

APPENDIX E. REQUIREMENTS FOR DEVELOPMENT OF SITE-SPECIFIC CRITERIA FOR CERTAIN PARAMETERS

A. General applicability to metals

Numerical criteria for total recoverable metals to protect aquatic life are referenced in OAC 785:45-5-12(f)(6)(G) and Table 2 of Appendix G of this Chapter. For permitting purposes, such criteria for total recoverable Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, and Zinc may be translated into dissolved metals criteria using the conversion factors referenced in OAC 785:45-5-12(f)(6)(H) and Table 3 of Appendix G. Criteria for parameters other than metals are also located in Table 2 of Appendix G.

An additional alternative which may be utilized for permitting purposes is to determine site-specific criteria from either the total recoverable or the dissolved criteria. However, federal regulations found at 40 CFR 122.45(C) require that NPDES permit limits must express metals concentrations as total recoverable, not dissolved. Therefore, if dissolved criteria for metals are implemented, they must be translated to site-specific total metals criteria to be used in the issuance of permit limits consistent with OAC 785:46.

The permitting authority may issue a total recoverable permit limit if statewide total recoverable criteria are appropriate in the permitting authority's view, and/or satisfactory in the permittee's view. If permit limits obtained using total recoverable criteria are unsatisfactory to the permittee, the permittee may attempt to obtain different permit limits by developing site-specific criteria in accordance with the provisions of this Appendix.

Implementation of site-specific criteria may reduce the margin of safety afforded by implementation of criteria per 785:45-5-12(f)(6)(G) and Table 2 of Appendix G. Therefore, it is important that background concentration (which reduces the assimilation capacity of receiving water) be accounted for when site-specific criteria are implemented. Determination of background concentration requires a minimum of twelve samples collected over twelve months.

In order to develop permissible site-specific criteria, this Appendix must be followed to the satisfaction of the permitting authority and the OWRB. A work plan explaining sampling and analysis procedures and quality assurance/quality control must be approved by the OWRB prior to commencing the site-specific study. Upon completion, results must be submitted to OWRB and the permitting authority. Additional technical guidance is available in OWRB technical report 2001-2, "Guidance for Developing Site Specific Criteria for Metals and through Appendices J and L of the "Water Quality Standards Handbook", EPA publication no. 823-B-94-005a (August 1995). Permittees are strongly encouraged to evaluate both the discharge and receiving water using clean sampling techniques.

Upon OWRB approval, site-specific criteria shall be promulgated as part of this Appendix following the next subsequent permanent rulemaking to amend OAC 785:45. These site-specific criteria supersede other numeric criteria promulgated elsewhere in this chapter if it is shown to the satisfaction of the Board that properties of the discharge or the circumstances surrounding the development of the site-specific criteria have not significantly changed since the promulgation of those site-specific criteria. Such criteria and the conditions around which they were derived, including but not limited to local environmental factors and effluent characteristics, shall be re-evaluated by the permit holder with each subsequent discharge permit renewal application or major modification request to determine if any significant changes have affected the propriety of the site-specific criteria.

B. Site-specific Criteria Applicability for NPDES Permit Activities

Oklahoma's site-specific criteria, except as otherwise specified, apply where the maximum concentration on the chronic regulatory mixing zone boundary occurs under critical conditions for receiving streams where $Q^* > 0.1823$ and on the acute regulatory mixing zone boundary for streams where $Q^* \leq 0.1823$. Critical conditions include regulatory effluent and receiving stream flows. OAC 785:46-5-2(C) requires that effluent flow, Q_e , be the highest monthly averaged discharge if sufficient data is available, or the design flow otherwise. When chronic criteria implementation is appropriate, OAC 785:45-5-4 requires that the receiving stream flow, Q_u , be the larger of 7Q2 or 1 cfs. One cfs shall be used if the 7Q2 cannot be determined. The discharger shall be required to determine the 7Q2 per OAC 785:46-1-6 prior to the next permit cycle at which time the permit limits may be revised using the newly calculated Q_u (785:46-1-6(d)).

The maximum concentration on the mixing zone boundary may be simulated by mixing effluent and receiving water. Percent effluent in receiving water, PE, depends upon the dilution capacity of the stream and shall not exceed 100%. Dilution capacity, for streams, is represented as $Q^* = Q_e/Q_u$.

The following formulas shall be used to determine PE for receiving streams:

For streams with large dilution capacities ($Q^* < \text{or equal to } 0.1823$), PE equals $(194Q^*)$ divided by $(1 + Q^*)$. PE for $Q^* < \text{or equal to } 0.1823$ shall not be less than 10%.

For streams with intermediate dilution capacities ($0.1823 < Q^* < 0.3333$), PE equals (100) divided by $(6.17 - 15.51Q^*)$.

For streams with small dilution capacities ($Q^* > \text{or equal to } 0.3333$), PE equals 100%.

Site-specific criteria in Oklahoma lakes are also based on the maximum concentration on the mixing zone boundary. The following formulas shall be used to determine PE for lakes:

PE equals $4.96D$, $D > \text{or equal to } 3$ feet where D is pipe diameter.

PE equals $23.8\sqrt{W}$, $W > \text{or equal to } 3$ feet where W is canal width.

As with streams. PE is always less than or equal to 100% for lakes.

If PE is calculated to be less than 10%, then effluent water effect ratios shall use PE = 10%.

"Waterbody-specific" criteria, such as segment-specific metals, may not have limitations on its applicability. Rather, it may be used a substitute for other applicable statewide criteria for the entire waterbody.

Site-specific criteria are dependent, in part, on specific properties of the effluent that influence the bioavailability and toxicity of metals. Substantial changes in the quality or quantity of the effluent may affect the resulting site-specific criterion. Therefore, if the existing permit contains requirements for toxicity reduction evaluations (TREs) or pollution prevention efforts, a site-specific criterion should not be developed until after these efforts have been completed. A new site-specific criteria study would likely have to be performed after those requirements are met

because the characteristics of the effluent may significantly change (e.g., hardness, pH, TDS). In cases where the quality or quantity of an effluent changes, the burden rests on the permittee to demonstrate that the effluent characteristics are not significantly altered to a degree that would affect the validity of the outcomes of the original site-specific criteria study. A site-specific criterion may need to be re-evaluated periodically to reflect changes in the system that may alter the characteristics of either the receiving water or effluent.

C. Site-specific Criteria Applicability for Activities Not Related to NPDES Permits

In certain circumstances, statewide numeric criteria for parameters other than metals may be replaced by segment-specific criteria for specific parameters applicable to just one waterbody. These criteria will be applicable to any point in the waterbody. These criteria must be shown to be protective of native aquatic life through procedures similar to those used in the WER procedures detailed here and in OWRB technical report 2001-2, "Guidance for Developing Site Specific Criteria for Metals".

Development of segment-specific criteria for minerals should follow the guidance contained in OWRB technical report TRWQ2001-2 ("Guidance For Developing Site-Specific Minerals Criteria"). Certain cases may require additional data or justification, but this document should provide sufficient basic guidance for the development of alternative criteria. Development of site-specific or segment-specific criteria for parameters for other than metals or minerals and lacking specific guidance documents will require extensive coordination with technical staff from OWRB and the permitting authority.

D. Sampling Procedures

General guidance for field sampling can be found in Appendix B of OWRB technical guidance document 2001-2, "Guidance for Developing Site Specific Criteria for Metals". The permittee shall collect both receiving water and effluent, and mix them together to obtain PE. Ambient water collections shall be representative of low stream flow events and collected at a location unaffected by the discharge being permitted. Twenty-four (24) hour composite effluent samples representative of normal operation shall be collected at the outfall such that any periodic toxic discharges are captured and average effluent conditions are represented. Outfalls may be combined proportional to flow if in close proximity. Clean sampling techniques shall be used where possible and samples shall be analyzed by an Oklahoma certified laboratory utilizing generally accepted methods. Dilution water must be made in accordance with EPA's acute biomonitoring manual entitled "Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms", EPA publication no. 600/4-90-027 (1991). The pH, hardness, conductivity and alkalinity must be similar to that of the receiving water.

Site-specific criteria development for lakes should employ sampling procedures detailed in OWRB guidance document for B.U.M.P. Standard Operating Procedures. Deviation from these prescribed techniques must be justified to OWRB and the permitting authority prior to initiation of the sampling. Excursions from these techniques that occur as a result of on-site conditions must be reported to OWRB and the permitting authority as soon as possible. Implications of these deviations on the data quality and their appropriateness to the outcomes of the study must be reviewed and agreed upon by OWRB and the permitting authority prior to their use in the derivation of any criteria.

For systems lacking NPDES permitted dischargers, sampling procedures for determining background concentration detailed in the OWRB technical guidance 2001-2 shall be sufficient for characterizing local conditions.

E. Site-Specific Criteria Development Options for Metals:

Prior to the initiation of any work toward development of a site-specific criterion, interested parties must coordinate with OWRB technical staff. Such coordination will require, at a minimum, a workplan addressing project goals, collection and testing methods, quality assurance measures, and output schedules. This workplan will need to be reviewed and approved by OWRB and the permitting authority prior to initiation of any work.

Three options are available if the permittee decides to develop site-specific metals criteria for permitting purposes instead of utilizing the total recoverable criteria referenced in 785:45-5-12(f)(6)(G) and Table 2 of Appendix G.

1. Option 1: Water Effects Ratio (WER)

The permittee may obtain a site-specific water effects ratio (WER) to translate a state wide total criterion to a site-specific total criterion if the existing permit does not contain requirements for toxicity reduction evaluations or implementation of pollution prevention efforts. Toxicity tests using both laboratory dilution water and PE water must be performed. PE water is obtained by first determining the amount of water required for the toxicity test (e.g. 1L). Since $PE = 100V_e/(V_e + V_r)$, where V_e and V_r are volumes of effluent and receiving water required for the toxicity test, respectively, then $V_e = PE/100$ (L). If $PE = 25\%$, then $V_e = 0.25L$. Given that $V_e + V_r = 1$ (L) in this example, $V_r = 1 - PE/100$, or $0.75L$.

Toxicity tests using two different species are required. Acute 48-hour static renewal definitive toxicity tests shall be performed by the permittee in accordance with the EPA guidance for acute testing identified above. LC_{50} tests shall be used to determine WER's for both acute and chronic criteria. Toxicity tests require adding metal to both PE and dilution water. It shall not be acceptable to estimate metal concentrations by measuring the amount added. Total recoverable concentrations must be used to obtain LC_{50} 's for both test species for PE and laboratory water in Option 1.

Multiple WER's must be performed. At a minimum, three tests in three different seasons must be performed for two test species. WER is computed as $LC_{50dilution}/LC_{50PE}$. A geometric mean of the WER's is the final water effect ratio, FWER. A minimum of four WER's must be used in the computation of FWER. An explanation of any WER's obtained but not used in computation of FWER must be provided to the permitting authority and OWRB. The total criterion specified in Table 2 of Appendix G is divided by FWER to obtain a site-specific total criterion. Background concentration must be determined to use with the site-specific criterion to develop permit limits.

2. Option 2: Dissolved To Total Fraction

Dissolved and total recoverable concentrations must be obtained to determine a dissolved to total fraction. Samples must be taken from the effluent, receiving water and PE water. The dissolved to total fraction must be successfully computed a minimum of ten times.

The dissolved to total fraction is defined as $f_i = C_{Di}/C_{Ti}$, where C_{Di} is the dissolved concentration in the i th PE sample, and C_{Ti} is the total recoverable concentration. The dissolved fraction for the site shall be determined as the geometric mean for the n samples.

$$\therefore f = \exp \left[\sum_{i=1}^n [\ln(f_i)]/n \right]$$

To develop a site-specific criterion from the dissolved fraction alone, divide the dissolved criterion determined from Table 3 of Appendix G by f . The result is a site-specific total recoverable criterion.

3. Option 3: Combining f And FWER

The most definitive method of developing a site-specific criterion is to modify a dissolved criterion to account for both the fraction of the concentration biologically available and the difference between the toxicity of the metal in the laboratory dilution water and in PE water. In order to perform option 3, WER's must be obtained using dissolved concentrations. This accounts for differences between the toxicity of the dissolved metal in laboratory dilution water and dissolved metal in PE water.

A translator, T , is obtained as the product of f and dissolved FWER. T is divided into the dissolved criterion determined from Table 3 of Appendix G to obtain a site-specific total recoverable criterion.

F. Site-specific Criteria for Metals Which Have Been Developed for Particular Waterbodies

Subsequent to the initial promulgation of this Appendix, there have been cases in which interested persons have developed site-specific criteria for particular discharges or other circumstances in accordance with this Appendix. Such site-specific criteria are set forth below. These site-specific criteria shall be interpreted according to the following:

- C_{ast} = acute statewide total criterion
- C_{cst} = chronic statewide total criterion
- C_{asd} = acute statewide dissolved criterion
- C_{csd} = chronic statewide dissolved criterion
- S_{ast} = acute site-specific total criterion
- S_{cst} = chronic site-specific total criterion
- $FWER_t$ = final total water effects ratio
- $FWER_d$ = final dissolved water effect ratio
- f = dissolved to total fraction

Acute site-specific criteria are appropriate for large streams and chronic site-specific criteria are appropriate for small and medium size streams.

Options Allowed In Appendix E

$$\text{Option 1} \\ S_{ast} = C_{ast}/FWER_t$$

$$S_{cst} = C_{cst}/FWER_t$$

Option 2

$$S_{ast} = C_{csd}/f$$

$$S_{cst} = C_{csd}/f$$

Option 3

$$S_{ast} = C_{csd}/(fxFWER_d)$$

$$S_{cst} = C_{csd}/(fxFWER_d)$$

1. City of Blackwell Discharge to Chikaskia River

A site-specific criteria modification study has been satisfactorily completed for cadmium for the City of Blackwell.

$$FWER_t = 0.0989$$

$$FWER_d = 0.2905$$

$$f = 0.18$$

The results of the study allow any of the four following criteria to be utilized.

$C_{cst} = 2.2 \mu\text{g/L}$	Statewide criterion
$S_{cst} = 22.24 \mu\text{g/L}$	Option 1
$S_{cst} = 10.68 \mu\text{g/L}$	Option 2
$S_{cst} = 36.76 \mu\text{g/L}$	Option 3

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

2. AES Shady Point Discharge to Poteau River

A site-specific criteria modification study has been satisfactorily completed for copper for AES Shady Point.

$$FWER_t = 0.0876$$

$$FWER_d = 0.1306$$

$$f = 0.5936$$

The results of the study allow any of the four following criteria to be utilized.

$C_{cst} = 9.50 \mu\text{g/L}$	Statewide criterion
$S_{cst} = 65 \mu\text{g/L}$	Option 1
$S_{cst} = 15.3 \mu\text{g/L}$	Option 2
$S_{cst} = 74 \mu\text{g/L}$	Option 3

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

3. City of Idabel Discharge to Mud Creek

A. Lead

A site-specific criteria modification study has been satisfactorily completed for lead for the City of Idabel.

$$\begin{aligned} \text{FWER}_t &= 2.5912 \\ \text{FWER}_d &= 0.2914 \\ f &= 0.7157 \end{aligned}$$

The results of the study allow any of the four following criteria to be utilized.

$C_{\text{cst}} = 2.3492 \mu\text{g/L}$	Statewide criterion
$S_{\text{cst}} = 0.9066 \mu\text{g/L}$	Option 1
$S_{\text{cst}} = 2.7104 \mu\text{g/L}$	Option 2
$S_{\text{cst}} = 9.3036 \mu\text{g/L}$	Option 3

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

B. Nickel

A site-specific criteria modification study has been satisfactorily completed for nickel for the City of Idabel.

$$\begin{aligned} \text{FWER}_t &= 1.1244 \\ \text{FWER}_d &= 0.9735 \\ f &= 0.5798 \end{aligned}$$

The results of the study allow any of the four following criteria to be utilized.

$C_{\text{cst}} = 128.8834 \mu\text{g/L}$	Statewide criterion
$S_{\text{cst}} = 114.6242 \mu\text{g/L}$	Option 1
$S_{\text{cst}} = 221.6226 \mu\text{g/L}$	Option 2
$S_{\text{cst}} = 227.6697 \mu\text{g/L}$	Option 3

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

C. Zinc

A site-specific criteria modification study has been satisfactorily completed for zinc for the City of Idabel.

$$\begin{aligned} \text{FWER}_t &= 0.6714 \\ \text{FWER}_d &= 0.7178 \\ f &= 0.6213 \end{aligned}$$

The results of the study allow any of the four following criteria to be utilized.

$C_{\text{cst}} = 96.6161 \mu\text{g/L}$	Statewide criterion
$S_{\text{cst}} = 129.0082 \mu\text{g/L}$	Option 1
$S_{\text{cst}} = 137.4592 \mu\text{g/L}$	Option 2
$S_{\text{cst}} = 191.4874 \mu\text{g/L}$	Option 3

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

4. Oklahoma Gas & Electric Mustang Generating Station Discharge to North Canadian River at NE 1/4 of NE 1/4 of SE 1/4 of Section 36, T 12 N, R 5 WIM, Canadian County, Oklahoma

A site-specific criteria modification study has been satisfactorily completed for copper for the Oklahoma Gas & Electric Mustang Generating Station discharge to the North Canadian River.

$$\begin{aligned} \text{FWER}_t &= 0.053 \\ \text{FWER}_d &= 0.224 \\ f &= 0.368 \text{ (0.37)} \end{aligned}$$

The results of the study allow any of the four following criteria to be utilized. All criteria are calculated at an in-stream hardness of 334 mg/L.

$C_{\text{cst}} = 35.9 \mu\text{g/L}$	Statewide criterion
$S_{\text{cst}} = 677 \mu\text{g/L}$	Option 1
$S_{\text{cst}} = 94.0 \mu\text{g/L}$	Option 2
$S_{\text{cst}} = 416.0 \mu\text{g/L}$	Option 3 (Recommended in OG&E study)

$C_{\text{ast}} = 59.8 \mu\text{g/L}$	Statewide criterion
$S_{\text{ast}} = 1128 \mu\text{g/L}$	Option 1
$S_{\text{ast}} = 156.0 \mu\text{g/L}$	Option 2
$S_{\text{ast}} = 692.0 \mu\text{g/L}$	Option 3 (Recommended in OG&E study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

5. City of Poteau Discharge to Poteau River at SE 1/4 of NW 1/4 of Section 30, T 7 N, R 26 EIM, LeFlore County, Oklahoma

A. Copper

A site-specific criteria modification study has been satisfactorily completed for copper for the City of Poteau discharge to the Poteau River.

$$\begin{aligned} \text{FWER}_t &= 0.1850 \\ \text{FWER}_d &= 0.1765 \\ f &= 0.2969 \end{aligned}$$

The results of the study allow any of the four following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L.

$C_{\text{cst}} = 4.02 \mu\text{g/L}$	Statewide criterion
$S_{\text{cst}} = 21.73 \mu\text{g/L}$	Option 1
$S_{\text{cst}} = 13.0 \mu\text{g/L}$	Option 2
$S_{\text{cst}} = 73.66 \mu\text{g/L}$	Option 3 (Recommended in Poteau study)

$C_{\text{ast}} = 5.35 \mu\text{g/L}$	Statewide criterion
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$S_{ast} = 28.92 \mu\text{g/L}$ Option 1
 $S_{ast} = 17.31 \mu\text{g/L}$ Option 2
 $S_{ast} = 98.09 \mu\text{g/L}$ Option 3 (Recommended in Poteau study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

B. Zinc

A site-specific criteria modification study has been satisfactorily completed for zinc for the City of Poteau discharge to the Poteau River.

$FWER_t = 0.4040$
 $FWER_d = 0.4276$

The results of the study allow any of the four following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L. However, option 1 was deemed sufficient to provide relief from a zinc limit in the discharge permit.

$C_{cst} = 33.59 \mu\text{g/L}$ Statewide criterion
 $S_{cst} = 83.14 \mu\text{g/L}$ Option 1 (Recommended in Poteau study)

$C_{ast} = 37.08 \mu\text{g/L}$ Statewide criterion
 $S_{ast} = 91.78 \mu\text{g/L}$ Option 1 (Recommended in Poteau study)

C. Cadmium

A site-specific criteria modification study has been satisfactorily completed for cadmium for the City of Poteau discharge to the Poteau River.

$FWER_t = 0.2427$
 $FWER_d = 0.2400$

The results of the study allow any of the following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L.

$C_{cst} = 0.39 \mu\text{g/L}$ Statewide criterion
 $S_{cst} = 1.61 \mu\text{g/L}$ Option 1
 $S_{cst} = 0.38 \mu\text{g/L}$ Option 2
 $S_{cst} = 1.58 \mu\text{g/L}$ Option 3 (Recommended in Poteau study)

$C_{ast} = 7.30 \mu\text{g/L}$ Statewide criterion
 $S_{ast} = 30.08 \mu\text{g/L}$ Option 1
 $S_{ast} = 7.31 \mu\text{g/L}$ Option 2
 $S_{ast} = 30.46 \mu\text{g/L}$ Option 3 (Recommended in Poteau study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

D. Silver

A site-specific criteria modification study has been satisfactorily completed for silver for the City of Poteau discharge to the Poteau River.

$$\text{FWER}_t = 0.2075$$
$$\text{FWER}_d = 0.2908$$

The results of the study allow any of the following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L.

Statewide chronic criteria are available for this parameter.

$C_{ast} = 0.39 \mu\text{g/L}$	Statewide criterion
$S_{ast} = 1.88 \mu\text{g/L}$	Option 1
$S_{ast} = 0.94 \mu\text{g/L}$	Option 2
$S_{ast} = 3.24 \mu\text{g/L}$	Option 3 (Recommended in Poteau study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

E. Lead

A site-specific criteria modification study has been satisfactorily completed for lead for the City of Poteau discharge to the Poteau River.

$$\text{FWER}_t = 0.1782$$
$$\text{FWER}_d = 0.1828$$

The results of the study allow any of the following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L.

$C_{cst} = 0.57 \mu\text{g/L}$	Statewide criterion
$S_{cst} = 3.20 \mu\text{g/L}$	Option 1
$S_{cst} = 0.59 \mu\text{g/L}$	Option 2
$S_{cst} = 3.25 \mu\text{g/L}$	Option 3 (Recommended in Poteau study)

$C_{ast} = 14.52 \mu\text{g/L}$	Statewide criterion
$S_{ast} = 81.48 \mu\text{g/L}$	Option 1
$S_{ast} = 15.15 \mu\text{g/L}$	Option 2
$S_{ast} = 82.88 \mu\text{g/L}$	Option 3 (Recommended in Poteau study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

6. City of Heavener Discharge to Morris Creek at SE 1/4 of NW 1/4 of Section 30, T 7 N, R 26 EIM, LeFlore County, Oklahoma: Copper

A site-specific criteria modification study has been satisfactorily completed for copper for the City of Heavener discharge to Morris Creek.

$$\text{FWER}_t = 0.1294$$
$$\text{FWER}_d = 0.1216$$
$$f = 0.8595$$

The results of the study allow any of the four following criteria to be utilized. All criteria are calculated at an in-stream hardness of 25.75 mg/L.

$C_{cst} = 4.02 \mu\text{g/L}$ Statewide criterion
 $S_{cst} = 31.07 \mu\text{g/L}$ Option 1
 $S_{cst} = 4.68 \mu\text{g/L}$ Option 2
 $S_{cst} = 38.50 \mu\text{g/L}$ Option 3 (Recommended in Morris Ck. study)

$C_{ast} = 5.35 \mu\text{g/L}$ Statewide criterion
 $S_{ast} = 41.34 \mu\text{g/L}$ Option 1
 $S_{ast} = 6.22 \mu\text{g/L}$ Option 2
 $S_{ast} = 51.19 \mu\text{g/L}$ Option 3 (Recommended in Morris Ck. study)

The discharger may choose the above criterion it wishes to use for discharge permit calculations.

7. City of Broken Bow to Unnamed Tributary of Yanubbe Creek at SE 1/4 of SE 1/4 of SE 1/4 of Section 18, T 6 S, R 24 EIM, McCurtain County, Oklahoma (Latitude 34° 01' 37.165" North, Longitude 94° 43' 22.270" West)

A. Copper

A site-specific criteria modification study has been satisfactorily completed for copper for the City of Broken Bow discharge to Unnamed Tributary of Yanubbe Creek. All criteria are calculated at an in-stream hardness of 34.9 mg/L.

$FWER_t = 0.0995$
 $FWER_d = 0.1253$
 $f = 0.6536$

The results of the study allow any of the four following criteria to be utilized

$C_{cst} = 5.20 \mu\text{g/L}$ Statewide criterion
 $S_{cst} = 52.32 \mu\text{g/L}$ Option 1
 $S_{cst} = 7.645 \mu\text{g/L}$ Option 2
 $S_{cst} = 61.01 \mu\text{g/L}$ Option 3

$C_{ast} = 7.12 \mu\text{g/L}$ Statewide criterion
 $S_{ast} = 71.56 \mu\text{g/L}$ Option 1
 $S_{ast} = 10.46 \mu\text{g/L}$ Option 2
 $S_{ast} = 83.44 \mu\text{g/L}$ Option 3

B. Zinc

A site-specific criteria modification study has been satisfactorily completed for zinc for the City of Broken Bow discharge to Unnamed Tributary of Yanubbe Creek. All criteria are calculated at an in-stream hardness of 34.9 mg/L.

$FWER_t = 0.6314$
 $FWER_d = 0.7519$
 $f = 0.7353$

$C_{cst} = 43.44 \mu\text{g/L}$ Statewide criterion
 $S_{cst} = 68.80 \mu\text{g/L}$ Option 1
 $S_{cst} = 58.25 \mu\text{g/L}$ Option 2

$$\underline{S_{cst} = 77.48 \mu\text{g/L} \quad \text{Option 3}}$$

$$\underline{C_{ast} = 47.96 \mu\text{g/L} \quad \text{Statewide criterion}}$$

$$\underline{S_{ast} = 75.96 \mu\text{g/L} \quad \text{Option 1}}$$

$$\underline{S_{ast} = 63.79 \mu\text{g/L} \quad \text{Option 2}}$$

$$\underline{S_{ast} = 84.85 \mu\text{g/L} \quad \text{Option 3}}$$

G. Site-Specific Criteria for Parameters Other Than Metals

The purpose of site-specific criteria investigations may not necessarily be intended to prevent toxicity as a result of the substance of concern. Various substances may produce various types of adverse impacts in the environment. For example, minerals may produce a toxic response due to ionic imbalance while nutrients may produce various impacts depending upon algal response to various conditions within the system. Examples of such systems include those where there may be nitrogen, phosphorus or light limitations. Resulting site-specific criteria may involve seasonal, spatial or other limitations as well as specific numeric limitations.

“Waterbody-specific” criteria, such as certain nutrients in Sensitive Water Supplies or segment-specific metals, may not have limitations on its applicability. Rather, it may be used a substitute for other applicable statewide criteria.

Development of site-specific criteria for minerals should follow the guidance contained in OWRB technical report TRWQ2001-2 (“Guidance For Developing Site-Specific Minerals Criteria”). Certain cases may require additional data or justification, but this document should provide sufficient basic guidance for the development of site-specific criteria.

Development of site-specific criteria for parameters other than metals or minerals and lacking specific guidance documents will require extensive coordination with technical staff from OWRB and the permitting authority. Such coordination will require, at a minimum, a workplan addressing project goals, collection and testing methods, quality assurance measures and output schedules. This workplan will need to be reviewed and approved by OWRB and the permitting authority prior to initiation of any work.

Those instances in which site-specific phosphorus or nitrogen criteria may be promulgated pursuant to OAC 785:45-5-10(7) titled “Chlorophyll-a numerical criterion for certain waters” will be limited to those waterbodies that have been shown to be impaired by nutrients and a numeric nutrient criterion has been determined to be the best way to affect reductions in the target nutrient. Such a demonstration will follow procedures outlined in OAC 785:46-15-10. Criteria may be derived from the result of “Clean Lake Studies” or other site-specific investigations performed by an agency of competent authority or a designee.

In cases where toxicity may be a concern due to the parameter in question, toxicity testing using two different species is required. Such testing should comply with the procedures detailed in OAC 252:690 and guidance found in OWRB technical report TRWQ2002-1 (*Guidance Document for the Development of Site-Specific Water Quality Criteria for Metals*). Exceptions to or deviations from these protocols should be brought to the attention of the OWRB and permitting authority prior to completion of the testing and thoroughly detailed in the final report.

H. Site-specific Criteria for Nutrients Which Have Been Developed for Particular Waterbodies

(reserved)

I. Site-specific Criteria for Other Parameters Which Have Been Developed for Particular Waterbodies

- 1. American Electric Power discharge to a tributary of Nine Mile Creek and Nine Mile Creek upstream of the confluence with East Cache Creek at Section 4, T 1 S, R 11 WIM, Comanche County.**

A site-specific mineral study has been satisfactorily completed on these waterbodies indicating that the actual agricultural uses of the waterbody are capable of tolerating more mineral input than currently allowed by the default values in Appendix F for segment 311300. The following criteria are allowed for the protection of the actual agricultural usage of the water.

	Total Dissolved Solids	Sulfate	Chloride
Yearly mean standard (mg/L)	1680	338	499
Sample standard (mg/L)	2100	423	624