STAFF REPORT

Meeting Type:	Board of Directors
Title:	FY 2025 Purchase of Water Treatment Chemicals
From:	Darren Machado, Operations Director
Through:	Ben Horenstein, General Manager
Meeting Date:	May 21, 2024

TYPE OF ACTION: X Action Information Review and Refer

RECOMMENDATION: Authorize the General Manager to execute agreements for the purchase of water treatment chemicals in an amount not to exceed $2,326,866

SUMMARY: The District annually solicits competitive bids for the supply and delivery of eight bulk water treatment chemicals needed to treat water at the District's treatment plants and the Ignacio Water Quality pump station. Four of the chemicals were bid through the Bay Area Chemical Consortium (BACC). Staff solicited competitive bids for four other water treatment chemicals, Zinc Orthophosphate, Cationic Polymer, Anionic Polymer and Ferric Sulfate. The total estimated costs for the eight water treatment chemicals for fiscal year 2025 is $2,326,866 representing a 4.42% decrease over the prior year bids.

DISCUSSION: The District utilizes water treatment chemicals to ensure the water delivered to District customers meets all federal and state water quality requirements. These chemicals help remove sediment from the water, kill disease causing organisms, and reduce corrosion in the District's piping system as well as our customers' household piping, among other benefits.

The District participates in Bay Area Chemical Consortium (BACC) to obtain bids for the supply and delivery of water treatment chemicals. The BACC is a collection of over 58 water and wastewater agencies around the greater San Francisco Bay Area ranging from Sacramento to Gilroy that work together to leverage their combined purchasing power and achieve better chemical pricing. The District obtains competitive quotes for chemicals (Zinc Orthophosphate, Cationic Polymer, and Ferric Sulfate) that are not available through the BACC. Staff also have received a quote for a proprietary Anionic Polymer from Nalco, which is not available through the BACC. The bid and quotation results for each water treatment chemical is included in the table below.

Bid and Quotation Results for Furnishing Water Treatment Chemicals

July 1, 2024 – June 30, 2025

CHEMICAL	COMPANY	ESTIMATED QUANTITY	UNIT PRICE	TOTAL ESTIMATED COST
Aqua Ammonia	Hills Brother Chemical Co.	20,000 gal	$4.10	$82,000
Ferric Sulfate	Thatcher Chemical of CA, Inc.	1331 dry tons	$571.05	$760,067
Hydrofluorosilicic Acid	Pennco, Inc.	28,000 gal	$3.18	$89,040
Caustic Soda	Brenntag Pacific, Inc.	626 dry tons	$669.9	$419,357
Sodium Hypochlorite	Univar USA Inc.	220,000 gal	$3.25	$715,000
Zinc Orthophosphate	Brenntag Pacific, Inc.	135 wet tons	$1,536.67	$207,450
Cationic Polymer	Nalco Company	40,000 lbs.	$1.18	$47,200
Anionic Polymer	Nalco Company	2,790 lbs.	$2.42	$6,752
Total Estimated Cost:				$2,326,866

The total estimated cost of $2,326,866 is 4.42% lower than the prior year bids.

A brief review and explanation of water treatment chemicals (ferric sulfate, polymers, sodium hypochlorite, ammonia, caustic soda, zinc orthophosphate, and fluoride) used by MMWD follows.

Specifications and Standards

In addition to the District's own requirements, standards published by the American Water Works Association are used in the purchase contract. Also, since 1994, California has required that all drinking water "direct additive" products be certified by a testing organization that is accredited by the American National Standards Institute (ANSI). The two major testing organizations are the National Sanitation Foundation (NSF International) and Underwriter's Laboratory (UL). These organizations provide independent quality control oversight to the producers of drinking water treatment chemicals.

Removal of Particulate Matter (Coagulation/Flocculation/Sedimentation)

Due to supply issues in the Ferric Chloride market, in FY2021 the District was forced to switch to Ferric Sulfate. Over the past few years the Ferric Chloride market continues to be impacted by instability in the market place. This year staff decided to bid only Ferric Sulfate, since the Ferric Chloride market has

not softened to the point of affordability. The plants will remain on Ferric Sulfate this year because it works well and remains more cost effective.

All surface waters contain naturally-occurring suspended and dissolved matter such as clays, decayed organic matter, metal oxides, and minerals like silica. These particles are too small to be removed by gravity settling alone, partly due to the negative charge of the particles which helps keep them in suspension. The District adds a coagulant, ferric sulfate, which acts to disrupt the natural particle charge so that dissolved matter comes out of solution to form particles and these particles and as well as suspended solids are attracted to each other to form larger particles. Flocculation is the process of applying mixing energy to the water containing the small particles to promote particles coming into contact with each other thereby enabling the formation of larger particle groups (called flocs). The floc particle groups are heavy enough to settle and be removed through sedimentation from the drinking water. Each of these processes (coagulation, flocculation and sedimentation) takes place in the large circular clarifiers at District treatment plants.

Ferric sulfate also enables the District to continue meeting the stringent regulations limiting total organic carbon (TOC), a surrogate parameter for the precursors of disinfection by-products. The use of ferric sulfate has significantly reduced TOC and lowered disinfection by-products in treated water and puts the District in good position to continue to meet regulations and reduce health concerns about disinfection by-products. As an added benefit, ferric sulfate is less sensitive to changes in raw water conditions typically encountered when changing supply from one reservoir to another.

Polymers

To further control particle charge, and thereby improve the removal of particulates and filtration processes, polymers or polyelectrolytes may be added. Polymers are high molecular weight, long-chained organic compounds. Polymers that create a positive charge are referred to as cationic polymers, and those polymers that create a negative charge are referred to as anionic, and a third variety that provides an overall neutral charge are referred to as nonionic. Polymers added to enhance coagulation are referred to as a *coagulant aid* while those added to enhance filtration are called a *filter aid*.

Destruction of Disease Causing Organisms (Disinfectants)

Chlorine in the form of sodium hypochlorite (bleach) is used to inactivate disease causing bacteria, viruses, and, to some extent, protozoa. The District uses two forms of chlorine: free and combined.

Free chlorine is used as the primary disinfectant; with appropriate doses and contact time this strong disinfectant virtually eliminates the risk from bacteria, viruses, and most protozoa. The use of chlorine in water treatment is largely responsible for the near-elimination of waterborne disease in the U.S. However, free chlorine has some drawbacks such as limited ability to penetrate the thick walls of the *Cryptosporidium* oocyst, which can cause gastrointestinal illness, has little effect on biofilm in the distribution system, creates disinfection by-products with regulatory limits and health concerns by reaction with naturally occurring matter in the water, has poor persistence, and imparts a chlorinous taste and smell to drinking water.

Combined chlorine or chloramine (chlorine combined with ammonia) is too slow-acting to use as a primary disinfectant but is an excellent secondary disinfectant. Chloramine doesn't create THMs or other chlorine by-products, has excellent persistence and ability to penetrate biofilm, and does not

have a chlorinous taste or smell. Recent research has indicated that chloramine following chlorine disinfection can achieve significant inactivation of *Cryptosporidium.*

Free chlorine is used within the treatment plant where its strength and kinetic advantage is needed. Once primary disinfection has been achieved, the free chlorine is converted to chloramine before the water leaves the plant to provide a long-lasting disinfectant residual providing bacterial protection throughout the distribution system and results in better tasting water.

Corrosion Control (Caustic Soda & Zinc Orthophosphate)

This year, staff was able to find Zinc Orthophosphate suppliers willing to commit to an annual contract. The current FY2025 price is $1,536.67/wet ton. This represents a 35% decrease from last year's annual contract unit cost. Corrosion control is important in maintaining the longevity of the District's pipe network as well as consumer household piping and helps to maintain compliance with lead and copper water quality regulations. The District uses two chemicals to provide corrosion control to the water: pH adjustment using caustic soda (sodium hydroxide) and zinc orthophosphate. The two chemicals have a synergistic effect that protects both the customers' and the District's piping without the scale build-up of other techniques. Corrosion control also minimizes the lead and copper that can leach from customers' soldered copper piping and brass faucets. The District has one of the lowest lead/copper corrosion rates in the Bay Area as measured by first-draw testing at customers' faucets. New and existing plumbing components still contain small amounts of lead, therefore the District's corrosion control program is critical to minimizing the amount of lead in drinking water.

Fluoride

Fluoride in the form of hydrofluosilicic acid is added to boost the naturally-occurring fluoride level (0.1 mg/L) to the optimum level for cavity prevention (0.7 mg/L). Fluoride addition was implemented following the passage of a voter initiative in 1972, which was reconfirmed by the District's voters in 1978. In California, legislation was enacted in 1995 which requires fluoridation after 1997 for all public water agencies serving populations over 10,000 if there is an external source of funding.

ENVIRONMENTAL REVIEW: Not applicable.

FISCAL IMPACT: The purchase of water treatment chemicals is essential to the production of safe drinking water and the cost of water treatment chemicals is included in the budget for FY 2025.

ATTACHMENT(S): None.

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Operations	Darren Machado	Ben Horenstein
	Darren Machado **Operations Director**	**Ben Horenstein** **General Manager**