

CALCULATIONS OF ARKANSAS WATER QUALITY-BASED EFFLUENT LIMITATION:

For an Arkansas River/Stream

(Reserved)

STEP 1: INPUT TWO LETTER CODE FOR ECOREGION (Use Code at Right)
Basin Name

DL
St. Francis

FACILITY

Permittee & Date
NPDES Permit No.
Outfall No.(s)
Plant Avg Flow (MGD)
SIUs Avg Flow (MGD)
Domestic Flow (MGD)
Plant Design Flow (MGD)
Plant Design Flow (cfs)

Wynne Nov 14 TBLL
AR0021903
1.00
0.80
0.03
0.77
2.76
4.26

Codes & TSS for Ecoregions and Large Rivers

| | | | |
|-----------------------------|----------|--|-----------|
| Ouachita Mts. Eco (OM) = | 2.0 mg/l | Arkansas (Ft. Smith to Dardanelle Dar | 12.0 mg/l |
| Ozark Highlands Eco (OH) = | 2.5 mg/l | Arkansas (Dardanelle Dam to Terry L& | 10.5 mg/l |
| Boston Mts. Eco (BM) = | 1.3 mg/l | Arkansas (Terry L&D to L&D No. 5) | 8.3 mg/l |
| Ark River Valley Eco (AV) = | 3.0 mg/l | Arkansas (L&D No. 5 to Mouth) | 9.0 mg/l |
| Gulf Coastal Eco (GC) = | 5.5 mg/l | White (Above Beaver Lake) | 2.5 mg/l |
| Delta Ecoregion (DL) = | 8.0 mg/l | White (Below Bull Shoals to Black Riv) | 3.3 mg/l |
| | | White (From Black River to Mouth) | 18.5 mg/l |
| | | St. Francis River | 18.0 mg/l |
| | | Ouachita (Above Caddo River) | 2.0 mg/l |
| | | Ouachita (Below Caddo River) | 5.5 mg/l |
| | | Red River | 33.0 mg/l |

RECEIVING STREAM

Is this a large river? (see list at right)(enter "1" if yes, "0" if no; make entry as a number)
Name of Receiving Stream:
Waterbody Segment Code No.
Is this a lake or reservoir? (enter '1' if yes, '0' = no; make entry as a number)
Is seasonal critical flow applicable (1=yes, 0=no); see Reg 2 page 1-3 for details.
(Reserved) DO NOT INPUT DATA INTO CELL H22, H23 & H24....LEAVE BLAN
(Reserved)
(Reserved) (Reserved)
(Reserved) (Reserved)
(Reserved) (Reserved)
(Reserved) (Reserved)

0
Caney Creek
3J
0
0
?
?
?
?

Total Hardness for:

| | |
|----------------------------|------------------------------|
| Arkansas River = 125 mg/l | Red River = 211 mg/l |
| Ouachita River = 28 mg/l | St. Francis River = 103 mg/l |
| White River = 116 mg/l | |
| Gulf Coastal = 31 mg/l | Ouachita Mount = 31 mg/l |
| Ozark Highlands = 148 mg/l | Ark River Valley = 25 mg/l |
| Boston Mount = 25 mg/l | Delta = 81 mg/l |

Ecoregion TSS (mg/l) (For Large River, See List to Right)
Ecoregion Hardness (mg/l)
Enter 7Q10 (cfs) (Reserved)
Long Term Avg / Harmonic Mean Flow (cfs)
Using Diffusers (Yes/No)
pH (Avg)
Percent (%) of 7Q10 for Chronic Criteria
Percent (%) of 7Q10 for Acute Criteria
Water Effect Ration (WER)
EPA Statistical Factor for Data (enter 2.13 for <20; enter 1 for >20)
Ave Monthly Limit LTA Multiplier (Ref: page 103 TSD for WQ-Based Toxics Control)
Max Daily Limit LTA Multiplier (Ref: " " " ")

8.00
81.00
0.00
0.00
No
7.03
0.67
0.33
1.00
2.13
1.55
3.11

Large Rivers

Mississippi River, Arkansas River, Red River
White (Below confluence with Black River)
Ouachita (Below confluence with Little Miss. River)

WQ Levels not to exceed for

Wynne Nov 14 TBL

| | Cb | WQSa | WLAa | LTAa | WQSc | WLAc | LTAc | LTAa/LTAc | Aquatic Life AML, ug/l |
|-----------------|------|---------|---------|---------|----------|--------|--------|-----------|---------------------------|
| Cadmium Total | 0.00 | 11.94 | 11.94 | 6.81 | 3.5755 | 3.58 | 2.57 | 2.57 | 3.9902 |
| Chromium (hex) | 0.00 | 15.71 | 15.71 | 8.96 | 10.5820 | 10.58 | 7.62 | 7.62 | 11.8095 |
| Copper Total | 0.00 | 38.87 | 38.87 | 22.15 | 26.4109 | 26.41 | 19.02 | 19.02 | 29.4745 |
| Lead Total | 0.00 | 269.04 | 269.04 | 153.35 | 10.4840 | 10.48 | 7.55 | 7.55 | 11.7001 |
| Mercury Total | 0.00 | 6.46 | 6.46 | 3.68 | 0.0120 | 0.01 | 0.01 | 0.01 | 0.0134 |
| Nickel Total | 0.00 | 2603.30 | 2603.30 | 1483.88 | 289.1173 | 289.12 | 208.16 | 208.16 | 322.6549 |
| Selenium Total | 0.00 | 20.00 | 20.00 | 11.40 | 5.0000 | 5.00 | 3.60 | 3.60 | 5.5800 |
| Silver Total | 0.00 | 7.82 | 7.82 | 4.45 | ##### | ##### | ##### | 4.45 | 6.9048 |
| Zinc Total | 0.00 | 319.04 | 319.04 | 181.85 | 291.3325 | 291.33 | 209.76 | 181.85 | 281.8725 |
| Chromium (Tri) | 0.00 | 2256.37 | 2256.37 | 1286.13 | 731.9422 | 731.94 | 527.00 | 527.00 | 816.8475 |
| Cyanide Total | 0.00 | 22.36 | 22.36 | 12.75 | 5.2000 | 5.20 | 3.74 | 3.74 | 5.8032 |
| Beryllium Total | 0.00 | 130.00 | 130.00 | 74.10 | 5.3000 | 5.30 | 3.82 | 3.82 | 5.9148 |
| Arsenic | 0.00 | 662.95 | 662.95 | 377.88 | 349.8929 | 349.89 | 251.92 | 251.92 | 390.4805 |

Wynne Nov 14 TBLL

| Pollutant | % Rem*** | Water Quality | Water Quality* | Sludge | Sludge**** | Inhibition** | Inhibition^^ | MAHL | MAHC | Domestic | Allocation for %SF | MAIL | Max Inf Exceedec | Max Effluent |
|----------------|----------|---------------|----------------|--------|------------|--------------|--------------|---------|--------|----------|--------------------|---------|------------------|--------------|
| | | mg/l | lbs/day | mg/kg | lbs/day | mg/l | lbs/day | lbs/day | mg/l | lbs/day | lbs/day^ | lbs/day | MAHC | vs WQS(mg/l) |
| Cadmium Total | 74.2 | 0.0040 | 0.1032 | 85 | 0.596 | 1.00 | 6.67 | 0.103 | 0.0155 | 0.002 | 0.083 | 0.0809 | No | No |
| Copper Total | 84.6 | 0.0295 | 1.2770 | 4300 | 26.43 | 1.00 | 6.67 | 1.277 | 0.1914 | 0.258 | 1.022 | 0.7637 | No | No |
| Lead Total | 77.4 | 0.0117 | 0.3454 | 840 | 5.64 | 1.00 | 6.67 | 0.345 | 0.0518 | 0.010 | 0.276 | 0.2667 | No | No |
| Mercury Total | 93.7 | 0.00001 | 0.0014 | 57 | 0.32 | 0.10 | 0.67 | 0.001 | 0.0002 | 0.000 | 0.001 | 0.0010 | No | No |
| Nickel Total | 49.0 | 0.3227 | 4.2211 | 420 | 4.46 | 1.00 | 6.67 | 4.221 | 0.6327 | 0.025 | 3.377 | 3.3517 | No | No |
| Selenium Total | 50.0 | 0.0056 | 0.0745 | 100 | 1.04 | 0.20 | 1.33 | 0.074 | 0.0112 | 0.016 | 0.060 | 0.0435 | No | No |
| Silver Total | 83.4 | 0.0069 | 0.2775 | 0 | 0.00 | 0.25 | 1.67 | 0.278 | 0.0416 | 0.002 | 0.222 | 0.2204 | No | No |
| Zinc Total | 66.6 | 0.2819 | 5.6307 | 7500 | 58.56 | 0.50 | 3.34 | 3.336 | 0.5000 | 1.418 | 2.669 | 1.2505 | No | No |
| Chromium Total | 82.0 | 0.8168 | 30.2778 | 3000 | 19.02 | 1.00 | 6.67 | 6.672 | 1.0000 | 0.032 | 5.338 | 5.3054 | No | No |
| Cyanide Total | 69.0 | 0.0058 | 0.1249 | 0 | 0.00 | 0.10 | 0.67 | 0.125 | 0.0187 | 0.064 | 0.100 | 0.0355 | No | No |
| Arsenic | 63.6 | 0.3905 | 7.1574 | 75 | 0.61 | 0.10 | 0.67 | 0.613 | 0.0919 | 0.010 | 0.491 | 0.4810 | No | No |
| Molybdenum | 59.2 | 1.0000 | 16.3529 | 75 | 0.66 | 0.20 | 1.33 | 0.659 | 0.0987 | 0.026 | 0.527 | 0.5012 | No | No |
| Beryllium | 50.0 | 0.005915 | 0.0789 | 0 | 0.00 | 0.10 | 0.67 | 0.0789 | 0.0118 | 0.002 | 0.063 | 0.0615 | No | No |

Dry tons/day of sludge 2.60 Safety Factor 0.20

Yellow highlighted boxes indicate driving criteria

* lbs/day = mg/l X 8.34 X POTW avg flow / (1-Total POTW %Rem)

** EPA Default values (most conservative) from page G-1 of the 7/04 EPA TBLL guidance manual (Be est. @ 0.10 mg/l; Se & Mo est. @ 0.2 mg/l; Ag from old 12/87 EPA guidance manual)

*** EPA Default Median Removal Numbers from page R-2 of the 7/04 TBLL guidance manual for Se, Cr & CN (Be est. @ 50%)

**** lbs/day = dry tons/day X 0.002 X CFR 503 (Table 1) criteria / % removal from EPA Pret. Prog. Implementation workshop mtrl. ~ 6/93

^lbs/day = mg/l X Avg POTW flow X 8.34

^ lbs/day = (1 - SF) X MAHL

MAIL = Maximum allowable industrial loading = MAHL - Allocation for % SF - Domestic lb/day

Domestic Calculations for Wynne Nov 14 TBLL

| Pollutants | EPA pg V-1 Avg Reported Loading | | | |
|----------------|---------------------------------|------------|----------|---------------------------------|
| | mg/l | mg/l | lbs/day | |
| Cadmium Total | 0.0030 | 0.00025000 | 0.001612 | used 1/2 the MQL of 0.0005 mg/l |
| Copper Total | 0.0607 | 0.04000000 | 0.257873 | 2002 & 2012 city data |
| Lead Total | 0.0490 | 0.00150000 | 0.009670 | 2012 city data |
| Mercury Total | 0.0003 | 0.00002200 | 0.000142 | 2012 city data |
| Nickel Total | 0.0210 | 0.00390000 | 0.025143 | 2012 city data |
| Selenium Total | - | 0.00250000 | 0.016117 | used 1/2 the MQL of 0.005 mg/l |
| Silver Total | 0.0050 | 0.00025000 | 0.001612 | used 1/2 the MQL of 0.0005 mg/l |
| Zinc Total | 0.1750 | 0.22000000 | 1.418300 | 2002 & 2012 city data |
| Chromium Total | 0.0050 | 0.00500000 | 0.032234 | used 1/2 the MQL of 0.01 mg/l |
| Cyanide Total | 0.0410 | 0.01000000 | 0.064468 | used min. EPA guidance value |
| Arsenic | 0.0030 | 0.00147800 | 0.009528 | 2012 city data |
| Molybdenum | | 0.00400000 | 0.025787 | used 1/2 the MQL of 0.008 mg/l |
| Beryllium | | 0.00025000 | 0.001612 | used 1/2 the MQL of 0.0005 mg/l |

| Date | Cadmium | Copper | Lead | Mercury | Nickel | Selenium | Silver | Zinc | Chromium | Cyanide | Arsenic | Molydenum | Beryllium |
|--|---------|----------|----------|----------|---------|----------|---------|-------|----------|---------|---------|-----------|-----------|
| 8/21 thru 8/24/12 avg data (6 samples) | 0.00025 | 0.035000 | 0.001500 | 0.000022 | 0.00390 | 0.002500 | 0.00025 | ##### | 0.00500 | 0.0100 | ##### | 0.0040000 | 0.00025 |
| 8/26 thru 10/2/02 avg data 10 samples; all ND exc Cu & Zn | | 0.045000 | | | | | | ##### | | | | | |
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| Quantitation Level (QL) | 0.0005 | 0.000500 | 0.000500 | 0.000005 | 0.0005 | 0.005000 | 0.0005 | 0.02 | 0.0100 | 0.0100 | ##### | 0.0100000 | 0.00050 |
| Average | 0.00025 | 0.040000 | 0.001500 | 0.00002 | 0.00390 | 0.002500 | 0.00025 | 0.22 | 0.00500 | 0.0100 | ##### | 0.0040000 | 0.00025 |
| Maximum | 0.0003 | 0.045000 | 0.001500 | 0.0000 | 0.0039 | 0.002500 | 0.0003 | 0.33 | 0.0050 | 0.0100 | ##### | 0.0040000 | 0.00025 |
| All Concs > QL (Yes/No) | No | Yes | Yes | Yes | Yes | No | No | Yes | No | Yes | Yes | No | No |

*EPA Default Numbers from guidance document