

USCID Water Management Conference

*Planning, Operation and Automation  
of Irrigation Delivery Systems*



**USCID**

*The U.S. society for irrigation and drainage professionals*

Cooperating Organization —  
*American Society of Civil Engineers*

**ASCE** American Society  
of Civil Engineers

*Environmental and Water Resources Institute*



December 2-5, 2014  
Phoenix, Arizona

# Program

## Monday, December 1

1:00 p.m. - 5:00 p.m.    **Optional Workshop —  
Variable Speed Pumps**

Presented by — **Charles M. Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA

## Tuesday, December 2

7:00 a.m. - 5:30 p.m.    **Registration**

8:00 a.m. - 11:30 a.m.    **Field Tour**

This half-day field trip will visit Hanson Pipe & Precast.

12:00 noon - 1:15 p.m.    **Lunch with Speaker**

Moderator — **Bryan P. Thoreson**, President, USCID, and Davids Engineering, Inc., Davis, CA

*The History of Modernization*

**Herve L. Plusquellec**, Consultant, Washington, DC

1:30 p.m. - 3:00 p.m.    **Opening Plenary Session —  
ASCE Manual of Practice 131: Canal Automation for  
Irrigation Systems**

Moderator — **Brian T. Wahlin**, WEST Consultants, Inc., Tempe, AZ

*Keynote Address — Control Engineering for Irrigation and  
Drainage Canals*

**Peter-Jules van Overloop**, Delft University of Technology, Delft, The Netherlands

*Modernization Concepts*

**Darell D. Zimelman**, Water Systems Operations & Management LLC, Windsor, CO

*Infrastructure*

**Charles M. Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA

3:00 p.m. - 3:30 p.m.    **Break**

3:30 p.m. - 5:00 p.m.    **Opening Plenary Session,  
continued**

*Operations Concepts*

**Pierre-Olivier Malaterre**, IRSTEA, Montpellier, France

*SCADA Implementation*

**Robert Strand**, Agricultural Research Service, USDA, Maricopa, AZ; and **Sumith Choy**, Rubicon Pty Ltd, Hawthorn East, Australia

*Control Details*

**Albert J. Clemmens**, WEST Consultants, Inc., Tempe, AZ

5:00 p.m. - 5:30 p.m.    **Meet the Exhibitors**

5:30 p.m. - 7:30 p.m.    **Networking Reception and  
Exhibition**

## Wednesday, December 3

7:00 a.m. - 5:00 p.m.    **Registration**

7:00 a.m. - 8:00 a.m.    **Continental Breakfast in  
Exhibit Hall**

8:00 a.m. - 9:30 a.m.    **Plenary Session —  
Panel Discussion: Irrigation District Modernization**

Moderator — **Charles M. Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA

### Panel Members

**Clarence J. Begay**, San Carlos Irrigation Project, Coolidge, AZ

**David Gensler**, Middle Rio Grande Conservancy District, Albuquerque, NM

**Bryan Kelly**, Merced Irrigation District, Merced, CA

**Hector Mendez**, Imperial Irrigation District, Imperial, CA

**Tim O'Halloran**, Yolo County Flood Control and Water Conservation District, Woodland, CA

**Alejandro Paolini**, Henry Miller Reclamation District #2131, Dos Palos, CA

9:30 a.m. - 10:30 a.m.    **Break in Exhibit Hall**

10:30 a.m. - 12:00 noon    **Plenary Session —  
Panel Discussion: Irrigation District Modernization,  
continued**

Moderator — **Charles M. Burt**

12:00 noon - 1:15 p.m.    **Lunch with Speaker**

Moderator — **Bryan P. Thoreson**

*Without a Paddle: Navigating the Murky Waters of the Clean Water Act's Definition of "Waters of the US"*

**Sheryl Sweeney** and **Samuel Lofland**, Ryley Carlock & Applewhite, Phoenix, AZ

1:30 p.m. - 3:00 p.m. **Technical Session 1A — Irrigation District Modernization I**

Moderators — **Peter-Jules van Overloop**, Delft University of Technology, Delft, The Netherlands; and **Jeffrey Shaw**, Stantec Consulting, Sacramento, CA

*Implement Total Channel Control® Technology Oakdale Irrigation District — Case Study*

**Steve Knell** and **Eric Thorburn**, Oakdale Irrigation District, Oakdale, CA

*Reducing Operational Spills on a 100-Year-Old Canal System*

**Brian W. Sauer**, Bureau of Reclamation, Boise, ID; and **Brian Olmstead** and **Louis Zamora**, Twin Falls, Canal Co., Twin Falls, ID

*Irrigation Canal Automation: A Collaborative Research and Development Journey Between the University of Melbourne, and Rubicon Water Pty Ltd.*

**Anthony Oakes**, Rubicon Pty Ltd, Hawthorn East, Australia; and **Ivan Mareels**, University of Melbourne, Melbourne, Australia

1:30 p.m. - 3:00 p.m. **Technical Session 2A — Canal Flow Measurement**

Moderators — **Nelson W. Plummer**, Water Resources Consultant, Scottsdale, AZ; and **Blair L. Stringam**, New Mexico State University, Las Cruces, NM

*Improved Water Management, Measurement and Accounting for the Carlsbad Irrigation District*

**Albert J. Clemmens**, WEST Consultants, Inc., Tempe, AZ; **Dale Ballard**, Carlsbad Irrigation District, Carlsbad, NM; and **Loren Kirkes**, K&B Engineering, Carlsbad, NM

*Clamp-On Ultrasonic Flowmeter at the Horsetooth Reservoir Outlet: A Case Study*

**Amy L. Johnson**, Northern Colorado Water Conservancy District, Berthoud, CO

*Features of the Supervisory Control and Data Acquisition (SCADA) System for Centralized Operation of the Central Arizona Project Canal*

**Alex Khazanovich** and **Marcus Shapiro**, Central Arizona Project, Phoenix, AZ

3:00 p.m. - 3:30 p.m. **Break in Exhibit Hall**

3:30 p.m. - 5:00 p.m. **Technical Session 1B — Irrigation District Modernization I, continued**

Moderators — **Peter-Jules van Overloop** and **Jeffrey Shaw**

*Replacing Soviet Built Centralized Pumping Schemes with Efficient Modular Pumping Schemes in the Republic of Moldova*

**Andrew A. Keller** and **Michael J. Isaacson**, Keller-Bliesner Engineering, LLC, Logan, UT

*Modernization Efforts — The Case of Henry Miller Reclamation District*

**Alejandro Paolini**, San Luis Canal Company and Henry Miller Reclamation District No. 2131, Dos Palos, CA

*Efficient Water and Energy Use by Modernization and Automation of Canals in the Irrigation Module, Valley of Banderas, Nayarit, Mexico*

**Osuna Duarte A.**, Nortech Water Specialities, Mexicali, Baja California, Mexico; and **Montiel G. Mario**, Water Technology Institute of Mexico, Jiutepec, Morelos, Mexico

3:30 p.m. - 5:30 p.m. **Technical Session 2B — Canal Flow Measurement, continued**

Moderators — **Nelson W. Plummer** and **Blair L. Stringam**

*Rehabilitation of SRP's Horseshoe Dam Outlet Works, Providing Irrigation Flow Since 1945*

**Noel Guercio** and **Gary Brady**, Stantec Consulting Services Inc., Phoenix, AZ; and **Roger Baker** and **Kevin Wolford**, Salt River Project

*Scalable Low-Power Networked Hydrometry for Distributary Canal Networks in the Indus Basin*

**Abubakr Muhammad**, Lahore University of Management Sciences, Lahore, Pakistan

*Volumetric Flow Measurement in the Junta de Vigilancia Río Elqui Irrigation District, Chile*

**Alan Jackson**, Rubicon Water, Imperial, CA

*Modernization of the Walker River Irrigation District Water Gauges*

**Stuart W. Styles**, ITRC, California Polytechnic State University, San Luis Obispo, CA; **Robert C. Bryan**, Walker River Irrigation District, Yerington, NV; and **Kenneth C. Spooner**, Consultant, Yerington, NV

6:30 p.m. - 7:00 p.m. **Reception**

7:00 p.m. - 9:30 p.m. **Dinner with Speaker**

Moderator — **Bryan P. Thoreson**

*Water Issues in Congress that Affect Irrigation Districts*

**Robert Johnson**, Executive Vice President, National Water Resources Association, Scottsdale, AZ

## Thursday, December 4

7:00 a.m. - 5:00 p.m. **Registration**

7:00 a.m. - 8:00 a.m. **Continental Breakfast and Poster Session**

### *Funding Agricultural Water Conservation in Texas*

**Mindy M. Conyers** and **Cameron G. Turner**, Texas Water Development Board, Austin, TX

### *Small Acreage Pasture Irrigation*

**Jacob Hymas**, California Polytechnic State University, San Luis Obispo, CA

### *Automated Surface Irrigation*

**Alan Jackson**, Rubicon Water, Imperial, CA

7:30 a.m. - 8:00 a.m. **USCID Members Meeting**

Moderator — **Bryan P. Thoreson**

8:00 a.m. - 10:00 a.m. **Concurrent Session 3A — Irrigation District Modernization II**

Moderators — **Charles M. Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA; and **Brian T. Wahlin**, WEST Consultants, Inc., Tempe, AZ

### *Modernization of Customer Turnouts for SBx7-7 Compliance*

**Wes Miller**, Turlock Irrigation District, Turlock, CA

### *Modernization of Irrigation Canal Systems in Vietnam — Practice and Lessons Learned*

**Dao Viet Dzung** and **Nguyen Tung Phong**, Vietnam Academy for Water Resources Research, Hanoi, Vietnam

### *Management of Irrigation Systems in the Yuma, Arizona, Area*

**Nelson W. Plummer**, Water Resources Consultant, Scottsdale, AZ

### *Merced Irrigation District's Water Resources Management Plan — the District's Long Range Investment and Modernization Strategy*

**Bryan Kelly**, Merced Irrigation District, Merced, CA

8:00 a.m. - 10:00 a.m. **Concurrent Session 4A — Irrigation District Modernization III**

Moderators — **John A. Replogle**, Consultant, Phoenix, AZ; and **Tom Gill**, Bureau of Reclamation, Denver, CO;

### *San Carlos Irrigation and Drainage District Water Conservation Opportunities*

**Albert J. Clemmens**, WEST Consultants, Inc., Tempe, AZ; **Grant G. Davids**, Davids Engineering, Inc., Davis, CA; **Delbert M. Smith**, Bureau of Reclamation, Denver, CO; and **Chad Wegley**, San Carlos Irrigation and Drainage District, Coolidge, AZ

### *Automation of Pressurized Irrigation Systems at the South San Joaquin Irrigation District*

**Jason Foster**, Stantec Consulting, Rocklin, CA; and **Jeff Shaw**, Stantec Consulting, Sacramento, CA

### *Minimizing Impacts and Optimizing Benefits when Configuring Irrigation Conveyance Pipelines in Previously Developed Farmland*

**Michael J. Isaacson**, **Ronald D. Bliesner** and **Andrew A. Keller**, Keller-Bliesner Engineering, LLC, Logan, UT

### *Tradeoffs Between Efficiency and Energy in the Modernization of Irrigation in Spain*

**Luciano Mateos**, Instituto de Agricultura Sostenible, Córdoba, Spain; **Juan A. Rodríguez-Díaz**, University of Córdoba, Córdoba, Spain; and **Pedro Parias**, FERAGUA, Sevilla, Spain

10:00 a.m. - 10:30 a.m. **Break**

10:30 a.m. - 12:00 noon **Concurrent Session 3B — Irrigation District Modernization II, continued**

Moderators — **Charles M. Burt** and **Brian T. Wahlin**

### *Winter Delivery Capacity and Emergency Control of a Large Cascade Open-Channel System*

**Guanghua Guan** and **Ting Liu**, Wuhan University, Wuhan, China; and **Guoqiang Liu** and **Yibo Yan**, Changjiang Institute of Survey, Planning, Design and Research, Wuhan, China

### *Specifying Appropriate Construction Standards for Irrigation Conveyance Pipelines in the Republic of Moldova*

**Michael J. Isaacson** and **Andrew A. Keller**, Keller-Bliesner Engineering, LLC, Logan, UT

### *Successful Canal Automation — Examples from Around the World*

**Anthony Oakes** and **Sumith Choy**, Rubicon Pty Ltd, Hawthorn East, Australia

10:30 a.m. - 12:00 noon **Concurrent Session 4B — Irrigation District Modernization III, continued**

Moderators — **John A. Replogle** and **Tom Gill**

### *Predictive Analytics for Residential Water Efficiency Programs: Promises and Pitfalls*

**Hal T. Nelson**, and **John Shideler**, Claremont Graduate University, Claremont, CA

### *Irrigation System Modernization in Australia*

**Damien Pearson**, Rubicon Water, Fort Collins, CO

### *Storm Water Management on Farmland Located in Low Elevation Flood Plains of the Prut River in the Republic of Moldova*

**Ronald D. Bliesner** and **Michael J. Isaacson**, Keller-Bliesner Engineering, LLC, Logan, UT

12:00 noon - 1:15 p.m. **Lunch with Speaker**

Moderator — **Bryan P. Thoreson**

Speaker — **Michael J. Lacey**, Director, Arizona Department of Water Resources, Phoenix, AZ

1:30 p.m. - 3:00 p.m. **Concurrent Session 5A — Groundwater/Water Quality**

Moderators — **Michael Davidson**, Davidson Consultants, Altadena, CA; and **David E. Bradshaw**, Imperial Irrigation District, Imperial, CA

*Regulation of Agricultural Groundwater Nitrates in California*  
**Charles Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA

*Third Time's the Charm, Right? — An Adventure into Groundwater Wells*

**Jared C. Grandy**, Stantec Consulting Services Inc., Phoenix, AZ

*Satellite-Based Calculator for Estimation of Crop Consumptive Use Fraction*

**Lee Johnson** and **Forrest Melton**, NASA ARC-CREST/CSU Monterey Bay, Moffett Field, CA

1:30 p.m. - 3:00 p.m. **Concurrent Session 6A — Canal Control and Operation**

Moderators — **Albert J. Clemmens**, WEST Consultants, Inc., Tempe, AZ; and **Darell D. Zimbelman**, Water Systems Operations & Management LLC, Windsor, CO

*Human in the Loop Control of Dez Main Canal*

**Peter-Jules van Overloop**, Delft University of Technology, Delft, The Netherlands; **José M. Maestre**, University of Seville, Seville, Spain; **Seied M. Hashemy**, University of Tehran, Tehran, Iran; **Anna D. Sadowska**, Delft University of Technology, Delft, The Netherlands; **Jeff C. Davids**, H2oTech | CSU, Chico, CA; and **Eduardo F. Camacho**, University of Seville, Seville, Spain

*Pecos River Basin Water Management in New Mexico*

**Emile Sawyer**, New Mexico Interstate Stream Commission, Santa Fe, NM; **Larry Grey**, Bureau of Reclamation, Albuquerque, NM; and **Greg Lewis**, New Mexico Interstate Stream Commission, Santa Fe, NM

*Fault Tolerant Model Predictive Control of Open Channels*

**Klaudia Horvath**, École des Mines de Douai, Douai, France; **Joaquim Blesa**, Institut de Robòtica i Informàtica Industrial, Barcelona, Spain; **Eric Duviella**, École des Mines de Douai, Douai, France; and **Karine Chuquet**, VNF, Lille, France

3:00 p.m. - 3:30 p.m. **Break**

3:30 p.m. - 5:00 p.m. **Concurrent Session 5B — ET and Field Irrigation**

Moderators — **Michael Davidson** and **David E. Bradshaw**

*Field Testing of an Automated Surface Irrigation System*

**Tom Gill** and **Dale Lentz**, Bureau of Reclamation, Denver, CO; and **Khaled Bali**, University of California Desert Research Center, Holtville, CA

*ET Toolbox: An Overview*

**Carolyn E. Donnelly**, Bureau of Reclamation; and **David Gensler**, Middle Rio Grande Conservancy District, Albuquerque, NM

*Flow Measurement Options for Canal Turnouts*

**Kyle Feist** and **Charles M. Burt**, ITRC, California Polytechnic State University, San Luis Obispo, CA

3:30 p.m. - 5:00 p.m. **Concurrent Session 6B — Canal Control and Operation, continued**

Moderators — **Albert J. Clemmens** and **Darell D. Zimbelman**

*Simulation and Integration of Control for Canals Software (SIC2), for the Design and the Verification of Manual or Automatic Controllers for Irrigation Canals*

**Pierre-Olivier Malaterre**, **David Dorchies** and **Jean-Pierre Baume**, IRSTEA, Montpellier, France

*An Automatic Control Strategy for Closure and Opening of Irrigation Canals*

**E. Galvis**, **J. Mantecón** and **M. Gómez**, Technical University of Catalonia, Barcelona, Spain; **K. Horváth**, Ecole des Mines de Douai, Douai, France; and **J. Rodellar**, Technical University of Catalonia, Barcelona

*Cost Effective Rehabilitation of Aged Irrigation Systems Connection Basins*

**John Paulson**, Milliken Infrastructure Solutions, LLC, Alpharetta, GA

**Friday, December 5**

8:00 a.m. - 5:30 p.m. **Field Tour**

This day-long tour will visit the Central Arizona Project, including the Project control center and New Waddell Dam.

(Updated November 12, 2014)