	A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р
1						CALCULATI	ONS OF ARKAN	SAS WATE		-BASED EFF	LUENT LIMIT	ATIONS				
2	The spreadshee							For an Arka	ansas Rive	er/Stream						
3	Do not enter dat							(Reserved)								
	STEP 1:	INPUT TWO	D LETTER C	ODE FOR E	COREGION	(Use Code at	Right)	GC								
5																
6																
7	FACILITY										Codes & TSS	for Ecoregi				
8										Ouachita Mts	s. Eco (OM) =	2.0 mg/l	Arkansas (Ft.	Smith to Dar	danelle Dam	12.0 mg/l
	Permittee							Ash Grove		Ozark Highla	nds Eco (OH) =	2.5 mg/l	Arkansas (Da	rdanelle Darr	n to Terry L&I	10.5 mg/l
10	NPDES Permit I	No.						AR0042846		Boston Mts.	Eco (BM) =	1.3 mg/l	Arkansas (Te	rry L&D to L8	D No. 5)	8.3 mg/l
	Outfall No.(s)							001		Ark River Va	lley Eco (AV) =	3.0 mg/l	Arkansas (L&	D No. 5 to M	outh)	9.0 mg/l
12	Plant Effluent Fl	ow (MGD)						0.916		Gulf Coastal	Eco (GC) =	5.5 mg/l	White (Above	Beaver Lake	e)	2.5 mg/l
13	Plant Effluent Fl	ow (cfs)						1.42		Delta Ecoreg	ion (DL) =	8.0 mg/l	White (Below			3.3 mg/l
14													White (From	Black River to	o Mouth)	18.5 mg/l
15	RECEIVING ST	REAM											St. Francis Ri	ver		18.0 mg/l
16													Ouachita (Ab	ove Caddo R	iver)	2.0 mg/l
17	Is this a Large F	River from t	he list at rig	ht? (enter "	1" if yes, "0" i	f no; make en	try as a number)	0					Ouachita (Bel	low Caddo Ri	ver)	5.5 mg/l
18	Name of Receiv	ing Stream:						unnamed tri	butary				Red River			33.0 mg/l
19																
20	Is this a lake or	reservoir? (e	enter '1' if yes	s, '0' = no;	make entry a	as a number)		0			Total Hardnes	s for:				
21	(Reserved)							0			Arkansas Rive	r = 125 mg/		Red River =	211 mg/l	
22	(Reserved)	DO	NOT INPUT	DATA INTO	CELL H22, H	123 & H24L	EAVE BLANK→	?			Ouachita Rive	r = 28 mg/l		St. Francis I	River = 103 m	ng/l
23	(Reserved)										White River =	116 mg/l				
24		(Reserved)		(Reserved)				(Reserved)								
25				(Reserved)				(Reserved)			Gulf Coastal =	31 mg/l		Ouachita Mo	ount = 31 mg	/I
26				(Reserved)				(Reserved)			Ozark Highlan	ds = 148 mg	j/l	Ark River Va	alley = 25 mg	g/l
27				(Reserved)				(Reserved)			Boston Mount	= 25 mg/l		Delta = 81 n	ng/l	
20																
	Ecoregion TSS			See List to F	kight)			5.50			Large Rivers			 D'		
	Ecoregion Hard			(D				31.00	(D		Mississippi Riv					
31	Enter 7Q10 (cfs) as the Criti	cal Flow	(Reserved)					(Reserved		White (Below of					
	Long Term Ave		viean Flow (c	cis)					(Reserved	(Reserved)	Ouachita (Belo	w confluenc	e with Little Mi	ss. River)		
33	Using Diffusers	(Yes/No)						no								
	pH (Avg)												facility, use the	0	, ,	tlow
	Percent (%) of C							0.67			for the past 24	months. Fo	or POTWs, use	e the design fl	OW.	
	Percent (%) of C		tor Acute Cri	teria				0.33				<u> </u>		<u> </u>		
	Water Effect Ra			400					These cells		#VALUE! =>			ble		
38	Ave Monthly Lin	nit LTA Multi	plier (Ref: pa	ige 103 TSE) for WQ-Bas	ed Toxics Co	ntrol)	1.55			9999999.00 =>	No EPA/AI	JEQ Guideline			
39	Max Daily Limit	LIA Multiplie	er (Ref: "	"	")	3.11	unlocked							
40	Max Daily Limit	L I A Multiplie	er for Human	Health (Re	t: 2009 CPP;	Section 5.27.	2)	1.64	to change.							

	A	В	С	D	E	F	G	Н		J	K	L	М	N	0	Р
				EFFLUENT [
42		CALCULAT	E IN-STREA	M WASTE (CONCENTR	ATIONS										
43																
44	DATA INPUT					U U	metric mean cor		U U		• • • •					
45				For 20 or m	nore data poi	ints in set ente	r highest concen	tration as mi	icro-gram p	er liter (ug/l o	r ppb).					
46																
47							n level" (DL) but t									
48							level" (DL) and			/IQL, "0" is us	sed.					
49				If a firm val	ue is reporte	ed, even less th	an MQL, the rep	orted value	is used.							
50																
51							ulate the Instrea	m Waste Co	ncentration	(IWC)						
52					er to CPP for	,										
53					Qa*Cb) + (Q	e*2.13*Ce)] / (F*Qa + Qe)									
54				Where:												
55						Concentration										
56						n allowed for m	<u> </u>									
57						ration in effluer										
58							ostream of disch	arge								
59					effluent flow											
60							harge point expl		e 7Q10 or h	armonic mea	in flow for humar	n health crite	eria			
61				Upstream F	-low (Qb)= (9	<u>% of 7Q10) X 7</u>	Q10 for Chronic	and Acute								
62																
	The following fo	rmulae conv	ert metals re	eported in tot	tal form to di	ssolved form if	criteria are in di	ssolved form	<u> </u>							
64																
	Kp = Kpo * (TSS						artition coefficie									
	C/Ct = 1/(1 + K)						suspended solids					nt for interm	ittent stream)			
	Total Metal Crite	eria (Ct) = C	r / (C/Ct)			C/Ct = Fractio	on of metal disso	lved; and Ci	r = Dissolve	d criteria valu	ie					
68																
69			near Partitic	on Coefficie	nt (Insert "D	issolved" Co	nc in Column B	to convert	to "Total")		Lake Linear Pa	artition Coe	fficient			
		Dissolved														
		Value in														
70	Total Metals	Stream		Кро	alpha (a)	Кр	C/Ct	Total Value			Кро	alpha (a)	Кр	C/Ct	Total Value	
/1																
/3	Cadmium			4000000	-1.13		0.237818469	0.00			3520000.00	-0.92	733514.98			
14	Chromium(3)			3360000	-0.93	688338.365		0.00			2170000.00	-0.27	1369499.28			
15	Copper			1040000	-0.74	294554.016		0.00			2850000.00	-0.9	614495.12			
	Lead			2800000	-0.8	715925.58	0.202527926	0.00			2040000.00	-0.53	826490.64	0.1803199		
	Mercury			2900000	-1.14	415321.613	0.30448177	0.00			1970000.00	-1.17	268066.09	0.4041443		
	Nickel			490000	-0.57	185433.992	0.495077211	0.00			2210000.00	-0.76	604946.03	0.2310962		
	Zinc			1250000	-0.7	379014.766		0.00			3340000.00	-0.68	1047851.74	0.1478593		
	Silver			2400000		8 414607.994	0.30484608	0.00			2400000.00	-1.03	414607.99	0.3048461	0	
81		*Note: Use this	s section to conv	vert lab concent	rations shown a	is "dissolved" to "to	otal"				D'a a a la di	T . (.)				
82											Dissolved	Total				

	A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р
83	The following for	ormulas a	re used to ca	alculate wate	er quality cr	iteria based o	on Regulation No	5. 2 (Act 472	2 of Ark 19	49)	WQC (ug/l)	WQC(ug/l)				
84	Cadmium			Acute			WER X CF1 X e	e(1.128[ln(ha	ardness)]-3.	828)	1.04		CF1 = 1.1366	72 - [0.0418	38*In(hardnes	.s)]
85				Chronic			WER X CF2 X e	e(0.7852[ln(h	nardness)]-3	3.490)	0.43		CF2 = 1.1016	72 - [0.0418	38*ln(hardnes	.s)]
86																
	Chromium Tri			Acute			WER X 0.316 X				210.28					
88				Chronic			WER X 0.86 X e	e(0.819[ln(ha	ardness)]+1	.561	68.21					
89																
90	Chromium Hex			Acute			WER X 0.982 X	16			15.71					
91				Chronic			WER X 11 X 0.9	962			10.58					
92																
	Copper			Acute			WER X 0.96 X 6	0.9422[ln(h	nardness)]-	1.464)	5.64					
94				Chronic			WER X 0.96 X e	e(0.8545[ln(h	nardness)]-	1.465)	4.17					
95																
	Lead			Acute			WER X e(1.273				17.68		CF3 = 1.4620	3 - [0.145712	2*In(hardness)]
97				Chronic			WER X e(1.273	[In(hardness	s)]-4.705)*C	F3	0.69					
98																
	Mercury			Acute			WER X 0.85 X 2	2.4			2.04					
100				Chronic			WER X 0.012				0.01					
101																
	Nickel			Acute			WER X 0.998 X				525.50					
103				Chronic			WER X 0.997 X	e(0.8460[ln	(hardness)]	+1.1645)	58.36					
104																
	Zinc			Acute			WER X 0.978 X				42.43					
106				Chronic			WER X 0.986 X	e(0.8473[In	(hardness)]	+0.7614)	38.74					
107																
	Silver			Acute			WER X 0.85 X e	(1.72[ln(har	dness)]-6.5	52)	0.46					
109																
110	Cyanide			Acute			WER X 22.36				22.36					
111				Chronic			WER X 5.2				5.20					
118																
119	Selenium			Acute			WER X 20				20.00					
120				Chronic			WER X 5				5.00					
121																
122	The following for	rmulas are	applicable to	the Jet Strea			culating the Dilution									
123			DF = ((2.8	* D * 3.1416^			% of effluent at d									
124				and X is aq	uatic life crite	eria25 feet fo	or ZID; 100 feet fo	or mixing zor	ne; human l	nealth criteria	a 200 feet for mix	ing zone.				
125			DF =	#VALUE!	Acute	#VALUE!	Chronic	#VALUE!	Bioacc.							
126																
			DF =	#VALUE!	Acute	#VALUE!	Chronic	#VALUE!	Bioacc.							

	A	В	С	D	Е	F	G	Н	I	J	K	L	М	N	0	Р
127	The following forr	mulas are ι	ised to calcul	ate the instr	eam waste c	oncentration (IWC) for each po	ollutant:								
128																
129			IWC = [(Fra	c X Critical	Flow X Cb) +	(2.13 X Ce X	Qd)] / [Frac X C	ritical Flow +	Qd] wher	e the critical f	flow is the 7Q1	0 except for I	akes with the	Jet Stream Mo	odel.	
130							Ce data points v	vith the Geor	netric Mean	of the Ce's;	use 1 for more	than 20 data	points with the	e maximum C	е.	
131			IWC = (DF X	(Ce) + Cb f	or lakes with	Jet Stream Mo	odel.									
													Arkansas	Arkansas		
			Number of		EPA	Background	Effluent	Domestic	Acute	Chronic			Acute	Chronic	Arkansas	EPA
132	POLLUTANTS		Data points	MQL	Statistical	Conc.	Conc.	Supply	Aquatic	Aquatic	Bioacc.	[Reserved]	Aquatic	Aquatic	Bioacc.	Bioacc.
						Cb	Ce	IWC	IWC	IWC	IWC					
133				ug/l	Factor	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		ug/l	ug/l	ug/l	ug/l
	METALS AND C	YANIDE														1
138	2. Arsenic Total		1	0.5	2.13	0	0.547	1.17	1.17	1.17	1.17	9999999	9999999.00	9999999.00	9999999	1.4

	A	В	С	D	E	F	G	Н		J	K	L	М	Ν	0	Р
1							ONS OF ARKAN	SAS WATE	R QUALIT	Y-BASED EFF	LUENT LIMIT	ATIONS				
2	The spreadshee							For an Arka								
3	Do not enter dat							Seasonal C	ritical Flow	from June thr	ough Novembe	er				
	STEP 1:	INPUT TWO	D LETTER C	ODE FOR E	COREGION	(Use Code at	Right)	GC								
5																
6																
7	FACILITY										Codes & TSS					
8										Ouachita Mts	s. Eco (OM) =	2.0 mg/l	Arkansas (Ft.	Smith to Dar	danelle Dam	12.0 mg/l
	Permittee							Ash Grove			nds Eco (OH) =	= 2.5 mg/l	Arkansas (Da			10.5 mg/l
10	NPDES Permit	No.						AR0042846		Boston Mts.	Eco (BM) =	1.3 mg/l	Arkansas (Te	rry L&D to L8	kD No. 5)	8.3 mg/l
11	Outfall No.(s)							001		Ark River Val	ley Eco (AV) =	= 3.0 mg/l	Arkansas (L&	D No. 5 to M	outh)	9.0 mg/l
12	Plant Effluent Fl	ow (MGD)						0.19		Gulf Coastal	Eco (GC) =	5.5 mg/l	White (Above	Beaver Lake	e)	2.5 mg/l
13	Plant Effluent Fl	ow (cfs)						0.29		Delta Ecoreg	ion (DL) =	8.0 mg/l	White (Below	Bull Shoals t	o Black Riv)	3.3 mg/l
14													White (From	Black River to	o Mouth)	18.5 mg/l
15	RECEIVING ST	REAM											St. Francis R	ver		18.0 mg/l
16													Ouachita (Ab	ove Caddo R	iver)	2.0 mg/l
17	Is this a Large F	River from t	he list at rig	ht? (enter "	1" if yes, "0" i	f no; make en	try as a number)	0					Ouachita (Be	low Caddo Ri	ver)	5.5 mg/l
	Name of Receiv	ing Stream:						unnamed tri	butary				Red River			33.0 mg/l
19																
20	Is this a lake or	reservoir? (e	enter '1' if yes	s, '0' = no;	make entry a	as a number)		0			Total Hardnes	s for:				
21	Seasonal Limits N	May Apply						1			Arkansas Rive	r = 125 mg/l		Red River =	211 mg/l	
22	(Reserved)	DO	NOT INPUT	DATA INTO	CELL H22, H	123 & H24L	EAVE BLANK \rightarrow	?			Ouachita Rive	r = 28 mg/l		St. Francis I	River = 103 m	ng/l
23	(Reserved)										White River =	116 mg/l				
24		(Reserved)		(Reserved)				(Reserved)								
25				(Reserved)				(Reserved)			Gulf Coastal =	31 mg/l		Ouachita Mo	ount = 31 mg/	/I
26				(Reserved)				(Reserved)			Ozark Highlan	ds = 148 mg	ı/l	Ark River Va	alley = 25 mg	g/l
27				(Reserved)				(Reserved)			Boston Mount	= 25 mg/l		Delta = 81 n	ng/l	
20		, , , , , , , , , , , , , , , , , , , 														
	Ecoregion TSS			See List to R	light)			5.50			Large Rivers		<u> </u>			
	Ecoregion Hardr							31.00			Mississippi Riv					
	Enter 7Q10 (cfs)			(Reserved)		imits may app		0.00			White (Below of			,		
	Seasonal LTA/H		an Flow		based on s	site verificatio	า.	0.00	2.12	<====This is	Ouachita (Belo	w confluenc	e with Little Mi	ss. River)		
	Using Diffusers	(Yes/No)						no								
	pH (Avg)												facility, use the	-		flow
	Percent (%) of C							0.67			for the past 24	months. Fo	or POTWs, use	the design f	low.	
	Percent (%) of C		for Acute Cri	teria				0.33								
	Water Effect Ra							1.00			#VALUE! =>					
38	Ave Monthly Lim	nit LTA Multi	plier (Ref: pa	age 103 TSD	for WQ-Bas	ed Toxics Co	ntrol)	1.55			9999999.00 =>	> No EPA/A	DEQ Guideline			
	Max Daily Limit			"	"	")	3.11	unlocked							
40	Max Daily Limit	LTA Multipli	er for Human	Health (Rei	f: 2009 CPP;	Section 5.27.	2)	1.64	to change.							

	A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р
		INPUT AMB														
42		CALCULAT	E IN-STREA	M WASTE C	CONCENTRA	ATIONS										
43																
44	DATA INPUT						metric mean cor									
45				For 20 or m	ore data poir	nts in set enter	highest concen	tration as mi	cro-gram p	er liter (ug/l o	r ppb).					
46																
47							level" (DL) but									
48							level" (DL) and			MQL, "0" is us	sed.					
49 50				If a firm val	ue is reporte	d, even less th	an MQL, the rep	ported value i	s used.							
50				The followin			ulate the Instrea		acontration							
52					er to CPP for											
53						e*2.13*Ce)] / (I										
54				Where:												
55					eam Waste	Concentration										
56						allowed for m	ixina									
57						ation in effluer	<u> </u>									
58							stream of disch	arge								
58 59					effluent flow											
60							harge point exp	ressed as the	e 7Q10 or h	armonic mea	in flow for huma	health crite	eria			
61							Q10 for Chronic									
62						,										
63	The following fo	rmulae conv	ert metals re	ported in tot	al form to dis	solved form if	criteria are in di	ssolved form								
64																
	Kp = Kpo * (TSS						artition coefficie									
	C/Ct = 1/(1 + K)						suspended solids					nt for interm	ittent stream)			
	Total Metal Crite	eria (Ct) = Cr	/ (C/Ct)			C/Ct = Fractio	on of metal disso	lved; and Cr	= Dissolve	d criteria valu	le					
68																
69			near Partitio	on Coefficier	nt (Insert "D	issolved" Cor	nc in Column B	to convert t	o "Total")		Lake Linear P	artition Coe	fficient			
		Dissolved														
		Value in					0 (2)							0.101		
70	Total Metals	Stream		Кро	alpha (a)	Кр	C/Ct	Total Value			Кро	alpha (a)	Кр	C/Ct	Total Value	
72	Codmium			4000000	1 4 0	E90700 000	0.007040400	0.00			2520000.00	0.00	700544.00	0.4000004		
71	Cadmium			4000000	-1.13		0.237818469	0.00			3520000.00	-0.92	733514.98		0	
75	Chromium(3) Copper			3360000 1040000	-0.93		0.208948818 0.381672529	0.00			2170000.00 2850000.00	-0.27 -0.9	1369499.28 614495.12		-	
	Lead	-		2800000	-0.74	715925.58	0.381672529	0.00			2040000.00	-0.9	826490.64	0.2263249		
	Mercury			2900000	-0.8	415321.613	0.30448177	0.00			1970000.00	-0.53	268066.09	0.1803199		
	Nickel			490000	-0.57	185433.992	0.495077211	0.00			2210000.00	-0.76	604946.03	0.2310962	0	
	Zinc			1250000	-0.57	379014.766		0.00			3340000.00	-0.68	1047851.74	0.1478593		
	Silver			2400000		414607.994		0.00			2400000.00			0.3048461	0	
81	0	*Note: Use this	section to conv			s "dissolved" to "to		0.00			2.00000.00	1.00	111007.00	5.00 10101		
82					alone chowit d						Dissolved	Total				
		1		1		1		1						1		

	А	В	С	D	E	F	G	Н	I	J	К	L	М	N	0	Р
	The following for	ormulas ar	e used to ca	alculate wate	er quality cri	iteria based o	on Regulation No				WQC (ug/l)	WQC(ug/l)				
	Cadmium			Acute			WER X CF1 X e				1.04		CF1 = 1.1366			
85				Chronic			WER X CF2 X e	e(0.7852[ln(ł	nardness)]-3	3.490)	0.43		CF2 = 1.1016	72 - [0.0418	38*ln(hardnes	s)]
86																
	Chromium Tri			Acute			WER X 0.316 X				210.28					
88				Chronic			WER X 0.86 X e	e(0.819[ln(ha	ardness)]+1	.561	68.21					
89																
	Chromium Hex			Acute			WER X 0.982 X				15.71					
91				Chronic			WER X 11 X 0.9	962			10.58					
92																
	Copper			Acute			WER X 0.96 X e				5.64					
94				Chronic			WER X 0.96 X e	e(0.8545[ln(ł	nardness)]-	1.465)	4.17					
95																
	Lead			Acute			WER X e(1.273				17.68		CF3 = 1.4620	3 - [0.14571	2*In(hardness)]
97				Chronic			WER X e(1.273	[In(hardness	<u>s)]-4.705)*C</u>	F3	0.69					
98																
	Mercury			Acute			WER X 0.85 X 2	2.4			2.04					
100				Chronic			WER X 0.012				0.01					
101																
	Nickel			Acute			WER X 0.998 X				525.50					
103				Chronic			WER X 0.997 X	e(0.8460[ln	(hardness)]	+1.1645)	58.36					
104																
105				Acute			WER X 0.978 X				42.43					
106				Chronic			WER X 0.986 X	e(0.8473[ln	(hardness)]	+0.7614)	38.74					
107																
	Silver			Acute			WER X 0.85 X e	e(1.72[ln(har	dness)]-6.5	2)	0.46					
109																
	Cyanide			Acute			WER X 22.36				22.36					
111				Chronic			WER X 5.2				5.20					
118																
	Selenium			Acute			WER X 20				20.00					
120				Chronic			WER X 5				5.00					
121																
122	The following for	rmulas are a					culating the Dilution									
123			DF = ((2.8 *	* D * 3.1416^			% of effluent at d									
124							or ZID; 100 feet fo			nealth criteria	a 200 feet for mix	ing zone.				
125			DF =	#VALUE!	Acute	#VALUE!	Chronic	#VALUE!	Bioacc.							
126																

	A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р
127	The following fo	rmulas are ι	used to calcul	ate the inst	ream waste c	concentration (IWC) for each po	ollutant:								
128																
129			IWC = [(Fra	c X Critical	Flow X Cb) +	· (2.13 X Ce X	Qd)] / [Frac X C	ritical Flow +	Qd] wher	e the critical	flow is the 7Q10	except for la	akes with the .	Jet Stream Mo	odel.	
130							Ce data points v	vith the Geon	netric Mean	of the Ce's;	use 1 for more	than 20 data	points with the	e maximum C	e.	
131			IWC = (DF >	< Ce) + Cb f	for lakes with	Jet Stream Mo	odel.									
													Arkansas	Arkansas		
			Number of		EPA	Background	Effluent	Domestic	Acute	Chronic			Acute	Chronic	Arkansas	EPA
132	POLLUTANTS		Data points	MQL	Statistical	Conc.	Conc.	Supply	Aquatic	Aquatic	Bioacc.	[Reserved]	Aquatic	Aquatic	Bioacc.	Bioacc.
						Cb	Ce	IWC	IWC	IWC	IWC					
133				ug/l	Factor	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		ug/l	ug/l	ug/l	ug/l
	METALS AND															
	2. Arsenic Total		1	0.5	2.13	0	2.54	5.41	5.41	5.41	5.41	9999999	9999999.00	9999999.00	9999999	1.4
	8. Copper Total		1	0.5	2.13	0	0.995	2.12	2.12	2.12	2.12	9999999	14.79	10.93	9999999	13,000
	12. Nickel Total		1	0.5	2.13	0	2.38	5.07	5.07	5.07	5.07	9999999	1061.45	117.88	9999999	46,000
141																

	A	В	С	D	E	F	G	Н		J	K	L	М	N	0	Р
142	STEP 3:	APPLICABI	LE WATER C	UALITY-BA	SED LIMITS											
143																
144																
145								ADEQ H	UMAN	HEALTH	CRITERIA					
			Permit	Permit	Permit	Permit		Permit	Permit	Permit	Permit					
			Daily	Monthly	Daily	Monthly		Daily	Monthly	Daily	Monthly					
146	POLLUTANTS		Maximum	Average	Maximum	Average		Maximum	Average	Maximum	Average					
147			ug/l	ug/l	lb/day	lb/day		ug/l	ug/l	lb/day	lb/day					
	Copper Total		NO	NO	NO	NO										
149	Nickel Total		NO	NO	NO	NO										

	А	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Р
1						CALCULATI	ONS OF ARKAN	ISAS WATE	R QUALIT	Y-BASED EFF	LUENT LIMIT	ATIONS				
2	The spreadshee							For an Ark	ansas Rive	er/Stream						
3	Do not enter dat							(Reserved)								
4	STEP 1:	INPUT TWO	D LETTER C	ODE FOR E	COREGION	(Use Code at	: Right)	GC								
5																
6																
7	FACILITY										Codes & TSS	for Ecoregi				
8										Ouachita Mts	. Eco (OM) =	2.0 mg/l	Arkansas (Ft.	Smith to Da	rdanelle Dam	12.0 mg/l
9	Permittee							Ash Grove		Ozark Highla	nds Eco (OH) =	2.5 mg/l	Arkansas (Da			10.5 mg/l
10	NPDES Permit	No.						AR0042846		Boston Mts. I		1.3 mg/l	Arkansas (Te	rry L&D to La	&D No. 5)	8.3 mg/l
	Outfall No.(s)							001		Ark River Val	lley Eco (AV) =	3.0 mg/l	Arkansas (L&	D No. 5 to N	louth)	9.0 mg/l
12	Plant Effluent Fl	ow (MGD)						6.5		Gulf Coastal		5.5 mg/l	White (Above			2.5 mg/l
13	Plant Effluent Fl	ow (cfs)						10.0		Delta Ecoreg	ion (DL) =	8.0 mg/l	White (Below	Bull Shoals	to Black Riv)	3.3 mg/l
14													White (From	Black River t	o Mouth)	18.5 mg/l
	RECEIVING ST	REAM											St. Francis Ri	ver		18.0 mg/l
16													Ouachita (Ab	ove Caddo R	liver)	2.0 mg/l
17	Is this a Large F	River from t	he list at rig	ht? (enter "	1" if yes, "0" i	if no; make er	itry as a number)	0					Ouachita (Be	low Caddo R	iver)	5.5 mg/l
18	Name of Receiv	ing Stream:						unnamed tr	butary				Red River			33.0 mg/l
19																
20	Is this a lake or	reservoir? (e	enter '1' if yes	s, ' 0 ' = no;	make entry a	as a number)		0			Total Hardnes	s for:				
21	(Reserved)							0			Arkansas Rive	r = 125 mg/	I	Red River =	211 mg/l	
22	(Reserved)	DO	NOT INPUT	DATA INTO	CELL H22, H	123 & H24L	EAVE BLANK→	?			Ouachita Rive	r = 28 mg/l		St. Francis	River = 103 m	ng/l
	(Reserved)										White River =	116 mg/l				
24		(Reserved)		(Reserved)				(Reserved)								
25				(Reserved)				(Reserved)			Gulf Coastal =	31 mg/l			ount = 31 mg	
26				(Reserved)				(Reserved)			Ozark Highlan	ds = 148 mg	g/l	Ark River V	alley = 25 mg	J/I
27				(Reserved)				(Reserved)			Boston Mount	= 25 mg/l		Delta = 81 i	ng/l	
20	- · T00															
	Ecoregion TSS			See List to F	kight)			5.50			Large Rivers	L				
	Ecoregion Hard			(5				31.00			Mississippi Riv					
	Enter 7Q10 (cfs			(Reserved)					(Reserved		White (Below of					ļ]
	Long Term Ave		viean Flow (o	cts)					(Reserved	(Reserved)	Ouachita (Belo	ow confluenc	ce with Little Mi	ss. River)		ļ]
	Using Diffusers	(Yes/No)						no					())), ()	<u> </u>		
	pH (Avg)												facility, use the			tiow
	Percent (%) of C							0.67			for the past 24	months. Fo	or POTWs, use	e the design f	low.	ļ
	Percent (%) of C		tor Acute Cri	teria				0.33						<u> </u>		ļ]
	Water Effect Ra					L		1.00			#VALUE! =>					ļ]
38	Ave Monthly Lin	nit LTA Multi	plier (Ref: pa	age 103 TSE	tor WQ-Bas	sed Toxics Co	ntrol)	1.55			9999999.00 =>	> No EPA/Al	DEQ Guideline			ļ
	Max Daily Limit			"	")	3.11	unlocked							ļ
40	Max Daily Limit	LTA Multipli	er tor Humar	h Health (Re	t: 2009 CPP;	Section 5.27	.2)	1.64	to change.							

	А	В	С	D	Е	F	G	Н	I	J	К	L	М	Ν	0	Р
		INPUT AMB														
42		CALCULATI	E IN-STREA	M WASTE C	CONCENTRA	ATIONS										
43																
44	DATA INPUT			For less that	in 20 data po	oints enter geo	metric mean cor	ncentration as	s micro-gra	m per liter (u	g/l or ppb).					
45				For 20 or m	ore data poir	nts in set enter	r highest concen	tration as mid	cro-gram pe	er liter (ug/l o	r ppb).					
46																
47							level" (DL) but t									
48							level" (DL) and			1QL, "0" is us	sed.					
49				If a firm valu	ue is reported	d, even less th	an MQL, the rep	orted value i	s used.							
50																
51							ulate the Instream	m Waste Cor	centration	(IWC)						
52				(Please refe	er to CPP for	detail)										
53				$IWC = [(F^*C)]$	Qa*Cb) + (Qe	e*2.13*Ce)] / (F	⁼ *Qa + Qe)									
54				Where:												
55						Concentration										
56						allowed for m	0									
57				Ce = Repor	ted concentr	ation in effluer	nt									
58							stream of disch	arge								
59					effluent flow											
60				Qb = Critica	al low flow of	stream at disc	harge point exp	ressed as the	7Q10 or h	armonic mea	in flow for humai	h health crite	eria			
61				Upstream F	low (Qb)= (%	6 of 7Q10) X 7	Q10 for Chronic	and Acute								
62																
	The following fo	rmulae conv	ert metals re	eported in tot	al form to dis	solved form if	criteria are in di	ssolved form								
64																
	Kp = Kpo * (TSS						artition coefficie									
66	C/Ct = 1/ (1 + K	p*TSS* 10^-(6)			TSS = Total s	suspended solids	s concentratio	on found in	receiving stre	eam (or in efflue	nt for interm	ittent stream)			
67	Total Metal Crite	eria (Ct) = Cr	/ (C/Ct)			C/Ct = Fractio	on of metal disso	lved; and Cr	= Dissolve	d criteria valu	Je					
68																
69		*Stream Lin	near Partitio	on Coefficier	nt (Insert "Di	issolved" Cor	nc in Column B	to convert t	o "Total")		Lake Linear Pa	artition Coe	fficient			
		Dissolved														
Ι_		Value in														
-	Total Metals	Stream		Кро	alpha (a)	Кр	C/Ct	Total Value			Кро	alpha (a)	Кр	C/Ct	Total Value	
71																
	Cadmium			4000000	-1.13	582706.889	0.237818469	0.00			3520000.00	-0.92	733514.98	0.1986361	0	
	Chromium(3)			3360000	-0.93	688338.365		0.00			2170000.00	-0.27	1369499.28	0.1172024	0	
	Copper			1040000	-0.74	294554.016	0.381672529	0.00			2850000.00	-0.9	614495.12	0.2283249	0	
	Lead			2800000	-0.8	715925.58	0.202527926	0.00			2040000.00	-0.53	826490.64	0.1803199	0	
	Mercury			2900000	-1.14	415321.613	0.30448177	0.00			1970000.00	-1.17	268066.09	0.4041443	0	
	Nickel			490000	-0.57	185433.992	0.495077211	0.00			2210000.00	-0.76	604946.03	0.2310962	0	
	Zinc			1250000	-0.7	379014.766	0.324193117	0.00			3340000.00	-0.68	1047851.74	0.1478593	0	
	Silver			2400000		414607.994		0.00			2400000.00	-1.03	414607.99	0.3048461	0	
81		*Note: Use this	section to conv	vert lab concentr	rations shown as	s "dissolved" to "to	otal"									
82											Dissolved	Total				

	А	В	С	D	E	F	G	Н	I	J	K	L	М	Ν	0	Р
		ormulas are	used to ca	Iculate wate	er quality cri	teria based o	on Regulation No				WQC (ug/l)	WQC(ug/l)				
	Cadmium			Acute			WER X CF1 X e				1.04		CF1 = 1.1366			
85				Chronic			WER X CF2 X e	(0.7852[ln(h	ardness)]-3	3.490)	0.43		CF2 = 1.1016	72 - [0.04183	8*In(hardness	s)]
86																
	Chromium Tri			Acute			WER X 0.316 X				210.28					
88				Chronic			WER X 0.86 X e	(0.819[ln(ha	ardness)]+1	.561	68.21					
89																
	Chromium Hex			Acute			WER X 0.982 X				15.71					
91				Chronic			WER X 11 X 0.9	62			10.58					
92																
93	Copper			Acute			WER X 0.96 X e				5.64					
94				Chronic			WER X 0.96 X e	(0.8545[ln(h	ardness)]-1	.465)	4.17					
95																
	Lead			Acute			WER X e(1.273				17.68		CF3 = 1.46203	3 - [0.145712	*In(hardness))]
97				Chronic			WER X e(1.273	In(hardness)]-4.705)*C	F3	0.69					
98																
	Mercury			Acute			WER X 0.85 X 2	.4			2.04					
100				Chronic			WER X 0.012				0.01					
101																
	Nickel			Acute			WER X 0.998 X				525.50					
103				Chronic			WER X 0.997 X	e(0.8460[ln	(hardness)]·	+1.1645)	58.36					
104																
105	Zinc			Acute			WER X 0.978 X				42.43					
106				Chronic			WER X 0.986 X	e(0.8473[ln	(hardness)]·	+0.7614)	38.74					
107																
	Silver			Acute			WER X 0.85 X e	(1.72[ln(har	dness)]-6.5	2)	0.46					
109																
	Cyanide			Acute			WER X 22.36				22.36					
111				Chronic			WER X 5.2				5.20					
118																
	Selenium			Acute			WER X 20				20.00					
120				Chronic			WER X 5				5.00					
121																
122	The following for				m Model for	lakes for calc	ulating the Dilution	n Factor (D	F):							
123 124		[DF = ((2.8 *	D * 3.1416^	0.5) / X)	where DF is	% of effluent at di	stance X, D	is the diam	eter of the o	outfall pipe					
124				and X is aq	uatic life crite	ria25 feet fo	or ZID; 100 feet fo	r mixing zor	ne; human h	ealth criteria	a 200 feet for mix	ing zone.				
125		[DF =	#VALUE!	Acute	#VALUE!	Chronic	#VALUE!	Bioacc.							
126																

	А	В	С	D	Е	F	G	Н	I	J	К	L	М	Ν	0	Р
127	The following formulas are used to calculate the instream waste concentration (IWC) for each pollutant:															
128																
129			IWC = [(Fra	c X Critical	Flow X Cb) +	(2.13 X Ce X	Qd)] / [Frac X C	ritical Flow +	Qd] wher	e the critical f	low is the 7Q1	except for l	akes with the J	let Stream M	odel.	
130			Use EPA Statistical Factor of 2.13 for less than 20 Ce data points with the Geometric Mean of the Ce's; use 1 for more than 20 data points with the maximum Ce.													
131			IWC = (DF X Ce) + Cb for lakes with Jet Stream Model.													
													Arkansas	Arkansas		
			Number of		EPA	Background	Effluent	Domestic	Acute	Chronic			Acute	Chronic	Arkansas	EPA
132	POLLUTANTS		Data points	MQL	Statistical	Conc.	Conc.	Supply	Aquatic	Aquatic	Bioacc.	[Reserved]	Aquatic	Aquatic	Bioacc.	Bioacc.
						Cb	Ce	IWC	IWC	IWC	IWC					
133				ug/l	Factor	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l		ug/l	ug/l	ug/l	ug/l
107																
	37 METALS AND CYANIDE															
	2. Arsenic Total		1	0.5	2.13	0	1.58	3.37	3.37	3.37	3.37	9999999	9999999.00	99999999.00	9999999	1.4
	Copper Total		1	0.5	2.13	0	1.09	2.32	2.32	2.32	2.32	9999999	14.79	10.93	9999999	13,000
140	9. Lead Total		1	0.5	2.13		0.599	1.28	1.28	1.28	1.28	9999999	87.29	3.40	9999999	50
141	12. Nickel Total		1	0.5	2.13	0	1.18	2.51	2.51	2.51	2.51	9999999	1061.45	117.88	9999999	46,000
142																

	A	В	С	D	E	F	G	Н	I	J	K	L	М	Ν	0	Р
143	STEP 3:	APPLICABLE WATER QUALITY-BASED LIMITS														
144																
145																
146							ADEQ HUMAN HEALTH CRITERIA									
			Permit	Permit	Permit	Permit		Permit	Permit	Permit	Permit					
			Daily	Monthly	Daily	Monthly		Daily	Monthly	Daily	Monthly					
147	POLLUTANTS		Maximum	Average	Maximum	Average		Maximum	Average	Maximum	Average					
148			ug/l	ug/l	lb/day	lb/day		ug/l	ug/l	lb/day	lb/day					
	Copper Total		NO	NO	NO	NO										
	Lead Total		NO	NO	NO	NO										
151	Nickel Total		NO	NO	NO	NO										