CONTRACTUAL AGREEMENT

For

INVITATION TO NEGOTIATE (ITN) #: 2023-17OCSA

ENTITLED: Chemical Treatment Services Campus Water Loops

Between

THE UNIVERSITY OF CENTRAL FLORIDA BOARD OF TRUSTEES AND CHEM-AQUA, INC.

This Agreement is entered into and effective as of the date of the last signature hereto, by and between The University of Central Florida Board of Trustees ("University" or "UCF") and Chem-Aqua, Inc. ("Contractor"). The parties agree as follows:

1. **ACKNOWLEDGMENT.** The Contractor acknowledges that:
   - **A.** The University is a public entity of the State of Florida;
   - **B.** The University is exempt from federal and Florida taxes;
   - **C.** Except for its employees acting within the course and scope of their employment, UCF shall not indemnify any entity or person and, then, such indemnification is limited to the express terms of §768.28, Florida Statutes. The University of Central Florida is self-insured to the extent of its liability under law, and any liability in excess of that specified in statute may be awarded only through special legislative action. Accordingly, UCF's liability and indemnification obligations in this Agreement shall be effective only to the extent expressly required by §768.28, Florida Statutes. Any provision requiring UCF to provide insurance coverage other than the State of Florida self-insurance shall not be effective.

2. **DESCRIPTION OF SERVICES.** The Contractor will provide chemical treatment services for UCF's campus water loops. Goods/services shall be provided in accordance with UCF's Invitation to Negotiate (ITN) 2023-17OCSA and the Contractor's Offer in response thereto, both of which are incorporated by reference and the terms of this Agreement. The Contractor is an independent contractor pursuant to Florida law and assumes full responsibility for completion of the services/delivery of the goods, as described in detail in Attachment "B" to this Agreement, which is incorporated herein for all purposes. Such services/goods shall be rendered/delivered in accordance with the schedule and for the amounts set forth in Attachment "A".

3. **CONTRACT TERM.** The Contractor shall commence performance of the terms of this Agreement on the date of the last signature, and shall end his/her performance of this Agreement on June 30, 2028. The University may renew/extend this Agreement, as mutually agreed to by both parties. Total renewals shall not exceed 5 years or twice the length of the original term, whichever is longer. An extension may not exceed 12 months or until completion of the competitive solicitation and award or protest, whichever is longer.

4. PAYMENT.

A. The University shall have sufficient time (as determined by the University) after its actual receipt of ordered goods or services to inspect and approve/disapprove the goods and/or services. It is the policy of the University that invoices on goods and/or services that have been received, inspected and approved by the University will generally be paid within thirty (30) days of the University's receipt, inspection and approval thereof. Until the University receives a properly completed invoice, the payment process will not begin.

B. Advance payment for goods and services shall not be made except in accordance with applicable Florida law.

C. The University shall not be bound to any prepayment penalty clauses.

D. Bills for approved travel expenses shall be submitted in accordance with §112.061, Florida Statutes. The University may establish rates not to exceed the maximum allowed as provided in §112.061, Florida Statutes. The University reserves the right not to pay travel expenses unless the University approves such expenses in advance, in writing. The University has the right to make travel arrangements for the Contractor.

E. Bills for fees or other compensation for services or expenses shall be submitted in sufficient detail with supporting documentation sufficient for pre-audit and post-audit.

5. CONTRACTOR OMBUDSMAN STATEMENT. The University has established a Contractor Ombudsman who acts as an advocate for contractors who may be experiencing problems in obtaining timely payment(s). The Contractor Ombudsman may be contacted at (407) 882-1082.

6. ANNUAL APPROPRIATION. The University's performance and obligations under this Agreement are subject to and contingent upon annual appropriations by the Florida Legislature and other funding sources.

7. ASSIGNMENTS. Under no circumstances shall the Contractor assign to a third party any right or obligation of the Contractor pursuant to this Agreement without prior written consent of the University. If the Contractor is, or during the term of this Agreement becomes, an individual on the payroll of the State of Florida, the Contractor represents that he or she has complied with all applicable provisions in the Florida Statutes and Florida Administrative Code regarding outside or dual employment and compensation.

8. BILLING. The University shall only submit payment to the Contractor if the Contractor has provided the University with approved invoices. Mere statements in lieu of approved invoices will not be accepted by the University. All invoices must specifically describe the services and/or goods provided, the dates and hours that the services were rendered and/or goods delivered and the fee charged. The Contractor shall deliver the invoices to UCF's Division of Finance, unless the Contractor has been otherwise instructed by the University. The Contractor must display the applicable purchase order number on the face of each of

the Contractor's invoices to the University. The University will not be responsible for any goods or services delivered without a properly completed University purchase order or other order provided in writing by a duly authorized University signatory or designee. If the Contractor's invoice lists any freight or cartage charges, such invoice must attach all of the Contractor's receipted transportation bills.

9. **CANCELLATION/TERMINATION.** This Agreement may be unilaterally cancelled by UCF for refusal by the Contractor to allow public access to all documents, papers, letters, or other materials subject to the provisions of Chapter 119, Florida Statutes and made or received by the Contractor in conjunction with this Agreement. UCF also may terminate this Agreement without cause on thirty (30) days' advanced written notice to the Contractor. The parties to this Agreement may terminate the Agreement at any time by mutually consenting in writing. Either party may terminate this Agreement immediately for breach by the other that remains substantially uncured after thirty (30) days' advanced written notice to the breaching party, which notice describes the breach in detail sufficient to permit cure by the breaching party. The University shall be liable only for payment for services satisfactorily rendered/goods satisfactorily delivered and accepted from the date of commencement until the effective date of cancellation/termination.

10. **COMPLIANCE.** The parties shall at all times comply with all applicable ordinances, laws, rules and regulations of local, state and federal governments, or any political subdivision or agency, or authority or commission thereof, which may have jurisdiction to pass laws, ordinances, or make and enforce rules and regulations with respect to the parties.

11. **EXPORT CONTROL.** The parties shall comply with all applicable U.S. export control laws and regulations, including but not limited to the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799 and/or other restrictions imposed by the Treasury Department's Office of Foreign Asset Controls (OFAC), in the performance of this Agreement. The parties agree that no technology, related data or information will be exchanged or disseminated under this Agreement nor any collaborations conducted pursuant to this Agreement that are export controlled pursuant to the export control laws of the United States, including the EAR, ITAR, and any other applicable regulations. The Parties agree that the Contractor will not provide the University with any ITAR or EAR restricted technology and/or related data, and that any ITAR or EAR restricted technologies and/or data produced in furtherance of this Agreement will be in the exclusive possession of the Contractor, and at no time will any export controlled technologies, related data, or information be intentionally or inadvertently transferred to the University, its facilities, labs, staff, researchers, employees, officers, agents, servants or students in the performance of this Agreement. If the Contractor wishes to disclose export-controlled technology or technical data to the University, the Contractor will, prior to disclosing any information, technical data or source code that is subject to export controls under federal law, notify the University in writing that the material is export controlled and shall identify the controls that apply. The University shall have the right to decline or limit (a) the receipt of such information and (b) any task requiring receipt of such information. In the event the Contractor sends any such technical data or product that is subject to export control without

notice of the applicability of such export control, the University has the right to immediately terminate this Agreement. The Contractor understands and agrees that to the extent the Contractor's personnel have access to work or materials subject to U.S. export controls while on University property, such personnel will meet all federal export control regulatory requirements or have the appropriate U. S. government approval.

12. **CONFLICTS OF INTEREST.** Acceptance of this Agreement shall certify that the Contractor is aware of the requirements of Chapter 112, Florida Statutes and in compliance with the requirements of Chapter 112, Florida Statutes and other laws and regulations concerning conflicts of interests in dealing with entities of the State of Florida. The Contractor certifies that its directors and/or principal officers are not employed and/or affiliated with the University unless a current Conflict of Interest (Report of Outside Activity/Employment) form has been completed, executed by such director or officer and approved in accordance with applicable University policies or rules. Violation of this section by Contractor shall be grounds for cancellation of this Agreement.

13. **DELIVERY.** Delivery is to be made to the "Ship To" location shown on the face of this purchase order. When delivery is specified to a location other than the University's Central Receiving Department, the Contractor shall direct its carrier to telephone the University's Central Receiving Department before unloading. Delivery of all shipments shall occur between 9:00 a.m. and 4:00 p.m., Mondays through Fridays only, except on State of Florida or U.S. holidays, or University holidays or closures. Indicated on the face of this purchase order is the "Delivery Desired By" date; failure to make delivery by or before "Delivery Desired By" constitutes cause for cancellation of this Agreement by the University. The University of Central Florida is committed to sustainable practices. Palletized shipments should not exceed 1500 pounds per pallet and when possible, should be shipped on a 40"x 48" pallet. The Contractor shall include a packing list showing contents of shipment (if shipment is made in two or more containers). No boxing, packing, installation, assembly, or similar charges (not included in the item price) will be allowed unless expressly and specifically authorized in writing by the University on the face of this purchase order.

14. **EMPLOYMENT OF ALIENS.** The Contractor's employment of unauthorized aliens, if any, shall be considered a violation of §§274(e) of the Immigration and Nationality Act. If the Contractor knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of the Agreement by the University.

15. **FORCE MAJEURE.** No default, delay or failure to perform on the part of UCF shall be considered a default, delay or failure to perform otherwise chargeable, hereunder, if such default, delay or failure to perform is due to causes beyond UCF's reasonable control including, but not limited to, strikes, lockouts, actions or inactions of governmental authorities, epidemics, pandemics, wars, embargoes, fire, earthquakes, acts of God, or default of common carrier. In the event of such default, delay or failure to perform due to causes beyond UCF's reasonable control, any dates or times by which UCF is otherwise scheduled to perform shall be extended automatically for a period of time equal in duration to the time lost by reason of the cause beyond the reasonable control of UCF.

16. **GOVERNING LAW AND VENUE.** This Agreement and any attachments and addenda hereto are subject to and governed by Florida law. Venue for any action arising hereunder shall be in Orange County, Florida. The University is entitled to the benefits of sovereign immunity, including immunities from taxation.

17. **HEADINGS.** Headings have been included in this Agreement for convenience only and shall not affect the interpretation of any terms found herein.

18. **INDEMNIFICATION.** Except to the extent of the negligence or willful misconduct of the indemnified parties hereunder, the Contractor shall hold the University of Central Florida Board of Trustees and the University's officers, employees, agents and/or servants harmless and indemnify each of them against any and all liabilities, actions, damages, suits, proceedings, and judgments from claims arising or resulting from the negligent acts or omissions of the Contractor, its employees, its agents or of others under the Contractor's control and supervision. If any part of a delivery to the University pursuant to this Agreement is protected by any patent, copyright, trademark, other intellectual property right or other right, the Contractor also shall indemnify and hold harmless the University of Central Florida Board of Trustees and the University's officers, employees, agents and/or servants from and against any and all liabilities, actions, damages, suits, proceedings and judgments from claims instituted or recovered against the University by any person or persons whomsoever on account of the University's use or sale of such article in violation of rights under such patent, copyright, trademark, other intellectual property right or other right.

19. **INDEPENDENT CONTRACTOR.** Each of the parties is an independent contractor and nothing contained herein shall constitute or designate any of the employees or agents of one party as employees or agents of the other party.

20. **NO JOINT VENTURE.** Nothing contained in this Agreement shall be construed to create a joint venture, partnership, or other like relationship between the parties.

21. **LEASED EQUIPMENT.** The risk of loss or damage to leased equipment, goods or property shall not transfer to the University except as provided in §680.219, Florida Statutes. Any security interest in the leased equipment, goods or property granted to the Contractor contrary to AGO 79-72 and AGO 80-9 is null and void. Limitations of remedies provisions, which are unconscionable under applicable Florida law, are void.

22. **MATERIAL SAFETY DATA SHEET (MSDS).** In compliance with Florida Statutes, Ch. 442, a Material Safety Data Sheet (MSDS) must accompany any applicable item delivered under this Agreement.

23. **NON-PERFORMANCE.** Neither party shall be required to perform under this Agreement or any attachments or addenda hereto executed by the University's duly authorized signatory when such performance is delayed or prevented by any cause beyond the party's or parties' control. This Agreement and any attachments and addenda hereto executed by

the University's duly authorized signatory may not be altered, amended or assigned without the prior written agreement of all the parties.

24. **NOTICES.** Any written notices between the parties shall be sent by certified mail to the following addresses, or other addresses of which the parties shall have notified each other.

For UCF: **Procurement Services**
12424 Research Parkway
Suite 355
Orlando, FL 32826
procurement@ucf.edu

For Contractor: **Chem-Aqua, Inc.**
2727 Chemsearch Blvd
Irving, TX 75062
paul.lioce@chemaqua.com

25. **PARKING.** The Contractor shall ensure that all vehicles parked on campus for purposes relating to work resulting from this Agreement shall have proper parking permits. This applies to all personal vehicles and all marked and unmarked company vehicles that will be on any University campus for one (1) day or more or on a recurring basis. All such vehicles must be registered with University's Parking Services Department, and parking permits must be purchased by the Contractor. The Contractor's vehicle(s) shall observe all parking rules and regulations. Failure to obtain parking permits, properly display them, and otherwise comply with all of the University's parking rules and regulations could result in the issuance of a parking ticket and/or towing at the expense of Contractor or Contractor's employees. UCF's Parking Services Department can be contacted at (407) 823-5812 for additional information pertaining to parking and parking fees/rates.

26. **WORK FOR HIRE.** Any work specifically created for the University under this Agreement by the Contractor or anyone working on behalf of the Contractor (the term Contractor shall encompass both) shall be considered a "work for hire." All designs, prints, paintings, artwork, sketches, etchings, drawings, writings, photographs, or any other work or material or property produced, developed or fabricated and any other property created hereunder, including all material incorporated therein and all preliminary or other copies thereof (the "Materials") shall become and remain the property of the University, and, unless otherwise specifically set forth herein, shall be considered specially ordered for the University as a "work made for hire," or, if for any reason held not to be a "work for hire," the Contractor who created, produced, developed or fabricated the Materials hereunder assigns all of his/her right, title and interest in the Materials to the University. The University shall own all right, title and interest in the Materials. The Contractor agrees upon request to execute any documents necessary to perfect the transfer of such title to the University. The Materials shall be to the University's satisfaction and are subject to the University's approval. The Contractor bears all risk of loss or damage to the Materials until the University has accepted delivery of the Materials. The University shall be entitled to return, at the Contractor's expense, any Materials which the University deems to be unsatisfactory. On or before completion of the Contractor's services hereunder, the Contractor must furnish the University with valid and adequate releases necessary for the unrestricted use of the Materials for advertising or trade purposes, including model and property releases relating to the Materials and releases from any persons whose names, voices or likenesses are incorporated or used in the Materials. The Contractor hereby represents and warrants that (a) all applicable laws, rules and regulations have been

complied with, (b) the Contractor is free and has full right to enter into this Agreement and perform all of its obligations hereunder, (c) the Materials may be used or reproduced for advertising or trade purposes or any commercial purposes without violating any laws or the rights of any third parties and (d) no third party has any rights in, to, or arising out of, or in connection with the Materials, including without limitation any claims for fees, royalties or other payments. The Contractor agrees to indemnify and hold harmless the University of Central Florida Board of Trustees and those acting for or on its behalf, the State of Florida and the Florida Board of Governors and their respective officers, agents, employees and servants from and against any and all losses, claims, damages, expenses or liabilities of any kind, including court costs and attorneys' fees, resulting from or in any way, directly or indirectly, connected with (a) the performance or non-performance of the University's order by the Contractor, (b) the use or reproduction in any manner, whatsoever, or (c) any breach or alleged breach of any of the Contractor's agreements or representations and warranties herein.

27. PUBLIC RECORDS, CONTRACT FOR SERVICES: COMPLIANCE WITH SECTION 119.0701, F.S.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: Office of the General Counsel, (407) 823-2482, gcounsel@ucf.edu, University of Central Florida, 4365 Andromeda Loop N., Millican Hall, Suite 360, Orlando, FL 32816-0015

PUBLIC RECORDS, CONTRACT FOR SERVICES

To the extent that the Contractor meets the definition of "contractor" under Section 119.0701, Florida Statutes, in addition to other contract requirements provided by law, the Contractor must comply with public records laws, including the following provisions of Section 119.0701, Florida Statutes:

1. Keep and maintain public records required by the public agency to perform the service.
2. Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.
3. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.
4. Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records

disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request, and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.

If a contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.

This Contractor and any subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a), 60-741.5(a), and 29 CFR Part 471, Appendix A to Subpart A with respect to affirmative action program and posting requirements. These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender, identity, or national origin and for inquiring about, discussing, or disclosing compensation. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sexual orientation, gender identity, national origin, veteran status, or disability.

28. **RECORDS.** The Contractor agrees to keep and maintain separate and independent records, in accordance with generally accepted accounting principles, devoted exclusively to its obligations and activities pursuant to this Agreement. Such records (including books, ledgers, journals, and accounts) shall contain all entries reflecting the business operations under this Agreement. The University or its authorized agent shall have the right to audit and inspect such records from time to time during the term of this Agreement, upon reasonable notice to the Contractor.

29. **TAXES.** The University shall not pay any intangible taxes, property taxes or sales taxes.

30. **VIETNAM ERA VETERANS READJUSTMENT ACT OF 1974.** The University and the Contractor must comply with all applicable provisions of: (i) §402:60-250.4 of the Vietnam Era Veterans Readjustment Act of 1974; (ii) §503:60-741.4 of the Rehabilitation Act of 1973; (iii) Executive Order 11246, as amended; and (iv) the rules, regulations, and relevant orders of the U.S. Secretary of Labor.

31. **EQUAL OPPORTUNITY.** This Contractor and any subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a), 60-741.5(a), and 29 CFR Part 471, Appendix A to Subpart A with respect to affirmative action program and posting

requirements. These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin and for inquiring about, discussing, or disclosing compensation. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, veteran status, or disability.

32. SEVERABILITY. This Agreement is severable such that should any provision of this Agreement be or become invalid or unenforceable, the remaining provisions shall continue to be fully enforceable.

33. WAIVER/REMEDIES. No failure or delay by a party hereto to insist on the strict performance of any term of this Agreement, or to exercise any right or remedy consequent to a breach thereof, shall constitute a waiver of any breach or any subsequent breach of such term. No waiver of any breach hereunder shall affect or alter the remaining terms of this Agreement, but each and every term of this Agreement shall continue in full force and effect with respect to any other then existing or subsequent breach thereof. The remedies provided in this Agreement are cumulative and not exclusive of the remedies provided by law or in equity.

34. CONTRACTOR INSURANCE. All insurance shall be procured from companies authorized to do business in the State of Florida, with a minimum of A.M. Best rating of A, or equivalent. Proof of coverage shall be provided by submitting to the University's Risk Management Office a certificate or certificates, evidencing the existence thereof or insurance binders and shall be delivered within fifteen (15) days of the tentative award date of the Agreement. In the event a binder is delivered, it shall be replaced within thirty (30) days by a certificate in lieu thereto. A renewal certificate shall be delivered to the University's Risk Management Office at least thirty (30) days prior to the expiration date of each expiring policy.

1. The University, at its sole discretion, has the right to deviate from any of the insurance requirements herein. If the University decides to deviate from the insurance requirements stated herein, the University will inform the Contractor in writing.
2. **General Liability:** The Contractor shall provide a Certificate of Insurance evidencing Commercial General Liability insurance coverage in force with minimum limits of $1,000,000 (ONE MILLION DOLLARS) per Occurrence and $2,000,000 (TWO MILLION DOLLARS) Aggregate. Upon acceptance and confirmation of coverage by the University and before beginning work, and at all times during the term of this Agreement , Contractor will maintain said General Liability insurance in force and shall provide the University with a Certificate of Insurance and Additional Insured Endorsement listing the University of Central Florida Board of Trustees as

"Additional Insured." The Certificate will provide a minimum 30 days advanced notice to in the event of cancellation.

3. **Auto Liability:** If the Contractor operates a vehicle on campus for commercial use in the performance of this Agreement (i.e. deliveries, transport of employees, etc.), the Contractor shall provide a Certificate of Insurance evidencing Auto Liability insurance with minimum $1,000,000 (ONE MILLION DOLLARS) per Accident Combined Single Limit for Bodily Injury and Property Damage. Upon acceptance and confirmation of coverage by the University and before beginning work, and at all times during the term of this Agreement , the Contractor will maintain said Auto Liability insurance in force and provide University with a Certificate of Insurance listing the University of Central Florida Board of Trustees as "Additional Insured." The Certificate will provide a minimum 30 days advanced notice to the University in the event of cancellation.

4. **Workers' Compensation:** The Contractor shall provide a Certificate of Insurance evidencing Workers' Compensation coverage consistent with Florida Statute and Employer's liability no less than $500,000 (FIVE HUNDRED THOUSAND DOLLARS) for Bodily Injury by accident, each accident, Bodily Injury by disease, each employee, and policy limit. Upon acceptance and confirmation of coverage by the University and before beginning work, and at all times during the term of this Agreement , the Contractor will maintain said Workers' Compensation and Employer's Liability insurance in force and provide the University with a current Certificate of Insurance. The Certificate will provide a minimum 30 days advanced notice to the University in the event of cancellation.

5. **Certificates of Insurance:** The University of Central Florida Board of Trustees is to be listed as Additional Insured on all Certificates issued. Contractor shall send a copy of his/her Certificate of Insurance along with accompanying Additional Insured Endorsements naming the University of Central Florida Board of Trustees to the following address:

   Email: RiskManagement@ucf.edu

35. AMENDMENTS. No changes or amendments to this Agreement are binding on the University unless made in legible writing that is reviewed and approved by an attorney in the University's General Counsel's Office and an authorized UCF signatory. The Contractor shall return this Agreement to the University's Procurement Services Department at once with a written explanation if it is not acceptable in its entirety.

36. USE OF CONTRACT BY OTHER GOVERNMENT AGENCIES. At the option of the Contractor, the use of the Agreement resulting from this solicitation may be extended to other governmental agencies, including the State of Florida, its agencies, political subdivisions, counties and cities. Each governmental agency allowed by the Contractor to use this Agreement shall do so independent of any other governmental entity. Each agency shall be responsible for its own purchases and shall be liable only for goods or services ordered, received and accepted. No agency receives any liability by virtue of this bid and

subsequent contract award.

37. **SECURE HANDLING OF UCF DATA.** The University requires Contractors and other third parties to review, accept, and integrate secure data handling requirements as part of any contract, agreement, or Service Level Agreement ("SLA") that involves the storage, transmission, processing, or collection of UCF data, or access to UCF data, by the Contractor. Additional agreements may be required depending on the data involved. This Agreement is intended to ensure that UCF's security and compliance requirements are outlined and followed by the Contractor. Visit http://www.Infosec.ucf.edu/vrm for additional information.

38. **SMOKE-FREE POLICY.** The University prohibits smoking on all university owned, operated, leased and/or controlled properties in order to maintain a healthy and safe environment for its faculty, staff, students, and visitors. Visit http://www.ucf.edu/smokefree for additional information.

39. **CONTACT WITH MINOR CHILDREN.** To the extent that the Contractor has or will have any contact with minor children, the Contractor hereby guarantees that the Contractor and/or anyone acting on the Contractor's behalf (including, but not limited to the Contractor's employees, agents, subcontractors, etc.) has undergone/passed a Level II (two) background check with the State of Florida and hereby certifies that none of the Contractor's employees, agents, subcontractors and/or anyone else acting on the Contractor's behalf has any disqualifying offenses, including, but not limited to those listed in Section 435.04, Florida Statutes.

40. **REPORTING OF CHILD ABUSE**. To the extent that the Contractor has or will have any contact with minor children, the Contractor hereby expressly agrees to instruct its employees, agents, subcontractors and/or anyone else acting on the Contractor's behalf to report to the University of Central Florida police any instance of child abuse, abandonment, or neglect witnessed or learned about that occurred on University of Central Florida property or during an event or function sponsored by the University of Central Florida.

41. **REVISED QUANTITIES**. The University reserves the right to increase or decrease total quantities as necessary. The University may place additional orders for the same or modified scope of the commodities/services solicited under this ITB/ITN within 180 days after expiration of the contract resulting from this ITB/ITN. Total additional quantities/modified scope, if any, are unknown.

42. **E-VERIFY**. To the extent that Contractor meets the definition of "Contractor" or "Subcontractor" under Section 448.095, Florida Statutes, Contractor agrees that it and any Subcontractors it utilizes under this agreement are registered with and use the E-Verify system as required by Section 448.095, Florida Statutes.

43. **HUMAN TRAFFICKING.** If Contractor is not a governmental entity under Section 287.138(1), Florida Statutes, Contractor agrees that, prior to any contract being executed, renewed, or extended between the parties, it shall comply with the requirements of Section

787.06(13), Florida Statutes, by providing University with an affidavit signed by an officer or representative of Contractor under penalty of perjury attesting that Contractor does not use coercion for labor or services, as defined in that section.

44. ATTACHMENTS AND ENTIRE AGREEMENT. This Agreement and any attachments and/or addenda hereto that are executed by the University's duly authorized signatory constitute the entire and exclusive agreement between the parties. Attachments and/or addenda may include, but are not limited to, the University's ITB/ITN, if any, including all the University's ITB/ITN specifications, and the Contractor's ITB/ITN response, if applicable. In the event of any conflict or inconsistency between this Agreement and the provisions of attached documents, the order of priority is:

A. This Agreement;
B. The University's ITB/ITN and ITB/ITN specifications, if any;
C. The Contractor's ITB/ITN response; and
D. Any other attached documents signed by the University's official signatory at the time the Agreement is executed.

UNIVERSITY OF CENTRAL FLORIDA BOARD OF TRUSTEES		**CHEM-AQUA, INC.**	
Signature:	Gerald Hector	**Signature:**	Robert Bellinger
Date:	Signed: Friday, February 14, 2025	**Date:**	Signed: Friday, February 14, 2025
Printed:	**Gerald Hector**	**Printed:**	Robert Bellinger
Title:	**Senior Vice President, Administration and Finance**	**Title:**	VP Corporate Accounts

ATTACHMENT "A" PRICE SCHEDULE

In accordance with the University of Central Florida's ITN No. 2023-17OCSA and the Contractor's response.

9.0 Renewal Price Section

Chem-Aqua is excited about the opportunity to work and partner with the University of Central Florida. We have instituted our Corporate Account discount across the portfolio. This price will remain firm for the first year (not including any system or tonnage alterations) and then an annual price increase will be considered based on Commodity PPI (Chemicals and Allied Products), not to exceed 3%.

This price is inclusive of:

- All chemical for the facility
- A minimum of weekly service
- All corrosion coupon analysis, and basic microbiological testing
- Yearly audits by our Corporate Engineering team

More detailed pricing information can be found in the pricing sheets on the attached pages.

10.0 Pricing Summary

University of Central Florida

ChemAqua - Annual Pricing Agreement - Based on 365 days of Treatment

System To Be Treated	Calculated Chemical Costs For Cooling Tower, Boilers and Closed loop (Towers With Continuous NaCl & NaBr) Weekly Service
Tower Water System One	$205,467.52
TES CHWS	$33,710.98
Partnership V	$7,655.25
CHP Hot Loop Water System	$122.88
Biological Science Steam Boilers	$3,663.11
309 Boiler House Steam Boiler	$854.73
Reflection Pond	$58,235.06
Closed Chilled Water Systems	$821.55
Closed Hot Water Systems	$1,855.20
Leased Equipment	$13,536.00
Applicable Freight/Labor	Included
Total	**$325,922.27**

Tower Water Systems

Cooling Costs - Cooling Towers on Hard Water MU

Chemical and System	Cooling Towers on Soft Water MU	Cooling Towers on City Water MU Chemical Costs With Stabilized Bromine	Annual lbs of product
Tower Make Up Per Year Gallons	125,000,000		
Tower System Volume Gallons	76,500		
Tower Cycles	3		
Tower Inhibitor - Chem-Aqua 31185			
Tower Inhibitor Cost/Lb.	$4.62		
Tower Inhibitor Feedrate - PPM	100		
Tower Inhibitor Cost/1000 Gallons MU	$1.283	$ 160,416.67	34722
Liquid Sodium Hypochlorite Costs/LB	$1.00		
Liquid Sodium Hypochlorite Costs/1000 gal	$0.75	$ 8,950.50	8951
Liquid Sodium Bromide Cost/LB	$3.10		
Liquid Sodium Bromide Costs/1000 gal	$0.78	$ 9,248.85	2984
Bact 45 Glut Cost/LB	$6.75		
Glut Costs/1000 Gallons	$6.75	$ 26,851.50	3978
Total Cooling Chemical Costs Using Bromine			
Total Bid		**$ 205,467.52**	**50,634**

Closed Loop Costs - Silica/Azole Program

Chemical and System	Closed Loops	Closed Loop Chemical Costs	Lbs of Product
Chill Water System Volume	3,375,000		
Chill Water Make Up Per Year Gallons	3,500,000		
Sio2 Chilled Water Cost /Lb. - Chem-Aqua 53505	$2.97		
Chill Water Inhibitor Feedrate - PPM	300		
Chill Water Inhibitor Cost/1000 Gallons MU	$7.43	$ 25,987.50	8750
ClO2 - Price per dose	$7,723.48		
Lbs/Dose	281		
		$ 7,723.48	3372
Total Bid		**$ 33,710.98**	**12,122**

Closed Loop Costs - Silica/Azole Program

Chemical and System	Closed Loops	Closed Loop Chemical Costs	Lbs of Product
Chill Water System Volume	60,000		
Chill Water Make Up Per Year Gallons	6,000		
Sio2 Chilled Water Cost /Lb. - Chem-Aqua 53505	$2.97		
Chill Water Inhibitor Feedrate - PPM	300		
Chill Water Inhibitor Cost/1000 Gallons MU	$7.43	$ 44.55	15
Closed Loop Isothiazolin Feed Costs/LB - Chem-Aqua 40215	$3.10		
Closed Loop Isothiazolin Costs/1000 Gallons - Chem-Aqua 40215	$6.20	$ 372.00	120
45% Glut Cost/LB Bacticide 45	$6.75		
45% Glut Costs/1000 Gallons - Bacticide 45	$6.75	$ 405.00	60
Total Bid		**$ 821.55**	**195**

Closed Loop Costs - Nitrite/Azole Program

Chemical and System	Closed Loops	Closed Loop Chemical Costs	Lbs of Product
Hot Water System Volume	1,200		
Hot Water Make Up Per Year Gallons	1,200		
Nitrite Hot Water Cost /Lb. - Chem-Aqua 51999	$3.84		
Hot Water Inhibitor Feedrate - PPM	3200		
Hot Water Inhibitor Cost/1000 Gallons MU	$102.40	$ 122.88	32
Total Bid		**$ 122.88**	**32**

Closed Loop Costs - Nitrite/Azole Program

Chemical and System	Closed Loops	Closed Loop Chemical Costs	Lbs of Product
Hot Water System Volume	80,000		
Hot Water Make Up Per Year Gallons	8,000		
Nitrite Hot Water Cost /Lb. - Chem-Aqua 51999	$3.84		
Hot Water Inhibitor Feedrate - PPM	3200		
Hot Water Inhibitor Cost/1000 Gallons MU	$102.40	$ 819.20	213
Closed Loop Isothiazolin Feed Costs/LB - Chem-Aqua 40215	$3.10		
Closed Loop Isothiazolin Costs/1000 Gallons - Chem-Aqua 40215	$6.20	$ 496.00	160
45% Glut Cost/LB Bacticide 45	$6.75		
45% Glut Costs/1000 Gallons - Bacticide 45	$6.75	$ 540.00	80
Total Bid		**$ 1,855.20**	**453**

ATTACHMENT "B" SCOPE OF WORK

4.0 Guaranteed Service

Chem-Aqua Representatives

Service is one of the most important aspects of a water treatment program. The economics and technical success of your program depends not only on the chemical and equipment selection, but also how well it is managed. Chem-Aqua is proud to offer one of the most comprehensive service programs available in the industry.

Chem-Aqua has over 450 Technical Representatives and managers in the United States. Our representatives will take personal involvement with your systems. They will take ownership in the treatment program implementation, and problem solving. They will involve all aspects of their experience and expertise to reduce energy and fuel costs, protect equipment, reduce chemical and water consumption, and become a dedicated partner.

The following table summarizes the service team's responsibilities. The facility will have additional support and oversight from Chem-Aqua Corporate Accounts, Corporate Engineering, Regional Managers, Senior Vice Presidents, and Business Development Managers.

Title	Service Month/Year
Team Leaders	Weekly
Regional Manager	2-3 times per year
Corporate Account Manager	1-2 times per month
Corporate Engineer	1-2 times per year

Due to the service requirements and technical demands of the systems at The University of Central Florida, we are recommending putting a team into place to meet the needs of the specification with one primary point of contact.

Our service is summarized below:

- One (1) primary representative (lives <1 mile from UCF) and one (1) back up representative responsible for the account
- Commitment to providing weekly physical service with continuous remote monitoring
- A Regional Manager who will be on-site 2-3 times per year
- A Corporate Engineer who will be on-site 1-2 times per year
- A team of Corporate Account Managers who will be on-site 1-2 times per month and provide continuous over-site on the account by making routine checks of AquaDART graphs, service reports, and quarterly review preparation and involvement

Chem-Aqua will provide service for all towers, closed loops, boilers and make-up water per specifications.

Services Provided Periodically:

Particle Size Analysis – Will be performed annually on systems that have side stream filtration present or as needed if suspended solids are a concern.

Biological Profile – Dip slides will be performed as outlined in the bid package and full microbiological analyses/profiles will be performed by our in-house lab on tower and closed loop systems quarterly.

System Volume/Leak Tests – Initially system volumes will be confirmed on all treated systems. Follow up volume studies will be performed if systems are modified or expanded. Leak tests will be performed as needed if signs of water loss are seen in closed loop systems.

System Audits – All treatment equipment and system equipment will be inspected during regular service visits. A Chem-Aqua representative will be present for any equipment openings and will provide full documentation/report on all inspections/findings. The direct manager/supervisor will be on site monthly and will be reviewing all service reports to confirm program performance.

Elution Studies – Elution studies will be performed on all water softeners annually or as needed due to breakthrough concerns. Please see the Water Softener Monitoring and Resin Maintenance section of this proposal.

Dissolved Oxygen Studies – Dissolved oxygen studies will be performed on all DA's annually or as need if concerns arise with DA performance. A full report will be submitted any time a DO study is performed.

Borescope Inspections – Chem-Aqua will have a borescope present for all chiller and boiler inspections. If video/pictures are required, we do have access to borescopes equipped with these capabilities at no charge.

Deposit Analysis – Chem-Aqua maintains an in-house deposit lab that can be utilized at no cost. Samples can be sent to the lab as needed to ensure we are addressing any system issues.

Corrosion Studies – Chem-Aqua will maintain quarterly coupon studies on all systems that have corrosion coupon racks present. If the corrosion rates fall out of spec the corrosion coupon frequency will increase to every 30 days. We do have corrators available for further instantaneous corrosion readings.

Total and Dissolved Iron- Chem-Aqua will perform total and dissolved iron tests on the process condensate, feedwater, and boiler water monthly. They will be targeting a total iron residual of <2 ppb in the feedwater and <5 ppb in the boilers

Please see the Chemical Containerization & Delivery Service section of this proposal for double walled tank details.

Chem-Aqua representatives or Engineering staff will be on site for all equipment openings. There will be a borescope on site for inspection of chillers, boilers, etc. Pictures will be taken each year to maintain a digital library of ongoing success of the treatment program and reports will be submitted for all inspections. Chem-Aqua has full lab resources for deposit, microbiology and failure analysis at no charge as well as resources for resin analyses if there are issues with a water softener.

Chem-Aqua will be available for quarterly meetings and will outline a quarterly report to address every aspect of the treatment program. We will review problem areas, areas of improvement and completed/on-going projects. Our quarterly review meetings will utilize our Chem-Aqua Dashboards where both The Ohio State University and Chem Aqua personnel can quickly trend service data, monitor lab reports, view chemical usage, and monitor KPI's. All quarterly reviews and reports will include a review of chemistry results, data trends, corrosion coupon summaries, and chemical usage. Chem-Aqua will provide six copies of the written report.

Chem-Aqua will provide a full water analysis on each water system on a quarterly basis or as requested.

4.1 Service Call from Chem-Aqua

A. This starts with staying in touch with your facilities 24 hrs./day, 365 days/year via use of the aquaDART™/Advantage Miniwave controller on line.
   - Print any graphs or logs which we may want to discuss on the next visit to the campus.

B. Visit the web site to look at all parameters prior to our visit.

C. Advise plant contacts that we are in the plant. Visit with plant personnel to see how things have been running and if they have any questions or items they want us to specifically check on.

D. Inspection of feed stations
   1. chemical spills/leaks
   2. flow through side stream
   3. alarms on controller
   4. controller conductivity
   5. feed pumps are primed/working properly
   6. Inspect corrosion coupon rack/change
   7. chemical inventory
   8. organization

E. General walk around plant
   1. odd noises
   2. leaks
   3. visual check of towers
   4. check approach temperatures
   5. visual check of chill water system and side stream filtration

F. Inspection of testing station
   1. inspect test kits
   2. check daily logs
   3. discuss testing with plant testing personnel
   4. schedule side by side testing once per quarter minimum
   5. check dip slides for cooling water and chill water
   6. maintain up to date SDS/Testing procedures
   7. clean and organize testing station when done testing
   8. leave clear written instructions for all tasks that are to be completed by Centrio Energy

G. Conduct water testing/Pull Coupons (every 30-90 days)
   1. Testing outlined on following page
   2. Perform/Analyze MB Dip Slides

4.2 Transition Plan

This is a general transition plan and will be modified as needed to ensure a smooth transition.

Action Item	Timeframe
Chem-Aqua will be on-site 1 day a week to start our chemical treatment program.	Immediately upon award of the contract
Meeting with Management Team to outline all concerns, needs, and objectives	First day after contract award
Bring in complete Chem-Aqua team to introduce to all personnel, to familiarize the team with all plant operations, and to assist with transition of treatment program	Within 1 week after contract award
Comprehensive sampling of all systems to be treated to assess current operating conditions of all boiler systems, closed loops, and tower systems.	Beginning immediately upon award of the contract
Record readings of all operating equipment to determine current operating condition. Provide report on findings.	First week after award of the contract
Establish daily transition progress review updates	Weekly after contract award
We will bring in a corporate engineer to audit the facility to ensure all possible cost savings opportunities are being met for UC Merced cooling systems	Within first month after contract award
Determine current inventory and furnish inventory report to facility personnel	First day after contract award
Order chemical containments	First week after contract award
Obtain Environmental Health and Safety Approval to bring Chem-Aqua products on site	First week after contract award
Order chemical treatment products	Immediately after chemicals are approved
Furnish 48 hours prior notice of chemical delivery via email and telephone	48 hours prior to delivery
Introduce UC Merced personnel to dedicated site chemical delivery drivers	When chemicals are delivered
Primary account representative will accompany chemical delivery driver on-site during deliveries	When chemicals are delivered

Action Item	Timeframe
Determine all plant personnel to be trained	First week after contract award
Establish training schedule and scope of training. Include at least two days of in-depth training.	First week after contract award
Furnish operating control manuals	Within 2 weeks after contract award
Install chemical tanks/containments	Before the first chemical delivery
Transition to Chem-Aqua products as competitor product inventories are depleted	Depending on inventory analysis and agreement between UC Merced and the current vendor
Plan follow-up training sessions	TBD
We will perform volume studies on the cooling towers to ensure accurate dosage rates through the use of PTSA tablet method.	First week after contract award
We will perform volume studies on the closed loops through the use of the recommended treatment products.	In the first 3 months after contract award

5.0 Chemical Containment and Delivery Services

SMARTLink℠
Delivering Solutions

Chemical Handling, Storage, and Delivery

SMARTLink™ Delivery Services
In 1992, our SMARTLink Delivery Services was launched in order to provide our customers with chemical delivery services tailored to their specific needs.

If drum placement and empty drum pickup are important, our SMARTLink Point-of-Use Delivery may be right for you. With this service, your treatment chemicals will be delivered on a lift gate equipped SMARTLink truck by a trained delivery specialist who is familiar with your site's unique requirements. Your chemicals will be transported where you want them and empty drums will be picked up for recycling or disposal. The following services are available on point-of-use shipments:

- Delivery by safety trained personnel
- Placement of chemicals at the point of use
- Pick up of empty Chem-Aqua drums
- All trucks lift-gate equipped
-

Another valuable service is our SMARTLink Hands-Free Delivery. With Hands-Free Delivery, a delivery specialist will transport your treatment chemicals to the point of use, pump transfer them into properly sized SMARTFeed tanks, and promptly remove the empty shipping containers from your site. Along with feed equipment that adds chemical directly from the storage tanks into the treated systems, SMARTLink provides a hands-free feed system that virtually eliminates direct contact with treatment chemicals. Hands-free delivery from Chem-Aqua provides many cost saving benefits over drums including:

- Simplified Chemical Handling
- More reliable Chemical Feed
- Better labor Utilization
- Improved Workplace Safety
- Reduced Environmental Concerns
- Reduced Chemical Storage Requirements

Our SMARTLink Delivery Services offer many valuable benefits over common carrier delivery that will help lower your total cost of operation and save you money.

Your Facility

A primary objective is to minimize/eliminate chemical handling and safety hazards to your personnel. We are proud to offer the following chemical handling, storage, and delivery services for your facilities:

- Chemical deliveries will generally be made via a site familiar Chem-Aqua delivery specialist using our SMARTLink Service.
- With the exception of sulfuric acid, all chemicals will be delivered to point of use and transferred into
- Appropriately sized SMARTFeed tanks with spill containment using our Hands-Free Delivery Service. The chemicals will then be fed “neat” from the SMARTFeed tanks into the systems being treated.
- Because of the significant hazards and safety issues involved in transporting and pump transferring sulfuric acid, it will be provided in 30- or 55-gallon carboys that are delivered to the point of use and stored on a 2 or 4 drum in-line spill pallet. When one carboy is near empty, the operator will merely have to lift the suction wand out of the empty carboy and place it in the full one. Chem-Aqua partners with commodity suppliers to meet point of use delivery regarding sulfuric acid.
- All empty chemical containers will be promptly removed.
- Chemicals, parts, and test equipment to be stored on University of Central Florida by Chem-Aqua shall be stored only in locations previously agreed to by University of Central Florida.
- All tank replacements or new tanks will meet University of Central Florida specifications.

Tank Specifications

SMARTFeed Tanks are available in a wide variety of sizes and configurations to meet any need. For this particular application, we are recommending top feed heavy duty poly tanks with rectangular spill containment. Tanks can be in 40, 75, and 100-gallon and up. Following you will find drawings showing the foot print of the particular SMARTFeed tanks that we are initially recommending for your facility.

6.0 Equipment Offering

University of Central Florida - Leased Equipment					
System	Qty. Needed	Code	Equipment Description	Monthly Lease	Annual Lease
Towers/Closed Loops	12	12092430	AQUADART TOUCH PLUS W/2-PL COUPON, COND, ORP, PH, PTSA	No Cost	$ 13,536.00
	24		Chemical Injection Pumps	No Cost	
	12	12088854	AQUADART ENCLOSURE OPTION. INCLUDES QUBE ENCLOSURE, NEMA 4X, OVERAL LDIMENSIONS 41"L X 32"W X 12"D. BACKPLATE INCLUDED, HINGED COVER, AND CLEAR POLY WINDOW WELDED IN. INCLUDES MOUNTING FEED, AQUADART WINDOW LABEL, AND ELECTRICAL RECEPTACLES	No Cost	
	12	12092965	MODEM, CELLULAR, DIGI, IX10-00G4-CA, VERIZON, W/ENCLOSURE	$ 288.00	
	12	12078367	MONTHLY SUBSCRIPTION DATA PLAN, 250 MB, CHEM-AQUA	$ 480.00	
	20	12097370	LEVEL, ULTRASONIC, PYXIS LS-200, GENERIC, SPECIFY TANK DIM	$ 360.00	
	TBD	12088840	TANK, 160 GAL, CYLINDRICAL PEABODY	No Cost	
Total (Not included: Tax or Installation)				$ 1,128.00	$ 13,536.00

1 Testing Equipment Set will be provided at no charge for each facility. Chem-Aqua is offering to provide all chemical feed equipment at no cost to UCF. This equipment offering totals more than $241,559 in savings for UCF . AquaDART controllers and other equipment will be owned and maintained by Chem-Aqua for the life of the agreement.

Chem-Aqua is offering to provide all chemical feed equipment including double walled chemical containment tanks at no cost to the University of Central Florida. This totals $241,559 in savings for the University!

This also includes an automated chemical feed system for the TES Closed Chilled Water System!

Controller Package

Tower controllers include:

- ✓ Continuous conductivity monitoring for cycle control
- ✓ Continuous fluorescence/inhibitor monitoring
- ✓ Continuous ORP monitoring for biocide feed verification and control
- ✓ Selectable feed timers
- ✓ Tank Level Monitors
- ✓ Water usage monitoring
- ✓ On Line Access
- ✓ Board mounted controller and flow assembly for easy installation
- ✓ NEMA Enclosure
- ✓ aquaDART are Universal Access – No Protected/Proprietary Software like some other companies employ.

6.1 Equipment Capabilities and Reporting

The chemical feed and control equipment used is just as important as the treatment chemicals. Even the "best" chemical program available cannot provide good results if the treatment chemicals are not added properly. We are recommending the following feed and control equipment for your cooling water system(s):

Cooling Tower Conductivity Controllers & Pumps
Chem-Aqua will provide smart conductivity controllers to meet the water treatment specifications. There are some options to consider. Chem-Aqua wishes to suggest the use of the Chem-Aqua MegaWave conductivity controller.

aquaDART™
By Chem-Aqua®

The aquaDART controller is the most advanced, user friendly, powerful and flexible controller available within the industry. The "system" approach means a single Megawave can have 1 to 4 independent systems. Each system can be configured differently (i.e. 1 tower and 2 closed water system for Tower 1 and 1 tower and 1 closed water system for Tower 2).

Data Collection
One of our goals with the management of the water treatment program for the Centrio Energy facilities is to improve the data management. Chem-Aqua will utilize software for the management of all data collected from the water flow signals, conductivity meters, chemical test results to name a few and will be managed using this statistical control software. This software package manufactured by Advantage exclusively for Chem-Aqua Inc. will allow for the wireless cellular modem to be accessed anytime by the facility or Chem-Aqua.

Chemical Feed Pumps
Chemical feed pumps are available in a wide range of sizes, applications and delivery methods. Chem-Aqua has a wide range of suppliers and chemical feed pumps available.

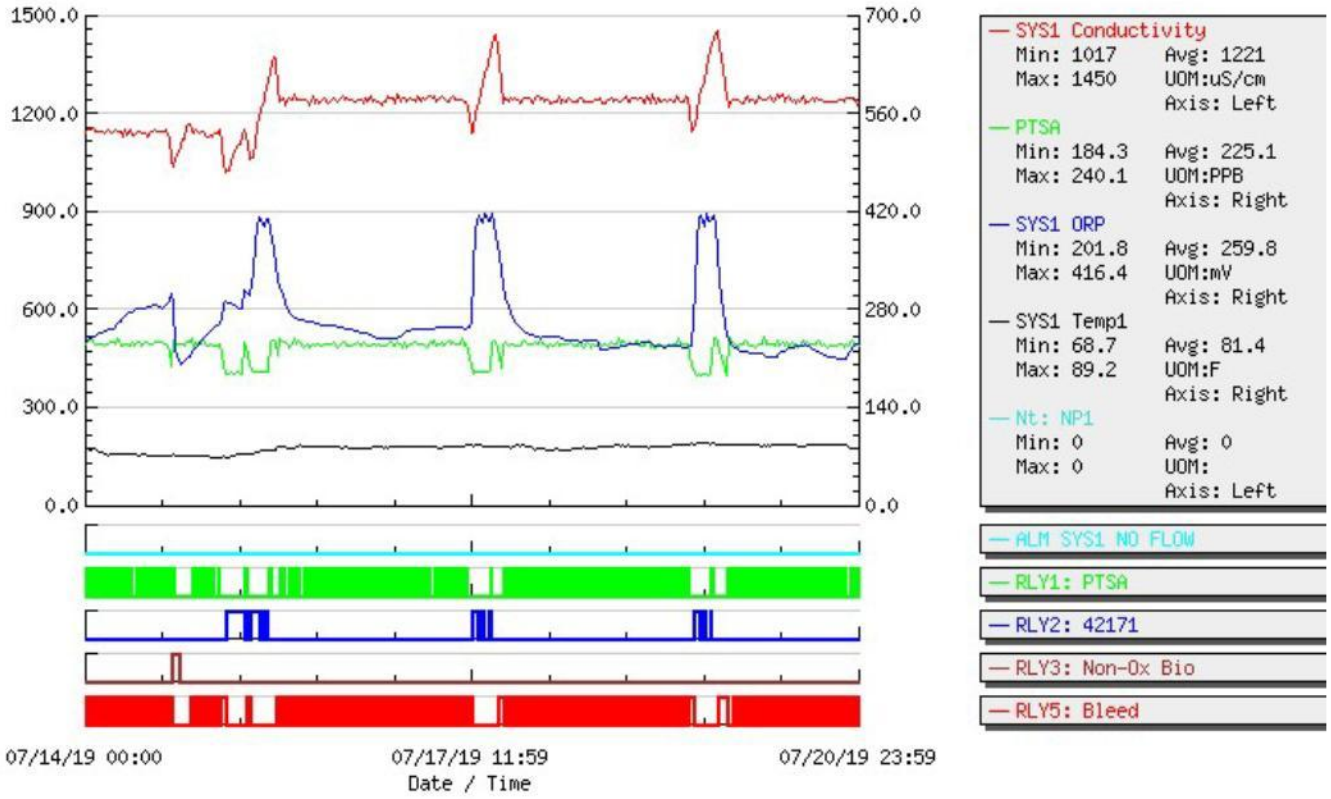
Corrosion Coupon Racks

Four position coupon racks can be used to monitor steel, copper and aluminum corrosion rates. The use of coupon racks is critical in providing data to ensure that system corrosion rates are within defined limits as established by the specification.

Testing Equipment (Included)

- The Myron model 6P unit is capable of providing instant readings for conductivity, total dissolved solids, pH, ORP, and temperature.
- The Hach DR890 colorimeter can be used for the testing of aluminum, copper, iron, molybdenum, turbidity, free halogen, and suspended solids. There is a total of 90 specific tests this unit is capable of analyzing depending on the type of reagents consumed. Easy-to-use software offers push-button method selection, automatic wavelength selection and a preprogrammed method timer. Results are displayed immediately.
- Chem-Aqua will provide all necessary glassware, reagents, and dip slides necessary to perform on-site tests.

aquaDART SMART Controllers Track and Control Many Aspects of Cooling Tower Chemical Program (Included)



1. ORP goes down about 75 mV during non-oxidizer feed. This we refer to the glute bump or depression. This assures non-oxidizer has been fed.
2. ORP rises about 100 – 150 mV during each 3 weekly oxidizer feeds. This assures oxidizer has been fed.
3. Oxidizer rises quickly to the pre-set 150 mV increase above background level of ORP and held at this 400 mV level during the 4 hours of oxidizer feed.
4. Inhibitor PTSA drops during the oxidizer and non-oxidizer feeds and stays depressed during oxidizer feeds. This confirms the lock out cooling water inhibitor during oxidizer and non-oxidizer feeds. Inhibitor feed re-established after oxidizer and non-oxidizer feeds

5. Conductivity increase during oxidizer feed and stays increased during oxidizer feeds. This confirms the conductivity is locked during oxidizer feeds.
6. Conductivity increase during non-oxidizer feed and stays increased during non-oxidizer feed time of 1 hour. This confirms the conductivity is locked during non-oxidizer feed.
7. There are pre-bleeds that initiate before the oxidizer feeds on M, W, F.
8. There is a pre-bleed that initiate before the non-oxidizer feeds on Sunday.

Smart Site and Example Reports

Our goal is to be one of your most valuable business partners.

The recommended water treatment programs are designed to help management optimize plant processes, improve productivity, and realize bottom line cost savings.

Our proposals include a wide range of value-added services designed to enhance the results you receive from your water treatment programs and to help your facilities realize Operational Cost Savings (OCS). Upon close examination, we believe you will find that we are offering one of the most comprehensive service packages available in the industry. The following services are included with your Chem-Aqua treatment program:

1. Service Report Generation

A written report will be submitted during every service visit. An electronic service report will be sent to you before leaving the facilities. We will have an Excel file to track our services.

Chem-Aqua will make all service reports available to you via our online SmartSite report portal. Depending on the level of access, reports can be viewed, printed and saved for all or selected service reports.

Chem-Aqua Engineering will review each system for product choice, feed rates, and technical applications. Control charts and a Control Manuals will be maintained at each facility containing:

- Service reports generated on our online SMART Service Report system.
- Servicing standards to ensure each site receives quality service and good results.
- Comprehensive onsite testing of system waters, immediate interpretation of test results, and accurate written recommendations.
- Routine monitoring of your pretreatment (softener, filters, etc.), and application equipment with troubleshooting and repair services provided as necessary.
- Inventory management.
- Results of each visit discussed with appropriate plant personnel.

2. Operator Training

We will provide “one on one” operator training as needed, as well as site-specific training and seminars. We’re especially excited about our ability to provide internet-based multimedia training.

Chem-Aqua e-Learning allows us to provide effective “just in time” learning with proficiency testing and results tracking on all types of relevant topics. Chem-Aqua e-Learning is the wave of the future that’s available today.

3. Program Control Manuals (Included)

We will provide detailed Control Manuals for your treatment programs including the control ranges, corrective measures, test procedures, and troubleshooting guidelines. and other requested material specific to your facility. Example of the contents in a Chem-Aqua Program Manual:

Program Manual

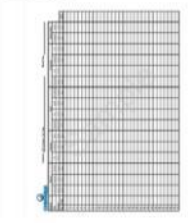
Contact Information

System Control Ranges

Test Procedure

Troubleshooting

Test Logs



SDS

Equipment Manual

Technical Bulletin

4. Special Services

1. Professional laboratory analyses will be provided as needed to help prevent and diagnose problems. We have full service analytical and research laboratories with modern instrumentation and over 25 scientists dedicated to water treatment.

2. Specialty inspection and monitoring equipment available when needed – borescope, dissolved oxygen monitor, ultrasonic flow sensor, condensate monitors, corrators, and much more

3. Start-up service visits will be provided as necessary to ensure a smooth transition to the new program and that all water treatments systems are functioning properly. A site-specific transition plan will also be provided to guide the transition process.

4. Engineering Support Specialists available as needed to assist with technical audits, surveys, equipment inspections and provide troubleshooting assistance. Our customers are supported by some of the best and most experienced professionals in the business.

5. Call-out service is also available should you need us anytime outside of our normal visits. Our goal is to be there when you need us.

5. Example Reports

1. Field Service Report (FSR)

CHEM-AQUA

SMARTFSR

Representative: John Smith | **ABC COMPANY INC (123456)** | Service Date: 1/21/2019

ABC COMPANY INC
123 SOMEWHERE DR
DALLAS, TX 75238

Submitted To: John Doe (jdoe@abcco.com)
John Smith (john.smith@chemaqua.com)

Cooling Towers

Test	Hydration Source Cooling System 1			Hydration Source Cooling System 2		
	Makeup Water	Cooling Tower	Closed System	Cooling Tower	Closed System	Makeup Water
Conductivity	446	2436	3280		2235	
Control Range		1300-1700			0-3000	
Ph	7.80	8.74	8.20		11.24	
Control Range		8.00-9.00	7.50-8.20		8.50-10.50	
M Alkalinity	96	340				
Control Range		200-500				
Calcium Hardness	120	680				
Control Range		300-600				
Iron	0.04	0.02	0.29		0.18	
Control Range		0.00-1.00	0.00-1.00		0.00-1.00	
Copper	0.14	0.18	0.18		0.09	
Control Range		0.00-0.50	0.00-0.50		0.00-0.50	
Molybdenum		0.47			120	
Control Range		0.25-0.50			100-150	
Glycol Percent			31.00			
Control Range			25.00-30.00			
Skin Temperature		115				
Control Range						
LSI		2.49				
Control Range						
COC		5.46				
Control Range						

Cooling Towers System Status And Corrective Actions

** WARNING: Operation outside of Control Range may cause system damage or failure. Test results only reflect conditions at the time of testing. **

Hydration Source Cooling System 1 - Cooling Tower

- Conductivity is above control range.High Conductivity can lead to scale formation within system. The electric bleed valve is not operating, not allowing the tower to bleed. I opened the bypass to allow the tower to bleed slowly until the valve can be checked out.
- pH is within proper control range demonstrating good system control and minimizing chemical and water consumption.
- Calcium Hardness is above control range.High Calcium Hardness can lead to scale deposition within heat exchange equipment. This can result in excessive energy costs and possible under deposit corrosion. Calcium hardness high due to no tower bleed.
- Molybdenum is within proper control range demonstrating good system control and minimizing chemical consumption.

Hydration Source Cooling System 1 - Closed System

- pH is within proper control range demonstrating good system control and minimizing system corrosion rates.

CHEM-AQUA

SMARTFSR

Representative: John Smith | **ABC COMPANY INC (123456)** | Service Date: 1/21/2015

Hydration Source Cooling System 2 - Closed System

- Conductivity is within proper control range demonstrating good system control.
- pH is above control range.High pH can lead to accelerated yellow metal corrosion rates. We will sample for microbiological growth, which can contribute to high pH. If needed, we will add biocide to the loop. I would recommend keeping the loop circulating.
- Molybdenum is within proper control range demonstrating good system control and minimizing corrosion within system.

Inventory

System	Product	Container Size	Inventory on Hand	Usage	Secondary Contained
Next to systems	15000MT	35	17	0	N
Next to systems	42171	35	18	0	N
Next to systems	Bacticide 45	35	18	0	N
Next to systems	Glycol	55	10	0	Y
Next to systems	52800	5	1	0	N

Comments

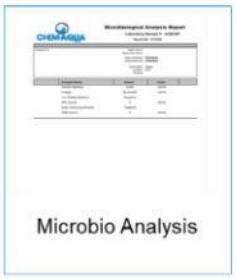
As noted in the other email I sent, the bleed valve for the cooling tower isn't working, so I opened the bypass slightly to allow the tower to bleed.

Please let me know if you can have your guys check this out, and what they find, also, let me know if I can help in any way.

Customer Signature

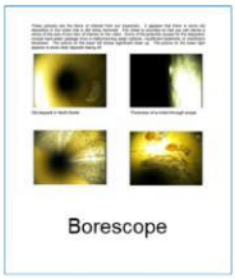
Rep. Signature

Additional Reporting



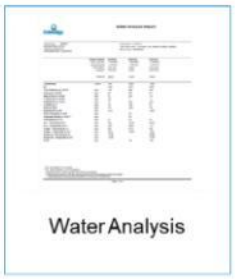
Microbio Analysis

Deposit Analysis



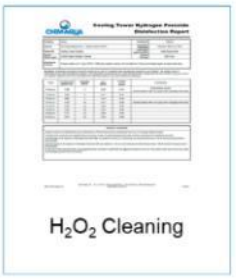
Borescope

Coupon Analysis



Water Analysis

Resin Analysis



H_2O_2 Cleaning

Disinfection

Physical Cleaning

Additional Remote Communication Capabilities (included)

Smart Controller Daily Graphs

There is a pre-bleed that initiate before the non-oxidizer feeds on Sunday.

There are conductivity pre-bleeds that initiate before the oxidizer feeds on MWF.

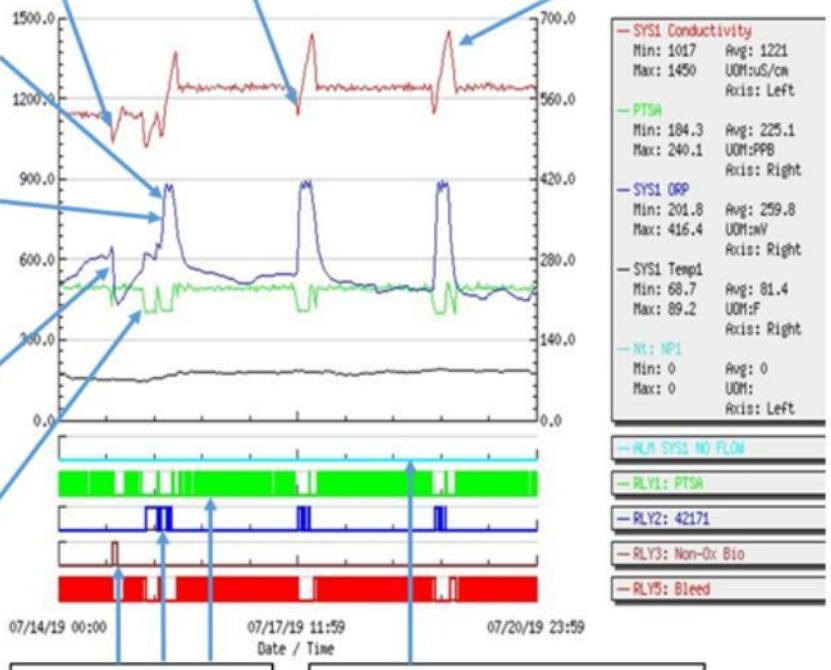
Conductivity increase during oxidizer and non-oxidizer feeds and stays increased during oxidizer feeds. This confirms the conductivity is locked during oxidizer and non-oxidizer feeds.

ORP rises about 100 – 150 mV during each 3 weekly oxidizer feeds. This assures oxidizer has been fed.

Oxidizer rises quickly to the pre-set 150 mV increase above background level of ORP and held at this 400-mV level during the 4 hours of oxidizer feed.

ORP goes down about 75 mV during non-oxidizer feed. This we refer to the glute bump or depression. This assures non-oxidizer has been fed.

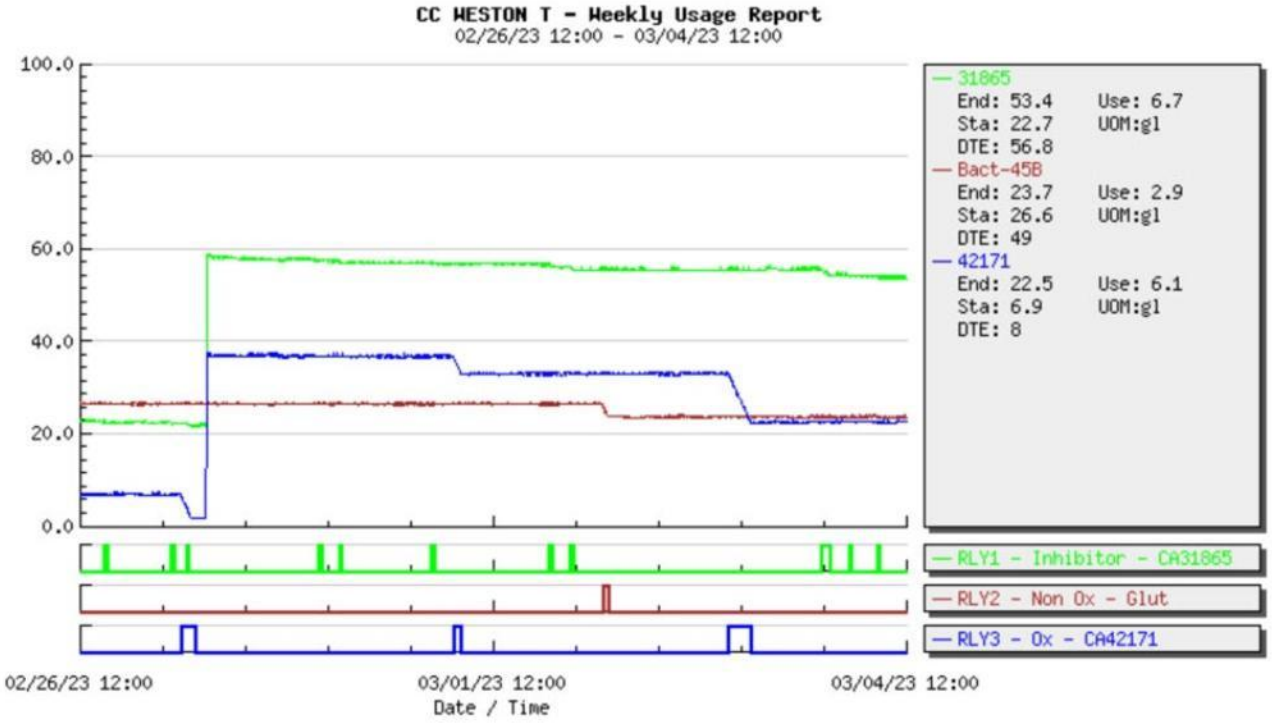
Inhibitor PTSA drops during the oxidizer and non-oxidizer feeds and stays depressed during oxidizer feeds. This confirms the lock out cooling water inhibitor during oxidizer and non-oxidizer feeds. Inhibitor feed re-established after oxidizer and non-oxidizer feeds.



Relay indicators on all feed or bleed activation.

Flow relay indicates the offline / online operation of the aquaDART controller. As you can see, this controller was online the entire week, 24/7.

Smart Controller Tank Level Monitoring



The Importance of Proper Cooling System Lay-Up

Technical Bulletin 2-033
Cooling Systems

Problems in Idle and Standby Systems

Many cooling systems are seasonally taken out of service or put on standby in lead-lag configurations. When these systems are idle microbiological growth and corrosion problems can develop and cause:

- Reduced equipment life from corrosion
- Increased operational and production costs
- Increased maintenance and utility costs

Severe Bacterial Fouling and SRB Corrosion in an Offline Chiller Condenser

Corrosion in Offline or Standby Systems

Unless continuously replenished, the protective films formed by cooling water corrosion inhibitors tend to degrade over time, leaving chiller condensers, piping, and heat exchangers vulnerable to pitting and accelerated corrosion.

Offline corrosion can cause exfoliation or iron chip scale: flakes or pieces of iron oxide break loose and clog tower distribution deck nozzles, pump strainers, and condenser tubes after spring startup. Iron chip scale tends to occur in partially drained systems where sections of piping have water and air exposure, but can occur in idle systems containing water. If there is significant pre-existing corrosion in the piping, there may not be an easy solution.

Microbiological Growth in Offline or Standby Systems

Idled systems with no water circulation or flow provide ideal conditions for problem-causing anaerobic, sulfate reducing, and iron related bacteria to grow and cause corrosion and fouling concerns. Slime-forming bacteria can also cause severe fouling in unprotected offline systems. The problems can lead to high condenser head pressures, high electricity costs, and/or chiller shutdown when the systems are put back in service.

Concerns with Enhanced Tubes

Enhanced chiller tubes have spiral grooves or "rifling" to increase surface area, which permits greater heat transfer. They are particularly vulnerable to pitting damage and tube fouling from biofilms. Improper lay-up can significantly shorten their life.

Enhanced Chiller Tubes

Guidelines for Cooling System Lay-up

- *The best option for idle or offline chillers and cooling systems is to drain them completely and store dry.* If that is not feasible, maintain water circulation through the chiller tubes and piping. Water circulation should be continuous, but periodic flow may suffice (duration and frequency may vary depending on design, controls present, and propensity for microbiological growth).
  - For chillers with enhanced tubes, a minimum of one to two hours per day may be satisfactory
  - At a minimum, chillers with conventional tubes should have water circulation several times per week
  - It may be desirable to install small bypass lines at chiller inlets and outlets and use small capacity re-circulating pumps to maintain continuous flow through the unit
- *If offline or standby conditions cannot be avoided, implement proper lay-up procedures.*
  - Provide proper microbiological control and inhibitor feed
  - Higher dosages of microbiocides, dispersants, and corrosion inhibitors may be needed for protecting offline chillers with intermittent or reduced flow
  - The treatment program for standby equipment needs to be monitored by facility
  - personnel and corrective actions taken as needed to avoid problems

Procedures for Lay-up of Idled Equipment

Tower Side Pre-shutdown

1. Approximately one week before shutdown, gradually reduce system conductivity to below the recommended limit. This will help reduce scaling potential, levels of dead microorganisms, and contaminants. Maintain inhibitor levels.
2. Within two days before shutdown, if high levels of dirt, suspended solids, or microbial growth exist, feed a polymer dispersant and a bio-surfactant at normal dosages. If side stream filtration is present, backwash as needed.
3. Wait several hours after dispersant feeds and add sufficient oxidizing biocide to achieve desired total and free halogen residuals*.
4. Flush and/or drain drip legs and dead spots that could harbor iron and anaerobic bacteria, such as SRB.
5. Follow test procedures (ampoule or growth strip) to check aerobic or anaerobic bacterial activity. If microbiological counts are high or SRB are present, re-treat with oxidizing and/or non-oxidizing biocides at a high dosage*.
6. Ideally, maintain corrosion inhibitor levels at the upper control limit during the pre-shutdown time.

Tower Side Dry Storage Shutdown

1. Shutdown the system, drain, and inspect. Clean and flush the tower, removing accumulated debris. Remove deposits from deck, louvers, fill, and spray heads. Refill condenser or tower side with fresh water.
2. Add passivation treatment and copper corrosion inhibitor at high dosages.
3. Add the non-oxidizing biocide at the maximum labeled dosage for the system volume. Circulate for 8-24 hours and drain the system completely, including all dead legs.
4. Inspect chillers at earliest opportunity to allow for drying of equipment. Use warm air to dry both condenser and evaporator sections. After inspection, close and seal tightly.

Tower Side Wet Lay-up Shutdown

1. Follow shutdown steps one and two.
2. Treat chiller condensers or cooling heat exchangers with compatible closed-system inhibitors and a non-oxidizing biocide for the system metallurgies present, volumes, and duration of storage.
   - Add closed-system inhibitor to maintain a minimum of 1,000 ppm as sodium nitrite or 200 ppm as molybdenum.
   - Add glutaraldehyde according to label directions.
   - If the system contains aluminum, contact Chem-Aqua Engineering for best recommendations.
   - Feed supplemental copper corrosion inhibitor in systems containing a large amount of copper or enhanced condenser tubes.
3. Bypass galvanized towers or evaporative condensers to minimize potential for white rust formation.
4. Maintain <1,000 microorganisms per mL bacteria count and negative testing for SRB and other anaerobes.
5. Provide water circulation.

Chilled Water Side Wet Lay-up Shutdown

1. Flush and/or drain drip legs and dead spots that could harbor iron and anaerobic bacteria.
2. Add closed-system inhibitor to obtain a minimum of 1,000 ppm as sodium nitrite or 200 ppm as molybdenum.
3. Add glutaraldehyde according to label directions.
4. Check microbiological activity with recommended test procedures. If microbiological counts are high and/or SRB exists, re-treat with non-oxidizing biocides.
5. Maintain <1,000 microorganisms per mL bacteria count and negative testing for SRB and other anaerobes.
6. Provide water circulation.

Cortec®* Cooling Loop Gator™

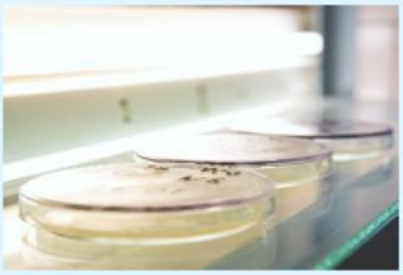
This VpCI is added to a cooling system at a rate of one Gator per 250 gallons system volume. After addition, the water must be circulated 10-12 hours. The water can remain in the system or be flushed, as long as it is tightly sealed immediately afterward. See product label for more details.

8.0 Laboratory Capabilities

CHEM-AQUA
An NCH Company

Laboratory Capabilities





ISO 9001 Certified Laboratories

Chem-Aqua's in-house ISO 9001 certified laboratories perform analysis in several areas.

Instrumentation / Equipment

- Inductively Coupled Plasma Spectrometer
- Ion and High-Performance Liquid Chromatographs
- Gas Chromatograph - Mass Spectrometer
- Potentiometric and Reaction Auto-Titrators
- Phase Contrast and Fluorescence Microscopes; Colony Counters
- Atomic Absorption and Fourier Transform Infra Red Spectrometers
- UV-Vis Spectrometers, Colorimeters, Fluorometers, and Electrochemical Meters

Testing Capabilities

- Water and Wastewater Analysis
- Deposit Analysis
- Corrosion Coupon Analysis
- Failure Analysis
- Ion Exchange Resin Analysis
- Microbiological Assays

Water Lab

The Chem-Aqua water lab is housed in the corporate Research and Development complex along with the other industrial groups supporting the sales team, including the engineering development and microbiological sciences groups. Access to all equipment, resources, and staff is available as needed to assist with technical support

Mohawk Laboratory Quality Assurance Overview

Mohawk Laboratories is under the NCH umbrella of companies and therefore is included in the NCH-North American Chemical ISO 9001:2008 Quality Management System. The Analytical and Research and Development laboratories support the family of business units within NCH Corporation, which includes Chem Aqua Corporation.

Laboratory Quality Control parameters include the analysis of Certified Third Party reference Quality Standards with each set of analytes tested. Instrumentation and test methods are calibrated daily before use and calibration checks are performed every 10 samples analyzed to insure reproducibility within specified tolerances. Additional QC measures include analysis of blind samples, spiked samples, duplicate analysis and blanks.

Quality Assurance is accomplished by separate and independent monitoring of laboratory procedures and QC activities. Also included in QA activity is the NCH internal audit program, non-conformance reviews and annual management review of Quality data.

All laboratory procedures are controlled by the Document Control process as outlined in the NAC Quality Manual. Test Methods and other laboratory procedures (SOPs), instrument manuals, and published test methods are referenced when used. The SOPs are reviewed annually and revised when needed.

The laboratory has procedures for identification, collection, access, storage and maintenance of test results and quality Records. Laboratory Analytical test results are stored electronically within the LIMS system indefinitely and are backed up within the corporate archive system. All hard copy records related to Research and Development laboratory notebooks and GLP Analytical results are stored in locked vaults.

All training of Laboratory Analytical and research personnel is documented to ensure all testing is performed by trained personnel. Management controls and authorizes personnel to perform specific test procedures, operate specific instrumentation, and to issue reports.

The laboratory does not perform sample collection. Sampling recommendations are provided in the sample submission guidelines. Samples are submitted with labels specific to the sample type along with submission forms where applicable. All samples are logged within the LIMS system with a unique ID number for ease of reference within the laboratory workflow.

11.0 Cooling Tower Cleanings and Chem-Aqua Services

Cooling Tower Hydrogen Peroxide Cleaning Procedure

The hydrogen peroxide cleaning will be completed immediately prior to a physical tower cleaning and will be documented.

1. Isolate all chemical feed points at least four hours prior to the procedure.
2. Ensure that any sand filters are operating properly.
3. Ensure that personnel have been trained on the usage of hydrogen peroxide and are outfitted with the necessary Personal Protective Equipment (PPE).
4. Ensure that an adequate supply of fresh water (hose) is available for rapid dilution in case of an accidental spill of the concentrated product.
5. Isolate the cooling tower blowdown and ensure that all of the piping and equipment is open to flow (no dead legs, etc.).
6. Product must be added to the sump – NEVER use a pot feeder.
7. Record the system turbidity prior to adding chemical.
    a. Samples should be drawn every 30 minutes during the cleaning and kept for the duration of the cleaning for evaluation.
    b. If the maximum turbidity increase exceeds 100 NTU from the baseline, then a second peroxide cleaning will need to be performed within 90 days.
8. Add one gallon of 35% hydrogen peroxide per 1,000 gallons of system volume or equivalent applied concentration.
9. Circulate for two hours through the entire system.
    a. Ensure that all piping and equipment is open to flow (no dead legs, etc.).
    b. Small strainers may need to be periodically cleaned during the procedure.
10. Add a second application (one gallon of 35% hydrogen peroxide per 1,000 gallons of system volume).
11. Circulate for two hours through the entire system.
12. At the conclusion of the four-hour cleaning procedure, the system should be blown down to remove the fouled water prior to sterilization.

    Disinfect the system by increasing the condenser water free halogen level to 5 PPM for six hours to prepare for the physical cleaning step.
13. Pull and clean all strainers on the condenser system.
14. Note that if the turbidity increase is more than 100 NTU from the baseline, then this triggers a second peroxide cleaning to be performed within 90 days. This is an indication that the system is excessively fouled and a second cleaning is needed to remove any remaining biofilm.

Cooling Tower Physical Cleaning Procedure

1. Coordinate the shutdown and lockout of the system.
2. Confirm that the appropriate Personal Protection Equipment (PPE) is available.
3. Photograph and document the condition of the equipment prior to beginning the cleaning process (fill, hot deck, internals, etc.).
4. Determine the total volume of the sump.
    a. Total volume (gallons) = length X width X height (in feet) X 7.5
    b. Divide the total volume by two if the system is a BAC unit or has a v-shaped sump.
5. Chlorinate the cooling tower sump.
    a. Test for free chlorine (which should be 5 PPM or greater).
    b. Add more product, if necessary, to reach the residual. Hypochlorite must be used, NOT liquid bromine.
6. Drain the system after the setup of the necessary equipment.
7. Plug the intake pipe openings and equalizer valves to prevent debris from entering the system during the cleaning process.
8. Clean the tower from the top down.
    a. Inspect the hot decks.
    b. Use a pressure washer to clean out distribution holes and free any blockages.
9. Use a descaler (refer to the treatment supplier for the proper ratio of product to city water) on the hot deck to dissolve existing scale (for 30 minutes), rinse tower with a pressure washer, and send the rinse byproduct to the sanitary sewer.
10. Clean the fan shroud and all working parts that can be accessed from the hot deck.
11. Clean the fill.
    a. Begin by spraying the fill with a pressure washer to remove loose sediment. A descaler may be necessary to dissolve remaining deposits.
12. Clean the inside of the tower.
    a. A descaler may be necessary.
13. When the fill is clean, use a descaler (refer to the treatment supplier for the proper ratio of product to city water) to complete the process.
14. Flush the sump from the outside in, washing all sediment to the center of the tower. Use a screen over the drain to prevent debris from clogging the drain. Use a shop vacuum to remove remaining debris from the sump.
15. The pump and system strainers **MUST** be cleaned after the tower cleaning is complete, prior to startup and again once the system has operated for several hours.
16. Fill the system with water and feed hypochlorite before putting the system back online.
17. Test for free chlorine (minimum of 5 PPM).
18. Coordinate the removal of lockout/tagout before putting the system back online.
19. Document the condition of the cleaned cooling tower (take pictures).
20. Return the system to normal treatment residuals; however, increase the azole level to 10 PPM.
21. Plan for the next cleaning.
    a. It is strongly recommended that your water treatment supplier be contracted to provide the cleaning services for the cooling towers and chillers.

Chem-Aqua Services

Chem-Aqua Services is a division of Chem-Aqua that provides value added specialty maintenance services including:

- Cooling tower cleaning and chlorination
- Coil cleaning and sanitizing
- Chlorine dioxide application using portable generators
- Pretreatment equipment service including water softeners, reverse osmosis, dealkalizers, and filtration
- Closed loop cleaning, passivation, filtration, and inhibitor replacement
- Domestic water chlorination

Chem-Aqua Delivers Value Several Ways

Chem-Aqua Service Technicians are trained professionals that understand the work to be performed:

- Proper use of Personal Protection Equipment (PPE)
- Follow industry recognized procedures
- Proper tools and equipment
- Documentation is provided for your records

These services provide bottom line benefits to your operation including:

- Improved equipment efficiency
- Maintained tenant comfort
- Freeing up valuable employee time
- Reduced employee exposure to hazards
- Extended equipment life

Cooling Tower Fill Cleaning

Cooling Tower Fill: Before and After Cleaning

Professional Chill Water Coil Cleaning

Professional Steam Cleaning

Programs Provided

Service Technicians

- Our Technicians are trained professionals
- Service is performed by company employees
- Proper use of Personal Protection Equipment (PPE)
- Follow industry recognized procedures
- Proper tools and equipment
- Documentation is provided for your records

Benefits of Chem-Aqua Services - Our services will take the STRESS out of your facility's operations

- Improved equipment efficiency
- Maintained tenant comfort
- Freeing up valuable employee time
- Reduced employee exposure to hazards
- Extended equipment life

12.0 Supplemental Cleaning & Disinfection Procedures

Supplemental Cleaning

Cleaning and Sterilization

The degree of corrosion and biological fouling would determine the course of action. Pricing is estimated at $60/1000 gallons of system volume.

Corrosion Byproducts-We would determine the amount of corrosion byproducts of likely iron oxide and determine if we would pursue one of the following:

Heavy Iron Tuberculation

1. Apply HEDP and sulfite to such a level to move and dislodge iron oxide from piping walls and equipment. Cost would vary depending upon size of application but cost would be in the general area of $600-$900/1000 gallons of system volume.
2. This would be done with circulation for at least 24 hours, followed by a series of drains and flushes.
3. A Chem-Aqua service person would be on-site.

Medium Iron Tuberculation

1. Apply Iron Surfactant of 100-200 PPM to move and dislodge iron oxide from piping walls and equipment. Cost would vary depending upon size of application but cost would be in the general area of $125-$200/1000 gallons of system volume.
2. This would be done with circulation for at least 24 hours, followed by a series of drains and flushes.
3. A Chem-Aqua service person would be on-site.

Heavy Biological Fouling

1. Cooling Tower Bio Fouling-Apply Hydrogen Peroxide at a rate of 1500 PPM and circulate for 2-3 hours. Add an additional 1500 PPM and continue to circulate. Attached is the procedure for Perasan A applications. Cost would vary depending upon size of application but cost would be in the general area of $100-$135/1000 gallons of system volume.
2. This would be done with circulation for at least 24 hours, followed by a series of drains and flushes.
3. A Chem-Aqua service person would be on-site.

Medium Biological Fouling

1. Cooling Tower Bio Fouling-Apply Sodium Hypochlorite to the level of 5 PPM and circulate for 24 hours. Continue to monitor free chlorine levels and add additional sodium hypochlorite if levels drop below 5 PPM. Cost would vary depending upon size of application but cost would be in the general area of $10-$15/1000 gallons of system volume.
2. This would be done with circulation for at least 24 hours, followed by a series of drains and flushes.
3. A Chem-Aqua service person would be on-site.

New Piping Clean Out Procedure and Costs

Pricing is estimated at $80/1000 Gallons of system volume.

1. Cleaning out of mill scale, oils of manufacturing of new piping
2. We recommend Chem-Aqua 61503 to passivate your new system piping and heat exchange equipment. Chem-Aqua 61503 is a blend of ortho and polyphosphate, dispersants and cleaning agents, that will effectively pre-clean and passivate metal surfaces in cooling water systems. It can't be used in systems operating under a heat load. A minimum of 50 PPM of calcium hardness as CaCO3 is required for good film formation. We also recommend the addition of Chem-Aqua 34120 (43% TTA) for the passivation of copper metallurgy and Bacticide 45B (45% Glutaraldehyde) for disinfection.
3. Directions: Flush and drain system to remove all loose debris. It is critical that wood towers be thoroughly flushed to remove preservatives that can leach out of the wood and interfere with film formation. Isolate all critical process equipment with small diameter piping (injection and blow molding machines) from the system during the cleaning process. Install by-pass loops to insure good flow through system piping and heat exchange equipment.
4. Add Chem-Aqua 61503 at the rate of 3 gallons per 1000 gallons of the system volume, and BACTICIDE 45 at 1 pint per 1000 gallons of system volume.
5. For optimum film formation, maintain the system pH in the 7.0 to 7.5 range throughout this procedure. If the tower contains new galvanized wetted parts, the system pH should be maintained in the range of 7.0 to 8.2 during the initial 60 to 90 days of operation to minimize the potential for white rust formation.
6. Circulate with full flow through all piping for 48 to 72 hours. Flush low point drains frequently during procedure.
7. If the system foams excessively, add FC 101 at 2 - 4 fl. oz. per 1000 gallons of system volume.
8. If the system is to be immediately placed in service, it should be flushed heavily until the phosphate and iron levels are reduced to within 1 ppm of the makeup levels and the turbidity is reduced to within 3 NTU of makeup levels. The phosphate level should not be allowed to reach zero before beginning the routine inhibitor program. If the system is left on stand-by, add a suitable non-oxidizing biocide at maximum label dosage 1 hour before discontinuing circulation. When the system is started up, begin flushing the system as outlined above before resuming normal treatment.
9. A Chem-Aqua service person would be on-site for the initial chemical application and final flushing.

Polymer Flush Procedure and Costs

Pricing is estimated at $40/1000 Gallons of system volume.

1. Apply Iron Dispersant at 100-200 PPM to move and dislodge iron oxide from piping walls and equipment
2. This would need circulation for at least 24 hours, followed by a series of drains and flushes.
3. A Chem-Aqua Service person would be on site.

Alternative Chlorine Dioxide TES Treatment

Mobile CLO_2 Feed Program – No storage of hazardous chemicals and no equipment required!!!

A site survey to confirm pricing would be required.

bioSTOP Has Special Designed Delivery Trucks to apply a chlorine dioxide requirement for a full turnkey and hands fee application.

33,000 lb. GVW box truck that can deliver or directly apply up to 24,000 gallons of ClO2 3000 PPM solutions. bioSTOPL makes the 3000 PPM ClO2 solutions on site

Delivers into storage tank or direct application for:

1. Water system slug treatments for biofilm control
2. High volume facility sanitation
3. Cooling tower slug treatment

1. Scrubber and Tank Vent line storage
2. Acid Stinger Storage
3. HCl (secondary Steel containment) scrubber solution and Spill Kit storage

CHEM-AQUA™
An NCH Company

EXCLUSIVELY FROM CHEM-AQUA

Untreated water harbors microbes within biofilm that can impact system efficiency and cause illness.

Safetly Utilizing the Full Potential of Chlorine Dioxide

WORLD CLASS, INDUSTRY-CHANGING TECHNOLOGY FOR THE CONTROL OF MICROORGANISMS

SAFE

Highly trained Chem-Aqua/bioSTOP employees handle every application. Your employees never have to touch any of the chemicals or equipment. Additionally. No on-site storage of hazardous chemicals.

EFFECTIVE

bioSTOPs high purity chlorine dioxide is proven to be the most effective answer for biological or other organic contamination in closed water systems of any size.

ECONOMICAL

No capital cost for expensive ClO2 generation equipment. No maintenance or repair costs. No need for dedicated, secure storage space. No waste, no disposal costs, and significant labor savings: bioSTOP generates and doses 5-10 times faster, reducing application times by as much as 80%.

CONTACT US TODAY

+ 1-866-209-3373

info@chemaqua.com

www.chemaqua.com

BIOSTOP
A CHEM-AQUA COMPANY

BECOME A PARTNER TODAY

Cooling Tower Emergency Disinfection Procedures

Technical Bulletin 2-056
Cooling Systems

Emergency Disinfection
The following emergency disinfection procedure is based on established industry guidelines and other governmental recommendations. This procedure may be specified where

Very high Legionella counts exist (>1,000 CFU/mL).
In cases where Legionnaires' disease is known or suspected and may be associated with the cooling tower.

Precautions
1. Personnel performing work should use appropriate Personal Protective Equipment (PPE). Consult corporate Environmental, Health, and Safety (EHS) rules and regulations.
2. Cooling tower fans should remain off during online disinfection procedures.
3. Disinfection procedures may present foam problems. Have antifoam available if needed.

Procedure
1. Keep all non-essential personnel away from the cooling tower and adjacent areas during procedure.
2. If possible, remove heat load from the cooling system before beginning the procedure.
3. Shut off cooling tower fans associated with the cooling equipment.
4. Shut off the system blowdown, but keep the makeup valves open and operating.
5. Close building air intake louvers within the vicinity of the cooling tower (especially those downwind) until the procedure is complete.
6. Continue to operate the pumps to circulate water through cooling tower system.
7. A dispersant may be used to aid in cleaning and the penetration of biofilms.
8. Feed an EPA registered chlorine or bromine based biocide according to label directions to achieve an initial free chlorine residual of 25-50 ppm.
9. Maintain a minimum of 10 ppm free chlorine residual for 24 hours. Add additional chlorine or bromine biocide as needed to maintain the target free chlorine residual.
10. Use a Disinfection Log to record free chlorine levels and verify the minimum level is maintained throughout the disinfection procedure. Recommend monitoring more frequently initially.
11. Drain the system completely and flush all low points. If this is not practical, blowdown heavily and flush system low points.
12. Refill the system and repeat steps 8 through 11.
13. Examine the cooling tower. If biofilm is present, refill the system and repeat steps 8-11 until no biofilm is present. Then proceed to step 14.
14. Mechanically clean the tower fill, tower supports, cell partitions, and sump. Wear appropriate PPE while engaging in this tower cleaning.
15. Refill the system with fresh water. Add chlorine or bromine biocide to achieve and maintain 10 ppm of free chlorine residual for a minimum of one hour. Flush the system until it is free of turbidity.
16. When flushing is complete, adjust the system blowdown controller for normal operation, charge with appropriate corrosion and deposit control chemicals, and re-establish normal biocide program.

Notes

a. Follow up microbiological (bacteria or Legionella) testing may be specified following procedure to confirm effective disinfection.

b. With chlorine based biocides, the pH of the system should preferably be between 7.0-7.6 during disinfection. The pH can be reduced either by pre-bleeding the system or adding a pH reducer. Bromine based biocides are preferred where the pH is greater than 8.0. Chem-Aqua MB-60B can be used over a wide range of pH values because it contains chlorine and bromine based halogens.

c. Ensure sufficient chlorine or bromine biocide is on-hand to completely perform the procedure.

d. Test strips, drop tests, and colorimetric methods may be used for free chlorine testing.

References

- American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems
- Cooling Technology Institute (CTI), Legionellosis Guideline: Best Practices for Control of Legionella (CTI Guidelines WTB-148[08])
- Association of Water Technologies (AWT), Legionella 2003: An Update and Statement by the Association of Water Technologies

The above disinfection procedure recommendations meet or exceed compliance requirements from both the New York City Department of Health (DOH) and New York State DOH. (Effective 8/17/2015).

Disclaimer: *Disinfection procedures should be carried out as part of a complete water management program for your building. The building owner is responsible for the water management program. This disinfection procedure (and any water treatment of the cooling tower) by and of itself is only part of and is not complete mitigation of the risks associated with Legionella bacteria or any other waterborne pathogens.*

Cooling Tower *Legionella* Testing Response Protocol

Technical Bulletin 2-049
Cooling Systems

Routine *Legionella* Testing
Whenever cooling tower water samples are tested for the presence of *Legionella* bacteria, a well-defined Response Protocol should be available for instances where positive Legionella test results are reported. In the absence of federal, state, or local regulations, or an alternate response plan, cooling tower owners may wish to adopt the following protocol for positive *Legionella* test results. This protocol is based on industry guidelines, and meets or exceeds the guidelines in the New York State and New York City Department of Health *Legionella* Regulations.

Personnel performing procedures must use the appropriate personal protective equipment (PPE) for the tasks performed. Consult company and site safety policies for specific PPE requirements. Specific procedures should be consulted for details on required steps.

Response Protocol for Cooling Tower *Legionella* Test Results

Test Result	Recommended Action
< 10 cfu/mL	1. Double the feed of oxidizing biocide for the next feed cycle. 2. Maintain current treatment and *Legionella* monitoring program.
10 to 99 cfu/mL	1. With blowdown valve closed, tower pumps running, and fans off[2], add an EPA registered oxidizing biocide per label instructions to maintain a minimum of 5 ppm Free Chlorine Residual for 6 hours or a minimum of 15 ppm Free Chlorine Residual for 2 hours. Bleed or flush system heavily following disinfection procedure. 2. Evaluate cooling tower for presence of sediment, biofilm, or algae, and schedule cooling tower cleaning and disinfection procedure if indicated. 3. Add chemicals as recommended for startup after disinfection then resume normal program. 4. Retest for *Legionella* after 3 - 7 day.
100.0 to 999.0 cfu/mL	*Disinfection Option 1:* 1. With blowdown valve closed, tower pumps running, and fans off[2], add an EPA registered oxidizing biocide per label instructions to maintain a minimum of 5 ppm Free Chlorine Residual for 6 hours or a minimum of 15 ppm Free Chlorine Residual for 2 hours. Bleed or flush system heavily following disinfection procedure. 2. Clean and disinfect cooling tower within 7 days. 3. Add chemicals as recommended for startup after disinfection then resume normal program. 4. Retest for *Legionella* after 3 - 7 days.
	Disinfection Option 2: 1. With blowdown valve closed, tower pumps running, and fans off[2], add an EPA registered oxidizing biocide per label instructions to maintain a minimum 5 ppm Free Chlorine Residual for 24 hours. Bleed or flush system heavily following disinfection procedure. 2. Evaluate cooling tower for presence of sediment, biofilm, or algae, and schedule cooling tower cleaning and disinfection procedure if indicated. 3. Add chemicals as recommended for startup after disinfection then resume normal program. 4. Retest for *Legionella* after 3 - 7 days.

Test Result	Recommended Action
≥ 1,000.0 cfu/mL	1. Keep non-essential personnel away from the cooling tower and adjacent areas. 2. Secure indoor air returns in vicinity of the cooling tower so any vapors or odors from the disinfection process are not drawn into the building ventilation system. 3. With blowdown valve closed, tower pumps running, and fans off[2], add an EPA registered oxidizing biocide per label instructions to achieve 25 to 50 ppm of Free Chlorine Residual. 4. Maintain a minimum 10 ppm Free Chlorine Residual for 24 hours. 5. Drain the system. 6. Mechanically clean the tower fill, tower supports, cell partitions, and sump. 7. Rinse the cleaning solution and drain the system. 8. Refill with fresh water. 9. Add an EPA registered oxidizing biocide per label instructions to maintain a minimum 15 ppm Free Chlorine Residual for 2 hours. 10. Drain the system and refill with fresh water. 11. Add chemicals as recommended for startup after disinfection then resume normal program. 12. Retest for *Legionella* after 3 - 7 days

Notes

1. Coordinate operation and shutdown of cooling tower pumps, fans, chillers, and other heat exchange equipment with plant personnel. Tower pumps must be running and fans should be off during procedures.
2. The presence of other risk factors may dictate stricter control levels and response protocols.
3. Any specified remedial procedures should be performed within 7 days of receiving test results.
4. Free Chlorine Residuals should be documented during disinfection procedures. For procedures less than 6 hours, recommend recording level every 15 minutes for the first hour, and then approximately hourly thereafter. For longer procedures, less frequent monitoring may be acceptable. The final reading must be above the minimum.
5. *Legionella* culture testing should be performed by laboratories that are certified by the CDC ELITE program. The CDC does not certify other *Legionella* testing methodologies (PCR, DFA, Rapid Analytical Tests) as a primary test to environmental samples.

References

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2020
2. ANSI/ASHRAE Standard 188-2018: Minimizing the Risk of Legionellosis Associated with Building Water Systems
3. Cooling Technology Institute (CTI), Legionellosis Guideline: Practices for Control of Legionella (CTI Guideline GDL-159)
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems.
5. NYSDOH State Sanitary Code: 10 NYCRR Part 4: *Protection against Legionella* (Enacted July 2016), *Appendix 4-A -Interpretation of Legionella Culture Results from Cooling Towers*.

***Disclaimer:** Disinfection procedures should be carried out as part of a complete water management program for your building. The building owner is responsible for the water management program. This disinfection procedure (and any water treatment of the cooling tower) by and of itself is only part of and is not complete mitigation of the risks associated with Legionella bacteria or any other waterborne pathogens.*

Disinfection Procedures for Cooling Systems

Technical Bulletin 2-041
Cooling Systems

Introduction

According to the Cooling Tower Institute (CTI) Guidelines, WTB-148(08), Best Practices for the Control of Legionella, there are routine and emergency disinfection procedures used to regain control of cooling systems that are suffering from biological problems. These problems may include bacterial slime that interferes with heat exchange and/or heavy algae growth in the hot deck that can cause plugging and fouling problems.

Routine Online Disinfection

The recommended online disinfection procedure is based on hyper-halogenation with a halogen donor according to labeled directions for use*. This is the practice of maintaining a free halogen residual of five ppm for at least six hours. Routine online disinfection helps inhibit the development of large populations of bacteria including *Legionella* and associated higher life forms, such as protozoa. When performed as part of scheduled maintenance, it can reduce or eliminate the need for more complicated and higher risk offline emergency disinfection procedures.

Routine online disinfection may be necessary for systems that

- Experience process leaks
- Use reclaimed wastewater as makeup
- Have been stagnant for a long time
- Regularly have total aerobic bacteria counts >100,000 CFU/mL
- Where *Legionella* test results >100 CFU/mL

When performing an online disinfection, the following key points must be kept in mind

1. Halogen donors such as liquid sodium hypochlorite solutions should be used. *Note that chlorine-based halogen donors are generally better for overcoming a high organic demand while being more cost effective than other halogen donors. Stabilized bromine donors should not be used because they can become over-stabilized, and thus ineffective, when fed at high levels.*
2. Ensure sufficient liquid sodium hypochlorite solution is on-hand to completely perform the procedure.
3. Ideally, if the pH of the system is higher than 8.4 it should be reduced to <8.2. High pH values (>8.4) reduce the effectiveness of chlorine-based halogens. It may be possible to reduce the pH by heavily pre-bleeding the system.
4. Free chlorine levels should be measured and recorded every hour.
5. When testing for free chlorine, dilutions using chlorine-free deionized (DI) water may be required.

Emergency Disinfection Procedure

The following emergency disinfection procedure is based on OSHA and other governmental recommendations. Emergency disinfection should be conducted when

- Very high *Legionella* counts exist (>1,000 CFU/mL)
- In cases where Legionnaires' disease is known or suspected and may be associated with the cooling tower
- Very high total microbial counts (>100,000 CFU/mL) reappear within 24 hours of routine online disinfection (hyper-halogenation)

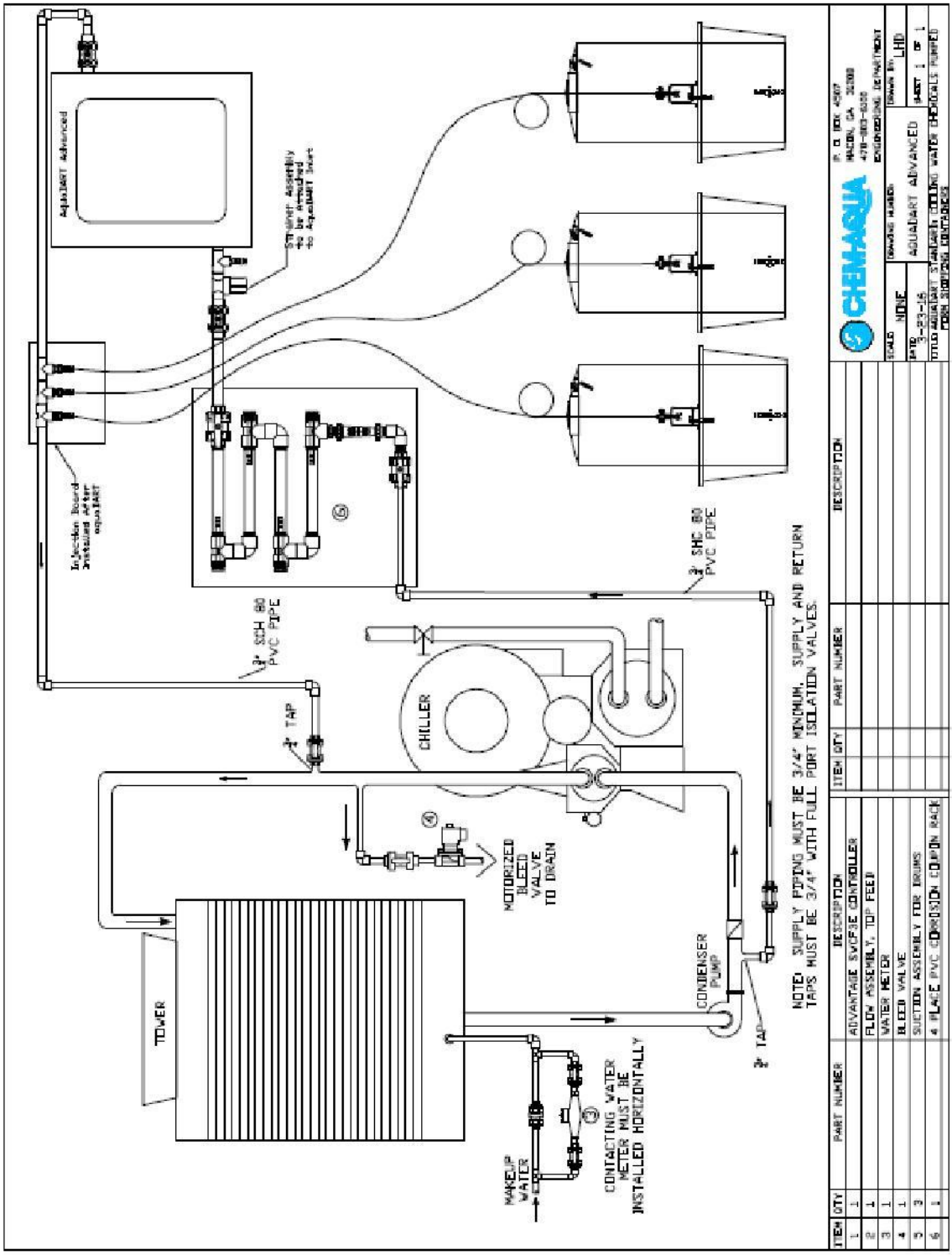
1. Before beginning the procedure, remove the heat load from the cooling system if possible.
2. Shut off all tower fans associated with the cooling equipment.
3. Shut off the system blowdown, but keep the makeup valves open and operating.

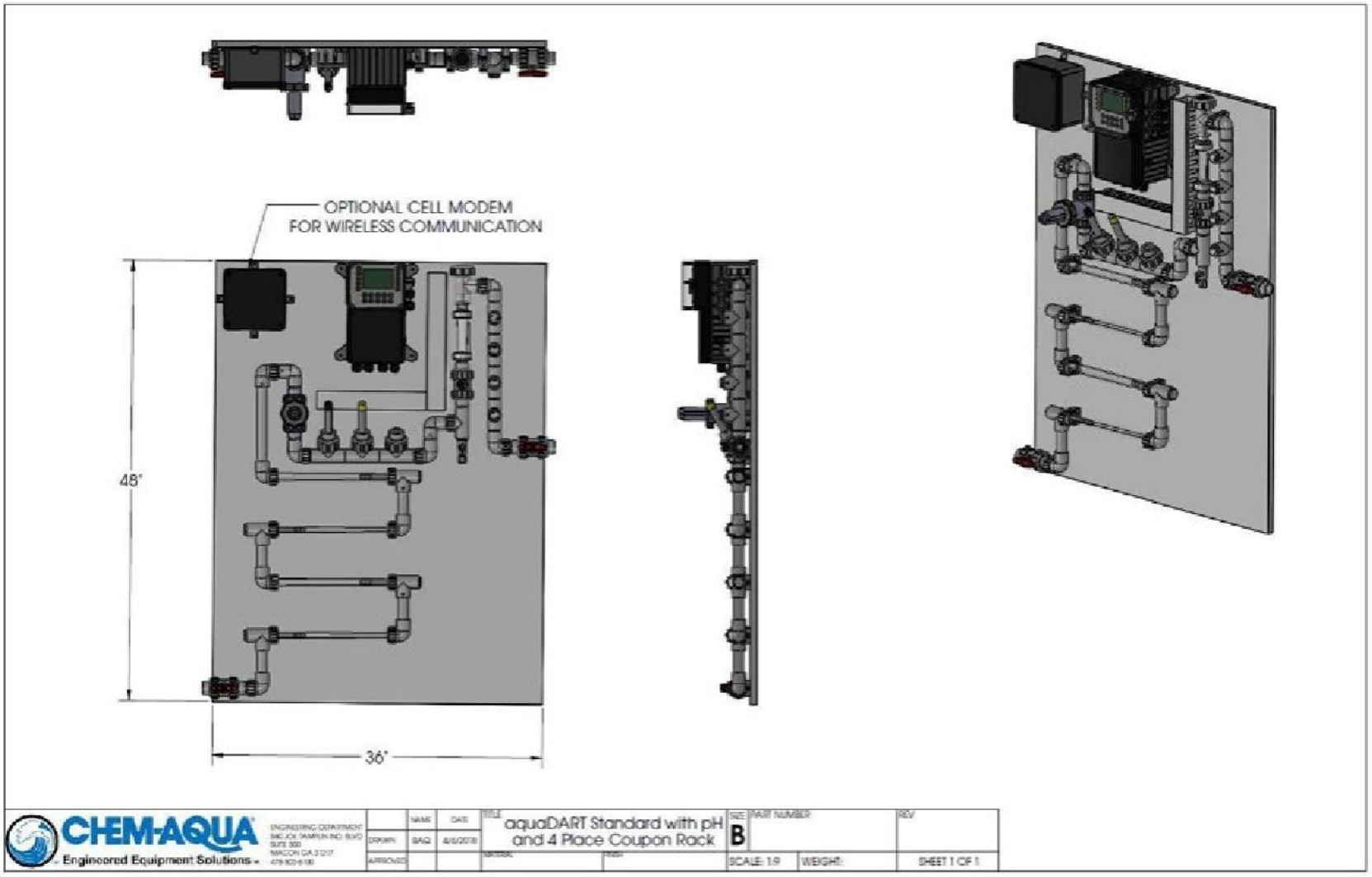
4. Close building air intake valves in the vicinity of the cooling tower (especially those downwind) until the procedure is complete.
5. Continue to operate the recirculating water pumps.
6. Maintain desired inhibitor levels throughout procedure.
7. Feed sufficient liquid sodium hypochlorite solution, according to label directions, to achieve a free chlorine residual of 25-50 ppm.
8. The use of a bio-dispersant is recommended to aid in the penetration, removal, and dispersion of biofilms.
9. Have an effective antifoam product readily available to add when using bio-dispersant or quat-based biocide as part of the procedure. Both can produce foam that builds up and can exit the tower or cause other problems.
10. Maintain a minimum of 10 ppm free chlorine residual for 24 hours. Add more biocide as needed to maintain this free chlorine residual.
11. Monitor the system pH regularly. If the pH of the system is higher than 8.4, it should be reduced to <8.2. High pH values (>8.4) reduce the effectiveness of chlorine-based halogens.
12. At the end of the procedure, but before the fans are turned on, bleed the system heavily to help flush loosened biological matter and other debris from the system. Also, flush system low points.
13. Refill the system and repeat steps one through 10.
14. When no biofilm is present, mechanically clean the tower fill, tower supports, cell partitions, and sump. Wear appropriate PPE while engaging in this tower cleaning.
15. Refill and recharge the system to achieve 10 ppm of free chlorine residual for a minimum of one hour. Drain the system until it is free of turbidity.
16. When flushing is complete, adjust the system bleed controller for normal operation, charge with appropriate corrosion and deposit control chemicals, and re-establish normal halogen residuals.

Follow-up Considerations

After the system has been cleaned and disinfected, it is important to add a proper corrosion inhibitor to passivate the system. During the cleaning process the inhibitor in the system may have been stripped away leaving the system metal vulnerable to attack and corrosion. The passivation chemicals added after disinfection react with the cleaned system metals to quickly establish a uniform corrosion resistant barrier and protect the system.

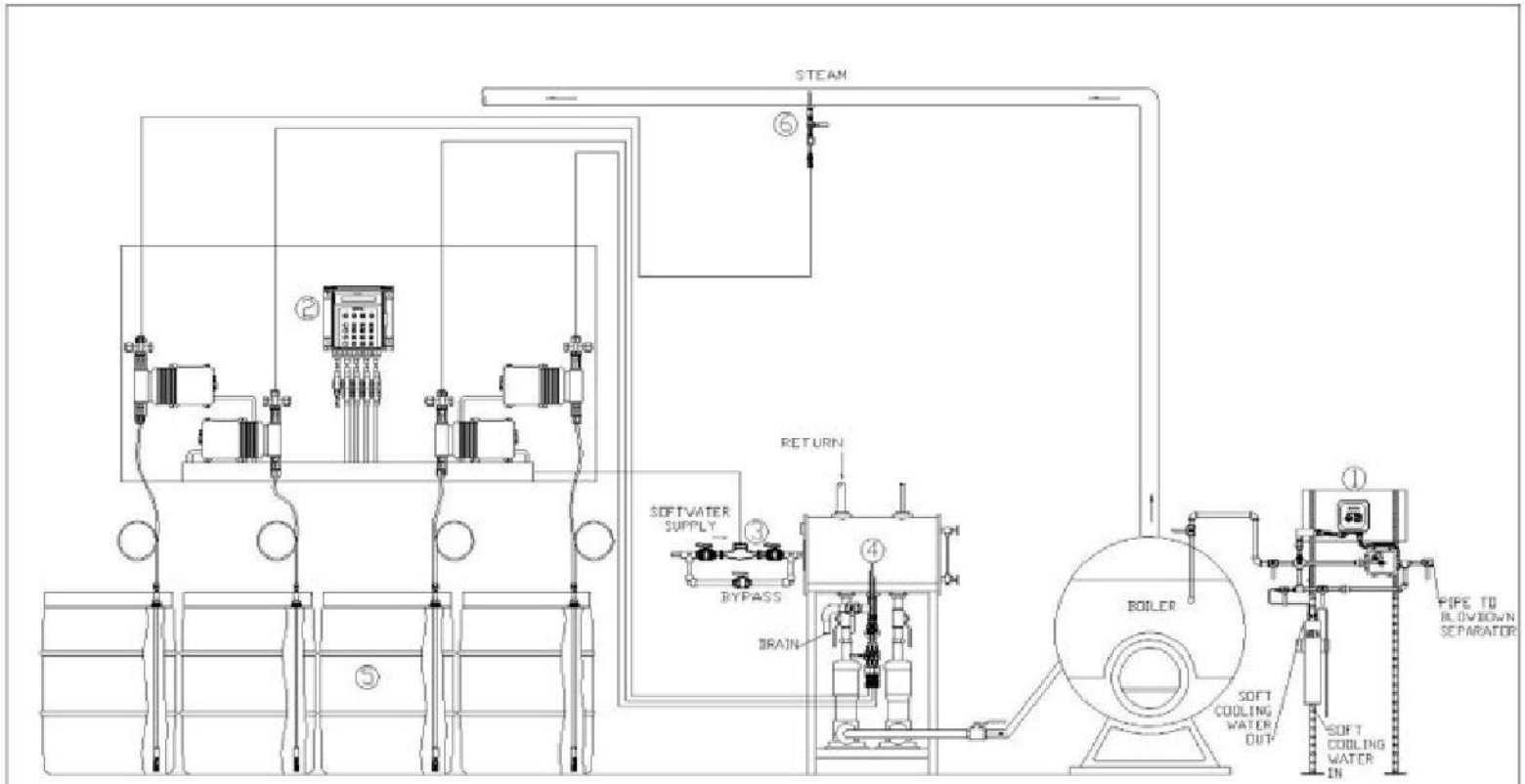
13.0 Equipment Drawings





CHEM-AQUA
Engineered Equipment Solutions

	NAME	DATE	TITLE	SIZE	PART NUMBER	REV
DRAWN	BAQ	4/5/2018	aquaDART Standard with pH and 4 Place Coupon Rack	B		
APPROVED			MATERIAL / FINISH	SCALE: 1:9	WEIGHT:	SHEET 1 OF 1



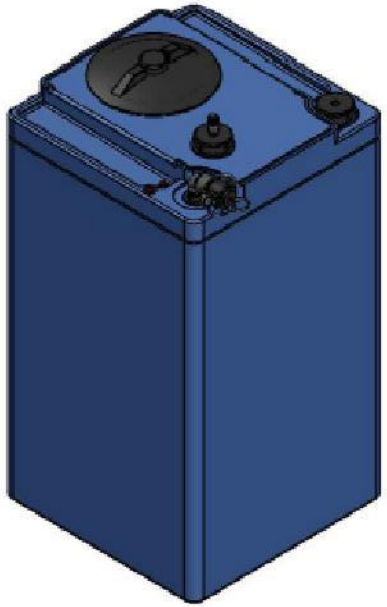
ITEM	QTY	PART NO.	DWG NO.	DESCRIPTION
1	1	EBCCSBWTSC	XXXXXXXXX	BLOWDOWN ASSEMBLY W/ S COOLER
2	1	EBCABMF4	XXXXXXXXX	ADVANTAGE 4 PLACE TIMER LF-4-9
3	1	EMSE1	XXXXXXXXX	SEAMETRICS WATER METER CONTACTOR
4	1	EBSIP10	XXXXXXXXX	SPECIAL INJECTION ASSEM 3 PLACE
5	4	ETFE161	XXXXXXXXX	SUCTION ASSEMBLY FOR DRUM
6	3	EBM26A	XXXXXXXXX	HIGH PRESSURE INJECTION NOZZLE

CHEM-AQUA

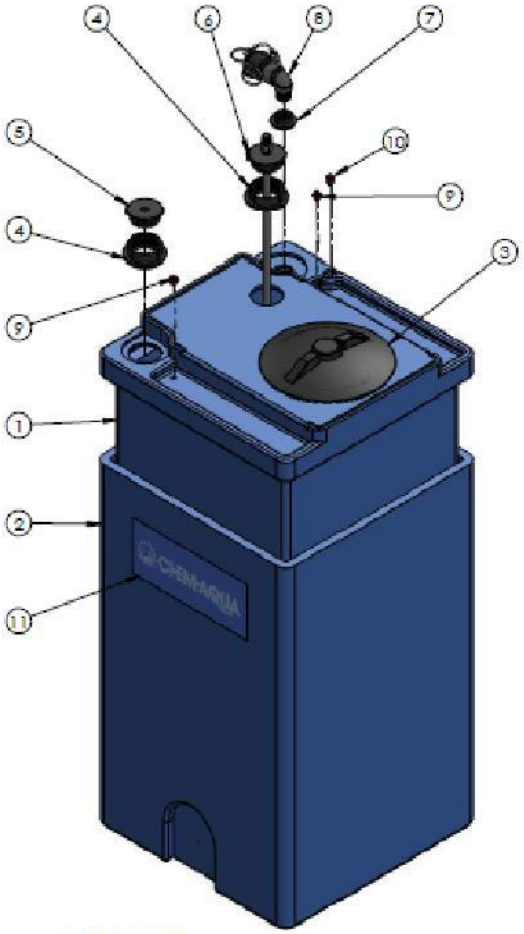
ENGINEERING DEPARTMENT
1840 WATERVILLE ROAD
MACON, GA 31206
478-803-6100

DRAWN	PJV	TITLE	STEAMPAK B-WBL-LF49-D	
DATE	10-19-05			
CHKD		DWG NO.	SB10E0ZAAA	PART NO. XXXXXXXXX REV A
DATE		SCALE	NONE	SIZE B FILE TYPE ACAD SHEET 1 OF 1

REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL RELEASE	3/18/2015



ISO VIEW
(REAR)



ISO VIEW
(FRONT, EXPLODED)

TOP LEVEL ASSEMBLY

ITEM NO.	DESCRIPTION	QTY.
1	GEMINI², 40G INNER TANK, LLDPE	1
2	GEMINI², 40G OUTER TANK, LLDPE	1
3	Ø6" TWIST LID ASSEMBLY	1
4	Ø2" FNPT SPIN WELD FITTING, PE, BLACK	2
5	Ø2" THREADED PLUG, BLACK	1
6	PUMP SUCTION TUBE ASSEMBLY	1
7	Ø3/4" FNPT SPIN WELD FITTING, PE	1
8	Ø3/4" FILL LINE ASSEMBLY	1
9	RED CAPLUG / O-RING SUB-ASSY	2
10	1/4" NPT THREADED PLUG, HDPE, RED	1
11	CHEMAQUA MOLD IN LOGO	1

PART NUMBER	
BLUE	NATURAL
01-31657	01-31652

NOTES:
1. CAPACITY: 40 GAL. NOMINAL
2. APPROXIMATE WEIGHT: 50 LBS
3. TANK MATERIAL: LLDPE W/ UV INHIBITOR
4. SERVICE PRESSURE: ATMOSPHERIC

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES: ±1/4"
ANGLES: ± .5°
ONE PLACE DECIMAL ± .250"
TWO PLACE DECIMAL ± .125"
THREE PLACE DECIMAL ± .062"
TANK MATERIAL: LLDPE
INNER TANK S/N:
OUTER TANK S/N:
CUSTOMER PO#:
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	M&M	3/18/15
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

PEABODY engineering

PROJECT: 40G GEMINI² TANK ASSEMBLY
CUSTOMER: NCH
SITE/LOCATION: -
SALES ORDER#: -

SIZE	DESC.	REV.
B	CUSTOM 40 GALLON GEMINI² ASSEMBLY FOR NCH	A

SCALE: 1:8 | SHEET 1 OF 3

REVISIONS		
REV.	DESCRIPTION	DATE
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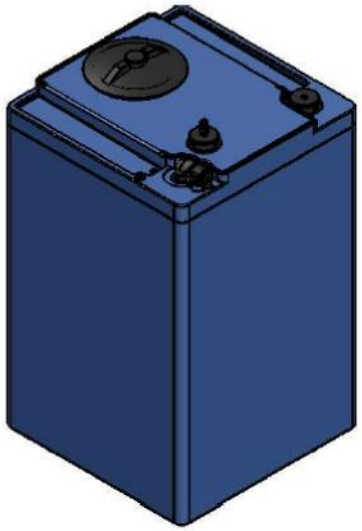

ISOMETRIC VIEW
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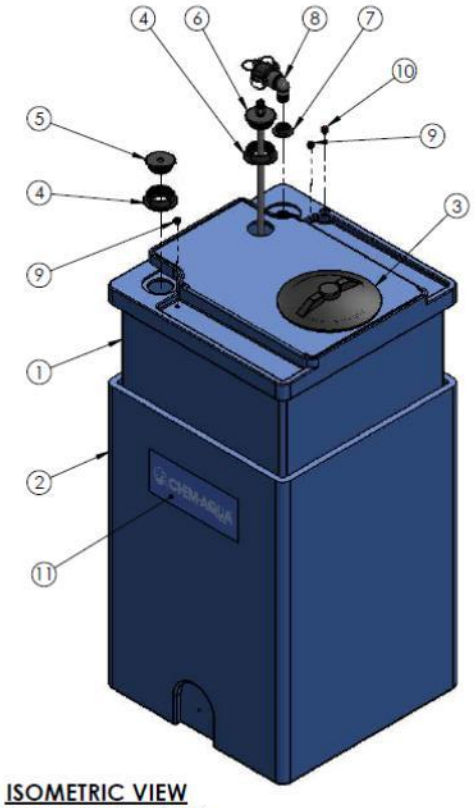


ISOMETRIC VIEW
(FRONT, EXPLODED)

TOP LEVEL ASSEMBLY

ITEM NO.	DESCRIPTION	QTY.
1	GEMINI², 70G INNER TANK, HDPE	1
2	GEMINI², 70G OUTER TANK, LLDPE	1
3	Ø8" TWIST LID ASSEMBLY	1
4	Ø2" FNPT SPIN WELD FITTING, PE, BLACK	2
5	Ø2" THREADED PLUG, BLACK	1
6	PUMP SUCTION TUBE ASSEMBLY	1
7	Ø3/4" FNPT SPIN WELD FITTING, PE	1
8	Ø3/4" FILL LINE ASSEMBLY	1
9	RED CAPLUG / O-RING SUB-ASSY	2
10	Ø1/4" NPT THREADED PLUG, HDPE, RED	1
11	CHEMAQUA MOLD IN LOGO	1

PART NUMBER	
BLUE	NATURAL
01-31658	01-31653

NOTES:
1. CAPACITY: 70 GAL. NOMINAL
2. APPROXIMATE WEIGHT: 70 LBS
3. TANK MATERIAL
   - HDPE INNER W/ UV INHIBITOR
   - LLDPE OUTER W/ UV INHIBITOR
4. SERVICE PRESSURE: ATMOSPHERIC

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES: ±1/4"
ANGULAR: ± .5°
ONE PLACE DECIMAL ± .250"
TWO PLACE DECIMAL ± .125"
THREE PLACE DECIMAL ± .063"
TANK MATERIAL: HPDE/LLDPE
INNER TANK S/N: -
OUTER TANK S/N: -
CUSTOMER PO#: -
DO NOT SCALE DRAWING

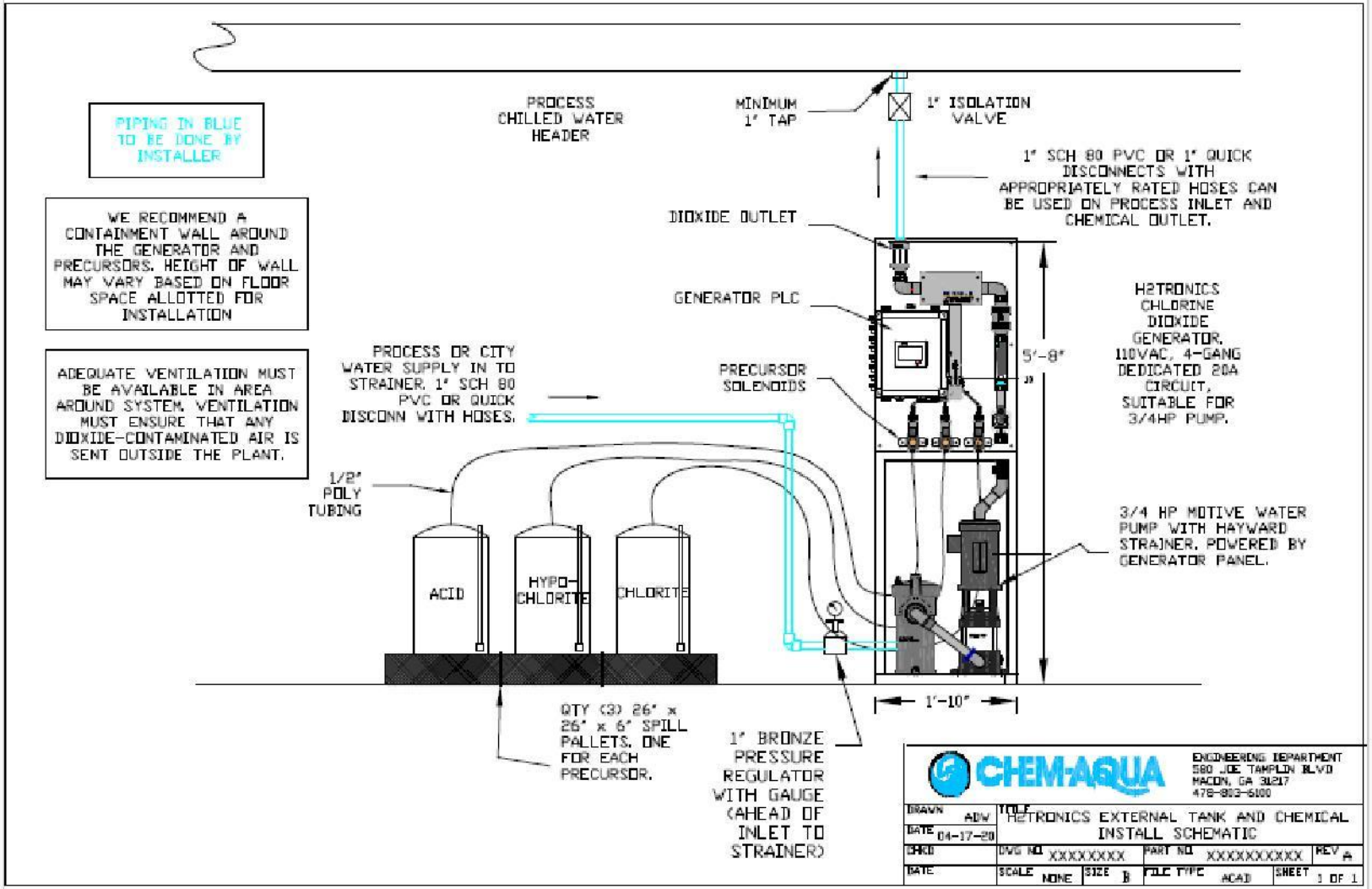
	NAME	DATE
DRAWN	MSM	3/18/15
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

PEABODY engineering

PROJECT: 70G GEMINI² TANK ASSEMBLY
CUSTOMER: NCH
SITE/LOCATION: -
SALES ORDER#: -

SIZE	DESC.	REV.
B	CUSTOM 70 GALLON GEMINI² ASSEMBLY FOR NCH	A

SCALE: 1:10 SHEET 1 OF 3

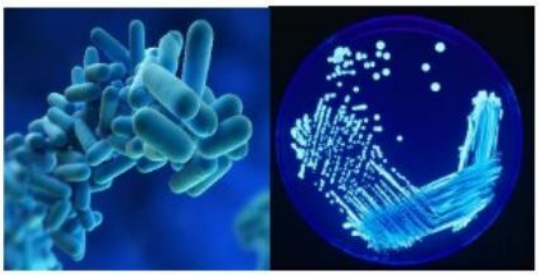

PIPING IN BLUE TO BE DONE BY INSTALLER
WE RECOMMEND A CONTAINMENT WALL AROUND THE GENERATOR AND PRECURSORS. HEIGHT OF WALL MAY VARY BASED ON FLOOR SPACE ALLOTTED FOR INSTALLATION
ADEQUATE VENTILATION MUST BE AVAILABLE IN AREA AROUND SYSTEM. VENTILATION MUST ENSURE THAT ANY DIOXIDE-CONTAMINATED AIR IS SENT OUTSIDE THE PLANT.
PROCESS CHILLED WATER HEADER
MINIMUM 1" TAP
1" ISOLATION VALVE
1" SCH 80 PVC OR 1" QUICK DISCONNECTS WITH APPROPRIATELY RATED HOSES CAN BE USED ON PROCESS INLET AND CHEMICAL OUTLET.
DIOXIDE OUTLET
GENERATOR PLC
PROCESS OR CITY WATER SUPPLY IN TO STRAINER. 1" SCH 80 PVC OR QUICK DISCONN WITH HOSES.
PRECURSOR SOLENOIDS
5'-8"
H2TRONICS CHLORINE DIOXIDE GENERATOR. 110VAC, 4-GANG DEDICATED 20A CIRCUIT, SUITABLE FOR 3/4HP PUMP.
1/2" POLY TUBING
ACID
HYPO-CHLORITE
CHLORITE
3/4 HP MOTIVE WATER PUMP WITH HAYWARD STRAINER. POWERED BY GENERATOR PANEL.
1'-10"
QTY (3) 26" x 26" x 6" SPILL PALLETS. ONE FOR EACH PRECURSOR.
1" BRONZE PRESSURE REGULATOR WITH GAUGE (AHEAD OF INLET TO STRAINER)
CHEM-AQUA
ENGINEERING DEPARTMENT
580 JOE TAMPLIN BLVD
MACON, GA 31217
478-803-6100
DRAWN ADW
DATE 04-17-20
CHKD
DATE
TITLE H2TRONICS EXTERNAL TANK AND CHEMICAL INSTALL SCHEMATIC
DWG NO XXXXXXXX
PART NO XXXXXXXXXX
REV A
SCALE NONE
SIZE B
FILE TYPE ACAD
SHEET 1 OF 1

14.0 ASHRAE 188 Water Management Plan

CHEM-AQUA™ An NCH Company

ASHRAE 188

Building Water Management Plan Development Process



STEPS

SIGN

SURVEY

1 Building Owner Representative Signs Water Management Plan Agreement to ensure understanding of process, responsibilities, and deliverables.

TEAM

2 Chem-Aqua performs Building Water Systems Survey to evaluate Legionella risks and document current maintenance practices.

PLAN & PROGRAM

3 Building Owner Representative Identifies Program Team responsible for developing and implementing the Water Management Plan and Program. Chem-Aqua will be represented as a consultant, but not on the program team.

REVIEW

4 Chem-Aqua generates *Draft Water Management Plan* including control measures for designated water systems. Program Team to review, correct, and finalize control measure and compliance verification frequencies.

IMPLEMENT

5 Chem-Aqua reviews Building Water System Information with customer and demonstrates cloud server platform functionality.

6 Program Team Implements Water Management Plan and Program using the program processes, procedures and documentation.