



California Regional Water Quality Control Board Central Valley Region

Karl E. Longley, ScD, P.E., Chair



Linda S. Adams
Secretary for
Environmental
Protection

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20 June 2007

Mark Madison, Director
Department of Municipal Utilities
City of Stockton
Regional Wastewater Control Facility
2500 Navy Drive
Stockton, CA. 95206-1191

HIGH FISH MORTALITY NEAR STOCKTON REGIONAL WASTEWATER CONTROL FACILITY DISCHARGE LOCATION, SAN JOAQUIN COUNTY

Please find attached the Regional Water Board Inspection Report for 22 May 2007. Currently, our investigation into the high fish mortality event near the Stockton Regional Wastewater Control Facility discharge location has not lead to evidence of a link between a specific event at the facility and the fish mortality event. Please call me at (916) 464-4623 if you have any questions.

PATRICIA LEARY
Senior Water Resource Control Engineer
NPDES Compliance and Enforcement Unit

Enclosure: Inspection Report for City of Stockton Regional Wastewater Control Facility

- cc: Bruce Herbold, U.S. EPA, Region 9, San Francisco
- Ken Greenberg, U.S. EPA, Region 9, San Francisco
- Jeff McLain, U.S. Fish and Wildlife Service, Sacramento
- Maria Reyes, National Marine Fisheries Service, Sacramento
- Diane Riddle, State Water Resources Control Board, Division of Water Rights, Sacramento
- Mark Bradley, State Water Resources Control Board, Office of Enforcement, Sacramento
- Karen Larsen, Regional Water Quality Control Board, Sacramento
- Lt. Hector Orozco, Department of Fish and Game, Region 2, Rancho Cordova
- Warden Lori Oldfather, Department of Fish and Game, Region 2, Rancho Cordova
- Dave Vogel, Natural Resource Scientists, Inc., Red Bluff
- Bill Jennings, California Sportfishing Protection Alliance, Stockton

20 June 2007

DISCHARGER: City of Stockton Regional Wastewater Control Facility

LOCATION & COUNTY: 2500 Navy Drive
Stockton, CA. 95206-1191
San Joaquin County

CONTACT(S): Fermin Garcia, Chief Plant Operator; and Greg White, Director of
Wastewater Operations for OMI/Thames Water

INSPECTION DATE: 22 May 2007

INSPECTED BY: Patricia Leary, Ann Hopkinson, and Spencer Joplin, Regional Water Board

ACCOMPANIED BY: Lori Oldfather and Lt. Hector Orozco, Department of Fish and Game

BACKGROUND:

The Vernalis Adaptive Management Plan, or VAMP, started in 2000 as part of the State Water Resources Control Board Decision 1641. It is a large-scale, multi-agency, long-term experimental/management program designed to protect juvenile Chinook salmon migrating from the San Joaquin River through the Sacramento-San Joaquin Delta. During the 2007 VAMP, when pulse flows were provided in the San Joaquin River, a pilot study was conducted by releasing 800 juvenile fall Chinook salmon with surgically-implanted, individually identifiable acoustic transmitters (tags) at various locations in the San Joaquin River and Delta. The fish movements were subsequently monitored with acoustic receivers. On or about 17 May 2007, a scientist found 116 acoustic tags approximately 1.7 miles upstream of the Stockton Deep Water Ship Channel, adjacent to a railroad bridge and the Stockton Regional Wastewater Control Facility outfall. The lack of movement of the tags suggested that fish mortality occurred at that location. No dead fish were located, and no reports of any fish kills in the area were received from any other parties. Regional Water Board staff inspected the Stockton Regional Wastewater Control Facility on 22 May 2007, accompanied by two wardens from the Department of Fish and Game, to evaluate if effluent discharges might have caused or contributed to the reported incident.

OBSERVATIONS AND COMMENTS:

Operation logs, plant monitoring data, and Supervisory Control and Data Acquisition (SCADA) continuous readouts from computer software used to monitor plant operations were collected for the period from 11 May through 17 May. Data indicated that pH, dissolved oxygen, turbidity, and chlorine readings were compliant with permit requirements. Although the SCADA readouts showed several plant start-ups and shut-downs, the facility utilized its ponds instead of discharging during these events.

Final effluent data from 1 May through 20 May 2007 are provided in Attachment 1. Six effluent ammonia measurements were recorded during this time interval. These are provided in Table 1 along with the result for a grab sample of effluent collected by staff during the 22 May inspection. Concentrations of ammonia varied from 2.9 to 11 mg/L as N. Daily maximum pH ranged from 6.5 to 7.9. The data points were compared to the Criteria Maximum Concentration (CMC) for protection of salmonid fish; which is a 1-hour aquatic exposure acute criterion. Of the seven ammonia measurements, one exceedance of the CMC water quality limit occurred on 7 May, when the concentration of ammonia exceeded the CMC by 0.33 mg/L as N. However, some of the tagged fish were not released until 11 May 2007, so the data does not support that ammonia toxicity caused fish mortality.

Table 1. Stockton RWCF Final Effluent Characteristics

Date	Day Max pH	Ammonia [mg/L as N]	*CMC [mg/L as N]
5/4/2007	6.8	11	28
5/7/2007	7.9	7.1	6.77
5/9/2007	6.6	6.7	31.3
5/11/2007	6.7	6.7	29.8
5/14/2007	7	5.2	24.1
5/16/2007	6.7	2.9	29.8
5/22/2007	6.5	4.4	32.6

Reference: * Regional Water Quality Control Board, *Water Quality Goals, August 2003*.

A standard Flow-Thru Bioassay to measure acute toxicity was conducted as part of plant permit requirements from 14 May to 18 May and resulted in a 95% survival rate for the fathead minnow in the plant effluent. A chronic toxicity test for *Selenastrum* conducted on 14 May resulted in no toxicity. At the inspection we requested that additional chronic toxicity testing be conducted as soon as possible. OMI agreed to collect samples and run another set of tests for the fathead minnow and *C. dubia*. Chronic toxicity tests for samples collected from 24 May to 31 May resulted in no measured toxicity for either survival or growth of fathead minnows, or for survival and reproduction for *C. dubia*.

The facility had experienced one Special Plant Accommodation (SPA) on 15 May. The SPA, provided in Attachment 2, implemented a plan to deviate from normal plant operations at the tertiary facility. The SPA indicates a start date on 15 May and a finish date of 17 May. However, Fermin Garcia, Chief Plant Operator, stated the SPA lasted only a brief time on 15 May with no unusual occurrences.

VAMP flows for the San Joaquin River from 11 May to 9 June were recorded by the USGS's flow measurement station and provided in Figure 1. The May VAMP flows oscillated around the 2000 cubic feet per second range with very limited flow in the negative range. For this discharge flow, tidal reversals are minimal; however, flows in the river periodically stop during each tidal cycle.

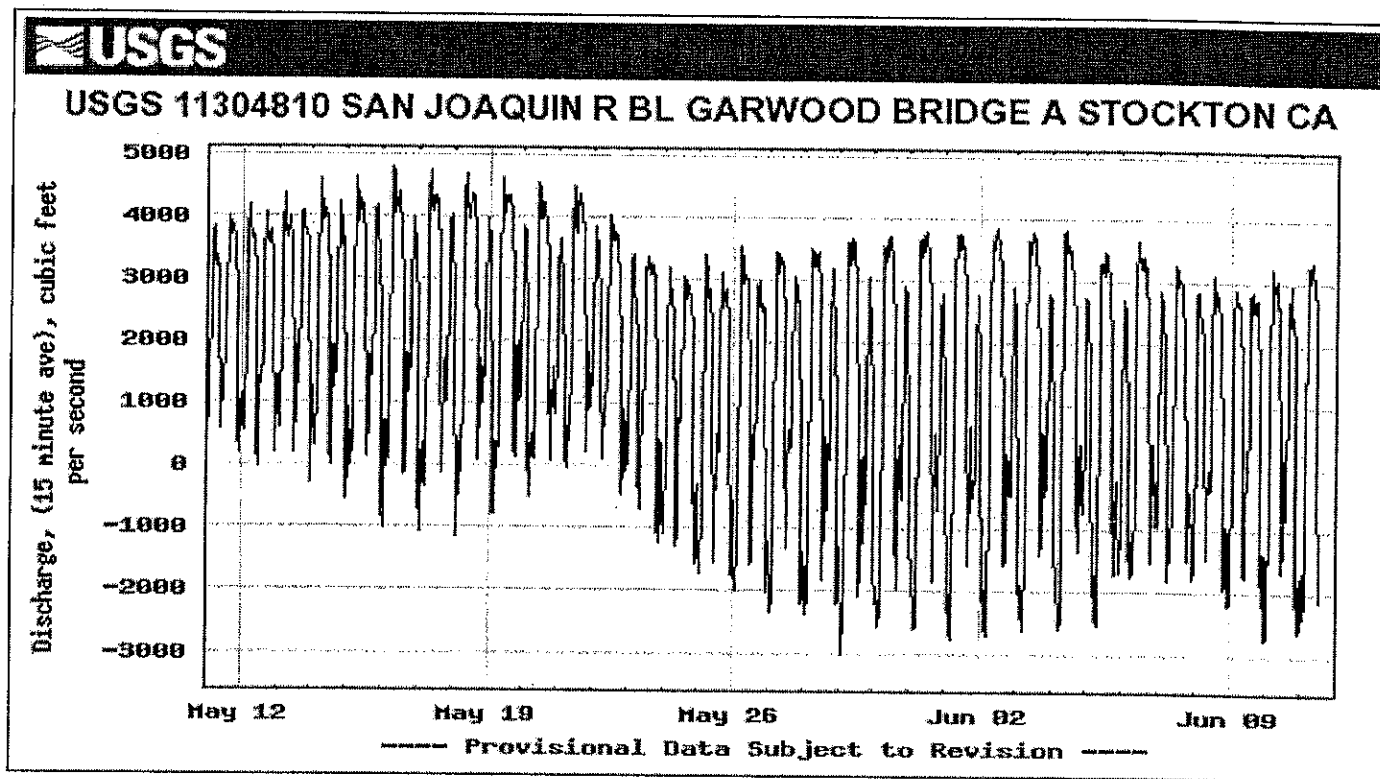


Figure 1. VAMP flows for the San Joaquin River

SUMMARY:

Although the matter is still under investigation, no strong evidence has been found at this time to link a specific event at the facility with the fish mortality event. The facility has been adjusting the operation of the ponds, wetlands, and biofiltration units in order to improve ammonia removal. These units are not meeting the final effluent limitations for ammonia (2 mg/L, monthly average; and 5 mg/L, daily maximum) that will be enforceable on 10 August 2008 as illustrated by the fluctuation in ammonia concentrations in the final effluent provided in Table 1. There are no indications of acute or chronic toxicity in the plant effluent during two separate sets of tests around the timeframe of the fish mortality event. Lastly, the VAMP flows remained in a primarily positive range creating a flow with stops and starts, but no significant reversals of flow direction.

Approved:	PHZ	
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Ann M. Hopkinson
 Ann M. Hopkinson
 Water Resource Control Engineer

ATTACHMENT 1

Stockton RWCF Final Effluent

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05/01/2007 through 05/31/2007												
May 2007	fineff 00095 CNDUCTVY25C UMHO/cm	fineff 00310 BOD 5 mg/L	fineff 00312 CBOD 5 mg/L	fineff 00400 pH FIELD Day Avg. SU (SCADA)	fineff pH Day Max. S.U. (SCADA)	FINEFF pH Day Min. S.U. (SCADA)	fineff 00410 ALK CACO3 mg/L	fineff 00530 TSS mg/L	fineff 00556 O&G mg/L	fineff 00600 Total N mg/L		
01 Tue			AC	AC	AC	AC		AC				
02 Wed			AC	AC	AC	AC		AC				
03 Thu			<2.0	6.7	6.8	6.5		<2.5				
04 Fri			<2.0	6.7	6.8	6.6		<2.5				
05 Sat			<2.0	6.6	6.7	6.5		<2.5				
06 Sun		2.9	<2.0	6.5	6.6	6.5		<2.5			AZ	
07 Mon			<2.0	6.5	7.9	6.3	110	<2.5				
08 Tue	1144		AE	6.5	6.6	6.3		<2.5			AZ	
09 Wed			<2.0	6.5	6.6	6.4		<2.5				
10 Thu			AC	AC	AC	AC		AC				
11 Fri			2.3	6.6	6.7	6.5		4.1				
12 Sat			<2.0	6.6	6.7	6.5		<2.5				
13 Sun			<2.0	6.5	7.2	6.3		<2.5				
14 Mon		2.8	<2.0	6.5	7.0	6.3		<2.5			AZ	
15 Tue			<2.0	6.5	7.0	6.3	AZ	2.7				
16 Wed			<2.0	6.5	6.7	6.3		<2.5				
17 Thu				6.5	7.0	6.4		<2.5				
18 Fri				6.5	7.2	6.4		<2.5				
19 Sat				6.5	6.6	6.5		<2.5				
20 Sun				6.5	6.6	6.4		<2.5				
21 Mon												
22 Tue												
23 Wed												
24 Thu												
25 Fri												
26 Sat												
27 Sun												
28 Mon												
29 Tue												
30 Wed												
31 Thu												
Sum	1144	2.8	<2.0	6.5	6.9	6.4	110	<2.6				
Avg	1144	2.9	2.3	6.7	7.9	6.6	110	4.1				
Max	1144	2.8	<2.0	6.5	6.6	6.3	110	<2.5				
Min	1144	2.8	<2.0	17.0	17.0	17.0	1	17.0	0.0	0.00		
Count	1	2.0	12.0	17.0	17.0	17.0	1	17.0	0.0	0.00		

Stockton RWCF Final Effluent

05/01/2007 through 05/31/2007

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May 2007	finerf 00605 ORGN N mg/L	finerf 00610 NH3 N mg/L	finerf 00615 NO2 N mg/L	finerf 00620 NO3 N mg/L	Finerf 00900 HARDNESS mg/L	Finerf 50050 FLOW MGD	Finerf 70300 TDS mg/L	Finerf 70348 SETT SOL m/L	finerf 00011A Temp. (Calc) Daily Avg. Deg F (SCADA)	Effluent 00300 D.O., mg/L Day Avg (SCADA)
01 Tue						AC		AC		AC
02 Wed						AC		AC		AC
03 Thu						18.60		<0.1	64.9	8.6
04 Fri		11.0				31.20		<0.1	63.0	9.0
05 Sat						32.70		<0.1	62.6	8.7
06 Sun						32.60		<0.1	65.5	7.6
07 Mon		7.1		AZ		31.70		<0.1	70.0	7.1
08 Tue				AZ		31.30	638	<0.1	73.8	8.2
09 Wed		6.7				11.40		<0.1	73.9	6.6
10 Thu						AC		AC		AC
11 Fri		6.7				28.60		<0.1	71.8	8.6
12 Sat						32.30		<0.1	68.9	8.8
13 Sun						32.20		<0.1	69.1	8.8
14 Mon		5.2		AZ		27.90		<0.1	71.2	8.6
15 Tue				AZ		17.30	662	<0.1	70.0	8.6
16 Wed		2.9				28.40		<0.1		8.7
17 Thu						26.70		<0.1		8.6
18 Fri						22.70		<0.1		8.7
19 Sat						23.30		<0.1		8.4
20 Sun						23.30		<0.1		8.2
21 Mon										
22 Tue										
23 Wed										
24 Thu										
25 Fri										
26 Sat										
27 Sun										
28 Mon										
29 Tue										
30 Wed										
31 Thu										
Sum						452.20				
Avg		6.6				26.60	650	<0.1	68.7	8.3
Max		11.0				32.70	662	<0.1	73.9	9.0
Min		2.9				11.40	638	<0.1	62.6	6.6
Count		6.0		0.00	0.00	17.00	2	17.0	12.0	17.0

Stockton RWCF Final Effluent

05/01/2007 through 05/31/2007

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May 2007	fineff 00010A Temp. Water Day Avg Deg C (SCADA)	fineff N00010 Temp. Daily Minimum Deg C (SCADA)	fineff X00010 Temp. Daily Maximum Deg C (SCADA)	fineff G00410 ALK, GRAB mg/L	FINEFF TURBIDITY Day Avg NTU (SCADA)	FINEFF TURBIDITY Daily Min. NTU (SCADA)	FINEFF TURBIDITY Daily Max. NTU (SCADA)
01 Tue	AC	AC	AC		AC	AC	AC
02 Wed	AC	AC	AC		AC	AC	AC
03 Thu	18.3	17.5	18.8		2.0	1.4	3.1
04 Fri	17.2	16.3	17.5		1.4	0.9	2.4
05 Sat	17.0	16.1	17.5		1.5	1.2	1.7
06 Sun	18.6	16.7	19.5		1.3	1.0	1.5
07 Mon	21.1	18.9	22.2		0.9	0.7	1.1
08 Tue	23.2	21.6	24.1	114	0.7	0.7	0.8
09 Wed	23.3	22.8	24.2		0.7	0.7	1.3
10 Thu	AC	AC	AC		AC	AC	AC
11 Fri	22.1	20.1	23.1		1.9	1.3	3.0
12 Sat	20.5	19.3	21.5		1.6	1.3	1.9
13 Sun	20.6	19.0	21.4		1.6	1.0	2.0
14 Mon	21.8	20.1	22.7		1.3	0.9	1.7
15 Tue	21.1	19.6	22.1		1.4	0.8	2.0
16 Wed	20.9	19.6	22.0		1.3	0.9	2.2
17 Thu	20.9	19.5	21.8		1.4	0.7	2.1
18 Fri	20.9	20.3	21.7		0.9	0.5	2.4
19 Sat	21.4	20.3	22.4		0.9	0.7	6.0
20 Sun	21.3	20.5	22.2		1.1	1.0	4.1
21 Mon							
22 Tue							
23 Wed							
24 Thu							
25 Fri							
26 Sat							
27 Sun							
28 Mon							
29 Tue							
30 Wed							
31 Thu							
Sum	20.6	19.3	21.5	114	1.3	0.9	2.3
AVG	23.3	22.8	24.2	114	2.0	1.4	6.0
Max	17.0	16.1	17.5	114	0.7	0.5	0.8
Min	17.0	17.0	17.0	1	17.0	17.0	17.0
Count							

ATTACHMENT 2

CCI/THAMES WATER STOCKTON DESIGN BUILD JOINT VENTURE



SPECIAL PLANT ACCOMMODATIONS (SPA)

(Blank form updated May 10, 2007)

PROJECT NAME		Main Plant Upgrade - SCADA	SPA No. 8L	ICI WW32
DATE SPA INITIATED	SPA NAME			
May 9, 2007	Modify PLCs for flow pacing, GBT quantities, etc			
START DATE	FINISH DATE	Duration		
May 15, 2007	May 17, 2007	Intermittently through 3 days		
CLEARANCE REQUIRED		ACCESS ALTERATION		
no		no		
POTENTIAL FOR SPILL YES OR NO IF YES, ATTACH SPILL PREVENTION PLAN		POTENTIAL SPILL MATERIAL		
CCI/THAMES CONSTRUCTION MANAGER		CELL PHONE		
Dick Richardson		916 496 7643		
CONTRACTORS AND CONTACT PERSONS*		MCC Control Systems	CELL PHONE	
Max Hanson			707 974 9221	
IMPACT TO PLANT Tertiary plant will be shut down for half an hour from 9 a.m. Tuesday May 15 th and will then be on recycle for two hours. GBT will be needed to run for an hour on Thursday about 10.				
ANY POTENTIAL FOR RISK TO COMPLIANCE? NO or MITIGATED - Ops Director to initial Mitigated				
WORK TO BE PERFORMED BY CONTRACTORS: MCC Control Systems ("Meyer")				
<ol style="list-style-type: none"> 1. Ask Operators to shut down wetlands pumps and close wetlands inlet valves and shut down DAFs and filters for half an hour. NBTs may be left on recycle if necessary. Shut down PLC 23 and add firmware. 2. Ask Operators to bring plant back into action on recycle. Shut down PLC 22 for up to 2 hours, which will remove low level protection of recycle pumps (and may necessitate shutting off NBTs). 3. Add level control system that will vary wetlands pump station flow to match raw water pumps flow and maintain raw water channel at level set point. 4. Restart PLC 22 and ask Operators to resume treating water from wetlands channel. Test and adjust new flow control system, which could take 3 or 4 hours. 5. On Wednesday shut off PLC 21 at GBTs for half an hour and add firmware. 6. Also make on-line modifications to PLC 9 at the digesters to receive and totalize flow data from the GBTs. Adjust Panelview, which will take it off line for only a few minutes. 7. On Thursday morning ask Operations to run a GBT, about mid-morning, and verify that the desired flow totalization is happening at PLC 9 at the digesters. 				
WORK TO BE PERFORMED BY PLANT OPERATIONS				
<ol style="list-style-type: none"> 1. Shut down the tertiary plant Tuesday morning from 9 a.m. for half an hour. 2. When Max has finished work on PLC 23, at filter 5, bring the plant back up on recycle, leaving the wetlands pumps off and the inlet valves closed. If preferred the recycle pumps, fans and biotower drives could be run under local control to keep them in service. There would not be low flow protection for the recycle pumps. 3. When Max has finished with PLC 22, resume flow through the wetlands and work with him to test the new control system with various flow rates from the raw water pumps and various raw water channel level set points, which could take 3 or 4 hours. 4. On Wednesday Max will need PLC 21 at the GBTs shut off for half an hour to add firmware. 5. On Thursday from mid-morning run a GBT for about an hour to allow MCC to confirm flow totalization at the digesters PLC. 				

<p>COMMENTS – ANY OPERATIONS TRAINING NEEDED? Yes, as control of flows through wetlands and wetlands pumps will be different. A Draft SOP will be provided before Tuesday on how the wetlands pumps will adjust themselves to maintain the level in the raw water channel as long as they have enough water available from the wetlands. Operators will also need to observe the new indicator of flow from the GBTs that will be on the digesters Panelview, PLC9.</p>	
<p>OPERATIONS* Director of Operations (Greg White)</p>	<p>DATE 5/10/07</p>
<p>MAINTENANCE* Maintenance Supervisor (Richard Saha)</p>	<p>DATE 5/10/07</p>
<p>ENGINEERING* <i>Approved by phone by Dick Richardson per HM</i> Project Engineer or General Superintendent</p>	<p>DATE 5/10/2007</p>
<p>DB JV to PLANT LIAISON* Director of Asset Management (Malcolm McLean)</p>	<p>DATE 5/10/2007</p>
<p>cc above * persons and Fermin Garcia, Paul Muirhead, Main Plant Control Room, Tertiary Control Room, Neil Gittens, Dick Richardson File/Eng.</p>	
<p>Number of attached pages 0</p>	