Arkansas Department of Energy and Environment – Division of Environmental Quality
Water Quality Management Plan Summary

Date: August 3, 2026 Reviewed by: Shane Byrum

☐ New Permit ☐ Renewal Permit ☒ Modified Permit

Type of Discharge: Domestic and Cafeteria Wastewater

Facility Name: Arkansas Department of Corrections – East Regional Unit

Permit No.: AR0045578

Design Flow Rate (MGD): 0.65

Receiving Stream: St. Francis River

Assessment Unit: AR_08020203_002 **7Q10:** 430 cfs[1]

Planning Segment: 5A **County:** Lee

Proposed 208 Plan Monthly Average Effluent Limits in mg/L:

Year-round: 30 / 30 / 2 / 2 (BOD_5/TSS/DO^2/PAA^3)

Current 208 Plan Monthly Average Effluent Limits in mg/L:

Year-round: 30 / 30 / 2 (BOD_5/TSS/DO^2)

TMDL Limits: None

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

Reach No.	Length (miles)	DO WQS_C (mg/L)	DO Sag_C (mg/L)	Distance to DO Sag_C (miles)	DO WQS_P (mg/L)	DO Sag_P (mg/L)	Distance to DO Sag_P (miles)
1	10	5.0	5.0	7.0	Primary season was not modeled since the DO standard and permit limits are the same year-round, and primary season has higher upstream flow.		

Values in above table are from a modeling analysis dated 12/15/2017.

Outfall Location (Lat/Long): 34° 50’ 10.00” N; 90° 36’ 43.00” W

Remarks: This is for the modification of the discharge permit for this existing facility to add Paracetic Acid (PAA) disinfection. The 208 Plan is being updated to add a year-round instantaneous maximum PAA limit of 2.0 mg/l to the existing water quality limitations.

[1] 7Q10 is published value at USGS Station 07047902 in USGS Scientific Investigation Report 2008-5065.
[2] DO limit is an Instantaneous Minimum.
[3] PAA limit is an Instantaneous Maximum.

Peracetic Acid (PAA) limit justification

The facility will be using PAA as a supplemental method of disinfection.

The receiving stream, the St. Francis River, has a 7Q10 flow of 430 cfs (Critical Season). In accordance with "OWQ Technology-based limitations for Peracetic Acid (PAA), March 3, 2026," a Dilution Factor (DF) is calculated as follows:

$$DF = \frac{\text{discharge flow} + (7Q10 \times MZ)}{\text{discharge flow}} \quad \text{(all flows in cfs)}$$

Where:

Discharge flow = 0.65 MGD = 1.01 cfs
7Q10 = 430 cfs
MZ = 0.25 for 7Q10 ≥ 100

$$DF = \frac{1.01 + (430 \times 0.25)}{1.01} = 107$$

DF ≥ 2 → PAA limit = 2.0 mg/L (Inst. Max.)

Ammonia Calculations

POTW?	no	(yes or no)		COLOR KEY	
Facility Name	ADC-East AR Regional Unit				User Inputs
Major or Minor	Minor				Calculated values
Permit Number	AR0045578				
Receiving Stream	St. Francis River		Ecoregion or River name	Mississippi Alluvial Plain (Least-Altered)	
Critical 7Q10, cfs	430	USGS 07047902	Watershed area (mi^2)	1,830.00	
Primary 7Q10, cfs	516	USGS 07047902			
0.25/0.67 multiplier	0.25				
0.25/0.67 multiplier	0.25				
Qb (Critical), cfs	107.50		Rule 2 (8 CAR § 21-512) Chronic Toxicity Criteria (Instream Concentration)		
Qb (Primary), cfs	129.00			AML, mg/l	DML, mg/l
Qe, MGD	0.65	Design flow	April	2.38	2.38
Qe, cfs	1.00425		May - October	2.38	2.38
Cb, mg/l	0.03	FRA0013	November - March	6.75	6.75
S. fishery flow, cfs	0				

Allowable Effluent Conc., mg/l

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

Allowable Effluent Conc. (Ce), mg/l

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

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

	Monthly Avg.,mg/l	Daily Max, mg/l
April	304.25	304.25
May - October	253.94	253.94
November - March	869.96	869.96

Chronic Toxicity Criteria vs. D.O. Model Limits

	Monthly Average, mg/l			Daily Max, mg/l		
Month	NH3-N Toxicity limit	Oxygen-based NH3-N limit	**Permit Limits**	NH3-N Toxicity limit	Oxygen-based NH3-N limit	**Permit Limits**
April	304.2	15	*	304.2	22.5	*
May - October	253.9	15	*	253.90	22.5	*
November - March	870	15	*	870	22.5	*

*Ammonia limits are not included in the permit because the permit contains BOD5 limits. BOD5 includes both carbonaceous and nitrogenous portions of oxygen demand. In addition, the ammonia limits needed to meet dissolved oxygen standards and ammonia toxicity standards instream are greater than 15 mg/l. Therefore, ammonia limits are deemed unnecessary.

Minor Permits

Ammonia Toxicity Criteria (8 CAR § 21-512)

Fish Early Life Stages Absent - Primary Season (November - March), mg/L

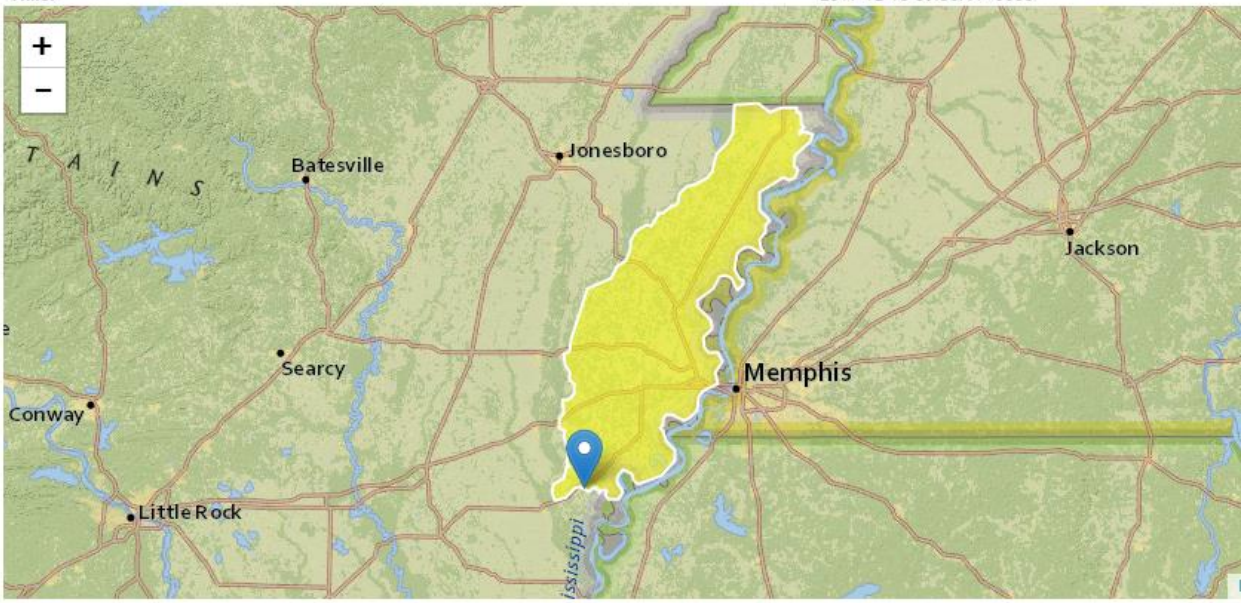
Ecoregion	Temperature	pH	4-day average	30-day average
Arkansas River	14	7.6	4.75	4.75
Arkansas Valley	14	6.7	7.50	7.50
Boston Mountains	14	6.9	7.25	7.25
Mississippi Alluvial Plain (Least-Altered)	14	7.1	6.75	6.75
Mississippi Alluvial Plain (Channel-Altered)	14	7.1	6.75	6.75
South Central Plains	14	6.6	7.75	7.75
Ouachita Mountains	14	7.1	6.75	6.75
Ouachita River (Little Missouri confluence to Mouth)	14	6.7	7.50	7.50
Ozark Highlands	14	7.6	4.75	4.75
St. Francis River	14	7.2	6.25	6.25
Red River	14	7.5	5.25	5.25
White River (Dam #1 to Mouth)	14	7.7	4.25	4.25

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	1.48	1.48
Arkansas Valley	31	6.7	2.50	2.50
Boston Mountains	31	6.9	2.40	2.40
Mississippi Alluvial Plain (Least-Altered)	30	7.1	2.38	2.38
Mississippi Alluvial Plain (Channel-Altered)	32	7.1	2.08	2.08
South Central Plains	30	6.6	2.75	2.75
Ouachita Mountains	30	7.1	2.38	2.38
Ouachita River (Little Missouri confluence to Mouth)	32	6.7	2.38	2.38
Ozark Highlands	29	7.6	1.78	1.78
St. Francis River	32	7.2	1.98	1.98
Red River	32	7.5	1.60	1.60
White River (Dam #1 to Mouth)	32	7.7	1.33	1.33

Watershed Area at outfall = 1,830 square miles

Region ID:	AR
Workspace ID:	AR20171215153623070000
Clicked Point (Latitude, Longitude):	34.83582, -90.61287
Time:	2017-12-15 09:36:41 -0600



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1830	square miles

Sediment Oxygen Demand (SOD) for Various Temperatures and Ecoregion [5]

Rocky Substrate[4]						Applicable Ecoregions[6]
TSS[1]	SOD_{20}	SOD_{22}	SOD_{29}	SOD_{30}	SOD_{31}	Ozark Highlands Boston Mountains Ouachita Mountains
15[2]	0.3	0.34	0.51	0.54	0.57	
20[2]	0.5	0.56	0.84	0.90	0.95	
30[2]	1.0	1.12	1.69	1.79	1.90	
45[3]	1.4	1.57	2.37	2.51	2.66	
90[3]	1.8	2.02	3.04	3.22	3.42	
Mixed Substrate						Arkansas Valley South Central Plains
TSS[1]	SOD_{20}	SOD_{22}	SOD_{29}	SOD_{30}	SOD_{31}	
15[2]	0.4	0.45	0.68	0.72	0.76	
20[2]	0.7	0.79	1.18	1.25	1.33	
30[2]	1.3	1.46	2.20	2.33	2.47	
45[3]	1.6	1.80	2.70	2.87	3.04	
90[3]	1.9	2.13	3.21	3.40	3.61	
Sandy Substrate[4]						Arkansas Valley South Central Plains Mississippi Alluvial Plain
TSS[1]	SOD_{20}	SOD_{22}	SOD_{30}	SOD_{31}	SOD_{32}	
15[2]	0.5	0.56	0.90	0.95	1.01	
20[2]	0.8	0.90	1.43	1.52	1.61	
30[2]	1.5	1.69	2.69	2.85	3.0	
45[3]	1.8	2.02	3.22	3.42	3.62	
90[3]	2.0	2.25	3.58	3.80	4.02	

[1] Projected TSS instream after mixing.

[2] TSS values are from MOA with EPA found in the CPP. SOD values for rocky substrate are the lower end of range given in the MOA. SOD values for sandy substrate are the upper end of range given in the MOA.

[3] These TSS concentrations are outside of the range given in the MOA, so the corresponding SOD values are estimated.

[4] SOD values given in this table are the lower and upper ends of the recommended range. SOD values between the upper and lower values are acceptable based on nature of substrate.

[5] Deviations from these rates may take place in situations of high instream dilution, which significantly reduces the impact of the benthal (sediment) deposits on oxygen consumption. In these situations, justification on a case by case basis will be provided in the documentation submitted to EPA. Mass balance equation can be used to calculate an instream TSS concentration after mixing with effluent.

[6] Applicable ecoregions are based on the general characteristics of waterbodies within each ecoregion (Rocky, Sandy, or Mixed). A different substrate type may be used based on site specific observations of the particular stream in question.

Model Input Data

Receiving Stream: St. Francis River

Q_{DESIGN} = 0.65 mgd = 1.008 cfs

7Q10 = 430 cfs (May-October from USGS Station 07047902)

W.S. Drainage Area (mi^2): 1830

Ecoregion: Mississippi Alluvial Plain (least altered)

Critical Season Stream Hydraulics

Quick Calculator

430	Headwater in CFS		0.045257	0.4	0.7	0.27	31.565657	0.33
				FPS		Feet		Feet
0.65	Discharger 1 in MGD	Reach 1 Velocity		0.512	Depth	3.601	Width	233.665

	Critical Season (May-Oct.)	Primary Season (Nov.-Apr.)
D.O. Standard (mg/L)	5.0	5.0
Temp. Standard (°C)	32	22
Q stream (cfs)	431	Primary season not modeled since DO WQS and permit limits are the same year round and there is more upstream flow in primary season.
Velocity stream (fps)	0.512	
Depth stream (ft)	3.601	

Input Model Coefficients

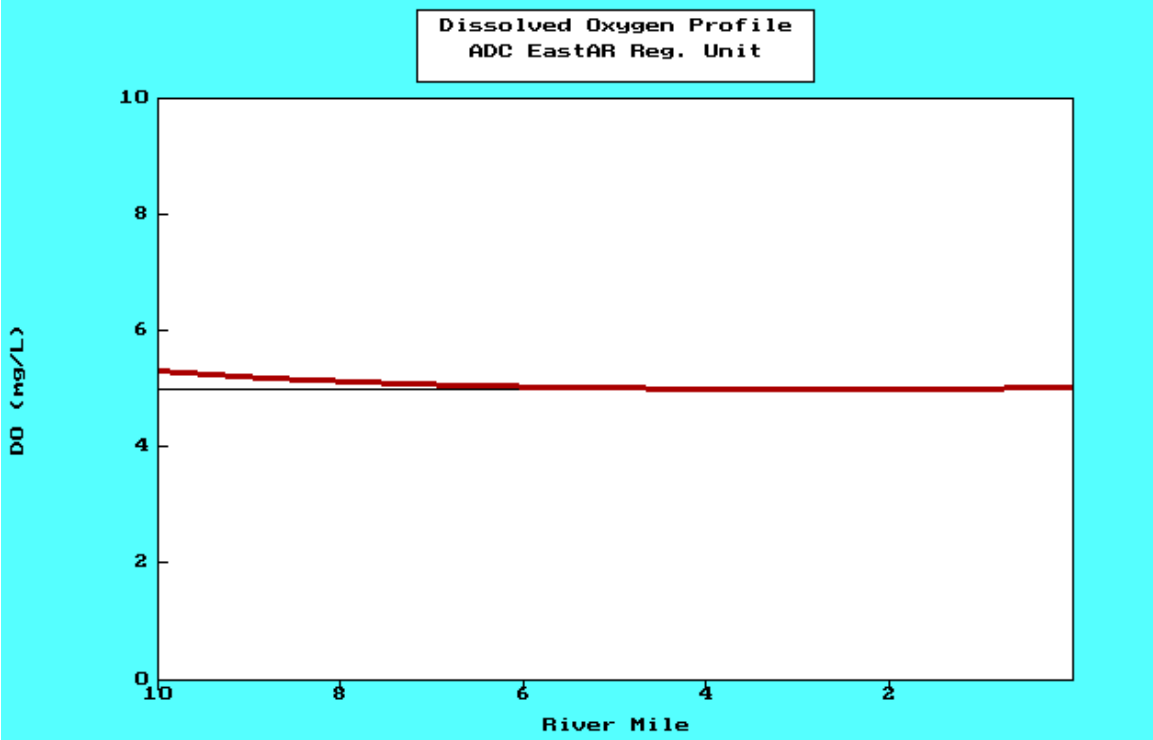
Reach 1

Coefficient – at 20° C	Input value	Justification
$BOD_{ult.}/BOD_5$	2.3	Default
K_d (1/day)	0.2	CPP, large river
K_n (1/day)	0.1	CPP, large river
SOD (g/m^2/day)	1.5	CPP, sandy substrate
K_a (1/day)	1.35	O'Conner Dobbins equation

Critical Season								Primary Season							
StationID	DateSampled	BOD5	TSS	DO	T	NH3		StationID	DateSamp	BOD5	TSS	DO	T	NH3	
FRA0013	5/28/2002 12:2	1.53	29	4.3	24	0.069		FRA0013	11/25/200	1.65	25.7	9.3	8.3	0.015	
FRA0013	6/25/2002 3:14	1.58		6.3	28	0.01		FRA0013	12/17/200	2.45	30.8	9	10	0.015	
FRA0013	7/9/2002 1:39:	2	42.5	8.43	31	0.006		FRA0013	1/28/2003	0.95	13.5	10.3	2	0.04	
FRA0013	8/13/2002 12:4	0.91	10.3	8.17	27	0.003		FRA0013	11/12/200	2.21	26.5	9.9	18	0.015	
FRA0013	9/10/2002 3:15	2.64	15			0.003		FRA0013	12/2/2003	1.02	25.7	11.2	9.9	0.048	
FRA0013	10/22/2002 10	2.15	25.5	6.55	16	0.034		FRA0013	2/18/2003	2.01	120	8.9	6	0.111	
FRA0013	5/20/2003 2:55	1.78	85	5.1	22	0.074		FRA0013	3/18/2003	1.22	23.5	8.9	17	0.015	
FRA0013	6/3/2003 11:14	1.26	14.5	8.6	21	0.065		FRA0013	4/15/2003	0.94	63.2	8.4	18.5	0.015	
FRA0013	6/30/2003 12:4	1.66	54.5	8.3	27.5	0.015		FRA0013	1/13/2004	1.12	19.5	11.2	8	0.015	
FRA0013	8/5/2003 11:22	1.15	37.7	5.3	27.5	0.034		FRA0013	2/17/2004	0.86	24.8	12.7	7	0.015	
FRA0013	9/16/2003 1:00	1.64	45.2	8.9	24	0.015		FRA0013	3/9/2004 1	2.37	133	8.54	14	0.132	
FRA0013	10/21/2003 1:0	2.23	29.5	9.9	21	0.015		FRA0013	4/20/2004		54.5	5.36	22	0.015	
FRA0013	5/18/2004 1:31	2.21	88.8	6.3	23	0.116		FRA0013	11/9/2004	2.04	47.2	7.73	14.7	0.015	
FRA0013	6/29/2004 2:29	3.43	29.2	4.87	26	0.015		FRA0013	11/30/200	1.85	55.8	12.5	10.3	0.015	
FRA0013	7/27/2004 2:22	1.89	47.2	6.67	27.5	0.015		FRA0013	1/11/2005	1.4	8.5	7.74		0.015	
FRA0013	8/17/2004 10:1	1.98	17.2	7.37	24.9	0.015		FRA0013	2/8/2005 1	1.18	116	10	9.5	0.015	
FRA0013	9/21/2004 10:3	2.98	21.5	7.18	22.5	0.015		FRA0013	3/8/2005 9	1.34	24.5	7.53	12.8	0.015	
FRA0013	10/26/2004 10	2.61	25.3	6.89	22.8	0.015		FRA0013	4/5/2005 1	1.97	60.5	6.83	17.7	0.03	
FRA0013	5/10/2005 10:0	2.49	39.2	7.54	22.1	0.015		FRA0013	11/1/2005		12.2	8.46	15.4	0.015	
FRA0013	5/31/2005 10:3	2.96	18.5	6.86	24.7	0.015		FRA0013	12/6/2005		22.5	7.96	5.6	0.015	
FRA0013	7/5/2005 9:35:		27.5	5.52	30.3	0.015		FRA0013	1/3/2006 1		22.2	7.77	10.4	0.015	
FRA0013	8/9/2005 10:33		12	5.64	30	0.015		FRA0013	1/31/2006		51	8.96	9.7	0.063	
FRA0013	9/6/2005 12:15		22.2	5.69	29.2	0.015		FRA0013	3/14/2006		277	6.67	16.4	0.133	
FRA0013	10/4/2005 10:0		24.8	5.62		0.015		FRA0013	4/11/2006		37	6.15	19	0.015	
FRA0013	5/9/2006 10:20		181	6.03	20.8	0.096		FRA0013	11/7/2006		25.2	9.38	12.1	0.015	
FRA0013	6/20/2006 10:2		181	6.08	27.7	0.224		FRA0013	12/12/200		16.2	9.09	7.3	0.015	
FRA0013	7/25/2006 9:10		28.2	5.7	28.5	0.015		FRA0013	1/9/2007 1		46.8	8.88	8.9	0.03	
FRA0013	8/22/2006 10:3		20.2	5.6	27.5	0.015		FRA0013	2/27/2007		49.5	8.63	10.3	0.015	
FRA0013	9/19/2006 10:3		97		22.5	0.015		FRA0013	3/27/2007		16.3	12.7	21.2	0.015	
FRA0013	10/17/2006 10		18.2	5.77	23.8	0.015		FRA0013	4/24/2007		22.5	10.2	21.3	0.015	
FRA0013	5/15/2007 10:3		39	6.8	25.9	0.015		FRA0013	11/27/200		120	11.4	8.1	0.06	
FRA0013	6/19/2007 10:3		49.2	6.26	26.6	0.015		FRA0013	12/11/200		28.8	14.5	9.9	0.062	
FRA0013	7/24/2007 9:45		17.2	8.74	26.9	0.015		FRA0013	1/29/2008		11.5	8.86	8	0.015	
FRA0013	8/7/2007 10:30		22	4.15	30.3	0.015		FRA0013	2/26/2008		24	17.1	6	0.036	
FRA0013	9/18/2007 10:0		21	6.68	23.7	0.015		FRA0013	3/25/2008		34	6.43	12.4	0.075	
FRA0013	10/23/2007 10		95	6.81	17.2	0.015		FRA0013	4/23/2008		11	5.24	19.7	0.015	
FRA0013	5/27/2008 10:3		24.5	5.83	24.8	0.015		FRA0013	11/4/2008		29.8	7.16	15.8	0.015	
FRA0013	6/24/2008 10:3		9.5	6.8	26.6	0.015		FRA0013	12/9/2008		23.5	7.77	9.5	0.298	
FRA0013	7/29/2008 10:0		29	4.88	29.7	0.015		FRA0013	1/28/2009		138	10.6	2.8	0.092	
FRA0013	8/26/2008 10:3		43.5	5.32	25.5	0.069		FRA0013	2/24/2009		22.5	10.7	7	0.071	
FRA0013	9/16/2008 10:3		33.5	7.1	21.6	0.015		FRA0013	3/24/2009		25.5	7.88	15.6	0.015	
FRA0013	10/7/2008 10:3		44.5	5.12	21.5	0.015		FRA0013	4/7/2009 1		33.5	8.13	13.3	0.015	
FRA0013	5/19/2009 10:3		18.8	4.26	20.6	0.047		FRA0013	11/3/2009		35	5.66	14.8	0.015	
FRA0013	6/16/2009 10:3		64	4.64	27.8	0.015		FRA0013	12/1/2009		13.5	8.53	10.4	0.015	
FRA0013	7/14/2009 10:3		156	3.94	27.8	0.182		FRA0013	1/26/2010		53.5	7.64	8.7	0.057	
FRA0013	8/25/2009 10:3		31	5.88	25.6	0.015		FRA0013	2/16/2010		14	11.3	2.7	0.032	
FRA0013	9/22/2009 10:3		41.5	5.75	24.2	0.015		FRA0013	3/30/2010		46	7.43	13.7	0.078	
FRA0013	10/27/2009 12		51.5	7.2	14.3	0.033		FRA0013	4/13/2010		80	5.4	20.8	0.046	

FRA0013	5/18/2010 10:4		33	4.86	22.9	0.015		FRA0013	11/8/2010		15	8.5	11.1	0.015
FRA0013	6/22/2010 12:2		22.8	7.12	31.3	0.015		FRA0013	11/30/201		94.5	8.5	9.1	0.089
FRA0013	7/20/2010 10:2		28	8.15	30.5	0.015		FRA0013	1/4/2011 1		58.5	9.95	6.4	0.015
FRA0013	8/17/2010 10:3		27.5	4.31	29.5	0.015		FRA0013	2/1/2011 8		47.5	9.67	9.1	0.015
FRA0013	9/21/2010 10:0		27	5.2	25.5	0.015		FRA0013	3/8/2011 9		161	7.27	9.7	0.106
FRA0013	10/19/2010 9:1		29	5	18	0.032		FRA0013	4/12/2011		198	4.88	20.4	0.049
FRA0013	5/24/2011 8:5(		14	4.6	22	0.072		FRA0013	11/29/201		71	6.69	9.4	0.052
FRA0013	5/24/2011 11:0							FRA0013	12/5/2011		94	8.35	8.4	0.049
FRA0013	6/14/2011 9:45		37	3.45	27.2	0.06		FRA0013	1/31/2012		119	8.69	8.2	0.085
FRA0013	7/19/2011 10:1		30	5.2	30.8	0.015		FRA0013	2/21/2012		22	9.3	9.5	0.015
FRA0013	7/5/2011 1:30:							FRA0013	3/20/2012		249	5.45	20.3	0.1
FRA0013	8/8/2011 11:47							FRA0013	4/17/2012		116	5.25	18.3	0.109
FRA0013	8/16/2011 10:0		32.5	4.49	28.1	0.015		FRA0013	11/6/2012		21.5	7.25	12.2	0.015
FRA0013	7/18/2011 1:29							FRA0013	12/3/2012		27.3	8.33	13.7	0.015
FRA0013	9/20/2011 9:30		26.5	5.74	21.4	0.015		FRA0013	1/15/2013		102	7.78	6.2	0.173
FRA0013	10/18/2011 9:4		31.5	5.02	18.5	0.015		FRA0013	2/5/2013 1		115	6.81	8	0.097
FRA0013	5/7/2012 12:5:							FRA0013	3/26/2013		28.5	7.08	7.5	0.045
FRA0013	5/29/2012 10:0		43	5.88	28.8	0.015		FRA0013	4/23/2013		131	6.13	17.1	0.114
FRA0013	6/12/2012 10:1		37	5.34	25.7	0.015		FRA0013	11/5/2013		23.5	8.19	14.8	0.015
FRA0013	7/17/2012 10:0		43	4.68	30.5	0.033		FRA0013	12/16/201		42.5	12.6	4.6	0.045
FRA0013	7/30/2012 12:2							FRA0013	1/14/2014		154	12	5	0.068
FRA0013	8/7/2012 10:00		26.5	3.83	29.8	0.015		FRA0013	2/18/2014		50.5	12.4	6.3	0.033
FRA0013	9/11/2012 10:1		23.5	3.5	24.7	0.015		FRA0013	3/11/2014		68.7	7.2	10.3	0.015
FRA0013	9/17/2012 12:3							FRA0013	4/22/2014		70	5	19.5	0.081
FRA0013	10/9/2012 10:1		30.5	7.2	14.9	0.032		FRA0013	11/3/2014		19	5.52	12.2	0.015
FRA0013	5/28/2013 10:0		16	5.95	23.8	0.031		FRA0013	12/1/2014		23.5	6.61	11	0.015
FRA0013	6/25/2013 10:1		56	4.15	28.5	0.015		FRA0013	1/20/2015		42	7.4	5.4	0.051
FRA0013	7/30/2013 9:45		62	4.25	25.7	0.038		FRA0013	2/3/2015 1		30.5	8.32	5.6	0.015
FRA0013	8/27/2013 10:1		36.5	4.81	28	0.015		FRA0013	3/3/2015 9		23.5	8.11	2.6	0.056
FRA0013	9/17/2013 9:45		44	4.9	24.7	0.015		FRA0013	4/28/2015		29.5	3.52	16.8	0.071
FRA0013	10/29/2013 10		22	7.79	15.5	0.015		FRA0013	11/30/201		53	6.32	11	0.015
FRA0013	5/20/2014 9:35		72.7	3.85	18.7	0.063		FRA0013	12/14/201		32	6.01	13.6	0.034
FRA0013	6/17/2014 10:0		67	3.66	25.9	0.062		FRA0013	1/19/2016		15.5	11.6	4.3	0.042
FRA0013	7/22/2014 10:1		44.8	2.97	26.6	0.015		FRA0013	2/23/2016		27.5	7.36	12.2	0.015
FRA0013	8/19/2014 10:0		42	3.87	27.2	0.031		FRA0013	3/15/2016		120	4.76	16.5	0.191
FRA0013	9/30/2014 10:0		24	3.12	23.6	0.015		FRA0013	4/26/2016		52.5	4.38	22.1	0.015
FRA0013	10/7/2014 10:2		37.5	4.27	21	0.015		FRA0013	11/1/2016		35.5	3.02	21	0.015
FRA0013	5/5/2015 10:00		88.7	2.33	21.5	0.04		FRA0013	12/5/2016		70.5	6.67	8.6	0.056
FRA0013	6/2/2015 10:00		64.5	2.59	22	0.036		FRA0013	1/24/2017		141	6.42	11	0.079
FRA0013	7/21/2015 10:0		19	1.8	30.4	0.015		FRA0013	2/21/2017		29.8	5.77	14.5	0.015
FRA0013	8/11/2015 10:0		91.2	2.42	29.2	0.015		FRA0013	3/14/2017		492	5.96	8.8	0.093
FRA0013	9/1/2015 9:40:		39.5	2.24	26.8	0.015		FRA0013	4/25/2017		131	4.97	19.6	0.049
FRA0013	10/20/2015 10		21.5	4.94	15.3	0.015								
FRA0013	5/3/2016 10:00		148	3.91	19.5	0.226								
FRA0013	6/7/2016 9:50:		51.8	2.94	25	0.031								
FRA0013	7/26/2016 10:0		30.5	2.12	31.4	0.015								
FRA0013	8/16/2016 9:40		47.8	2.46	27.3	0.015								
FRA0013	9/20/2016 10:0		40.3	2.22	24.9	0.015								
FRA0013	10/4/2016 10:3		37.5	3.36	21.7	0.015								
FRA0013	5/2/2017 10:00		188	3.65	18.5	0.097								
FRA0013	6/27/2017 10:2		102	3.52	25.9	0.015								
FRA0013	7/31/2017 10:1		48.8	3.02	27.5	0.015								
FRA0013	8/15/2017 10:5		126	3.04	24.9	0.015								
FRA0013	9/26/2017 10:2		17.3	3.69	26.4	0.015								
FRA0013	10/3/2017 10:1		18.3	4.84	22.7	0.015								
FRA0013	11/27/2017 9:4		15	10.7	10.5	0.015								
	Avg	2.05	45.22	5.31	24.67	0.03				1.56	62.93	8.21	11.73	0.05
		BOD5	TSS	DO	T	NH3				BOD5	TSS	DO	T	NH3

Critical Season Model (21962_C.smp)
25/30/15/2 simulation (CBOD5/TSS/NH3-N/DO)



ADC EastAR Reg. Unit — TABULAR MODEL OUTPUT

	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
1	10.00	5.30	4.84	0.06
2	9.90	5.29	4.82	0.06
3	9.80	5.28	4.80	0.06
4	9.70	5.27	4.78	0.06
5	9.60	5.26	4.76	0.06
6	9.50	5.25	4.74	0.06
7	9.40	5.24	4.72	0.06
8	9.30	5.23	4.70	0.06
9	9.20	5.22	4.68	0.06
10	9.10	5.21	4.66	0.06
11	9.00	5.20	4.64	0.06
12	8.90	5.19	4.62	0.06
13	8.80	5.18	4.60	0.06
14	8.70	5.17	4.58	0.06
15	8.60	5.16	4.57	0.06

ADC EastAR Reg. Unit	TABULAR MODEL OUTPUT		
	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
16	8.50	5.16	4.55	0.06
17	8.40	5.15	4.53	0.06
18	8.30	5.14	4.51	0.06
19	8.20	5.13	4.49	0.06
20	8.10	5.13	4.47	0.06
21	8.00	5.12	4.45	0.06
22	7.90	5.11	4.44	0.06
23	7.80	5.11	4.42	0.06
24	7.70	5.10	4.40	0.06
25	7.60	5.10	4.38	0.06
26	7.50	5.09	4.36	0.06
27	7.40	5.09	4.34	0.06
28	7.30	5.08	4.33	0.06
29	7.20	5.08	4.31	0.06
30	7.10	5.07	4.29	0.06

ADC EastAR Reg. Unit	TABULAR MODEL OUTPUT		
	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
31	7.00	5.07	4.27	0.06
32	6.90	5.06	4.26	0.06
33	6.80	5.06	4.24	0.06
34	6.70	5.05	4.22	0.06
35	6.60	5.05	4.20	0.06
36	6.50	5.05	4.19	0.06
37	6.40	5.04	4.17	0.06
38	6.30	5.04	4.15	0.06
39	6.20	5.04	4.13	0.06
40	6.10	5.03	4.12	0.06
41	6.00	5.03	4.10	0.06
42	5.90	5.03	4.08	0.06
43	5.80	5.02	4.07	0.06
44	5.70	5.02	4.05	0.06
45	5.60	5.02	4.03	0.06

ADC EastAR Reg. Unit	TABULAR MODEL OUTPUT		
River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
46	5.50	5.02	4.02	0.06
47	5.40	5.01	4.00	0.06
48	5.30	5.01	3.98	0.06
49	5.20	5.01	3.97	0.06
50	5.10	5.01	3.95	0.06
51	5.00	5.01	3.93	0.06
52	4.90	5.00	3.92	0.06
53	4.80	5.00	3.90	0.06
54	4.70	5.00	3.88	0.06
55	4.60	5.00	3.87	0.06
56	4.50	5.00	3.85	0.06
57	4.40	5.00	3.84	0.05
58	4.30	5.00	3.82	0.05
59	4.20	4.99	3.80	0.05
60	4.10	4.99	3.79	0.05

ADC EastAR Reg. Unit	TABULAR MODEL OUTPUT		
River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
61	4.00	4.99	3.77	0.05
62	3.90	4.99	3.76	0.05
63	3.80	4.99	3.74	0.05
64	3.70	4.99	3.73	0.05
65	3.60	4.99	3.71	0.05
66	3.50	4.99	3.70	0.05
67	3.40	4.99	3.68	0.05
68	3.30	4.99	3.67	0.05
69	3.20	4.99	3.65	0.05
70	3.10	4.99	3.64	0.05
71	3.00	4.99	3.62	0.05
72	2.90	4.99	3.61	0.05
73	2.80	4.99	3.59	0.05
74	2.70	4.99	3.58	0.05
75	2.60	4.99	3.56	0.05

ADC EastAR Reg. Unit	TABULAR MODEL OUTPUT			
	River Mile	DO (mg/L)	BOD (mg/L)	NH3 (mg/L)
76	2.50	4.99	3.55	0.05
77	2.40	4.99	3.53	0.05
78	2.30	4.99	3.52	0.05
79	2.20	4.99	3.50	0.05
80	2.10	4.99	3.49	0.05
81	2.00	4.99	3.47	0.05
82	1.90	4.99	3.46	0.05
83	1.80	4.99	3.44	0.05
84	1.70	4.99	3.43	0.05
85	1.60	4.99	3.42	0.05
86	1.50	4.99	3.40	0.05
87	1.40	4.99	3.39	0.05
88	1.30	5.00	3.37	0.05
89	1.20	5.00	3.36	0.05
90	1.10	5.00	3.35	0.05
91	1.00	5.00	3.33	0.05
92	0.90	5.00	3.32	0.05
93	0.80	5.00	3.30	0.05
94	0.70	5.00	3.29	0.05
95	0.60	5.00	3.28	0.05
96	0.50	5.00	3.26	0.05
97	0.40	5.00	3.25	0.05
98	0.30	5.01	3.24	0.05
99	0.20	5.01	3.22	0.05
100	0.10	5.01	3.21	0.05
101	0.00	5.01	3.20	0.05

ADC EastAR Reg. Unit	Run information screen	
Name of receiving stream		St. Francis River
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		ADC EastAR Reg. Unit

ADC EastAR Reg. Unit	Upstream River Parameters		Comments
Flow	(cfs)	430.00	USGS Report
Temperature	(°C)	32.00	Reg. 2.502 SFR
Dissolved Oxygen	(mg/l)	5.31	FRA0013
5-Day BOD	(mg/l)	2.05	FRA0013
Ult. CBOD / 5-Day BOD		2.30	Default
pH	(su)	7.00	Default
Ammonia	(mg/l)	0.03	FRA0013
Alkalinity	(mg/l)	0.00	
Upstream river mile		10.00	Model length

ADC EastAR Reg. Unit	Parameters for Discharge 1		Comments
Flow	(MGD)	0.65	Design Flow
Temperature	(°C)	32.00	Reg. 2.502 SFR
Dissolved Oxygen	(mg/l)	2.00	
5-Day BOD	(mg/l)	25.00	
Ult. CBOD / 5-Day BOD		2.30	default
pH	(su)	7.00	default
Ammonia	(mg/l)	15.00	
Alkalinity	(mg/l)	0.00	
Beginning of Reach Number		1	
Name of Discharger		ADC EastAR RU	AR0045578

ADC EastAR Reg. Unit	Parameters for Reach 1		Comments
Length	(mile)	10.00	model length
Velocity	(fps)	0.51	spreadsheet
Slope	(ft/mile)	0.00	
Average Depth	(ft)	3.60	spreadsheet
Temperature	(°C)	32.00	Calculated
BOD Removal Rate	(1/day)	0.20	large river
NH3 Decay Rate	(1/day)	0.10	large river
Sediment Oxygen Demand	(g/m^2/day)	2.85	k20=1.5
Photosynthesis/respiration	(mg/L/day)	0.00	