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COLORADO DISCHARGE PERMIT SYSTEM (CDPS)

SUMMARY OF RATIONALE

City of Longmont Wastewater Treatment Plant

CDPS PERMIT NUMBER CO-0026671, BOULDER COUNTY

TABLE OF CONTENTS

I. TYPE OF PERMIT — *Third Renewal*

II. FACILITY INFORMATION

A. *Facility Type:* — *Domestic- Major Municipal/Domestic Mechanical Plant*

B. *Facility Classification:* — *Class A per Section 100.9.2 of the Regulations for Certification of Water Treatment Plant and Wastewater Treatment Plant Operators.*

C. *Fee Category:* — *Category 21, Subcategory 8*
Category Flow Range: — *10,000,000 GPD up to 49,999,999 GPD*
Annual Fee: — *$14,130*

D. *Legal Contact:*

Mr. Gordon Pedrow, City Manager
City of Longmont; Civic Center
303 Kimbark Street
Longmont, Colorado 80501
(303) + 651-8601
(303) + 651-8590 [FAX]

E. *Facility Contact:*

Mr. John Anderson, Wastewater Treatment Plant Supervisor
City of Longmont Wastewater Treatment Plant
501 E. 1st Street
Longmont, Colorado 80501
(303) + 651-8497/8382
(303) + 651-8590 [FAX]
E-mail= john.anderson@ci.longmont.co.us

F. *Facility Location:*

NW ¼, and NE ¼ of the NW ¼ of Sec 11, T2N, R69W; at 501 E. 1st Street in south Longmont, Colorado. The plant is south and east of the intersection of Martin Street and Highway 119. From this intersection it is .25 miles to the 1st street. Turn left on 1st Street and continue to the treatment plant. The Latitude at the "Headworks", as determined by WQCD staff is 40° 09' 29" and the Longitude is 105° 05' 16"[TopoZone mjl]

ISSUED: December 31, 2002 EFFECTIVE: February 1, 2003 EXPIRATION: January 31, 2008

II. FACILITY INFORMATION

G. Discharge Point:

003A is subsequent to the UV Disinfection and the effluent flume and prior to discharge to the St. Vrain River. The Latitude is 40° 09' 18" and the Longitude is 105° 05' 07" [TopoZone mjl].

004A is an alternate discharge/sampling point that is utilized during flood stage of the St. Vrain River. This second line for the effluent is an alternate discharge line to the river. At flood stage, this line (an "emergency discharge" line) is located at the "Outfall Junction Structure", where the diversion takes place. The outfall pipe is 36 inches in diameter. The Latitude is 40° 09' 17" and the Longitude is 105° 04' 54" [TopoZone mjl].

III. RECEIVING STREAM

FABL Environmental Regulatory Specialists, Inc. has performed an assessment of the stream standards, low flow data, and ambient stream data for the Water Quality Control Division (Division) and determined the assimilative capacities of this water body for the pollutants of concern. The Permit Unit has reviewed the assimilative capacities and determined the appropriate water quality based limitations. This information can be found in Appendix A of this Rationale. The effluent limitations are found in TableVI-1.

IV. FACILITIES EVALUATION

A. Infiltration/Inflow (I/I)

Historical flows at the City's WWTP were analyzed for the years 1992 through 1998 as part of the Camp Dresser & McKee, Inc. infiltration (Ground-Water Dependent) and inflow (Rainfall-Dependent) study. During the wet year of 1995, the WWTP flows exceeded the WWTP effluent flows during the months of May and June, clearly indicating an I/I problem with the collection system. Based upon the 1993 and 1995 WWTP flow data, infiltration accounted for approximately 40 to 60 percent of the wastewater treated at the WWTP. The I/I study demonstrated that main sewer lines, identified as "Trunk", all had a percentage of I/I. The following is a break-out of the sewer lines and the corresponding percentage of I/I. "Trunk #1" had 7.6% I/I of the total of nine trunk lines. "Trunk #2" had 14.7% I/I of the total of nine trunk lines. "Trunk #3" had 22.8% I/I of the total of nine trunk lines. "Trunk #4" had 14.7% I/I of the total of nine trunk lines. "Trunk #5" had 10.8% I/I of the total of nine trunk lines. "Trunk #6" had 7% I/I of the total of nine trunk lines. "Trunk #7" had 10.8% I/I of the total of nine trunk lines. "Trunk #8" had 9.6% I/I of the total of nine trunk lines. "Trunk #9" had 2% I/I of the total of nine trunk lines. Trunk lines #1 and #2 service the oldest portions of the City. The main areas of concern appear to be "Trunks #1, 2, 3, and 4", which account for approximately 60% of the I/I flow within the overall system. The study recommended that because the cost of total rehabilitation of the collection system is too expensive, "Trunks #2 and #3" should receive the initial focus due to the amount of I/I infiltration they contribute to the wastewater collection system. In addition, the City will need to conduct visual inspections to determine the presence of I/I problems and the general physical condition of the system. Visual inspection will require sewer cleaning and the use of a closed-circuit television camera. Visual inspection may consist of smoke testing or simple wet weather observations.

B. Lift Stations

There are two lift stations located in the collection system that are privately owned. Table IV-1 summarizes the informatio available on the lift stations in the wastewater treatment facility area.

IV. FACILITIES EVALUATION

B. Lift Stations

Table IV-1 - Lift Station Summary

Station Name/#	Firm Pump Capacity (gpm)	*Existing Average/ Peak Flows (MGD)	% Capacity (based on peak flow)
Pump Station #1	10,694	8.27/13.6	88%
Pump Station #2A + 2b **	13,889	8.27/13.0	65%
Pump Station #3	10.903	8.27/13.0	84%
Pump Station #4	13,889	7.0/12.0	60%

* Note that the "Existing Average/Peak Flows" are based upon 2001 data.
** Pump Stations 2A and 2B are combined. These pump stations work together, therefore, the firm capacity is with 5 of 6 pumps in operation.

C. Facility Modifications and Resulting Changes in Capacity

The City of Longmont has upgraded the treatment capacity of the facility. This has been accomplished in two Phases.
Phase 1A made the following major components-additions/upgrades:
Average Annual Flow = 11.5 MGD; Maximum Month =14 MGD; Peak Flow = 25 MGD
Loadings: BOD_5 @270 mg/l = 23,000 lbs./day; TSS @175 mg/l = 14,900 lbs./day; Nitrate @ 20 mg/l = 1,700 lbs./day
New primary clarifier flow distribution structure is completed to reduce influent pumping and improve flow distribution among primary clarifiers;
Improvements to several clarifier influent lines;
Abandoned lines and boxes have been removed;
New trickling filter pump station has been built to replace existing pump stations2A and 2B;
and
A new disinfection system utilizing ultraviolet (UV) light was installed. Flow limits provided by the engineer for UV facility are as follows: Average Annual Flow = 14.0 MGD; Maximum Month =17 MGD; Peak Flow = 25 MGD
Phase 1B will make the following upgrades/component-additions by March, 2003:
Average Annual Flow = 14.0 MGD; Maximum Month =17 MGD; Peak Flow = 31 MGD
Loadings: BOD_5 @270 mg/l = 31,500 lbs./day; TSS @175 mg/l = 20,400 lbs./day; Nitrate @ 20 mg/l = 2,350 lbs./day
New vertical turbine pumps have been installed in Pump Station #1;
Improvements to several primary clarifier effluent lines:
Addendum to original plans and specifications resulted in seven aeration basins constructed instead of five.
Addendum to the original plans and specifications resulted in five centrifugal blowers instead of four.
New activated sludge process aeration basins constructed; Dissolved air floatation thickener was added.
Plant Influent Flume (36" Parshall Flume) modified to increase capacity to accommodate 14.0 MGD avg. annual flow; 17 MGD max. month flow and 31 MGD peak flow.
Velocity @ Peak Flow for the Mechanically Cleaned bar screen increased to 2.3 feet per second.
Primary Clarifier Flow Distribution Structure increased Peak Flow to 25 MGD for this particular piece of treatment facility.
Mixed Liquor Junction Structure
Alternate Discharge subsequent to UV to St Vrain River was constructed. This discharge point (004A) is utilized during major flood events.

IV. FACILITIES EVALUATION

C. Facility Modifications and Resulting Changes in Capacity (Continued)

Phase 1B (Continued)
Removed first stage trickling filters#1 and #2;
Removed Second Stage Trickling Filters #1 and #2.
Removed Pump Station #3;
Property Boundary Expanded to accommodate seven new aeration basins;
New Return and Waste Activated Sludge Pumps.

The treatment facility includes headworks with influent flume, mechanical bar screen, and aerated grit chamber. From the grit chamber the flow either goes to Primary Clarifier Flow Distribution Structure or to Pump Station #1 and then to the Flow Equalization Tank where it gravity flows back to the Primary Clarifier Flow Distribution Structure. From the Primary Clarifier Flow Distribution Structure the flow goes to one of four Primary Clarifiers. From the Primary Clarifiers the flow goes to the Aeration Basins. From the Aeration Basins, the flow goes through the Mixed Liquor Junction Structure and then to the one of two Final Clarifiers. From the Final Clarifiers the flow goes through Final Clarifier Junction Structure and then either goes to the Pump Station #4 and into the Nitrifying Trickling Filters (NTF) and then to NTF Effluent Junction Structure or goes to the NTF Effluent Junction Structure and then into the UV Disinfection Structure. After Disinfection, the flow goes either to the Effluent Flume and to the stormwater ditch to the St. Vrain River (003A), or the flow is diverted (during flood stage) to the alternate discharge point (004A), which also deposits the effluent into the St. Vrain River. The evaluation of these treatment components is found below.

UNIT PROCESS	*UNIT PROCESS FEATURES/DESCRIPTION*	*CAPACITY HYDRAULIC/ORGANIC*
Influent Flow Measuring	*36-inch Parshall Flume, ultrasonic sensor/recorder*	*43.5 MGD*
Preliminary Treatment	*2 - Mechanical bar screen w/ 1.0 - inch openings* *2 – Aerated Grit Chambers* *3.25 MG Equalization Basin*	*42.1 MGD*
Primary Treatment Facilities	*4 Primary Clarifiers @ diameters; 85' 70', 80' 95'* *Total Volume = 1.32 MG* *Total Surface Area = 21,640 sq. ft.* *Surface Overflow Rate = 647 gpd/sq. ft.* *Weir Loading Rate = 25,355 gpd/ft*	*53.0 MGD*
Secondary Treatment	*7 - Activated Sludge Basins* *Total Volume = 3.591 MG* *SWD = 15 ft.* *Detention Time = 6.0 hrs. @ 14 MGD* *Organic Loading = 42.9 lbs/1000 cu. ft/d.* *Horsepower = 200 HP (Blower w/fine bubble diffusers)* *Firm Capacity = 13,400 scfm*	*21.5 MGD* *47,875 lbs. BODs/day*

IV. FACILITIES EVALUATION

C. Facility Modifications and Resulting Changes in Capacity (Continued)

UNIT PROCESS	UNIT PROCESS FEATURES/DESCRIPTION	CAPACITY HYDRAULIC/ORGANIC
Secondary Treatment (Continued)	2 - Secondary Clarifiers Total Volume = 3.05 MG Detention Time = 5.2 hrs. SWD = 18 ft Total Surface Area = 22,620 sq. ft. Surface Overflow Rate = 620 gpd/sq. ft @ 14 MGD ADF Weir Loading Rate = 18,870 g/Lft @ 25 MGD peak design flow	26.5 MGD
Disinfection	Ultraviolet Contact Time 3.2 seconds @ peak design flow Minimum Design Dosage 33,863 microwatts/cm^2/sec @ 65% output	25.0 MGD (Peak Flow)
Effluent Flow Measuring Device and Recorder	30-inch w/ 18-inch insert Parshall Flume, ultrasonic sensor/totalizer/recorder	25 MGD

The site application is numbered 4629. The letter from the Division, which indicated approval of the expansion, is dated October 3, 2002 and is addressed to Calvin Youngberg, Water Quality Director for the City of Longmont. The treatment facility was approved for a maximum month average daily flow of 17.0 MGD. The annual average daily flow is 14.0 MGD.

D. Biosolids (Sludge) Treatment and Disposal

The City has added a "Dissolved Air Floatation Thickener as part of Phase 1B to their sludge treatment process. Currently, the biosolids are pumped from the Primary Clarifiers to Gravity Thickeners, then, through Thickened Sludge Pumps either to the Belt Filter Press and then to the Compost Facility or it is pumped to the Anaerobic Digester and then to Land Application. Hence, there are two sludge treatment process implemented by the City: (a) anaerobic digestion and (b) aerated static pile composting. The anaerobic digesters provide conditions for the growth of bacteria, which decompose the organic matter in the sludge and, in the process, raise the temperature of the sludge to more than 35 °C (95 °F). Following anaerobic digestion, the biosolids are pumped into tank trucks and taken to agricultural land by a contract hauler for application as a soil conditioner/fertilizer. During 2001, Parker Ag Service applied 522 dry metric tons (576 dry tons) by at six permitted sites. The total acreage at these sites is 1,583 acres.

The belt filter presses concentrate the thickener's sludge from approximately 5.5% solids (55,000 mg/l) to 24%)240,000 mg/l). This sludge cake is hauled to the compost site three miles east of the City. At the site, the sludge is mixed with wood chips and recycled compost chips to form the core of a compost pile. The pile is covered with a layer of finished compost and aerated using a dedicated blower for 28 days. During this period, the bacteria in the sludge break down the organic material and their activity heats the compost pile to over 55 °C (131 °F). A computerized control system is used to monitor pile temperatures and adjust pile aeration in response to temperature changes. Following the active composting period of 28 days, the piles are torn down and screened to separate the biosolids from the wood chips. The screened compost is placed into curing piles and aerated at a low rate for approximately 30 days. After the curing period, the compost is sampled and tested to insure compliance with all regulations. It is then considered a "Class A biosolids and made available to the public for use as a soil conditioner.

V. PERFORMANCE HISTORY

A. Monitoring Data

1. Table V-1 summarizes the effluent data reported on the monthly Discharge Monitoring Reports (DMR's) for the City of Longmont's WWTP from October, 1995 to June, 2002 for a discharge point that is called by different numbers in EPA's "Permit Compliance System" (PCS). Permit Amendment No. 5 indicates that the discharge point to the storm drainage ditch is 001A and this began in April, 1998 and has continued to the present day. However, the analytical results for 001A are reported under 002A, 002 B and 002C in PCS. PCS discharge point 002A contains the results for analyses performed for all parameters, when the influent/effluent flows are equal to or less than 7.5 MGD. PCS discharge point 002B contains the results for analyses performed for all parameters when the influent/effluent flows are greater than 7.5 MGD or less than 9.0 MGD. PCS discharge point 002C contains the results for analyses performed for all parameters when the influent/effluent flows are greater than 9.0 MGD. The point of measurement is at the effluent flume prior to entering a storm drainage ditch to St Vrain River. See Figure 3.

Table V-1 - Self-Monitoring Results

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows Less than 7.5 MGD 002A December 1995 to February 1995						
Influent Flow, MGD	19	7.09	6.51	7.47	Report	N/A
Effluent Flow, MGD	19	7.09	6.51	7.47	11.55 *	0
Influent BOD_5, mg/l	19	235	214	260	N/A	N/A
Influent BOD_5, lbs/day	19	13,888	12,327	15,682	23,000 *	0
Effluent BOD_5, mg/l {30-Day Ave}	19	7.8	5.0	10.0	30.0	0
Effluent BOD_5, mg/l {7-Day Ave.}	19	8.6	6.0	11.0	45.0	0
BOD_5 Removal, %	19	96.5	95.0	98.0	85.0	0
Influent TSS, mg/l {30-Day Ave.}	19	134	128	164	Report	N/A
Influent TSS, mg/l {7-Day Ave.}	19	151	136	187	Report	N/A
Effluent TSS, mg/l {30-Day Ave.}	19	8.6	7.0	11.0	30	0
Effluent TSS, mg/l {7-Day Ave.}	19	9.4	7.0	14.0	45	0
TSS Removal, %	19	93.8	92.0	95.0	85.0	0
Fecal Coliform, #/100 ml {30-Day Geom. Mean}	19	31.3	20.0	56	3,400	0
Fecal Coliform, #/100 ml {7-Day Geom. Mean}	19	59.0	22.0	210	6,800	0
Total Residual Chlorine, mg/l	19					
30 Day Average		0.004	0.0	0.1 (min.)	0.017	0
Daily Max.		0.0	0.0	0.0	0.033	0

V. PERFORMANCE HISTORY

A. Monitoring Data

Table V-1 - Self-Monitoring Results

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows Less than 7.5 MGD 002A December 1995 to February 1995						
Oil & Grease, mg/l	19	0	0	0	10.0	0
pH, s.u. {Minimum}	18	6.9	6.6	7.3	6.5	0
pH, s.u. {Maximum}	18	7.5	7.2	8.1	9.0	0
Ammonia, Total, mg/l as N	19					
January	4	5.62	4.2	7.5	14.9	0
February	4	5.45	4.2	6.19	14.3	0
March	3	5.4	4.4	6.3	10.4	0
April	2	4.1	3.91	4.29	10.3	0
November	2	6.4	5.7	7.0	12.3	0
December	4	5.3	3.8	6.5	13.2	0
Cyanide, WAD, ug/l	17	1.0	0	3.8	30	0
Cadmium, Total Recoverable, ug/l	7	0.14	0	0.5	4.3	0
Chromium, Total Recoverable, ug/l	7	2.1	0	6.0	15.0	0
Copper, Total Recoverable, ug/l	7	16.6	0	40.0	62	0
Iron, Total Recoverable, ug/l	4	166.2	120	305	Report	N/A
Lead, Total Recoverable, ug/l	7	2.4	0	5.8	45	0
Manganese, Total Recoverable, ug/l	4	26	22	37	Report	N/A
Mercury, Total, ug/l	19	<0.08	0	0.266	0.017	1
Nickel, Total Recoverable, ug/l	4	3.5	0	10	Report	N/A
Silver, Total Recoverable, ug/l	8	1.2	0	2.01	5.5	0
Zinc, Total Recoverable, ug/l	2	41.0	28.0	68.0	Report	N/A
Selenium, Total, ug/l	4	4.2	0	10	Report	N/A
WET, acute						
Fathead Minnows (9/00-6/02), %	7	88.1	16.8	>100	58	1
Ceriodaphnia (9/00-6/02), %	7	>100	>100	>100	58	0

V. PERFORMANCE HISTORY

A. Monitoring Data

* This is a facility capacity and not a permit limit.
≥ = Greater than or equal to
< = Less than
** In the sampling period from July, 2001 to June 2002, there were only seven months where chlorine was used as a disinfectant. UV was used the other seventeen months of the two-year period.

Table V-1 - Self-Monitoring Results (Continued) Monitoring Point 002B

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows > 7.5 MGD or < 9.0 MGD @ 002B October 1995 to May 2002						
Influent Flow, MGD	45	8.11	7.19	8.89	Report	N/A
Effluent Flow, MGD	46	8.43	7.19	9.55	11.55*	0
Influent BOD_5, mg/l	45	235	179	276	N/A	N/A
Influent BOD_5, lbs/day	45	15,851	12,516	18,105	23,000 *	0
Effluent BOD_5, mg/l {30-Day Ave}	46	10.7	6.00	29.0	30.0	0
Effluent BOD_5, mg/l {7-Day Ave.}	46	12.6	6.0	34.0	45.0	0
BOD_5 Removal, %	46	95.3	89.0	97.0	85.0	0
Influent TSS, mg/l {30-Day Ave.}	45	156.5	123	193	Report	N/A
Influent TSS, mg/l {7-Day Ave.}	45	170	128	2110	Report	N/A
Effluent TSS, mg/l {30-Day Ave.}	46	12.0	7.0	37	30	2
Effluent TSS, mg/l {7-Day Ave.}	46	14.2	8.0	47.0	45	2
TSS Removal, %	46	92.1	79.0	95.0	85.0	2
Fecal Coliform, #/100 ml {30-Day Geom. Mean}	46	36.4	21.0	212	3,400	0
Fecal Coliform, #/100 ml {7-Day Geom. Mean}	46	64.5	22.0	869	6,800	0
Total Residual Chlorine, mg/l	46					
30 Day Average		0.01	0.	0.13	0.017	1
Daily Max.		0.04	0	0.97	0.033	3
Oil & Grease, mg/l	24	0	0	0	10.0	0
pH, s.u. {Minimum}	46	7.0	6.5	7.4	6.5	0
pH, s.u. {Maximum}	46	7.33	6.5	7.8	9.0	0

V. PERFORMANCE HISTORY

A. Monitoring Data

Table V-1 - Self-Monitoring Results (Continued) Monitoring Point 002B

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows >7.5 MGD or < 9.0 MGD @ 002B October 1995 to May 2002						
Ammonia, Total, mg/l as N	26					
January	2	5.6	5.3	5.9	13.6	0
February	2	6.0	4.7	7.3	13.2	0
March	4	6.2	4.4	8.1	8.9	0
April	2	9.8	7.1	12.4	7.9	1
May	2	13.2	7.0	19.5	7.1	1
June	3	9.3	4.4	16.6	7.4	1
July	2	3.6	3.6	3.6	7.4	0
August	1	3.8	3.8	3.8	8.5	0
September	2	4.2	3.6	4.9	9.3	0
October	2	7.2	5.6	8.8	10.9	0
November	2	8.1	5.7	10.5	11.0	0
December	2	7.5	6.0	8.9	11.9	0
Cyanide, WAD, ug/l	42	0.17	0	2.6	30	0
Cadmium, Total Recoverable, ug/l	14	0.61	0	5	4.3	0
Chromium, Total Recoverable, ug/l	14	2.7	0	10.0	15.0	0
Copper, Total Recoverable, ug/l	14	16.2	0	28.0	62	0
Iron, Total Recoverable, ug/l	3	117.0	0.124	182	Report	N/A
Lead, Total Recoverable, ug/l	14	1.66	0	8.2	45.0	0
Manganese, Total Recoverable, ug/l	3	15.7	0.027	26	Report	N/A
Mercury, Total, ug/l	45	0.02	0	0.3	0.017	1
Nickel, Total Recoverable, ug/l	3	8.3	0	15	Report	N/A
Silver, Total Recoverable, ug/l	14	0.91	0	1.32	5.5	0
Zinc, Total Recoverable, ug/l	3	25.0	0.036	40.0	Report	N/A
Selenium, Total, ug/l	3	5.0	0	10	Report	N/A

V. PERFORMANCE HISTORY

A. Monitoring Data

Table V-1 - Self-Monitoring Results (Continued) Monitoring Point 002B

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows >7.5 MGD or < 9.0 MGD @ 002B October 1995 to May 2002 WET, acute						
Fathead Minnows, %	15	97.0	58	100	58	0
Ceriodaphnia, %	15	>100	100	>100	58	0

* This is a facility capacity and not a permit limit.
≥ = Greater than or equal to
< = Less than
** In the sampling period from July, 2001 to June 2002, there were only seven months where chlorine was used as a disinfectant. UV was used the other seventeen months of the two-year period.

Table V-1 - Self-Monitoring Results (Continued) Monitoring Point 002C

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows >9.0 MGD @ 002C June 1996 to May 2001						
Influent Flow, MGD	16	9.63	9.0	10.6	Report	N/A
Effluent Flow, MGD	16	9.66	9.12	10.63	11.55*	0
Influent BOD_5, mg/l	16	186.6	146	245	N/A	N/A
Influent BOD_5, lbs/day	16	14,843	11,785	18,600	23,000 *	0
Effluent BOD_5, mg/l {30-Day Ave}	16	8.6	6.0	20	30.0	0
Effluent BOD_5, mg/l {7-Day Ave.}	16	10.1	7.0	22.0	45.0	0
BOD_5 Removal, %	16	95.4	91.0	97.0	85.0	0
Influent TSS, mg/l l {30-Day Ave.}	16	131.6	107	158	Report	N/A
Influent TSS, mg/l {7-Day Ave.}	16	145.7	116	183	Report	N/A
Effluent TSS, mg/l {30-Day Ave.}	16	10.2	6.0	30	30	0
Effluent TSS, mg/l {7-Day Ave.}	16	11.8	7.0	36.0	45	0
TSS Removal, %	16	92.2	81.0	95.0	85.0	1

IV. PERFORMANCE HISTORY

A. Monitoring Data

Table V-1 - Self-Monitoring Results (Continued) Monitoring Point 002C

Parameter	# Samples or Reporting Periods	Reported Concentrations Average/Minimum/Maximum			Previous Permit Limit	No. of Limit Excursions
Flows > 9.0 MGD @ 002C June 1996 to May 2001						
Fecal Coliform, #/100 ml {30-Day Geom. Mean}	16	31.9	23.0	48	3,400	0
Fecal Coliform, #/100 ml {7-Day Geom. Mean}	16	54.3	29.0	93.0	6,800	0
Total Residual Chlorine, mg/l	16*					
30 Day Average		0.004	0.0	<0.05	0.017	0
Daily Max.		0.004	0.0	0.06	0.033	1
Oil & Grease, mg/l	24	0	0	0	10.0	0
pH, s.u. {Minimum}	16	7.15	6.3	7.5	6.5	1
pH, s.u. {Maximum}	16	7.69	7.5	8.1	9.0	0
Ammonia, Total, mg/l as N	16					
April	1	4.7	4.7	4.7	7.2	0
May	3	5.5	3.3	8.5	6.7	1
June	3	3.7	3.4	4.0	6.5	0
July	3	5.7	3.5	7.3	6.4	1
August	4	4.9	3.6	6.2	7.6	0
September	2	5.2	4.2	6.2	8.1	0
Cyanide, WAD, ug/l	16	0.75	0	4.8	30	0
Cadmium, Total Recoverable, ug/l	5	0.21	0	0.56	4.3	0
Chromium, Total Recoverable, ug/l	5	2.0	0	5.0	15.0	0
Copper, Total Recoverable, ug/l	5	6.18	0	14.1	62	0
Lead, Total Recoverable, ug/l	5	2.2	0	6	45	0
Mercury, Total, ug/l	16	0.02	0	<0.2	0.017	0
Silver, Total Recoverable, ug/l	5	0.62	0	2.0	5.5	0
WET, acute						
Fathead Minnows, %	5	>100	100	>100	58	0
Ceriodaphnia, %	5	>100	>100	>100	58	0

V. PERFORMANCE HISTORY

* This is a facility capacity and not a permit limit.
≥ = Greater than or equal to
< = Less than
** In the sampling period from July, 2001 to June 2002, there were only seven months where chlorine was used as a disinfectant. UV was used the other seventeen months of the two-year period.

2. State sampling results for the City of Longmont's treatment plant are summarized in Table V-2 for the Samples taken on March 22, 2000.

Table V-2 - Summary of State Sampling Results

Date	Flow MGD	Temp °F	pH su	DO mg/l	TRC mg/l	Oil&Greas e mg/l	Fec.Col. #/100 ml	BOD mg/l	TSS mg/l	NH_3-N mg/l
3/22/00	7.83	54	6.83		0.02	<10	2	10	<20	4.2

< - "Less than"
* These values exceed permit limits

B. Compliance With Terms and Conditions of Previous Permit

The data shown in the preceding tables indicates that the City of Longmont's facility has not maintained compliance with the previous permit. There are isolated incidences of permit violations. During the times when the effluent flow was less than 7.5 MGD, two violations occurred. One violation was for Mercury (3/31/96) and one violation was for WET testing, which resulted from a low percentage of survival for the Fathead Minnows (3/31/96). During the times when the effluent flow was 7.5 MGD or greater, but less than 9.0 MGD, there were fourteen violations during the time frame of October 1995 and May 2002. There were two violations for effluent Total Suspended Solids for the monthly average concentration. There were two violations in the same months of April 2002 and May 2002 for the maximum concentration for total suspended solids. As a result of these two violations, the facility, also, failed to meet the 85% removal requirement for the same two months. Also, during the time frame when the effluent flow was 7.5 MGD or greater, but less than 9.0 MGD, a violation occurred in the discharge for total residual chlorine. During the month of March 2002, the average monthly concentration was reported as 0.13 mg/l, which is greater than the permit limit of 0.017 mg/l. The daily maximum concentration for total residual chlorine exceeded the permit limit three times. The violation occurred during the months of October 1996, August 2001 and March 2002. The facility did not meet the permit limit for total ammonia during the months April 2002, May 2002 and June 2002. The final violation that occurred during this effluent flow bracket was for Mercury in the month of September 2000.

VI. TERMS AND CONDITIONS OF PERMIT

A. Determination of Effluent Limitations

1. Effluent Limitations - The following limits will apply and are discussed in Sections VI-A.2 and VI-A.3.

Table V-1 - Effluent Limits at 003A and 004A

Parameter	Limit	Rationale
Flow, MGD	17/Report [a]	Design Capacity
BOD_5, mg/l	30/45 [b]	State Effluent Regulations
TSS, mg/l	30/45 [b]	State Effluent Regulations

CONTINUED ON THE NEXT PAGE

VI.TERMS AND CONDITIONS OF PERMIT

A. *Determination of Effluent Limitations*

1. *Effluent Limitations - The following limits will apply and are discussed in Sections VI-A.2 and VI-A.3.*

Table V-1 - Effluent Limits at 003A and 004A

Parameter	Limit	Rationale
Fecal Coliform, no/100 ml	251/502 [e]	Water Quality Standards
Total Residual Chlorine, mg/l	0.017/0.026 [f]	Water Quality Standards
pH, s.u.	6.5-9.0 [d]	Water Quality Standards
Oil and Grease, mg/l	10 [c]	State Effluent Regulations
Total Ammonia (as N), mg/l		
Effective date of Permit		
Jan., Feb. and Dec.	10.8 [a]	Water Quality Standards
Mar., Apr., Aug. And Sep.	7.6 [a]	Water Quality Standards
May, Jun. and Jul.	6.5 [a]	Water Quality Standards
Oct. and Nov.	9.6 [a]	Water Quality Standards
Beginning April 1, 2004		
Jan., Feb. and Dec.	7.4 [a]	Water Quality Standards
Mar., Apr., Aug. And Sep.	5.1 [a]	Water Quality Standards
May, Jun. and Jul.	4.4 [a]	Water Quality Standards
Oct. and Nov.	6.5 [a]	Water Quality Standards
Cadmium, Total Recoverable, ug/l	9.2/24 [f]	Water Quality Standards
Chromium, Hex, Tot. Rec., ug/l	17/22 [f]	Water Quality Standards
Copper, Total Recoverable, ug/l	40/63 [f]	Water Quality Standards
Lead, Total Recoverable, ug/l	15/Report [f]	Water Quality Standards
Selenium, Total Recoverable, ug/l	5.5/23 [f]	Water Quality Standards
Silver, Total Recoverable, ug/l	4.9/27 [f]	Water Quality Standards
Mercury, Total, ug/l	0.015 [f]	Water Quality Standards
Nickel, Total Recoverable, ug/l	Report [f]	Water Quality Standards
Manganese, Total Recoverable, ug/l	Report [a]	Water Quality Standards
Iron, Total Recoverable, ug/l	Report [f]	Water Quality Standards
Zinc, Total Recoverable, ug/l	Report [c]	Water Quality Standards
WET, Chronic Lethality	Statistical Difference and IC25 > IWC = 65% [c]	State Permit Regulations

VI. TERMS AND CONDITIONS OF PERMIT

B. Determination of Effluent Limitations

[a] 30-day average
[b] 30-day average/7-day average
[c] Daily Maximum
[d] Minimum-Maximum
[e] 30-day geometric mean/7-day geometric mean
[f] 30-day average/daily maximum
[g] Inhibition Concentration (IC) and represents an estimate of the effluent concentration at which 25% of the test organisms demonstrate inhibition as reflected by lethality.

2. Discussion of Effluent Limitations

a. <u>BOD_5, TSS and Oil and Grease plus Dissolved Oxygen</u> - BOD_5, TSS, and Oil and Grease limits are taken from State Effluent Regulations (Regulation 62 "Regulations for Effluent Limitations"). No violations of the dissolved oxygen standard are expected due to the amount of instream dilution (85:1) that will occur in the discharge.

b. <u>pH</u> - This parameter is limited by Water Quality Standards. The pH standards of 6.5 and 9.0 are an instantaneous minimum and maximum, respectively.

c. <u>Oil and Grease</u> The limit of 10 mg/l is found in Regulation 62 "Regulations for Effluent Limitations". This limit applies when a "visual sheen" is observed in the discharge. Where a visual sheen is detected, the discharger is required to collect a grab sample and have it analyzed for oil and grease to determine the actual instantaneous concentration.

d. <u>Pollutants Limited by Water Quality Standards</u> - For this renewal, FABL Environmental Regulatory Specialists, Inc completed a Water Quality Assessment (WQA) for the City of Longmont's discharge to the St. Vrain River. The WQA addresses the issues that can affect effluent limits. This document is attached to the end of this rationale as Appendix A. The Permits Unit looked at the proposed limits and determined whether or not there was a reasonable potential for the facility to approach or exceed these proposed limits. The following discussion is meant to highlight the key points made in the assessment and define the final effluent limits.

<u>Fecal Coliform/E. coli</u>: This permit establishes effluent limits for fecal coliform. The Water Quality Control Commission (WQCC) adopted a dual fecal coliform and E. coli criteria in anticipation of a transition from reliance on the former indicator to reliance on the latter indicator. The WQCC intends that both indicators will be adopted as standards for individual water segments as these revisions are implemented in triennial reviews. So long as dual standards are in place for a water segment, the WQCC intends that dischargers have the option of either parameter being used in establishing their effluent limits. The Division did offer the option to the City of Longmont, and the City preferred to have fecal coliform as their effluent limit. As a result, the Division has only included fecal coliform in the permit.

<u>Total Residual Chlorine</u>: Total residual chlorine (TRC) is included in this permit in the event that the City needs to utilize chlorine, as a result of the ultraviolet disinfection failing to reduce the number of fecal coliform colonies to or below the permit limit. The Discharge Monitoring Report (DMR) for outfall 003A shall list the TRC parameter and the corresponding permit limit. The City is requested to report "NCT" (No Chlorine Treatment) in the boxes labeled "Average" and "Maximum", because the facility is using ultraviolet to disinfect the discharge. At such time that it is necessary to use chlorine, in order to meet the permit's fecal coliform limit, then the operator shall report the residual chlorine concentration determined for a sample taken at 003A

In the event that the City decides to use chlorine, the limit placed in the permit shall become applicable. The actual computed water quality based effluent limit is 0.017 mg/l for total residual chlorine.

<u>Total Ammonia:</u> This parameter was determined in the WQA by a ratio calculation. The reason for this is that the segment which the treatment facility discharges into is being modeled as part of a Total Maximum Daily Load (TMDL) development for the Boulder Creek Basin. Hence, prior to EPA's approval of the TMDL, the permit limits will be based on the permitted ammonia loading in the previous permit. The ammonia loading ratio includes the

VI. TERMS AND CONDITIONS OF PERMIT

B. *Determination of Effluent Limitations*

previous flow limit and the previous ammonia limit divided by the new design flow limit. The results of the calculation are found in Table A-8 in Appendix A. In addition, the Division has determined seasonal limits for total ammonia in the permit.

Metals: The mass-balance equation along with the pertinent information is found in the WQA located in Appendix A. The assimilative capacities for the stream for each metal were calculated. The resultant allowable discharge concentrations are found in Table A-6 for chronic assimilative capacities and in Table A-7 for acute assimilative capacities.

The permittee should note that the remaining parameters that are denoted in the Industrial Waste portion of the permit shall continue to be sampled and analyzed on an annual basis. The Environmental Protection Agency requires those facilities classified as "major" [greater than one million gallons per day treatment capacity] to sample for specific parameters, as found in the Permit in Part I A. 7. As a "major" wastewater treatment facility, the City shall perform sampling and analytical procedures in accordance with guidelines established in 40 CFR Part 136. Where sampling methods are not specified the effluent samples collected shall be composite samples consisting of at least twelve (12) aliquots collected at approximately equal intervals over a representative 24 hour period and composited according to flow. Where a flow proportioned composite sample is not practical, the Permittee shall collect at least three (3) grab samples, taken at equal intervals over a representative 24-hour period.

Typically, for metals with dissolved standards, corresponding effluent limits are based upon the potentially dissolved method of analysis, except for hexavalent chromium, which must be analyzed for using the dissolved method. For standards based upon the total and total recoverable methods of analysis, the limits are based upon the same method as the standard, except for arsenic and selenium. However, the City of Longmont has requested that they be allowed to determine compliance with the effluent limits for metal by performing a "monthly composite" and analyzing for the total recoverable species. Regulation 31 "The Basic Standards and Methodologies for Surface Water (5CCR 1002-31)" provides for this option by the permittee. The Division has accepted this option in the previous permit and shall continue to allow the permittee to use the total recoverable analysis for all metals except mercury. The monthly composite sample is prepared as last time i.e., combining equal volumes from a 24-hour composite samples which are taken on a daily basis. The sampling technique will be the most representative of the effluent quality over a 30-day period and the analytical results for the total recoverable species will be as great or greater than those for potentially dissolved species. However, should violations of the total recoverable metals limits occur, the Division will not accept data for potentially dissolved species as a mitigating factor in any decision regarding enforcement for such violations.

Based upon influent and effluent sample results, the Division has decided to maintain limits on the following metals: cadmium, hexavalent chromium, copper, lead, selenium and silver. For hexavalent chromium, samples must be un-acidified to prevent conversion of the trivalent species to hexavalent. However, the City of Longmont has requested that the calculated limit for dissolved hexavalent chromium be applied as a limit for total recoverable chromium using the "monthly composite" sampling technique described above.

For trivalent chromium, iron, manganese, nickel and zinc, comparison of the calculated effluent limit with the analytical concentrations results (based upon the previous DMR's) from effluent samples is not likely to result in violations of the permit limit.

Cyanide was evaluated after review of the last two years of DMR data and a reasonable potential analysis for the same period. The facility has not had a cyanide concentration in its effluent during that time frame. The reasonable potential analysis was performed by multiplying the maximum concentration found in the effluent ("0") for the last two years by three. Comparing this product with the calculated assimilative capacity (found in Appendix A) resulted in a demonstration that there was not a potential for the water quality standard to be exceeded.

VI. TERMS AND CONDITIONS OF PERMIT

A. Determination of Effluent Limitations

2. Discussion of Effluent Limitations – (Continued)

Mercury is included in the permit as it was in the previous permit. Because this facility has experienced an exceedance of the mercury limit, the mercury limit listed in the WQA (As found in Appendix A is 0.015 ug/l) is incorporated into the permit. A new mercury monitoring test method, Method 1631, has been approved by EPA. Quarterly mercury monitoring utilizing Method 1631, will be required for the term of the permit.

e. Whole Effluent Toxicity (WET): The Division's policy for major dischargers (design flow ≥ 1 MGD) requires that their permits include biomonitoring for whole effluent toxicity (WET) with possible limits to determine compliance with narrative standards. See VI.B.5. for further discussion of WET testing requirements. Also, by policy, the Division no longer allows biomonitoring samples to be dechlorinated at the lab or for any ammonia to be inhibited prior to testing.

f. Economic Reasonableness Evaluation - The Water Quality Control Commission, during their proceedings to adopt the Classification and Numeric Standards for the St. Vrain River Basin, considered the economic reasonableness of imposing the classification and standards listed in section VI.A. of this rationale. Since this is not a new discharger and no new information has been presented regarding the classifications and standards, the water quality standard-based effluent limitations of this permit are determined to be reasonably related to the economic, environmental, public health and energy impacts to the public and affected persons in accordance with Section 61.11 of the "Colorado Discharge Permit System Regulations". If the permittee disagrees with this finding, pursuant to 61.11(b)(ii), the permittee should submit all pertinent information to the Division during the public notice period.

Furthermore, this is not a new discharger and no new information has been presented regarding the classifications and standards. Therefore, the water quality standard-based effluent limitations of this permit are determined to be reasonably related to the economic, environmental, public health and energy impacts to the public and affected persons and are in furtherance of the policies set forth in Sections 25-8-102 and 104. If the permittee disagrees with this finding, pursuant to 61.11(b)(ii) of the Colorado Discharge Permit System Regulations, the permittee should submit all pertinent information to the Division during the public notice period.

g. Antidegradation: Since the receiving water is Use Protected, an antidegradation review is not required pursuant to section 31.8(2)(b) of The Basic Standards and Methodologies for Surface Water.

C. Monitoring

1. Influent and Effluent Monitoring - Influent and effluent monitoring will be required as shown in Tables VI-3 and VI-4. Refer to the permit for locations of monitoring points. The Division has maintained the sample frequency from the previous permit.

Table VI-3 - Influent Monitoring Requirements - Outfall 300I

Parameter	Measurement Frequency	Sample Type
Influent Flow, MGD	Continuous	Recorder
Influent BOD_5, lb./day (mg/l)	Daily	Composite
Influent Total Suspended Solids, mg/l	Daily	Composite

* If more than one source is being utilized, a composite sample proportioned to flow shall be prepared from individual grab samples.
** Report both influent and effluent flow, even if only one flow-measuring device is installed. See footnote h/ on page 3 of the permit.

2. VI. TERMS AND CONDITIONS OF PERMIT

B. Monitoring

1. Influent and Effluent Monitoring – (Continued)

Table VI-4 - Effluent Monitoring Requirements - Outfall 003A

Parameter	Measurement Frequency	Sample Type
Effluent Flow, MGD	Continuous	Recorder
Effluent BOD_5, mg/l	Daily	Composite
Effluent Total Suspended Solids, mg/l	Daily	Composite
Effluent Fecal Coliform, no./100 ml	Daily	Grab
Effluent Total Residual Chlorine, mg/l ****	5 x/Day	Grab
Effluent pH, s.u.	Daily	Grab
Effluent Oil & Grease, mg/l	Daily	Visual ***
Effluent Total Ammonia as N, mg/l	Daily	Composite
Effluent Mercury, Total, ug/l	Quarterly	Composite
Effluent Cadmium, Total Recoverable, ug/l	Monthly	Composite
Effluent Chromium, Hex, Total Recoverable, ug/l	Monthly	Composite
Effluent Copper, Total Recoverable, ug/l	Monthly	Composite
Effluent Lead, Total Recoverable, ug/l	Monthly	Composite
Effluent Selenium, Total, ug/l	Monthly	Composite
Effluent Silver, Total Recoverable, ug/l	Monthly	Composite
Effluent Iron, Total Recoverable, ug/l	Annually	Composite
Effluent Nickel, Total Recoverable, ug/l	Annually	Composite
Effluent Manganese, Total Recoverable, ug/l	Annually	Composite
Effluent Zinc, Total Recoverable, ug/l	Annually	Composite
Whole Effluent Toxicity, Chronic	Quarterly	3 Composites/Test

* If more than one source is being utilized, a composite sample proportioned to flow shall be prepared from individual grab samples.
** Report both influent and effluent flow, even if only one flow-measuring device is installed. See footnote h/ on page 3 of the permit.
*** If a visible sheen is noted, a grab sample shall be collected and analyzed for oil and grease. The results are to be reported on the DMR under parameter 03582.
**** In the event that chlorine is used in place of UV Disinfection.

VI. TERMS AND CONDITIONS OF PERMIT

B. Monitoring

3. Biosolids Monitoring

a. **Biosolids Monitoring and Reporting**: Municipalities and treatment facilities, which practice or contract any methods of biosolids disposal, including beneficial use, landfilling, or any combination of disposal methods, are required to determine and report the annual rate of biosolids produced. Annual biosolids production and a description of biosolids disposal practices are to be included in the annual report. Please see Part I, Section D.3 of the permit for more information. Additional requirements apply if land disposal for beneficial use is practiced. (See Part I.A.8. and I.B.3. of the permit for specific requirements).

b. **Land Application of Biosolids for Beneficial Use**

The discharge of solid waste to land for disposal is regulated by the "Colorado Solid Wastes Disposal Sites and Facilities Act" (30-20, Part 1 C.R.S. 1973) Biosolids Regulations, Regulation Number 64, Section 30-20-102(6) of the Act provides an exemption from the Certificate of Designation requirement for biosolids which are used in a beneficial manner and where the disposal of such biosolids is designated as meeting all applicable regulations of the Department, including the Biosolids Regulations.

The City of Longmont Wastewater Treatment Plant is a "Treatment Works Treating Domestic Sewage" (TWTDS) as that term is defined in the Biosolids Regulations, '64.9. As such, the requirements of the Biosolids Regulations are applicable to biosolids produced at this WWTP and which are land applied for beneficial use. The requirements imposed in this permit will be consistent with the Biosolids Regulations. See Parts I.A.8. and I.B.3. of the permit for specific requirements.

There are pathogen reduction and vector attraction reduction alternatives, in addition to those identified in Part I.A.8 b. and c. of the permit which may be allowed per the Colorado Biosolids Regulations, '64.12.B and C. If the permittee intends to use one of these alternatives, the Division and EPA must be informed at least 30 days prior to its use. This change may be made without additional public notice.

Requirements of the Biosolids Regulations are in addition to the monitoring requirements noted above.

4. Pretreatment Program - The permittee has been delegated primary responsibility for enforcing against discharges prohibited by 40 CFR 403.5, and applying and enforcing any National Pretreatment Standards established by the Environmental Protection Agency in accordance with Section 307(b) and (c) of the Act.

As part of the pretreatment program, the permittee is responsible for an annual report describing their pretreatment activities over the previous calendar year. As part of the annual report, the permittee is responsible for influent and effluent sampling of metals and cyanide.

5. Whole Effluent Toxicity (WET) Testing - Biomonitoring

a. Purpose of WET Testing: The Water Quality Control Division has established the use of WET testing as a method for identifying and controlling toxic discharges from wastewater treatment facilities. WET testing is being utilized as a means to ensure that there are no discharges of pollutants "in amounts, concentrations or combinations which are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life" as required by Section 31.11 (1) of the Basic Standards and Methodologies for Surface Waters.

b. General Information: The permittee should read the WET testing sections of Part I.A. and I.B. of the permit carefully. The permit outlines the test requirements and the required follow-up actions the permittee must take to resolve a toxicity incident. The permittee should read, along with the documents listed in Part I.B of the permit, the Colorado Water Quality Control Division Biomonitoring Guidance Document, dated July 1, 1993. This document outlines the criteria used by the Division in such areas as granting relief from WET testing, modifying test methods and changing test species. The permittee should be aware that some of the conditions outlined above

VI. TERMS AND CONDITIONS OF PERMIT

B. Monitoring

4. Whole Effluent Toxicity (WET) Testing – Biomonitoring (Continued)

may be subject to change if the facility experiences a change in discharge, as outlined in Part I.D.4.e) of the permit. Such changes shall be reported to the Division immediately.

c. Instream Waste Concentration (IWC): Where monitoring or limitations for WET are deemed appropriate by the Division, chronic instream dilution as represented by the chronic IWC is critical in determining whether acute or chronic conditions shall apply. According to the Colorado Water Quality Control Division Biomonitoring Guidance Document, dated July 1, 1993, for those discharges where the chronic IWC is greater than (>) 9.1% and the receiving stream has a Aquatic Life Class 1 use or Aquatic Life Class 2 use with all of the appropriate aquatic life numeric standards, chronic conditions apply. Referring to the Water Quality Assessment report in Appendix A to this Rationale, it is determined that the discharge occurs in a segment that is classified as Aquatic Life Class 1. **Where the chronic IWC is less than or equal to (≤) 9.1%, or the stream is not classified as described above, acute conditions apply.** The chronic IWC is determined using the following equation:

$$IWC = [Facility\ Flow\ (FF)/(Stream\ Chronic\ Low\ Flow\ (annual) + FF)]\ X\ 100\%$$

The flows and corresponding IWC for the appropriate discharge point are:

Discharge Point	Chronic Low Flow, 30E3 (cfs)	Facility Design Flow, (cfs)	IWC, (%)
003	14	26	65.0

The IWC for this permit is 65%, which represents a wastewater concentration of 65% effluent to 35% receiving stream, therefore chronic conditions apply to this discharge.

c. **It is Division's practice to require include WET limits in permits for all major domestic facilities. Due to the large number of taps in all major facilities service areas, the likelihood that one or more dischargers to the collection system contributes toxic substances in toxic amounts is significant,** for this reason the Division believes there is reasonable potential for the discharge to interfere with attainment of applicable water quality classifications or standards. Because of this condition, the chronic limit has been incorporated into the permit and becomes effective on the "Effective Date" of this permit. The permittee will be required to conduct two types of statistical derivations on the data, one looking for any statistically significant difference in toxicity between the control and the effluent concentrations and the second identifying the IC_{25}, should one exist. Both sets of calculations will look at the full range of toxicity (lethality, growth and reproduction). If a level of chronic toxicity occurs, such that there is a statistically significant difference in the lethality (at the 95% confidence level) between the control and any effluent concentration less than or equal to the Instream Waste Concentration (IWC) and if the lethality IC_{25} < the IWC, the permittee will be required to follow the automatic compliance schedule identified in Part I.B of the permit, if the observed toxicity is due to organism lethality. Once the chronic lethality limitation becomes effective, only exceedance of the limitation specified in Part I A.5. will trigger the requirement for conducting the automatic compliance schedule identified in Part I.B.4. of the permit. After the limitation becomes effective, if the toxicity is due to differences in the growth of the fathead minnows or the reproduction of the Ceriodaphnia, no immediate action on the part of the permittee will be required. However, this incident, along with other WET data, will be evaluated by the Division and may form the basis for reopening the permit and including additional WET limits or other requirements.

d. Chronic Monitoring will be required on a quarterly basis each year using Ceriodaphnia dubia and fathead minnows. The permittee shall report the LC_{50} for each test. If the $LC_{50} \leq$ 65% effluent and the IC_{25} is < the IWC, the permittee is required to conduct the automatic compliance schedule as identified in Part I.B. of the permit.

VI. TERMS AND CONDITIONS OF PERMIT

C. Reporting

1. Discharge Monitoring Report - The permittee must submit a Discharge Monitoring Report (DMR) monthly to the Division. This report will contain the test results for parameters shown in Tables VI-3/VI-4/VI-5 and Part I, Section B of the permit. The DMR form shall be completed and submitted in accordance with Part I, Section D.2 of the permit.

   Annual Biosolids Report - The permittee will be required to submit an annual Biosolids Report, which includes the results of all biosolids monitoring, performed for the year and information on management practices, land application sites, site restrictions and certifications. The Annual Biosolids Report is due by **February 19th** of the following year. Refer to Part I, Section D.3 of the permit.

2. Special Reports - Special reports are required in the event of a spill, bypass, or other noncompliance. Please refer to Part I, Section D.4 of the permit for reporting requirements.

D. Additional Terms and Conditions

1. Signatory Requirements - Signatory requirements for reports and submittals are discussed in Part I, Section D.1 of the permit.

2. Compliance Schedule

   Ammonia Permit Limits: A compliance schedule has been established in the permit to allow the previous permit ammonia limits to be extended into the present permit. The Division has pursued a compliance schedule, because (a) a potion of the existing treatment facility has experienced a failure resulting in a reduction of the WWTP's ability to nitrify; (b) the newly upgraded portion of the treatment facility to correct the inability to nitrify will be constructed by April, 2003; and (c) the forthcoming TMDL for this segment of the St Vrain River will result in ammonia limits that are more lenient than those calculated for the previous permit or the ones calculated in the WQA for this permit. When the Water Quality Control Commission and EPA approve the TMDL in the St. Vrain Creek Drainage, the Division is responsible to update this permit with newly approved ammonia limits. Because this TMDL is likely to be approved within the next year, the Division has utilized this amount of time for the compliance schedule. If the TMDL ahs not been approved by April 1, 2004, the permittee is responsible to meet the ammonia discharge limits found in the WQA and the discharge permit.

Code	Event	Permit Citation	Due Date
05699	Maintain the previous ammonia limits to allow approval of draft TMDL for St. Vrain Creek before meeting effluent limits at the new design flow.	Part I.A.7.	04/01/04

3. Reopener, Permit Renewal and Fee Information

1. The permit may be modified, suspended, or revoked in whole or in part during its term for reasons outlined in Part II, Section B.8 of the permit.

2. Requirements for permit renewal are discussed in Part II, Section B.9 of the permit.

3. Permit fee requirements are outlined in Part II, Section B.11 of the permit. An annual fee must be paid to the Water Quality Control Division to maintain the status of your permit.

VII. REFERENCES

A. Colorado Department of Public Health and Environment, Water Quality Control Division Files.

B. "Design Criteria for Wastewater Treatment Works", Colorado Water Quality Control Commission, December 1994.

C. "Basic Standards and Methodologies for Surface Water", Regulation No. 31, Colorado Water Quality Control Commission, effective October 30, 2001.

D. "Classification and Numeric Standards South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin", Regulation No. 38, Colorado Water Quality Control Commission, effective January 30, 2002.

E. "Colorado Discharge Permit System Regulations", Regulation No. 61, Colorado Water Quality Control Commission, effective December 30, 2001.

F. "Regulations for Effluent Limitations", Regulation No. 62, Colorado Water Quality Control Commission, effective December 30, 1998.

G. "Pretreatment Regulations", Regulation No. 63, Colorado Water Quality Control Commission, effective August 30, 2000.

H. "Biosolids Regulation", Regulation No. 64, Colorado Water Quality Control Commission, effective March 1, 2000.

I. "Colorado Total Maximum Daily Load and Wasteload Allocation Guidance", Colorado Department of Public Health and Environment, Water Quality Control Division, effective November 1991.

J. "Antidegradation Significance Determination for New or Increased Water Quality Impacts; Procedural Guidance; Version 1, December 2001".

Michael J. Liuzzi
13 November 2002

VIII. PUBLIC NOTICE COMMENTS

A. The Division did receive comments from the permittee on December 23, 2002. A summary of the comments has been provided below with the Division's responses following the summary comment.

Comment No.1: The rationale notes that monitoring for mercury will be quarterly. The permit lists monthly monitoring.

RESPONSE #1: The Division corrected the frequency of monitoring to quarterly for mercury. Both the Rationale and the Permit pages have been corrected.

Comment No.2: Monthly monitoring for cyanide, similar to our current permit is proposed. During the previous permit period, there was never any cyanide detected in our effluent. In addition, this year we did bi-weekly stream monitoring in St. Vrain Creek above and below our effluent for cyanide for over 8 months. We did not find cyanide in any of the samples. These data are available for your review. We request that monitoring for cyanide be dropped from the permit requirements.

VIII. PUBLIC NOTICE COMMENTS

RESPONSE #2: The Division reviewed the information found in Table V-1 for the concentration of cyanide found in the last seven years at the effluent sampling point. The amount of cyanide found in the effluent when the flow was greater than 9.0 MGD was 5 ug/l << 30 ug/l. The amount of cyanide found in the effluent when the flow was greater than 7.5 MGD and less than 9.0 MGD was 3 ug/l << 30 ug/l. The amount of cyanide found in the effluent when the flow was less than 7.5 MGD was 4 ug/l << 30 ug/l. However, the amount of cyanide reported in the last two years, which is the typical amount of data the Division reviews, no cyanide was reported in the effluent. The City of Longmont has an established pretreatment program, hence there is only the need to sample the influent for cyanide (See pretreatment requirements in VI. B. 3.). A Reasonable Potential Analysis was conducted to determine if there was reasonable potential for effluent discharges to cause exceedances of ambient water quality standards. This analysis was performed by multiplying the maximum concentration found in the effluent for the last two years ("0"), by three, and then comparing this product to the calculated assimilative capacities. Because three times the maximum concentration was NOT greater than the discharge limit of 6.8 ug/l, which is less than the PQL, it was assumed that there was NOT a reasonable potential that the effluent could cause an exceedance of the water quality standard. Therefore the requirement to monitor effluent cyanide was deleted from the permit. Furthermore, the permittee has indicated that cyanide is not used in any of the industrial facilities within the service area.

Comment No.3: Our WWTP experienced a failure of the first stage trickling filters early this year and, as a result, has not been able to consistently meet current ammonia limits. We are in construction to replace the lost capacity but the treatment units will not be fully operational until March or April of 2003. The proposed permit contains ammonia limits that are much lower than our current limits, consequently, the WWTP will probably be in noncompliance with these limits as soon as the permit is issued. However, as noted in the rationale, a TMDL for ammonia in the St Vrain basin has been completed and will soon go to public notice. This TMDL includes very different ammonia limits. Was there any consideration of a compliance schedule or interim limits in order to cover the time required for completion of construction, TMDL adoption and permit issuance? We request that the permit include some provisions of this kind.

RESPONSE #3: The permit drafter was unaware of the failure of first stage trickling filters. The expansion that is occurring at the City of Longmont's WWTP was presumed to be the result of a need for increased capacity only. The Division is required to establish a compliance schedule for the City's permit, in order to avoid issuing a permit for limits that cannot be met. The Division has placed a compliance schedule in the permit to allow for the construction of the increased capacity. The ammonia limits shall remain at the previous permit's levels and the present ammonia limits shall be become effective on April 1, 2004. Consideration shall also be given to the new TMDL ammonia limits, which in the draft stage are less stringent than the present permit limits. When the TMDL ammonia limits for the St. Vrain Creek become effective, the Division is responsible for updating the permit to the reflect these new limits.

VIII. PUBLIC NOTICE COMMENTS

Comment No.4: The rationale notes that the pretreatment program is to be "reactivated". We have had a pretreatment program in place since 1982, so this statement is incorrect.

RESPONSE #4: The Division has made the correction to the Rationale.

Comment No.5: The discharge points from the WWTP have been numbered 003A and 004A for no apparent reason. There are no 001 and 002 discharges, so we are not clear why this is the case.

RESPONSE #5: The Division attempted to explain in the Rationale that the PCS data incorporated 002 for the different flow levels to the St Vrain form the outfall flume structure. The emergency by pass point would include another discharge point. The Division is attempting to avoid confusion with the previous permit's nomenclature by establishing a new nomenclature for the primary discharge point as 003 A and the by pass discharge point as 004A. The permit has not been written for different flow ratings (capacities), as a result there will be no need to have a 002A and 002B , etc as is evident in Table V-1 in this Rationale. Discharge points 001A and 002A, etc have been inactivated.

Comment No. 6: There are minor errors and inaccuracies in the rationale and the permit. For example, there are several references to the "Arkansas River" and" the District" in the rationale. The description of the plant processes is also incorrect. There is also a discussion on residual; chlorine in the rationale that implies chlorine is still to be installed. Chlorination facilities are in place even though we are switching to UV disinfection.

RESPONSE #6: The Division contacted the permittee and determined the remaining errors and inaccuracies. These were corrected in the Permit and the Rationale.

B. The Division did receive comments from EPA on December 20, 2002. A summary of the comments has been provided below with the Division's responses following the summary comment.

Comment No.1: The permit must carry over the previous permit limit for mercury. See Boulder Rationale.

RESPONSE #1: The Division corrected the absence of a discharge limit for mercury in the Rationale and the Permit. Because the previous permit's DMR data demonstrated violations of the mercury limit, the WQA limit was established in the Rationale and the Permit. See Appendix A for the mercury limit of 0.015 ug/l.

Comment No.2: The TMDL for ammonia on Boulder Creek segment COSPB009 is scheduled to become final during the term of these renewal permits and the permit needs to reflect compliance with the TMDL wasteload allocations (WLAs) for ammonia if the WLAs are more stringent than the proposed effluent limits.

RESPONSE #2: The Division reviewed the proposed ammonia wasteload allocations from the proposed TMDL and determined that the proposed TMDL ammonia limits will be less stringent than the current permit limits. As a result, the ammonia limits from the previous permit were carried over into the renewal permit.

Michael J. Liuzzi
30 December 2002

APPENDIX A

WATER QUALITY

ASSESSMENT

APPENDIX A
WATER QUALITY ASSESSMENT
ST. VRAIN CREEK
CITY OF LONGMONT WWTF

Table A-1
Assessment Summary

Name of Facility	City of Longmont WWTF
CDPS Number	CO-0026671
WBID - Stream Segment	South Platte River Basin, St. Vrain Creek Sub-basin, Stream Segment 03: Mainstem of St. Vrain Creek from Hygiene Road to the confluence with the South Platte River and Barbour Ponds. COSPSV03
Classifications	Warm Water Aquatic Life Class 1 Class 1a Recreation Agriculture
Designation	Use Protected

I. Introduction

The water quality assessment (WQA) of St. Vrain Creek near the City of Longmont Wastewater Treatment Facility (WWTF) was developed for the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD). The WQA was prepared to facilitate issuance of the Colorado Discharge Permit System (CDPS) permit for the City of Longmont WWTF, CDPS Permit No. CO-0026671, and is intended to determine the assimilative capacities available to the City of Longmont WWTF for pollutants found to be of concern.

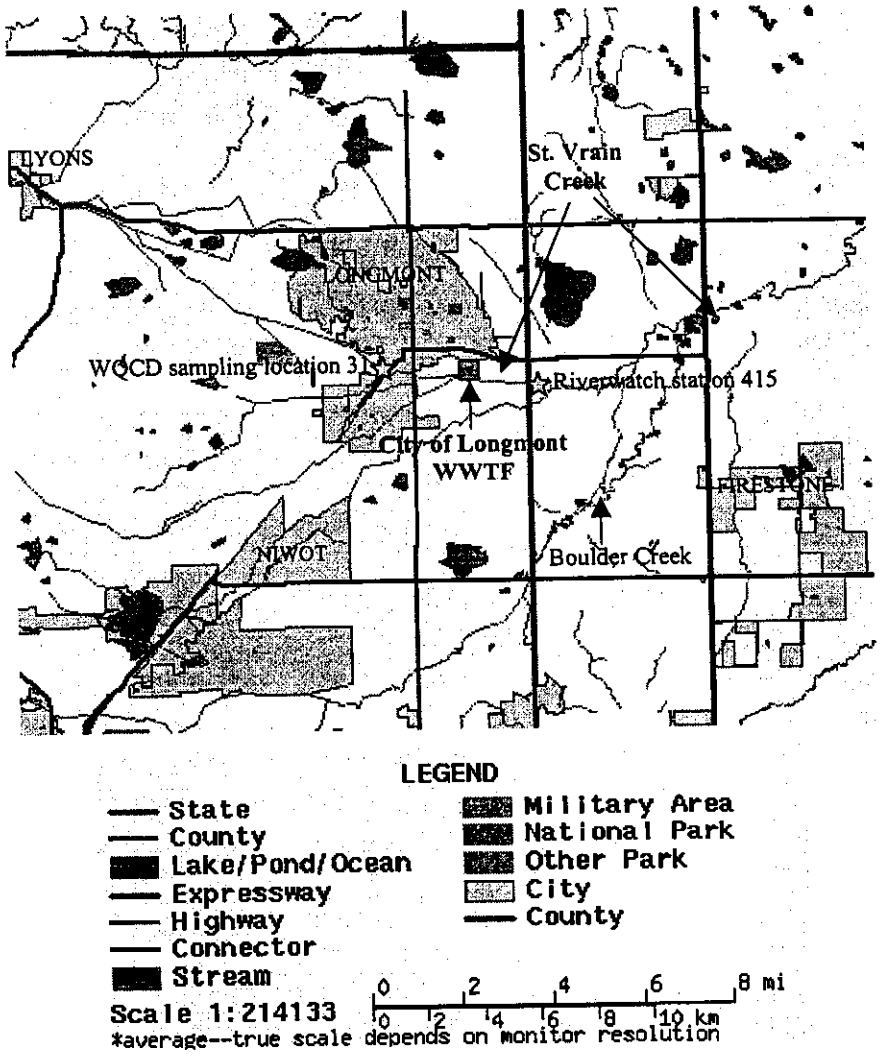
Figure A-1 on the following page contains a map of the study area evaluated as part of this WQA.

The City of Longmont WWTF Outfall 001 discharges to St. Vrain Creek via a drainage ditch that flows along property boundaries. An alternate second outfall, Outfall 002, discharges directly to St. Vrain Creek, but is used only when the area is at the flood stage and then used in lieu of Outfall 001.

The stream segment to which this facility discharges, stream segment COSPSV03, is currently listed on the Colorado 303(d) list of water quality impacted streams for ammonia. Thus, the City of Longmont WWTF is being included in the ammonia modeling that is being conducted as part of the Total Maximum Daily Load (TMDL) development for the Boulder Creek Basin. The in-stream low flow and facility design flow set forth in the TMDL will also be used in this WQA analysis.

The ratio of the low flow of St. Vrain Creek to the City of Longmont WWTF design flow is 0.54:1. The nearest upstream and downstream facilities had no impact on the assimilative capacities available to the City of Longmont WWTF. However, due to the small available dilution, analyses indicate that assimilative capacities are extremely limited.

Figure A-1
Study Area



Source: US Census Bureau, Tiger Map Server

Information used in this assessment includes data gathered from the City of Longmont WWTF, the WQCD, Riverwatch, the U.S. Environmental Protection Agency (EPA), the U. S. Geological Survey (USGS), and communications with the local water commissioner. The data used in the assessment consist of the best information available at the time of preparation of this WQA package.

II. Water Quality

The City of Longmont WWTF discharges to the Water Body Identification (WBID) stream segment COSPSV03, which means the South Platte River Basin, St. Vrain Creek Sub-basin, Stream Segment 03. This segment is composed of the "Mainstem of St. Vrain Creek from Hygiene Road to the confluence with the South Platte River and Barbour Ponds." Stream segment COSPSV03 is classified for Warm Water Aquatic Life Class 1, Class 1a Recreation, and Agriculture.

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. To simplify the listing of the segment-specific standards, many of the aquatic life standards are contained in a table at the beginning of each chapter of the regulations. The standards in Table A-2 have been assigned to stream segment COSPSV03 in accordance with the *Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin.*

Table A-2

In-stream Standards for Stream Segment COSPSV03

Physical and Biological
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH = 6.5 - 9 su
Fecal Coliform = 200 colonies/100 ml
E. Coli = 126 colonies/100 ml
Inorganic
Un-ionized ammonia acute = TVS
Un-ionized ammonia chronic = 0.06 mg/l
Chlorine acute = 0.019 mg/l
Chlorine chronic = 0.011 mg/l
Free Cyanide acute = 0.005 mg/l
Sulfide chronic = 0.002 mg/l
Boron chronic = 0.75 mg/l
Nitrite = 0.5 mg/l
Metals
Dissolved Arsenic chronic = 100 ug/l
Dissolved Cadmium acute and chronic = TVS
Dissolved Trivalent Chromium acute and chronic = TVS
Dissolved Hexavalent Chromium acute and chronic = TVS
Dissolved Copper acute and chronic = TVS
Total Recoverable Iron chronic = 1000 ug/l
Dissolved Lead acute and chronic = TVS
Dissolved Manganese acute and chronic = TVS
Total Mercury chronic = 0.01 ug/l
Dissolved Mercury acute = 0.01 ug/l
Dissolved Nickel acute and chronic = TVS
Dissolved Selenium acute and chronic = TVS
Dissolved Silver acute and chronic = TVS
Dissolved Zinc acute and chronic = TVS

Standards for metals are generally shown in the regulations as Table Value Standards (TVS), and these often must be derived from equations that depend on the receiving stream hardness or species of fish present. The Classification and Numeric Standards documents for each basin include a specification for appropriate hardness values to be used. Specifically, the regulations state that:

> The hardness values used in calculating the appropriate metal standard should be based on the lower 95% confidence limit of the mean hardness value at the periodic low flow

> criteria as determined from a regression analysis of site-specific data. Where insufficient site-specific data exists to define the mean hardness value at the periodic low flow criteria, representative regional data shall be used to perform the regression analysis. Where a regression analysis is not appropriate, a site-specific method should be used.

A regression analysis was conducted using a synthesis of flow data from the Division of Water Resources Gage Station SVCBLOCO (St Vrain Creek Below Longmont, CO), which is located approximately 4.5 miles downstream from the City of Longmont WWTF, and hardness data from the Riverwatch sampling station 415 (Boulder/Weld County Line), located approximately 1.5 miles downstream of the City of Longmont WWTF. These data were available for a period of record from January 1996 through November 1997. Thirty-eight flow and hardness data points were paired, although fifteen data points were excluded due to extreme and uncharacteristically high flow. A regression analysis on the remaining 23 data points was computed to a low flow of 30 cfs, which was the lowest of the measured flows in the data set. The 95th confidence interval was then calculated, resulting in a hardness value equal to 382 mg/l. This hardness value and the formulas contained in the TVS were used to calculate the in-stream water quality standards for metals with the results shown in Table A-3.

Note that the TVS equations published in the January 30, 2002 version of Regulation 38 contained several typographical errors. Because a revision will soon be accomplished, the corrected equations, versus the equations as published, are reflected in this analysis.

Ambient Water Quality

The WQCD evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*. Ambient water quality is evaluated in this WQA for use in determining assimilative capacities and, if applicable, in completing antidegradation reviews for potential pollutants of concern.

To conduct an assessment of the ambient water quality upstream of the City of Longmont WWTF, data were gathered primarily from WQCD sampling location 31 (St. Vrain Creek on Highway 119) located approximately two miles upstream from the facility. Data were available for a period of record from December 1995 through February 2000. As mentioned above, hardness was determined by conducting a regression analysis using flow data from Division of Water Resources Gage Station SVCBLOCO and hardness data from the Riverwatch sampling station. Data from these sources were used to reflect ambient water quality. These data are summarized in TableA-4.

Table A-3

TVS-Based Metals Water Quality Standards For CO-0026671

Based on the Table Value Standards Contained in the Colorado Department of Public Health and Environment Water Quality Control Commission *Regulation 38*

Calculated Using the Following Value for Hardness as $CaCO_3$: 382 mg/l

Parameter	*In-Stream Water Quality Standard*		*Formula Used*
Cadmium, Dissolved	Acute	18 ug/l	$[1.13667-0.04184\ln(\text{hardness})][e^{(1.128(\ln(\text{hardness}))-3.6867)}]$
	Chronic	6.0 ug/l	$[1.10167-0.04184\ln(\text{hardness})][e^{(0.7852(\ln(\text{hardness}))-2.715)}]$
Trivalent Chromium, Dissolved	Acute	1708 ug/l	$e^{(0.819(\ln(\text{hardness}))+2.5736)}$
	Chronic	222 ug/l	$e^{(0.819(\ln(\text{hardness}))+0.5340)}$
Hexavalent Chromium, Dissolved	Acute	16 ug/l	Numeric standards provided, formula not applicable
	Chronic	11 ug/l	Numeric standards provided, formula not applicable
Copper, Dissolved	Acute	48 ug/l	$e^{(0.9422(\ln(\text{hardness}))-1.7408)}$
	Chronic	28 ug/l	$e^{(0.8545(\ln(\text{hardness}))-1.7428)}$
Lead, Dissolved	Acute	268 ug/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-1.46)}]$
	Chronic	10 ug/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-4.705)}]$
Manganese	Acute	4666 ug/l	$e^{(0.3331(\ln(\text{hardness}))+6.4676)}$
	Chronic	2578 ug/l	$e^{(0.3331(\ln(\text{hardness}))+5.8743)}$
Nickel, Dissolved	Acute	1455 ug/l	$e^{(0.846(\ln(\text{hardness}))+2.253)}$
	Chronic	162 ug/l	$e^{(0.846(\ln(\text{hardness}))+0.0554)}$
Selenium, Dissolved	Acute	18 ug/l	Numeric standards provided, formula not applicable
	Chronic	4.6 ug/l	Numeric standards provided, formula not applicable
Silver, Dissolved	Acute	20 ug/l	$\frac{1}{2}\, e^{(1.72(\ln(\text{hardness}))-6.52)}$
	Chronic	3.2 ug/l	$e^{(1.72(\ln(\text{hardness}))-9.06)}$
Zinc, Dissolved	Acute	365 ug/l	$e^{(0.8473(\ln(\text{hardness}))+0.8618)}$
	Chronic	368 ug/l	$e^{(0.8473(\ln(\text{hardness}))+0.8699)}$

Table A-4

Ambient Water Quality for St. Vrain Creek

Parameter	*Number of Samples*	*15th Percentile*	*50th Percentile*	*85th Percentile*	*Mean*	*Chronic Stream Standard*	*Notes*
Temp (°C)	37	5.2	11	19	11	20	
DO (mg/l)	36	7.8	9.9	13	10	5	
pH (su)	26	7.4	8.0	8.5	8.0	6.5-9	
Fecal Coliform (#/100 ml)	33	9.0	210	786	106	200	1,2
Hardness (mg/l CaCO3)	33	85	338	466	286	NA	3
As, Dis (ug/l)	14	0	0	1.0	0.43	100	2
Cd, Dis (ug/l)	40	0	0	0	0	6	2
Cu, Dis (ug/l)	40	0	0	5.0	1.4	28	2
Fe, Dis (ug/l)	14	34	43	59	51	NA	2
Fe, Trec (ug/l)	39	117	430	1290	649	1000	2
Pb, Dis (ug/l)	40	0	0	0	0.068	10	2
Mn, Dis (ug/l)	40	12	24	42	26	2578	2
Hg, Tot (ug/l)	16	0	0	0	0	0.01	2
Se, Dis (ug/l)	39	1.0	3.0	3.0	2.3	4.6	2
Ag, Dis (ug/l)	39	0	0	0	0.013	3.2	2
Zn, Dis (ug/l)	40	0	10	28	11	368	2
B, Tot (mg/l)	14	0.12	0.18	0.21	0.16	0.75	
Sulfate (mg/l)	39	106	200	330	226	NA	
P, Tot (mg/l)	39	0.28	0.60	1.0	0.68	NA	
Nitrate+Nitrite (mg/l)	39	1.1	3.1	5.0	3.2	NA	
TKN (mg/l)	38	0	1.3	2.2	1.3	NA	2
NH_3, Tot (mg/l)	39	0.087	0.30	1.1	0.53	NA	2
NH_3, Unionized (mg/l)	7	0.0028	0.0070	0.028	0.026	0.06	
TSS (mg/l)	39	0	20	54	26	NA	2

Note 1: The calculated mean is the geometric mean. Note that for summarization purposes, the value of one was used where there was no detectable amount because the geometric mean using a value of zero cannot be calculated.

Note 2: Data taken from Riverwatch sampling station 415 (St. Vrain Creek at BW County Road), located approximately 1.5 miles downstream from the City of Longmont WWTF.

Note 3: When sample results were below detection levels, the value of zero was used in accordance with the CO WQCD's standard approach for summarization and averaging purposes.

III. Water Quantity

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval. The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval.

Low Flow Analysis

The low flows available to the City of Longmont WWTF were determined by the WQCD in a recently developed draft TMDL analysis for the Boulder Creek basin. In order to be consistent with the TMDL, the annual low flows as determined in the draft TMDL analysis are also used as part of this assessment. These low flows are set forth Table A-5.

Table A-5

Annual Low Flows for St. Vrain Creek at the City of Longmont WWTF

Annual Low Flows Acute (cfs)	*Annual Low Flows Chronic (cfs)*
9.1	14

IV. Technical Analysis

In-stream background data and low flows evaluated in Sections II and III are ultimately used to determine the assimilative capacity of St. Vrain Creek near the City of Longmont WWTF for potential pollutants of concern. For all parameters except ammonia, it is the WQCD's approach to conduct a technical analysis of stream assimilation capacity using the lowest of the monthly low flows (referred to as the annual low flow) as calculated in the low flow analysis. For ammonia, it is the standard procedure of the WQCD to determine assimilative capacities for each month using the monthly low flows calculated in the low flow analysis, as the regulations allow the use of seasonal flows when establishing assimilative capacities.

The WQCD's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the WQCD to calculate the maximum allowable concentration of pollutants in the effluent, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

where:

Q_1 = Upstream low flow (1E3 or 30E3)
Q_2 = Average daily effluent flow (design capacity)
Q_3 = Downstream flow ($Q_1 + Q_2$)
M_1 = In-stream background pollutant concentrations at the existing quality
M_2 = Calculated maximum allowable effluent pollutant concentration
M_3 = Maximum allowable in-stream pollutant concentration (water quality standards)

The upstream background pollutant concentrations used in the mass-balance equation will vary based on the regulatory definition of existing ambient water quality. For most pollutants, existing

quality is determined to be the 85th percentile. For metals in the total recoverable form, existing quality is determined to be the 50th percentile. For pathogens such as fecal coliform, existing quality is determined to be the geometric mean.

For non-conservative parameters and ammonia, the mass-balance equation is not as applicable and thus other approaches are considered where appropriate. Note that conservative pollutants are pollutants that are modeled as if mass is conserved and there is no degradation, whereas non-conservative pollutants degrade and sometimes are created within a receiving stream depending on stream conditions. A more detailed discussion of the technical analysis for these parameters is provided in the pages that follow.

Pollutants Evaluated

It is the standard procedure of the WQCD to evaluate domestic wastewater treatment facilities for the following pollutants:

- Ammonia
- Fecal Coliform
- Chlorine.

Additionally, it is WQCD's standard procedure to evaluate all metals and cyanide for which there are stream standards when conducting analyses for major domestic wastewater treatment facilities.

During assessment of this facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as potential pollutants of concern.

City of Longmont WWTF: The City of Longmont WWTF is located in the NW 1/4 of Section 11, T2N, R69W of the 6th PM in Boulder County. A proposed expansion at the facility would increase the design capacity from the previously permitted limit of 11.55 MGD (18 cfs) to an expanded design capacity of 17 MGD (26 cfs). Wastewater treatment will continue to be accomplished using a mechanical wastewater treatment process. The technical analyses that follow include assessments of the assimilative capacity based on this expanded design capacity.

Nearby Sources

An assessment of nearby facilities based on EPA's Permit Compliance System (PCS) database found 58 dischargers in the Boulder County area, and 106 dischargers in Weld County, which is approximately two miles downstream of the City of Longmont WWTF. More than one-half of the facilities conducted construction-related operations (e.g., sand and gravel) and thus had no potential pollutants of concern in common with City of Longmont WWTF. Several facilities were discharging to another watershed. Other facilities were located more than twenty miles from the City of Longmont WWTF and thus were not considered. The nearest dischargers were:

- The Town of Lyons WWTP (CO000877), a minor domestic wastewater facility, which discharges to St. Vrain Creek approximately ten miles upstream of the City of Longmont WWTF. This facility shares only fecal coliform, total residual chlorine, and ammonia as pollutants of concern in common with the City of Longmont WWTF. Due to the distance traveled, modeling the Town of Lyons WWTP in conjunction with City of Longmont

WWTF was not necessary, as discussed below. The Boulder Creek TMDL, however, will assess these facilities together when determining ammonia allocations.

- The Longs Peak Water District, Ute Hwy Plant #1 (COG640009), a water supply treatment plant, which discharges to the Highland Supply Ditch, a tributary to St. Vrain Creek upstream of the City of Longmont WWTF. This facility shares only total residual chlorine as a pollutant of concern in common with the City of Longmont WWTF.
- The Niwot Sanitation District (CO0021695), a minor domestic wastewater facility, which discharges to Dry Creek approximately eight miles upstream of Dry Creek's confluence with St. Vrain Creek. This facility shares only fecal coliform, total residual chlorine, and ammonia as pollutants of concern in common with the City of Longmont WWTF.
- The Saint Vrain Sanitation District (CO0041700), a minor domestic wastewater facility, which discharges to St. Vrain Creek approximately seven and a half miles downstream of the City of Longmont WWTF. This facility shares only fecal coliform, total residual chlorine, and ammonia as pollutants of concern in common with the City of Longmont WWTF.
- The Weld County Tri-Area Sanitation District (CO0021580), a minor domestic wastewater facility, which discharges to an unnamed ditch that is a downstream tributary to St. Vrain Creek. This facility shares only fecal coliform, total residual chlorine, and ammonia as pollutants of concern in common with the City of Longmont WWTF.

The ambient water quality background concentrations used in the mass-balance equation account for potential pollutants of concern contributed by upstream sources, and thus it was not necessary to model upstream dischargers together with the City of Longmont WWTF when determining the available assimilative capacities in St. Vrain Creek. Due to the distance traveled, the small contributions by the facilities, and the changes in the characteristics of the receiving stream, modeling downstream facilities in conjunction with City of Longmont WWTF was not necessary.

Based on available information, there is no indication that non-point sources were a significant source of potential pollutants of concern. Thus, non-point sources were not considered in this assessment.

Chlorine: The facility recently has replaced their chlorine contact basin with a UV disinfection system. However, the potential exists for the chlorine contact basin to be used on an emergency basis (i.e., in the case of a UV system failure). This potential situation warrants the establishment of the assimilative capacities available to the facility for the parameter of total residual chlorine.

The mass-balance equation was used to determine the assimilative capacity for chlorine. There are no point sources discharging total residual chlorine within one mile of the City of Longmont WWTF. Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

Using the mass-balance equation provided in the beginning of Section IV, the acute and chronic low flows set out in Section III, the chlorine background concentration of zero as discussed above, and the in-stream standards for chlorine shown in Section II, assimilative capacities for chlorine were calculated. The data used and the resulting calculations of the allowable discharge concentration, M_2, are set forth below.

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1 (mg/l)	M_3 (mg/l)	M_2 (mg/l)
Acute Chlorine	9.1	26	35.1	0	0.019	***0.026***
Chronic Chlorine	14	26	40	0	0.011	***0.017***

Fecal Coliform: There are no point sources discharging fecal coliform within one mile of the City of Longmont WWTF. Thus, fecal coliform assimilative capacities were evaluated separately.

It is the standard approach of the WQCD to perform a mass-balance check to determine if fecal coliform standards are exceeded. WQCD procedure specifies that checks be conducted using only the chronic low flow as set out in Section III. Using the mass-balance equation provided in the beginning of Section IV, the background concentration contained in Section II, and the in-stream standards for fecal coliform shown in Section II, checks for fecal coliform were conducted. The data used and the resulting calculations of the allowable discharge concentration, M_2, are set forth below.

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1 (#/100 ml)	M_3 (#/100 ml)	M_2 (#/100 ml)
Fecal Coliform	14	26	40	106	200	***251***

E. Coli: The E. Coli test and corresponding standard was discussed as an alternative to the fecal coliform test and corresponding standard. Because the E. Coli test is less susceptible to false positives, E. Coli standards, which are equally protective of water quality, are used to determine assimilative capacities for E. Coli.

There are no point sources discharging E. Coli within one mile of the Longmont WWTF. Thus, E. Coli assimilative capacities were evaluated separately.

Because there are no ambient water quality data for E. Coli available at upstream locations, ambient water quality data for E. Coli were synthesized based on current WQCD procedures. Specifically, the ratio of the E. Coli standard to the fecal coliform standard was multiplied by the geometric mean concentration of the upstream ambient water quality for fecal coliform to generate an E. Coli upstream ambient water quality geometric mean concentration. The following formula was used:

$$E.\ Coli_{ambient} = \frac{Fecal\ Coliform_{ambient} \times E.\ Coli_{std}}{Fecal\ Coliform_{std}}$$

$E.\ Coli_{ambient}$ = Calculated upstream ambient water quality geometric mean concentration for E. Coli

$Fecal\ Coliform_{ambient}$ = Upstream ambient water quality geometric mean concentration of 106 colonies/100 mls from Table A-4

$E.\ Coli_{std}$ = In-stream standard of 126 colonies/100 ml for E. Coli

$Fecal\ Coliform_{std}$ = In-stream standard of 200 colonies/100 ml for fecal coliform

Using the data summarized previously, a flow-weighted average downstream hardness value was determined as follows:

$$E.\ Coli_{ambient} = \frac{106\ colonies/100\ ml \times 126\ colonies/100\ ml}{200\ colonies/100\ ml}$$

$$E.\ Coli_{ambient} = 67\ colonies/100\ ml$$

It is the standard approach of the WQCD to perform a mass-balance calculation to determine E. Coli assimilative capacities. WQCD procedure specifies these evaluations are conducted using only the chronic low flow as set out in Section III. Using the mass-balance equation provided in the beginning of Section IV, the background concentration for E. Coli as calculated above, the in-stream standards for E. Coli, assimilative capacities for E. Coli were calculated. The data used and the resulting calculations of the allowable discharge concentration, M_2, are set forth below.

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1 *(#/100 ml)*	M_3 *(#/100 ml)*	M_2 *(#/100 ml)*
E. Coli	14	26	40	67	126	*158*

Metals and Cyanide: Metals and cyanide may be present at large domestic WWTFs that accept discharges from industrial contributors. It is the standard approach of the WQCD to determine the available assimilative capacities for cyanide and those metals for which ambient water quality standards are available.

Using the mass-balance equation provided in the beginning of Section IV, the low flows provided in Section III, the background concentrations contained in Section II, and the in-stream standards for metals shown in Section II, assimilative capacities were calculated. The data used and the resulting calculations of the allowable discharge concentrations, M_2, are set forth below in Table A-6 for chronic assimilative capacities and in Table A-7 for acute assimilative capacities.

Table A-6

Chronic Assimilative Capacities for Metals

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2	*Notes*
As, Dis (ug/l)	14	26	40	1.0	100	***153***	
Cd, Dis (ug/l)	14	26	40	0	6.0	***9.2***	
Cr^{+3}, Dis (ug/l)	14	26	40	0	222	***342***	1
Cr^{+6}, Dis (ug/l)	14	26	40	0	11	***17***	1
Cu, Dis (ug/l)	14	26	40	5.0	28	***40***	
Fe, Trec (ug/l)	14	26	40	430	1000	***1,307***	
Pb, Dis (ug/l)	14	26	40	0	10	***15***	
Mn, Dis (ug/l)	14	26	40	42	2578	***3,944***	
Hg, Tot (ug/l)	14	26	40	0	0.010	***0.015***	
Ni, Dis (ug/l)	14	26	40	0	162	***249***	1
Se, Dis (ug/l)	14	26	40	3.0	4.6	***5.5***	
Ag, Dis (ug/l)	14	26	40	0	3.2	***4.9***	
Zn, Dis (ug/l)	14	26	40	28	368	***551***	

Note 1: No current data were available for dissolved Cr+3,dissolved Cr+6, or dissolved Ni, and no historical data were found at upstream or downstream sampling locations. However, the findings of comparable studies suggest that pollutants consistently found at less than detection levels in-stream are deleted as pollutants of concern for a water body and are no longer analyzed when in-stream sampling is performed. Additionally, ambient water quality samplings throughout the Boulder Creek basin routinely show data for these parameters at less than detection levels. Thus, it has been assumed that dissolved Cr+3,dissolved Cr+6, or dissolved Ni are generally found at less than detectable levels and thus a background concentration of zero was used for these three parameters.

Table A-7

Acute Assimilative Capacities for Metals and Cyanide

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1	M_3	M_2	*Notes*
Cd, Dis (ug/l)	9.1	26	35.1	0	18	*24*	
Cr^{+3}, Dis (ug/l)	9.1	26	35.1	0	1708	*2,306*	1
Cr^{+6}, Dis (ug/l)	9.1	26	35.1	0	16	*22*	1
Cu, Dis (ug/l)	9.1	26	35.1	5.0	48	*63*	
CN, Free (ug/l)	9.1	26	35.1	0	5.0	*6.8*	1
Pb, Dis (ug/l)	9.1	26	35.1	0	268	*362*	
Mn, Dis (ug/l)	9.1	26	35.1	42	4666	*6,284*	
Hg, Dis (ug/l)	9.1	26	35.1	0	0.010	*0.014*	2
Ni, Dis (ug/l)	9.1	26	35.1	0	1455	*1,964*	1
Se, Dis (ug/l)	9.1	26	35.1	3.0	18	*23*	
Ag, Dis (ug/l)	9.1	26	35.1	0	20	*27*	
Zn, Dis (ug/l)	9.1	26	35.1	28	365	*483*	

Note 1: No current data were available for dissolved Cr+3,dissolved Cr+6, free CN, or dissolved Ni, and no historical data were found at upstream or downstream sampling locations. However, the findings of comparable studies suggest that pollutants consistently found at less than detection levels in-stream are deleted as pollutants of concern for a water body and are no longer analyzed when in-stream sampling is performed. Additionally, ambient water quality samplings throughout the Boulder Creek basin routinely show data for these parameters at less than detection levels. Thus, it has been assumed that dissolved Cr+3,dissolved Cr+6, free CN, or dissolved Ni are generally found at less than detectable levels and thus a background concentration of zero was used for these three parameters.

Note 2: In-stream ambient water quality data did not include dissolved Hg analytical results, but did contain total Hg data. In the absence of data for dissolved Hg, the data for total Hg, which were all found a less than detectable levels, were used.

Ammonia: Ammonia is present in the aqueous environment in both ionized and un-ionized forms. It is the un-ionized form which is toxic and which is addressed by water quality standards. The proportion of total ammonia present in un-ionized form in the receiving stream is a function of the combined upstream and effluent ammonia concentrations, and pH and temperature measurements.

Currently, stream segment COSPSV03 is listed on the WQCD's 303(d) list for ammonia. Dischargers to stream segment COSPSV03 are being included in the ammonia modeling that is being conducted as part of the Total Maximum Daily Load (TMDL) development for the Boulder Creek basin.

Because an ammonia Total Maximum Daily Load (TMDL) evaluation is currently being developed for the Boulder Creek, Coal Creek, Saint Vrain Creek basin area, no evaluation of ammonia limits is included in this rationale. Prior to the EPA approval of the TMDL, permit limits will be based on the permitted ammonia loading in the previous permit. To determine the permit limits based on the current permitted load, the following equation is used:

$$\frac{\text{Previous Ammonia Limit X Previous Flow Limit}}{\text{New Flow Limit}}$$

Using this equation, the new ammonia limits for the City of Longmont WWTF are calculated and are set forth in Table A-8.

Table A-8

Ammonia Limits Based on Current Permitted Load

Pollutant	*Previous 30-Day Average Limit (mg/l)*	*Previous Flow Limit (MGD)*	*New Flow Limit (MGD)*	*New 30-Day Average Limit (mg/l)*
NH3, Tot (mg/l) Jan	11.3	11.55	17	7.7
NH3, Tot (mg/l) Feb	10.8	11.55	17	7.3
NH3, Tot (mg/l) Mar	7.4	11.55	17	5.0
NH3, Tot (mg/l) Apr	7.2	11.55	17	4.9
NH3, Tot (mg/l) May	6.7	11.55	17	4.6
NH3, Tot (mg/l) Jun	6.5	11.55	17	4.4
NH3, Tot (mg/l) Jul	6.4	11.55	17	4.3
NH3, Tot (mg/l) Aug	7.6	11.55	17	5.2
NH3, Tot (mg/l) Sep	8.1	11.55	17	5.5
NH3, Tot (mg/l) Oct	9.4	11.55	17	6.4
NH3, Tot (mg/l) Nov	9.7	11.55	17	6.6
NH3, Tot (mg/l) Dec	10.4	11.55	17	7.1

V. Antidegradation Review

As set out in *The Basic Standards and Methodologies of Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as "Use Protected." Note that "Use Protected" waters are waters "that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process" as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this WQA development.

According to the *Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin*, stream segment COSPSV03 is Use Protected. Because the receiving waters are designated as Use Protected, no antidegradation review is necessary in accordance with the regulations. Thus, for purposes of this WQA, antidegradation review requirements have been met for the City of Longmont WWTP permit's issuance process.

VI. References

Colorado Total Maximum Daily Load and Wasteload Allocation Guidance, CDPHE, WQCD, November 1991.

Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin, Regulation No. 38, CDPHE, WQCC, Effective January 30, 2002.

The Basic Standards and Methodologies for Surface Water, Regulation 31, CDPHE, Effective October 30, 2001.

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, WQCD, December 2001.