



Monthly Update

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September 2017

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Executive Director's Message

Catching up with Kevin Hardy

Some words about the NWRI



A Conversation with Kevin Hardy Most of us remember Kevin Hardy as the energetic General Manager of the Encina Wastewater Authority. Kevin's progressive vision and leadership further advanced the innovative resource recovery program Encina is known for. Kevin is now the Executive Director of the National Water Research Institute (NWRI). SCAP enjoyed a recent opportunity to catch up with Kevin and ask him a few questions. As usual, Kevin has a lot to say so his message will dominate the Executive Director's Message this month,

SCAP – So Kevin what have you been up to?

KH - After taking some time off and freelancing a bit to keep busy, I started at NWRI in April, 2017. All our "children" have either established themselves as adults or have begun their adult journey so ... after a few months of commuting to the NWRI offices at the Orange County Water District we decided it was a good time to move from Carlsbad to the Newport Beach area. We just finished the physical aspect of the move. In the end, it was very difficult emotionally to leave San Diego county after 33 years – my wife and I spent our entire adult lives there so, as you might imagine, there have been some challenges. That said, she was raised in Costa Mesa and we've begun to learn more about living in Orange County. It's a similar lifestyle but a bit faster pace than North County. Learning the coast and breaking in at the local surf spots is also an on-going process.

SCAP - How did you get into the water industry?

KH - My first professional assignment was in the City of San Diego's Water Utilities Department. I was attached to the Combined Water and Sewer Systems Division and given the responsibility of coordinating the implementation of the Utilities' first CMMS. It was a mainframe based system and most of the veteran employees did not like the idea of having a computer assign and track their work. It introduced me to the water industry and I really enjoyed it. After a couple of years, I was promoted and reassigned by the City Manager and after five years at San Diego, I took a position at the City of Chula Vista. My plan was to be a city manager but after 10 years on that grind, an executive position opened up right down the street from our new home in Carlsbad at the Encina Wastewater Authority. And the rest, as they say, is history. I spent over 21 years at EWA which gave me the privilege of working for and with many, many good

[A Conversation with Kevin Hardy - continued](#)

people. And it pleases me that we left the clean water infrastructure in North County better than we found it and well-positioned for long-term success in protecting the Pacific Ocean and to intelligently manage the agency's resource recovery initiatives.

SCAP - What do you like about the water industry?

Defining and solving practical problems is exciting to me. As water resource professionals we get to resolve social, political, financial, planning, construction, operational, regulatory, risk management, and emergency response issues – sometimes all in the same day! I get a great deal of satisfaction participating in a community of professionals dedicated to preserving and enhancing a life-sustaining resource.

SCAP - Where is the water industry headed?

My sense is that there are two big trends that will drive where the water industry is headed. The industry trend is data analytics. I believe the ability to acquire and meaningfully analyze data will significantly impact how utilities and their partners define challenges and how those challenges are resolved. Citizens see data analytics impacting their professional and personal lives in positive ways and will expect no less from water resources managers. This technology will also enable utilities and regulators to diminish the innovation adoption curve while enhancing public health. The macro trend is water scarcity. Our lives, lifestyles and economy are each predicated on the availability of clean, fit for purpose water. We are already keenly aware of how water scarcity is now impacting nations, states, regions and communities, as well as their respective water infrastructure investments, across an incredibly diverse matrix of issues. Scarcity can motivate organizations and people to cooperate and adapt – it can also motivate conflict. As water professionals, we can and should serve as role models of cooperation for the public good.

SCAP - What are some of the challenges?

Many of the challenges facing the water industry are a function of how we communicate with the people whose health is in our hands and who foot the bill. Communicating with folks outside our industry about water quality and the resulting impacts on public health, the value and reliability of the services water utilities provide, and our motivations for investment must be timely, relevant and transparent. Understanding promotes trust and the water industry is in the trust business.

SCAP – What are your current hobbies?

In my free time you will find me in, on or around water.

SCAP – Tell us a little about the history and mission of NWRI

NWRI's mission is to ensure safe, reliable sources of water are available now and for future generations, NWRI was established in 1991. It has two independent but related entities, a California Joint Powers Agency (JPA) and an Internal Revenue Code Section 501c3 Non-Profit. The JPA Member Agencies are the Orange County Water District, the Orange County Sanitation District, the Irvine Ranch Water District, the Inland Empire Utilities Agency, the Los Angeles Department of Water and Power and the West Basin Municipal Utility District. NWRI's purpose is to contribute to the knowledge of managing water resources, enhancing water quality and supply, encouraging water conservation, preventing or remediating the degradation of water quality, protecting the beneficial uses of water resources, and improving public awareness and education with respect to water resource issues. What that means is:



Kevin Hardy
Executive Director - NWRI

[A Conversation with Kevin Hardy - continued](#)

we help our member agencies, other water utilities and regulators achieve their water resources management goals through independent expert advisory, research and related services.

SCAP - Who should be a member of NWRI?

Any public entity interested in contributing to the advancement of water resources management and public health should consider becoming a member of the Joint Powers Agency. The annual subscription for JPA members is \$50,000. Private sectors firms who share these interests can participate in NWRI through its 501c3 Non-Profit. Our corporate associates support NWRI generally through an annual campaign and through sponsoring events like the Clarke Prize Award and Conference. NWRI is about to initiate its first strategic planning process so now is an excellent time to get involved.

SCAP – What are some current priority initiatives of NWRI?

NWRI has thirteen active Independent Advisory Panels (IAP), eight active research projects and we're involved a variety of other activities as well. Right now, the IAPs supporting the Orange County Water District's Groundwater Replenishment Project, the City of San Diego's Pure Water Program, Padre Dam Municipal Water District's Indirect Potable Reuse Program, the Pure Water Soquel Project, and planning for the Clark Prize Award and Conference are front and center. We are working with the State Water Resources Control Board, the Department of Water Resources, WateReuse California and the Water Environment Research Foundation (WE&RF) on other exciting projects in support of water reuse as well.

SCAP - What is the history and significance of the Clarke Prize?

The Clarke Prize would not be possible without the vision and support of a very special group of people: the Irvine Family of Orange County, California. Through the Joan Irvine Smith and Athalie R. Clarke Foundation, the Irvine Family helped establish NWRI in 1991 and the Clarke Prize in 1994.

The Clarke Prize was named after Mrs. Athalie Richardson Irvine Clarke, a highly respected philanthropist who passed away in 1993. Fondly known as the "First Lady" of Orange County, California, Mrs. Clarke served on the White House preservation committee and participated in many other political activities. She and her daughter, Mrs. Joan Irvine Smith, ran the Irvine Ranch, one of California's most productive crop farms, and served on the board of trustees of the Irvine Company, a privately held real estate investment company with properties all throughout coastal southern California. Because of her ties to the land, Mrs. Clarke recognized the vital importance of water and strongly promoted better water science and technology. As supporters of the Clarke Prize, the Foundation not only sponsors the award, but members of the Irvine family are actively involved with the award ceremony and conference. The family has attended every Clarke Prize since 1994, presenting each winner with the Clarke Medallion and \$50,000 check. We are grateful to the Irvine Family and Joan Irvine Smith and Athalie R. Clarke Foundation for their outstanding support that has helped make the Clarke Prize one of the most esteemed water prizes in the world.

SCAP – Who is the 2017 Clarke Prize winner?

The 2017 Clarke Prize Laureate is Charles N. Haas, Ph.D. and LD Betz Professor of Environmental Engineering and Head of the Department of Civil, Architectural, and Environmental Engineering at Drexel University in Philadelphia, PA. His most widely cited book, *Quantitative Microbial Risk Assessment* (1999), the first complete guide for measuring and evaluating the risks to humans posed by disease-causing organisms in food, water, air, and other environmental pathways. As used today,



**2017 Clark Prize Laureate
Charles Haas**

quantitative microbial risk assessment (QMRA) involves hazard identification, dose response, exposure assessment, and risk characterization. This valuable tool has influenced the development of public health guidance and policies by prominent organizations both nationally and internationally. The USEPA has cited Haas’ research in the Surface Water Treatment Rule and Ground Water Rule (2006). Haas also used his expertise in QMRA to help the World Health Organization (WHO) develop multiple water guidelines. Today, Haas is known as the “Father of QMRA.” Dr. Haas was among 24 nominees for the 2017 Clarke Prize.

Clarke Prize winners are an incredibly distinguished group responsible for ground breaking research in the fields of water resources management and public health.

Join the Celebration

A black-tie dinner will take place on October 19th at the Irvine Marriott to celebrate Dr. Hass and the Irvine Family’s water legacy of intelligent water stewardship. If you are interested in attending dinner, visit www.clarkeprize.com and register today.

Don’t Miss the 2017 NWRI Conference

The 2017 NWRI Conference will take place on October 20th at the Irvine Marriott. The Conference Program is one track, with six - 30 minute sessions on each of the six research areas identified by the State Water Resources Control Board’s Evaluation of the Feasibility of Developing Uniform Water Recycling Criteria.

Robert Glennon, the Morris K. Udall Professor of Law at the University of Arizona will make the Keynote Address entitled: *“Our Future in a Warming, Water-Stressed World.”*

If you are a wastewater or water professional interested in the potable reuse, you do not want to miss this event. There is no other event in the water industry with this laser focus on potable reuse.

considering where potable reuse fits in its service portfolio, this one day event will substantially enhance your ability to identify the key opportunities and risks – and therefore your ability to make sound planning and execution decisions in this emerging practice discipline. If you are interested in attending the Clarke Prize Conference, visit www.clarkeprize.com and register today.

PAST CLARKE PRIZE WINNERS

- 2016 Mark D. Sobsey Ph.D., University of North Carolina Chapel Hill
- 2015 John C. Crittenden Ph.D., P.E., N.A.E., C.A.E., Georgia Institute of Technology
- 2014 David L. Sedlak Ph.D., University of California, Berkeley
- 2013 R. Rhodes Trussell Ph.D., P.E., BCEE, NAE, Trussell Technologies, Inc.
- 2012 Pedro J.J. Alvarez Ph.D., P.E., DEE, Rice University
- 2011 Mark R. Wiesner Ph.D., P.E., Duke University
- 2010 Jerald L. Schnoor Ph.D., University of Iowa
- 2009 Bruce E. Logan Ph.D., Pennsylvania State University
- 2008 Nancy N. Rabalais Ph.D., Louisiana Universities Marine Consortium
- 2007 James L. Barnard Ph.D., P.E., BCEE, Black & Veatch Corporation
- 2006 Philip C. Singer Ph.D., P.E., University of North Carolina at Chapel Hill
- 2005 Menachem Elimelech Ph.D., Yale University
- 2004 Vernon L. Snoeyink Ph.D., University of Illinois at Urbana-Champaign
- 2003 George Tchobanoglous Ph.D., P.E., NAE, University of California, Davis
- 2002 Harry F. Ridgway Ph.D., AquaMem Consultants
- 2001 Joan B. Rose Ph.D., Michigan State University
- 2000 Charles R. O’Melia Ph.D., Johns Hopkins University
- 1999 James J. Morgan Ph.D., California Institute of Technology
- 1998 Rafael L. Bras Sc.D., University of California, Irvine
- 1997 Perry L. McCarty Sc.D., Stanford University
- 1996 Walter J. Weber, Jr. Ph.D., P.E., DEE, University of Michigan at Ann Arbor
- 1995 David C. White M.D., Ph.D., University of Tennessee-Knoxville
- 1994 Bruce E. Rittmann Ph.D., Arizona State University

2017 NWRI CONFERENCE TRACK PRESENTERS

Jim Colston of the Orange County Sanitation District

Andy Salvesson of Carollo Engineers, Ufuk Erdal of AECOM

Jeff Neeman of Black & Veatch

Shane Trussel of Trussel Technologies, Inc.

Jeff Mosher of WE&RF

AIR QUALITY COMMITTEE REPORT

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Jim Marchese, Vice Chair
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Terry Ahn, Vice Chair
tahn@ocsd.com

Note: *The next Air Quality Committee meeting is scheduled for **Tuesday, October 17** from 10:00 a.m. to 12:00 noon at the offices of the Los Angeles County Sanitation Districts. All SCAP members are invited to attend.*

[SCAQMD Amended Governing Board Meeting Procedures](#) by David Rothbart, Chair - LACSD

On August 10th SCAQMD staff held a public consultation meeting to obtain feedback regarding proposed Governing Board meeting procedures. The purpose of the revised procedures is to promote public safety and minimize disruptions at Board meetings. Stakeholders unanimously opposed the proposed reduction of public testimony from 3-minutes to 90-seconds. While there was agreement about of time that should be allotted for public testimony, environmentalists expressed frustration with the Governing Board's actions pertaining to disadvantaged communities. These environmentalists expressed that they would continue to disrupt meetings until their concerns are addressed. As a result of this meeting, staff withdrew their proposal to reduce the allotted time for public testimony.

On September 1st the Governing Board discussed the recommended meeting procedures and directed staff to address the following items: (1) consider limiting the total amount of time for individuals (i.e., limit the ability of individuals to needlessly comment on multiple agenda items), (2) consider limiting comments on issues not on the agenda and (3) reconsider the proposed deadline for submitting speaker cards. SCAQMD staff will present revised procedures to the Administrative Committee on September 8th (click [HERE](#) and see Agenda Item 10).

[SCAQMD Proposed Rule 1118.1 - Control of Emissions from Non-Refinery Flares](#) by David Rothbart, Chair - LACSD

On August 25th SCAQMD staff held the first Proposed Rule 1118.1 working group meeting. As described in the 2016 Ozone AQMP, this rule *"...would require the installation of newer flares implementing Best Available Control Technology at sources such as landfills, wastewater treatment plants, and oil and gas production facilities. Alternate uses of flare gas would be encouraged, especially for facilities that, for example, would clean it for use as a transportation fuel, process it to become pipeline-quality dry natural gas, or direct it to equipment that can convert its energy into power and/or heat."*

Although not described in SCAQMD's presentation (click [HERE](#)), the wastewater NOx inventory for flaring is insignificant. During the development of the 2016 AQMP, SCAQMD staff confirmed that the wastewater sector only contributes 0.01 tons per day of NOx. The vast majority of the flaring inventory is attributed to the oil and gas sector, so the SCAP Air Quality Committee previously requested the wastewater sector be exempted from the proposed rule. At the time, SCAQMD staff noted that such a request would need to be evaluated during rulemaking. Accordingly, the Air Quality Committee is pursuing a possible exemption.

SCAQMD staff is still assessing flaring practices at oil and gas, wastewater and solid waste facilities, so rule language has yet to be drafted for our consideration. The SQAMD Master Calendar indicates the Proposed Rule 1118.1 is being moved from November of this year to the first quarter of 2018.

BIOSOLIDS COMMITTEE REPORT

Tom Meregillano, Co-Chair

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Christina Jones, Co-Chair

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Note: The next Biosolids Committee meeting is a joint SCAP/CASA scheduled for **Thursday, October 12** from 8:30 a.m. to 12:30 p.m. at OCSD. Look for the meeting announcement and agenda or email pmerriam@scap1.org for more information.

[EPA Releases Enforcement and Compliance History Online \(ECHO\) Website](#) – by Tom Meregillano, Vice Chair – Orange County Sanitation District (Source CASA/EPA)

On August 31, 2017, EPA announced the release of their Enforcement and Compliance History Online (ECHO) database tool that includes biosolids data from 503 annual reports submitted in February 2017. Several CASA members joined in beta testing of the database. In addition to the biosolids annual report data, ECHO integrates other biosolids enforcement and compliance data. The tool provides access to biosolids-specific permit, inspection, violation, enforcement, and penalty related data to users. ECHO can be access through the following link: [ECHO Biosolids Facility Search](#).

[SB 1383: SLCP Reduction Implementation – Stakeholder Workshops](#) – by Tom Meregillano, Vice Chair – Orange County Sanitation District

CalRecycle will hold its fifth and sixth set of stakeholder workshops on regulations for SB 1383 in Fall 2017.

- [September 20, 2017 at the CalEPA building in Sacramento \(will also be a live broadcast\)](#) to discuss regulatory concepts related to market development and recycling capacity planning. Agenda and concepts to be posted closer to date of the workshop.
- Then [October 30, 2017 at the CalEPA building in Sacramento \(will also be a live broadcast\)](#), to discuss draft regulatory language, and the workshop will include a panel of speakers addressing rate increases and Proposition 218. Agenda and other documents to be posted closer to date of the workshop.
- An additional workshop is being planned for Southern California on November 2, 2017 details will be released soon.

[Environmental Protection Agency \(EPA\) Proposed Rule: Renewable Fuel Standard Program: Standards for 2018 and Biomass-Based Diesel Volume for 2019](#) – by Tom Meregillano, Vice Chair – Orange County Sanitation District (Source, Greg Kester CASA)

EPA is proposing applicable percentage standards for the four categories of renewable fuel in the Renewable Fuel Standard (cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel) for 2018. EPA is also proposing the biomass-based diesel volume for 2019. Comments were due August 31, 2017. CASA is very concerned that the proposed cellulosic and advanced biofuel volume targets for 2018 are reduced from levels targeted in 2017. It is critical that EPA send clear signals that there will be a sufficient market for biofuels by forecasting appropriately, since financing current and future renewable natural gas projects in the wastewater sector depend upon this certainty. See CASA's Comment Letter for further details.

[2017 California Bioresources Alliance Symposium “Building California’s Sustainable Bioresource Economy”](#) – by Tom Meregillano, Vice Chair – Orange County Sanitation District (Source CASA/EPA)

2017 Annual California Bioresources Alliance Symposium will be held on November 1st and 2nd in Sacramento at the Ziggart Building, 707 3rd Street in West Sacramento. There is no charge this year but registration is required. Sessions will include discussion of building healthy soils, implementation of SB 1383, building markets, and many other timely topics.

[CASA/CWEA Joint Biosolids and Renewable Energy Innovative Technology Seminars - Save the Date](#) – by Tom Meregillano, Vice Chair – Orange County Sanitation District (Source CASA/CWEA)

CASA and the California Water Environment Association are hosting two Biosolids and Renewable Energy Innovative Technology seminars. The focus of the seminars will be on successful and innovative management practices and technology for biosolids, renewable energy production and utilization, and climate change mitigation. The dates and locations of the seminars are:

- Tuesday, November 14, 2017 from 8:30 am – 4:00 pm; HS Lordships, 199 Seawall Drive, Berkeley, CA 94710
- Wednesday, November 15, 2017 from 8:30 am – 4:00 pm; Doheny Beach Lounge, Student Center, University of California – Irvine. A 311 W. Peltason Drive, Irvine, CA 92697

Registration information will be coming soon, along with the agenda. For more information, contact Greg Kester, CASA Director of Renewable Resource Programs at gkester@casaweb.org.

COLLECTIONS COMMITTEE REPORT

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[Potential California Wipes Legislation](#) - By Steve Jepsen, SCAP



Sales continue to increase in the “flushable” wipes industry and the wastewater industry continues to struggle with the havoc these “flushable” wipes can wreak on our collection and pumping systems. There is currently little or no accountability in the wipes industry for the term “flushable”. The wastewater sector has attempted to work with the textile industry for over two years on the flushability issue with little success. The International Water Services Flushability Group (IWSFG) is in the process of developing a Flushability Standard, a draft is currently available for review on their [website](#). The National Association of Clean Water Agencies (NACWA) is working on State level model legislation. CASA has expressed interest in advancing the legislation in California.

ENERGY MANAGEMENT COMMITTEE REPORT

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[Energy/Biosolids Committee meeting at Anaergia's Rialto Bioenergy Facility](#) – by Steve Jepsen, SCAP

On a hot September 11th morning, a mix of the SCAP Energy and Biosolids Committees met at Anaergia's soon to be operational Rialto Bioenergy Facility. The facility will convert organic waste streams such as biosolids and food waste into electricity, renewable natural gas and fertilizer products. The project is driven by an organics processing demand arising out of several regulations including:

- AB 1826 – Businesses producing of 4 cubic yards of organic waste per week (or more) must divert from landfill
- SB 1383 – 75 percent landfill diversion of all organic waste, including biosolids, by 2025
- AB 876 – Organics Infrastructure Plan
- SB 605 – Short Lived Climate Pollutants (eliminate organics from landfills by 2025)
- SB 1122 – Requires 110 MW of renewable electricity procured from bioenergy

The project is receiving funding assistance from several sources including:

- U.S. Department of Energy
- CalRecycle
- California Energy Commission



Yaniv Scherson discussing the Rialto site improvements

The Rialto Bioenergy facility will feature dual train processing for up to 450 tons per day of biosolids and up to 700 tons per day of food waste. Both will be hauled in on trucks. Biogas powered Combined Heat and Power (CHP) generators will power facility operations and produce up to 500 MW of renewable electricity. The biogas will be conditioned and injected into the natural gas distribution network at a rate of up to 600,000 MBTU per year. The final bulk product from the biosolids and food waste feed stock will be a Class A Biochar urban fertilizer. Anaergia is currently looking for a biosolids source for up to 300 tons per day to participate in the facility.

To learn more contact Yaniv Scherson, Managing Director, 949-874-1118, Yaniv.Scherson@Anaergia.com

WATER ISSUES COMMITTEE REPORT

Al Javier, Chair

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Lyndy Lewis, Vice Chair

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[State Water Board Proposes Amendment to the Supplemental Environmental Project Policy](#) – by Steve Jepsen, SCAP

The State Water Resources Control Board (State Board) Office of Enforcement is proposing an amendment to the Supplemental Environmental Project (SEP) policy. The intention of the SEP policy amendment is to establish a uniform, consistent and transparent standard for implementation of SEPs as well as furthering the State Board's human right to water initiative. The draft SEP policy amendment reviewed by SCAP does not contain any dramatic changes, mostly clarifications in greater detail than the current policy. An important element still included in the draft SEP policy amendment is the allowance of Enhanced Compliance Actions (ECAs) described as capital or operational improvements beyond those required by law. The most troubling element of the draft SEP policy amendment is a 13-item list of example project types that are not acceptable as SEPs. Depending on how these examples are interpreted, it could dramatically limit the type of SEPs allowed. Another troubling element is a 24-month SEP funds expenditure (completion) requirement, which could be challenging for large SEPs requiring cooperation of multiple entities, public bidding, permits, etc. SCAP is working with CASA, BACWA, CVCWA and Downey Brand to provide comments on the new policy amendment. Downey Brand will be providing verbal testimony on the groups' behalf at the State Board hearing on September 20. The State Board will consider adoption of the proposed SEP policy amendment at the November 7, 2017 Board meeting.

[No Increase Expected for Water Quality Permit Fees](#) – by Steve Jepsen, SCAP

State Water Resources Control Board (State Board) staff proposes using reserve funds to offset fee increases required due to insufficient permit program revenue. This will allow the State Board to keep most fees at the FY 2016-17 levels, meet budgetary expenditures and maintain a prudent fund reserve. If adopted, agencies with NPDES permits or WDRs will pay the same fees for FY2018 that they paid this fiscal year.

WASTEWATER PRETREATMENT COMMITTEE REPORT

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[SCAP Working with CWEA on the next P3S Conference](#) - by Steve Jepsen - SCAP

CWEA will be holding their 2018 Pretreatment Pollution Prevention Stormwater (P3S) conference at the Riverside Convention Center on February 12th – 14th. SCAP is looking forward to collaborating with CWEA on several sessions and special events. Please reach out to our Pretreatment Committee chairs with ideas or requests.

[WEF Source Control Workshop](#) - by Steve Jepsen – SCAP

Source Control and the Transformation of Your WRRF Into a SWTF: Integrating DPR Into the Water Resource

This WEF workshop will be led by leading utility, university, and consulting experts in the fields of wastewater pretreatment programs, source control, and wastewater treatment. It will provide attendees information on how to develop and structure pre-treatment and source control programs for DPR and IPR and provide for a discussion forum on these subjects. The workshop will also provide learners a clear understanding on the links and continuity between SWTF design and operation and AWWPF design and operation. Exercises and interactive sessions are designed to enable learners to implement ideas and receive feedback and recommendations from their peers as well as the authors of the guidance manual developed for SWTF operation.

To learn more click [here](#)

CYBER SECURITY COMMITTEE REPORT

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[What will it take to improve the ICS patch process](#) – by David Malm, Chair (Source - Nir Giller, CyberX)



Nir Giller, CyberX

While regular patching is indisputably good advice for IT networks, one of the main takeaways from the Petya and WannaCry attacks is that a lot of companies don't do it. And with even more NSA exploits like EternalBlue scheduled to be released by The Shadow Brokers (TSB), it's certainly not going to get any better.

Patching IT systems is hard enough, but it's even more difficult to patch industrial control systems (ICS), commonly found in energy, manufacturing, pharmaceuticals and other verticals powered by Operational Technology (OT) networks that pre-date the Internet. These systems, which have been controlling complex machinery for years, run 24x7 and have limited maintenance windows, and often rely on custom software tethered to older, no-longer supported versions of Windows. A patch might very well crash the system, and in the ICS/SCADA world reliability and uptime are the number one priority.

Understandably this has led to an "if it ain't broke don't fix it" attitude towards security, where unpatched software – whether it's vulnerable firmware in Programmable Logic Controllers (PLCs) or older versions of Windows in SCADA workstations – remains unpatched for extended periods of time.

But something's got to give. The risk level from those unpatched systems won't be acceptable for much longer. In FY 2016, the ICS-CERT Incident Response team completed work on 290 incidents and coordinated 305 vulnerabilities, but those numbers may be misleadingly low because most industrial organizations lack the technology and personnel to detect intrusions when they happen. As a result, many incidents are never reported. Also, unlike retail and financial services organizations that are mandated by law to report consumer data breaches, industrial organizations are not required to report ICS intrusions (and potentially expose themselves to lawsuits if they do).

Furthermore, the continued evolution of customizable, autonomous malware specifically developed to manipulate ICS devices, such as the newly discovered Industroyer/CrashOverride, will greatly reduce the level of expertise needed to launch attacks on OT networks. Just imagine an attack that blends the sophisticated propagation of Petya/WannaCry with the destructive payload of Industroyer/CrashOverride ... now do you see why protecting vulnerable ICS systems is so important?

As bleak as that might sound, where there are challenges there are also opportunities. Here are some ideas on how to evolve ICS security processes to better match the real-world needs of OT organizations:

1. Evolve the culture - ICS networks often weren't designed with security in mind, but neither were IT networks in their early days. It took years, an increasingly visible stream of mega-breaches and legislation (such a breach notification laws) to motivate business and IT leaders to make cyber defense a strategic business imperative. Once they did, and the culture shifted, CEOs and boards re-evaluated the importance of security and became willing to fund it accordingly. Today, there is much more transparency and information sharing around breaches, which has helped to drive new and better approaches for dealing with them. The ICS patch process is ripe for such transformation. Sure, it's no surprise that OT organizations find ICS patching painful or even impossible, given their absolute requirement for uptime and the risk of applying ICS patches without extensive testing. But Industrial Internet CEOs need to work with their industrial automation vendors and system architects to upgrade their ICS environments for a net-enabled future – one that weaves essential security and “patchability” into the fabric of their network operations.

2. Encourage stronger controls via more carrot, less stick - When companies were either behaving badly or refusing to take fundamental security precautions in the IT realm, legislation such as SOX and consumer data protection laws became a major lever for establishing required security baselines. However, as cybersecurity policy experts including Richard Clarke have acknowledged, “regulation” is often a dirty word. So instead of punishing companies for not doing the right thing, let's provide tax incentives and/or federal subsidies for implementing “Cyber Homeland Security” initiatives and upgrading our critical digital infrastructures – not just our roads and bridges.

3. Promote compensating controls - Legacy OT assets and protocols lack basic security capabilities such as strong authentication that we now take for granted in IT. The challenge is compounded as industrial organizations adopt digitization initiatives such as Industry 4.0 and Smart Grid to optimize their operations, thereby increasing their attack surface while removing the traditional “air-gap” separation between IT and OT networks. When retrofitting outdated systems isn't practical, implement mitigating controls that reduce the risk and impact of attacks on critical assets.

Best practices include:

- Implementing continuous monitoring and behavioral anomaly detection to quickly detect and respond to suspicious activities in OT networks.
- Regularly assessing OT networks for vulnerabilities such as direct connections to the Internet, rogue devices, unmanaged connections between OT and IT networks, use of plaintext passwords, etc.
- Network segmentation and zoning to hinder lateral movement in case of an OT breach.

So, the OT security threat is real and the complexity of patching ICS/SCADA systems compounds it. When it comes to patching ICS networks, there's plenty we have learned from the IT security side of the house, but it's critical that adapt these processes to serve the unique needs of OT organizations — and not simply shame OT security teams for not following traditional IT processes such as patching.

MEETING SCHEDULE

September/October Meetings/Workshops/Conferences:

- **Tri-State Seminar:** September 26-28, South Point Hotel, Las Vegas, NV
- **SCAP/CASA Joint Land/Water Regulatory Works Group Meeting:** October 12, 8:30 a.m. to 12:30 p.m.
- **SCAP Air Committee Meeting:** October 17, 10:00 a.m. to 12:00 p.m., LACSD
- **NWRI Clark Prize Ceremony and Conference:** October 19-20, Irvine Marriott Hotel

National Water Research Institute
2017 Clarke Prize
AWARD CEREMONY AND CONFERENCE



Research and Innovations

Urban Water Sustainability

CLARKE PRIZE RECIPIENT: **Charles N. Haas**, *Drexel University*

CONFERENCE KEYNOTE: **Robert Glennon**, *University of Arizona*

HOST: **Kevin M. Hardy**, *National Water Research Institute*

October 19-20, 2017 • Irvine Marriott Hotel • Irvine, California

Online Registration Open • Sponsorships Available

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ANNOUNCEMENTS

[SCAP is pleased to welcome our newest Associate member:](#)

Hazen

Hazen is a nationally-recognized environmental and engineering consulting firm, specializing in the engineering and management of wastewater collection, treatment, and disposal; stormwater management; recycled water treatment and distribution; and water supply, distribution, and treatment.

Since our founding in 1951, the firm has developed a reputation for the technical, quality, and timeliness of our work. Currently, we have over 1,000 professionals and support staff in 46 offices. In California, we have a staff of nearly 70 in 6 offices, 4 of which in Southern California – Los Angeles, Irvine, San Diego and Palm Desert. Engineering News Record has listed Hazen as one of the top firms in the nation, focused entirely on the domestic wastewater, recycled water, and potable water market. We are a water-only firm; therefore, we can bring unique expertise and specialists to each project. One client even suggested that we “do all things water except make it rain!”

In addition to our project experience, Hazen is also a thought-leader in innovative research and evaluation of cutting-edge technology. We are active in Water Environment and Reuse Research Foundation (WE&RF) and National Water Research Institute. We have presented and published over 285 papers in peer reviewed journals, trade journals and international, national, and regional conferences since 2008.

Not only are we leading the industry in future technology and direction, we are working closely with regulatory agencies during our investigations. Hazen has a strong focus in planning, design, startup, and operation and maintenance of wastewater facilities. We inherently consider O&M concerns from the outset of a project. We are able to do this because our key team members bring a working background in operations, having worked at wastewater treatment plants. Thus, our attention to the ability of a plant to operate efficiently and be low maintenance is, for us, inherent.

To learn more, please contact:

Dave Jones, P.E. at (916) 769-8753; DRJones@HazenandSawyer.com or

Dawn Guendert at (760) 519-7255; DGuendert@HazenandSawyer.com

Non Sequitur

“Every job is a self-portrait of the person who does it. Autograph your work with excellence.”

- - - Author Unknown



Huntington Pier Sunset - Ralph Palomares 1

September 2017

Please Support our SCAP Associate Members



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