

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

Date: 5/29/2013

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 MGD

**Receiving Stream:** Hughes

**HUC + Reach Code:** 11010004+010

**7Q10:** 0 cfs

**Planning Segment:** 4F

**County:** Stone

**Proposed Effluent Limits in mg/L (CBOD5/TSS/NH3-N/DO):**

(May-Oct): 10.0/15.0/3.9/6.0

(Nov-March): 10.0/15.0/10.0/7.0

(April): 10.0/15.0/3.9/7.0

**Current Effluent Limits in mg/L (CBOD5/TSS/NH3-N/DO):**

(May-Oct): 10.0/15.0/3.9/6.0

(Nov-March): 10.0/15.0/10.0/7.0

(April): 10.0/15.0/3.9/7.0

**TMDL Limits (if any):** None

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

Reach No.	Length (miles)	DO <sub>C</sub> (mg/L)	Sag <sub>C</sub> (mg/L)	Distance to Sag <sub>C</sub> (miles)	DO <sub>P</sub> (mg/l)	Sag <sub>P</sub> (mg/L)	Distance to Sag <sub>P</sub> (miles)
1	1.6	5.0	4.997	0.5	6.0	5.809	0.65

Results in above table are from a MultiSMP modeling analysis dated 5/29/2013.

**Outfall Location (Lat/Long):** 35° 51' 57.32" N; 92° 08' 42.54" W

**Remarks:** This is for the reissuance of the discharge permit for this existing facility. No changes to WQMP are needed. Updated model was run since old model showed a DO sag of 4.5 mg/l during critical season. Updated model will be sent to EPA for technical approval.

**Ammonia Calculations**

Facility Name City of Mountain View  
 Major or Minor Minor  
 Permit Number AR0020117  
 Receiving Stream Hughes Creek  
 7Q10, cfs 0  
 0.25/0.67 multiplier 0.67  
 Qb, cfs 0.00  
 Qe, MGD 0.73  
 Qe, cfs 1.13  
 Cb, mg/l 0

Ecoregion or River name Ozark Highlands  
 Watershed area (mi<sup>2</sup>) 3  
 Regulation No. 2 Chronic Toxicity Criteria (Instream Concentration)  
 AML, mg/l DML, mg/l  
 April 3.9 3.9  
 May - October 3.9 3.9  
 November - March 10.3 10.3

Arkansas River  
 Arkansas River Valley  
 Boston Mountains  
 Delta  
 Gulf Coastal Plains  
 Ouachita Mountains  
 Ouachita River (L. Mo. to Mouth)  
 Ozark Highlands  
 Red River  
 White River (Dam #10 Mouth)

Allowable Effluent Conc., mg/l

$$(Q_e * C_e) + (Q_b * C_b) = (Q_e + Q_b) * IWC$$

Qe Effluent Flow  
 Ce Allowable Effluent Concentration  
 Qb % of Low Flow of Receiving Stream  
 Cb Background Concentration  
 IWC Instream Waste Concentration Chronic Toxicity Criteria

**Allowable Effluent Conc. (Ce), mg/l**

$C_e = (IWC (Q_e + Q_b) - C_b \times Q_b) / Q_e$   
 Monthly Avg.,mg/l Daily Max, mg/l  
 April 3.90 3.90  
 May - October 3.90 3.90  
 November - March 10.30 10.30

**Chronic Toxicity Criteria vs. D.O. Model Limits**

Month	Monthly Average, mg/l		Permit Limits	Daily Maximum,mg/l		Permit Limits
	Toxicity limit	D.O. limit		Toxicity limit	D.O. limit	
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

## Model Input Data

Facility Name: City of Mountain View

Permit Number: AR0020117

Lat./Long.: 35° 51' 57.32" N; 92° 08' 42.54" W

W.S. Drainage Area (mi<sup>2</sup>): 3                      Ecoregion: Ozark Highlands

	Critical Season (May-Oct.)	Primary Season (Nov.-Apr.)
D.O. Standard (mg/L)	5.0	6.0
Temp. Standard (°C)	29	22
Q stream (cfs)	0	0.1
Velocity stream (fps)	0.187	0.187
Depth stream (ft)	0.6	0.6

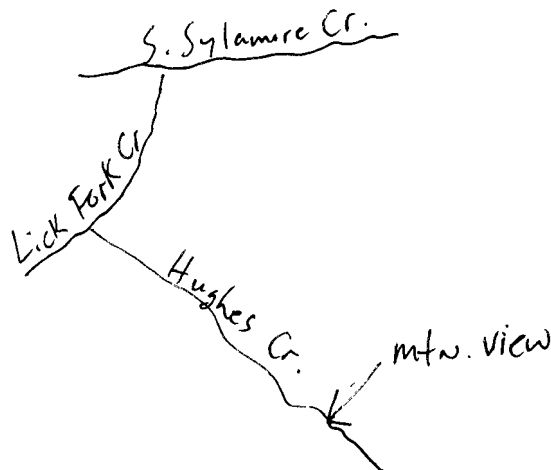
Q<sub>DESIGN</sub> (MGD): 0.73                      Planning Segment: 4F                      County: Stone

Receiving Stream: Hughes Creek

HUC + reach code: 11010004 + 010                      Permit type: Municipal

### Other Facilities

None



Engineer: SB

Date: 5/29/13

### Input Model Coefficients

#### Reach 1

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)	0.7	MOA
K <sub>n</sub> (1/day)	0.4	MOA
SOD (g/m <sup>2</sup> /day)	0.5	MOA
K <sub>a</sub> (1/day)	12	O'Conner Dobbins

Engineer: SB

Date: 5/29/13

BVC

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*                               SIMPLIFIED METHOD PROGRAM                               *
*                               COMPLETE INPUT LISTING                               *
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2017\_C, SMP 5/29/13

\*-\*-\*-\*-\* Run Information \*-\*-\*-\*-\*

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Name of receiving stream ----- Hughes Creek
Number of discharges ----- 1
Number of reaches ----- 1
Reaeration type ----- O'Connor-Dobbins
Run title ----- Mtn View critical

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\*-\*-\*-\*-\* Upstream Parameters \*-\*-\*-\*-\*

Parameter	Value	Comment
Flow (cfs)	0.000	
Temperature (°C)	29.000	
Dissolved Oxygen (mg/l)	0.000	
5-Day BOD (mg/l)	0.000	
Ult. CBOD / 5-Day BOD	2.300	
pH (su)	7.000	
Ammonia (mg/l)	0.000	
Alkalinity (mg/l)	-0.000	

\*-\*-\*-\*-\* Effluent Parameters \*-\*-\*-\*-\*

Number of Discharges = 1

For Discharge Number 1 (Mtn View)

Parameter	Value	Comment
Flow (MGD)	0.730	
Temperature (°C)	29.000	
Dissolved Oxygen (mg/l)	6.000	
5-Day BOD (mg/l)	10.000	
Ult. CBOD / 5-Day BOD	2.300	
pH (su)	7.000	
Ammonia (mg/l)	3.900	
Alkalinity (mg/l)	-0.000	
Beginning of Reach Number	1.000	

\*-\*-\*-\*-\* Reach Information \*-\*-\*-\*-\*

Number of Reaches = 1  
 Reaeration Type is O'Connor-Dobbins

For Reach Number 1

Parameter	Value	Comment
Length (mile)	1.000	
Velocity (fps)	0.187	
Slope (ft/mile)	0.000	
Average Depth (ft)	0.600	
Temperature (°C)	29.000	Calculated

BOD Removal Rate	(1/day)	0.700	
NH3 Decay Rate	(1/day)	0.400	
Sediment Oxygen Demand	(g/m <sup>2</sup> /day)	0.840	SOD = 0.5 @20C
Photosynthesis/respiration	(mg/L/day)	-0.000	

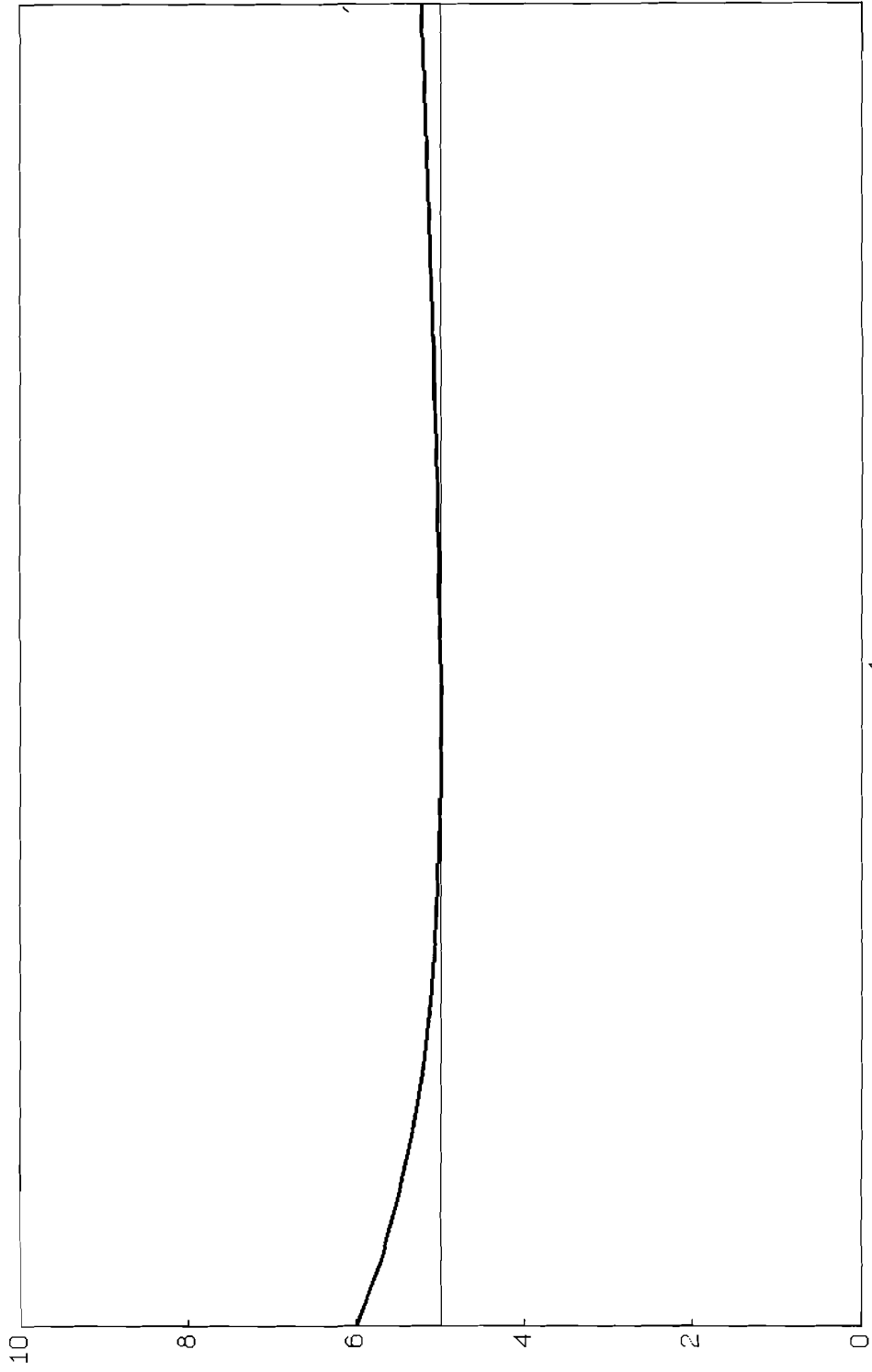
Temperature-corrected BOD removal rate	(1/day)	1.058
Temperature-corrected NH3 decay rate	(1/day)	0.800
Calculated reaeration rate at 20° C	(1/day)	12.003
Temperature-corrected reaeration rate	(1/day)	14.872
Calculated reach-averaged width	(ft)	10.059

\*-\*-\*-\*-\* Results for Hughes Creek \*-\*-\*-\*-\*

Discharge is to -- Hughes Creek  
Run Title is -- Mtn View critical

River Mile	DO Predicted	DO Observed	BOD Predicted	BOD Observed	NH3 Predicted	NH3 Observed
1.000	6.000		23.000		3.900	
0.950	5.711		22.606		3.849	
0.900	5.492		22.218		3.799	
0.850	5.330		21.837		3.750	
0.800	5.210		21.463		3.701	
0.750	5.125		21.095		3.653	
0.700	5.067		20.733		3.606	
0.650	5.029		20.378		3.559	
0.600	5.007		20.028		3.513	
0.550	4.997		19.685		3.467	
0.500	4.997		19.348		3.422	
0.450	5.005		19.016		3.378	
0.400	5.018		18.690		3.334	
0.350	5.036		18.369		3.291	
0.300	5.057		18.054		3.248	
0.250	5.081		17.745		3.206	
0.200	5.106		17.441		3.164	
0.150	5.133		17.142		3.123	
0.100	5.161		16.848		3.083	
0.050	5.189		16.559		3.043	
-0.000						
-0.000	5.218		16.275		3.003	

Dissolved Oxygen Profile  
Mtn View critical



DO (mg/L)

Reach

Max unionized ammonia = 0.0290 mg/L

BVC

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*                               SIMPLIFIED METHOD PROGRAM                               *
*                               COMPLETE INPUT LISTING                               *
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20117\_P.SMP      5/29/13

\*-\*-\*-\*-\*-\* Run Information \*-\*-\*-\*-\*-\*

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Name of receiving stream ----- Hughes Creek
Number of discharges ----- 1
Number of reaches ----- 1
Reaeration type ----- O'Connor-Dobbins
Run title ----- Mtn View primary

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\*-\*-\*-\*-\*-\* Upstream Parameters \*-\*-\*-\*-\*-\*

Parameter	Value	Comment
Flow (cfs)	0.100	
Temperature (°C)	22.000	
Dissolved Oxygen (mg/l)	7.900	90% sat ERstudy
5-Day BOD (mg/l)	1.300	
Ult. CBOD / 5-Day BOD	2.300	
pH (su)	7.000	
Ammonia (mg/l)	0.100	
Alkalinity (mg/l)	-0.000	

\*-\*-\*-\*-\*-\* Effluent Parameters \*-\*-\*-\*-\*-\*

Number of Discharges = 1

For Discharge Number 1 (Mtn View)

Parameter	Value	Comment
Flow (MGD)	0.730	
Temperature (°C)	22.000	
Dissolved Oxygen (mg/l)	7.000	
5-Day BOD (mg/l)	10.000	
Ult. CBOD / 5-Day BOD	2.300	
pH (su)	7.000	
Ammonia (mg/l)	10.000	
Alkalinity (mg/l)	-0.000	
Beginning of Reach Number	1.000	

\*-\*-\*-\*-\*-\* Reach Information \*-\*-\*-\*-\*-\*

Number of Reaches = 1  
 Reaeration Type is O'Connor-Dobbins

For Reach Number 1

Parameter	Value	Comment
Length (mile)	1.000	
Velocity (fps)	0.187	
Slope (ft/mile)	0.000	
Average Depth (ft)	0.600	
Temperature (°C)	22.000	Calculated



BOD Removal Rate	(1/day)	0.700	
NH3 Decay Rate	(1/day)	0.400	
Sediment Oxygen Demand	(g/m <sup>2</sup> /day)	0.560	SOD = 0.5 @20C
Photosynthesis/respiration	(mg/L/day)	-0.000	

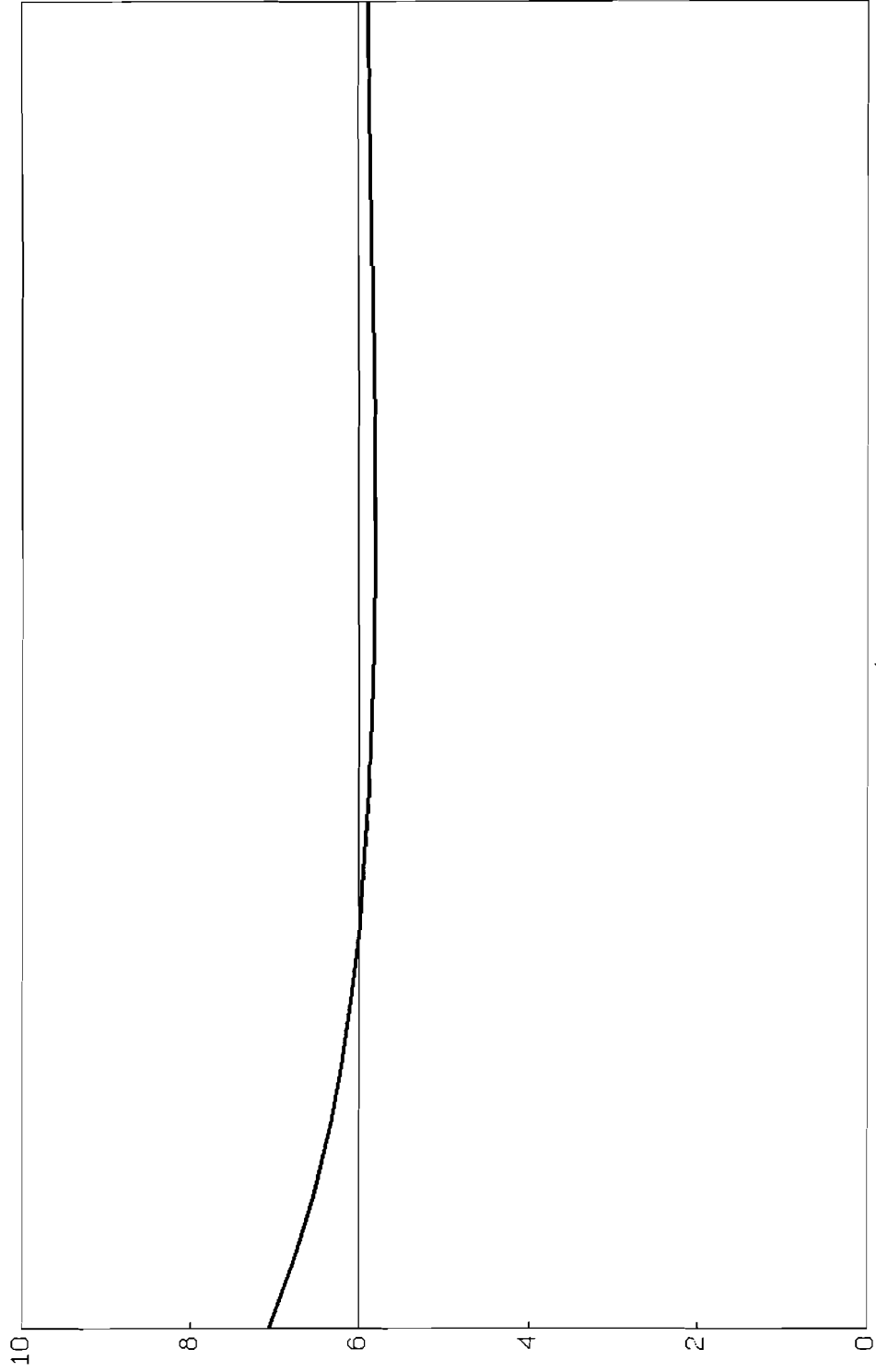
Temperature-corrected BOD removal rate	(1/day)	0.767
Temperature-corrected NH3 decay rate	(1/day)	0.467
Calculated reaeration rate at 20° C	(1/day)	12.003
Temperature-corrected reaeration rate	(1/day)	12.588
Calculated reach-averaged width	(ft)	10.950

\*-\*-\*-\*-\* Results for Hughes Creek \*-\*-\*-\*-\*

Discharge is to -- Hughes Creek  
Run Title is -- Mtn View primary

River Mile	DO Predicted	DO Observed	BOD Predicted	BOD Observed	NH3 Predicted	NH3 Observed
1.000	7.073		21.371		9.194	
0.950	6.778		21.105		9.124	
0.900	6.543		20.842		9.055	
0.850	6.357		20.582		8.986	
0.800	6.211		20.326		8.918	
0.750	6.097		20.073		8.850	
0.700	6.009		19.823		8.783	
0.650	5.942		19.576		8.716	
0.600	5.893		19.332		8.650	
0.550	5.857		19.091		8.585	
0.500	5.833		18.853		8.519	
0.450	5.818		18.618		8.455	
0.400	5.811		18.386		8.390	
0.350	5.809		18.157		8.327	
0.300	5.813		17.931		8.263	
0.250	5.820		17.707		8.201	
0.200	5.831		17.487		8.138	
0.150	5.844		17.269		8.077	
0.100	5.858		17.054		8.015	
0.050	5.875		16.841		7.954	
-0.000						
-0.000	5.893		16.631		7.894	

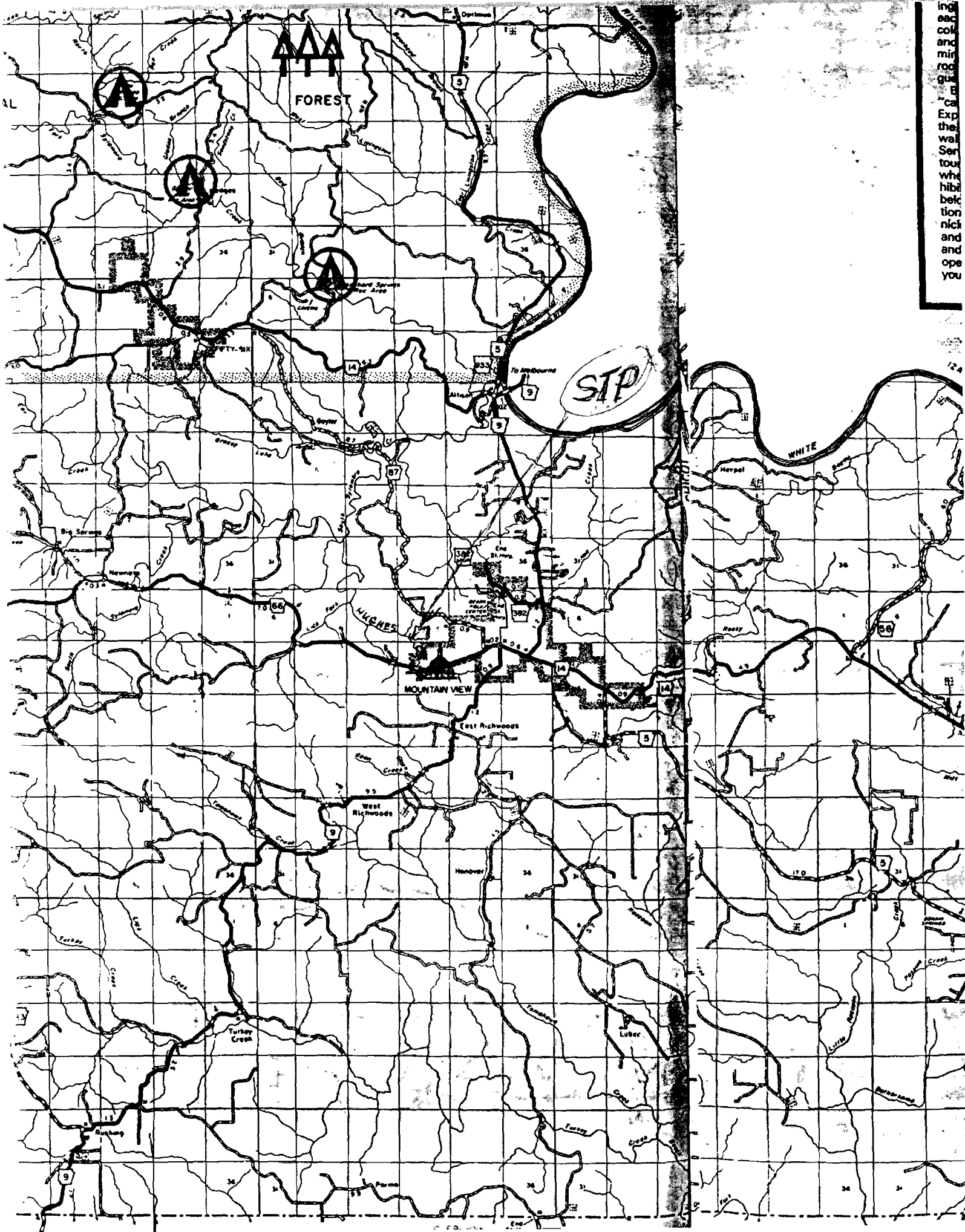
Dissolved Oxygen Profile  
Mtn View primary



1  
Reach

Max unionized ammonia = 0.0419 mg/L

DO (mg/L)



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