

**Arkansas Department of Environmental Quality  
Water Quality Management Plan Update Summary Sheet**

Date: February 7, 2018

New Permit                                               Renewal Permit                                               Amended Permit

**Type of Discharge:** Minor Municipal

**Facility Name:** City of Mountain View

**Permit No.:** AR0020117

**Design Flow Rate (MGD):** 0.73

**Receiving Stream:** Hughes Creek, thence to Tubbs Creek, thence to Lick Fork Creek, thence to South Sylamore Creek, and thence to the White River

**HUC + Reach Code:** 11010004+010                                              **7Q10:** 0 cfs (critical)  
0.25 cfs (primary season)<sup>1</sup>

**Planning Segment:** 4F                                              **County:** Stone

**Proposed Effluent Limits in mg/L (CBOD<sub>5</sub>/TSS/NH<sub>3</sub>-N/DO):**

No changes from current effluent limits shown below.

**Current Effluent Limits in mg/L (CBOD<sub>5</sub>/TSS/NH<sub>3</sub>-N/DO):**

May-October:                                              10.0/15.0/3.9/6.0  
November-March:                                              10.0/15.0/10.0/7.0  
April:                                              10.0/15.0/3.9/7.0

**TMDL Limits:** None.

**Justification (Sag = Minimum Modeled Value ≠ Difference in Value):**

Reach No.	Length (miles)	DO WQS <sub>C</sub> (mg/L)	DO Sag <sub>C</sub> (mg/L)	Distance to DO Sag <sub>C</sub> (miles)	DO WQS <sub>P</sub> (mg/L)	DO Sag <sub>P</sub> (mg/L)	Distance to DO Sag <sub>P</sub> (miles)
1	1.0	5.0	5.19	0.25	6.0	5.94	0.4

Values in above table are from a modeling analysis dated 2/8/2018.

**Outfall Location (Lat/Long):** 35° 52' 01.54" N; 92° 08' 47.01" W

**Remarks:** This is for the reissuance of the discharge permit for this existing facility. The stream hydraulics were updated in the model based on updated 7Q10 from USGS StreamStats. Based on updated model, existing limits meet water quality standards for dissolved oxygen and ammonia toxicity. No changes to the 208 Plan are being proposed with this permit renewal.

<sup>1</sup> 7Q10 values are based on USGS StreamStats.

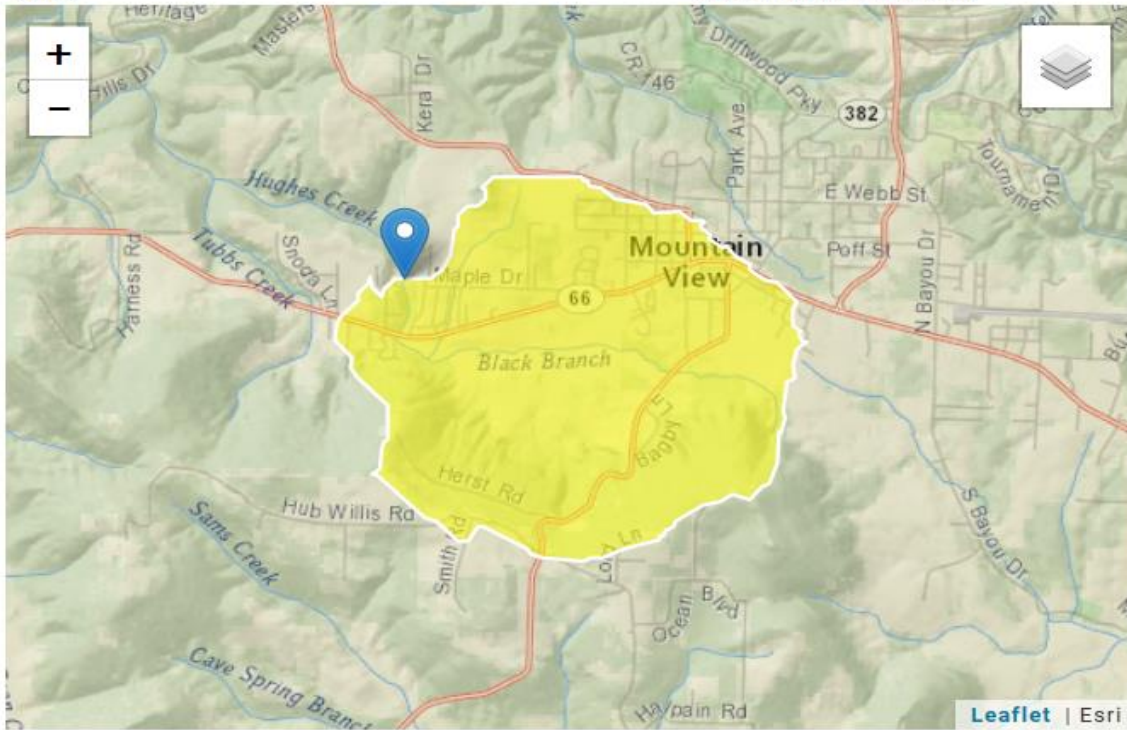
		Ammonia Calculations			COLOR KEY	
Facility Name	City of Mountain View					User Inputs
Major or Minor	Minor					Calculated values
Permit Number	AR0020117					
Receiving Stream	Hughes Creek	Ecoregion or River name	Ozark Highlands			
7Q10, cfs	0 SOURCE	Watershed area (mi <sup>2</sup> )	3.29			
0.25/0.67 multiplier	0.67	Regulation No. 2 Chronic Toxicity Criteria (Instream Concentration)				
Qb, cfs	0.00		AML, mg/l	DML, mg/l		
Qe, MGD	0.73 SOURCE	April	3.9	3.9		
Qe, cfs	1.13	May - October	3.9	3.9		
Cb, mg/l	0 SOURCE	November - March	10.3	10.3		
Allowable Effluent Conc., mg/l						
$(Q_e * C_e) + (Q_b * C_b) = (Q_e + Q_b) * IWC$			Allowable Effluent Conc. (Ce), mg/l			
Qe	Effluent Flow	$C_e = (IWC (Q_e + Q_b) - C_b \times Q_b) / Q_e$				
Ce	Allowable Effluent Concentration		Monthly Avg., mg/l	Daily Max, mg/l		
Qb	% of Low Flow of Receiving Stream	April	3.90	3.90		
Cb	Background Concentration	May - October	3.90	3.90		
IWC	Instream Waste Concentration Chronic Toxicity Criteria	November - March	10.30	10.30		
<b>Chronic Toxicity Criteria vs. D.O. Model Limits</b>						
	Monthly Average, mg/l		Permit Limits		Daily Maximum, mg/l	
Month	Toxicity limit	D.O. limit		Toxicity limit	D.O. limit	Permit Limits
April	3.90	10	3.90	3.90	15	3.90
May - October	3.90	3.9	3.90	3.90	5.85	3.90
November - March	10.30	10	10.00	10.30	15	10.30

<b>Minor Permits</b>					
Fish Early Life Stages Absent - Primary Season (November - March), mg/L					
Ecoregion	Temperature	pH	4-day average	30-day average	
Arkansas River	14	7.6	10.3	10.3	
Arkansas River Valley	14	6.7	16.7	16.7	
Boston Mountains	14	6.9	15.8	15.8	
Delta	14	7.1	14.7	14.7	
Gulf Coastal Plains	14	6.6	17	17	
Ouachita Mountains	14	7.1	14.7	14.7	
Ouachita River (L. Mo. to Mouth)	14	6.7	16.7	16.7	
Ozark Highlands	14	7.6	10.3	10.3	
Red River	14	7.5	11.3	11.3	
White River (Dam #10 Mouth)	14	7.7	9.3	9.3	
Fish Early Life Stages Present - Critical Season (April - October), mg/L					
Ecoregion	Temperature	pH	4-day average	30-day average	
Arkansas River	32	7.6	3.2	3.2	
Arkansas River Valley	31	6.7	5.6	5.6	
Boston Mountains	31	6.9	5.3	5.3	
Delta	30	7.1	5.2	5.2	
Gulf Coastal Plains	30	6.6	6.1	6.1	
Ouachita Mountains	30	7.1	5.2	5.2	
Ouachita River (L. Mo. to Mouth)	32	6.7	5.2	5.2	
Ozark Highlands	29	7.6	3.9	3.9	
Red River	32	7.5	3.5	3.5	
White River (Dam #10 Mouth)	32	7.7	2.9	2.9	

# StreamStats Report

Region ID:  
 Workspace ID:  
 Clicked Point (Latitude, Longitude):  
 Time:

AR  
 AR20180206150054764000  
 35.86714, -92.14639  
 2018-02-06 09:01:09 -0600



AR0020117 - City of Mountain View

## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.29	square miles
CSL1085ADJ	Adjusted 10-85 slope in feet per mile	87.214	

## Probability Statistics Flow Report [Pzero Flow Region 1 2008 5065]

Statistic	Value	Unit
Probability zero flow 7Day	0.213	dim
Probability zero flow 7 day Nov to Apr	0.00574	dim

## Seasonal Flow Statistics Flow Report [Low Flow Region 1 2008 5065]

Statistic	Value	Unit
Nov to Apr 7 Day 10 Year Low Flow	0.25	ft <sup>3</sup> /s

Figure D-10. Dissolved Oxygen and Saturation Values for Ozark Highlands Ecoregion Reference Streams during Summer Period

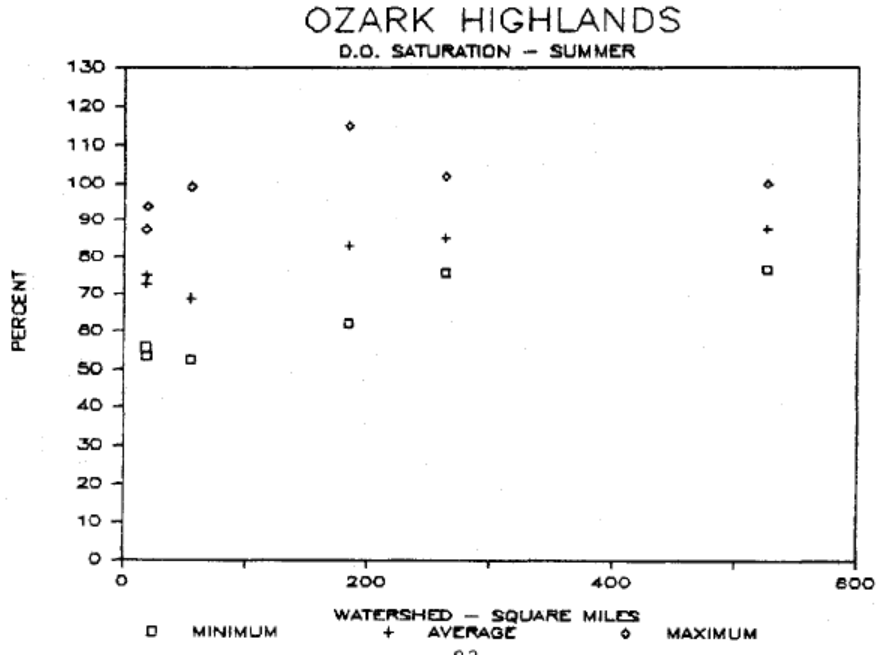
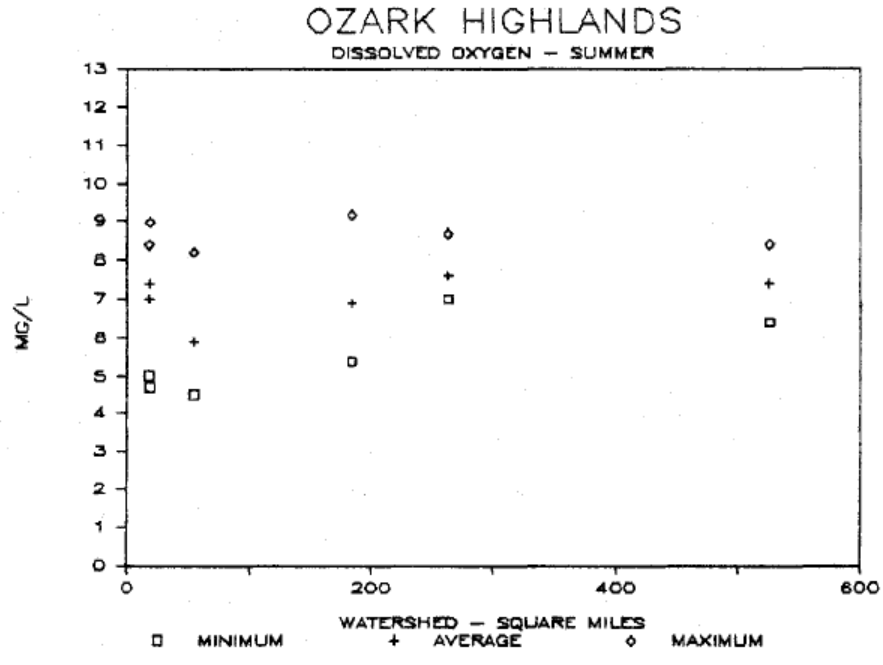
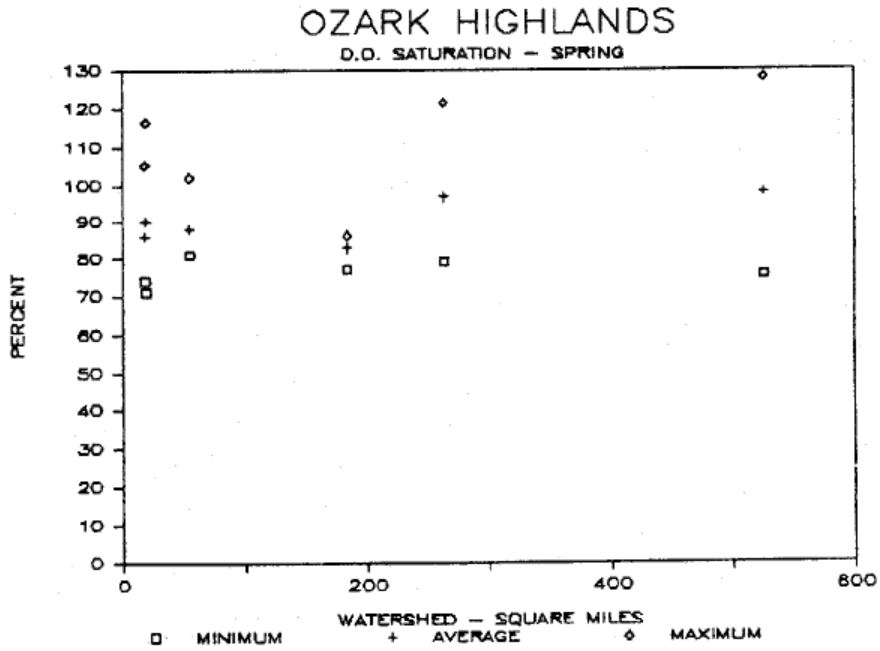
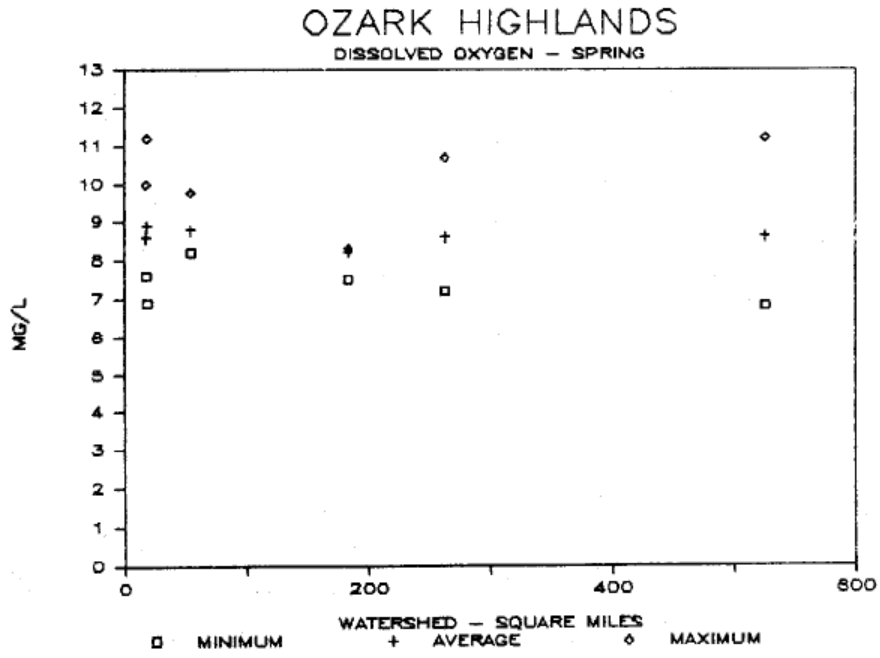


Figure D-11. Dissolved Oxygen and Saturation Values for Ozark Highlands Ecoregion Reference Streams during Spring Period



## Critical Season Hydraulics

0	Headwater in CFS		0.088886	0.5	0.492814	0.4	22.82883	0.1	Accum
				FPS		Feet		Feet	MGD
0.73	Discharger 1 in MGD	Reach 1 Velocity	0.094	Depth	0.517	Width	23.108		0.730

## Primary Season Hydraulics

0.25	Headwater in CFS		0.088886	0.5	0.492814	0.4	22.8288	0.1	Accum
				FPS		Feet		Feet	MGD
0.73	Discharger 1 in MGD	Reach 1 Velocity	0.104	Depth	0.560	Width	23.575		0.892

## Model Input Data

Facility Name: \_\_\_\_\_ City of Mountain View \_\_\_\_\_

Permit Number: \_\_\_\_\_ AR0020117 \_\_\_\_\_

Lat./Long. \_\_\_\_\_ Latitude: 35° 52' 01.54" N; Longitude: 92° 08' 47.01" \_\_\_\_\_

W.S. Drainage Area (mi<sup>2</sup>) \_\_\_\_\_ 3.29 \_\_\_\_\_ Ecoregion: Ozark Highlands \_\_\_\_\_

Q<sub>DESIGN</sub> (MGD): \_\_\_\_\_ 0.73 \_\_\_\_\_

	Critical Season (May-Oct.)	Primary Season (Nov.-Apr.)
D.O. Standard (mg/L)	5.0*	6.0
Temp. Standard (°C)	29	22
Q upstream (cfs)**	0	0.25

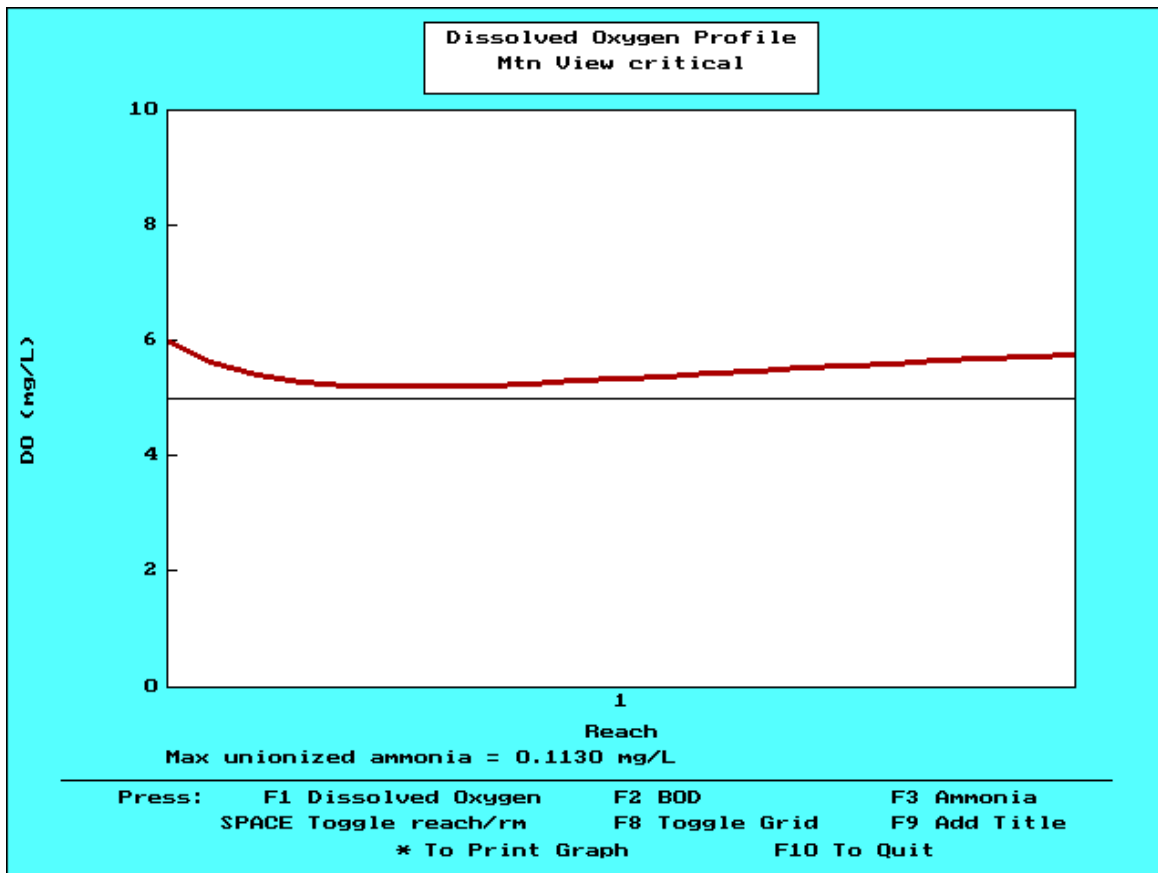
\* The critical season standard for the next size category of stream applies because the discharge is >1 cfs, therefore is assumed to support aquatic life.

\*\*Based on USGS StreamStats for Hughes Creek at outfall location.

## Input Model Coefficients

Coefficient – at 20° C	Input value	Justification
BOD <sub>ult</sub> /BOD <sub>5</sub>	2.3	EPA Guidance
K <sub>d</sub> (1/day)	0.5	MOA for small stream
K <sub>n</sub> (1/day)	0.4	MOA for small stream
SOD (g/m <sup>2</sup> /day)	0.3	MOA for TSS = 15, rocky substrate
K <sub>a</sub> (1/day)	10.6 (critical season)	O'Conner Dobbins equation
	9.9 (primary season)	O'Conner Dobbins equation

# Critical Season Model (20117 C.smp)



Mtn View critical	TABULAR MODEL OUTPUT			
	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
1	1.00	6.00	23.00	3.90
2	0.95	5.63	22.44	3.80
3	0.90	5.40	21.90	3.70
4	0.85	5.28	21.37	3.61
5	0.80	5.22	20.85	3.51
6	0.75	5.19	20.34	3.42
7	0.70	5.20	19.85	3.34
8	0.65	5.22	19.37	3.25
9	0.60	5.25	18.90	3.17
10	0.55	5.29	18.44	3.09
11	0.50	5.33	17.99	3.01
12	0.45	5.37	17.55	2.93
13	0.40	5.42	17.13	2.86
14	0.35	5.46	16.71	2.78
15	0.30	5.51	16.31	2.71
16	0.25	5.55	15.91	2.64
17	0.20	5.59	15.52	2.57
18	0.15	5.64	15.15	2.51
19	0.10	5.68	14.78	2.44
20	0.05	5.72	14.42	2.38
21	-0.00	5.76	14.07	2.32

Run information screen		
Name of receiving stream		Hughes Creek
Number of discharges	(max = 10)	1
Number of reaches	(max = 10)	1
Reaeration type	(O, T, M)	O'Connor-Dobbins
Run title for screen display		Mt. View Critical
Graphics printer type	(HP, FX, LQ, None)	HP LaserJet
Printed graph resolution	(Low, Med, High)	Medium resolution

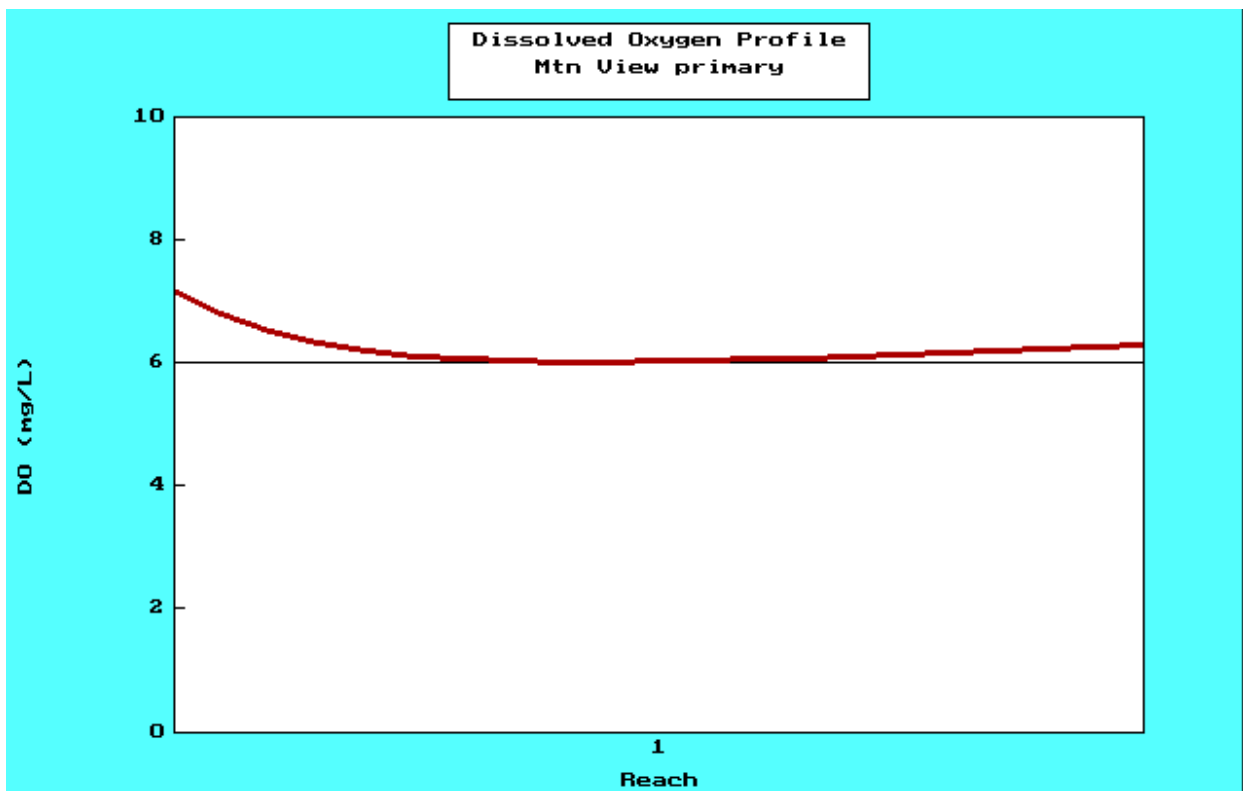
Mtn View critical	Upstream River Parameters		Comments
Flow	(cfs)	0.00	
Temperature	(°C)	29.00	
Dissolved Oxygen	(mg/l)	0.00	
5-Day BOD	(mg/l)	0.00	
Ult. CBOD / 5-Day BOD		2.30	
pH	(su)	7.60	
Ammonia	(mg/l)	0.00	
Alkalinity	(mg/l)	-0.00	
Upstream river mile		1.00	



Mtn View critical	Parameters for Discharge 1		Comments
Flow	(MGD)	0.73	
Temperature	(°C)	29.00	
Dissolved Oxygen	(mg/l)	6.00	
5-Day BOD	(mg/l)	10.00	
Ult. CBOD / 5-Day BOD		2.30	
pH	(su)	7.60	
Ammonia	(mg/l)	3.90	
Alkalinity	(mg/l)	-0.00	
Beginning of Reach Number		1	
Name of Discharger		Mtn View	

Mtn View critical	Parameters for Reach 1		Comments
Length	(mile)	1.00	
Velocity	(fps)	0.09	
Slope	(ft/mile)	0.00	
Average Depth	(ft)	0.52	
Temperature	(°C)	29.00	Calculated
BOD Removal Rate	(1/day)	0.50	
NH3 Decay Rate	(1/day)	0.40	
Sediment Oxygen Demand	(g/m <sup>2</sup> /day)	0.51	k20=0.3(tss=15)
Photosynthesis/respiration	(mg/L/day)	-0.00	

Primary Season Model (20117 P.smp)



Mtn View primary		TABULAR MODEL OUTPUT		
	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
1	1.00	7.16	19.25	8.20
2	0.95	6.78	18.94	8.09
3	0.90	6.51	18.64	7.98
4	0.85	6.32	18.34	7.87
5	0.80	6.19	18.05	7.77
6	0.75	6.10	17.76	7.66
7	0.70	6.05	17.47	7.56
8	0.65	6.02	17.19	7.45
9	0.60	6.01	16.92	7.35
10	0.55	6.01	16.65	7.25
11	0.50	6.02	16.38	7.15
12	0.45	6.03	16.12	7.06
13	0.40	6.05	15.86	6.96
14	0.35	6.07	15.61	6.87
15	0.30	6.10	15.36	6.77
16	0.25	6.13	15.12	6.68
17	0.20	6.16	14.87	6.59
18	0.15	6.19	14.64	6.50
19	0.10	6.22	14.40	6.41
20	0.05	6.25	14.17	6.32
21	-0.00	6.28	13.95	6.24

Run information screen		
Name of receiving stream		Hughes Creek
Number of discharges	(max = 10)	1
Number of reaches	(max = 10)	1
Reaeration type	(O, T, M)	O'Connor-Dobbins
Run title for screen display		Mt. View Primary
Graphics printer type	(HP, FX, LQ, None)	HP LaserJet
Printed graph resolution	(Low, Med, High)	Medium resolution

Mtn View primary	Upstream River Parameters		Comments
Flow	(cfs)	0.25	7Q10 Nov-Apr
Temperature	(°C)	22.00	
Dissolved Oxygen	(mg/l)	7.90	90% sat ERstudy
5-Day BOD	(mg/l)	1.00	assumed
Ult. CBOD / 5-Day BOD		2.30	
pH	(su)	7.00	
Ammonia	(mg/l)	0.10	assumed
Alkalinity	(mg/l)	-0.00	
Upstream river mile		1.00	

Mtn View primary	Parameters for Discharge 1		Comments
Flow	(MGD)	0.73	
Temperature	(°C)	22.00	
Dissolved Oxygen	(mg/l)	7.00	
5-Day BOD	(mg/l)	10.00	
Ult. CBOD / 5-Day BOD		2.30	
pH	(su)	7.00	
Ammonia	(mg/l)	10.00	
Alkalinity	(mg/l)	-0.00	
Beginning of Reach Number		1	
Name of Discharger		Mtn View	

Mtn View primary	Parameters for Reach 1		Comments
Length	(mile)	1.00	
Velocity	(fps)	0.10	
Slope	(ft/mile)	0.00	
Average Depth	(ft)	0.56	
Temperature	(°C)	22.00	Calculated
BOD Removal Rate	(1/day)	0.50	
NH3 Decay Rate	(1/day)	0.40	
Sediment Oxygen Demand	(g/m <sup>2</sup> /day)	0.34	k20=0.3
Photosynthesis/respiration	(mg/L/day)	-0.00	