



City of Palo Alto

City Council Staff Report

(ID # 9367)

Report Type: Consent Calendar

Meeting Date: 8/13/2018

Summary Title: Wastewater Treatment Plant Alkalinity Chemical Blanket Purchase Order

Title: Approval of a Blanket Purchase Order With Hill Brothers Chemical Company for a One-year Period in an Amount Not-to-Exceed \$464,405 for Bulk Magnesium Hydroxide Slurry for the Regional Water Quality Control Plant, With the Option to Renew for two Additional One-year Periods Not-to-Exceed \$464,405 per Year Subject to Consumer Price Index (CPI) Increases

From: City Manager

Lead Department: Public Works

Recommendation

Staff recommends that Council:

1. Approve and authorize the City Manager or his designee to approve a blanket purchase order (BPO) with Hill Brothers Chemical Company (Hill Brothers) for a period of one year not to exceed \$464,405 for bulk magnesium hydroxide slurry delivered and off-loading at the Regional Water Quality Control Plant; and
2. Authorize the City Manager or his designee to exercise up to two (2) one-year options to renew the BPO with funding not to exceed \$464,405 in each of the option years as increased by the local Consumer Price Index.

Background

Due to ammonia concentration increase in incoming sewage at the Palo Alto Regional Water Quality Control Plant ("Plant"), magnesium hydroxide ($Mg(OH)_2$) must be added as a form of additional alkalinity to consistently meet discharge permit requirements. Without this alkalinity chemical addition, violations of pH and ammonia limits would be expected. These violations would result in mandatory fines and state regulatory action against the City.

The Plant discharges treated wastewater to San Francisco Bay. The discharge is regulated through a discharge permit issued by the California Regional Water Quality Control Board, the principal regulatory agency. Although a gradual increase in the Plant's incoming wastewater strength has been occurring over decades, the more rigorous water conservation efforts in recent years have resulted in more rapid increases. Due to the lower flow and increased sewage strength, the Plant must augment the treatment process with an alkalinity chemical to consistently meet permit limits.

The Plant oxidizes ammonia, resulting in the production of nitric acid. The creation of nitric acid reduces the pH of the Plant's effluent and impacts the effectiveness of ammonia oxidation. In the past, the influent sewage contained enough buffering capacity to counteract the nitric acid. Unfortunately, due to the increase in sewage strength and decrease in influent flows, the buffering capacity is not great enough to counteract the acid production. This has resulted in pH levels below the Plant's permit limit of a minimum pH of 6.5. These violations occurred once in November 2014 and again in December 2014. The City received a Cease and Desist Order (Attachment A) from the RWQCB on February 11, 2015. As a result of the pH violations, City staff studied various changes to the treatment process and found adding $Mg(OH)_2$ to be the most effective and cost efficient option. $Mg(OH)_2$ has been added to supplement alkalinity since 2014. Consequently, the City is in compliance with all requirements of the Cease and Desist Order, meeting all pH limits with no violations.

Staff consulted with industry experts, chemical suppliers and technical experts regarding alternative chemical treatment methods. $Mg(OH)_2$ is the most safe and cost effective product available at this time. Additionally, $Mg(OH)_2$ has no negative impacts on the recycled water produced at the Plant. Since the original system was installed, staff reviewed alternative chemical addition methods. Staff found that calcium hydroxide slurry, $Ca(OH)_2$, would also be effective. However, more of the $Ca(OH)_2$ slurry is required based on stoichiometric differences with $Mg(OH)_2$.

Council approved a BPO with Hill Brothers for $Mg(OH)_2$ on November 30, 2015 (see SR [ID # 6183](#)). A pricing comparison of the prior BPO (FY2016 to FY2018) to this proposed BPO is shown below:

- FY2016 - \$2.55 / gallon
- FY2017 - \$2.63 / gallon
- FY2018 - \$2.71 / gallon
- FY2019 - \$2.84 / gallon (NEW)

Due to the ongoing need for alkalinity chemical, a BPO for alkalinity chemical is still needed. Staff anticipates that the need for chemical addition will continue even in the absence of a drought, given the higher concentration of ammonia in plant influent due to water conservation.

Discussion

A Request for Quotation (RFQ) for the purchase of bulk Ca(OH) and/or Mg(OH)₂ slurry was issued on May 22, 2018. The solicitation was sent to seven vendors. Three responses were received. These bids are included in Attachment B. The responsive bidder quoted a unit price of \$2.84 per gallon of Mg(OH)₂ for bulk deliveries (about 4,000 gallons). This unit price was based on an estimated annual usage quantity of 111,000 gallons of Mg(OH)₂. During the term of the BPO, an annual usage of 150,000 gallons of Mg(OH)₂ may be needed in a drought, especially with more use in late dry season and less in wet season. Increased use in a drought does not have any impact on the unit price. Per the RFQ specifications, the quantities stated in the RFQ and BPO are approximate and may be increased or decreased to conform to the needs of the Plant.

Based on the RFQ, the price for the first year of the BPO is fixed. If needed, the Plant has the option to extend the purchase order at an increase per unit for two 12-month periods pursuant to the Consumer Price Index for Urban Wage Earners and Clerical Workers in the San Francisco-Oakland-San Jose, CA area (typically about 2.75%). The alkalinity chemical purchased under this BPO will help the Plant comply with regulatory limits.

Summary of Request for Quotation Process

Proposal Name/Number	Request for Quotation (RFQ172042) Alkalinity Chemical
Proposed Length of Blanket Purchase Order	One year with two one-year options to renew for a total of 3 years if both options are used

Number of Bidders Contacted	7
Total Days to Respond to RFQ	14
Pre-Quotation Meeting	No
Number of Quotations Received	3
Quotation Price Range (9.25% sales tax) <ul style="list-style-type: none"> • Low: 110,000 gallons of Mg(OH)₂ • High: 212,118 gallons of Ca(OH) 	Low: \$2.84 per gallon (\$341,297.00) High: \$2.10 per gallon (\$486,651.72)

It takes about twice as much Ca(OH) as Mg(OH)₂ to provide the same amount of alkalinity for the process reactions. When this ratio is taken into account, the contract cost for the amount of Mg(OH)₂ needed is lower, despite its higher cost per gallon. Staff reviewed the quotations submitted on June 4, 2018. Based on the total cost of Hill Brothers being lower (i.e., \$341,297.00 vs. \$486,651.72), the quotation evaluation resulted in the selection of Hill Brothers. Hill Brothers has a record of reliable performance with the plant, having supplied Mg(OH)₂ since 2014.

Resource Impact

Funds for the first year of the contract have been appropriated in the FY 2019 Wastewater Treatment Enterprise Fund under supplies and materials in the operations cost center. Funds for contract years two and three are contingent upon Council approval of the budget for each subsequent year.

Budget estimates for chemical addition in a regular year are about \$341,000 per year; however, given the potential severity of a future drought during the term of the BPO and the increased concentration of ammonia in the influent, the Wastewater Treatment Fund may require a budget amendment in later years to ensure adequate funds are available to fund the difference between the budget and the annual BPO approved amount of \$464,405. The department would return to Council if a budget amendment is needed in the future.

Policy Implications

Authorization of this project does not represent a change in existing City policies.

Environmental Review

The recommended action is exempt from review under the California Environmental Quality Act pursuant to CEQA Guidelines Section 15301 (b), which

includes operation of publicly-owned wastewater facilities involving negligible or no expansion.

Attachments:

- Attachment A - Cease and Desist Order
- Attachment B - Bids Results and Summary

**California Regional Water Quality Control Board
San Francisco Bay Region**

**Cease and Desist Order No. R2-2015-0011
City of Palo Alto
Palo Alto Regional Water Quality Control Plant
Palo Alto, Santa Clara County**

WHEREAS the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds that:

Background

1. The City of Palo Alto (Discharger) owns and operates the Palo Alto Regional Water Quality Control Plant located at 2501 Embarcadero Way, Palo Alto. The plant treats domestic, commercial, and industrial wastewater from the East Palo Alto Sanitary District, Stanford University, and the cities of Palo Alto, Mountain View, Los Altos, and Los Altos Hills. It has a dry weather design capacity of 39 million gallons per day (MGD).
2. Plant treatment processes consist of screening, grit removal, primary sedimentation, and two-stage secondary treatment with fixed film reactors and activated sludge aeration basins, followed by clarifiers, dual-media filtration, and ultraviolet disinfection.
3. On June 11, 2014, the Regional Water Board adopted Order No. R2-2014-0024, which reissued NPDES Permit No. CA0037834 (Permit) that regulates plant discharges to South San Francisco Bay and Matadero Creek.
4. The Permit authorizes discharges subject to certain effluent limitations and other requirements, including limitations on ammonia and pH, among other parameters.
5. Nitrification to remove ammonia occurs in the activated sludge aeration basins and is necessary for the Discharger to comply with the Permit's ammonia effluent limitations. Nitrification also serves as a basis to justify the Discharger's exception to Basin Plan Discharge Prohibition 1 (Basin Plan Table 4-1), which is necessary if the plant is to continue discharging to the shallow waters of South San Francisco Bay and Matadero Creek.
6. Influent ammonia concentrations and total ammonia loads arriving at the plant have increased. From 2005 to 2014, influent ammonia concentrations have increased 58 percent, from 24 to 38 mg/L, and influent ammonia loads have increased by 17 percent, from 2,300 to 2,700 kg/day. From 2009 through 2014, ammonia concentrations increased in all trunklines. Correlated data suggest that the ammonia increases can be attributed to a combination of increased water conservation, population growth, and increase in employment in the service area (*Trunkline Ammonia Evaluation and Impact on Treatment Plant Process, 2009-2014*, December 8, 2014).
7. Nitrifying micro-organisms in the activated sludge aeration basins produce nitric acid as a byproduct of nitrification. This acid lowers aeration basin pH and, consequently, the final

effluent pH. As influent ammonia concentrations and loads have increased, the pH of the final effluent has decreased.

Purpose of this Order

8. A discharge is taking place or threatening to take place in violation of the Permit's pH effluent limitations; therefore, this Order requires the Discharger to take specific actions to comply with the Permit.
9. The Permit contains an instantaneous minimum pH effluent limitation of 6.5 and an instantaneous maximum pH effluent limitation of 8.5.
10. On both November 30 and December 1, 2014, the Discharger reported that the effluent pH was 6.4, twice violating the minimum effluent limitation of 6.5.
11. During the 365 days from January 1 through December 31, 2014, the effluent pH equaled the instantaneous minimum effluent limitation of 6.5 56 times (15 percent of the time). The number of recent violations and near-violations suggests a worsening trend. In November 2014, the pH equaled or was less than the minimum effluent limitation more than 50 percent of the time. Future pH effluent limitation violations appear likely.

Cease and Desist Order Authority

12. Water Code section 13301 authorizes the Regional Water Board to issue a cease and desist order when it finds that a waste discharge is taking place, or threatening to take place, in violation of Regional Water Board requirements.
13. Pursuant to Water Code section 13385(j)(3), mandatory minimum penalties required by Water Code sections 13385(h) and (i) do not apply when a discharger complies with a cease and desist order issued on or after July 1, 2000, pursuant to Water Code section 13301 if all of the following conditions are met:
 - a. The cease and desist order specifies actions the discharger must take to correct the violations that would otherwise be subject to mandatory minimum penalties;
 - b. The discharger is unable to consistently comply with the effluent limitations for at least one of the following reasons:
 - i. The limitations are new, more stringent, or modified regulatory requirements, and new or modified control measures cannot be put into operation within 30 calendar days;
 - ii. New methods for detecting or measuring a pollutant demonstrate that new or modified control measures are necessary and cannot be put into operation within 30 calendar days;
 - iii. Unanticipated changes in the quality of the water supply available to the discharger cause unavoidable changes in the composition of the waste discharge, the changes in the composition of the waste discharge cause the inability to comply with the limitations, no alternative water supply is reasonably available, and new or modified

measures to control the composition of the discharge cannot be designed, installed, and put into operation within 30 calendar days; or

- iv.** The discharger is a publicly-owned treatment works located in Orange County that meets certain requirements;
 - c.** The Regional Water Board establishes a time schedule of no more than five years for bringing the discharge into compliance (The time schedule must be as short as possible, taking into account the technological, operational, and economic factors that affect the design, development, and implementation of the control measures necessary to comply with the effluent limitations. If the time schedule exceeds one year, it must include interim requirements and the dates for their achievement. The interim requirements must include effluent limitations for the pollutants of concern and actions and milestones leading to compliance with the limitations.); and
 - d.** The discharger is required to prepare and implement a pollution prevention plan pursuant to Water Code section 13263.3.
- 14.** Provided that this Order is complied with, Water Code section 13385(j)(3) criteria for mandatory minimum penalties are met as follows:
- a.** This Order establishes tasks and time schedules for the Discharger to complete necessary investigative, preventive, and remedial actions to address its imminent and threatened violations.
 - b.** The Discharger cannot consistently comply with the pH effluent limitations due to unanticipated and unavoidable changes in influent quality. Providing an alternate water supply is infeasible and would not affect ammonia loads. New or modified measures to control the effluent pH cannot be designed, installed, and put into operation within 30 calendar days.
 - c.** The time schedule in this Order is as short as possible, accounting for uncertainty in how quickly measures necessary to achieve compliance can be implemented. The time schedule is based on reasonably expected times needed to test, select, and implement plant improvements. The Regional Water Board may revisit these assumptions as more information becomes available.

The time schedule exceeds one year but provides less than five years to achieve compliance. This Order requires the Discharger to comply with interim requirements by specified dates and includes an interim effluent limitation to ensure that the Discharger maintains at least its existing performance while completing required tasks.

- d.** The Discharger has prepared and currently implements a pollution prevention plan in accordance with Permit requirements. The plan contains the elements listed in Water Code section 13263.3(d)(3). This Order requires continued implementation of the existing pollution prevention plan.

15. This Order is an enforcement action and, as such, is exempt from the provisions of the California Environmental Quality Act (Pub. Res. Code § 21000 *et seq.*) in accordance with California Code of Regulations title 14, section 15321.
16. The Regional Water Board has notified the Discharger and interested persons of its intent to consider adoption of this Order and provided an opportunity to submit written comments and appear at a public hearing. The Regional Water Board, in a public hearing, heard and considered all comments.

IT IS HEREBY ORDERED, in accordance with Water Code section 13301, that the Discharger shall cease and desist from discharging and threatening to discharge wastes in violation of the Permit (Order No. R2-2014-0024) and comply with the following provisions:

1. **Interim Effluent Limitation and Requirements.** The Discharger shall comply with the following interim effluent limitation and requirements:
 - a. The Discharger shall comply with an interim instantaneous minimum pH effluent limitation of 6.0. Compliance shall be measured at Monitoring Location EFF-001 as described in Permit Attachment E.
 - b. The Discharger shall complete the prescribed actions listed in Table 1, below, in accordance with the time schedule provided therein to achieve compliance with Permit requirements. The Discharger shall revise deliverables to incorporate any comments the Executive Officer may make to ensure that the deliverables are adequate and acceptably comply with the requirements of this Order. The Discharger shall implement all actions set forth for each deliverable.
 - c. The Discharger shall continue to implement the pollution prevention plan as required by Permit section VI.C.3.

**Table 1
Time Schedule and Prescribed Actions**

Task	Compliance Date
a. Submit pH Control Plan: Submit a plan for controlling pH and complying with the pH effluent limitation of the Permit using chemical addition through a chemical delivery system, or using alternate means, and report on performance efforts to date.	April 1, 2015
b. Submit Preliminary Engineering Report and Schedule: Develop engineering plans to implement the actions in Task “a” and submit a Preliminary Engineering Report describing them. The Preliminary Engineering Report shall include preliminary design details, cost estimates, and a schedule for each action. The schedule shall include dates for completion and descriptions of at least the following milestones: <ol style="list-style-type: none"> i. Secure funding ii. Complete bench tests, if necessary iii. Complete final design details iv. Commence construction v. Complete construction vi. Complete pilot tests, if necessary vii. Commence full scale operation 	June 1, 2015

Task	Compliance Date
<p>c. Implement Plan and Report on Progress: Implement the plan described in Task “a” in accordance with the report and schedule described in Task “b” and incorporate any changes the Executive Officer may provide. Submit monthly and annual status reports that describe progress and summarize planned changes. Reports shall evaluate whether the Discharger is on track to successfully bring the discharge into compliance with the Permit’s pH effluent limitations. If not, the Discharger shall identify additional measures to further control pH and implement them.</p>	<p>Report with Permit-required self-monitoring reports beginning July 30, 2015</p>
<p>d. Achieve Compliance with pH Effluent Limitations: Submit documentation confirming complete implementation of the plans required by tasks “a” and “b” and achieve full compliance with the pH effluent limitations as established in Permit section IV.A.</p>	<p>April 1, 2017</p>

2. **Consequences of Non-Compliance.** If the Discharger fails to comply with the provisions of this Order, it may be subject to enforcement action(s), including, but not limited to, administrative or judicial civil liability.

3. **Force Majeure.** If the Discharger is delayed, interrupted, or prevented from meeting the provisions and time schedule of this Order due to a force majeure^{*}, the Discharger shall notify the Executive Officer in writing within ten days of the date that the Discharger first knows of the force majeure. The Discharger shall demonstrate that timely compliance with the Order or any affected deadlines will be actually and necessarily delayed and that it has taken measures to avoid or mitigate the delay by exercising all reasonable precautions and efforts, whether before or after the occurrence of the force majeure.

4. **Mandatory Minimum Penalties.** Violations of the Permit instantaneous minimum pH effluent limitation shall not be subject to the mandatory minimum penalties required by Water Code sections 13385(h) and (i) as long as the Discharger complies with the requirements of this Order.

If the Discharger fails to comply with this Order, including, but not limited to, the interim pH effluent limitation, the Discharger shall be subject to mandatory minimum penalties for all Permit pH violations for the entire calendar month during which the non-compliance occurs. If the Discharger returns to full compliance with this Order, Permit pH violations shall again not be subject to mandatory minimum penalties as of the first day of the month following the return to full compliance.

5. **Effective Date.** This Order shall be effective immediately upon Regional Water Board adoption.

* A “force majeure” is an event that could not have been anticipated by and is beyond the control of the Discharger, such as an act of God; earthquake, flood, or other natural disaster (not including the ongoing drought, which is a known condition); civil disturbance; fire or explosion; declared war within the United States; or embargo. “Force majeure” does not include delays caused by funding, contractor performance, equipment delivery and quality, weather, permitting, other construction-related issues, CEQA challenges, initiative litigation, or adverse legislation.

I, Bruce H. Wolfe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on February 11, 2015.

Bruce H. Wolfe
Executive Officer

Attachment B
Bid Results for Alkalinity Chemical (RFQ172042)

Unit Prices

Item Num	Description	Unit of Measure	Quantity	Lhoist North America of Arizona	Univar USA Inc	Hill Brothers Chemical Company
01 - Bid Schedule A	Bulk Magnesium Hydroxide	gallons	110,000	no bid	no bid	\$2.84
01 - Bid Schedule B	Bulk Calcium Hydroxide	gallons	212,218	\$2.10	\$1.96	no bid

Line Totals

Item Num	Description	Unit of Measure	Quantity	Lhoist North America of Arizona	Univar USA Inc	Hill Brothers Chemical Company
01 - Bid Schedule A	Bulk Magnesium Hydroxide	gallons	110,000	no bid	no bid	\$341,297.00
01 - Bid Schedule B	Bulk Calcium Hydroxide	gallons	212,218	\$486,881.15	\$454,422.40	no bid

BID RANK: HIGH MID LOW