

# Summer The TJCAA Quarterly

2015  
www.tjcaa.com

## Message from the President

### TJCAA "Processes" a New Panel

#### TJCAA's Business Certifications

- Alameda County Small, Local Emerging Business
- Bay Area Green Business Program, Green Business
- City of Oakland Local Business Enterprise
- California DGS Micro Business (SB (micro))
- Port of Long Beach SBE
- San Diego County Water Authority SBE
- SoCal Network SBE
- CA PUC WBE
- Sacramento Municipal Utilities District (SMUD) SEED Vendor

## Message from the President, Gianna Zappettini



Company events are a great way to stay connected with your staff members and have fun at the same time. One of our most recent activities was "footgolf." When I searched the great WWW for a meaningful description, I found the definition of the word was

just as enjoyable as the activity itself. Footgolf is a "portmanteau" word, which means it **combines** parts of two or more words **into one**. I am always looking to expand my vocabulary, and "portmanteau" is my newest addition. I feel the same about the expansion of TJCAA's working relationships. There are always great additions just waiting to happen. So why not consider **combining** the expertise of our company with that of yours **to form one great team** for your next project?

### TJCAA "Processes" a New Panel

TJCAA recently completed an upgrade of the Benicia Water Treatment Plant's programmable



The "Before" Picture

logic controller. PLCs are industrial computer control systems that monitor real-time process controls and instruments.

The PLCs use custom programming to make decisions based on the inputs received, and send output signals to

process control equipment to perform automated functions. A PLC in a WTP might, for example, control the filter backwash system. The PLC can be programmed to initiate the filter backwash sequence if it receives a signal indicating that the turbidity is too high, or that the head loss across a filter is too high. In addition, a manual input can be used to perform a sequence that the PLC controls.

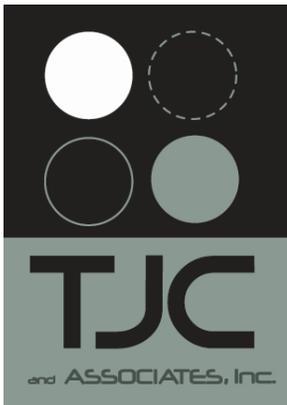
TJCAA Electrical Engineer Mike Erwin explains that the Benicia PLC, which was installed with the WTP's main control panel in 1989, had been subject to many replacements, upgrades, and additions since then. Multiple programmers made the changes, and much of the original program documentation was lost, making the PLC very difficult and expensive to modify and maintain.

Mike has been working with PLCs since 1989, when the Benicia system was his first startup working for an integrator. The original project control system included a GE Fanuc Series 6 PLC with Genius remote I/O in the chemical control building and in four filter control consoles. The Series 6 PLC was replaced with a GE Fanuc 90-70 PLC in 1996 by Erwin Integration. During the 1996 upgrade, the PLC racks were replaced in kind and the internal panel wiring, power supplies, and other components were reused. During a plant expansion in 2006, two additional filter control consoles were added.

In 2014, TJCAA was awarded the contract to design a PLC upgrade based on the latest GE Intelligent Platforms PACSystems RX3i and to provide a fully updated and documented PLC program for control of the WTP. The design included disconnecting all field wiring and removal of the entire mounting panel, installing a new mounting panel with all new components, and re-terminating the existing field wiring on the new terminal blocks. The manufacturing and

Copyright 2015 TJC and Associates, Inc. All Rights Reserved

- Structural Engineering • SCADA • Electrical Engineering • Instrumentation and Controls • Control Systems Programming •



# Summer The TJCAA Quarterly

# 2015

[www.tjcaa.com](http://www.tjcaa.com)

installation project went out to bid in November of 2014 and was awarded to Telstar Instruments in January 2015.

TJCAA staff worked closely with Telstar during the submittal through manufacturing phases of the project to arrange the panel layout for an efficient installation and to fully document the existing field terminations. Because the plant “as-built” drawings were anything but that, this project offered the team unique opportunities to tour the deep recesses of the plant while following conduit runs along the ceiling, tugging on various wires in pull boxes to see exactly where they went.

The programming portion of the work also included some unique challenges. Because most of the existing PLC’s program was not documented, TJCAA used a database export file from the plant’s existing SCADA software to document the PLC tags, then reverse-engineered the existing ladder logic to determine how the existing PLC controlled each plant process.

Mike explains what came next: “Once we determined how a process was controlled, its PLC program was rewritten and fully documented. Using the latest programming features and techniques, we were able to reduce the size of the program by about 20%. We developed the user-defined function blocks for scaling analog I/O to real numbers (in engineering units), totalizing flows, controlling equipment cycle timers, tracking equipment runtimes, and filtering noisy analog input signals.”

At 9:00 a.m. on Monday, May 27 the plant was taken offline and the demolition crew came in and removed the old mounting panel. TJCAA’s Maria Aguirre was on-site during the day shift, monitoring progress and making sure the installation matched the drawings. By 3:00 p.m. the old panel was removed and installation of the

new panel began. We powered up the PLC and began point-to-point and functional testing as soon as the wires were terminated for each piece of equipment. Work continued through the night with Telstar bringing in multiple shifts to cover the installation.

By 9:00 a.m. the next day we began to bring the plant online and by 10:00 a.m. the plant was once again producing drinking water with all critical monitoring and control systems in full operation. This project offers a great example of the plant staff, the contractor, and the consulting engineer working in cooperation to accomplish an extraordinary amount of work in a very limited time.

Mike Erwin, who pulled a 28-hour shift to shepherd the installation, notes that special kudos should be given to Ted Kozlik, the plant maintenance technician who was instrumental in both the prep work and in tracking down mysterious wires during our all-night adventure. We also wish to acknowledge Telstar Instruments for staffing the installation with the right people for this challenging work.

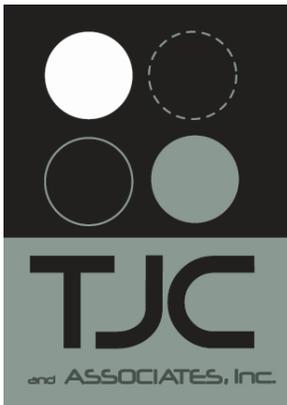
If your PLC is in need of an upgrade, call us to discuss how we can help you bring it up to speed.



After the Upgrade - Functional Beauty!

Copyright 2015 TJC and Associates, Inc. All Rights Reserved

• Structural Engineering • SCADA • Electrical Engineering •  
• Instrumentation and Controls • Control Systems Programming •



# Summer

## The TJCAA Quarterly

2015  
[www.tjcaa.com](http://www.tjcaa.com)

### Did you know?

### Entertainment Review

#### Did you know?

The US Geological Survey Earthquakes Hazards Program conducts seismic hazard assessments, monitors seismic activity, and reports on earthquakes. If you think that you have felt an earthquake, you can open up the map at [earthquake.usgs.gov/earthquakes/map/](http://earthquake.usgs.gov/earthquakes/map/) and check it out.

The USGS also publishes a helpful guide titled *Putting Down Roots in Earthquake Country: Your Handbook for the San Francisco Bay Region*. The guide lists several steps that we can take to prepare for earthquakes. Why prepare? As the guide puts it, "The disastrous 1989 magnitude 6.9 Loma Prieta earthquake was not the 'Big One!' If you do not prepare for the next big quake in the Bay Area, you and your family could be left without a home, food and water, medical supplies, and financial resources."

Communities throughout the Bay Area are at risk from earthquake effects, which include shaking, landslides, and liquefaction. The USGS states "there are many faults in the Bay Area certain to produce large earthquakes in the future...Scientists estimate that there is more than a 60% chance of a damaging earthquake striking the region in the next 30 years." The classification "damaging earthquake" in this case is one of magnitude 6 or greater.

The guide describes six steps to prepare for earthquakes:

1. Identify potential hazards in your home and begin to fix them.
2. Create a disaster-preparedness plan.
3. Create disaster kits.
4. Identify your building's potential weaknesses and begin to fix them.
5. Protect yourself during earthquake shaking.

6. After the quake, check for injuries and damage.
7. When safe, continue to follow your disaster-preparedness plan.

For more detail, tips on how to get started, and interesting facts about earthquakes, check out the guide, which is available at: <http://earthquake.usgs.gov/regional/nca/prepare/index.php>.

#### Entertainment Review

Throughout our area, local and regional organizations sponsor outdoor summer concerts, often lining up an entire series of shows. TJCAA family member Coral Cavanagh recently attended an installment of the Fair Oaks Concerts in the Park



Concertgoers in Fair Oaks

series. This long-running tradition offers an opportunity to enjoy music from the comfort of one's own lawn chair or blanket in a family friendly setting. On Thursday evenings throughout the summer, old folks and young folks alike gather to hear rock, blues, pop, and even cowboy tunes, and can share the evening with the unique blend of people (and chickens) that gives Fair Oaks its charm.

We recommend checking out your local summer concert opportunities, many of which are offered free of charge. For specific suggestions, see the events in our Dates to Note section below—the band SOL and the Junius Courtney Big Band feature TJCAA's own Paul Giorsetto on trumpet!

Copyright 2015 TJC and Associates, Inc. All Rights Reserved

• Structural Engineering • SCADA • Electrical Engineering •  
• Instrumentation and Controls • Control Systems Programming •



**TJC**

and ASSOCIATES, Inc.

Fun Fact about  
TJCAA

Dates to Note

# Summer The TJCAA Quarterly

# 2015

www.tjcaa.com

## Fun Fact about TJCAA

We are music lovers here at TJCAA. We enjoy listening to a wide variety of music, and many of us play instruments ourselves:

Andria – Clarinet

Gianna – Piano

Maria – Bell Lyre, Flute

Hernando – Bell Lyre, Cello, Drums, Piano

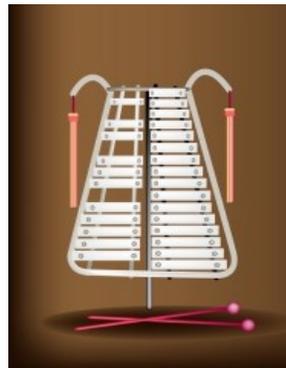
Michelle – Cello

Paul – Flute, Piano, Trombone, Trumpet, Flugelhorn

Richard – Bagpipes, Flute/Recorder

Rick – Guitar (Electric, Acoustic, Bass)

Terry – Ukulele



This is a bell lyre.

(Photo by lamnee,  
freedigitalphotos.net)

Speaking of music, on May 5, 1965, the Warlocks played their first public gig at Magoo's Pizza Parlor in Menlo Park. Fifty years later, the four remaining members will play two shows at Levi's Stadium in Santa Clara, CA on 6/27/2015 and 6/28/2015.

They'll then play three shows at Soldier Field in Chicago, IL on 7/3/2015, 7/4/2015 and 7/5/2015.

They'll play as The Dead. In the interim years, they played over two thousand shows as The Grateful Dead.

## Dates to Note

- June 21 The Summer Solstice
- June 25–28 U.S. Senior Open Championship, Del Paso Country Club, Sacramento
- June 27–28 Maker Faire Kansas City
- June 29–July 12 The Championships at Wimbledon
- July 4–26 Tour de France
- July 5 FIFA Women's World Cup Finals, Vancouver, Canada
- July 13–16 Intersolar North America, San Francisco
- July 10–26 California State Fair
- July 16–19 The Open Championship at St. Andrews
- July 24 SOL at the Foster City Friday Evening Concert Series, Foster City Amphitheater, 6-8 pm (FREE)
- August 6 SOL at Palo Alto Music in the Plaza, Palo Alto City Hall, 6–8 pm (FREE)
- August 12–13 Perseids Meteor Shower
- August 31–September 13 US Open Tennis Tournament, New York City
- August 23 Junius Courtney Big Band at Friends of the Golden Gate Library event, Doyle-Hollis Park, Emeryville, 3–5 pm, (FREE)
- September 10 NFL Season Opener Steelers at Patriots

Copyright 2015 TJC and Associates, Inc. All Rights Reserved

• Structural Engineering • SCADA • Electrical Engineering •  
• Instrumentation and Controls • Control Systems Programming •