organization, involved in all facets of water quality protection.

Franklin D.R. Jones, Jr., Elected Chairman of GCA Board

Franklin D.R. Jones, Jr., J.D.
Harris County
Chairman of the Board

Mark Schultz
Chambers County
Member

Frank Jones was elected Chairman of the Board of GCA in September 2014. He was appointed to the board in 2001 by the Harris County Commissioners Court and served as board secretary prior to becoming chairman. Jones currently is a Shareholder at the international law firm of Greenberg Traurig LLP, where his clients have included the Dallas Cowboys, the Harris County-Houston Sports Authority, Harris County and other governmental entities. He has also served as special counsel to the Harris County Sports & Conventions Corporation.

Jones earned his undergraduate degree from Rice University in 1984 and his Doctorate of Jurisprudence from the University of Houston Law Center in 1995. He is a member of the State Bar of Texas, the National Association of Bond Lawyers, the Houston Bar Association and the Houston Lawyers Association. He also serves on the board of directors of several non-profit organizations in the Houston area including Theatre Under the Stars and the Houston Livestock Show and Rodeo.

Jones succeeds former Chairman Mark Schultz, who was appointed to the GCA Board in 1979, becoming chairman in 1990. During his tenure at GCA, Schultz has served as vice chairman and secretary in addition to chairman of the board.

Schultz pursued a career in banking at Republic National Bank and Texas Commerce Bank before joining the his family's rice farming enterprise in Chambers County in 1970. He is a graduate of North Texas State University.

GCA welcomes Jones as its new chairman and appreciates all the hard work and dedication of Schultz in his various roles with the Authority.

GCA's Blackhawk Regional Wastewater Treatment Facility saw a number of construction projects and upgrades begun or completed during 2014.

While our other facilities primarily treat industrial wastewater, Blackhawk is solely dedicated to regional municipal sewage treatment, serving the City of Friendswood, Harris County Municipal Utility District (MUD) 55, Baybrook Municipal Utility District 1, and extreme southern portions of the City of Houston.

The new UV disinfection system

Among last year's upgrade projects, we completed the rehabilitation of the two oldest of the facility's five dual-media sand filters. These provide tertiary treatment to the water leaving the plant by fine filtering. The old filters were taken down to bare concrete and then refitted with new under-drains and media-support systems. New filter cells were installed with fresh sand and anthracite coal media. New pumps were also installed and the traveling bridges, or elevated walkways, were sand-blasted and painted.

2014 WAS A BUSY YEAR FOR

Also completed in 2014 were upgrades to Blackhawk's ultraviolet (UV) disinfection system. The previous system was outdated and in need of replacement. The new system was activated in April of 2014 and is operating very well. "We are very pleased with the new system's performance" said Gordon Pederson, Manager of Facility Services. "The technology has improved significantly since the first system was installed in 1994."

Last year saw the start of a new headworks for Blackhawk. That's where untreated wastewater first enters the treatment facility. The new headworks will have two automatic, self-cleaning bar screens to remove solid debris and then wash, compact and dewater the screened material in preparation for disposal. Removing screenings at the headworks will increase the lift of all pumps located downstream in the treatment facility.

We're also relocating the four force mains terminating at the old headworks to the new one. The new piping will have new flow meters to record volumes entering the treatment plant.

Top portion of the two automatic, self-cleaning bar screens

Termination of the four force mains coming into the Blackhawk facility

CONSTRUCTION AT BLACKHAWK

The headworks project is expected to be completed by mid-2015.

This year, plans to start construction of a new third clarifier for the facility will begin. This project will help the treatment process during times of high water flow due to rain. The new clarifier will enable operators to better control flow velocities during such storm events.

Blackhawk came on line in 1979 after the City of Friendswood invited GCA to create a regional facility to treat its and other entities' wastewater more efficiently and economically. Its capacity was more than tripled during the 1990s to accommodate customer growth and the facility is currently operating at roughly half capacity.

Wastewater is transported by pipeline to the facility, where it undergoes primary, secondary and advanced treatment, including filtering through sand and charcoal and disinfection by ultraviolet (UV) light, prior to discharge into Clear Creek.

GCA Investigates Industrial Water Management and Reclamation for Permian Basin

GCA has been awarded a $150,000 grant by the U.S. Bureau of Reclamation to study the feasibility of developing regional water recycling infrastructure to provide water for industrial use—including oil and gas exploration and production—in the Permian Basin. The federal grant has been matched by the Odessa Development Corporation, bringing the total to $300,000.

The Permian Basin in West Texas is a major producing area for oil and gas, accounting for 14 percent of total annual petroleum production in the United States.

The conceptual approach is to build one or more facilities that would receive non-potable water from various sources, such as flow-back water from fracking, produced water from the operation of oil wells, brackish groundwater, treated municipal wastewater, and, possibly, water recovered from salt water disposal well fields. GCA would treat and blend water from these sources to provide water with a quality suitable for industrial use—including fracking and

water flooding to enhance oil production—and then redistribute the reclaimed waters to industrial users. Transportation of water to the treatment facility and then on to the location of reuse would be by pipeline.

Potential benefits of such a system include:

- Additional water supply in a water-short area;
- Reduction of industrial demand on water suitable for potable use;
- Additional capacity for salt water disposal; and
- Reduction in truck traffic on area roadways.

The primary investigator for the study is Dr. Peggy Glass of Alan Plummer Associates, Inc. The official completion date for the Agreement with the Bureau of Reclamation is Sept 30, 2016.

Last year's enactment of a bill expanding GCA's ability to participate in broader water resource projects enables the Authority to investigate and pursue projects of this nature.

Christmas Bird Count at GCA Facilities Finds Rare Species

GCA's Texas City facilities are proud to have been a part of the 36th annual Christmas Bird Count. A group of 10 avid birders visited our 40-Acre and Campbell Bayou facilities to count birds in the Galveston area over the 2014 Christmas holidays.

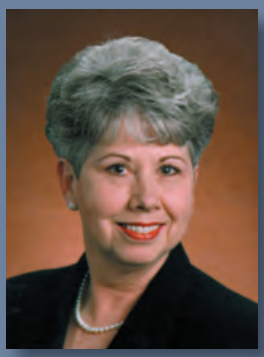
Birders come from all walks of life: a gas trader; Audubon Society Executive Director; SCENIC GALVESTON board members and friends; an NRG Energy employee; Galveston Bay Estuary Program representatives and more.

Overall, the winter 2014 count identified 167 different species – 55 of which were found on the GCA facilities. Two of the species encountered, the Stilt Sandpiper and the Wilson's Phalarope, are uncommon winter finds, seen during this count only by birders at GCA. Another, the Great Kiskadee, a South Texas species very rare to this area, appeared to be attempting to nest and winter at GCA. Also among our winter guests were 13 Sandhill Cranes and many American Pipits. The counts, designed to eliminate spring and fall migrants, assess the true wintering birds for the purpose of ascertaining populations of North American species. These numbers help designate various species as endangered, threatened, or of special concern.

★

Board of Directors

Franklin D.R. Jones, Jr.
Chairman of the Board,
Harris County



Rita E. Standridge
Vice Chair,
Chambers County

Stanley Cromartie
Secretary,
Galveston County

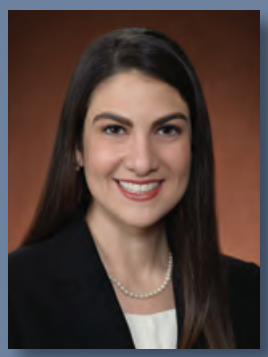
Dr. Irvin Osborne-Lee
Treasurer,
Harris County

J.M. “Mark” Schultz
Member,
Chambers County

Chris Peden
Member,
Galveston County

Ron Crowder
Member,
Galveston County

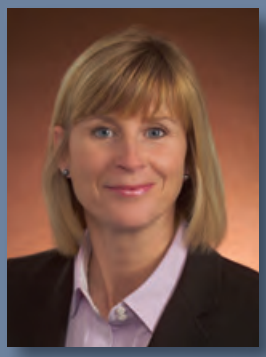
Lamont Meaux
Member,
Chambers County



Gloria Milian Matt
Member,
Harris County

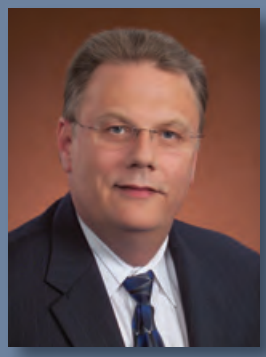
Senior Managers

Ricky Clifton
General Manager



Lori Traweek
Manager of Operations

Elizabeth Free
Manager of Financial Services



Gordon Pederson
Manager of Facility Services

Protecting the waters of the State of Texas
through environmentally sound and economically
feasible regional waste management practices

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