

## FACT SHEET

PERMITTEE: United States Department of the Air Force  
FACILITY: Air Force Academy Wastewater Treatment Facility  
PERMIT NO.: CO-0020974  
RESPONSIBLE OFFICIAL: Jose L. Rivera Hernandez, Lieutenant Colonel, USAF  
Commander, 10<sup>th</sup> Civil Engineer Squadron  
8120 Edgerton Drive, Suite 40  
USAF Academy, Colorado 80840-2400  
719-333-2660  
Email: jose.riverahernandez.2@us.af.mil

FACILITY CONTACT: Dan Follett  
Office Telephone 719-333-8367  
Cell Phone 719-241-0218  
Email: [danny.follett.ctr@usafa.af.mil](mailto:danny.follett.ctr@usafa.af.mil)

PERMIT TYPE Major Federal Facility, Permit Renewal

### **Background Information**

This fact sheet (statement of basis) is for the renewal of the NPDES permit for the wastewater treatment facility (WWTF) that treats the sanitary wastewater from the Air Force Academy (AFA).

Coverage under the previous permit, which had a February 28, 2011, expiration date, has been administratively extended until coverage under the renewal permit can become effective.

The AFA is the Air Force's military service academy, equivalent to the Army's Military Academy at West Point and the Navy's Naval Academy at Annapolis. Under the North American Industrial Classification System (NAICS), which replaced the Standard Industrial Classification (SIC) Code, military academies at the college level have the classification 611310 (SIC Code 8221), Colleges, Universities, and Professional Schools. Military service academies do not come under the classification 928110 (SIC Code 9711), National Security. The AFA covers an area of approximately 19,000 acres and is located just to the north of the City of Colorado Springs and extends approximately six miles along Interstate Highway 25 (I-25). Most of the AFA is located west of I-25, extending into the edge of the foothills of the Rocky Mountains. According to the permit application, the WWTF serves a population of approximately 16,000. This includes students, housing units for military personnel, and workers that do not live at the AFA.

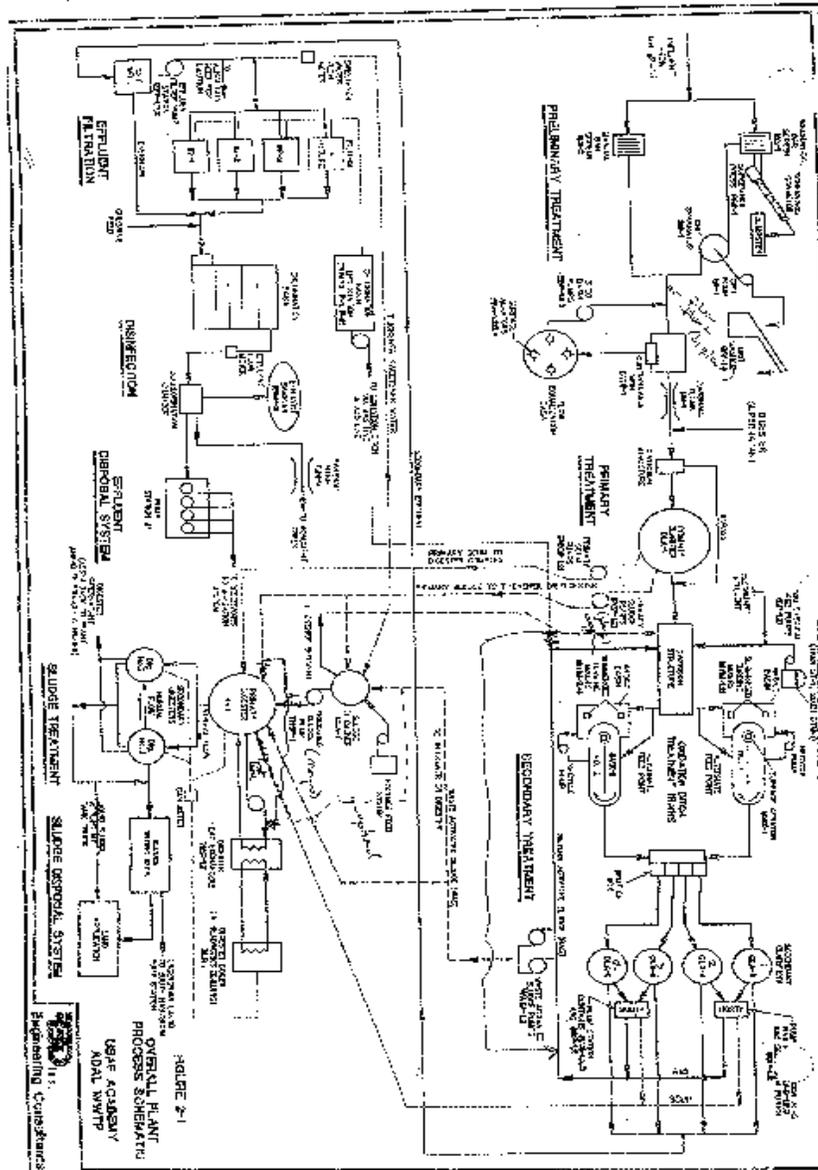
The WWTF is located at approximately latitude 38.984722° N and longitude 104.830000° W (SW1/4, SW1/4 sec. 19, T.12 S, R.66 W) on the west bank of Monument Creek, in the southeastern portion of the AFA. It was first constructed in about 1958 and has undergone several modifications since then, with the last major modification done in 1996. Ultraviolet disinfection was added in 2005. The treatment process includes preliminary treatment (bar screens and grit separation), a flow control weir for diverting excess flow to an off-channel flow equalization basin with aeration, a primary clarifier, two oxidation ditches in parallel, four secondary clarifiers, three filters for filtering the secondary effluent, and ultraviolet disinfection.

Normally only one oxidation ditch and two secondary clarifiers are used. There are chlorination/dechlorination facilities available in case they are needed. Biosolids are thickened and anaerobically digested in a primary digester and two secondary digesters. The treated biosolids are hauled offsite for land application on agricultural land. There are sludge drying beds that are used for backup storage when weather or site conditions prevent the land application of the biosolids as a liquid.

The AFA has coverage under the EPA issued general permit for Federal Facilities in Colorado (COG652000) for the use and disposal of biosolids. A schematic of the treatment process, without the ultraviolet treatment disinfection, is shown in Figure 1 below.

Figure 1

**OVERALL PLANT PROCESS SCHEMATIC  
USAF ACADEMY WASTEWATER TREATMENT FACILITY**



NOTE: The ultraviolet disinfection process is not shown on the above schematic. The complete operation and maintenance of the WWTF is done under a Civil Engineer Support Services contract. The U.S. Air Force is the permittee.

Stormwater discharges from treatment works treating domestic sewage and that have a design flow of 1.0 mgd or greater are required to have coverage under an NPDES permit. The WWTF has met the requirements of 40 CFR §122.26(g), "Conditional exclusion for "no exposure" of industrial activities and materials to storm water." (EPA tracking number CONOE0021, September 21, 2010.)

Therefore, permit coverage is not required for stormwater runoff from the WWTF and no conditions on stormwater runoff from the WWTF will be included in this renewal permit.

In 1994 the Colorado Water Quality Control Division (WQCD) gave site approval for the WWTF. The site approval was for an average flow capacity of 1.4 mgd and an equalized flow capacity of 2.2 mgd. The site approval also specified that there shall be no direct discharge to Monument Creek except in accordance with the bypass provisions of the permit. According to the permit renewal application, the average discharge from the WWTF is 0.70 million gallons per day (mgd), with a maximum discharge of 1.0 mgd. The WQCD has been aware that the permits issued by the EPA have allowed discharges to Monument Creek via Outfall 001A and not exclusively with the by-pass provisions of the permit. The WQCD certified those permits in accordance with section 401 of the Clean Water Act

After treatment, the effluent may be either discharged to Monument Creek via Outfall 001A or to Pumping Station 4 via Outfall 001B. (Note: For purposes of this permit, Outfall 001B is the pipe that connects the WWTF to Pumping Station 4. Unless otherwise specified, except for temperature and flow, the sampling point for both outfalls is the sampling point shown in Attachment A of the permit.) The discharge from Outfall 001A enters Monument Creek via a pipe just to the south of the WWTF (latitude 38.982644° N longitude 104.830175° W). Normally there is no discharge from Outfall 001A.

Normally all the effluent is discharged from Outfall 001B and is pumped via a pipeline to Non-Potable Reservoir No. 1 (NPR#1) for subsequent use in the irrigation of approximately 184 acres of landscape, recreational fields, etc. NPR#1 is located approximately 1 mile north of the WWTF on Lehman Run, an ephemeral drainage tributary to Monument Creek. The flow from the pipeline enters NPR#1 as a surface flow on the south side of the reservoir near the west end of the reservoir (latitude 38.998677° N longitude 104.835028° W). Water can be pumped from NPR#1 to NPR#2, from NPR#2 to NPR#3, and from NPR#3 to NPR#4. NPR#2 and NPR#3 are located near the headwaters of ephemeral drainages tributary to Monument Creek and there is very little runoff into those two reservoirs. NPR#4 is located on Goat Camp Creek, which flows into Deadmans Creek, a tributary to Monument Creek. The four non-potable reservoirs and the WWTF are shown below in Figure 2, which is based on a Google Earth® satellite image of 2011. All four non-potable reservoirs are considered by EPA to be located in waters of the U.S.

To this writer's knowledge, none of the non-potable reservoirs are lined.

During the irrigation season the supply of water for irrigation is supplemented by water pumped from seven wells located on the AFA property. The water rights for those wells are for irrigation use only and pumping from those wells is limited to the irrigation season.

Water from three of the wells (1A, 1B, and 5A) is conveyed to NPR#1 by the same pipeline that contains the effluent from Outfall 001B. Water from well 9A is discharged into NPR#1 at the point where the pipeline from the WWTF discharges into NPR#1.

Water from the three other wells goes into the irrigation water distribution system north of NPR#1. The volume of water from the four wells going into NPR#1 varies and at times may equal or exceed the flow from the WWTF. As will be explained later, the compliance point for all limitations with the possible exception of temperature, is at the WWTF.

The statement of basis for the permit issued in 1995 had the following capacities for the four non-potable reservoirs:

<u>Non-Potable Reservoir Number</u>	<u>Reservoir Capacity Gallons</u>	<u>Types of Areas Irrigated</u>
1	31,850,000	Median Strips
2	71,825,000	Recreational Facilities & Cemetery
3	36,075,000	Parade Field & Athletic Fields
4	22,100,000	N/A

The combined capacity of NPRs 1, 2, and 3 is equal to about six months of flow from the WWTF based on an average flow rate of 0.7 mgd. During years of average and below average precipitation there is not a discharge from NPRs Nos. 1, 2, and 3 unless it is necessary to take one of them out of service due to repairs and/or maintenance. In years of above average precipitation there may be a surplus of water and it may be necessary to discharge excess water from the NPRs. If there is an excess of water for the first three NPRs, water is normally discharged from NPR#3. That discharge would go to an unnamed, ephemeral tributary to Monument Creek. This writer does not know how much, if any, of the discharge reaches Monument Creek before seeping into the ground. There have been occasional discharges from NPR#4 when runoff exceeds available storage capacity. The last overflow from NPR#1 occurred sometime during the 1990s.

Figure 2

NON-POTABLE RESERVOIRS AND WASTEWATER TREATMENT FACILITY AT THE AFA



Below in Figure 3, which is based on a Google Earth® satellite image of 2011, is a closer view of the WWTF showing it located next to Monument Creek and the approximate location of where Outfall 001A enters the creek.

Figure 3  
Satellite View of WWTF at Air Force Academy



The effluent limitations in the previous permit were the same for Outfalls 001A and 001B and are given below in Table 1. The previous permit did not have any restrictions on when a discharge from Outfall 001A could occur. The statement of basis stated that discharges from Outfall 001A directly to Monument Creek will be authorized when use of the non-potable reservoirs is impractical. The limitations on 5-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) and total suspended solids (TSS) were based on the national Secondary Treatment Regulation (40 CFR Part 133) and the Colorado Water Quality Control Commission's Regulation 62, Regulations for Effluent Limitations. The limitation was on CBOD<sub>5</sub> instead of BOD<sub>5</sub> because the WWTF operates in the nitrification mode. The limitations on pH, total residual chlorine, *E. coli*, ammonia nitrogen, and total inorganic nitrogen were based on applicable water quality standards and conditions at the time that permit was issued.

Table 1

## EFFLUENT LIMITATIONS IN PERMIT ISSUED IN 2006

Parameter	30-Day Avg. <u>a/</u>	7-Day Avg. <u>a/</u>	Daily Max. <u>a/</u>
Flow, MGD <u>b/</u>	1.4	N/A	N/A
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> ), mg/L <u>c/</u>	25	40	N/A
Total Suspended Solids(TSS), mg/L <u>c/</u>	30	45	N/A
Total Residual Chlorine (TRC), ug/L <u>c/</u>	11	N/A	19
<i>E. coli</i> , no./100 mL <u>c/ d/</u>	126	252	N/A
Total Inorganic Nitrogen, mg/L as N <u>c/ e/</u>			
January 1 - February 28	23	N/A	N/A
March	24	N/A	N/A
April	25	N/A	N/A
May	24	N/A	N/A
June 1 – October 31	23	N/A	N/A
November	24	N/A	N/A
December	23	N/A	N/A
Ammonia as N, mg/L			
June	24	N/A	26
July	18	N/A	25
August	17	N/A	25
September	22	N/A	26
October	25	N/A	25
Whole Effluent Toxicity, Chronic (Outfall 001A and Outfall 001B)	There shall be no chronic toxicity in a 19% dilution of final effluent discharge.		
The pH of the effluent shall not be less than 6.5 or greater than 9.0 in any single sample or analysis.			
The concentration of oil and grease in any single sample shall not exceed 10 mg/L nor shall there be any visible sheen in the receiving water.			

- a/ See Definitions, Part 1.1, for definition of terms.
- b/ The average flow rate (in million gallons per day) during the period of discharge and the daily maximum flow rate (in a 24-hour period) shall be reported. Flow measurements shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.
- c/ The TRC limits apply when the chlorination system is used. When the Ultraviolet (UV) disinfection system is used at all times, report "N/A" to the TRC field on the Discharge Monitoring Report (DMR). When the results of an analysis is "less than" a numerical value, the numerical value shall be reported and used for averaging purposes, except when results are less than the method detection limit specified below. The following table values shall be reported and used for averaging purposes on the DMR form when the analytical result is less than the specified method detection limit:

<u>Parameter</u>	<u>Method Detection Limit</u>	<u>Table Value</u>
CBOD <sub>5</sub>	1.0 mg/L	0
TSS	4.0 mg/L	0
<i>E. coli</i>	2.2 CFU/100 mL	1
Total Residual Chlorine	50 ug/L	0
Total Inorganic Nitrogen	0.1 mg/L	0

- d/ Effective immediately the quality of effluent discharged by the facility through Outfall 001A and Outfall 001B shall, at a minimum, meet the limitations for *E. coli* organisms.
- e/ For the purposes of this permit, the term "total inorganic nitrogen" is defined as the sum of the concentration of total ammonia (as N) plus nitrate and nitrite (as N).

During the period March 2006 through May 2011 all of the effluent was discharges from Outfall 001B except during the months of March and April 2008 and December 2010, when there were discharges from Outfall 001A.

A summary of the self-monitoring data for Outfall 001B from March 2006 through February 2013 is given below in Table 2. A review of the data shows that with the exception of one week during March 2007, the effluent was in compliance with the effluent limitations.

During that one week the concentrations of CBOD<sub>5</sub> and TSS averaged 55.5 mg/L and 53 mg/L, respectively. Those high concentrations were attributed to an upset of an unknown cause. The discharge data for Outfall 001A is similar to that for Outfall 001B and shows compliance with the effluent limitations.

**TABLE 2**  
**SUMMARY OF SELF-MONITORING RESULTS FOR OUTFALL 001B**  
**MARCH 2006 THROUGH FEBRUARY 2013**

Effluent Characteristic	30-Day Average Concentration			7-Day Average Concentration			Daily Maximum Concentration			Effluent Limitation		
	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	30-Day	7-Day	Max
pH, su							6.5		8.4			a/
CBOD <sub>5</sub> , mg/L	1	2.57	17.7	1	4.21	55.5	N/A	N/A	N/A	25	40	
TSS, mg/L b/	0.4	4.21	28.2	1.8	7.13	53	N/A	N/A	N/A	30	45	
Oil & Grease, Visual							None Observed			No sheen & 10 mg/L maximum		
<i>E. coli</i> CFU/100mL d/	1	3.36	38	1	11.45	141.8	N/A	N/A	N/A	126	252	N/A
Flow, MGD	0.14	0.56	0.78	N/A	N/A	N/A	N/A	N/A	N/A	1.4	N/A	N/A
Zinc, mg/L	N/A	N/A	N/A	N/A	N/A	N/A	0.033	0.074	0.140	N/A	N/A	N/A
Selenium, ug/L c/	N/A	N/A	N/A	N/A	N/A	N/A	1	1.2	2.7	N/A	N/A	N/A
TRC, ug/L e/	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NH <sub>3</sub> -N, mg/L												
June	0.042	0.14	0.353	N/A	N/A	N/A	0.1	0.50	1.8	24	N/A	26
July	0.064	0.16	0.27	N/A	N/A	N/A	0.116	0.57	1.31	18	N/A	25
August	0.028	0.17	0.424	N/A	N/A	N/A	0.046	0.62	2.75	17	N/A	25
September	0.046	0.33	0.693	N/A	N/A	N/A	0.144	1.13	2.53	22	N/A	26
October	0.09	0.44	1.46	N/A	N/A	N/A	0.18	1.74	7.66	25	N/A	25
Tot. Inorganic Nitrogen, mg/L												
Jan. – Feb.	4.3	9.6	15.9	N/A	N/A	N/A	N/A	N/A	N/A	23	N/A	N/A
March	6.5	12.1	20.7	N/A	N/A	N/A	N/A	N/A	N/A	24	N/A	N/A
April	6.6	12.4	24.5	N/A	N/A	N/A	N/A	N/A	N/A	25	N/A	N/A
May	5.8	10.4	17.6	N/A	N/A	N/A	N/A	N/A	N/A	24	N/A	N/A
June-October	2.7	8.9	19.0	N/A	N/A	N/A	N/A	N/A	N/A	23	N/A	N/A
November	5.8	9.3	17.0	N/A	N/A	N/A	N/A	N/A	N/A	24	N/A	N/A
December	4.2	8.1	15.4	N/A	N/A	N/A	N/A	N/A	N/A	23	N/A	N/A
Chronic Whole Effluent Toxicity – None at 19% Effluent												

a/ Limits were 6.5 minimum and 9.0 maximum

b/ The previous permit specified that analytical values for TSS less than 4.0 mg/L were to be reported as zero. The zero values were not used in determining the summary values for this table.

c/ Results for June, 2010 reported as <20 ug/L, which was the MDL for that analysis of that sample. The <20 ug/L value was not included in the summary of results for selenium.

d/ Geometric mean instead of average.

e/ Did not chlorinate.

## **Receiving Waters Classifications**

In 2013, the Colorado Water Quality Control Commission (WQCC) made revisions to the water quality classifications, standards and designations for multiple segments in the Arkansas River Basin, Regulation #32 (5 CCR 1002-32). The changes were effective December 31, 2013. One of the changes included splitting lakes and reservoirs from segments that also contained streams, so that new temperature standards could be adopted.

With the exception of NPR#1, all the lakes and reservoirs in Fountain Creek segment 3a were placed in a new Fountain Creek segment 10. NPR#1 was removed from Fountain Creek segment 3a and placed in a new Fountain Creek segment 11. That segment included “All lakes and reservoirs which are tributary to Fountain Creek which are not within the boundaries of National Forest or Air Force Academy lands, except AFA Non-Potable Reservoir #1, from a point immediately above the confluence with Monument Creek to the confluence with the Arkansas River, excluding the specific listings in segments 7a and 7b.”

Segment 11 is classified for Aquatic Life Warm 2, Recreation E, Water Supply, and Agriculture.

On March 11, 2014, at the request of the AFA, the WQCC approved a wording change to the description of segment 11 and changed the designation of segment 11 from undesignated to use protected. The description of segment 11 is “AFA Non Potable Reservoir #1 and all lakes and reservoirs tributary to Fountain Creek from a point immediately above the confluence with Monument Creek to the confluence with the Arkansas River, excluding lakes and reservoirs within the boundaries of the National Forest and other lakes on the Air Force Academy and the specific listings in segments 7 and 7b.” These changes were effective April 30, 2014.

The main stem of Monument Creek from the boundary of National Forest lands to the confluence with Fountain Creek is segment 6 of the Fountain Creek basin. On those rare occasions when there is a discharge from Outfall 001A, the discharge goes to segment 6 of the Fountain Creek basin. Segment 6 has the same use classifications as segment 11. Segment 6 is undesignated, which means antidegradation analyses must be considered when determining effluent limitations for Outfall 001A.

In addition to the new temperature standards, the total phosphorus and chlorophyll *a* portion of the new nutrient standards, various miscellaneous changes were considered. It should be noted that for the lakes and reservoir segments the total phosphorus and chlorophyll *a* standards have been footnoted that they apply only to lakes and reservoirs larger than 25 acres surface acres. NPR#1 has a surface area less than 25 acres.

The classifications, designations and WQS for Fountain Creek segment 6 and the new Fountain Creek segment 11 are given in Table 3 below. Segment 10 is not included because there is no direct discharge from the WWTF to the other three NPRs. Any wastewater going into those three NPRs is pumped from NPR#1, a water of the U.S., to NPR#2, then to NPR#3, and sometimes to NPR#4.

TABLE 3  
Classifications and WQS for Fountain Creek Segments 6 and 11 Effective 12/31/2013

	Fountain Creek – Segment 11 <u>a</u> /	Fountain Creek - Segment 6
Designation	Use Protected	Not designated
Classification	Aq Life Warm 2	Aq Life Warm 2
	Recreation E	Recreation E
	Water Supply	Water Supply
	Agriculture	Agriculture
Physical & Biological	T = TVS(WL) °C	T=TVS(WS-II) °C
	D.O. = 5.0 mg/L	D.O. = 5.0 mg/L
	pH = 6.5-9.0	pH = 6.5-9.0
	<i>E. coli</i> = 126/100 mL	<i>E. coli</i> = 126/100 mL
	Chla = 20 ug/L (tot) <sup>B</sup>	Chla = 150mg/m <sup>2</sup> <sup>C</sup>
Inorganic, mg/L	NH <sub>3</sub> (ac/ch) = TVS	NH <sub>3</sub> (ac/ch) = TVS
	CL <sub>2</sub> (ac) = 0.019	CL <sub>2</sub> (ac) = 0.019
	CL <sub>2</sub> (ch) = 0.011	CL <sub>2</sub> (ch) = 0.011
	CN = 0.005	CN = 0.005
		S = 0.002
	B = 0.75	B = 0.75
	NO <sub>2</sub> = 0.5	NO <sub>2</sub> = 0.5
	NO <sub>3</sub> = 10	NO <sub>3</sub> = 10
	Cl = 250	Cl = 250
	SO <sub>4</sub> = WS	SO <sub>4</sub> = WS
	P = 83 ug/L (tot) <sup>B</sup>	P = 170 ug/L (tot) <sup>C</sup>
Metals, ug/L	As (ac) = 340	As (ac) = 340
	As (ch) = 0.02-10 (Trec) <sup>A</sup>	As (ch) = 0.02-10 (Trec) <sup>A</sup>
	Cd (ac/ch) = TVS	Cd (ac/ch) = TVS
	CrIII (ac) = 50 (Trec)	CrIII (ac) = 50 (Trec)
	CrIII (ch) = TVS	CrIII (ch) = TVS
	CrVI (ac/ch) = TVS	CrVI (ac/ch) = TVS
	Cu (ac/ch) = TVS	Cu (ac/ch) = TVS <u>b</u> /
	Fe (ch) = WS (dis)	Fe (ch) = WS (dis)
	Fe (ch) = 1000 (Trec)	Fe (ch) = 1000 (Trec)
	Pb (ac/ch) = TVS	Pb (ac/ch) = TVS
	Mn (ac/ch) = TVS	Mn (ac/ch) = TVS
	Mn (ch) = WS (dis)	Mn (ch) = WS (dis)
	Hg (ch) = 0.01 (tot)	Hg (ch) = 0.01 (tot)
	Mo(ch) = 160 (Trec)	Mo(ch) = 160 (Trec)
	Ni (ac/ch) = TVS	Ni (ac/ch) = TVS
	Se (ac/ch) = TVS	Se (ac/ch) = TVS
	Ag(ac/ch) = TVS	Ag (ac/ch) = TVS
Zn (ac/ch) = TVS	Zn (ac/ch) = TVS	

- (A) Whenever a range of standards is listed and referenced to this footnote, the first number in the range is a strictly health-based value, based on the Commission's established methodology for human health-based standards. The second number in the range is a maximum contaminant level, established under the federal Safe Drinking Water Act that has been determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. Control requirements, such as discharge permit effluent limitations shall be established using the first number in the range as the ambient water quality target, provided that no effluent limitation shall require an "end-of-pipe" discharge level more restrictive than the second number in the range. Water bodies will be considered in attainment of this standard and not included on the Section 303(d) List, so long as the existing ambient quality does not exceed the second number in the range.
- (B) Total phosphorus (TP) and chlorophyll *a* standards apply only to lakes and reservoirs larger than 25 acres surface area. (Note: NPR#1 has a maximum surface area less than 25 acres.)
- (C) Total phosphorus and chlorophyll *a* standards apply only above the facilities listed at 32.5(4). (Note: The Colorado Springs Utilities were listed and they are downstream from the AFA WWTF.)
- a/ NPR#1 was in segment 3a in the old classification and is in segment 11 under the new classification.
- b/ For Fountain Creek segment 6 under Temporary Modifications and Qualifiers it states "Copper BLM-based Fixed Monitoring Benchmark (FMB). Copper FMBa = 28.4 ug/L Copper FMBc = 17.8 ug/L for a sub-segment of Monument Creek from immediately above the Tri-Lakes Wastewater Treatment Facility to the North Gate Boulevard Bridge." That sub-segment is upstream from the discharges from the WWTF.

**Note:** Statewide standards for nonylphenol (acute/chronic) will be applied to both stream segments. The Colorado Water Quality Control Commission made the criteria effective January 1, 2011, "with the understanding that the normal permitting process would be followed. Effluent limits would not normally be imposed during the first round of permit renewals, but monitoring would be required as a first step."

### **Water Quality Considerations**

Because the two permitted discharges, Outfalls 001A and 001B, go to two different streams with different water quality standards, it is necessary to consider water quality based effluent limitations (WQBELs) and anti-degradation requirements for each outfall separately.

In 2007 and 2010 the Water Quality Control Commission developed detailed water quality criteria for temperature, which are given in Table 1 of Section 31.16 of Regulation 31. Prior to now the temperature criteria had not been included in the Arkansas River Basin (Regulation 32).

The August 2013 changes to Regulation 32 included assigning temperature standards for most segments, with the changes effective December 31, 2013. For Fountain Creek segment 6 the temperature criterion is T=TVS(WS-II) °C. For the new Fountain Creek segment 11 the temperature criterion is T=TVS(WL) °C.

Table 4 below shows the temperature classifications for the two stream segments, the months the summer and winter criteria apply, the summer and winter criteria, and the maximum effluent temperatures observed during the period of May, 2008, through September, 2011. Those effluent temperature data indicate that the discharge would not exceed the acute or chronic temperature criteria for either receiving water, especially during the “summer” months. However, the effluent temperature data are based on daily grab samples taken at the WWTF and does not meet the sampling requirements of the WQCD. The temperature of the water entering NPR#1 would be affected by any temperature change that occurred in the pipeline from the WWTF to NPR#1, the effects of ground water being pumped into the pipeline during the irrigation season, and the temperature change that occurs when the water flows down the constructed drainage way from the end of the pipeline into NPR#1.

TABLE 4  
Comparison of Temperature Criteria and Maximum Observed Temperatures

Outfall	Temperature Classification <u>a/</u>	Applicable Months	Temperature Standard (°C)		Maximum Temperature Observed (°C) <u>d/</u>
			MWAT <u>b/</u> (°C)	DM <u>c/</u> (°C)	
001A	T=TVS(WS-II)	March-Nov.	27.5	28.6	20.6
		Dec.-Feb.	13.7	14.3	12.8
001B	T=TVS(WL)	April-Dec.	26.5	29.3	20.6
		Jan.-March	13.3	14.6	12.2

a/ Based on applicable classifications for the Arkansas River Basin (Regulation 32) effective 12/31/2013.

b/ Maximum Weekly Average Temperature (MWAT). The MWAT is calculated as the largest mathematical mean of multiple, equally spaced temperatures over a seven-day consecutive period, with a minimum of three data points spaced equally through the day.

c/ Daily Maximum Temperature (DM). The DM means the highest two-hour average temperature recorded during a given 24-hour period. The daily maximum should be calculated from a minimum of 12 measurements spaced equally through the day.

d/ Maximum temperature observed at the WWTF for the applicable months based on daily grab samples for the period of May, 2008, through September, 2011.

The permit will require detailed effluent temperature monitoring to determine if the effluent meets the temperature criteria. It would be easier to monitor effluent temperature at the WWTF and that would provide data for the rare occasions when there are discharges to Monument Creek via Outfall 001A. Temperature monitoring at the point where the water enters NPR#1 would provide more accurate data on the temperatures of the water entering NPR#1, but logistically would be more difficult to do. The permit will give the permittee the option of selecting the point to monitor temperature. The permittee has the option to monitor temperature regularly at the WWTF and occasionally at NPR#1 to show what happens to the temperature between the two points.

The Water Quality Control Commission on June 11, 2012, adopted Regulation No. 85, Nutrients Management Control Regulation, with an effective date of September 30, 2012. Section 85.5 includes specific limitations for dischargers of total inorganic nitrogen and total phosphorus, which are to be implemented in permits no sooner than July 1, 2013. The effluent limitations are not to be included into permits for domestic wastewater treatment works (DWWTW) with a design capacity of less than or equal to 1.0 million gallons per day and not to be included in permits for any existing permitted DWWTW with a design capacity of less than or equal to 2.0 million gallons per day prior to May 31, 2022.

Since the AFA WWTF has an approved design capacity of 1.4 million gallons per day, the effluent limitations based on Regulation No. 85 will not be considered for this permit.

**However, those effluent limitations will need to be considered in the future and the permittee should be evaluating methods for meeting them, especially the limitations on total phosphorus. Monitoring for total nitrogen and total phosphorus will be included in this permit.**

### Water Quality Considerations for Outfall 001A

Although discharges from Outfall 001A to Monument Creek seldom occur, it is occasionally necessary for the permittee to discharge from Outfall 001A when it is not practical to discharge from Outfall 001B to NPR#1. The pollutants of potential concern for a discharge to Monument Creek include *E. coli*, total inorganic nitrogen, ammonia, metals and cyanide. Monument Creek is on the State of Colorado's Section 303(d) list of impaired waters for *E. coli* for May to October. Total inorganic nitrogen is of concern because of the water supply intake downstream near Pikeview and the potential formation of nitrates. Ammonia is of concern because of the potential toxicity to aquatic life in Monument Creek. It is the WQCD's standard procedure to consider metals and cyanide of potential concern for all major WWTFs.

The amount of dilution flow available for the discharge from Outfall 001A is based on the flow data for USGS gaging station 07103780. This gaging station is located on Monument Creek approximately 0.8 mile upstream from the North Gate Boulevard at the AFA and has been in operation since April 1985. The WQCD used data for this station and other data for Monument Creek in developing some of the effluent limitations for the renewal permit for the Tri-Lakes WWTF (CO-0020435) that was reissued effective January 1, 2012. Although there are flow data for USGS gaging station 07103780 from 1985 to the present, data from October 4, 2000 through October 3, 2010 were used by the WQCD in calculating the 1E3, 7E3, and 30E3 low flow values given in Table 5 below.

The WQCD did not use the flow data prior to October, 2000, because of the significant populations growth that occurred upstream of the gaging station, resulting in some changes in stream flow. It should be noted that there are data gaps in the period of record that include the following times: 11/01/03 thru 03/31/04; 10/01/04 thru 01/09/05; and 10/01/05 thru 03/31/06.

In accordance with the WQCD's procedures, the lowest of the monthly low flows from Table 5 were used in determining the WQBELs for all parameters except ammonia.

Colorado's regulations allow the use of seasonal flows for determining WQBELs for ammonia.

TABLE 5  
Low Flows for Monument Creek at the USGS Gage Station 07103780 a/

<i>Low Flow (cfs)</i>	<i>Annual</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
1E3 * Acute	1.10	2.60	2.50	2.60	3.50	2.70	1.40	1.50	1.10	1.30	1.30	2.40	2.40
7E3 * Chronic	1.30	2.70	2.70	2.70	3.60	2.70	2.00	1.70	1.30	1.40	1.40	2.40	2.50
30E3 * Chronic	1.70	2.70	2.90	2.90	3.60	2.70	2.00	1.70	1.70	1.70	2.30	2.40	2.70

\* 1E3 represents the one-day low flow recurring in a 3 year interval. 7E3 represents the 7-day low flow recurring in a 3 year interval. 30E3 represents the 30-day low flow recurring in a 3 year interval.

- a/ Low flow values for Monument Creek at the USGS Gage Station 07103780, Located Above North Gate Boulevard at Air Force Academy, as determined by the WQCD for the Tri-Lakes Waste Water Treatment Facility WWTF Water Quality Assessment, CO-0020435, October 25, 2011, for the permit reissued in 2011.

Section 31.10 of Colorado's Basic Standards and Methodologies for Surface Water, Regulation No. 31, require that mixing zones in the receiving waters be considered in determining water quality based effluent limitations.

There are certain exemptions from the mixing zone requirement for discharges to streams. One exemption is if the maximum permitted flow is greater than twice the chronic low flow (30E3). The design flow for the AFA WWTF is 1.4 mgd (2.2 cfs) which is the maximum permitted flow as a 30-day average. The chronic low flow for Monument Creek at the point of discharge is 1.7 cfs.

The ratio of the design flow to chronic low flow is 2.2/1.7. The ratio of those flows is 1.3, which is less than twice the chronic low flow. Another exemption from the mixing zone requirements may be given if "Exemption tables, other procedures developed or approved by the Division, or site-specific data indicate that the chronic regulatory mixing zone is larger than the physical mixing zone;"

Based on the use "Google Earth" and the USGS topographic map for the area, it appears that the Monument Creek drops about 20 feet in 2600 feet of distance. Assuming a distance of 3000 feet, the slope (i.e., gradient) of Monument Creek is approximately 0.0067 ft./ft. through the area where Outfall 001A discharges into Monument Creek. The width of the stream channel at low flow appears to be less than 14 feet.

**Based on Table I-2 of the Colorado Mixing Zone Guidance, April 2002, the physical mixing zone would be less than the regulatory mixing zone. Therefore, a mixing zone would not have to be considered when determining the effluent limitations for the discharge from Outfall 001A.** For the calculations involving 1E3 and 30E3 low flows, instantaneous and complete mix is assumed.

There are water quality data for the USGS gaging station 07103780. Those data can be used to determine ambient water quality in Monument Creek above the discharge from Outfall 001A.

A summary of water quality data for those pollutants that are considered of potential concern for the discharge from the AFA's WWTF is given below in Table 6. The data are for the period 2000 to 2011 except where noted. Because the water supply based criterion for arsenic applies at the intake point for the water supply, the data for total recoverable arsenic are for the USGS gaging station 07104000 on Monument Creek at Pikeview.

TABLE 6

Ambient Water Quality For Monument Creek At USGS Gaging Station 07103780 Located Above North Gate Boulevard at Air Force Academy Except As Noted. Data Are For Period 2000 – 2011 Unless Otherwise Noted.

Parameter	Number of Samples	15 <sup>th</sup> Percentile	50 <sup>th</sup> Percentile	85 <sup>th</sup> Percentile	Mean	Max.	Stream Standard <u>i/</u>		
							Chronic	Acute	
As, TR (ug/L) <u>a/</u>	7	1	1	2	1.4	2	0.02-10	N/A	
As, Dis. (ug/L)	3	1.38	1.8	1.94	1.7	2	N/A	340	
Cd, Dis. (ug/L)	13	0.04	0.06	0.08	0.06	0.09	0.46	3.0	
Cr III, TR (ug/L)	20 <u>e/</u>	1	1	2	1.5	6	N/A	50	
Cr III, Dis. (ug/L)	<u>b/</u>						81	621	
Cr VI, Dis. (ug/L)	10 <u>c/</u>	1	2	5	2.5	6	11	16	
Cu, Dis. (ug/L)	43	1.59	2.5	4.74	3.1	10	9.8	14.8	
Fe, Dis. (ug/L)	82	6	10.5	24.9	17.7	280	300	N/A	
Fe, TR (ug/L)	22	320	476	1001	680	3240	1000	N/A	
Pb, Dis. (ug/L)	18	0.16	0.22	0.36	0.26	0.54	2.8	72	
Mn, Dis. (ug/L)	174 <u>h/</u>	34	55	90	64	250	50	3091	
Hg, Tot (ug/L)	19	1 sample = 0.014. All other samples reported as <.						0.01	N/A
Mo, TR (ug/L)	4	1.4	2.0	3.2	2.3	4.2	160	N/A	
Ni, Dis. (ug/L)	21	1.1	2.04	3.6	2.3	4.4	57	511	
Se, Dis. (ug/L)	22	0.33	0.4	0.45	0.4	0.53	4.6	18.4	
Ag, Dis. (ug/L)	22	All samples reported as <.						0.38	2.4
Zn, Dis. (ug/L)	44	8.7	14.8	22.2	16.2	45.5	133	176	
Cl, (mg/L)	167 <u>f/</u>	7	15	25	16	40	250	N/A	
SO <sub>4</sub> , (mg/L)	43	15	30	37	30	42	250	N/A	
CN, Free, (ug/L)	<u>d/</u>						N/A	5	
Sulfide as H <sub>2</sub> S, (ug/L)	0						2	N/A	

- a/ Data for USGS Gaging Station on Monument Creek at Pikeview, USGS station number 07104000. Data for the period 1990 – 2004.
- b/ Data for chromium, water, filtered. 22 Samples from 2-16-2000 through 10-28-2003. 3 samples had estimated values of 0.5 or 0.6, 1 sample was <1 and 18 samples were <0.8. Used 0.8 as the 85 percentile value for calculation purposes.
- c/ No samples collected after 9/17/1997. 95 samples collected 11/16/1989 to 9/17/1999. All but 10 samples were reported as < 1. The values reported for the other 10 samples ranged from 1 to 6, with a mean of 2.5.
- d/ 21 samples, with 20 reported as < 10 ug/L. One sample reported as “presence verified but not quantified.”
- e/ Data for chromium, unfiltered, recoverable. A total of 125 samples reported for the period 10-19-1989 to 10-28-2003. A total of 103 samples were reported as <0.8 or <1.0, two samples reported as E 0.5 ug/L and 20 samples had values ranging from 1 to 6.
- f/ Data for 2-15-1984 to 9-17-1997. No data after that period.
- g/ Minimum.
- h/ Data for 2-15-1984 to 12-15-1999.
- i/ For metals where the TVS are hardness based, a hardness of 111 was used in calculating the values.

For the Tri-Lakes renewal permit the WQCD did an analysis of the hardness data for USGS gaging station 07103780 and determined that an instream hardness of 111 mg/L for calculating the acute and chronic table value standards that are hardness dependent. The values in Table 7 below are for a warm water aquatic life classification and a hardness of 111 mg/L and are based on the equations in Regulation 32.

TABLE 7  
Aquatic Life Hardness Dependent Standards for Metals at Hardness of 111 as CaCO<sub>3</sub>

Metal	In-Stream Water Quality Standard	
	Chronic Standard	Acute Standard
Cadmium, Dissolved, ug/L	0.46	3.0
Chromium III, Dissolved, ug/L	81	621
Copper, Dissolved, ug/L	9.8 <u>a/</u>	14.8 <u>a/</u>
Lead, Dissolved, ug/L	2.8	72
Manganese, Dissolved, ug/L	1708	3091
Nickel, Dissolved, ug/L	57	511
Silver, Dissolved	0.38	2.4
Zinc, Dissolved, ug/L	133	176

a/ The copper BLM modification applies to a subsegment of Monument Creek from just above the Tri-Lakes WWTF to the North Gate Boulevard Bridge, which is upstream of Outfall 001A.

Several of the water quality criteria for Segment 6 of Monument Creek are based on the drinking water classification. These include arsenic (Trec.) (0.02 – 10 ug/L) (30-day), trivalent chromium (Trec.) (50 ug/L) (1-day), chloride (250 mg/L) (30-day), iron (dis.) (300 ug/L) (30-day), manganese (dis.) (50 ug/L) (30-day), nitrate (10 mg/L) (1-day) and sulfate (250 mg/L) (30-day).

Footnote 4 of Table II and footnote 14 of Table III of *Regulation 31, Basic Standards*, specify that the drinking water based standards for nitrates and arsenic apply at the point of intake to the water supply. The other criteria based on drinking water apply at the point of discharge after allowance for mixing.

The values used in calculating the 30-day (chronic) and daily maximum (acute) limitations for metals, chlorides, and sulfates are given in Tables 8 and 9, respectively. The WQBELs are based on mass balance calculations using the equation given below. Reasonable potential analyses to determine if effluent limitations are appropriate, are discussed later in this document.

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

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 WQBEL

$M_3$  = Water Quality Standard, or other maximum allowable pollutant concentration.

**TABLE 8**  
**Calculation of Chronic Water Quality Based Effluent Limitations for Outfall 001A**

Parameter	$Q_1$ (cfs)	$Q_2$ (cfs)	$Q_3$ (cfs)	$M_1$ c/	$M_3$	$M_2$	Notes
TRC, ug/L	1.7	2.2	3.9	11	0	20	
As, TR (ug/L)	6.5 <u>a/</u>	11.4 <u>b/</u>	17.9	1 <u>d/</u>	0.02	10 <u>e/</u>	10 ug/L
Cd, PD (ug/L)	1.7	2.2	3.9	0.08	0.46	0.75	
Cr III, PD ug/L	1.7	2.2	3.9	2	81	142	
Cr VI, +6, Dis (ug/L)	1.7	2.2	3.9	5 <u>f/</u>	11	15.6	
Cu, PD (ug/L)	1.7	2.2	3.9	4.74	9.8	13.7	
Fe, PD (ug/L)	1.7	2.2	3.9	87	300	465	
Fe, TR (ug/L)	1.7	2.2	3.9	476	1000	1405	
Pb, PD (ug/L)	1.7	2.2	3.9	0.36	2.8	4.7	
Mn, PD (ug/L)	1.7	2.2	3.9	90 <u>j/</u>	50	19 <u>k/</u>	90 ug/L <u>k/</u>
Hg, Tot (ug/L)	1.7	2.2	3.9	0 <u>h/</u>	0.01	0.018	
Mo, TR (ug/L)	1.7	2.2	3.9	2.0	160	282	
Ni, PD (ug/L)	1.7	2.2	3.9	3.6	57	98	
Se, PD (ug/L)	1.7	2.2	3.9	0.45	4.6	7.8	
Ag, Dis (ug/L)	1.7	2.2	3.9	0 <u>g/</u>	0.38	0.67	
Zn, PD (ug/L)	1.7	2.2	3.9	22	133	219	
Cl, (mg/L)	1.7	2.2	3.9	25	250	424	
SO <sub>4</sub> , (mg/L)	1.7	2.2	3.9	37	250	415	
Sulfide, (ug/L)	1.7	2.2	3.9	0 <u>i/</u>	2	3.5	

- a/ The chronic low flow (30E3) for Monument Creek at Pikeview as determined by the WQCD for the Tri-Lakes Waste Water Treatment Facility WWTF Water Quality Assessment, CO-0020435, October 25, 2011, for the permit reissued in 2011.
- b/ Sum of the design flows of the AFA WWTF (2.2 cfs), the Tri-Lakes WWTF (6.5 cfs), and the Upper Monument Creek WWTF (2.7 cfs).
- c/ Based on USGS water quality data for Monument Creek above North Gate Blvd. at USAF Academy (USGS Station No. 071037800 unless otherwise noted. Data for period 2000 to 2011 unless otherwise noted.
- d/ Based on USGS water quality data for Monument Creek at Pikeview (USGS Station No. 07104000). Data for period 1990 to 2004 unless otherwise noted.
- e/ The water quality based effluent limitation for total recoverable arsenic will be set at 10 ug/L based on the following: Footnote 13 of Table III (Metal Parameters) of Regulation No. 31, "The Basic Standards and Methodologies for Surface Waters" specifies "Control requirements, such as discharge permit effluent limitations, shall be established using the first number in the range as the ambient water quality target, provided that no effluent limitation shall require an "end-of-pipe" discharge level more restrictive than the second number in the range."
- f/ Based on data for 1987 to 1997. No data after that.
- g/ All sample values were less than minimum detection limit, so a zero value was assumed in accordance with practices of the WQCD.
- h/ Only one sample (0.014 ug/L) of 21 samples was above minimum detection limit. A background concentration of 0 was used for calculation purposes.
- i/ No data, so assumed zero since minimum dissolved oxygen concentration reported for Monument Creek was 5.8 mg/L over period of record, which indicates aerobic conditions.
- j/ Data for 1984 through 1999 to give water quality as of January 1, 2000.
- k/ The water quality standards provide that for the water supply classification, the less restrictive of either the numerical standard for dissolved manganese (50 ug/L) or the existing quality as of January 1, 2000 (90 ug/L), shall apply. Therefore, since the 85 percentile concentration of dissolved manganese as of January 1, 2000 is 90 ug/L, the effluent limitation shall be no more restrictive than 90 ug/L.

**TABLE 9**  
**Calculation of Acute Water Quality Based Effluent Limitations for Outfall 001A**

Parameter	Q <sub>1</sub> (cfs)	Q <sub>2</sub> (cfs)	Q <sub>3</sub> (cfs)	M <sub>1</sub> <u>a/</u>	M <sub>3</sub>	M <sub>2</sub>	Notes
TRC, ug/L	1.1	2.2	3.3	0	19	29	
As, PD (ug/L)	1.1	2.2	3.3	1.94	340	509	
Cd, PD (ug/L)	1.1	2.2	3.3	0.08	3.0	4.5	
Cr III, TR (ug/L)	1.1	2.2	3.3	1 <u>d/</u>	50	75	
Cr III, PD ug/L	1.1	2.2	3.3	2	621	930	
Cr, VI Dis (ug/L)	1.1	2.2	3.3	5 <u>c/</u>	16	21.5	
Cu, PD (ug/L)	1.1	2.2	3.3	4.74	14.8	19.8	
Pb, TR (ug/L)	1.1	2.2	3.3	0.36	72	108	
Mn, PD (ug/L)	1.1	2.2	3.3	96	3091	4590	
Ni, PD (ug/L)	1.1	2.2	3.3	3.6	511	765	
Se, PD (ug/L)	1.1	2.2	3.3	0.45	18.4	27	
Ag, PD (ug/L)	1.1	2.2	3.3	0 <u>b/</u>	2.4	3.6	
Zn, PD (ug/L)	1.1	2.2	3.3	22	176	253	
CN, Free (ug/L)	1.1	2.2	3.3	0 <u>b/</u>	5	7.5	

a/ Based on USGS water quality data for Monument Creek above North Gate Blvd. at USAF Academy (USGS Station No. 071037800 unless otherwise noted. Data for period 2000 to 2011 unless otherwise noted.

b/ All sample values were less than minimum detection limit, so a zero value was assumed in accordance with practices of the WQCD.

c/ Based on data for 1987 to 1997. No data after that.

d/ Based on data for 1989 to 2003. No date before or after that period.

e/ Based on drinking water classification and hardness greater than 80 mg/L.

For calculating the effluent limitations to meet the drinking water criterion of 10 mg/L of nitrate, the WQCD uses 10 mg/L total inorganic nitrogen (T.I.N.) at the water supply intake instead of nitrate because the various forms of inorganic nitrogen can oxidize to nitrate. In doing the water quality assessment for the renewal permit for the Tri-Lakes WWTF (CO-0020435), the WQCD did calculations to determine the effluent limitations on total inorganic nitrogen (T.I.N.) (total ammonia plus nitrate plus nitrite) necessary to meet the water quality criteria for nitrate of 10 mg/L at the water supply diversion at Pikeview.

A preliminary draft (September 6, 2011) of the water quality assessment included the discharge from the AFA's WWTF in the calculation of the limitations on T.I.N. That limitation on T.I.N. was 13 mg/L as a daily maximum. However, because the AFA seldom discharges from Outfall 001A to Monument Creek, the effluent limitations on T.I.N. were recalculated without the discharge from the AFA's WWTF. (See Tri-Lakes Waste Water Treatment Facility WWTF Water Quality Assessment, CO-0020435, October 25, 2011, for the permit reissued in 2011.) That limitation was 14 mg/L. The 13 mg/L limitation will be used in the AFA's renewal permit for Outfall 001A.

The Tri-Lakes water quality assessment for the renewal permit also included the results of modeling using the Ammonia Toxicity Model (AMMTOX) to determine effluent limitations for ammonia. The modeling included the discharges from the Tri-Lakes WWTF, the Upper Monument Creek WWTF (CO-0042030), and the AFA's WWTF. Monthly effluent limitations were calculated for the discharges from the three WWTFs and are given below in Table 10.

TABLE 10

Ammonia Limitations for Discharge from the USAF Academy WWTF to Monument Creek (Outfall 001A) Based on AMMTOX Modeling By the Colorado WQCD for the Water Quality Assessment for the Permit Renewal for the Tri-Lakes WWTF, October 25, 2011

Month	Total Ammonia 30-Day Average, mg/L	Total Ammonia Daily Maximum, mg/L
January	15	23
February	13	18
March	14	18
April	10.5	23
May	10.5	21
June	10.2	22
July	10	24
August	10	24
September	9	20
October	9.4	12
November	12.8	16
December	12.7	16.5

1/ See Tri-Lakes Waste Water Treatment Facility WWTF Water Quality Assessment, CO-0020435, October 25, 2011, for more details.

The previous permit had the requirement for both Outfalls 001A and 001B that there shall be no chronic toxicity in a 19% dilution of final effluent discharge. That was intended to mean that there was to be no chronic toxicity when the effluent was diluted to 19% effluent. The 19% value was based on the dilution flow at the USGS gaging station for Monument Creek at Pikeview.

The dilution flow should have been based on the USGS gaging station located on Monument Creek approximately 0.8 mile upstream from the North Gate Boulevard at the AFA. That dilution flow results in an instream concentration of 56% effluent. This renewal permit will require that the discharge from Outfall 001A have no chronic whole effluent toxicity where the instream waste concentration (IWC) is 56%. A review of the whole effluent toxicity data reported for the previous permit indicated that there was no chronic whole effluent toxicity at any dilution, including 100% effluent.

Segment 6 of Monument Creek is on Colorado's 303(D) list of impaired waters and monitoring and evaluation list. The listing is for impairment for *E. coli* from May through October. Accordingly, the 30-day average (geometric mean) effluent limitation for *E. coli* will be the same as the water quality criterion of 126 organisms/100 mL. In accordance with the WQCD practice, the 7-day average limitation will be 252 organisms/100 mL. The water quality based effluent limitations for Outfall 001A are given below in Table 11.

TABLE 11  
Water Quality Based Effluent Limitations for Outfall 001A

Effluent Characteristic <u>a/</u>	Effluent Limitation		
	30-Day Average	7-Day Average	Daily Maximum
<i>E. coli</i> , CFU/100 mL	126	252	N/A
Total Residual Chlorine, mg/L	0.011	N/A	0.019
Ammonia, Total (as N), mg/L See Table 10 above			
Total Inorganic Nitrogen (as N), mg/L	N/A	N/A	13
Arsenic, (TR), ug/L	10	N/A	N/A
Arsenic, (PD), ug/L	N/A	N/A	509
Cadmium, (PD), ug/L	0.75	N/A	4.5
Chromium III, (TR), ug/L	N/A	N/A	75
Chromium VI, (D), ug/L	15.6	N/A	21.5
Copper, (PD), ug/L	13.7	N/A	19.8
Iron, (PD), ug/L	465	N/A	N/A
Iron, (TR), ug/L	2,167	N/A	N/A
Lead, (PD), ug/L	4.7	N/A	108
Manganese, (PD), ug/L	90	N/A	4590
Mercury, Total, ug/L	0.01	N/A	N/A
Molybdenum, (TR), ug/L	282	N/A	N/A
Nickel, (PD), ug/L	98	N/A	765
Selenium, (PD), ug/L	7.8	N/A	27
Silver, (PD), ug/L	0.67	N/A	3.6
Zinc, (PD), ug/L	219	N/A	253
Chloride, mg/L	424	N/A	N/A
Sulfate, mg/L	415	N/A	N/A
Cyanide, Free, ug/L	N/A	N/A	5
The concentration of oil and grease in any single sample shall not exceed 10 mg/L, nor shall there be any visible sheen in the receiving water or adjoining shoreline.			
There shall be no chronic toxicity at an instream waste concentration (IWC) of 56 percent of the final effluent from Outfall 001A.			
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.			

a/ (D) means dissolved, (PD) means potentially dissolved, (TR) means total recoverable.

## Water Quality Considerations for Outfall 001B

Since Lehman Run is an ephemeral stream, much of the time the only water going into NPR#1 is the discharge from the WWTF via Outfall 001B and well water during the irrigation season. The quality of water in NPR#1 is unknown to this writer and most likely is variable, depending on the relative proportions of water from the WWTF, the wells, and surface runoff. For pollutants of potential concern, the quality is probably the poorest when the proportion of water from the WWTF is the greatest. If dilution in NPR#1 were to be considered in determining water quality based effluent limitations (WQBELs) for Outfall 001B, it would be necessary for the permittee to conduct a mixing zone study. What dilution, if any, would be provided by the water in NPR#1 would have to be determined by doing a mixing zone study. If the permittee wants to conduct a mixing zone study, it would have to be done in accordance with the *Colorado Mixing Zone Implementation Guidance*, April 2002.

**For the purposes of this permit, the determination of WQBELs, with the exception of the water supply criteria for arsenic and nitrates, will be based on the assumption that there is no dilution and effluent limitations must be met before any dilution, including well water.** If the permittee were to conduct a mixing zone study and the results of the study indicated that less stringent effluent limitations are appropriate, the permittee may request that the permit be modified accordingly following proper administrative procedures.

Although NPR#1 is classified for domestic water supply, the first water supply intake downstream of Outfall 001B is located on Monument Creek near Pikeview. The applicable water supply criteria listed for segment 11 include the following:

<u>Effluent Characteristic</u>	<u>Criterion</u>
Arsenic (chronic), total recoverable	0.02-10 ug/L, 30-day <u>a/</u>
Chromium III (acute), total recoverable	50 ug/L, 1-day
Chlorides	250 mg/L, 30-day
Iron (chronic), dissolved	300 ug/L, 30-day
Manganese (chronic), dissolved	50 ug/L, 30-day
Nitrates (acute)	10 mg/L, 1-day <u>b/</u>
Sulfate (chronic)	250 mg/L, 30-day

a/ The criterion is 0.02 ug/L and applies at the water supply intake, but the effluent limitation shall be 10 ug/L as a daily maximum based on footnote 13 of Table III (Metal Parameters) of Regulation No. 31.

b/ The criterion is 10 ug/L to be applied at the water supply intake. Although Lemman Run is a tributary to Monument Creek, water from NPR#1 seldom reaches Monument Creek due to the use of the water in NPR#1 for the watering of landscape, recreational fields, etc., at the AFA. According to the AFA, there has not been an overflow of NPR#1 since sometime in the 1990s. If water from NPR#1 were to reach Monument Creek, it most likely would occur when there is above normal precipitation, resulting in a full reservoir with the need to discharge water from the reservoir. In that situation the water being discharged from the reservoir would be significantly diluted by the runoff in Lemman Run. **Therefore, a WQBEL on nitrates is not considered necessary for Outfall 001B.**

The water quality criteria for some of the table value standards (TVS) for metals are based on hardness and the equations can be found in Table III, Metal Parameters, of CDPHE Water Quality Control Commission Regulation No. 31, “The Basic Standards and Methodologies for Surface Water”, effective January 1, 2012. They are also found in section 32.6(3) of Regulation No. 32, “Classifications and Water Quality Standards for Arkansas River Basin”, effective December 31, 2013. A hardness of 150 mg/L as calcium carbonate was used in the calculations and the resulting values are shown below in Table 12. The 150 mg/L hardness value is based on the permit renewal application.

TABLE 12

Table Value Standards for Hardness Dependent Metals at Hardness of 150 mg/L		
Metal	In-Stream Water Quality Criteria	
	Chronic Criterion	Acute Criterion
Cadmium, Dissolved, ug/L	0.58	3.90
Chromium III, Dissolved, ug/L	103	794
Copper, Dissolved, ug/L	12.7	19.7
Lead, Dissolved, ug/L	3.9	100
Manganese, Dissolved, ug/L	1888	3417
Nickel, Dissolved, ug/L	73	660
Silver, Dissolved, ug/L	0.64	4.08
Zinc, Dissolved, ug/L	175	231

For Outfall 001B the ammonia limitations are based on the WQBELs for ammonia given in the CDPS General Permit COG-589000, issued July 2, 2013, and effective October 1, 2013. This general permit is for domestic wastewater treatment facilities that discharge to receiving waters that are: unclassified; use protected; reviewable; or are designated threatened and endangered species habitat. According to the fact sheet for the general permit, the AMMTOX model was used for various dilution ratios of the receiving waters to determine WQBELs for ammonia.

The ammonia limitations for Outfall 001B, based on zero dilution, were taken from Tables 6d and 6e of the general permit and are listed below in Table 13.

TABLE 13

Water Quality Based Effluent Limitations for Ammonia-N for Outfall 001B, mg/L

Month	Chronic WQBEL a/ 30-Day Avg.	Acute WQBEL b/ Daily Max.
January	5.1	13
February	4.7	11
March	3.2	7.3
April	1.9	6.1
May	2.4	7.9
June	3.0	10
July	2.3	9.7
August	1.9	7.9
September	2.3	8.7
October	3.4	11
November	3.7	11
December	3.7	8.9

a/ Based on Table 6d, “Monthly Chronic Total Ammonia WQBEL for Warm Water Classified Streams (mg/L)”, from CDPS General Permit COG-589000 issued July 2, 2013 and effective October 1, 2013. The values are for zero (0) dilution ratio.

b/ Based on Table 6e, “Monthly Acute Total Ammonia WQBEL for Warm Water Classified Streams (mg/L)”, from CDPS General Permit COG-589000 issued July 2, 2013 and effective October 1, 2013. The values are for zero (0) dilution ratio.

For Outfall 001B the permit will require that there be no chronic whole effluent toxicity at 100% effluent. That requirement will be effective immediately as the monitoring data for the previous five years indicated that there has been no chronic toxicity at any dilution, including 100% effluent.

The water quality based effluent limitations (WQBELs) for Outfall 001B are given below in Table 14. Effluent limitations will not be put in the permit if it appears that there is not a reasonable potential for the WQBELs to be exceeded and/or there are insufficient data to do a reasonable potential analysis.

In the later situation, monitoring will be required to obtain sufficient data to determine if effluent limitations are appropriate.

A compliance schedule will be allowed for meeting those WQBELs where it is doubtful that the limitations can be met effective immediately.

TABLE 14  
Water Quality Based Effluent Limitations for Outfall 001B

Effluent Characteristic <sup>a/</sup>	Effluent Limitation		
	30-Day Average	7-Day Average	Daily Maximum
<i>E. coli</i> , CFU/100 mL	126	252	N/A
Total Residual Chlorine, mg/L	0.011	N/A	0.019
Ammonia, Total (as N), mg/L: See Table 13 above			
Total Inorganic Nitrogen (as N), mg/L	N/A	N/A	13
Arsenic, (TR), ug/L	N/A	N/A	10
Cadmium, (PD), ug/L	0.58	N/A	3.9
Chloride, mg/L	250	N/A	N/A
Chromium III, (TR), ug/L	N/A	N/A	50
Chromium VI, (D), ug/L	11	N/A	16
Copper, (PD), ug/L	12.7	N/A	19.7
Iron, (TR), ug/L	300	N/A	N/A
Lead, (PD), ug/L	3.9	N/A	100
Manganese, (PD), ug/L	50	N/A	N/A
Mercury, Total, ug/L	0.01	N/A	N/A
Molybdenum, (TR), ug/L	160	N/A	N/A
Nickel, (PD), ug/L	73	N/A	660
Selenium, (PD), ug/L	4.6	N/A	18.4
Silver, (PD), ug/L	0.64	N/A	4.1
Sulfates, mg/L	250	N/A	N/A
Zinc, (PD), ug/L	175	N/A	231
Cyanide, Free, ug/L	N/A	N/A	5
Temperature, °C, Mean Weekly Average	20	N/A	N/A
The concentration of oil and grease in any single sample shall not exceed 10 mg/L, nor shall there be any visible sheen in the receiving water or adjoining shoreline.			
There shall be no chronic toxicity for an instream waste concentration (IWC) of 100 percent of the final effluent from Outfall 001B or TUC <1.0. $\mu$ /			
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.			

<sup>a/</sup> (D) means dissolved, (PD) means potentially dissolved, (TR) means total recoverable.

### **Anti-degradation Evaluation**

Colorado’s regulations concerning anti-degradation of water quality are found in section 31.8, Anti-degradation, of Regulation 31, *The Basic Standards and Methodologies for Surface Water*. The anti-degradation review process is covered under Section 31.8(3) which specified that “The anti-degradation review procedures shall apply to the review of regulated activities with new or increased water quality impacts that may degrade the quality of surface waters that have not been designated as outstanding waters or use-protected waters, including waters previously designated as high quality class 2.”

Segment 6 of the Fountain Creek Basin is undesignated and therefore an anti-degradation review is required for the discharge to this stream segment. Segment 11 is designated use protected, so an anti-degradation review is not required for that stream segment.

### **Anti-degradation Review for Outfall 001A – Discharge to Monument Creek**

Normally there is no discharge from Outfall 001A except when it is impractical to pump the effluent to NPR#1. From March, 2006, through February, 2013, there were discharges from Outfall 001A only during the months of March and April, 2008, and December, 2010. The renewal permit will require that there be no discharge from Outfall 001A except when it is impractical to pump effluent to NPR#1. When it is necessary to have these infrequent discharges from Outfall 001A, the permit will require that the discharge meet applicable effluent limitations to meet the water quality standards for Monument Creek (i.e., segment 6 of the Fountain Creek Basin).

Section 31.8(3)(c) of the regulation provides that “The regulated activity shall be considered not to result in significant degradation, as measured in the reviewable waters segment, if: (section 31.8(3)(c)(ii)(C)) The regulated activity will result in short term changes in water quality. This exception shall not apply where long-term operation of the regulated activity will result in an adverse change in water quality.” Therefore, since the occasional discharges from Outfall 001A are temporary in nature, an anti-degradation review for Outfall 001A is not required.

### **Reasonable Potential Analysis**

Treatment is necessary to meet the WQBELs for *E. coli*, ammonia nitrogen, and total inorganic nitrogen, so it is not necessary to do reasonable potential analyses for these three pollutants. For the remaining pollutants for which there are WQBELs, there are only sufficient data for selenium and zinc to do reasonable potential analyses. The reasonable potential analysis results based on 95 percent confidence interval and lognormal distribution for selenium and zinc are given below in Table 15 along with the potential WQBELs for Outfalls 001A and 001B.

TABLE 16  
Comparison of Projected Maximum Concentration with WQBELs for Outfalls 001A and 001B

Pollutant	Projected Max. Concentration <sup>a/</sup>	WQBELs			
		Outfall 001A		Outfall 001B	
		Chronic	Acute	Chronic	Acute
Selenium, ug/L	3.2	7.8	27	4.6	18.4
Zinc, ug/L	160	219	253	175	231

<sup>a/</sup> Based on 95% confidence interval and lognormal distribution.

Based on Table 15, it appears that there is not a reasonable potential for either the chronic or acute WQBELs for selenium or zinc to be exceeded for either outfall. In accordance with the WQCD's policy on reasonable potential, no effluent limitations for either selenium or zinc will be placed in the permit. However, since the projected maximum concentration of both pollutants is greater than 50% of the WQBELs, monitoring will be required for both pollutants.

Monitoring will be required for the remaining pollutants to determine if there is a reasonable potential to exceed the WQBELs. If it is subsequently found that there is a reasonable potential for a WQBEL to be exceeded, the appropriate effluent limitation(s) may be placed in the permit upon reissuance.

### **Effluent Limitations**

Although the discharge from the WWTF normally goes to NPR#1 via Outfall 001B, it is sometimes necessary to discharge to Monument Creek via Outfall 001A. This usually occurs when it is impractical to discharge via Outfall 001B due to problems with the pumping system to NPR#1 or there is a need not to discharge to NPR#1. The permit will authorize discharges from both outfalls, but will specify that a discharge from Outfall 001A is to occur only when it is impractical to discharge to NPR#1 via Outfall 001B. As explained below, when a discharge occurs from Outfall 001A, the discharge must meet applicable WQBELs for a discharge to Monument Creek. The WQBELs are different for each outfall, and will be specified accordingly in the permit. However, the WWTF must have the capability of meeting the more stringent of the different effluent limitations because of the potential for the discharge occurring from either outfall.

### **Effluent Limitations Outfall 001A**

The permit requires that there be no discharge from Outfall 001A except when it is impractical to discharge to NPR#1. The potential reasons for justifying a discharge from Outfall 001A include such factors as problems with the pumping system and/or the pipeline to NPR #1, the need to work on NPR #, or the discharge to NPR #1 has to be temporarily stopped due to excessive runoff into NPR #1.

For Outfall 001A it appears that the effluent limitations for CBOD<sub>5</sub>, TSS, *E. coli*, pH, TRC, total ammonia, oil and grease, and chronic toxicity can be met effective immediately. Available data indicate that the existing treatment system is not adequate to meet the WQBEL on T.I.N. of 13 mg/L as a daily maximum.

The effluent limitations on T.I.N. in the previous permit ranged from 23 to 25 mg/L as a 30-day average. An interim effluent limitation on T.I.N. of 23 mg/L as a 30-day will be used until 4 years, 6 months after the effective date of the permit. The WQBEL of 13 mg/L as a daily maximum will then become effective. The four and one-half year time frame is being allowed for the permittee to do the necessary studies and obtain the necessary financing to make the necessary modifications to meet the 13 mg/L limitation on T.I.N. for Outfalls 001A. The effluent limitations and the basis for the effluent limitations are given below in Tables 16 and 17.

**TABLE 16**  
**Effluent Limitations for Outfall 001A**

Effluent Characteristic	Effluent Limitations <u>a/</u>			Basis <u>e/</u>
	30-Day Average	7-Day Average	Daily Maximum	
Flow, MGD	1.4	N/A	N/A	S.A.
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> ), mg/L (Kg/day) <u>b/</u>	25 (132)	40 (212)	N/A	CR#62
Total Suspended Solids , mg/L (Kg/day) <u>b/</u>	30 (159)	45 (238)	N/A	CR#62
<i>E. coli</i> , CFU/100 mL	126	252	N/A	WQS
Total Residual Chlorine, ug/L	11	N/A	19	WQS
Total Inorganic Nitrogen, mg/L <u>c/ d/</u>	N/A	N/A	13 <u>d/</u>	WQS
Total Ammonia as N, mg/L				
January	15	N/A	23	WQS
February	13	N/A	18	WQS
March	14	N/A	18	WQS
April	10.5	N/A	23	WQS
May	10.5	N/A	21	WQS
June	10.2	N/A	22	WQS
July	10	N/A	24	WQS
August	10	N/A	24	WQS
September	9	N/A	20	WQS
October	9.4	N/A	12	WQS
November	12.8	N/A	16	WQS
December	12.7	N/A	16.5	WQS
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.				WQS
There shall be no chronic toxicity at an instream waste concentration (IWC) of 56 percent of the final effluent from Outfall 001A.				WQS & WET
The concentration of oil and grease in any single sample shall not exceed 10 mg/L nor shall there be any visible sheen in the receiving water.				CR#62

a/ See Definitions, Part 1.1, for definitions.

b/ Percentage Removal Requirements (TSS and CBOD<sub>5</sub> Limitation): In addition to the concentration limits for total suspended solids and CBOD<sub>5</sub> indicated above, the arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at approximately the same times during the same period (85 percent removal).

c/ For purposes of this permit, the term “total inorganic nitrogen (T.I.N.)” is defined as the sum of the concentrations of total ammonia nitrogen (as N) plus total nitrate and nitrite ( or nitrate and nitrite individually) (as N).

d/ **Effective 4 years, 6 months after the effective date of the permit. Until then an interim limitation of 23 mg/L as a 30-day average is in effect.**

e/ Basis of effluent limitations: CR#62 = Colorado Regulation No. 62 – Regulations for Effluent Limitations; S.A. = Colorado site approval for WWTF dated 1994; WQS = water quality standards; WET = whole effluent toxicity.

### Effluent Limitations Outfall 001B

The main differences in the effluent limitations for Outfalls 001A and 001B is that the effluent limitations for total ammonia for Outfall 001B are more stringent than for Outfall 001A and no dilution is allowed (100% effluent) for chronic toxicity for Outfall 001B. However, the monitoring data indicate that both of those effluent limitations can be met effective immediately. The effluent limitations for Outfall 001B are given below in Table 17.

TABLE 17  
Effluent Limitations for Outfall 001B

Effluent Characteristic	Effluent Limitations a/			Basis c/
	30-Day Average	7-Day Average	Daily Maximum	
Flow, MGD	1.4	N/A	N/A	S.A.
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> ), mg/L (Kg/day) b/	25 (132)	40 (212)	N/A	CR#62
Total Suspended Solids , mg/L (Kg/day) b/	30 (159)	45 (238)	N/A	CR#62
<i>E. coli</i> , CFU/100 mL	126	252	N/A	WQS
Total Residual Chlorine, ug/L	11	N/A	19	WQS
Total Ammonia as N, mg/L				
January	5.1	N/A	13	WQS
February	4.7	N/A	11	WQS
March	3.2	N/A	7.3	WQS
April	1.9	N/A	6.1	WQS
May	2.4	N/A	7.9	WQS
June	3.0	N/A	10	WQS
July	2.3	N/A	9.7	WQS
August	1.9	N/A	7.9	WQS
September	2.3	N/A	8.7	WQS
October	3.4	N/A	11	WQS
November	3.7	N/A	11	WQS
December	3.7	N/A	8.9	WQS
The pH of the discharge shall not be less than 6.5 or greater than 9.0 at any time.				WQS
There shall be no chronic toxicity for an instream waste concentration (IWC) of 100 percent of the final effluent from Outfall 001B or TUC <1.0. c/				WQS & WET
The concentration of oil and grease in any single sample shall not exceed 10 mg/L nor shall there be any visible sheen in the receiving water.				CR#62

- a/ See Definitions, Part 1.1, for definitions.
- b/ Percentage Removal Requirements (TSS and CBOD<sub>5</sub> Limitation): In addition to the concentration limits for total suspended solids and CBOD<sub>5</sub> indicated above, the arithmetic mean of the concentration for effluent samples collected in a 30-day consecutive period shall not exceed 15 percent of the arithmetic mean of the concentration for influent samples collected at approximately the same times during the same period (85 percent removal).
- c/ Basis of effluent limitations: CR#62 = Colorado Regulation No. 62 – Regulations for Effluent Limitations; S.A. = Colorado site approval for WWTF dated 1994; WQS = water quality standards; WET = whole effluent toxicity.

### **Best Management Practices (BMPs) For Irrigation of Landscape, Recreational Areas, Etc**

Part 1.3.2 of the previous permit, titled “Best Management Practices (BMPs) For Irrigated Landscape Areas,” contained requirements intended to protect public health. These requirements included limiting irrigation to when the public is not present and the posting of signs warning about the use of reclaimed wastewater for irrigation and avoid contact and do not drink. Because the permit now has WQBELs based on the state’s classification of Lehman Run (including NPR#1), EPA Region 8 believes it does not have the authority to require the AFA to follow the best management practices specified in the previous permit. Technically, the AFA is taking water from a stream for the purpose of irrigating landscape, recreational areas, etc. However, on a practical basis the situation is similar to using reclaimed wastewater for irrigation of landscape, recreational areas, etc.

**Therefore, EPA Region 8 strongly recommends that the AFA continue to implement policies to protect the public health with the use of water from NPR#1.**

### **Self-Monitoring Requirements**

The self-monitoring requirements are given in Part 1.3.2 of the permit. Unless otherwise specified, except for temperature and flow, the sampling point for both outfalls is the sampling point shown in Attachment A of the permit. This is essentially the last point after treatment before the flow has to go to either Outfall 001A or Outfall 001B. The monitoring results obtained from samples taken at this point apply to all outfalls which discharge during the monitoring period.

Part 1.3.2.1 lists the various effluent characteristics to be monitored, the frequency to be monitored, the type of sample to be collected, and for some effluent characteristics, the practical quantitation level (PQL) to be used in the analyses. The values are those used by the Colorado WQCD for permits. In the previous permit, footnote f/, method detection limits were specified for CBOD<sub>5</sub>, TSS, *E. coli*, TRC, and T.I.N. The Colorado PQL values were used for CBOD<sub>5</sub>, TRC, and T.I.N. **In this renewal permit no PQL or method detection limit is specified for TSS and the permit specifies, footnote g/, that all analytical values for TSS shall be reported and used in calculating average concentrations.**

Effluent monitoring will be required for total nitrogen and total phosphorus in accordance with Regulation 85, Nutrient Management Control Regulation. However, the EPA does not have the authority to require stream monitoring, so the permit will not require stream monitoring for total nitrogen and total phosphorus.

Several metals, chloride, sulfate, sulfide, free cyanide, and nonylphenol were added to the monitoring list in order to obtain adequate data to determine if reasonable potential for the applicable WQBELs to be exceeded. The data will also be useful in any anti-degradation analysis that may be necessary.

There is a provision that after one year of data have been collected, the permittee may request that the frequency of monitoring for this effluent characteristic be reduced to quarterly or eliminated based on a reasonable potential analysis of the data collected since the permit was issued. The reasonable potential analysis shall be done based on a lognormal distribution and a 95 percent confidence interval.

**Based on the information submitted, the permit issuing authority may do one of the following: (1) not make any change in the monitoring frequency; (2) reduce the frequency of monitoring to quarterly; or (3) delete the monitoring requirement for that effluent characteristic. These changes may be made without going to public notice.**

The monitoring requirements for chronic whole effluent toxicity shall be done on alternating species every 10 months instead of yearly. The purpose of the 10 month frequency is to determine over the life of the permit if there is any chronic toxicity in the effluent during different times of the year.

The testing is to be done every 10 months, starting February 2015. The alternating species is a continuation from the previous permit and is justified by the consistent toxicity results demonstrating compliance with previous permit limits. The laboratory shall use a multi-dilution test as specified below, consisting of five concentrations and a control.

The five concentrations shall consist of 100%, 78%, 56%, 28% and 14%. The control water utilized for the test shall be moderately hard synthetic laboratory grade water, consistent with the EPA WET manual laboratory specifications. The test results apply to both outfalls.

WET test results shall be reported on the Discharge Monitoring Report (DMR) submitted for the reporting period when the monitoring was conducted (e.g., WET test results for December shall be reported with the DMR due January 28, etc.). The laboratory data, including all chemical and physical data as specified in the method, shall also be submitted to the permitting issuing authority along with the DMR. Suggested formats for reporting laboratory data for the two different test procedures are included at the end of this statement of basis.

Monitoring for temperature with a recorder is required in order to obtain adequate data to determine if effluent limitations may be necessary in the future. Once per day monitoring of temperature would not be adequate to determine if effluent limitations are necessary to comply with Colorado's new WQS on temperature. The initial temperature monitoring requirements are intended to determine if the temperature of the effluent being discharged meets the temperature criteria of the receiving waters. If it is determined that the temperature sometimes exceeds the applicable temperature criteria of the receiving waters, the permittee may need to do stream monitoring to determine the temperature impacts with the receiving waters. This will have to be done in conjunction with the WQCD because the EPA does not have the authority to require NPDES permittees to do stream monitoring.

### **Endangered Species Act (ESA) Requirements**

Section 7(a) of the Endangered Species Act requires federal agencies to insure that any actions authorized, funded, or carried out by an Agency are not likely to jeopardize the continued existence of any federally-listed endangered or threatened species or adversely modify or destroy critical habitat of such species.

Federally listed threatened, endangered and candidate species found in El Paso County, Colorado include:

<b><u>Species</u></b>	<b><u>Status</u></b>
Arkansas darter ( <i>Etheostoma cragini</i> )	C
Black-Footed ferret ( <i>Mustela nigripes</i> )	EX
Greenback cutthroat trout ( <i>Oncorhynchus clarki stomias</i> )	T
Least tern (interior population) ( <i>Sternula antillarum</i> )	T
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	T
North American wolverine ( <i>Gulo gulo luscus</i> )	P
Pallid sturgeon ( <i>Scaphirhynchus albus</i> )	T
Pawnee Mountain skipper ( <i>Hesperia leonardus montana</i> )	T
Piping plover ( <i>Charadrius melodus</i> )	T
Preble's meadow jumping mouse ( <i>Zapus hudsonius preblei</i> )	T
Ute ladies'-tresses orchard ( <i>Spiranthes diluvialis</i> )	T
Western Prairie Fringed Orchid ( <i>Platanthera praeclara</i> )	T
Whooping crane ( <i>Grus americana</i> )	T

C = Candidate, E = Endangered, EX = Experimental Population, P = Proposed, R = Recovery,  
T = Threatened

The EPA finds that this permit is Not Likely to Adversely Affect any of the species listed by the US Fish and Wildlife Service under the Endangered Species Act. This facility discharges into Non-Potable Reservoir No. 1 on Lehman Run, a tributary to Monument Creek, and occasionally to Monument Creek. The permit limitations are protective of water quality and the water discharged into Non-Potable Reservoir No. 1 normally is totally used for the irrigation of approximately 184 acres of landscape, recreational fields, etc. The rates of discharge are expected to be similar to those during the previous permit.

### **National Historic Preservation Act (NHPA) Requirements**

Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470(f) requires that federal agencies consider the effects of federal undertakings on historic properties. The EPA has evaluated its planned reissuance of the NPDES permit for the Air Force Academy's WWTF to assess this action's potential effects on any listed or eligible historic properties or cultural resources. The EPA does not anticipate any impacts on listed/eligible historic properties or cultural resources because this permit is a renewal and will not be associated with any significant ground disturbance or significant changes to the volume or point of discharge.

### **Miscellaneous**

The permit will be issued for a period of approximately 5 years, but not to exceed 5 years, with the permit effective date and expiration date determined at the time of permit issuance.

Preliminary permit drafted by Robert D Shankland, SEE, 8P-W-WW, EPA Region 8 July 28, 2014.  
Preliminary draft reviewed by Bruce Kent, 8P-W-WW, EPA Region 8.

## SUGGESTED FORMAT

### *Ceriodaphnia dubia* CHRONIC TOXICITY TEST REPORT FORMAT

IWC = \_\_\_\_\_  Pass  Fail

#### FACILITY INFORMATION & REQUIREMENTS

PERMITTEE NAME	NPDES PERMIT # 
HAS THE PERMITTEE SUPPLIED A COPY OF THE NPDES PERMIT? <input type="checkbox"/> YES <input type="checkbox"/> NO IS THE PERMIT PROVIDED THE MOST CURRENT? WHAT IS THE EXPIRATION DATE OF THE PERMIT? _____ PERMIT SPECIFIES <input type="checkbox"/> MONITORING ONLY <input type="checkbox"/> LIMITATIONS (if limitations, limits specified in permit?) _____ TEST TYPE(S) SPECIFIED IN PERMIT? <input type="checkbox"/> ACUTE <input type="checkbox"/> CHRONIC <input type="checkbox"/> ACUTE AND CHRONIC (one data sheet for each test and species) SPECIES SPECIFIED IN PERMIT? <input type="checkbox"/> <i>Ceriodaphnia dubia</i> <input type="checkbox"/> <i>Pimephales promelas</i> <input type="checkbox"/> Not specified (one data sheet for each species) LENGTH OF TEST SPECIFIED IN PERMIT? <input type="checkbox"/> 60% SURVIVAL <input type="checkbox"/> THREE BROOD SUCCESS <input type="checkbox"/> Not specified IS DILUTION WATER SPECIFIED IN THE PERMIT? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not specified (if yes, what is specified? _____) IS A DILUTION SERIES SPECIFIED? <input type="checkbox"/> YES <input type="checkbox"/> NO (if yes, what are the specified dilutions?) _____ SAMPLE TYPE SPECIFIED IN PERMIT? <input type="checkbox"/> GRAB <input type="checkbox"/> COMPOSITE <input type="checkbox"/> Not specified SAMPLE DAYS REQUIRED IN PERMIT? _____	

#### LABORATORY TEST & SAMPLE INFORMATION

SAMPLE 1 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm		TEST SOLUTION INITIATION DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm	
SAMPLE 2 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm		TEST SOLUTION RENEWAL DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm	
SAMPLE 3 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm		TEST SOLUTION RENEWAL DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm	
WERE THREE SAMPLES SENT ON DAYS 1, 3, & 5? <input type="checkbox"/> YES <input type="checkbox"/> NO	WERE HOLDING TIMES MET FOR ALL 3 SAMPLES RECEIVED? <input type="checkbox"/> YES <input type="checkbox"/> NO	SAMPLES RECEIVED? GRABS / COMPOSITES	OUTFALL #?
TEMPERATURE _____°C _____°C _____°C	TOTAL RESIDUAL Cl _____ mg/l _____ mg/l _____ mg/l	HARDNESS _____ mg/L CaCO3 _____ mg/L CaCO3 _____ mg/L CaCO3	AMMONIA _____ mg/l as N _____ mg/l as N _____ mg/l as N
CONDUCTIVITY _____ _____ _____	D.O. _____ _____ _____	OTHER _____ _____ _____	OTHER _____ _____ _____

#### LABORATORY ALTERATIONS PRIOR TO TEST

WERE SAMPLES DECHLORINATED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE DECHLORINATION (if any)
WERE SAMPLES FILTERED? <input type="checkbox"/> YES <input type="checkbox"/> NO FILTER SIZE?	WAS pH ADJUSTED? <input type="checkbox"/> YES <input type="checkbox"/> NO
WERE RECEIVED SAMPLES AERATED?	OTHER ADJUSTMENTS? (if any, describe)

#### TEST ORGANISM INFORMATION

<i>Ceriodaphnia dubia</i> HAS INITIAL SPECIES BEEN PROPERLY IDENTIFIED AND SPECIMIN MOUNTED <input type="checkbox"/> YES <input type="checkbox"/> NO ARE BROOD BOARDS USE AND RANDOMIZED ACCORDING TO TEST PROCEDURES? (blocking by known parentage)? <input type="checkbox"/> YES <input type="checkbox"/> NO WERE NEONATES USED <24-HRS OLD AND ALL WITHIN 8-H OF THE SAME AGE? <input type="checkbox"/> YES <input type="checkbox"/> NO HAVE ANY MALE DAPHNIA BEEN IDENTIFIED IN THIS TEST? <input type="checkbox"/> YES <input type="checkbox"/> NO	
HAVE ORGANISMS FROM THE SAME INITIAL SPECIMIN PERFORMED SUCCESSFULLY IN THE MONTHLY CHRONIC REFTOX? <input type="checkbox"/> YES <input type="checkbox"/> NO	HAS MONTHLY CHRONIC REFTOX MET CONTROL CHART PARAMETERS? <input type="checkbox"/> YES <input type="checkbox"/> NO

#### TEST SET-UP

IDENTIFY THE DILUENT (O <sub>1</sub> ) CONTROL (receiving water recommended)  _____  (if used) IDENTIFY THE SECONDARY (O <sub>2</sub> ) CONTROL (MHRW recommended unless receiving water characteristics differ)  _____	DILUTIONS USED: CONTROL 12.5% 25% 50% 75% 100%	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">EFFLUENT</td> <td style="width: 50%;">DILUENT</td> </tr> <tr> <td style="text-align: center;">---</td> <td style="text-align: center;">1200 mL</td> </tr> <tr> <td style="text-align: center;">150 mL</td> <td style="text-align: center;">1050 mL</td> </tr> <tr> <td style="text-align: center;">300 mL</td> <td style="text-align: center;">900 mL</td> </tr> <tr> <td style="text-align: center;">600 mL</td> <td style="text-align: center;">600 mL</td> </tr> <tr> <td style="text-align: center;">900 mL</td> <td style="text-align: center;">300 mL</td> </tr> <tr> <td style="text-align: center;">1200 mL</td> <td style="text-align: center;">---</td> </tr> </table>	EFFLUENT	DILUENT	---	1200 mL	150 mL	1050 mL	300 mL	900 mL	600 mL	600 mL	900 mL	300 mL	1200 mL	---
EFFLUENT	DILUENT															
---	1200 mL															
150 mL	1050 mL															
300 mL	900 mL															
600 mL	600 mL															
900 mL	300 mL															
1200 mL	---															

**TEST RESULTS**

<b>SURVIVAL &amp; REPRODUCTION MEASUREMENTS (example numbers provided)</b>											
REPLICATES	1	2	3	4	5	6	7	8	9	10	# LIVE ADULTS
CONTROL	31	30	29	31	25	30	31	23	32	28	10/10
12.5	29	25	0*2	11	24	22	0*3	28	3*4	24	7/10
25	26	0*3	0*3	24	29	19	27	1*4	0*3	22	6/10
50	26	23	15	0*3	29	26	23	28	21	28	9/10
75	25	13	0*4	0*3	24	2*4	26	0*3	23	19	6/10
100	36	0*3	24	24	26	32	31	0*4	4*4	25	7/10

COMMENTS: \*2 dead at day 2, \*3 dead at day 3, \*4 dead at day 4

**TEMPERATURE MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN TEMPERATURE IN °C	/	/	/	/	/	/	/

**D.O. MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN D.O IN mg/L	/	/	/	/	/	/	/

**pH MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN pH IN s.u	/	/	/	/	/	/	/

**CONDUCTIVITY MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN IN mS/cm	/	/	/	/	/	/	/

**CO2 MEASUREMENTS (if used)**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN AS CALCULATED	/	/	/	/	/	/	/

**DATA ANALYSIS**

METHODS USED TO CALCULATE THE IC25? <input type="checkbox"/> GRAPHICAL <input type="checkbox"/> SPEARMAN-KARBER <input type="checkbox"/> TRIMMED SPEARMAN-KARBER <input type="checkbox"/> PROBIT <input type="checkbox"/> LINEAR INTERPOLATION <input type="checkbox"/> OTHER		HOW WERE ANY OUTLIERS REMOVED FROM CALCULATION? (describe)
<i>Ceriodaphnia dubia</i> SURVIVAL IC25 _____ TUc _____ NOEC (if calculated) _____ LOEC (if calculated) _____ REPRODUCTION IC25 _____ TUc _____ NOEC (if calculated) _____ LOEC (if calculated) _____		
DESCRIBE ANY DEVIATIONS FROM TEST METHODS OR APPROVED MODIFICATIONS ADMINISTERED (e.g. pH-overlay used and how administered, D.O. issues, aeration used, temperature issues, holding time issues, etc.)		
ANALYST(S)		QA OFFICER

**SUGGESTED FORMAT**

***Pimephales promelas* CHRONIC TOXICITY TEST REPORT FORMAT**

IWC = \_\_\_\_\_  Pass  Fail

**FACILITY INFORMATION & REQUIREMENTS**

PERMITTEE NAME	NPDES PERMIT # 
HAS THE PERMITTEE SUPPLIED A COPY OF THE NPDES PERMIT? <input type="checkbox"/> YES <input type="checkbox"/> NO IS THE PERMIT PROVIDED THE MOST CURRENT? WHAT IS THE EXPIRATION DATE OF THE PERMIT? _____ PERMIT SPECIFIES <input type="checkbox"/> MONITORING ONLY <input type="checkbox"/> LIMITATIONS (if limitations, limits specified in permit?) _____ TEST TYPE(S) SPECIFIED IN PERMIT? <input type="checkbox"/> ACUTE <input type="checkbox"/> CHRONIC <input type="checkbox"/> ACUTE AND CHRONIC (one data sheet for each test and species) SPECIES SPECIFIED IN PERMIT? <input type="checkbox"/> <i>Ceriodaphnia dubia</i> <input type="checkbox"/> <i>Pimephales promelas</i> <input type="checkbox"/> Not specified (one data sheet for each species) LENGTH OF TEST SPECIFIED IN PERMIT? <input type="checkbox"/> 60% SURVIVAL <input type="checkbox"/> THREE BROOD SUCCESS <input type="checkbox"/> Not specified IS DILUTION WATER SPECIFIED IN THE PERMIT? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Not specified (if yes, what is specified? _____) IS A DILUTION SERIES SPECIFIED? <input type="checkbox"/> YES <input type="checkbox"/> NO (if yes, what are the specified dilutions?) _____ SAMPLE TYPE SPECIFIED IN PERMIT? <input type="checkbox"/> GRAB <input type="checkbox"/> COMPOSITE <input type="checkbox"/> Not specified SAMPLE DAYS REQUIRED IN PERMIT? _____	

**LABORATORY TEST & SAMPLE INFORMATION**

SAMPLE 1 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm	TEST SOLUTION INITIATION DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm		
SAMPLE 2 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm	TEST SOLUTION RENEWAL DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm		
SAMPLE 3 COLLECTION DATES & TIMES / / ____:____am/pm TO / / ____:____am/pm	TEST SOLUTION RENEWAL DATES WITH START & END TIMES / / ____:____am/pm TO / / ____:____am/pm		
WERE THREE SAMPLES SENT ON DAYS 1, 3, &5? <input type="checkbox"/> YES <input type="checkbox"/> NO	WERE HOLDING TIMES MET FOR ALL 3 SAMPLES RECEIVED? <input type="checkbox"/> YES <input type="checkbox"/> NO	SAMPLES RECEIVED? GRABS / COMPOSITES	OUTFALL #?
TEMPERATURE _____°C _____°C _____°C	TOTAL RESIDUAL Cl _____ mg/l _____ mg/l _____ mg/l	HARDNESS _____ mg/L CaCO3 _____ mg/L CaCO3 _____ mg/L CaCO3	AMMONIA _____ mg/l as N _____ mg/l as N _____ mg/l as N
CONDUCTIVITY _____ _____ _____	D.O. _____ _____ _____	OTHER _____ _____ _____	OTHER _____ _____ _____

**LABORATORY ALTERATIONS PRIOR TO TEST**

WERE SAMPLES DECHLORINATED? <input type="checkbox"/> YES <input type="checkbox"/> NO	DESCRIBE DECHLORINATION (if any)
WERE SAMPLES FILTERED? <input type="checkbox"/> YES <input type="checkbox"/> NO FILTER SIZE?	WAS pH ADJUSTED? <input type="checkbox"/> YES <input type="checkbox"/> NO
WERE RECEIVED SAMPLES AERATED?	OTHER ADJUSTMENTS? (if any, describe)

**TEST ORGANISM INFORMATION**

<i>Pimephales promelas</i> ARE ORGANISMS CULTURED IN-HOUSE? <input type="checkbox"/> YES <input type="checkbox"/> NO ARE ORGANISMS USED <24-HRS OLD? <input type="checkbox"/> YES <input type="checkbox"/> NO	
HAVE <i>Pimephales promelas</i> PERFORMED SUCCESSFULLY IN THE MONTHLY CHRONIC REFTOX? <input type="checkbox"/> YES <input type="checkbox"/> NO	HAS MONTHLY CHRONIC REFTOX MET CONTROL CHART PARAMETERS? <input type="checkbox"/> YES <input type="checkbox"/> NO

**TEST SET-UP**

IDENTIFY THE DILUENT (O <sub>1</sub> ) CONTROL (receiving water recommended) _____ (if used) IDENTIFY THE SECONDARY (O <sub>2</sub> ) CONTROL (MHRW recommended unless receiving water characteristics differ) _____	DILUTIONS USED: CONTROL 12.5% 25% 50% 75% 100%	EFFLUENT      DILUENT - - -            1200 mL 150 mL        1050 mL 300 mL         900 mL 600 mL         600 mL 900 mL         300 mL 1200 mL        - - -
---	--	---

**TEST RESULTS**

<b>SURVIVAL &amp; REPRODUCTION MEASUREMENTS</b> (dry weights per original / no. per surviving) (example numbers provided)										
	SURVIVAL PROPORTION				MEAN	DRY WEIGHT				MEAN
	a	b	c	d		a	b	c	d	
CONTROL	1.0	1.0	0.9	0.9	0.95	0.711	0.662	0.646	0.690	0.677
12.5	0.8	0.8	1.0	0.8	0.85	0.517	0.501	0.723	0.560	0.575
25	0.9	1.0	1.0	1.0	0.975	0.602	0.669	0.694	0.676	0.660
50	0.9	0.9	0.8	1.0	0.90	0.566	0.612	0.410	0.672	0.565
75	0.7	0.9	1.0	0.5	0.775	0.455	0.502	0.606	0.254	0.454
100	0.4	0.3	0.4	0.2	0.325	0.143	0.163	0.195	0.099	0.150

COMMENTS:

**TEMPERATURE MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN TEMPERATURE IN °C	/	/	/	/	/	/	/

**D.O. MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN D.O IN mg/L	/	/	/	/	/	/	/

**pH MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN pH IN s.u	/	/	/	/	/	/	/

**CONDUCTIVITY MEASUREMENTS**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN IN mS/cm	/	/	/	/	/	/	/

**CO2 MEASUREMENTS (if used)**

DILUTIONS	O <sub>1</sub>	O <sub>2</sub> (if used)	12.5%	25%	50%	75%	100%
MAX/MIN AS CALCULATED	/	/	/	/	/	/	/

**DATA ANALYSIS**

METHODS USED TO CALCULATE THE IC25? <input type="checkbox"/> GRAPHICAL <input type="checkbox"/> SPEARMAN-KARBER <input type="checkbox"/> TRIMMED SPEARMAN-KARBER <input type="checkbox"/> PROBIT <input type="checkbox"/> LINEAR INTERPOLATION METHOD <input type="checkbox"/> OTHER		HOW WERE ANY OUTLIERS REMOVED FROM CALCULATION? (describe)
<i>Pimephales promelas</i> SURVIVAL IC25 _____ TUc _____ NOEC (if calculated) _____ LOEC (if calculated) _____ REPRODUCTION IC25 _____ TUc _____ NOEC (if calculated) _____ LOEC (if calculated) _____		
DESCRIBE ANY DEVIATIONS FROM TEST METHODS OR APPROVED MODIFICATIONS ADMINISTERED (e.g. pH-overlay used and how administered, D.O. issues, aeration used, temperature issues, holding time issues, etc.)		
ANALYST(S)		QA OFFICER