STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF DECEMBER 7-8, 2017
Prepared on November 1, 2017

ITEM NUMBER: **11**

SUBJECT: **Approval of Cambria Community Services District's Blending of Surface Impoundment Wastewater with Treated Municipal Effluent per Resolution No. R3-2014-0041, General Waiver for Specific Types of Discharges**

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KEY INFORMATION

Location:	990 San Simeon-Monterey Creek Road, Cambria, San Luis Obispo County
Type of Discharge(s):	Removal of existing liquids from Class II Title 27 Surface Impoundment
Design Capacity:	≈ 20 gallons per minute
Treatment:	Blending with Wastewater Treatment Plant Effluent
Disposal:	Percolation ponds
Reclamation:	None
Existing Orders:	R3-2017-0016 (CDO), R3-2014-0047 (Title 27), 01-100 (WDRs)
Owner/Operator:	Cambria Community Services District
This Action:	Enrollment under Resolution No. R3-2014-0041, *General Waiver for Specific Types of Discharges*

SUMMARY

The Cambria Community Services District (discharger or CCSD) owns and operates the surface impoundment subject to Cease and Desist Order (CDO) No. R3-2017-0016, adopted by the Water Board on July 13, 2017. The CDO required CCSD to submit a workplan for Executive Officer's review within 30 days of the adoption of the CDO. The CCSD stated that it intends to close the impoundment facility by removing all wastes to the satisfaction of the Water Board. Water Board staff concurs impoundment closure in a rapid yet reasonable manner provides the best water quality protection, versus taking several years and multiple rainy seasons to reach closure.

Water Board staff and the CCSD met on multiple occasions to discuss various potential methods of complying with the CDO requirements and about coming to agreement on a workplan for pond closure that would be acceptable to the EO. Water Board staff and the CCSD considered the water quality risks and risk to the environment associated with each practicable potential impoundment waste removal method, including the corresponding timelines to

achieving closure, and agreed on a method of disposal that largely relies on the blending of water drawn from the impoundment's liquid surface with treated effluent from the district's municipal wastewater treatment plant. This blended water will be discharged to the district's wastewater percolation ponds. The methodology includes a monitoring and reporting program designed to ensure that impoundment pollutants contained in the blended effluent are diluted such that they do not violate water quality objectives contained in the Basin Plan and essentially pose no risk to the environment or beneficial uses of the underlying San Simeon Aquifer.

Water Board staff concluded that the most appropriate and expeditious regulatory vehicle for permitting this discharge was Resolution No. R3-2014-0041, *General Waiver for Specific Types of Discharges,* which allows the Executive Officer to tentatively enroll projects not specifically described in the general waiver, contingent upon Water Board approval.

This approach would not be possible if the impoundment had not been inundated with stormwater and its contents greatly diluted, and is not a viable solution to CCSD's long-term brine-disposal dilemma.

Water Board staff recommends that the Central Coast Water Board concur with the Executive Officer's tentative enrollment of the blended discharge of the CCSD's surface impoundment water with treatment plant effluent under Resolution R3-2014-0041, *General Waiver for Specific Types of Discharges*.

DISCUSSION

Background

CCSD operates its emergency water supply (EWS) project to provide drinking water to the community during drought emergencies. The EWS includes a surface impoundment to contain reverse osmosis residual and other wastewaters.

In January and February of 2017, the surface impoundment was inundated with surface water runoff and filled to the point that it violated the facility's 34.2-inch freeboard requirements. Shortly after that event, it was discovered that the areal groundwater level had risen to the point of contacting the impoundment's liner system, in violation of requirements.

On July 13, 2017, the Central Coast Water Board adopted Cease and Desist Order No. R3-2017-0016 requiring the discharger to either close or rehabilitate the surface impoundment. The CCSD did not contest the CDO and stated at the July 13 Water Board hearing that they intended to repurpose the impoundment as a potable water storage pond, taking it out of service as a waste impoundment. The CDO required the discharger to submit a workplan within 30 days of the adoption of the CDO and further stated: "The workplan shall include a timeline for removing all wastes from the surface impoundment at the earliest possible date."

At the July 13 hearing, the Water Board directed the Executive Officer to consider the following language in his review and approval of the workplan:

> "Any workplan approval must be of sufficient detail to ensure that all current permit terms will be met at all times. If the pond continues in operation into the rainy season, the workplan must also incorporate the technical requirements of option 1 listed in the CDO. The third requirement may be satisfied by a demonstration that the liner system has not leaked. The second and fourth requirement may be satisfied through a third party who is approved by

the Executive Officer, determining that the impoundment currently has the capacity to contain, and prevent inundation from, the 1,000 year, 24-hour precipitation event and that the five-foot separation from the bottom of the surface impoundment will be maintained. The workplan shall include a timeline for removing all wastes from the surface impoundment at the earliest possible date, but not to exceed 5 years."

Following the July 13 hearing, Water Board and CCSD staff met and conferred regarding the CCSD's proposed strategy for complying with the CDO. Ultimately, these discussions targeted how to best eliminate long-term water quality risk and resulted in focusing resources towards removing waste from the impoundment in a timeframe that did not span multiple rainy seasons. An initial meeting was held on July 26, 2017, and it was agreed that boron was the primary constituent of concern, with impoundment liquid concentrations on the order of 5 mg/L. The Basin Plan agricultural water quality objective for boron is 0.75 mg/L. Discussions at the July 26 meeting focused almost exclusively on using ion exchange as the method of treatment for impoundment water and discharging the treated water to the discharger's nearby percolation ponds.

On August 14, 2017, the CCSD submitted an initial impoundment basin closure plan, which evaluated various options for removing liquid from the surface impoundment, including:

1) Allowing water to evaporate
2) Piping the contents of the impoundment to the wastewater treatment plant by reversing effluent flow from the percolation ponds back to the wastewater treatment plant
3) Trucking the impoundment contents to an off-site disposal destination
4) Treating impoundment water by ion exchange and discharging it to the wastewater treatment plant percolation ponds

Options specifically not evaluated in the closure plan but contemplated were:

1) Using the emergency water supply system to treat the impoundment water (the system is not designed to remove boron)
2) Pumping the contents to the nearby State Park wastewater pump station (would require temporary easements deemed unlikely based on past requests)
3) Keeping the impoundment in service (would require significant work and would not allow conversion to raw water storage).

The closure plan initially submitted stated that CCSD's preferred option was to allow the water to evaporate, and that this was "the only option within CCSD's financial capability."

Water Board staff replied to the August 14 closure plan on August 21 (Attachment 2) with a letter stating that the plan was unacceptable because it did not support its assumptions, evaluations, or conclusions and therefore did not assure the Water Board that the CCSD was complying with the CDO. The August 21 reply to the CCSD also stated that the CCSD must submit a workplan that addressed the requirements contained in the CDO and the language agreed to by all parties at the July 13, 2017 Water Board meeting.

On August 24, 2017, the CCSD submitted a CDO status report which stated that "it would be an extreme cost burden to empty the pond by various means prior to the start of this upcoming rainy season." The August 24 status report also included a hydrogeologic evaluation of the area around CCSD's surface impoundment, authored by Cleath-Harris Geologists, Inc. The evaluation stated in its conclusion: "The groundwater level rises during extended periods of

rainfall and stream flow to a level that is within 5 feet of the bottom of the surface water impoundment basin."

Water Board and CCSD staff met again on August 31, 2017, and September 14, 2017, to discuss acceptable approaches for CDO compliance. It was at these two meetings that the approach of blending of impoundment water liquid with wastewater treatment plant effluent was conceived and agreed upon. This strategy was conceived to satisfy the goal of expeditious closure of the impoundment, and thereby minimize risk of further operational failures by limiting the number of rainy seasons/months the impoundment remains open.

CCSD submitted a revised impoundment basin closure plan on September 28, 2017, which proposed blending impoundment liquids with treatment plant effluent as a means of disposal, with the last "one or two feet of pond water, precipitated solids and concentrated slurry…removed by trucking to a landfill or other suitably licensed and permitted facility."

The revised closure plan presented two potential scenarios: blending impoundment water with wastewater treatment plant effluent five days per week or blending seven days per week. The five-days-per-week scenario would result in the impoundment's being closed in October 2018, and the seven-day scenario would result in the impoundment's closure in August 2018.

Water Board staff replied with comments regarding the September 28 plan on October 5, 2017 (Attachment 3). The comments requested a number of clarifications, corrections, revisions, and changes to the plan.

CCSD submitted the next iteration of the closure plan on October 19, 2017, which addressed Water Board staff's comments and committed CCSD to conduct blending operations seven days per week until pollutant concentrations become sufficiently high that blending is no longer practicable or feasible. When concentrations become too great, CCSD will commence trucking the remaining liquids and solids to a landfill or other suitably licensed and permitted treatment or disposal facility.

Impoundment Water Quality

The surface impoundment was originally constructed to sequester brackish reverse osmosis reject water and the various cleaning and membrane preservative solutions used at the EWS project. Surface impoundment monitoring shows boron as the constituent with the largest percentage exceedance of its acceptable concentration. Table 1 displays constituent concentrations in the impoundment both before and after the early 2017 flooding event.

Table 1 – Surface Impoundment Constituent Concentrations - Pre and Post flooding

MCL	250	500	500	10	1	750	1.3	50	69
	Chloride	**Sulfate**	**TDS**	**Arsenic**	**Barium**	**Boron**	**Copper**	**Selenium**	**Sodium**
	mg/L[1]	mg/L	mg/L	µg/L[2]	mg/L	µg/L	mg/L	µg/L	mg/L
3/24/15	290	870	2,400	5.3	.52	250	7.8	27	210
2/11/16	430	1,300	3,500	14	0.21	20,000	5.5	45	360
9/8/16	1,300	3,900	8,300	33	0.2	74,000	30	150	1,200
% of MCL	5,500%	520%	780%	330%	20%	**9,867%**	2,308%	300%	1,739%
Flooding									
2/13/17	110	330	898	2	0.11	4,000	0.0036	7.9	88
3/16/17	120	360	910	2.4	0.09	4,400	ND	15	95
3/17/17	120	370	880	2.58	0.10	4,775	-	15.75	96.8

MCL	250	500	500	10	1	750	1.3	50	69
	Chloride	**Sulfate**	**TDS**	**Arsenic**	**Barium**	**Boron**	**Copper**	**Selenium**	**Sodium**
% of MCL	48%	72%	182%	24%	9%	**587%**	0%	30%	138%

[1] milligrams per liter (parts per million)
[2] micrograms per liter (parts per billion)

Wastewater Treatment Plant Effluent Quality

The data in Table 2 were excerpted from CCSD's 2016 and 2017 WWTP reports.

Table 2 – Wastewater Treatment Plant Effluent Quality (mg/L)

	TDS	**Sodium**	**Chloride**
January 2016	2310	494	32
April 2016	1180	270	21
July 2016	870	153	28
October 2016	860	126	157
January 2017	570	98	-
April 2017	740	163	-
July 2017	1050	187	-
Average	1083	213	60

Note: Cambria WWTP is not required to monitor effluent for boron or other Title 27 constituents of concern.

Table 3 – Recent Municipal Effluent Data (mg/L)

	TDS	**Arsenic**	**Barium**	**Boron**	**Selenium**	**Sulfate**
September 2017	920					
October 2017		ND	0.06595	0.4	ND	96.9

Note: October 2017 extra constituents monitored at the request of Water Board staff

Groundwater Quality

Table 4 – August 2017 Groundwater Monitoring Results (mg/L)

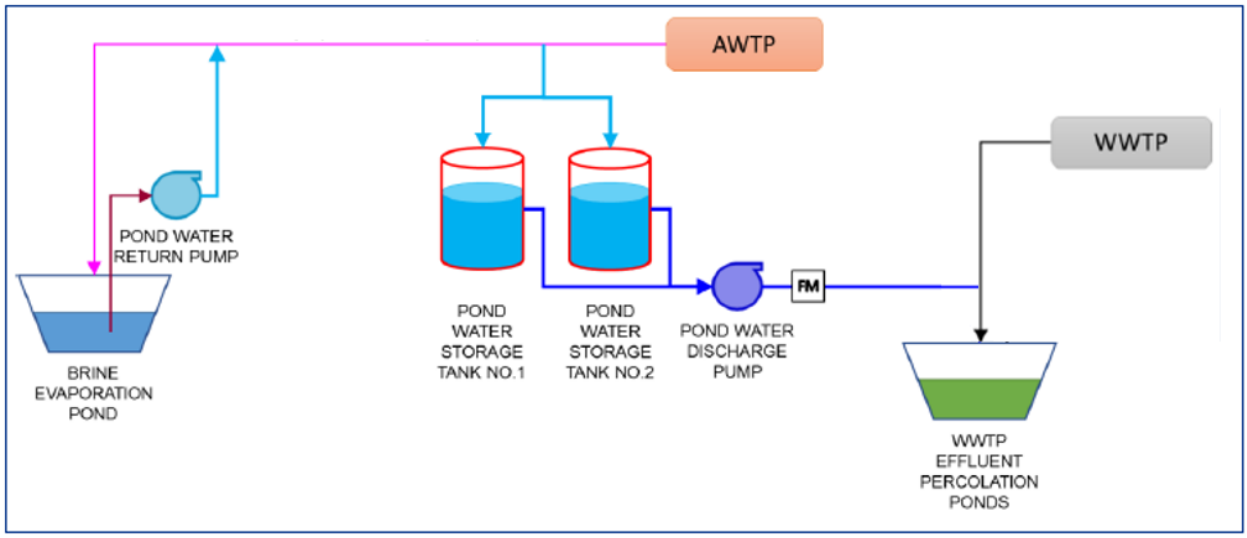
Well	**RIW-1**	**MIW-1**	**SS-3**	**9P7**	**MW4**	**16D1**
TDS	350	360	360	360	640	640
Sodium	20	20	20	22	95	130
Chloride	17	18	17	22	74	89
Nitrate – N	0.3	0.32	0.35	0.36	0.25	0.31
Boron	0.21	0.22	0.22	0.21	0.27	0.32
Arsenic (μg/L)	ND	ND	ND	ND	0.12J	ND
Barium	0.15	0.13	0.12	0.13	0.24	0.14
Copper	ND	ND	ND	ND	0.0028J	0.0038J
Selenium (μg/L)	0.95	3.1	ND	11	24	1.4

J = lab estimated value

Blending Operations

CCSD will blend surface impoundment liquid with wastewater treatment plant effluent before discharging the blend into the percolation ponds. (see Figure 1) .

Figure 1 – Process Flow Diagram



The blending will occur as a batch process with impoundment water pumped to two new 16,000- to 18,000-gallon tanks, to be installed next to the EWS facility. Water in each tank will be tested for its boron concentration, and an acceptable flow will be calculated according to the equation shown in Figure 2. The value of the *Boron Loading Rate* in the Figure 2 equation is the lbs/day contribution from pond water only.

Figure 2 – Boron Load Rate Equation

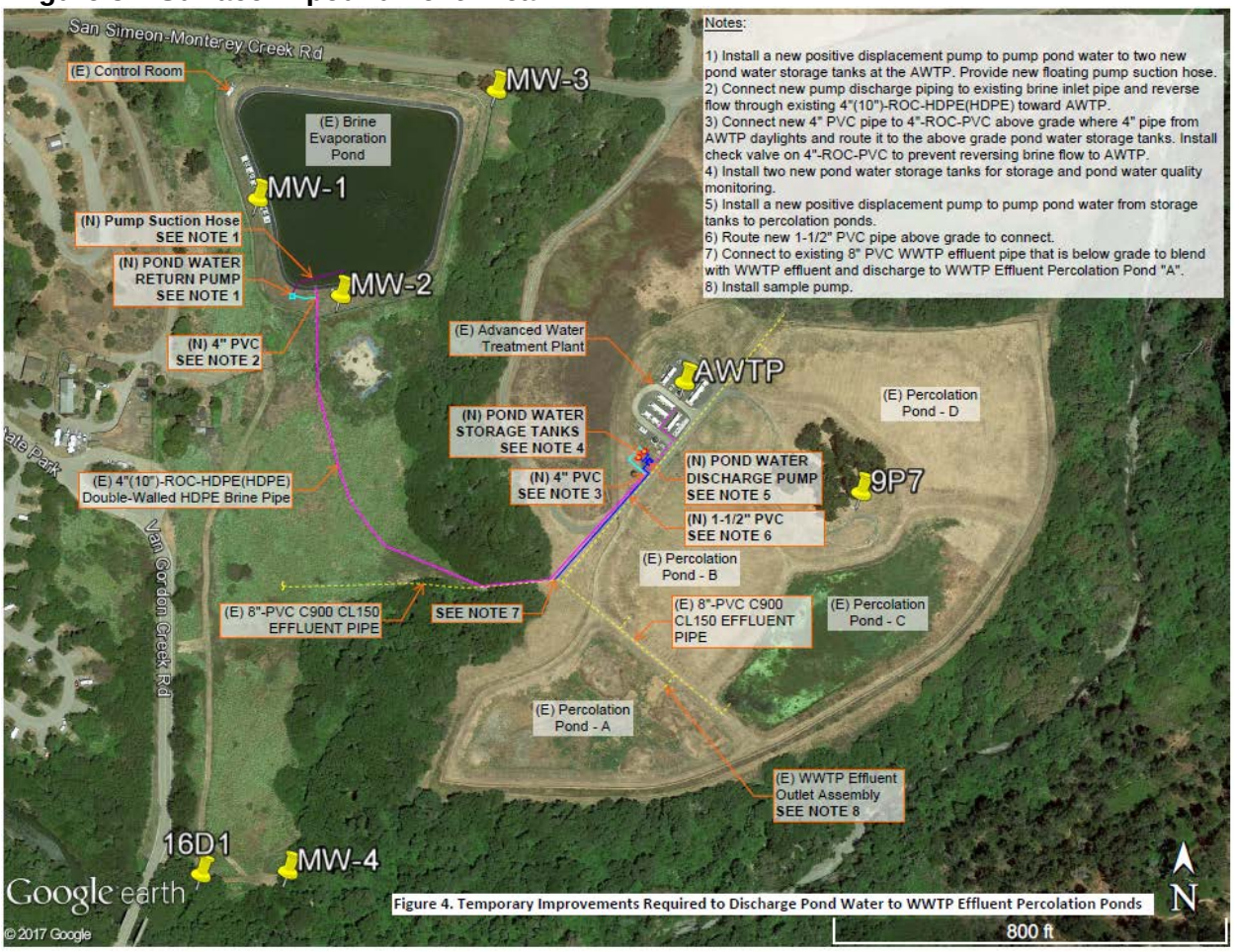
$$Pond\ Water\ Flow\ (gpm) = \frac{Boron\ Loading\ Rate\left(\frac{lbs}{day}\right) * 453600\ (\frac{mg}{lbs})}{Pond\ Water\ Boron\ \left(\frac{mg}{L}\right) * 3.785\ \left(\frac{L}{gal}\right) * 1440\ (\frac{min}{day})}$$

The CCSD will use a spectrophotometer to provide on-site analysis of boron from each batch prior to discharge as well as a check of the boron concentration in the blended effluent with each batch. Sulfate concentrations in the blended effluent will be analyzed using the onsite instrument on a monthly basis.

If the boron concentration exceeds 0.75 mg/L in the blended effluent, blending operations will immediately cease and the pond water flow rate will be adjusted so as to result in an acceptable blended boron concentration. Retesting of the blended water will occur, and flow adjustments will be continued until the blended water does not exceed 0.75 mg/L of boron.

Figure 3 show where impoundment liquid will be injected into the wastewater treatment plant effluent line, prior to discharge into the percolation pond (see note 7 in Figure 3).

Figure 3 – Surface Impoundment Area



Blended Effluent Water Quality (mg/L)

Table 5 – Blended Water Quality *(assuming pond boron concentration 5 mg/L)*

Constituent	Pond Water Quality	Average WWTP Effluent Quality	Blended Water Quality at 1:13.5 Ratio	MCL	% of MCL	% Increase or Decrease
Pond Water Flow, gpm			20			
WWTP Effluent Flow, gpm			270			
Boron, mg/L	5	0.4	0.745	0.75[1]	99%	86.3%
Sulfate, mg/L	370	96.9	117	500[2]	23%	20.6%
TDS , mg/L	880	1,108	1091	500[2]	218%	-1.5%
Chloride, mg/L	120	60	64	250[2]	26%	6.7%
Arsenic, mg/L	0.00258	ND	0.00019	0.01[3]	2%	-
Barium, mg/L	0.10	0.06595	0.0685	1[3]	7%	3.9%
Selenium, mg/L	0.01575	ND	0.00117	0.05[3]	2%	-
Sodium, mg/L	96.8	213	204.4	69[1]	296%	-4.0%

[1] Basin Plan Ag water quality objective
[2] Secondary MCL
[3] Primary MCL

The anticipated blending ratio of 1:13.5 equates to approximately 20 gpm of impoundment water to 270 gpm of treatment effluent, which will attain a boron concentration of less than or equal to the 0.75 mg/L maximum concentration. As stated previously, the 1:13.5 ratio improves treatment plant effluent quality for sodium and TDS. The sodium concentration will be decreased approximately 4% and the TDS decrease is approximately 1.5%. Other constituent concentrations will increase slightly with sulfate increasing to 23% of its secondary MCL.

The blending ratio may vary considerably over the course of the project depending upon the amount of rainfall received and seasonal evaporation rates.

Threat to Water Quality and the Environment

To approve this project's enrollment under the general waiver, the Board must concur that the proposed discharge complies with all general waiver conditions and will not impair beneficial uses of underlying groundwater or cause an exceedance of water quality objectives. It is important to remember that the discharge of impoundment liquid and WWTP effluent is temporary and, based on CCSD's schedule, will be completed by fall of 2018.

There are six constituents present in the impoundment liquids that will result in an increase of their respective concentrations in blended treatment plan effluent. These constituents are boron, sulfate, chloride, arsenic, barium, and selenium. TDS and sodium will see effluent concentrations decreased in the blended treatment plant effluent.

Boron
Water Board staff conducted a literature search regarding the threat boron poses to human life, aquatic life, and plant life. Staff concludes that the Basin Plan's limit of 0.75 mg/L is both protective and appropriate in this setting.

Sulfate
Sulfate has a secondary maximum contaminant limit (MCL) of 500 mg/L and is projected to have a concentration in the blended wastewater of approximately 117 mg/L, which is 23% of the secondary MCL. At this concentration sulfate will have no discernable impact upon groundwater quality or the environment.

Total Dissolved Solids
Total dissolved solids increases in groundwater are a problem throughout parts of the Central Coast region and nationwide. The CCSD's wastewater treatment plant permit has a 30-day mean limit on TDS of 1,000 mg/L and a daily instantaneous maximum limit of 1,500 mg/L. The blended concentration of TDS is predicted to decrease average effluent TDS from 1,108 mg/L to 1,091 mg/L, which is a slight improvement in effluent water quality. As noted in Table 2, TDS concentrations vary considerably in the treated effluent over the year, but the blending project is expected in improve this aspect of water quality on average.

Chloride
Chloride concentrations are projected to increase to approximately 26% of its MCL and will have no discernable impact upon groundwater quality or the environment.

Arsenic
As shown in Table 1, arsenic concentrations in the surface impoundment were diluted significantly during last year's flooding and the blended concentration is projected to be approximately 2% of the MCL. This concentration of arsenic will have no discernable impact upon groundwater quality or the environment.

Barium
Barium is projected to have a slight increase in concentration and is projected to be just 3% of its MCL in the blended effluent. This slight increase will have no discernable impact upon groundwater quality or the environment.

Selenium
Selenium concentrations in the blended effluent are projected to be around 2% of this constituent's MCL and will have no discernable impact upon groundwater quality or the environment.

Sodium
Sodium concentrations in CCSD's treated effluent are consistently high and the blending of liquid from the surface impoundment is projected to slightly improve discharge water quality by approximately 4%.

MONITORING

Monitoring impoundment water on a batch-by-batch basis is important, as constituent levels could rise as the impoundment liquid level decreases, and the blending ratio may need to be adjusted to ensure the 0.75 mg/L maximum for boron is maintained. Monitoring will also occur at the point of discharge to verify the calculated blending ratio is sufficient to achieve the 0.75 mg/L requirement for boron.

CONCLUSION

Blending liquids from the CCSD's surface impoundment with effluent from the municipal wastewater treatment plan at the correct ratio qualifies for coverage by the general waiver. The pollutant with the highest percentage concentration of its maximum contaminant limit is boron. Diluting pond water with WWTP effluent down to less than 0.75 mg/L of boron will preclude any threat to the environment and will result in the improvement of TDS and sodium concentrations in the discharge. Other constituents of concern will be far below their respective regulatory thresholds. This approach would not be possible if the impoundment had not been inundated with stormwater and its contents greatly diluted. Using this impoundment water disposal strategy accelerates closure of the impoundment, reducing the long-term threat incurred by its continued operation and known surface water (inundation) and groundwater (lack of adequate groundwater separation) risks. The blending of diluted pond water with WWTP effluent will result in compliance with Cease and Desist Order No. R3-2017-0016 in 2018 in a manner that is protective of the environment and cost effective for the CCSD.

RECOMMENDATION

Water Board staff recommends that the Central Coast Water Board concur with the Executive Officer's tentative enrollment of the blended discharge of the CCSD's surface impoundment water with treatment plant effluent under Resolution R3-2014-0041, *General Waiver for Specific Types of Discharges*.

ATTACHMENTS

1. Resolution No. R3-2014-0041
2. August 21, 2017 Water Board letter
3. October 5, 2017 Water Board letter

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