



MALAGA COUNTY WATER DISTRICT

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29 December 2014

Central Valley Regional Water Quality Control Board
Matt Scroggins, Senior Water Resource Control Engineer
1685 E Street
Fresno, Ca 93706

Review of Disposal Capacity Technical Submittals

Matt,

The attached WWTF Water Balance Report from the District Engineer is submitted to meet the requirements of our meeting on 19 December 2014.

In view of the additional information enclosed, the supplemental information submitted on 19 November 2014, and the original draft permit written response submitted on 27 October 2014, it is requested that the Executive Officer revert the new permit secondary effluent limit of 0.49 mgd back to the original limit of 0.85 mgd.

At this moment, the only pond in service (Pond 6) continues to percolate faster than it is being filled. All other ponds remain empty.

Thank you,

J. D. Anderson



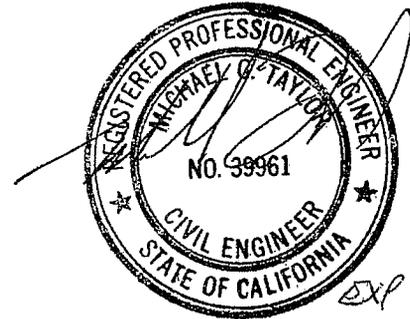
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MEMORANDUM

To: Malaga County Water District, Jim Anderson
From: Michael Taylor
Subject: WWTP Water Balance
Date: December 29, 2014



This memorandum serves as an update to the memorandum dated October 24, 2014. Pursuant to questions presented by the RWQCB on December 19, 2014, this memorandum clarifies and supplements information presented previously.

Percolation Rates:

The District performed monitoring of actual water level changes in Ponds 5, 6, and 7, which were isolated during portions of the months of July through October, 2014. Individual ponds were isolated and the actual decline of water level was monitored until the ponds had no standing water. Information documenting the actual water level changes is included as Attachment 1. The estimated percolation rate in the wastewater disposal ponds is 1.66 inches per day. It is noted that the previous estimated percolation rate (from 2008) was 0.60 inches per day. This updated percolation rate demonstrates a significant improvement in pond percolation rates. This improvement is a direct result of Malaga County Water District commitment during the previous six (6) years to scrape and rip the disposal ponds at the WWTP.

The percolation rates for each pond tested were determined by identifying the total water level change in the pond, determining the pan evaporation rate over the same period of time, converting the pan evaporation rate to the evaporation rate from the pond, and then determining the resulting percolation rate from the pond.

When the percolation rate of 1.66 inches per day is applied to a 100 Year Rainfall Water Balance, the existing ponds at the WWTP may be able to dispose of approximately 1.085 mgd (Attachment 2). When the percolation rate is 1.29 inches per day during a 100 Year Rainfall Water Year, the Water Balance indicates that the disposal capacity is 0.85 mgd (Attachment 3).

The memorandum of October 24, 2014 discussed the gradual decline of percolation rate that is expected in all disposal ponds. However, since the preparation of the October 24, 2014 memorandum, the District has prepared a Standard Operating Procedure (SOP) for Pond Maintenance and Monitoring (Attachment 4). The SOP

states that when the percolation rate of a pond drops to 1.5 inches/day, it would be taken out of service and disked to bring the percolation rate back up. The District has therefore established a procedure to prevent the percolation rate from declining so much as to compromise overall disposal capacity. The water balance provided in October 2014 that was based on the percolation rate declining to 1.24 inches per day (disposal capacity of 0.821 mgd) is therefore mute.

It is recommended that this information is reviewed and forwarded to the RWQCB for consideration in establishing discharge limits for the new Waste Discharge Requirements to be adopted for the facilities. The efforts taken by the District over the past six (6) years has had significant impact in improving the on-site disposal capacity at the site, as evidenced by the recent pond percolation tests.

Also attached with this memorandum is a spreadsheet that allows the District to readily check that the necessary Available Capacity in the disposal ponds is available prior to each winter (Attachment 5). For example, information regarding freeboard in the disposal ponds as of October, 2014 has been entered into the table. The ponds had approximately 34,828,258 gallons of capacity available. The 100 Year Rainfall Water Balance for 0.85 mgd indicates that the District must have at least 5,107,194 gallons of available capacity. The actual available capacity greatly exceeds the minimum requirement. A water balance must balance each year. The water balance uses a theoretical actual utilized capacity of 0 gallons in September to confirm that a balance is established. The value of required available capacity is determined by measuring the actual utilized capacity in the disposal ponds during the month of September and then adding the required capacity established by the water balance. The information may be shown graphically as each month of the water year progresses (Attachment 6).

Based on the information associated with current pond percolation rates, it is recommended that the present discharge flowrate limitation of 0.85 mgd to the disposal ponds is still viable for the Malaga County Water District.

A question was raised as to whether the operating procedure of operating one pond at a time affects the water balance assumptions. It is noted that the water balance is used to determine the maximum disposal capacity of the site in the 100 year condition. During those environmental circumstances, all ponds are likely utilized throughout the year as a means to provide the overall maximum disposal capacity of the site. If the District can keep the number of ponds used to a minimum, the District will actually realize an ability to retain the percolation capacity of the unused ponds since the solids in the effluent, algae, bird droppings, etc. would not contribute to a decline in pond percolation capacity. The District also realizes the benefit of reduced maintenance of weeds, mosquitoes, and erosion. The District retains the ability to put additional ponds to use at any time to take advantage of unused percolation surface area. The use of one pond at a time, when rainfall and wastewater flows are less than the maximum, does not adversely impact the assumptions of the water balance for the worst case scenario.

The RWQCB recommended that the District prepare a pond maintenance log. It is understood that the District has prepared a pond maintenance log that could be routed to the RWQCB for review.

Attachment 1	Actual Water Level changes in Ponds 5, 6, and 7
Attachment 2	Water Balance with percolation rate of 1.66 inches/d
Attachment 3	Water Balance with percolation rate of 1.29 inches/d
Attachment 4	SOP for Pond Maintenance and Monitoring
Attachment 5	Available Capacity Spreadsheet
Attachment 6	Graphical Representation of Available Capacity

Please contact me if you need additional information or if you have any questions.

Thank you.

ATTACHMENT 1

MCWD

Percolation/Evaporation Pond #5

<u>Date</u>	<u>P&E</u>
10/14/2014	Start
10/22/2014	15 inches

Total: 15 inches
8 days

Average evaporation rate from 10/14 to 10/22
8 days in October 1.141

Total Pan Evaporation	1.14 in
Adjustment for Open Water Surface	0.80
Total Evaporation	0.91
Total Percolation	14.09 in
Average Percolation Rate	1.761 in/day

MCWD

Percolation/Evaporation Pond #6

<u>Date</u>	<u>P&E</u>
10/1/2014	Start
10/22/2014	34 inches

Total: 34 inches
21 days

Average evaporation rate from 10/1 to 10/22

21 days in October 2.994

Total Pan Evaporation 2.99 in

Adjustment for Open Water Surface 0.80

Total Evaporation 2.40

Total Percolation 31.60 in

Average Percolation Rate 1.505 in/day

MCWD

Percolation/Evaporation Pond #7

<u>Date</u>	<u>P&E</u>
7/21/2014	Start
7/22/2014	2.8"
7/23/2014	2.8"
7/24/2014	2.8"
7/25/2014	2.8"
7/26/2014	2.8"
7/27/2014	2.8"
7/28/2014	2.8"
7/29/2014	2.8"
7/30/2014	2.8"
7/31/2014	2.8"
8/1/2014	2.8"
8/2/2014	2.8"
8/3/2014	2.8"
8/4/2014	1.1"
8/5/2014	1.1"
8/6/2014	Dry
Total:	31.84 inches 16 days
Average evaporation rate from 7/21 to 8/6	
11 days in July	3.555
5 days in August	1.560
Total Pan Evaporation	5.11 in
Adjustment for Open Water Surface	0.80
Total Evaporation	4.09
Total Percolation	27.75 in
Average Percolation Rate	1.734 in/day

Weighted Average percolation rate:

Pond	Area	Percolation Rate	
5	3.07	1.760935	5.406071935
6	4.29	1.504983	6.456377512
7	4.79	1.734274	8.307173387
Sum	12.15		20.16962283
Weighted Average		1.660051	

ATTACHMENT 2

**Malaga County Water District
Wastewater Treatment & Disposal Facilities
Estimated Capacity Wastewater Disposal - 100 Year Rainfall Water Balance, Discharge and Storage**

DATA:				Discharge to canal		WWTF POND CALCULATIONS:						Monthly Change In Storage	Required Storage Capacity
Month	Number of Days per Month	100 Yr. Rainfall ^{1/} (in/month)	100 Yr. Evaporation ^{2/} (in/month)		0 MGD	Effluent Produced (gal/month)	Effluent To Canal (gal/month)	Effluent to Ponds (gal/month)	Surface Rainfall ^{18/} (gal/month)	Surface Evaporation ^{20/} (gal/month)	Pond Percolation ^{21/} (gal/month)	(gal/month)	(gal)
January	31	5.14	0.90	Daily Effluent Production ^{5/} =	1,055,000	33,635,000	0	33,635,000	3,243,677	567,959	32,474,638	3,836,080	8,030,702
February	28	3.70	1.46	Pond Wet Area ^{6/} =	23.24	30,380,000	0	30,380,000	2,334,943	921,356	29,331,931	2,461,656	10,492,358
March	31	4.53	2.09	Pond Storage =	139.4	33,635,000	0	33,635,000	2,858,727	1,318,927	32,474,638	2,700,162	13,192,520
April	30	2.76	3.71	Pond Percolation Rate =	1.66	32,550,000	0	32,550,000	1,741,741	2,341,254	31,427,069	523,418	13,715,938
May	31	0.01	6.21	Additional Pond Wet Area =		33,635,000	0	33,635,000	8,311	3,918,919	32,474,638	(2,752,245)	10,963,893
June	30	0.31	6.85	Additional Pond Storage =	0.0	32,550,000	0	32,550,000	185,830	4,322,900	31,427,069	(3,004,239)	7,959,454
July	31	0.00	8.14	Estimated Pond Percolation Rate =	1.00	33,635,000	0	33,635,000	0	5,136,874	32,474,638	(3,976,512)	3,982,942
August	31	0.00	6.99	Total Storage =	139.4	33,635,000	0	33,635,000	694,172	2,953,387	31,427,069	(1,136,294)	0
September	30	1.10	4.68	Total Storage =	45,498,728	32,550,000	0	32,550,000	997,084	1,949,993	32,474,638	207,453	207,453
October	31	1.58	3.09			33,635,000	0	32,550,000	1,884,167	757,279	31,427,069	2,359,819	2,567,272
November	30	3.16	1.20			33,635,000	0	33,635,000	1,003,394	538,406	32,474,638	1,627,350	4,194,622
December	31	1.59	0.85										
Total	365	23.88	46.17	Total Area =	23.2 acres	Total (gal)	1,215.4	0.0	1,215.4	46.2	89.4	1,173.4	-404,129

1/ Rainfall Data per the Western Regional Climate Center.
 2/ Evaporation data per WRCC X.0.75
 5/ Design Capacity Effluent Production
 7/ Total existing wet area of the existing lagoons.
 18/ Surface Rainfall = Volume of 100 Year rainfall on the existing WWTF treatment and storage ponds and proposed storage ponds.
 20/ Surface Evaporation = Volume of effluent and rain water evaporating from the existing WWTF treatment and disposal ponds.
 21/ Pond Percolation = Volume of effluent and rain water percolating into the ground for existing ponds 1 through 8.
 23/ Required Storage = Theoretical starting point Sept. 1st where pond storage starts at zero with monthly contributions.
 26/ Maximum Storage Needed = Peak end of month pond storage volume needed (gallons & ac-ft).
 37/ Storage Available from all ponds = Total volume of available storage.
 39/ Check Balance = Comparison of this value with total wastewater processed.



ATTACHMENT 3

**Malaga County Water District
Wastewater Treatment & Disposal Facilities
Estimated Capacity Wastewater Disposal - 100 Year Rainfall Water Balance, Discharge and Storage**

Month	Number of Days per Month	100 Yr. Rainfall ^{1/} (in/month)	100 Yr. Evaporation ^{2/} (in/month)	Discharge to canal	0	MGD
January	31	6.14	0.90	Daily Effluent Production ^{3/} =	859,000	gpd
February	28	3.70	1.46	Pond Wet Area ^{4/} =	23.24	acres
March	31	4.53	2.09	Pond Storage =	139.4	ac-ft
April	30	2.76	3.71	Pond Percolation Rate =	1.29	In/day
May	31	0.01	6.21	Additional Pond Wet Area =		acres
June	30	0.31	6.85	Additional Pond Storage =	0.0	ac-ft
July	31	0.00	8.14	Estimated Pond Percolation Rate =	1.00	In/day
August	31	0.00	5.99	Total Storage =	139.4	ac-ft
September	30	1.10	4.68	Total Storage =	48,434,728	gal
October	31	1.58	3.09			
November	30	3.16	1.20			
December	31	1.59	0.85			
Total	365	23.88	46.17	Total Area =	23.2	acres

WWTF POND CALCULATIONS:

Effluent Produced (gal/month)	Effluent To Canal (gal/month)	Effluent to Ponds (gal/month)	Surface Rainfall ^{19/} (gal/month)	Surface Evaporation ^{20/} (gal/month)	Pond Percolation ^{21/} (gal/month)	Monthly Change In Storage (gal/month)	Required Storage Capacity ^{22/} (gal)
26,350,000	0	26,350,000	3,243,677	587,959	25,236,315	3,789,403	7,845,500
23,800,000	0	23,800,000	2,334,843	921,356	22,794,091	2,419,498	10,264,998
26,350,000	0	26,350,000	2,858,727	1,318,927	25,236,315	2,853,485	12,918,481
25,500,000	0	25,500,000	1,741,741	2,341,254	24,422,240	478,247	13,396,728
26,350,000	0	26,350,000	6,311	3,916,918	25,236,315	(2,798,922)	10,597,906
25,500,000	0	25,500,000	195,630	4,322,600	24,422,240	(3,049,410)	7,548,396
26,350,000	0	26,350,000	0	5,136,674	25,236,315	(4,023,189)	3,525,207
26,350,000	0	26,350,000	0	4,411,149	25,236,315	(3,297,454)	227,743
25,500,000	0	25,500,000	894,172	2,853,387	24,422,240	(1,181,455)	0
26,350,000	0	26,350,000	997,084	1,849,993	25,236,315	160,778	160,776
25,500,000	0	25,500,000	1,884,167	757,279	24,422,240	2,314,648	2,475,424
26,350,000	0	26,350,000	1,003,394	536,406	25,236,315	1,880,673	4,056,097
Total (gal)	0	219,230,000	11,089,444	19,138,292	219,137,235	-953,712	September 1st

1/ Rainfall Data per the Western Regional Climats Center.

2/ Evaporation data per WRCC X 0.75

3/ Design Capacity Effluent Production

4/ Total existing wet area of the existing lagoons.

19/ Surface Rainfall = Volume of 100 Year rainfall on the existing WWTF treatment and storage ponds and proposed storage ponds.

20/ Surface Evaporation = Volume of effluent and rain water evaporating from the existing WWTF treatment and disposal ponds.

21/ Pond Percolation = Volume of effluent and rain water percolating into the ground for existing ponds 1 through 8.

22/ Required Storage = Theoreticall starting point Sept. 1st where pond storage starts at zero with monthly contributions.

36/ Maximum Storage Needed = Peak end of month pond storage volume needed (gallons & ac-ft).

37/ Storage Available from all ponds = Total volume of available storage.

39/ Check Balance = Comparison of this value with total wastewater processed.

Maximum Required storage	13,396,728
Total Storage Available ^{36/}	45,436,728 gal
Extra Storage:	32,039,998 gal
	98 ac-ft
Total Effluent Production:	310,250,000 gal
Total Effluent Exported:	0 gal
Total Surface Rainfall ^{19/}	15,069,849 gal
Total Evaporation ^{20/}	29,138,302 gal
Total Percolation ^{21/}	297,137,256 gal
Effluent Applied to Crop:	0 gal
Check Balance ^{39/}	311,203,712 gal



Updated: 10/24/14
Print Date: 12/22/14

ATTACHMENT 4



SOP for Pond Maintenance and Monitoring

1. Weekly pond level readings in inches shall be taken and entered into the Pond Capacity Matrix to determine pond volume in MG, pond capacity in use, and pond capacity available.
2. Weekly totals from the Pond Capacity Matrix shall be entered on the Weekly Pond Monitoring report. The Weekly Pond Monitoring report shall be an attachment to the monthly DMR to supplement the pond data submitted in the DMR.
3. Ponds shall be operated one at a time. When the pond in service reaches 100% freeboard capacity, it shall be taken offline and isolated to collect percolation and evaporation data. A new pond shall be selected for all secondary effluent.
4. The pond taken offline to collect percolation and evaporation data shall be isolated and have a measuring stick implanted to record daily level. When that pond completely empties the data shall be used to calculate the percolation/evaporation rate of the pond.
5. When a pond reaches a percolation/evaporation rate of less than 1.5 inches/day it shall be taken out of service, allowed to dry, and disked with the tractor and disc. If the same pond fails to achieve a percolation/evaporation rate of 1.5 inches/day or greater the next time it is isolated and monitored, the pond shall be taken out of service for scraping and ripping.
6. If total pond volume is equal to or greater than 50% of total freeboard capacity, the District Engineer shall perform a calculation from all percolation/evaporation data and secondary effluent flow data to determine the volume of tertiary discharge required to not exceed total pond capacity freeboard limits.
7. Based upon the District Engineer's calculation above, a determination shall be made when and at what rate tertiary discharge shall begin. Consideration will be made to coincide tertiary discharge with Fresno Irrigation District water delivery through Central Canal.
8. The monthly DMR cover letter shall explain any requirements for tertiary discharge and the rate and timing of anticipated tertiary discharge.
9. The District will, as part of its budget process, provide sufficient funding to perform disposal pond monitoring and maintenance as required by this SOP.

ATTACHMENT 5

Yellow Cells for data entry

325851 gal/af

ict

gd) Disposal Pond Available Capacity

Required Disposal Pond Capacity (percolation rate of 1.3 in/d) gallons

Available Capacity Exceeds Required Capacity? gallons

Available Disposal Pond Capacity as of October 31, 2014

Pond	Freeboard (ft)	Available Depth (ft)	Acreage (acres)	Available Capacity (acre-ft)	Available Capacity (gal)
1	2.5	0.5	1.29	0.645	210,174
2	8	6	0.76	4.56	1,485,881
3	8	6	2.59	15.54	5,063,725
4	8	6	2.5	15	4,887,765
5	3.2	1.2	3.07	3.684	1,200,435
6	5.5	3.5	4.29	15.015	4,892,653
7	8	6	4.79	28.74	9,364,958
8	8	6	3.95	23.7	7,722,669
Total			23.24	106.884	34,828,258

Total Depth (ft)
8
8
8
8
8
8
8
8
8
8

5,107,194

Y

Available Disposal Pond Capacity as of November 30, 2014

Pond	Freeboard (ft)	Available Depth (ft)	Acreage (acres)	Available Capacity (acre-ft)	Available Capacity (gal)
1	8	6	1.29	7.74	2,522,087
2	8	6	0.76	4.56	1,485,881
3	4	2	2.59	5.18	1,687,908
4	7	5	2.5	12.5	4,073,138
5	7	5	3.07	15.35	5,001,813
6	8	6	4.29	25.74	8,387,405
7	8	6	4.79	28.74	9,364,958
8	8	6	3.95	23.7	7,722,669
Total			23.24	123.51	40,245,857

Total Depth (ft)
8
8
8
8
8
8
8
8
8

7,421,842

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ATTACHMENT 6