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

Date: 07/18/2012

☐ New Permit ☒ Renewal Permit ☐ Amended Permit

Type of Discharge: Municipal Wastewater

Facility Name: City of Flippin

Permit No.: AR0021717

Design Flow Rate (MGD): 0.175

Receiving Stream: Fallen Ash Creek thence to the White River

HUC + Reach Code: 11010003+002[1] **7Q10:** 0 cfs

Planning Segment: 4I **County:** Marion

Proposed Effluent Limits in mg/L (CBOD5/TSS/NH3-N/DO/TP):[1]

April: 10/15/3.9/9.2 mg/l
May-Oct: 10/15/2.0/7.6 mg/l
Nov-March: 10/15/9/9.2 mg/l

TMDL Limits (if any): N/A

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

Reach No.	Length (miles)	DO_C (mg/L)	Sag_C (mg/L)	Distance to Sag_C (miles)	DO_P (mg/l)	Sag_P (mg/L)	Distance to Sag_P (miles)
1	1.0	5.0	6.24	0.15	5.0	7.093	0.35

Modeling results shown above are from MultiSMP model dated 3/29/2007.

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

April: 10/15/-/9.2 mg/l
May-Oct: 10/15/2.0/7.6 mg/l
Nov-March: 10/15/9/9.2 mg/l

Outfall Location (Lat/Long): 36° 17` 00`` N; 92° 35` 10`` W

Remarks: This is for the reissuance of the discharge permit for this existing facility. Limits are continued from the previous permit. AWQMP needs to be revised to add the effluent limitation of 3.9 mg/l for Ammonia Nitrogen for the month of April.

1 The receiving stream does not have an assigned reach number. It empties into the White River in reach # 002.

Ammonia Calculations

Facility Name	City of Flippin
Major or Minor	Minor
Permit Number	AR0021717
Receiving Stream	Fallen Ash Creek

7Q10, cfs	0
0.25/0.67 multiplier	0.67
Qb, cfs	0.00
Qe, MGD	0.175
Qe, cfs	0.27
Cb, mg/l	0

Ecoregion or River name	Ozark Highlands
Watershed area (mi^2)	12

Regulation No. 2 Chronic Toxicity Criteria (Instream Concentration)

	AML, mg/l	DML, mg/l
April	N/A	3.9
May - October	N/A	3.9
November - March	N/A	10.3

Allowable Effluent Conc., mg/l

(Qe * Ce) + (Qb* Cb) = (Qe + Qb) * 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

Ce = (IWC (Qe + Qb) - Cb X Qb) / Qe

	Monthly Avg., mg/
April	3.9
May - October	3.9
November - March	10.3

Chronic Toxicity Criteria vs. D.O. Model Limits

	Monthly Average, mg/l		**Permit Limits**	Daily Maximum, mg/l	
Month	Toxicity limit	D.O. limit		Toxicity limit	D.O. limit
April	3.9	9.0	3.9	3.9	13.5
May - October	3.9	2.0	2.0	3.9	3.0
November - March	10.3	9.0	9.0	10.3	13.5

3VC

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*                        SIMPLIFIED METHOD PROGRAM                       *
*                          COMPLETE INPUT LISTING                        *
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21717_C.SMP 3/29/2007

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

Name of receiving stream	Fallen Ash Creek
Number of discharges	1
Number of reaches	1
Reaeration type	O'Connor-Dobbins
Run title	Flippin_critical

--*-*-*-* 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)	-0.000	
Ammonia	(mg/l)	-0.000	
Alkalinity	(mg/l)	-0.000	

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

Number of Discharges = 1

For Discharge Number 1 (Flippin)

Parameter		Value	Comment
Flow	(MGD)	0.400	
Temperature	(°C)	29.000	
Dissolved Oxygen	(mg/l)	7.600	
5-Day BOD	(mg/l)	10.000	
Ult. CBOD / 5-Day BOD		2.300	
pH	(su)	-0.000	
Ammonia	(mg/l)	2.000	
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)	0.046	
Slope	(ft/mile)	-0.000	
Average Depth	(ft)	0.293	
Temperature	(°C)	29.000	Calculated

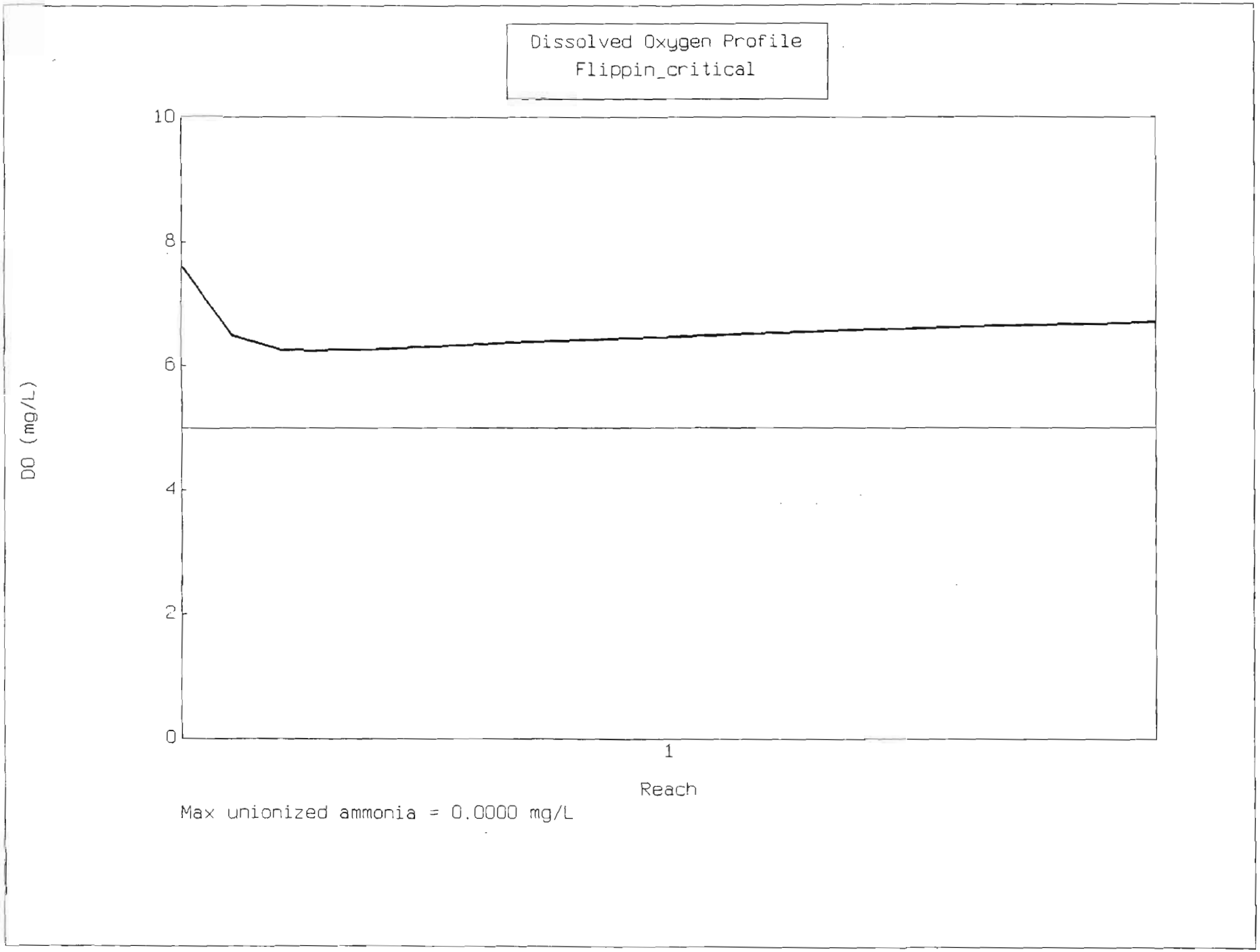
BOD Removal Rate	(1/day)	0.400	
NH3 Decay Rate	(1/day)	0.400	
Sediment Oxygen Demand	(g/m²/day)	0.840	k20=0.5
Photosynthesis/respiration	(mg/L/day)	-0.000	

Temperature-corrected BOD removal rate	(1/day)	0.605
Temperature-corrected NH3 decay rate	(1/day)	0.800
Calculated reaeration rate at 20° C	(1/day)	17.445
Temperature-corrected reaeration rate	(1/day)	21.615
Calculated reach-averaged width	(ft)	45.882

--*-*-* Results for Fallen Ash Creek *-*-*-*-*

Discharge is to -- Fallen Ash Creek
Run Title is -- Flippin_critical

River Mile	DO Predicted	DO Observed	BOD Predicted	BOD Observed	NH3 Predicted	NH3 Observed
1.000	7.600		23.000		2.000	
0.950	6.496		22.094		1.897	
0.900	6.265		21.224		1.798	
0.850	6.240		20.389		1.705	
0.800	6.263		19.586		1.617	
0.750	6.297		18.815		1.534	
0.700	6.331		18.074		1.454	
0.650	6.364		17.362		1.379	
0.600	6.397		16.679		1.308	
0.550	6.427		16.022		1.240	
0.500	6.457		15.391		1.176	
0.450	6.485		14.785		1.115	
0.400	6.512		14.203		1.057	
0.350	6.537		13.644		1.003	
0.300	6.562		13.106		0.951	
0.250	6.586		12.590		0.902	
0.200	6.608		12.095		0.855	
0.150	6.629		11.618		0.811	
0.100	6.650		11.161		0.769	
0.050	6.670		10.721		0.729	
-0.000						
-0.000	6.688		10.299		0.691	


Dissolved Oxygen Profile
Flippin_critical
10
8
6
4
2
0
DO (mg/L)
1
Reach
Max unionized ammonia = 0.0000 mg/L

BVC

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**********************************************************************
*                      SIMPLIFIED METHOD PROGRAM                     *
*                        COMPLETE INPUT LISTING                      *
**********************************************************************
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21717 - P. SMP 3/29/2007

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

Name of receiving stream	Fallen Ash Creek
Number of discharges	1
Number of reaches	1
Reaeration type	O'Connor-Dobbins
Run title	Flippin_Primary

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

Parameter		Value	Comment
Flow	(cfs)	0.500	
Temperature	(°C)	22.000	
Dissolved Oxygen	(mg/l)	7.000	80% sat
5-Day BOD	(mg/l)	1.000	
Ult. CBOD / 5-Day BOD		2.300	
pH	(su)	-0.000	
Ammonia	(mg/l)	0.100	
Alkalinity	(mg/l)	-0.000	

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

Number of Discharges = 1

For Discharge Number 1 (Flippin)

Parameter		Value	Comment
Flow	(MGD)	0.400	
Temperature	(°C)	22.000	
Dissolved Oxygen	(mg/l)	9.200	
5-Day BOD	(mg/l)	10.000	
Ult. CBOD / 5-Day BOD		2.300	
pH	(su)	-0.000	
Ammonia	(mg/l)	9.000	
Alkalinity	(mg/l)	-0.000	
Upstream river mile		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)	0.078	
Slope	(ft/mile)	-0.000	
Average Depth	(ft)	0.444	
Temperature	(°C)	22.000	Calculated

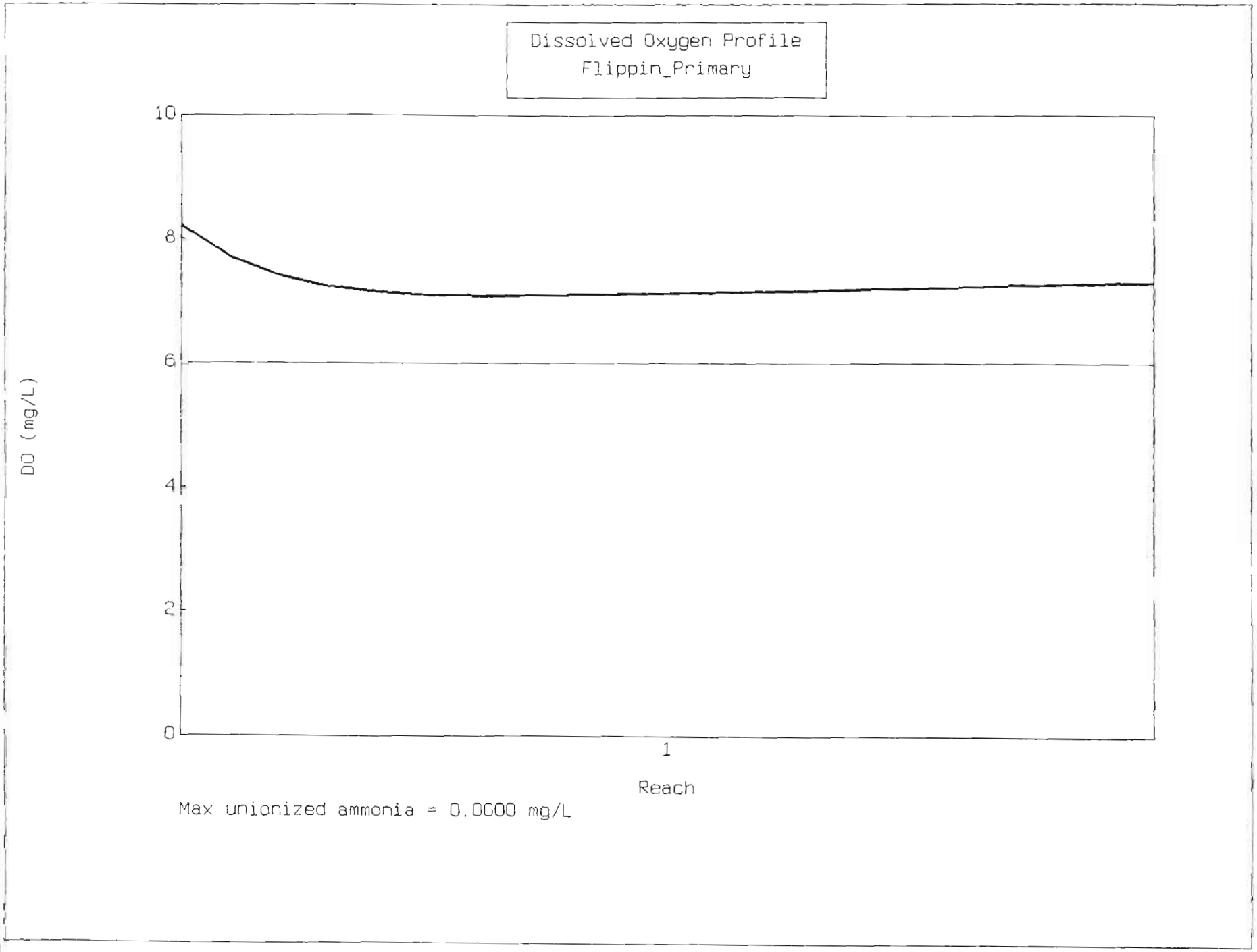
BOD Removal Rate	(1/day)	0.400	
NH3 Decay Rate	(1/day)	0.400	
Sediment Oxygen Demand	(g/m²/day)	0.560	k20=0.5
Photosynthesis/respiration	(mg/L/day)	-0.000	

Temperature-corrected BOD removal rate	(1/day)	0.438
Temperature-corrected NH3 decay rate	(1/day)	0.467
Calculated reaeration rate at 20° C	(1/day)	12.178
Temperature-corrected reaeration rate	(1/day)	12.772
Calculated reach-averaged width	(ft)	32.294

--*-*-* Results for Fallen Ash Creek *-*-*-*-*

Discharge is to -- Fallen Ash Creek
Run Title is -- Flippin_Primary

River Mile	DO Predicted	DO Observed	BOD Predicted	BOD Observed	NH3 Predicted	NH3 Observed
1.000	8.216		13.746		5.021	
0.950	7.719		13.512		4.930	
0.900	7.427		13.282		4.841	
0.850	7.259		13.055		4.753	
0.800	7.166		12.833		4.667	
0.750	7.117		12.614		4.583	
0.700	7.097		12.400		4.500	
0.650	7.093 ←		12.188		4.418	
0.600	7.098		11.981		4.338	
0.550	7.109		11.777		4.260	
0.500	7.124		11.576		4.182	
0.450	7.141		11.379		4.107	
0.400	7.158		11.185		4.032	
0.350	7.177		10.995		3.959	
0.300	7.195		10.808		3.888	
0.250	7.213		10.624		3.817	
0.200	7.231		10.443		3.748	
0.150	7.249		10.265		3.680	
0.100	7.267		10.090		3.613	
0.050	7.284		9.918		3.548	
-0.000						
-0.000	7.301		9.749		3.484	


Dissolved Oxygen Profile
Flippin_Primary
10
8
6
4
2
0
DO (mg/L)
1
Reach
Max unionized ammonia = 0.0000 mg/L

Byrum, Shane

From: Byrum, Shane
Sent: Tuesday, August 21, 2012 11:33 AM
To: Jastrzebski, Marysia
Subject: RE: WQMP summary Sheet and NH3-N spreadsheet for AR0021717-City of Flippin - CORRECTED
Attachments: AR0021717_Modeling Report_20120718.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Found the previous model dated 3/29/2007. Renew as is. I will add NH3-N limit of 3.9 mg/l for April in the WQMP at final permit routing. This WQMP update has to be sent to EPA, and I will send in the next batch. I have attached the modeling report.

Shane Byrum, Engineer
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North Little Rock, AR 72118-5317
(501) 682-0618
byrum@adeq.state.ar.us

From: Jastrzebski, Marysia
Sent: Thursday, July 19, 2012 2:23 PM
To: Byrum, Shane
Subject: FW: WQMP summary Sheet and NH3-N spreadsheet for AR0021717-City of Flippin - CORRECTED

Shane,

After reviewing I concluded that watershed are is above 10 sq. miles. This will not require change of effluent limits but I had to redoNH3-N spreadsheet. Please disregard the original one.

Thanks,

m

From: Jastrzebski, Marysia
Sent: Thursday, July 19, 2012 1:00 PM
To: Byrum, Shane
Subject: WQMP summary Sheet and NH3-N spreadsheet for AR0021717-City of Flippin

Shane,

Proposing to continue all limits from the current permit:

April: 10/15/3.9/9.2 mg/l
May-Oct: 10/15/2.0/7.6 mg/l
Nov-March: 10/15/9/9.2 mg/l

AWQMP needs to be revised to add NH3-N limit of 3.9 mg/l during the months of April.

I did not find water quality model but this is the last e-mail from Amy regarding the limits:

http://www.adeq.state.ar.us/ftproot/Pub/WebDatabases/PermitsOnline/NPDES/Tech/AR0021717_Update%20Effluent%20Limits_20070329.pdf

I am working on a draft permit and hoping to deliver it to NLR office son June 23, 2011. Please let me know if I need to make any changes.

Thanks,

m

Marysia Jastrzebski, P. E.
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