



REQUEST FOR PROPOSALS

DESAL ANTISCALANT/CLEAN-IN-PLACE CHEMICALS

BID NO: 18-18006

ADDENDUM 1

BIDS DUE: April 30, 2018 @ 3:00 PM Central Time

**To report suspected ethics violations impacting the San Antonio Water System,
please call 1-800-687-1918.**

Addendum 1 is issued to perform the following:

- Change the number values for Attachment C Section A and change the value to number 1 for correct number sequence.
- Delete item 'a' from Section A (SAWS BGD CLEAN-IN-PLACE (CIP) SYSTEM) of Attachment C
- Revised (PERFORMANCE SPECIFICATIONS) in Attachment C Cleaning chemical shall contain no materials or components that deposit on or foul the RO membrane elements. The supplier will be responsible for providing proof to SAWS that the cleaning chemical is qualified as compatible with the membrane manufacturer's requirements and not void membrane warranty. Cleaning chemical shall be fully compatible with Model BW 30-400/34 manufactured by Dow Filmtec. The supplier is responsible to provide a proof of compliance to the SAWS before the RFP is awarded. Proof of compliance shall be a letter from the membrane manufacturer that has been provided within the past five years. Proof of compliance shall be based on the specific chemical formulation of the scale inhibitor supplied. Supporting documentation shall be provided in the proposal. Changed to Cleaning chemical shall contain no materials or components that deposit on or foul the RO membrane elements. The supplier will be responsible for providing proof to SAWS that the cleaning chemical is qualified as compatible with the membrane manufacturer's requirements and not void membrane warranty. Cleaning chemical shall be fully compatible with Model BW 30-400/34 manufactured by Dow Filmtec. The supplier is responsible to provide a proof of compliance to the SAWS before the RFP is awarded. Proof of compliance shall be a letter from the membrane manufacturer that has been provided within the past five years. Proof of compliance shall be based on the specific chemical formulation of the CIP chemicals supplied. Supporting documentation shall be provided in the proposal. In item c of Section 2 (PERFORMANCE SPECIFICATIONS) in Attachment C
- Perform editorial changes to Attachment C section 5 from d, c, d, and e and changed to a, b, c, and d.

Below is the updated attachments for you to use.

ATTACHMENT A

SCALE INHIBITOR (ANTISCALANT) PURCHASE SPECIFICATION

1. **SAWS BRACKISH GROUNDWATER (BGD) DESALINATION PROCESS DESCRIPTION**
 - a) SAWS BGD plant has a capacity of delivering 12 MGD treated water; of which, 10 MGD is produced using a reverse osmosis (RO) system, and 2 MGD is bypassed.
 - b) SAWS RO system contains six trains. Four of these trains are called primary RO trains and two are called concentrator RO trains.
 - c) Each primary RO train contains two stages; the first stage contains 40 pressure vessels, the second stage contains 20 pressure vessels. The first stage is divided into two banks (20 vessels in each bank).
 - d) Each concentrator RO train contains sixteen pressure vessels (third stage).
 - e) Each pressure vessel contains seven RO membranes, manufactured by Dow Filmtec (BW30-400/34)
 - f) SAWS BGD plant uses a pretreatment system, which is located upstream of the reverse osmosis system. The pretreatment system consists of 93% sulfuric acid addition (to lower the feed water pH to 6.5), 2 to 3 mg/L of a proprietary antiscalant addition, and a nominally rated 5-micron cartridge filter system.

2. PERFORMANCE SPECIFICATIONS

The scale inhibitor shall meet the requirements presented herein.

- a) The scale inhibitor shall consist of organic and/or inorganic compounds which inhibit the precipitation of sparingly soluble inorganic salts such as, but not limited to, calcium carbonate, calcium sulfate, barium sulfate, strontium sulfate, calcium fluoride, calcium phosphate, iron silicate, and silica
- b) The scale inhibitor also needs to inhibit the deposition of colloidal materials such as, but not limited to, clays and the hydroxides of metals such as aluminum, iron, and manganese.
- c) Attachment B includes a general overview of raw water and feed water chemistry for SAWS BGD system. If the suppliers need additional information on raw water or feed water chemistry, they will collect and analyze SAWS BGD raw water and/or feed water at no cost to the SAWS.
- d) Scale inhibitor shall contain no materials or components that deposit on or foul the RO membrane elements.
- e) Scale inhibitor shall be qualified as compatible with the membrane manufacturer's requirements and not void membrane warranty. Scale inhibitor shall be fully compatible with the membrane elements BW 30-400/34 manufactured by DOW Filmtec. The supplier is responsible to provide a proof of compliance to the SAWS before the RFP is awarded. Proof of compliance shall be a letter from the membrane manufacturer that has been provided within the past five years. Proof of compliance shall be based on the specific chemical formulation of the scale inhibitor supplied. Supporting documentation shall be provided in the proposal.
- f) Should use of the scale inhibitor in accordance with the scale inhibitor vendor's recommendations result in deterioration of the membrane elements, the scale inhibitor supplier shall clean or repair the membrane elements in a timely manner or replace the membrane elements at no cost to the SAWS. The cleaning methods and chemicals shall not damage the RO elements and shall conform to requirements of their manufacturer.
- g) Supplier shall propose scale inhibitor dosage rate. Scale inhibitor dosage needs to be determined in such a way so that the primary RO membrane elements do not need to be cleaned more than 2 times and concentrator RO membrane elements do not need to be cleaned more than 3 times in any 12-month period. If dosage rate needs to be increased to obtain/sustain desired performance for SAWS BGD system, supplier shall bear all costs associated with the increase dosage rate. The following criteria need to be followed during developing scale inhibitor dosing rate:
 1. The supplier will use a vendor model to calculate dosing rate for scale inhibitor. A print out from the software package shall be submitted with the proposal. The supplier needs to be the owner of the model that will be used to calculate the dosing rate.
 2. The scale inhibitor needs to be designed for 90% overall feed water recovery (80% from primary RO trains and 50% from concentrator RO trains).
 3. The supplier shall use the Calcium Carbonate Precipitation Potential (CCPP) method as part of calculating the scale inhibitor dose rate. This method shall be integrated into a chemical dosing software package that permits easy access system operation.
 4. The use of only Langelier Saturation Index (LSI) in quantifying the level of calcium carbonate precipitation will not be accepted.
 5. The scale inhibitor dose shall be in the range of 1 to 5 mg/L, as delivered, without any requirements to dilute scale inhibitor prior to use.
 6. Physical and chemical properties of the scale inhibitor shall be provided with the proposal and with shipments. Physical and chemical properties include, but not limited to, pH, specific gravity, density, and associated health, handling, and safety warnings.

3. **QUALITY ASSURANCE**

a) Scale Inhibitor

1. Scale inhibitor shall be in accordance with NSF/ANSI 60 including dosage limits.

b) Chemical strength

1. The use of concentrate is acceptable; however, the batching of concentrate must be done off-site. The product delivered shall be guaranteed to be of the concentration that corresponds with the recommended dosing rate. Make-up water used for dilution of concentrated scale inhibitor shall be chlorine free and shall not compromise the performance of the scale inhibitor or compromise the integrity of the RO membrane elements or other equipment.

c) Shelf Life

1. Scale inhibitor as delivered shall retain full inhibition and dispersant properties for a period of at least one (1) year from the date of delivery to the membrane facility.
2. Scale inhibitor as delivered shall not support biological growth in the solution during the period of at least one (1) year from the date of delivery.
3. Scale inhibitor, when used at the dose recommended by supplier and when the RO plant is operated at or below the specified recovery, shall fully inhibit any sparingly soluble salts that are indicated by the specified feed water analysis.

d) Chemical Purity

1. Supplier shall guarantee the minimum purity of the scale inhibitor. Supplier shall provide certificates of analysis, verifying the purity of the product, upon request, within 7 business days.
2. Supplier shall submit testing procedures that are used to determine the quality of the offered product.

4. **SUPPLIER REQUIREMENTS**

- a) The Supplier shall demonstrate that the proposed product has been successfully used in at least three municipal RO water treatment facilities with at least 5 MGD of capacity for at least two consecutive years in the past 10 years. References and contact information shall be provided with the proposal.
- b) Supplier has provided scale inhibitor for at least 10 years to municipalities.
- c) Supplier needs to have its own laboratory facility that is capable of performing membrane autopsy, and analyzing potential foulants.

5. **SERVICE REQUIREMENTS**

- a) Supplier shall provide at least a 16-hour training (eight hours each day) to operators for the purpose of trending RO systems performances.
- b) At no cost to the SAWS, the supplier shall provide same day support service, over the phone or by e-mail. Support service includes any technical issues related to the antiscalant.
- c) The supplier shall provide a minimum quarterly site visit at no cost to the SAWS. During the site visit, the supplier shall provide at least half-a day training on scale control for the RO system.
- d) At no cost to the SAWS, the supplier will conduct an annual efficiency study to optimize the scale inhibitor dosage rates.
- e) Shall membrane fouling occur, supplier shall diagnose cause of fouling free of charge and provide the SAWS with a cleaning recommendation within ten (10) business days.

ATTACHMENT B

TABLE B-1

(THIS IS A GENERAL OVERVIEW OF SAWS BGD COMBINED RAW WATER DATA. IF THE SUPPLIERS NEED MORE INFORMATION, THEY WILL COLLECT AND ANALYZE SAWS BGD RAW WATER AT NO COST TO THE SAWS)

Raw Water Quality			
Component	Average	Minimum	Maximum
pH	7.78	7.31	8.05
Temperature (C)	28.98	23.50	32.90
Turbidity (NTU)	0.61	0.30	0.87
Hardness (mg/L)	114	82	168
NH₃-N (mg/L)	1.09	0.96	1.26
TDS (mg/L)	1,317	1,130	1,400
Alkalinity (mg/L)	226	190	243
Aluminum (µg/L)	11.42	2.57	59.50
Barium (µg/L)	31.33	26.80	35.20
Calcium (mg/L)	25.50	18.20	37.60
Total Iron (mg/L)	0.20	0.10	0.63
Magnesium (mg/L)	12.29	8.85	18.00
Manganese (µg/L)	50.40	43.70	56.70
Potassium (mg/L)	7.02	6.34	8.29
SiO₂ (mg/L)	16.14	14.70	17.80
Sodium (mg/L)	411	382	446
Strontium (mg/L)	2.07	1.50	3.00
Chloride⁻ (mg/L)	244	219	274
Fluoride⁻ (mg/L)	0.23	0.20	0.26
NO₃ (mg/L)	0.03	0.00	0.14
PO₄ (mg/L)	0.10	0.10	0.11
SO₄ (mg/L)	456	374	492

TABLE B-2
(THIS IS A GENERAL OVERVIEW OF SAWS RO FEED WATER DATA. IF THE SUPPLIERS NEED MORE INFORMATION, THEY WILL COLLECT AND ANALYZE SAWS RO FEED WATER AT NO COST TO SAWS)

Feed Water Quality			
Component	Average	Minimum	Maximum
pH	6.5	6.4	6.6
Temperature (C)	28.98	23.50	32.90
Hardness (mg/L)	115	85	131
TDS (mg/L)	1,342	1,220	1,440
Alkalinity (mg/L)	175	124	208
Aluminum (µg/L)	4.96	2.50	9.18
Barium (µg/L)	30.90	28.10	33.90
Calcium (mg/L)	25.82	18.90	30.00
Magnesium (mg/L)	12.33	9.22	13.9
Manganese (µg/L)	48.85	48.00	49.70
Potassium (mg/L)	7.02	6.34	8.29
SiO₂ (mg/L)	16.32	15.00	17.90
Sodium (mg/L)	417	395	487
Strontium (mg/L)	2.09	1.54	2.44
Chloride⁻ (mg/L)	241	219	264
Fluoride⁻ (mg/L)	0.24	0.22	0.25
SO₄ (mg/L)	520	477	587

ATTACHMENT C

MEMBRANE CLEAN-IN-PLACE PURCHASE SPECIFICATION

1. SAWS BGD CLEAN-IN-PLACE (CIP) SYSTEM

- a) Total volume of cleaning solution required to clean one primary RO train is approximately 11,500 gallons. Total volume to clean all four primary RO trains one time is approximately 46,000 gallons. This includes enough cleaning solution to keep the re-circulation pumps of the CIP system primed as well as the volume of the CIP piping. Primary RO trains may need to be cleaned two times per year.
- b) Total volume required to clean both concentrator RO train is approximately 9,000 gallons. This includes enough cleaning solution to keep the re-circulation pumps of the CIP system primed as well as the volume of the CIP piping.

2. PERFORMANCE SPECIFICATIONS

The membrane cleaning chemicals need to meet the requirements presented herein.

- a) The cleaning chemical shall consist of organic or inorganic compounds which will be responsible to clean:
 1. The precipitation of sparingly soluble inorganic salts such as, but not limited to, calcium carbonate, calcium sulfate, barium sulfate, strontium sulfate, calcium fluoride, calcium phosphate, iron sulfide, and silica scale.
 2. The deposition of colloidal materials such as, but not limited to, silts, silica, clays and the hydroxides of metals such as aluminum, iron, and manganese.
- b) RO permeate will be used to prepare CIP solution for cleaning membranes. CIP chemical shall be fully compatible with RO permeate.
- c) Cleaning chemical shall contain no materials or components that deposit on or foul the RO membrane elements. The supplier will be responsible for providing proof to SAWS that the cleaning chemical is qualified as compatible with the membrane manufacturer's requirements and not void membrane warranty. Cleaning chemical shall be fully compatible with Model BW 30-400/34 manufactured by Dow Filmtec. The supplier is responsible to provide a proof of compliance to the SAWS before the RFP is awarded. Proof of compliance shall be a letter from the membrane manufacturer that has been provided within the past five years. Proof of compliance shall be based on the specific chemical formulation of the CIP chemicals supplied. Supporting documentation shall be provided in the proposal.
- d) Should use of the cleaning chemicals result in deterioration of the membrane elements, the supplier shall replace the membrane elements at no cost to the SAWS.
- e) Supplier shall propose cleaning chemical dosage rate. If dosage rate needs to be increased to obtain/sustain desired performance, supplier shall bear all costs associated with the increase dosage rate.
- f) Physical and chemical properties of the cleaning chemical shall be provided with the proposal and with shipments, including pH, specific gravity or density, and associated health, handling, and safety warnings.

3. QUALITY ASSURANCE

- a) Certification:
 1. The cleaning chemical shall be in accordance with NSF/ANSI 60 including dosage limits.
- b) Chemical strength

1. Concentrated chemical in bulk form is acceptable; however, the supplier will provide calculation for dilution.
- c) Shelf Life
 1. Cleaning chemical as delivered shall retain full chemical properties for at least two (2) months from the date of delivery to SAWS facility.
- d) Chemical Purity
 1. Supplier shall guarantee the minimum purity of the cleaning chemical. Supplier shall provide certificates of analysis, verifying the purity of the product, upon request, within 7 business days.
 2. Supplier shall submit testing procedures that are used to determine the quality of the offered product.

4. SUPPLIER REQUIREMENTS

- a) The Supplier shall demonstrate that the proposed product has been successfully used in at least three municipal RO water treatment facilities with at least 5 MGD of capacity for at least two consecutive years in the past 10 years. References and contact information shall be provided with the proposal.
- b) Supplier has provided CIP chemicals for at least 10 years to municipalities.
- c) Supplier needs to have its own laboratory that is capable of performing membrane autopsy, and analyzing potential foulants.

5. SERVICE REQUIREMENTS

- a) A membrane cleaning expert from the supplier shall be present during each cleaning event at SAWS BGD facility for the first year. In the following years, at no cost to the SAWS, the supplier shall provide technical assistance and troubleshooting on RO cleaning via email and/or phone.
- b) Shall membrane fouling occur, supplier shall diagnose cause of fouling at no cost to the SAWS and provide SAWS with a cleaning recommendation within ten (10) business days.
- c) At no cost to the SAWS, the supplier shall perform membrane autopsy analyses before a cleaning event. At no cost to the SAWS, the supplier will provide clean membrane elements to the SAWS to replace the membranes that will be used for autopsy.
- d) The supplier will be responsible to review monthly normalized data for all primary RO and concentrator RO trains/skids, and recommend SAWS operators for a potential cleaning event. Normalized data is generated by SAWS SCADA system.

ATTACHMENT D

PILOT STUDY

- a) Before awarding the RFP, the SAWS will require the supplier to conduct a pilot study for 35 days, of which 30 consecutive days (non-stop 24/7) will be allocated to demonstrate the performance of the selected scale inhibitor, and 5 consecutive days will be allocated to demonstrate the performance of the selected CIP chemicals.
- b) The supplier will submit a pilot study protocol to SAWS 15 days before starting the pilot study. The protocol will include, but not limited to, the following: a detailed schedule, process description, health and safety procedures, etc.
- c) During the pilot study, the supplier will use a three-stage reverse osmosis system (at 90 percent recovery) that mimics SAWS BGD system.
- d) The supplier will be responsible to operate, and maintain the pilot system. The supplier will also be responsible to collect and process the data of the pilot study.
- e) The pilot system needs to continuously monitor physical and chemical parameters of feed, permeate and concentrate streams. Physical parameters include, but not limited to, the following: inlet pressures for stages 1, 2, and 3; permeate and concentrate pressure; feed, permeate and concentrate temperature; feed permeate, and concentrate flow rates, etc. Chemical parameters include, but not limited to the following, TDS, TOC, pH, conductivity of feed, permeate and concentrate streams, iron and silica concentration of feed, permeate, and concentrate, etc.
- f) After the completion of the pilot study, the supplier will perform autopsy of the first and third stage membranes used for performing the pilot study, and identify the organic, inorganic and biological materials that are deposited on the membrane surface.
- g) The supplier will issue a pilot study report within 7 days of the completion of the pilot study. The report will include the operational data as well as the membrane autopsy result.
- h) The supplier will be responsible to bring the equipment, membranes, pumps, piping, chemicals, and other accessories required to conduct the pilot study. The supplier will be responsible to pay the entire cost for conducting the pilot. SAWS will provide a space for performing the pilot. SAWS will also provide raw water for the pilot study.
- i) SAWS reserves all rights to reject a scale inhibitor and/or CIP chemical if the performance of the chemicals are not satisfactory to SAWS.

ATTACHMENT E

SIMILAR PAST PROJECTS AND PERFORMANCE FORM

In the following Table, list three projects where the supplier provided both scale inhibitor and CIP chemicals for at least 2 consecutive years in the past 10 years.

Project Name #1	
Project Location: City/State	
Utility/Owner	
Owner Contact Person Name: Phone Number: Email:	
Reverse Osmosis Plant Size:	
Supplier's Key Staff and Role	

Project Name #2	
Project Location: City/State	
Utility/Owner	
Owner Contact Person Name: Phone Number: Email:	
Reverse Osmosis Plant Size:	
Supplier's Key Staff and Role	

Project Name #3	
Project Location: City/State	
Utility/Owner	
Owner Contact Person Name: Phone Number: Email:	
Reverse Osmosis Plant Size:	
Supplier's Key Staff and Role	

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