



STATE OF HAWAII
DEPARTMENT OF HEALTH
SAFE DRINKING WATER BRANCH
ULUAKUPU BLDG. 4
2385 WAIMANO HOME ROAD, SUITE 110
PEARL CITY, HI 96782-1400

In reply, please refer to:
File: SDWB
Minutes 11-24-20

BOARD OF CERTIFICATION OF PUBLIC WATER SYSTEM OPERATORS
MINUTES OF THE MEETING

DATE: November 24, 2020

TIME: 10:00 a.m. to 11:00 a.m.

MEMBERS PRESENT: Eric Okazaki (2nd term expires 6/30/21)
Guy Moriguchi (1st term expires 6/30/22)
Glenn Ah Yat (2nd term expires 6/30/23)
Mark Prescott (2nd term expires 6/30/24)
Jodi Yamami (2nd term expires 6/30/24)

This meeting was conducted by video-teleconference in accordance with the Fourteenth Proclamation Related to the COVID-19 Emergency provisions. A recording of this meeting is available upon request from Jodi Yamami, jodi.yamami@doh.hawaii.gov, of the Safe Drinking Water Branch.

A. Call to Order

- The meeting began at 10:00 a.m.

B. Old Business

- The Board unanimously approved the September 3, 2020 meeting minutes.

C. New Business

- DSO Certification Applications

The Board unanimously approved the following applications for certification:

	Name	Grade Requested	Grade Approved
1	Bush, Cody	1	1
2	Hale, Devin	1	1
3	Ramos, Willie	1	1
4	Oducado, Justin	2	2

5	Uehara, Kamalani	2	2
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For detailed information on the DSO applications, please refer to Attachment 1.

- WTPO Certification Applications

The Board unanimously approved the following applications for certification:

	Name	Grade Requested	Grade Approved
1	Bartlett, Sean	1	1
2	De Mello, Wilfred	1	1
3	Evans, Troy	1	1
4	Hendershot, Kalei	1	1
5	Perry, Daniel	2	2

For detailed information on the WTPO applications, please refer to Attachment 2.

- CEU Requests

The Board unanimously approved the following CEU requests:

	Course	Date	Sponsor	CEUs Approved
1	2019 Water Quality Technology Conference	11/3-7/19	AWWA	0.35
2	NFPA 70E-2018 / Arc Flash Awareness and OSHA Control of Hazardous Energy - Lock Out/Tag Out	11/20/19	Safety Trained Professionals	0.6
3	LCR Revisions and Corrosion Control Basics	2/5/20	AWWA	0.15
4	Membrane Master Class	7/30-8/20	AWWA	0.6
5	Corrosion Control Strategies for Water Mains	9/10/20	HDR	0.15
6	Wildfires and Resulting Impacts to Water Bodies Used as Drinking Water	9/29/20	US EPA	0.1
7	Building Security and	10/7/20	US EPA	0.15

	Resilience to Cyber Threats, Disinformation, and other Hazards in the Water and Wastewater Sector			
8	Virtual Hawaii WARN Presentation	10/12/20	HIWARN	0.15
9	Virtual Hawaii WARN Functional Exercise	10/12/20	HIWARN	0.4
10	Disinfectants and Disinfection Byproducts	10/27/20	US EPA	0.1
11	Health Effects Associated with Harmful Algal Blooms and Algal Toxins	10/28/20	US EPA	0.1
12	Strategic Initiatives Tracking HUB Training	10/30/20	Harris & Associates	0.15
13	AWIA Multi-Module Workshop Module 1	11/2/20	US EPA	0.15
14	AWIA Multi-Module Workshop Module 2	11/4/20	US EPA	0.15
15	AWIA Multi-Module Workshop Module 3	11/5/20	US EPA	0.15
16	AWIA and Creating Resilient Water Utilities	11/17/20	US EPA	0.1
17	Basic Electricity for Water System Operators	12/1/20	RCAC	0.4
18	2021 Pacific Water Annual Conference	2/3-4/21	AWWA Hi/HWEA	See Attach. 3
19	Disinfectant Residual Control in Water Distribution Systems	TBD	UGSI Solutions	0.1
20	On-Site Sodium Hypochlorite Generation as a Safe & Efficient Alternative to Chlorine Gas or Commercial Strength Bulk Hypochlorite	TBD	UGSI Solutions	0.1
21	THM Mitigation in Water Distribution Systems through Water Storage Tank Mixing and Aeration	TBD	UGSI Solutions	0.1
22	Water Quality Improvement through Water Storage Tank Mixing	TBD	UGSI Solutions	0.1
23	Cross Connection Control	Repeating	RCAC	0.2
24	Water Quality Sampling	Repeating	RCAC	0.2

25	Groundwater Treatment Technologies Session 1	Repeating	RCAC	0.2
26	Groundwater Treatment Technologies Session 2	Repeating	RCAC	0.2
27	Compliance Monitoring and Reporting	Repeating	RCAC	0.6
28	Regulations Essentials	Repeating	RCAC	0.6
29	Math Essentials for Water System Operation	Repeating	RCAC	0.6
30	General Overview of Groundwater Principles	Repeating	HRWA	0.6
31	Developing Drought Preparedness and Response	Repeating	HRWA	0.4
32	2035 Verification	online	Water Otter	0.15
33	2040 Supply Infections Part 1	online	Water Otter	0.1
34	2041 Supply Infections Part 2	online	Water Otter	0.15
35	3000 Fluoride: What's It About	online	Water Otter	0.15
36	3001 Chloride Dioxide	online	Water Otter	0.15
37	4000 Distribution Systems	online	Water Otter	0.2
38	4001 Membranes	online	Water Otter	0.35
39	Chemical Feed Pumps & Disinfection	online	CRWA	0.4
40	#101 History and Use of Centrifugal Pumps	online	Grundfos Technical Institute	0.033
41	#102 Centrifugal Pump Theory	online	Grundfos Technical Institute	0.1
42	#103 Pump Hydraulics	online	Grundfos Technical Institute	0.1
43	#104 Centrifugal Pump Types and Components	online	Grundfos Technical Institute	0.1
44	#106 Electric Motors	online	Grundfos Technical Institute	0.067
45	#108 Pump Selection Basics	online	Grundfos Technical Institute	0.1

46	#109 Variable Speed Basics	online	Grundfos Technical Institute	0.1
47	#110 Fundamentals of Piping	online	Grundfos Technical Institute	0.075
48	#111 Pressure Booster Basics – Commercial	online	Grundfos Technical Institute	0.1
49	#114 Introduction to Codes & Standards	online	Grundfos Technical Institute	0.042
50	#115 Allowable & Preferred Operating Regions	online	Grundfos Technical Institute	0.042
51	#119 Pipe Sizing Basics	online	Grundfos Technical Institute	0.1
52	#121 Choose the Right Pump for the Application	online	Grundfos Technical Institute	0.1
53	#124 Pump Industry Guidelines, Standards, and Codes	online	Grundfos Technical Institute	0.025
54	#137 How to Read a Centrifugal Pump Curve	online	Grundfos Technical Institute	0.1
55	#138 How to Size a Centrifugal Pump Driver	online	Grundfos Technical Institute	0.1
56	#140 Deep Well Vertical Turbine Pumps Introduction	online	Grundfos Technical Institute	0.075
57	#142 Component of Water Lubricated Open Lineshaft Deep Well Vertical Turbine Pumps	online	Grundfos Technical Institute	0.133
58	#143 Components of Oil Lubricated Enclosed Lineshaft Deep Well Vertical Turbine Pumps	online	Grundfos Technical Institute	0.15
59	#213 Affinity Laws for Variable Speed Applications	online	Grundfos Technical Institute	0.033

60	#220 Newtonian & Non-Newtonian Fluid Guidelines	online	Grundfos Technical Institute	0.2
61	#227 Saving Pump Energy in Variable Flow Hydronic Systems	online	Grundfos Technical Institute	0.067

For detailed information on the CEU requests, please refer to Attachment 3.

- DSO Certification Exam Results

The Board was notified of the following results of the DSO certification exam administered since August 23, 2020. Exams administered thru November 14 are included in these results. Computer-based exams were given on Oahu, Maui, and Hawaii. Paper-based exams were originally scheduled for Molokai, Lanai, and Kauai, however, due to the increase in COVID-19 cases, testing sessions were postponed until conditions are safer for travel. Some paper-based exams were administered on Hawaii because of technical difficulties with the computer-based exam. Three out of 14 operators passed for an overall passing rate of 21%.

	Examinee	Grade	Certification
1	Adric, Keola	1	None
2	Bartlett, Sean	1	D1-498
3	Bentosino, Dymen	1	None
4	Kawamura, Justin	1	D1-499
5	Purdy, Wesley	1	None
6	Tabangcura, Wilfred	1	None
7	Bamsey, Duncan	2	D2-303
8	Rowland, Matthew	2	None
9	Naungayan, Darroll	3	None
10	Camara, Ransen	4	None
11	Kainoa, John	4	None
12	Pang Kee, Adrian	4	None
13	Pascua, Joseph	4	None
14	Prest, James	4	None

DSO Exam Results			
Grade	Passed	Examinees	Passing Rate
DSO 1	2	6	33%
DSO 2	1	2	50%
DSO 3	0	1	0%
DSO 4	0	5	0%
Total	3	14	21%

- **WTPO Certification Exam Results**

The Board was notified of the following results of the WTPO certification exam administered since August 23, 2020. Exams administered thru November 14 are included in these results. Computer-based exams were given on Oahu, Maui, and Hawaii. Paper-based exams were originally scheduled for Molokai, Lanai, and Kauai, however, due to the increase in COVID-19 cases, testing sessions were postponed until conditions are safer for travel. Some paper-based exams were administered on Hawaii because of technical difficulties with the computer-based exam. Five out of 10 operators passed for an overall passing rate of 50%.

	Examinee	Grade	Certification
1	Cabatingan, Ian	1	T1-226
2	Gottlieb, Bonnie	1	T1-225
3	Nerveza, Juan	1	None
4	Oducado, Justin	1	T1-224
5	Venus, Thomas	1	T1-227
6	Martinez, Daniel	2	None
7	Paman, Daniel	2	None
8	Shull, John	2	T2-235
9	Landgraf, Andrew-James	4	None
10	Mukai, Miki	4	None

WTPO Exam Results			
Grade	Passed	Examinees	Passing Rate
WTPO 1	4	5	80%
WTPO 2	1	3	33%
WTPO 3	--	--	--
WTPO 4	0	2	0%
Total	5	10	50%

Exam administration on Kauai, Molokai, and Lanai

- These islands have not had exams administered for almost a year since the pandemic started because proctors have not been able to travel.
- HRWA has offered to proctor these exams.
- All board members feel this would be a conflict of interest:
 - HRWA members are also certified operators who have taken these exams in the past and could take more exams in the future.
 - HRWA provides DSO and WTPO Exam Review classes.
- The following options were discussed for replacement proctors:
 - Wastewater board members who are now proctoring wastewater exams
 - Former drinking water board members
 - Mailing paper-based exams and virtually proctoring
 - Computer-based exams at libraries or community colleges.
- Exam administration will be further discussed with Association of Boards of Certification (ABC) for their approval.

D. Announcements

- The next board meeting is scheduled for February 23, 2021.

E. Adjournment

- The meeting adjourned at 11:00 a.m.

Respectfully Submitted,



Jodi Yamami
Board of Certification of
Public Water System Operators

JY:aeh

- c: Anna Yen, U.S. EPA Region IX [via yen.anna@epa.gov only]
Adam Ramos, U.S. EPA Region IX [via ramos.adam@epa.gov only]
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ATTACHMENT 1
DSO DECISIONS
11-24-2020

- 1 **Bush, Cody I. Grade 1** **Approve Grade 1**
248 Kawela Plantation
Supervisor Mervin Dudoit
Water Support
1 yr/5 mos

Daily rounds include: check chlorine residual at the injection site and at the end of the water system; check well sites including flow meter, hour meter, amps, volts and for leaks; check psi at the potable tank sites making sure they are the same as the SCADA readout; check the booster station to make sure the amps, volts, flow meters and hour meters are working properly; check chlorine room and pump, lines and meter is all clean and in proper working order, monthly customer water meter reads and leak checks, learn how to install water meters and backflow preventors, identify and repair water leaks, help set up and complete annual flushing program
- 2 **Hale, Devin C. Grade 1** **Approve Grade 1**
135 Waikoloa
Supervisor Abe Takushi
Utility Worker
1 yr

Service and repair water lines, install and read meters, flush and repair hydrants, take chlorine readings, adjust flows, repair chlorine valves, exchange chlorine tanks, troubleshoot, locate leaks on water line, repair CLA valves, install curb stops, and other maintenance measures as needed
- 3 **Ramos, Willie C. Grade 1** **Approve Grade 1**
212 Wailuku
Supervisor Cullen Falces
Pipefitter Helper
1 yr/11 mos

Assist with all stages of the pipe fitting process including planning, layout, installation, testing and repair of all piping systems, work under the direct supervision of a Pipefitter

212 Wailuku
Supervisor Cari Sumabat
Laborer
4 yrs/5 mos

 - 4 yrs of experience count towards high school diploma
- 4 **Oducado, Justin Grade 2** **Approve Grade 2**
355 Barber's Point
Supervisor Brandon Basilio
Technician
2 yrs/10 mos

Inspect pumps, take chlorine residuals, adjust chlorine pump in accordance with standard practices, repair leaks and mechanical issues, take water samples, maintain well site with proper cleaning and maintenance, inspect storage tanks, install new connections and live taps

 - DSO Grade 1 and WTPO Grade 1 certified
- 5 **Uehara, Kamalani T. Grade 2** **Approve Grade 2**
212 Wailuku
Supervisor Leonore Amano
Water Microbiologist
3 yrs/5 mos

Take field samples, conduct microbiological and chemical analyses of water samples (total coliform, E. coli, residual chlorine, temperature, pH, turbidity, conductivity, anion detection) that determine water quality, laboratory maintenance and quality control of supplies, process, and data, create reports for State

 - DSO Grade 1 certified

ATTACHMENT 2
WTPO DECISIONS
11-24-2020

- | | | |
|--|--|-------------------------------|
| <p>1 Bartlett, Sean Grade 1
135 Waikoloa
Chlorination
Utility Worker
Supervisor Abe Takushi
1 yr/3 mos</p> | <p>Maintenance and repair of treatment system pumps and filters, replace filters, pH testing and adjustments as needed, chlorination system maintenance-transport and adjust dosage</p> <ul style="list-style-type: none">• DSO Grade 1 certified | <p>Approve Grade 1</p> |
| <p>2 De Mello, Wilfred Grade 1
256 Maui Highlands
Chlorination, GAC, RO
Technician
Supervisor Christian Rosenthal
3 yrs/8 mos</p> | <p>Operate, maintain, and troubleshoot 3 RO facilities and 2 GACs, check and repair chlorination equipment, RO membranes, SCADA systems, tanks, water lines, pre-filters, and CIP equipment.</p> <ul style="list-style-type: none">• DSO Grade 1 certified | <p>Approve Grade 1</p> |
| <p>3 Evans, Troy P. Grade 1
213 Makawao
Microfiltration
Water Treatment Plant Worker
Supervisor Marvin Ignacio
1 yr/2 mos</p> | <p>Assist operators in running plants, transport, handle, and store chemicals for treatment process, service and repair filtration modules, service and repair automatic and manual valves, use laboratory equipment to test water quality, keep records of maintenance and water quality, troubleshoot issues with plant</p> | <p>Approve Grade 1</p> |
| <p>4 Hendershot, Kalei W. Grade 1
205 Kaanapali
GAC, Chlorination
Utility Worker
Supervisor Efren Ugalino
1 yr/9 mos</p> | <p>Daily checks and troubleshooting on system, ensure chlorine residuals are in the appropriate range and adjust rate of injection at chlorination stations, if needed, routine sampling for total coliform, EDB/DBCP, and GACs, maintain clean sample stations</p> <ul style="list-style-type: none">• DSO Grade 1 certified | <p>Approve Grade 1</p> |
| <p>5 Perry, Daniel K. Grade 2
163 Kaupulehu
RO
WTPO
Supervisor Rory Belanio
3 yrs/4 mos</p> | <p>Daily logs of GPMs or pressure gauges in RO facility, labs consist of iron, free chlorine, chlorides, hardness, sulfate, silica, Co2, TDS, pH, and phos, review SCADA with other operators, grab sample off skids and tanks for quality control, change and clean pre-filter pods, chemical handling and filling tanks</p> <ul style="list-style-type: none">• DSO Grade 1 and WTPO Grade 1 certified | <p>Approve Grade 2</p> |

ATTACHMENT 3
CEU DECISIONS
11-24-2020

Hawaii Courses

1 2019 Water Quality Technology Conference

11/3-7/19

AWWA

3.5 Contact Hour

0.35 CEUs

Topics include:

- MON08 Prevalence and Monitoring of Opportunistic Pathogens
 - Occurrence of Legionella Pneumophila in Drinking Water Distribution systems
 - Legionella Monitoring in NYC's Water Distribution System
 - Enhancement of Inactivation of Legionella Using Multiwavelength UV LEDs
- STS02 Lead Service Lines: Disclosure, Detection and Replacement
 - Disclosing Lead Service Lines to Customers and Public
 - Novel Detection of Buried Lead Service Lines
 - Full Lead Service Line Replacement Guidance

2 NFPA 70E-2018 / Arc Flash Awareness and OSHA Control of Hazardous Energy - Lock Out/Tag Out

11/20/19

Safety Trained Professionals

6.0 Contact Hours

0.6 CEUs

This training covers NFPA 70E requirements for safe work practices to protect personnel by reducing exposure to major electrical hazards. NFPA 70E helps companies and employees avoid workplace injuries and fatalities due to shock, electrocution, arc flash, and arc blast, and assists in complying with OSHA 1910 Subpart S and OSHA 1926 Subpart K. This course also covers the responsibilities to develop and implement an energy control program or lock-out/tag-out for protection of workers.

3 LCR Revisions and Corrosion Control Basics

2/5/20

AWWA Webinar

1.5 Contact Hours

0.15 CEUs

Topics include:

- Lead and Copper Rule Revisions
- Overview of Lead Corrosion Control
- Implementing the Lead and Copper Rule Effectively
- Filter Challenge Study

4 Membrane Master Class

7/30/20 – 8/20/20

AWWA Webinar Series

9.0 Contact Hours

0.6 CEUs

Topics include:

- Roles of Membranes in PFAS Removal
 - Best Practices for Improving MF/UF Operations
 - Membrane Treatment Provides Pathogen Removal Credits (wastewater)
 - Concentrate Management (wastewater)
 - Ceramic and Polymeric UF Membranes
 - Innovative Operations Reverse Osmosis
-
- No credit for wastewater content which is 3 out of 9 contact hours

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5 **Corrosion Control Strategies for Water Mains**

9/10/20

HDR Webinar

1.5 Contact Hour

0.15 CEUs

Topics include:

- Describe the fundamentals of the electrochemical process of water main corrosion
- Describe the major reasons for water main corrosion
- Describe the major methods of corrosion prevention associated with water mains

6 **Wildfires and Resulting Impacts to Water Bodies Used as Drinking Water**

9/29/20

US EPA Webinar

1.0 Contact Hour

0.1 CEUs

This presentation will provide information on the impacts of high and low severity wildfires on dissolved organic matter concentrations in water bodies used as drinking water sources and DBP formation during treatment. Also, it will provide information on how water utilities can modify treatment plant operations to avoid disinfection byproducts.

7 **Building Security and Resilience to Cyber Threats, Disinformation, and other Hazards in the Water and Wastewater Sector**

10/7/20

US EPA Webinar

1.5 Contact Hours

0.15 CEUs

This webinar will share information about security and resilience needs of the water and wastewater sectors. It will give attendees appropriate information to help further improve the areas of security and resilience within their own systems through firsthand accounts and leaders in cybersecurity.

8 **Virtual Hawaii WARN Presentation**

10/12/20

HIWARN

1.5 Contact Hours

0.15 CEUs

Topics include:

- Resource Typing Overview – AWWA Water Sector Guidance
 - Maintaining an emergency response plan
 - Applying National Incident Management System principles
 - Establishing mutual aid agreements
- Building Resilient Infrastructure and Communities
 - Capability and capacity building
 - Encouraging innovation
 - Promoting partnerships
- Hazard Mitigation Grant Program – Funding after a disaster declaration

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- 9 **Virtual Hawaii WARN Functional Exercise**
10/12/20
HIWARN
4.0 Contact Hours
0.4 CEUs
The exercise facilitators will initiate the communications-based functional exercise. All attendees and their water and wastewater systems will receive information regarding how their system has been impacted by a hypothetical hurricane. Water and wastewater systems, with the help of an exercise phonebook that lists all other participants will work internally as well as together to address the impacts to their systems. Other participants will include county emergency management agencies (EMAs), county electrical providers and state agencies (e.g., Hawaii DOH SDWB, HIEMA). Participants and their water and wastewater systems will receive new information about how their systems have been impacted approximately once per hour to help advance the scenario. The information provided by the exercise facilitators, along with coordination between other systems and response partners will lead to continuous exercise engagement for the participants.
- 10 **Disinfectants and Disinfection Byproducts**
10/27/20
US EPA Webinar
1.0 Contact Hour
0.1 CEUs
This presentation will provide a summary of EPA's research conducted on disinfectant penetration into biofilm and sediment. Free chlorine and monochloramine penetration will be compared. Also, it will discuss improving compliance with the Stage 2 disinfection byproducts rule.
- 11 **Health Effects Associated with Harmful Algal Blooms and Algal Toxins**
10/28/20
US EPA Webinar
1.0 Contact Hour
0.1 CEUs
This webinar will summarize the state of the science and describe how a One Health approach (a collaborative, multisectoral, and transdisciplinary) to cyanobacteria harmful algal blooms in surface water bodies can inform human health risks.
- 12 **Strategic Initiatives Tracking HUB Training**
10/30/20
Harris & Associates
1.5 Contact Hours
0.15 CEUs
This training will describe the purpose of the SIT HUB used by Maui County DWS staff in strategic initiatives tracking. A specific tracking tool training will be given for participants to learn how to update the status of strategic initiatives on a monthly basis for digital infrastructure, workforce sustainability, SCADA upgrades and water resource management.
- 13 **AWIA Multi-Module Workshop Module 1**
11/2/20
US EPA Webinar
1.5 Contact Hours
0.15 CEUs
Topics include:
 - America's Water Infrastructure Act Section 2013 Overview
 - Risk and Resilience Assessment
 - Emergency Response Plan Certification Process
 - Section 2018 basics

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- 14 **AWIA Multi-Module Workshop Module 2**
11/4/20
US EPA Webinar
1.5 Contact Hours
0.15 CEUs
- Topics include:
- Risk and Resilience Assessment requirements and resources
 - Demonstration on using the Small Systems Risk and Resilience Assessment Checklist to complete an RRA
 - RRAs and certification
- 15 **AWIA Multi-Module Workshop Module 3**
11/5/20
US EPA Webinar
1.5 Contact Hours
0.15 CEUs
- Topics include:
- Emergency Response Plan requirements and Guidance and Template introduction
 - Demonstration on Using your RRA to complete the ERP
 - ERPs and certification
- 16 **AWIA and Creating Resilient Water Utilities**
11/17/20
US EPA Webinar
1.0 Contact Hours
0.1 CEUs
- This presentation will discuss the American Water Infrastructure Act which requires community water systems serving a population greater than 3,300 persons to assess the risks to and resilience of their systems. Tools and resources to assist in the development of a Risk and Resilience Assessment and Emergency Response Plan will be discussed.
- 17 **Basic Electricity for Water System Operators**
12/1/20
RCAC
4.0 Contact Hours
0.4 CEUs
- Topics include:
- Discover what electricity is
 - Terms and definitions
 - Define AC/DC power
 - Methods of converting energy into electricity
 - What is electricity
 - Power production and distribution
 - Types of motor controllers and their functions
 - What is an amp
 - Intro to SCADA
 - Control loops
 - Lockout/tagout procedures

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18 **2021 Pacific Water Annual Conference**

2/3-4/21

AWWA Hi/HWEA

Virtual

35 0.5-hour drinking water sessions for full credit

1.6 CEUs

1 6-hour drinking water session for full credit

0.6 CEUs

1 4-hour drinking water session for full credit

0.4 CEUs

1 0.5-hour drinking water session for no credit

29 0.5-hour wastewater sessions for no credit

5 0.5-hour water reuse sessions for no credit

2 0.5-hour storm water sessions for no credit

4 0.5-hour clean water sessions for no credit

1 0.5-hour water resource sessions for no credit

Total possible CEUs will be determined after schedule is finalized due to overlapping sessions.

Drinking Water topics (0.5 contact hours each) include:

- Coatings and the Longevity of Ductile Iron Pipes
- System Integration and Collaboration Prepares San Juan Water for the Future
- Maps & Apps Support COVID-19 Response at Central Arkansas Water
- PFAS Overview & Removal Approaches
- Remote Imaging for Linear Underground Asset Management and Real Water Loss Reduction on Oahu
- Hawaii's Watershed Partnerships and Protecting the Source Water of the Waianae Mountains
- Potable Reuse from Across Two Ponds – Evaluating Water Recycling in the UK
- 2020 Second Edition of AWWA M55 HDPE Pipe
- Developing a Large-Scale Emergency Power Plan
- Securing Regulatory Compliance
- There was a Fire in My Watershed, Now What?
- Case Study: Hyperion Advanced Water Purification Demonstration Facility
- No Bad Bugs: Protecting Your Water System from Microbial Contaminants (6 contact hours, already approved 9/3/2020 meeting)
- Once More into the Bleach: Handling and Application of Sodium Hypochlorite (4 contact hours, already approved 9/3/2020 meeting)
- Prepare your Water/Wastewater Operations for the Future
- Accurate Risk-Based Prioritization of Transmission Pipelines
- Investing in Desalination for Water Supply Resilience: Worth its Weight in Salt?
- Operators, Document Your Work
- The Need for an On-Site Operator Certification Program at Your Company
- Mechanical Fittings and Repairs on High Density Polyethylene Pipe (HDPE)
- How to Control Bulk and Trace Organics throughout Multiple Treatment Barriers
- The Fast PFAS Arms Race for Reliable Water treatment Removal Technologies
- For the Utility of The Future: Understanding What Is Hard to See in The Data
- Comparison of Removal of Preformed Disinfection Byproducts vs Removal of TOC on GAC Performance
- How to Reduce Bending Moments on Large Butterfly Valves Below Ground
- Best Available Treatment Technologies for Treating PFAS
- Distribution System Water Quality Improvements with Implementation of Active Tank Mixing

ATTACHMENT 3
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- Distribution System Water Quality Improvements with Implementation of Active Tank Mixing
- Chloramine Disinfectant Residual Optimization and Management in Distribution Systems: Taming the Breakpoint Curve Automatically
- The Role of Smart Tanks in Distribution Water Quality Management
- Distribution Network THM Mitigation in Consecutive and Wholesale Water Systems
- Kalaeloa Seawater Desalination, Reducing Project Uncertainties and Risks in a DBOM Delivery RFP
- Flushing Water Mains without Discharging the Water Used to Do So
- EPA Drinking Water Regulatory Update
- Advantages of Ultra High Solids Linings in Potable Water Service
- Optimizing Pipeline Rehabilitation and Replacement – InfoAsset Risk
- Maps & Apps Support COVID-19 Response at Central Arkansas Water
- BWS and COVID-19

Drinking Water topics include: (no credit)

- Hawaii Small Systems Roundtable (panel discussion)

Wastewater topics include: (no credit)

- Creating and Implementing a Smart Industrial Monitoring Network and Advanced Data Analytics at the City of Memphis
- Energy Considerations for Sewage Sludge Treatment via Thermal Hydrolysis Pretreatment, Anaerobic Digestion, Thermal Drying and CHP
- Experimenting with Denitrifying Leachfields: A Passive Nitrogen Removal Method for Cesspool Replacements
- Physical Characteristics of Thermal Hydrolysis (THP) Treated Primary and Secondary Sewage Sludge
- Comparison of Low-, Medium-, and High-Temperature Thermal Hydrolysis (THP) on Product Speciation and Biomethane Potential of Primary and Secondary Sewage Sludge from Honouliuli WWTP
- Wastewater Headworks Screening for Smaller Installations
- The Importance of Wastewater Characterization and How to Do It Right!
- When COVID Clouds the O&M Picture IoT Brings New Clarity
- Adaptive Mixing Leads to Better Biological Nutrient Removal
- Comparison of Compressible Medium and Cloth Disk Primary Filtration Technologies to Replace or Augment Conventional Primary Treatment Method
- Start-up and Commissioning at the Lahaina Wastewater Reclamation Facility
- Building and Starting Up Phosphorous Recovery
- London Tideway Improvement Program
- Startup and Testing of a New Biofilter Odor Control System
- Working out the "Small" Details: How to Overcome Challenges Associated with Satellite Membrane Bioreactor Water Reclamation Facilities

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- Cesspool Conversion Options for Hawaii: Evaluation of Onsite Treatment and Disposal Technologies
- Lifting the Fog from FOG Receiving
- Process Intensification using Membrane Bioreactor Process: The Case of Fulton County, GA
- Honouliuli WWTP Expansion Phase 1B Project - 5 Quality Assurance Steps for Corrosion Resistant Lining Systems
- Save the Outfall, Save the Avocados: Design Build for Advanced Treatment
- BNR Conversion of Ora Loma Water Pollution Control Plant
- Enhancing Biogas Production from Anaerobic Digesters through Organic Waste Addition – Benefits and Lessons Learned
- Waianae WWTP Digester Rehabilitation
- State of Hawaii Cesspool Conversion Working Group
- To Expand, or to Intensify? An Anaerobic Digestion Question
- BNR Conversion of Ora Loma Water Pollution Control Plant
- Enhancing Biogas Production from Anaerobic Digesters through Organic Waste Addition – Benefits and Lessons Learned
- Enhanced Source Control Programs Using Real Time Sewer Monitoring Systems

Water Reuse topics include: (no credit)

- Hawaii Fresh Water Initiative: Update and Next Steps
- Discfilters are Not Just for Reuse
- From Recycled Water to Vines – A Chloride Reduction Story
- Using WIFIA to Finance Water Reuse Projects
- Weighing the Future of Non-Potable Reuse in Colorado

Stormwater topics include: (no credit)

- Characterizing the Push-Pulls of Stormwater Management Discourse
- Evaluating Potential Next Steps to Address Mapunapuna Flooding

Clean Water topics include; (no credit)

- Hawaii's Water Quality Standards: Time for an Update
- Analytical Uncertainty Associated with Regulation of Nutrients at Trace Levels
- SCOTUS and WOTUS; Implications and Confusion for Hawaii Wastewater Agencies
- Direct Detection of Pathogen for Recreational Water Quality Monitoring in Hawaii

Water Resources topics include: (no credit)

- The Hawaii Drought Knowledge Exchange (HDKE)
- Leveraging Industry Experience to Anticipate the Trade-offs of Alternative Water Supplies
- Climate Ready Oahu

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- 19 **Disinfectant Residual Control in Water Distribution Systems**
TBD
UGSI Solutions
1.0 Contact Hours
0.1 CEUs
This seminar will provide water system managers, operators and engineers a practical understanding of the conditions, chemistry and science behind affecting positive control of both chloramine and free-chlorine levels in water distribution systems. It will present a suite of proven technologies that can be employed to automatically control disinfectant residual levels in real world water distribution systems.
- 20 **On-Site Sodium Hypochlorite Generation as a Safe & Efficient Alternative to Chlorine Gas or Commercial Strength Bulk Hypochlorite**
TBD
UGSI Solutions
1.0 Contact Hours
0.1 CEUs
This seminar will provide water system managers, operators and engineers a practical understanding of the science and implementation behind on-site sodium hypochlorite generation as a source of chlorine disinfection capacity for water and wastewater plants as well as distribution well systems.
- 21 **THM Mitigation in Water Distribution Systems through Water Storage Tank Mixing and Aeration**
TBD
UGSI Solutions
1.0 Contact Hours
0.1 CEUs
This seminar will provide water system managers, operators and engineers a practical understanding of the conditions chemistry and science behind trihalomethane generation in water distribution systems. It will present a suite of proven technologies that can be employed to reduce THM levels in real world water distribution systems.
- 22 **Water Quality Improvement through Water Storage Tank Mixing**
TBD
UGSI Solutions
1.0 Contact Hours
0.1 CEUs
This seminar will provide water system managers, operators and engineers a practical understanding of the science behind applying mixing energy to water in reservoirs or tanks as a means to improve water quality in distribution networks.
- Repeating Courses**
- 23 **Cross Connection Control**
RCAC Online
2.0 Contact Hours
0.2 CEUs
Topics included:
 - Hydraulics Review
 - Definitions
 - Backflow Preventers
 - Applications
 - Program Implementation
- 24 **Water Quality Sampling**
RCAC Online
2.0 Contact Hours
0.2 CEUs
Topics included:
 - Importance of Water Quality Sampling
 - Sampling & SDWA Compliance
 - System Sampling Plan
 - Sampling Required by each Rule
 - Reporting Sample Results

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25 **Groundwater Treatment Technologies Session 1**

RCAC Online

2.0 Contact Hours

0.2 CEUs

Topics included:

- Treatment Technologies
- Treatment Processes
 - Process Description
 - Contaminants Controlled
 - Design Requirements
 - Operational Drawbacks

26 **Groundwater Treatment Technologies Session 2**

RCAC Online

2.0 Contact Hours

0.2 CEUs

Topics included:

- Applied Groundwater Treatment
 - Microbial Contaminants
 - Iron and Manganese
 - Arsenic
 - Nitrate
 - Uranium
 - Organics – VOCs & SOCs

27 **Compliance Monitoring and Reporting**

RCAC

6.0 Contact Hours

0.6 CEUs

Topics included:

- Functions of Water Quality Sampling
- Consequences of Not Sampling
- Identify System for Determination of Sampling
- Contaminant Standards
- Monitoring Framework
- Who's Responsible
- SDWIS Look-Up
- Types of Sampling
- Chain of Custody

28 **Regulations Essentials**

RCAC

6.0 Contact Hours

0.6 CEUs

Topics included:

- SDWA Provisions
- Walkerton Case Study
- SDWA History
- Wall Chart (MCL Chart) Exercise
- Regulations Exercise
- Waterworks Standards
- Federal vs. California Standards
- Water Quality Emergency Response Exercise
- Sample Reporting and Data

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29 **Math Essentials for Water System Operation**

RCAC

6.0 Contact Hours

0.6 CEUs

Topics included:

- Math Conversions Line Tool Exercise
- Conversions
- Volume to be Disinfected
- Volume Calculation
- Determine Disinfection Dosage
- Parts Per Million
- Pounds Formula
- Pressure & Head
- Water Flow Rate into the Water Line to be Disinfected
- Water Flow Rate into the Pipeline
- Hypochlorite Feed Rate

30 **General Overview of Groundwater Principles**

HRWA

6.0 Contact Hours

0.6 CEUs

This course is designed to give students a general understanding of the principles involved with groundwater, its movement, and character, and the subsequent impact these characteristics have on the design, construction, and maintenance of groundwater well systems for water utilities.

31 **Developing Drought Preparedness and Response**

HRWA

4.0 Contact Hours

0.4 CEUs

The primary focus of this course is to provide a step-by-step strategy to anticipate and respond to water shortages through a structured planning process. Some of these actions will result in permanent changes in water use.

Topics include:

- Drought and Water Shortages
- From a Water Shortage Response Team
- Balance Supply and Demand and Assess Mitigating Options
- Establishing Triggering Levels
- Develop a Staged Demand Reduction Program
- Adopt the Plan
- Implement the Plan
- Contingency Planning Checklist
- Hawaii's Drought Plan

Correspondence/Online Courses

32 **2035 Verification**

Water Otter

1.5 Contact Hours

0.15 CEUs

This course goes into verification of water and wastewater processes to help you choose simple process validation (chemical strength, physical tests, gravity, titrametric, & colorimetric) and measurement tools.

33 **2040 Supply Infections Part 1**

Water Otter

1.0 Contact Hours

0.1 CEUs

This course speaks about 5 ways to a Coliform "Hit" or worse in your system. Operator mistakes and outside influences are covered. Part 1 covers different tests and bacteria.

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- 34 **2041 Supply Infections Part 2**
Water Otter
1.5 Contact Hours
0.15 CEUs
This course speaks about 5 ways to a Coliform “Hit” or worse in your system. Operator mistakes and outside influences are covered. Part 2 covers transmission issues, feeders and cross connections, and measurements and safety.
- 35 **3000 Fluoride: What’s It About**
Water Otter
1.5 Contact Hours
0.15 CEUs
This course will cover the ins and outs of fluoride including its history, operations with math calculations, and safety.
- 36 **3001 Chloride Dioxide**
Water Otter
1.5 Contact Hours
0.15 CEUs
This course will cover chloride dioxide including its definition, dose rates, byproducts, benefits, monitoring, testing, titration, and generators.
- 37 **4000 Distribution Systems**
Water Otter
2.0 Contact Hours
0.2 CEUs
This course will cover distribution systems including systems and piping, valves, hydrants, backflow, and pumps
- 38 **4001 Membranes**
Water Otter
3.5 Contact Hours
0.35 CEUs
This course will take a look at membranes including types of systems, filtration and principles, operations examples, system control, and configurations and replacements.
- 39 **Chemical Feed Pumps & Disinfection**
Colorado Rural Water
Association
4.0 Contact Hours
0.4 CEUs
Topics include:
 - Motor Pumping Technology
 - Applications
 - Sizing of Chemical Feed Pumps
 - Disinfection
- 40 **#101 History and Use of Centrifugal Pumps**
Grundfos Technical Institute
20 Contact Minutes
0.033 CEUs
After this course you should be able to:
 - Name the two major categories of pumps
 - Identify primary rotodynamic pump types
 - Name major market segments
 - Identify common pump applications
- 41 **#102 Centrifugal Pump Theory**
Grundfos Technical Institute
1.0 Contact Hour
0.1 CEUs
This course covers the identification of pumps by classification, components and description of primary use. Essential pump hydraulic principles and the impact on proper pump selection are covered.

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- 42 **#103 Pump Hydraulics**
Grundfos Technical Institute After this course you will be able to:
1.0 Contact Hour
0.1 CEUs
- Read and understand pump performance curves,
 - Calculate water, brake and electrical horsepower requirements,
 - Calculate Net Positive Suction Head,
 - Apply the affinity laws to calculate the effects pump speed and impeller diameter have on capacity, head and horsepower requirements.
- 43 **#104 Centrifugal Pump Types and Components**
Grundfos Technical Institute After this course you should be able to:
1.0 Contact Hour
0.1 CEUs
- Recognize the different types of pumps
 - Be comfortable with choosing the right pump for the job,
 - Recognize the different types of components,
 - Understand the primary function,
 - Understand the impact of improper component selection on pump performance.
- 44 **#106 Electric Motors**
Grundfos Technical Institute In this course you will be introduced to foundation principles on the function of
40 Contact Minutes induction motors. We will study the principles of electromagnetism and how this
0.067 CEUs affect both the stator and rotor, and how these two components work together
to provided powered rotary motion. We will look at both three phases and
single-phase motor operation and will compare asynchronous and synchronous
motors by looking at both induction and electronically commutated types.
- 45 **#108 Pump Selection Basics**
Grundfos Technical Institute This course describes the various criteria that enter into the decision process in
1.0 Contact Hour selecting the best pump for a given application. Constant and variable speed
0.1 CEUs criteria that can be applied in the selection process is also discussed.
- 46 **#109 Variable Speed Basics**
Grundfos Technical Institute Discussion of affinity laws is touched upon and the importance of applying
1.0 Contact Hour variable speed in reducing overall energy consumption in numerous applications
0.1 CEUs is addressed.
- 47 **#110 Fundamentals of Piping**
Grundfos Technical Institute Different pumping applications require different forms of piping from simple one
45 Contact Minutes pipe residential systems to complex very large chilled water systems in large
0.075 CEUs clinical and education campus. When are these different methods applied and
why?
- 48 **#111 Pressure Booster Basics - Commercial**
Grundfos Technical Institute The basic level course has a focus on sizing & selecting in real world applications
1.0 Contact Hour while covering key features & benefits of operation. Participants will learn key
0.1 CEUs features of the controller capabilities.

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- 49 **#114 Introduction to Codes & Standards**
Grundfos Technical Institute 25 Contact Minutes
0.042 CEUs Energy consciousness has become a societal priority and energy codes and standards are being developed and updated to help address the need to decrease energy consumption. Several of the primary codes are reviewed and discussed here to raise awareness and understanding of the codes general impact.
- 50 **#115 Allowable & Preferred Operating Regions**
Grundfos Technical Institute 25 Contact Minutes
0.042 CEUs The Hydraulic Institute standards define allowable regions of operation for a pump to be selected to work within. POR, AOR, MOR are addressed in the course and provides guidance in knowing what is the right type and model of pump to select.
- 51 **#119 Pipe Sizing Basics**
Grundfos Technical Institute 1.0 Contact Hour
0.1 CEUs In this course you will learn to:
- Evaluate pipe sizing methods.
 - Compare friction loss through various types of piping materials.
 - Describe the effects that velocity can have on piping systems.
 - Evaluate the impact of pipe sizing on the system performance.
 - Compare the effect of different piping methodologies in an example building.
- 52 **#121 Choose the Right Pump for the Application**
Grundfos Technical Institute 1.0 Contact Hour
0.1 CEUs Provides a methodology for identifying the most appropriate centrifugal pump type to use in a wide variety of markets in applications for clean, cool water; describes the role of Life Cycle Cost analysis in making the final determination of pump type to use.
- 53 **#124 Pump Industry Guidelines, Standards, and Codes**
Grundfos Technical Institute 15 Contact Minutes
0.025 CEUs After this course you should be able to:
- Identify primary guidelines, standards, and codes that may impact the application and use of pumps
 - Explain why each type of convention or regulation exists, and how each influences the use pumps
 - Know where to access an expansive listing of such documents
- 54 **#137 How to Read a Centrifugal Pump Curve**
Grundfos Technical Institute 1.0 Contact Hour
0.1 CEUs This course will teach you to read the pump curve, to know what information is there, and to understand how it is formatted. Additionally, you will learn how to interpret the graphically provided information and what it means. Finally, you will learn how to use the pump curve to make decisions on the choices of pump and driver sizing, power consumption strategies, and many others.

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- 55 **#138 How to Size a Centrifugal Pump Driver**
Grundfos Technical Institute This course answers questions such as: How are pump loads calculated and how do I use them to make my motor sizing decision? What is the best way to deal with Service Factor? When should I allow for a power reserve? With this course you will learn to choose the right driver size by applying all of the pertinent criteria.
1.0 Contact Hour
0.1 CEUs
- 56 **#140 Deep Well Vertical Turbine Pumps Introduction**
Grundfos Technical Institute This course provides an introduction to vertical turbine pumps as configured for deep well applications. It covers the basics for virtually all markets that employ deep well pumps, including agricultural irrigation, along with municipal and industrial water supply. The focus is on lineshaft type turbines – both open lineshaft water lubricated and enclosed lineshaft oil lubricated. The main components of turbines, along with their interactions, are explained, as are the various driver types that are available. Finally, we will explore some of the advantages and challenges that are associated with deep well turbine pumps.
45 Contact Minutes
0.075 CEUs
- 57 **#142 Component of Water Lubricated Open Lineshaft Deep Well Vertical Turbine Pumps**
Grundfos Technical Institute One of the first steps that must be taken in order to gain an in-depth knowledge of components of water lubricated open lineshaft deep well vertical turbine pumps and their proper application, sizing, and selection is to learn about all component parts and how they work together to provide an integrated functioning machine. We will explore all parts from the top of the motor to the bottom of the strainer, including those in the discharge head, the column and shaft, the bowls and impellers, and the drivers.
80 Contact Minutes
0.133 CEUs
- 58 **#143 Components of Oil Lubricated Enclosed Lineshaft Deep Well Vertical Turbine Pumps**
Grundfos Technical Institute In order to gain an in-depth knowledge of deepwell enclosed lineshaft oil lubricated vertical turbine pumps and their proper application, sizing, and selection it is critical to learn about all component parts and how they work together to provide an integrated functioning machine. We will explore all parts from the top of the motor to the bottom of the strainer, including those in the discharge head, the column and shaft and tube assemblies, the bowls and impellers, and the drivers.
1.5 Contact Hours
0.15 CEUs
- 59 **#213 Affinity Laws for Variable Speed Applications**
Grundfos Technical Institute Variable speed pumping offers tremendous opportunities for energy use reduction and system optimization. But in order to take full advantage of these opportunities, you must have a complete understanding of the pump Affinity Laws and how they impact pump flow, head, and brake horsepower. Armed with that knowledge you will then be able to make decisions on the best control method to apply to your pumping system.
20 Contact Minutes
0.033 CEUs

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60 **#220 Newtonian & Non-Newtonian Fluid Guidelines**

Grundfos Technical Institute
2.0 Contact Hours

0.2 CEUs

The viscosity of a fluid, liquid or gas; is that property which offers resistance to flow due to the existence of internal friction within the fluid. Viscosity is described in terms of either dynamic (absolute) or kinematic values. This course will assist you in covering and describing the many terms used in association with Newtonian and Non-Newtonian Fluids.

61 **#227 Saving Pump Energy in Variable Flow Hydronic Systems**

Grundfos Technical Institute
40 Contact Minutes

0.067 CEUs

This course will help engineers ensure they are able to evaluate the many control modes that are possible with today's modern variable speed pumps in order to quantify and maximize their potential energy savings.