Temecula Valley Regional Water Reclamation Facility
ECOSYSTEM PLUS® TREATMENT

Report of Results

The following is a report of the results of a treatment program at the Temecula Valley Regional Water Reclamation Facility in Temecula, California utilizing the EcoSystem Plus® (ESP) product manufactured by Neozyme International, Inc. The Plant is owned and operated by The Eastern Municipal Water District. The objectives of the treatment include increasing dissolved oxygen in the aeration basins, a reduction in aeration energy and a reduction in sludge. The ESP treatment was successful in achieving all of these objectives.

Facility Description

The Facility is designed for an influent flow of8 million gallons per day (MGD). It is of the Advanced Wastewater Treatment type utilizing primary clarifiers, an activated sludge nitrification/denitrification secondary treatment system, and a tertiary treatment system incorporating nitrification of secondary effluent followed by flocculation, tertiary clarifiers, tertiary gravity filtration, and chlorine contact tanks. Effluent is discharged to a storage basin under an NPDES permit, and is reused for irrigation.

After passing through a comminutor and two grit settling chambers, solids are separated in primary clarifiers prior to entering the secondary treatment system. A flow equalization basin receives a portion of the primary effluent during high-flow periods of the day, and returns flow during low flow periods. The secondary system includes six basins each incorporating an anoxic section, a mixed anaerobic section, and an aeration section; followed by secondary clarifiers. The aeration sections incorporate fine-bubble diffused air aeration supplied by positive displacement blowers that are manually controlled. These blowers are driven by engines fueled with natural gas. A single, 6,OOO-scfinblower driven by a 465 horsepower engine normally supplies all of the aeration air, and a small amount of air to the grit tanks and other locations in the Facility. The blower output is not easily adjusted, and is rarely changed. The other two blower units are for standby use. Dissolved Oxygen (DO) is continuously measured with permanent probes installed at the downstream end of each aeration basin. Data is automatically logged into the Facility computer system.

Primary Sludge is pumped directly to two anaerobic digesters. Activated sludge is returned to the secondary basins, or wasted to a dissolved air floatation (DAF) unit for thickening prior to the anaerobic digesters. Digested sludge is dewatered with belt filter presses and transported offsite for processing and disposal by a contractor (Synagro). A Return Water Clarifier receives DAF subnatant and belt press filtrate for solids settling prior to returning the flow to the secondary basins.

Baseline Conditions

Based upon data received from the Facility operators for the March, 2001 baseline period, the Facility received an average influent flow of 6.77 MGD at an average of 244 mg/L BOD_5 (13,701 lb BOD_5/day). Primary effluent averaged 155 mg/L (8,659 lb BOD_5/day). One of the six secondary basins and one of the primary clarifiers were out of service for maintenance during the March baseline period. The Facility reduced an average of 8,507 lb BOD_5/day in the secondary/tertiary treatment portion of the system (primary effluent BOD_5 minus plant effluent BOD_5).

The natural gas consumption 'of the engines driving the blowers could not be measured directly due to metering problems. The total natural gas consumption of the Facility was recorded each day, and the gas consumption by the engine-driven effluent pump was subtracted to obtain the consumption by the aeration engines. The operators determined that the effluent pump engine consumes a steady 1,230 CCF

(hundreds of cubic feet, or therms) per day, about 60% of the total natural gas consumption. An additional 3.8% of the natural gas consumed by the aeration engines was subtracted to account for air utilized in the grit chambers and other locations, based upon data supplied by the operators. Using this calculation method, the aeration engines consumed an average of 664 CCF/day during the baseline period.

Sludge generation was determined by converting the Belt Press Dry Tons data on the Monthly Data report for March into pounds by multiplying by 2,000. This data represents the daily mass of dry solids produced for disposal each day. The Facility produced an average of 10,878 lb/day of sludge solids during the baseline period.

Table 1 lists the daily data for the baseline period obtained from the plant operators.

Treatment Set-up

The mixing and metering device was set up on March 31 at a location near the headworks convenient for access by the plant operators for changing the 55-gallon drums of ESP used in the treatment. Plant wash water (effluent) was used as dilution water for the treatment at about 2.0 gallons per minute. A diaphragm-type metering pump was used to inject ESP into the dilution water stream at a dosage rate of 16 gallons per day (based upon the average influent BOD_5). The ESP solution was split into two equal streams and injected into the discharge of the two grit settling tanks prior to the primary clarifiers. ESP injection was started in the afternoon of March 31.

In order to achieve a more direct effect on the aeration basins, the injection point was changed to the point at which the primary effluent enters the anaerobic section of each biological reactor basin. The output flow from the mixing and metering device was extended via flexible hose to a manifold that distributes the flow equally to each of the six anaerobic/anoxic/aeration basins. The ESP flow was stopped and installation of the extension hose and manifold was started on Friday May 11. Installation was completed and the ESP flow was restarted at 16 gallons per day on Saturday May 12. Due to installation problems, leaks at certain joints prevented the ESP solution from flowing completely to the new injection points during the week of May 14. Repairs were made by May 17. The treatment continued through July 31, 2001.

Results of Treatment

All data were collected by the plant operators as normal practice during the treatment period. One of the secondary basins was also out of service for maintenance during the April period. The Return Water Clarifier was also out of service during an approximately two-week period starting on April 7. As a result, the solids that would normally be settled out were returned to the secondary basins. These solids are high in ammonia content, and have a high oxygen demand. Despite this extra load; the average DO in the aeration basins increased in April to 2.68 mg/L from the baseline average of2.16. Figure 1 is a graph of the average daily DO for the baseline and treatment period. No significant adjustments were made to the aeration blower engines during the treatment period according to the operators.

Table 2 lists the daily BOD_5, sludge and energy data for the month of April. The BOD_5 reduced by the Facility averaged 9,943 lb/day in April, an increase of about 17% from the baseline period. This increase is partly due to increased influent BOD_5 in April. The average aeration basin DO increased in spite of this additional load. The sludge solids averaged 11,779 lb/day in April (an increase of about 8% from the baseline) and the natural gas consumption averaged 674 CCF/day (an increase of 1.5% from the baseline). Calculated per pound of BOD reduced, however, both the sludge generation and gas consumption showed reductions from the baseline. An inspection of the injection device on May 28 revealed that the injection pump was not pumping the ESP product due to the loss of prime during a drum change. The injection was off for about five 'days. An inventory of the ESP on May 31 showed that three drums remained unused out of 18 drums shipped to the plant. Since nine drums were injected in April, only six drums (330 gallons), or an average of 10.6 gallons per day, were injected during May, and no

injection occurred between May 23 and May 28. This quantity represents only about 66% of the desired dosage, which significantly reduced the effectiveness of the treatment. Despite this low dosage, the average daily DO for May was significantly higher (23% higher) at 2.66 mg/L versus 2.16 mg/L for the baseline (March) period. No significant adjustments were made to the aeration blower engines during the May period according to the operators.

Table 3 lists the daily BOD_5, sludge and energy data for the month of May. The BOD_5 reduced by the biological portion of the Facility averaged 8,812 lb/day in May, an increase of about 4% from the baseline period. This increase is partly due to increased influent BOD_5 in May. The average aeration basin DO increased in spite of this additional load. The sludge solids averaged 12,402 lb/day in May (an increase of about 14% from the baseline) and the aeration system natural gas consumption averaged 747 CCF/day (an increase of 11% from the baseline). Total natural gas consumption was reduced in May to 26,701 CCF from over 55,200 CCF in March. Much of this reduction was due to the shutdown of the gas-fired effluent pump, replaced with the electric pump, on April 28 continuing to May 30 (except for electric power interrupt periods on May 8, 9 and 10).

An inspection of the injection device on Friday June 22 revealed that the injection pump was programmed by mistake to run only a few hours per day, and had injected only a small amount for the entire week. The pump program was corrected and put back into proper operation. Plant operators also took the main blower unit offline for three days between 6/2 through 6/5 for repairs. During this period, a backup blower of smaller capacity was operated, but was not of adequate capacity for the aeration basins. The attached chart of DO concentrations shows a significant drop in DO during this period. Further, for most of the month of June, the aeration basins experienced unusually high flow due to the recycling of stored effluent with low chlorine residual (between 1.0 and 1.3 MGD extra flow). As a result, the average DO concentration for June (1.94 mg/L) was lower than the baseline period (2.16). However, after the high flow from recycled effluent stopped and the injection pump was fixed, the DO for the final week of June averaged 2.74 mg/L. No significant adjustments were made to the aeration blower engines during the June period according to the operators.

Table 4 lists the daily BOD_5, sludge and energy data for the month of June. The BOD_5 reduced by the biological portion of the Facility averaged 10,475 lb/day in June, much higher (23%) than the baseline period. This increase is partly due to increased influent BOD_5 in June (about 20% higher). The sludge solids averaged 1O,716 lb/day in June (about the same as the baseline period of 10,878 lb/day) and the aeration system natural gas consumption averaged 677 CCF/day (also about the same as the baseline period of 673 CCF/day), despite the significantly higher BOD_5 load.

The Dissolved Oxygen probe in biological reactor basin number 6 was replaced on July 10. The DO in basin 6 had been chronically low during the treatment period, averaging only 0.41 mg/L in June, 0.28 mg/L in May, and 0.26 mg/L in April. After replacement, the average DO in basin 6 increased dramatically with several readings above 5.0 during the remainder of the month, and an average of2.08 mg/L. The attached chart of DO concentrations also shows a significant increase in average plant DO following replacement of the basin 6 probe. These data indicate that the average DO numbers recorded during the treatment period were probably significantly lower than the actual DO due to the defective probe in basin 6. The average of the daily plant DO data in July was 2.6 mg/L compared with 2.16 mg/L in the baseline period (about 20% higher) even though no significant adjustments were made to the aeration blower engines during the July period, and the BOD_5 load was higher.

Table 5 lists the daily BOD_5, sludge and energy data for the month of July. The BOD_5 reduced by the biological portion of the Facility averaged 9,276 lb/day in July, about 9% higher than the BOD_5 reduced in the baseline period (8,507Ib/day). The sludge solids averaged 10,606Ib/day in July (slightly lower than the baseline period of 10,878 lb/day) and the aeration system natural gas consumption averaged 641 CCF/day (slightly lower than the baseline period of673 CCF/day), despite the significantly higher BOD_5 load.

Over the entire treatment period from April 1 through July 31, the BOD_5 reduced by the biological portion of the Facility averaged 9,625 lb/day, about 13% higher than the BOD_5 reduced in the baseline period (8,507 lb/day). The sludge solids averaged 11,354 lb/day (about 4% higher than the baseline period of 10,878 lb/day) and the aeration system natural gas consumption averaged 685 CCF/day (about 2% higher than the baseline period of 673 CCF/day).

Conclusions

Because the plant operators were not able to easily adjust the airflow to the aeration basins during the treatment period, a reduction in the total aeration energy consumption was not expected. However, an increase in average DO concentration during treatment was expected, along with greater solubilization of suspended organics. These effects should result in reductions of both energy and sludge calculated per pound of BOD_5. The following are the conclusions that can be drawn from the data.

1. **DO was increased by 42%**. The plant average DO for all aeration basins increased from an average of 1.74 mg/L during the three months prior to the treatment, to an average of 2.47 mg/L during the treatment period. This represents an increase in DO of about 42%.

2. **Energy consumption was reduced by 10%**. Calculated per pound of BOD_5 reduced, the consumption of natural gas for running the aeration blower was reduced ITom0.079 CCF/lb BOD_5 during the baseline period to 0.071 CCF/lb BOD_5 during treatment, a reduction of over 10%.

3. **Sludge generation was reduced by 8%**. Calculated per pound of BOD_5 reduced, the generation of sludge solids from the plant was reduced from 1.28 lb sludge/lb BOD_5 to 1.18 lb sludge /lb BOD_5 during treatment, a reduction of almost 8%.

TABLE 1
ENERGY AND SLUDGE DATA
Before Treatment with Neozyme ESP Baseline
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District

Date	Influent	Influent BOD		Prim Effluent		Effluent BOD		BOD Reduction (2)	Belt Press Solids	Aeration Nat Gas
	MGD	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day	lb/day (3)	CCF/day (4)
3/1	6.88	210	12,035	130	7,459	2.0	115	7,345	10,360	760
3/2	6.76					2.0	113		10,360	719
3/3	7.12					3.0	178		10,920	780
3/4	7.28	280	16,980	170	10,322	4.0	243	10,079	no data	658
3/5	6.93	230	13,277			3.0	173		9,000	720
3/6	6.77	190	10,715	140	7,905	2.0	113	7,792	8,760	671
3/7	6.79	290	16,403			2.0	113		11,680	719
3/8	6.97	220	12,773	130	7,557	3.0	174	7,383	10,580	694
3/9	7.14					4.0	238		no data	577
3/10	6.99					5.0	291		9,520	658
3/11	5.79	270	13,022	170	8,209	4.0	193	8,016	10,260	987
3/12	6.71	230	12,856			3.0	168		14,060	568
3/13	6.72	330	18,473	180	10,088	4.0	224	9,864	10,700	635
3/14	6.72	150	8,397			2.0	112		8,060	569
3/15	6.72	270	15,114	190	10,649	2.0	112	10,537	9,880	625
3/16	6.72					2.0	112		13,060	691
3/17	6.72					3.0	168		no data	509
3/18	6.72	260	14,554	150	8,407	3.0	168	8,239	17,600	517
3/19	6.72	300	16,793			3.0	168		113,000	715
3/20	6.72	200	11,196	170	9,528	2.0	112	9,416	10,520	736
3/21	6.72	230	12,875			2.3	129		no data	736
3/22	6.72	240	13,435	70	3,923	2.0	112	3,811	12,860	689
3/23	6.72					2.0	112		11,280	552
3/24	6.72					3.0	168		10,520	761
3/25	6.72	210	11,755	200	11,209	2.0	112	11,097	10,660	764
3/26	6.72	320	17,913			4.0	224		no data	747
3/27	6.72					3.0	168		no data	662

3/28	6.72	210	11,755			3.0	168		10,700	405
3/29	6.72								10,240	575
3/30	6.72					2.0	112		no data	623
3/31	6.72								8,200	834
Averages	6.77	244	13,701	155	8,659	2.80	158.00	8,507	10,878	673

Avg lb of sludge solids per lb of BOD reduced (6):	0.803
Avg CCF consumed per lb of BOD reduced:	0.0791

Source: EMWD

Notes:

(1) Average influent flow used due to meter problems

(2) Primary Effluent BOD lb/day minus Plant Effluent BOD lb/day

(3) Belts Press Dry Tons x 2,000 lb/ton

(4) Total natural gas consumption, minus gas usage by effluent pump (assumed to average 1,230 CCF/day), minus gas usage for grit chambers (assumed to average 3.8% of gas usage by blower engines). 1 CCF = 100 cubic feet - 1 Therm

(5) Effluent pump engine off for maintenance of varying periods on these days. Adjustments made to compensate

(6) Per pound of total BOD reduced (influent minus effluent)

TABLE 2
ENERGY AND SLUDGE DATA
During Treatment with Neozyme ESP April
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District

Date	Influent	Influent BOD		Prim Effluent BOD		Plant Effluent BOD		BOD Reduction (2)	Belt Press Solids	Aeration Nat Gas
	MGD	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day	lb/day (3)	CCF/day (4)
4/1	6.72	280	15,674	150	8,407	3.0	168	8,239	10,140	602
4/2	6.38	250	13,286			3.0	159		10,160	833
4/3	6.88	170	9,743	160	9,181	2.0	115	9,066	10,120	584
4/4	7.05	170	9,984			2.0	117		9,200	547
4/5	7.18	240	14,354	180	10,779	4.0	239	10,539	9,820	649
4/6	6.81								9,000	559
4/7	7.57								9,540	733
4/8	7.57								10,960	617
4/9	7.36	200	12,262			3.0	184		11,500	804
4/10	7.15	200	11,912	160	9,541	3.0	179	9,362	no data	571
4/11	7.13	250	14,848			2.0	119		16,780	593
4/12	7.36	260	15,940	130	7,980	2.0	123	7,857	10,820	674
4/13	6.79								9,460	670
4/14	7.70					2.0	128		no data	727
4/15	7.39	250	15,390	180	11,094	2.0	123	10,971	11,140	679
4/16	7.47	250	15,556			2.0	124		9,986	709
4/17	7.28	230	13,948	150	9,107	2.0	121	8,986	15,390	724
4/18	7.40	200	12,328			2.0	123		11,200	668
4/19	7.21	350	21,021	180	10,824	2.0	120	10,704	no data	722
4/20	7.31					2.0	122		18,840	656
4/21	7.57					4.0	252		9,897	656
4/22	7.89	250	16,431	180	11,844	2.0	131	11,713	11,240	656
4/23	7.37	200	12,278			2.0	123		10,380	721
4/24	7.26	240	14,514	200	12,110	2.0	121	11,989	no data	656
4/25	7.18	240	14,354			2.0	120		no data	452
4/26	7.56	260	16,373	150	9,458	2.0	126		11,760	764

4/27	6.99					2.0	116		18,580	697
4/28	7.40					2.0	123		16,980	819
4/29	7.64	250	15,910	180	11,469	2.0	127		11,840	747
4/30	7.34	240	14,674			2.0	122		9,740	716
Averages	7.26	237	14,323	167	10,149	2.3	140	9,943	11,779	674

Avg lb of sludge solids per lb of BOD reduced:	1.185
Avg CCF consumed per lb of BOD reduced:	0.0677

Source: EMWD

Notes:

(1) Average influent flow used due to meter problems

(2) Primary Effluent BOD lb/day minus Plant Effluent BOD lb/day

(3) Belts Press Dry Tons x 2,000 lb/ton

(4) Total natural gas consumption, minus gas usage by effluent pump (assumed to average 1,230 CCF/day), minus gas usage for grit chambers (assumed to average 3.8% of gas usage by blower engines). 1 CCF = 100 cubic feet - 1 Therm

(5) Effluent pump engine off on these days

TABLE 3
ENERGY AND SLUDGE DATA
During Treatment with Neozyme ESP May
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District

Date	Influent	Influent BOD		Prim Effluent		Effluent BOD		BOD Reduction (1)	Belt Press Solids	Aeration Nat Gas
	MGD	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day	lb/day (2)	CCF/day (3)
5/1	7.08	210	12,385	140	8,267	3.2	189	8,078	11,600	732
5/2	7.00	220	12,828			2.0	117		25,540	711
5/3	7.16	240	14,314	170	10,151	2.0	119	10,032	10,140	703
5/4	7.04					2.0	117		17,620	749
5/5	7.46					2.0	124		8,900	745
5/6	7.79	270	17,520	170	11,045	2.0	130	10,915	8,400	696
5/7	7.22	230	13,833			2.0	120		11,600	697
5/8	7.13	230	13,660	150	8,920	2.0	119	8,801	24,500	867
5/9	7.12	240	14,234			2.0	119		10,540	804
5/10	7.15	280	16,677	140	8,348	2.0	119	8,229	12,220	649
5/11	7..11					2.0	118		13,920	873
5/12	7.37					3.0	184		11,720	742
5/13	7.47	250	15,556	170	10,591	3.0	187	10,404	no data	705
5/14	7.31	190	11,570			2.0	122		9,380	711
5/15	6.54	230	12,530	160	8,727	3.2	174	8,553	9,640	719
5/16	7.24	250	15,077			3.0	181		11,260	741
5/17	7.35	220	13,470	120	7,356	3.0	184	7,172	13,280	816
5/18	7.18					4.0	239		10,600	733
5/19	7.47					2.0	124		17,940	703
5/20	7.68	210	13,435	140	8,967	2.0	128	8,839	11,600	738
5/21	7.43	120	7,427			2.0	124		12,840	693
5/22	7.29	220	13,360	140	8,512	2.0	121	8,390	12,140	714
5/23	7.36	240	14,714			3.0	184		9,320	735
5/24	7.32	240	14,634	130	7,936	2.0	122	7,814	no data	804
5/25	7.18					2.0	120		12,480	689
5/26	7.35					2.0	122		11,120	741

5/27	7.55					4.0	252		11,160	750
5/28	7.80	210	13,645			3.0	195		7,800	722
5/29	7.45	190	11,791	140	8,699	3.0	186	8,512	11,380	774
5/30	7.38	320	19,672			3.0	184		10,780	735
5/31	7.23								10,240	967
Averages	7.30	229	13,921	148	8,960	2.5	151	8,812	12,402	747

Avg lb of sludge solids per lb of BOD reduced (5):	0.901
Avg CCF consumed per lb of BOD reduced:	0.0848

Source: EMWD

Notes:

(1) Primary Effluent BOD lb/day minus Plant Effluent BOD lb/day

(2) Belts Press Dry Tons x 2,000 lb/ton

(3) Total natural gas consumption, minus gas usage by effluent pump (assumed to average 1,230 CCF/day), minus gas usage for grit chambers (assumed to average 3.8% of gas usage by blower engines). 1 CCF = 100 cubic feet - 1 Therm

(4) Effluent pump engine off on these days

(5) Per pound of total BOD reduced (influent minus effluent)

(6) Effluent pump engine on during electric power interrupt on these days

TABLE 4
ENERGY AND SLUDGE DATA
During Treatment with Neozyme ESP June
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District

Date	Influent	Influent BOD		Prim Effluent BOD		Effluent BOD		BOD Reduction (1)	Belt Press Solids	Aeration Nat Gas
	MGD	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day	lb/day (2)	CCF/day (3)
6/1	7.06					3.0	176		11,500	568
6/2	7.37					2.0	123		12,760	912
6/3	7.64	250	15,910	190	12,106	2.0	127	11,979	10,340	551
6/4	7.36	200	12,262			2.0	123		12,320	628
6/5	7.01	260	15,182	130	7,600	2.0	117	7,483	10,600	767
6/6	7.18	240	14,354			2.0	120		7,060	528
6/7	7.28	250	15,161	160	9,714	2.0	121	9,593	9,980	634
6/8	7.14					2.0	119		15,660	743
6/9	7.39					2.0	123		10,720	579
6/10	7.53	220	13,799	140	8,792	2.0	125	8,667	7,740	680
6/11	7.36	210	12,875			2.0	123		6,600	857
6/12	7.28	260	15,767	150	9,107	2.0	121	8,986	no data	473
6/13	7.34	310	18,954			3.0	183		12,400	975
6/14	7.36	220	13,396	150	9,145	2.0	122	9,023	10,120	212
6/15	7.53					3.0	181		15,800	686
6/16	7.52								9,400	635
6/17	7.30	350	21,283	220	13,394	3.0	122	13,272	no data	561
6/18	7.34	310	18,954			2.0	183		16,860	681
6/19	7.32	370	22,561	200	12,210	3.0	183	12,027	10,080	706
6/20	7.17	360	21,501			3.0	179		9,060	856
6/21	6.99	310	18,050	220	12,825	3.0	175	12,651	9,580	814
6/22	7.25					5.0	302		10,220	635
6/23	7.25					7.0	423		10,680	700
6/24	7.33	260	15,875	240	14,672	10.0	611	14,061	10,340	711
6/25	7.22	240	14,434			2.0	120		10,120	530
6/26	7.16	240	14,314	160	9,554	2.0	119	9,435	9,160	715

6/27	7.11	260	15,399			2.0	118		9,080	700
6/28	7.41	240	14,814	140	8,652	2.0	123	8,528	10,240	834
6/29	7.25					3.0	181		9,960	674
6/30	7.30					3.0	182		11,680	776
Averages	7.28	268	16,242	175	10,648	2.9	173	10,475	10,716	677

Avg lb of sludge solids per lb of BOD reduced (4):	0.666
Avg CCF consumed per lb of BOD reduced:	0.0647

Source: EMWD

Notes:

(1) Primary Effluent BOD lb/day minus Plant Effluent BOD lb/day

(2) Belts Press Dry Tons x 2,000 lb/ton

(3) Total natural gas consumption, minus gas usage by effluent pump (assumed to average 1,230 CCF/day), minus gas usage for grit chambers (assumed to average 3.8% of gas usage by blower engines). 1 CCF = 100 cubic feet - 1 Therm

(4) Per pound of total BOD reduced (influent minus effluent)

TABLE 5
ENERGY AND SLUDGE DATA
During Treatment with Neozyme ESP July
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District

Date	Influent	Influent BOD		Prim Effluent		Effluent BOD		BOD Reduction (1)	Belt Press Solids	Aeration Nat Gas
	MGD	mg/L	lb/day	mg/L	lb/day	mg/L	lb/day	lb/day	lb/day (2)	CCF/day (3)
7/1	7.36	220	13,488	140	8,594			8,594	11,440	675
7/2	7.36	250	15,327			3.0	184		12,060	634
7/3	7.19					3.0	180		10,380	587
7/4	7.19	280	16,770			2.0	120		12,840	760
7/5	7.37	24	14,734	180	11,064	2.0	123	10,941	12,960	606
7/6	7.20					2.0	120		10,560	709
7/7	7.21					2.0	120		12,820	737
7/8	7.45	170	10,550	140	8,699	2.0	124	8,575	11,040	713
7/9	7.29	220	13,360			3.0	182		11,580	733
7/10	7.14	210	12,490	140	8,337	2.0	119	8,218	11,040	550
7/11	7.23	240	14,454						9,620	660
7/12	7.23	210	12,647	120	7,236			7,236	9,260	744
7/13	7.25								9,740	700
7/14	7.34					3.0	183		8,080	866
7/15	7.30	250	15,202	160	9,741	3.0	182	9,559	11,480	381
7/16	7.28	220	13,341			2.0	121		10,500	792
7/17	7.19	200	11,979	140	8,395	2.0	120	8,275	10,560	727
7/18	7.25	180	10,871			2.0	121		9,720	589
7/19	7.29	220	13,360	150	9,120	2.0	121	8,998	10,520	759
7/20	7.31					2.4	146		9,600	627
7/21	7.40					4.0	247		9,380	634
7/22	7.41	220	13,580	150	9,270	2.0	123	9,146	10,120	703
7/23	7.39	210	12,927			2.0	123		10,720	750
7/24	7.23	160	9,636	180	10,854	5.0	301	10,553	20,720	599
7/25	7.17	250	14,932			4.0	239		9,240	624
7/26	7.51	250	15,640	170	10,648	2.0	125	10,523	8,840	402

7/27	7.46					3.0	186		10,180	703
7/28	7.26					5.0	302		8,000	565
7/29	7.38	280	17,213	180	11,079	3.0	184	10,894	7,660	592
7/30	7.48	210	13,085			2.0	125		9,620	647
7/31	7.35	200	12,245	150	9,195	2.0	122	9,072	8,520	93
Averages	7.31	222	13,538	154	9,402	2.6	161	9,276	10,606	641

Avg lb of sludge solids per lb of BOD reduced (5):	0.793
Avg CCF consumed per lb of BOD reduced:	0.0691

Source: EMWD

Notes:

(1) Primary Effluent BOD lb/day minus Plant Effluent BOD lb/day

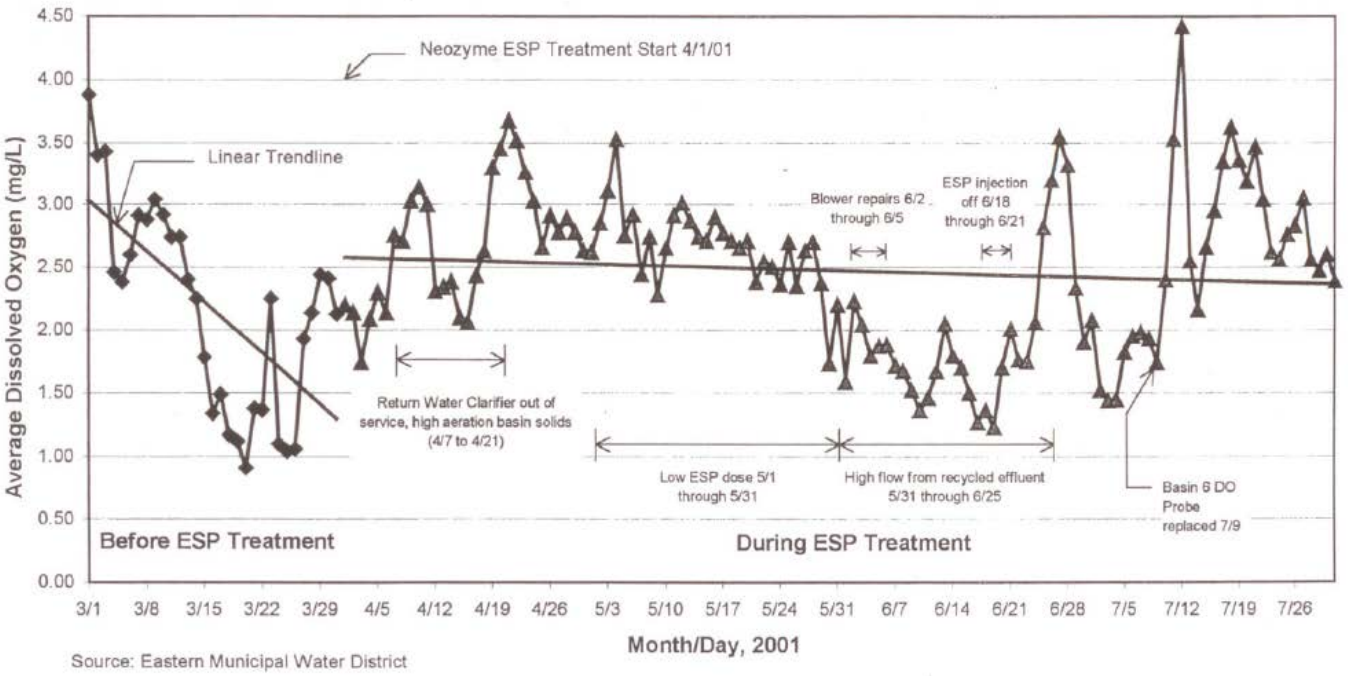
(2) Belts Press Dry Tons x 2,000 lb/ton

(3) Total natural gas consumption, minus gas usage by effluent pump (assumed to average 1,230 CCF/day), minus gas usage for grit chambers (assumed to average 3.8% of gas usage by blower engines). 1 CCF = 100 cubic feet - 1 Therm

(4) Effluent pump engine off on these days

(5) Per pound of total BOD reduced (influent minus effluent)

FIGURE 1
AERATION TANK DISSOLVED OXYGEN
(Daily Averages)
Temecula Valley Regional Water Reclamation Facility
Eastern Municipal Water District



Source: Eastern Municipal Water District