CenCal Water
P.O. Box 3695
Visalia, CA 93278
(916) 412-4926

May 11, 2016

Ms. Judy Lanchester
Yosemite Community College District
2201 Blue Gum Avenue
Modesto, CA 95352

CC: C. Noakes

RE: Water Treatment Modesto Campuses

Dear Ms. Lanchester,

I am pleased to submit the following water treatment program for your steam boilers, cooling towers and closed loops. Also, for your reference, our CA SBA number is 2001723. Please use this number when referencing the CA SBA registered businesses list.

Cooling Towers

All calculations are based upon the water quality, the towers circulation rates, and assumed load conditions.

The Maximum or upper limits for cycles of concentrations of the cooling water is determined from several different parameters dependent upon the quality of the Make-up water. The following are the accepted industry guide lines and the proposed Inland chemical treatment program being applied has the following control limits:

Total Hardness (as $CaCO_3$) = 600ppm
Total Alkalinity (as $CaCO_3$) = 500ppm
Silica (as SiO_2) = 175ppm

An upper limit on the concentration of each of these mineral constituents is set forth in order not to exceed the saturation level where deposition and scaling can occur.

Make-up analysis is as follows:

	pH	'P' Alkalinity	'M' Alkalinity	Chloride	Total Hardness	Silica	Conductance	O-P
City	7.9	0	44	12	36	6	105	2

Cycles of Concentration

The dissolved solids concentrations are as follows:

Total Hardness = 600 ppm (allowable) = 16.6 cycles
36 ppm (make-up)

Total Alkalinity = 500 ppm (allowable) = 11.4 cycles
44 ppm (make-up)

Silica = 175 ppm (allowable) = 29 cycles
6 ppm (make-up)

The lowest value obtained was in the calculations for Total Alkalinity, indicating that if 11.4 cycles of concentration are reached, the Total Alkalinity levels will be at its maximum allowable concentration. By operating above this control limit (500 ppm as Total Alkalinity), deposition of minerals can occur. For the purposes of this program the maximum cycles will be set at 10.

System Cleaning

Prior to CenCal Water initiating any water treatment program for deposit, fouling and or corrosion control, the Towers should be cleaned, drained, opened and inspected. If the units are clean we can proceed with the proper treatment program. If the unit are fouled, scaled or corroded, they need to be cleaned prior to start-up. Each unit will be individually inspected.

Recommended CenCal Water Cooling Tower Treatment Program

The objective of CenCal Water's cooling water treatment program is to maintain clean heat transfer surfaces while preventing corrosion in all phases of the cooling water and maintaining the highest practical cooling water concentrations in order to conserve water and treatment chemicals.

Tower Water Parameters

8.8 pH	Maximum Allowable pH
600ppm	Maximum Allowable Total Hardness
500ppm	Maximum Allowable Total Alkalinity
120ppm	Maximum Allowable Chlorides
175ppm	Maximum Allowable Silica
1000mmohs	Maximum Allowable conductance
3-8ppm	Active Organophosphonate Average

CenCal Water CT-447

This is a very high transport, wide pH spectrum, concentrated, liquid formula of scale and corrosion inhibitors for cooling water systems. Because of the high transport of organics, high cycles of concentrations of the cooling water are obtainable, which will minimize chemical and water demands. This formula is an acceptable scale inhibitor which provides:

1. Hardness stabilization (threshold effect)
2. Crystal Modification
3. Complexing (sequestering)
4. Dispersing effect
5. pH suppression

CenCal Water CT-447 also contains a co-polymer for additional dispersant and effective mild steel corrosion inhibitor. Control is by a quick, simple but accurate, direct reading test developed for field testing.

Bro Max 7.1

Bro Max 7.1 is a highly concentrated, liquid, stabilized bromine. It is used to control microbial, fungal and algal growth in industrial water systems such as cooling towers, evaporative condensers and air conditioning systems (effective against Legionella). This product can be fed by chemical metering injection pump or by slug dosing. Effective feed is 2-3 times per week for up to 5 minutes at a time. Control range is 1-2ppm at time of dosage.

CenCal Boiler Water Treatment Program Objectives

The objectives of CenCal Water's boiler water treatment program at Modesto Junior College-East Campus will be to provide conditions conducive to the production of dry, high quality, high BTU steam while maintaining clean heat transfer surfaces and the highest practical concentrations of dissolved solids within the boiler water in order to conserve fuel, water and treatment chemicals. Additionally, the treatment program goals are to prevent oxygen pitting and generalized corrosion of all boiler waterside surfaces.

CenCal Water's boiler water treatment programs are based upon many years of experience, industry standards and ABMA and ASME recommendations for steam quality. Our testing procedures are based on Standard Methods for the Examination of Water and Wastewater.

The proposed boiler operator testing schedule, procedures, bottom blowdown schedule and control limits are all intended to achieve the above objectives, keeping in mind the other duties of the boiler operator and the variances of makeup water quality.

While CenCal Water's treatment program provides a wide control range in the boiler water chemical concentrations, it is imperative that these control conditions be maintained at all times. In general, when the boiler water is out of the various control specifications, the following conditions may occur:

1. Carryover of boiler water solids into the steam which may result in sticking valve stems as well as fouling of heat exchange surfaces and steam traps. Severe water hammer in the steam lines can also occur.

2. Severe oxygen pitting of boiler internal surfaces resulting in expensive replacement cost to Modesto Junior College- East Campus, and possible loss of steam capacity

3. Deposition of inorganic salts (including calcium, magnesium, iron, and silica) onto high heat flux tubes of the boilers which results in unnecessarily higher fuel costs. It should be noted that $1/64^{th}$ inch of scale deposition on boiler tubes may result in increased fuel consumption of 4%; $1/32^{nd}$ inch of scale can result in 8% increased fuel consumption, etc. Multiply this factor by the annual fuel cost and it is evident that the cost of scale deposition is considerable and normally goes unnoticed.

4. Generalized corrosion will greatly reduce the life span of the entire steam generating system and can result in costly replacement expense.

If the boiler water treatment program including the pre-treatment and post-treatment system is not maintained according to the specified control parameters, serious and costly failures may result. However, with due diligence from the boiler operators, maintaining the water systems within the control parameters is a fairly simple matter.

Boiler Operating Parameters

10.5-12.5 pH	Preferred pH range
0 ppm	Maximum allowable Total Hardness
500-1000ppm	Preferred Total Alkalinity range
250ppm	Minimum Hydrate Alkalinity level
360ppm	Maximum allowable Chlorides
175ppm	Maximum allowable Silica
3000mmohs	Maximum allowable Conductance
10-30ppm	Sulfite Residual level
10-30ppm	Phosphate residual level

CenCal BT-236 Boiler Scale/Corrosion Inhibitor

To prevent calcium, magnesium, and silica precipitation on the watersides of the boiler tubes, CenCal BT-236 is proposed. BT-236 is a highly concentrated blend of new technology synthetic polymers and phosphates which provide solubilizing and dispersing capabilities for handling hardness leakage from the softeners as well as iron and copper intrusions from the returned condensate. This liquid product can be pumped directly from the barrel or from a double containment bin by means of a metering chemical injection pump.

CenCal BT-203 Oxygen Scavenger

In order to prevent oxygen pitting in the feedwater system, boilers and steam lines, BT-203, catalyzed liquid sulfite oxygen scavenger is recommended. BT-203 is a high active formulation which reacts rapidly with dissolved oxygen present in the boiler feedwater. This liquid product can be pumped directly from the barrel or from a double containment bin by means of a metering chemical injection pump.

CenCal BT-219 Steam Line Treatment

In order to protect the condensate return lines, condensate receivers and steam traps from carbonic acid attack, CenCal BT-219 is a concentrated formulation which neutralizes carbonic acid and other acidic components present in the steam thereby raising the condensate pH to non-corrosive levels. This liquid product can be pumped directly from the barrel or from a double containment bin by means of a metering chemical injection pump. pH levels to be 8.0-8.2.

CenCal BT-234 Alkalinity Booster

To keep alkalinity and pH levels within the proper control range it will be necessary to feed BT-221. This is a liquid blend of sodium hydroxide. Control range is 250ppm-450ppm OH alkalinity.

Service

There is no chemical treatment program in existence that will work without proper supervision and service by the chemical supplier and the systems operators. It will be necessary for the operating personnel to be completely familiar with the chemical treatment program. They must be familiar with the objectives, test procedures and chemical control methods. To accomplish this, CenCal Water personnel will administer a training program for your personnel responsible for the maintenance of the treatment program. It will include program objectives, test procedures, handling procedures, treatment control limits, and treatment guideline.

During the initial start-up or cleaning, CenCal Water personnel will be on site to provide testing and consulting services to ensure the treatment program success. After complete control of the treatment program is established, service will be provided once per month and will routinely include the following:

1. Complete on-site testing of:

    a. Plant make-up waters
    b. Cooling towers
    c. Boilers
    d. Review of in-house log sheets

2. A written report detailing the conditions of each system and any adjustments made to the chemical or blow down controls as well as any recommendations made. This report will be submitted along with an oral report to all parties responsible at the conclusion of the service.

3. Provide laboratory services as needed.

Modesto Junior College- East and West Campus

CenCal Water will agree to chemically treat your cooling towers, steam boilers and closed loops for control of scale and corrosion, and bacteria/algae growth on a monthly charge. CenCal Water will provide all treatment formulas as stipulated in the program proposal which are suitable replacements for current vendor products (like-kind). All chemicals are to be water treatment formulated by CenCal Water. Formulas will meet USDA and FDA compliance if needed.

CenCal Water is to calculate proper cycles of concentration for cooling water/boiler water applications and to set up these parameters in the water treatment program so as to minimize energy and water losses. Every effort will be made by CenCal Water to reduce energy losses on good engineering practices. Blowdown requirements for towers/boilers are to be calculated upon proper engineering practices so as to keep energy and water losses at absolute minimum.

CenCal Water will make as many initial service visits as required to properly set up the program. Thereafter, CenCal Water is to call at your facility once per month to test all waters as to establish compliance with set control parameters.

CenCal Water will furnish any test kits and log sheets necessary to facilitate in-house testing on a regular basis. The customer is responsible for regular system maintenance.

Plant personnel are to monitor and test, record results, keep all chemical tanks charged and pumps operational with CenCal Water formulas. Plant personnel are to execute the CenCal Water treatment program as outlined in proposal and log sheets without deviation. Any changes or alterations to equipment settings must be approved by CenCal Water. CenCal Water will not be held accountable for changes made without CenCal Water authorization. CenCal Water is to attend yearly inspections and provide a report in writing as to the condition of the equipment. A 3-day notice of inspection is requested.

Treatment Points of Contract:

1. The following **Cooling Water Treatment** items shall be provided as part of this contract:
    a. CT-447 Scale and Corrosion Inhibitor: as needed for treatment program (3-5ppm)
    b. Bromax 7.1: for microbiological control in system as needed (1-2ppm, 3x/week)
    c. LT-754 Closed Loop Inhibitor: for routine maintenance amounts.
    d. Once Monthly Testing of Towers and Closed Loops and written service report.

2. The following **Boiler Water Treatment** items shall be provided as part of this contract:
    a. BT-203 Catalyzed Sulfite: as needed for use as oxygen scavenger (10-30ppm)
    b. BT-219 Neutralizing Amine: as needed for steam line corrosion inhibitor (8.0-8.2)
    c. BT-236 Boiler Phosphate Treatment: as needed for internal treatment (10-30ppm)
    d. BT-234Alkalinity Booster: as needed to maintain Boiler pH (10.5-12.5)
    e. Monthly testing of Boiler plant water and written service reports.

3. The following items shall not be provided as part of this contract:

a. The physical wash-out of the cooling towers, either during the season or at the end of the season.
b. Routine physical clean-out of the condenser tubes, either during the season or at the end of the season.
c. Chemical feed pump systems or bleed-off control equipment.
d. Parts and Mechanical Services are not provided for. We do not warrant the mechanical conditions of your systems.

Additional Points:

a. Annual fees remain in effect for a minimum of one (1) year.
b. Invoices are payable in net thirty (30) days.
c. Agreement is cancelable upon thirty (30) day written notice by either party.
d. No separate freight charges will be billed.

Cost:

Cost is based upon water analysis, the equipment being treated and load condition information that was provided. We will provide the chemicals necessary to properly treat your cooling tower for mineral deposit scaling and bacterial/algal growth, boiler system and steam lines for scale and corrosion, closed loops for corrosion protection, and provide described above service for annual cost of **$20,592**. This cost is to be billable as **$1,716.00** per month taxes and freight included.

ACCEPTED BY:

Judith M Lanchester

Judy Lanchester
Yosemite Community College District
2201 Blue Gum Ave
Modesto, CA 95352

Scott Travis
CenCal Water
P.O. Box 3695
Visalia, CA 93278

Date: 6-29-16

Start Date:

CenCal Water
P.O. Box 3695
Visalia, CA 93278
(916) 412-4926

May 11, 2016

Ms. Judy Lanchester
Yosemite Community College District
2201 Blue Gum Avenue
Modesto, CA 95352

CC: C. Noakes

RE: Water Treatment Columbia Campus

Dear Ms. Lanchester,

I am pleased to submit the following water treatment program for your cooling towers and closed loops. Also, for your reference, our CA SBA number is 2001723. Please use this number when referencing the CA SBA registered businesses list.

Cooling Towers

All calculations are based upon the water quality, the towers circulation rates, and assumed load conditions.

The Maximum or upper limits for cycles of concentrations of the cooling water is determined from several different parameters dependent upon the quality of the Make-up water. The following are the accepted industry guide lines used in making this determination:

Total Hardness (as $CaCO_3$) = 600ppm
Total Alkalinity (as $CaCO_3$) = 500ppm
Silica (as SiO_2) = 175ppm

An upper limit on the concentration of each of these mineral constituents is set forth in order not to exceed the saturation level where deposition and scaling can occur.

Tower Water Parameters

8.8 pH	Maximum allowable pH
600ppm	Maximum allowable Total Hardness
500ppm	Maximum allowable Total Alkalinity
400ppm	Maximum allowable Chlorides
175ppm	Maximum allowable Silica
1000mmohs	Maximum allowable conductance
3-8ppm	Active Organophosphonate Average

System Cleaning

Prior to CenCal Water initiating any water treatment program for deposit, fouling and or corrosion control, the Towers should be cleaned, drained, opened and inspected. If the units are clean we can proceed with the proper treatment program. If the unit are fouled, scaled or corroded, they need to be cleaned prior to start-up. Each unit will be individually inspected.

CenCal CT-447

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1. Hardness stabilization (threshold effect)
2. Crystal Modification
3. Complexing (sequestering)
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5. pH suppression

CenCal CT-447 also contains a co-polymer for additional dispersant and effective mild steel corrosion inhibitor. Control is by a quick, simple but accurate, direct reading test developed for field testing.

Bro Max 7.1

Bro Max 7.1 is a highly concentrated liquid stabilized bromine. It is used to control microbial, fungal and algal growth in industrial water systems such as cooling towers, evaporative condensers and air conditioning systems (effective against Legionella). This product can be fed by chemical metering injection pump or by slug dosing. Effective feed is 1-2 times per week for up to 5 minutes at a time. Control range is 1-2ppm at time of dosage.

Service

There is no chemical treatment program in existence that will work without proper supervision and service by the chemical supplier and the systems operators. It will be necessary for the operating personnel to be completely familiar with the chemical treatment program. They must be familiar with the objectives, test procedures and chemical control methods. To accomplish this, CenCal Water personnel will administer a training program for your personnel responsible for the maintenance of the treatment program. It will include program objectives, test procedures, handling procedures, treatment control limits, and treatment guideline.

During the initial start-up or cleaning, CenCal Water personnel will be on site to provide testing and consulting services to ensure the treatment program success. After complete control of the treatment program is established, service will provided once per month and will routinely include the following:

1. Complete on-site testing of:

    a. Plant make-up waters
    b. Cooling towers and closed loops
    c. Review of in-house log sheets

2. A written report detailing the conditions of each system and any adjustments made to the chemical or blow down controls as well as any recommendations made. This report will be submitted along with an oral report to all parties responsible at the conclusion of the service.

3. Provide laboratory services as needed.

AGREEMENT FOR WATER TREATMENT PRODUCTS AND SERVICES

Columbia College- Columbia, CA

CenCal Water will agree to chemically treat your cooling towers and closed loops for control of scale and corrosion, and bacteria/algae growth on a monthly charge. CenCal Water will provide all treatment formulas as stipulated in the program proposal which are suitable replacements for current vendor products (like-kind). All chemicals are to be water treatment formulated by CenCal Water. Formulas will meet USDA and FDA compliance if needed.

CenCal Water is to calculate proper cycles of concentration for cooling water water applications and to set up these parameters in the water treatment program so as to minimize energy and water losses. Every effort will be made by CenCal Water to reduce energy losses on good engineering practices. Blowdown requirements for towers are to be calculated upon proper engineering practices so as to keep energy and water losses at absolute minimum.

CenCal Water will make as many initial service visits as required to properly set up the program. Thereafter, CenCal Water is to call at your facility once per month to test all waters as to establish compliance with set control parameters.

CenCal Water will furnish any test kits and log sheets necessary to facilitate in-house testing on a regular basis. The customer is responsible for regular system maintenance.

Plant personnel are to monitor and test, record results, keep all chemical tanks charged and pumps operational with CenCal Water formulas. Plant personnel are to execute the CenCal Water treatment program as outlined in proposal and log sheets without deviation. Any changes or alterations to equipment settings must be approved by CenCal Water. CenCal Water will not be held accountable for changes made without CenCal Water authorization. CenCal Water is to attend yearly inspections and provide a report in writing as to the condition of the equipment. A 3-day notice of inspection is requested.

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    a. CT-447 Scale and Corrosion Inhibitor: as needed for treatment program (3-5ppm)
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    c. LT-754 Closed Loop Inhibitor: for routine maintenance amounts.
    d. Once Monthly Testing of Towers and Closed Loops and written service report.

(cont.)

2. The following items shall not be provided as part of this contract:

a. The physical wash-out of the cooling towers, either during the season or at the end of the season.
b. Routine physical clean-out of the condenser tubes, either during the season or at the end of the season.
c. Chemical feed pump systems or bleed-off control equipment.
d. Parts and Mechanical Services are not provided for. We do not warrant the mechanical conditions of your systems.

Additional Points:

a. Annual fees remain in effect for a minimum of one (1) year.
b. Invoices are payable in net thirty (30) days.
c. Agreement is cancelable upon thirty (30) day written notice by either party.
d. No separate freight charges will be billed.

Cost:

Cost is based upon water analysis, the equipment being treated and load condition information that was provided. We will provide the chemicals necessary to properly treat your cooling tower for mineral deposit scaling and bacterial/algal growth, boiler system and steam lines for scale and corrosion, closed loops for corrosion protection, and provide described above service for annual cost of **$6,127.56**. This cost is to be billable as **$510.63** per month, taxes and freight included.

ACCEPTED BY:

Judith M. Lanchester

Judy Lanchester
Yosemite Community College District
2201 Blue Gum Ave
Modesto, CA 95352

Scott Travis
CenCal Water
P.O. Box 3695
Visalia, CA 93278

Date: 6-29-16

Start Date:

CenCal Boiler Water Treatment Program Objectives

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Boiler Operating Parameters

10.5-12.5 pH	Preferred pH range
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3. Provide laboratory services as needed.