

# OBTAINING RELIEF UNDER NEW KDHE RULES

by John C. Hall

## INTRODUCTION

Over the past four years many communities have received more restrictive NPDES permit requirements as a result of stringent standards and permit development procedures adopted by the Kansas Department of Health & Environment (KDHE) in 1995. These more stringent requirements have caused the expenditure of millions of local dollars. The League of Kansas Municipalities has recently been successful in fostering changes to the state water quality standards and implementation policies which will provide significant relief to many communities. In part, obtaining this relief will be contingent upon development of site-specific information and filing requests for permit modification. The following briefly describes the significant changes to the state rules and the types of information necessary to obtain relief.

## AMMONIA CRITERIA

Prior to the recent amendments to the KDHE water quality standards for ammonia, facilities were required to achieve very stringent in-stream standards for total ammonia (as nitrogen). The previous chronic ammonia standard was applied as a 7-day average and used to set stringent limits on a year-round basis.

Meeting these limitations in the winter was particularly difficult and costly. The permit limitation for ammonia was derived using the 7/Q/10 design flow (e.g., the minimum annual 7-day average flow with an expected return frequency of once in 10 years), and no consideration was given to seasonal variation in stream flows that could allow for less stringent limitations. Depending upon the dilution flow available, it was not unusual for this procedure to yield monthly average effluent limits of 2.0 - 3.0 mg/l (total ammonia as nitrogen).

The ammonia water quality standards adopted in 1999 by KDHE are less restrictive than the prior standards in a number of respects:

- At lower and higher pH values the criteria are less restrictive.
- A 30-day averaging period and 30/Q/10 flow is used to calculate limits.
- When fish spawning is not occurring (e.g., late fall and winter) the criteria may be three times less restrictive.

The new standard follows EPA's recent update of the national water quality criteria for ammonia. The allowance for more dilution (30/Q/10 vs. 7/Q/10) and a less restrictive standard when early life stages of fish are not expected to be present in the receiving stream significantly increases the allowable ammonia discharge. The 30-day

averaging period also affects the allowable mixing zone in that chronic impacts must be considered as a 30-day average exposure. Reduced mixing zones previously employed by KDHE on many streams, corresponding to exposure periods of less than one day, are not relevant to the 30-day average chronic criteria. However, in order to take advantage of the winter criteria adjustment, permittees must present site-specific data on fishery spawning times.

## SEASONAL STREAM DESIGN FLOWS

As discussed above, a single worst case annual 7/Q/10 flow previously served as the basis for calculating permit limitations. In addition to application of a 30-day low flow regime, the new rule authorizes the use of seasonal stream flows to develop seasonally-based ammonia limits (as opposed to a single annual low flow applicable to all seasons). The seasonal periods requested by the permittee should generally follow from a consideration of temperature and precipitation changes anticipated throughout the year and how these affect the appropriate standard, dilution flow, and plant performance.

A four season analysis will often be appropriate as for many Kansas streams, winter and spring flows are considerably higher than summer/fall low flows. Consideration of seasonal flows allows an increased dilution factor to be used to set higher permit limits during the period when attainment of stringent limits would be most difficult and costly to achieve.

## MIXING ZONES

Prior to the adoption of the revised water quality standards by KDHE, mixing zones were restricted depending upon the amount of dilution that was available and the stream designation. For example, if the ratio of the effluent flow to the low stream flow was less than

3:1 for a special aquatic life designated stream, mixing with 100% of the stream flow was allowed. However, if the available dilution flow exceeded 3:1, mixing to achieve compliance with the chronic ammonia standard was limited to 25% of the stream flow, and mixing for compliance with the acute standard was limited to 10% of the chronic mixing flow (*i.e.*, 2.5% of the stream flow). The extent of the mixing zone was also limited to 300 meters.

With the revised regulations, the chronic mixing flow may be increased up to 100% of the low stream flow provided that a "zone of passage" is ensured (typically an acute toxicity concern). The 300 meter mixing zone limitation may also be extended provided that the permittee demonstrates no adverse impact to resident aquatic life from the extended zone. Either of these two cases must be supported by site-specific data showing that complete mixing occurs and an expanded zone will not impair special aquatic life or other species of concern. Depending upon the stream designation and discharge circumstances, the level of technical analysis required to support a modified mixing zone will vary.

## PROCEDURES FOR OBTAINING RELIEF

As discussed above, significant relief on water quality-based ammonia limits may be obtained under the revised KDHE water quality standards and permit derivation procedures. Use of a 30/Q/10 flow and 30-day permit limits will be automatic; however, significant relief through seasonal flows, winter criteria adjustments and expanded mixing zones can only be obtained if site-specific analysis and data supporting the relaxed limitations is developed by the permittee. The following outlines the type of information that may be required.

### 1. Seasonal Ammonia Standards

The winter ammonia standards can be relaxed by a factor of 3, which translates into a 200% increase in the allowable effluent ammonia concentration, if

site-specific data are developed to demonstrate that early life stages of fish are not present during the "winter" period. [Note: "winter" can be defined as that period when early life stages of fish are not present. It is not limited to specific months of the year.] It is the responsibility of the discharger to make this demonstration through identification of fish species expected to inhabit the receiving stream and characterization of the spawning period for such species. This information is available from the Department of Natural Resources and through local universities.

### 2. Seasonal Flow Adjustment

Seasonal effluent limits can be significantly relaxed if seasonal periods are identified and the in-stream seasonal design low flow is determined. Generally, the seasonal periods should be defined to correspond with biological conditions (*i.e.*, no early life stages present), flow conditions (*i.e.*, group consecutive high flow months with similar biological conditions), and treatment capability (*i.e.*, ability to achieve specific effluent concentrations).

The discharger should begin this process by calculating 30/Q/10 flows for each month, using the available flow record as the basis for establishing the low flow condition. After the low flows are identified, seasonal groupings should be evaluated against likely effluent limits and compliance expectations.

### 3. Justification for Expanded Mixing Zones

Expanded mixing zones may be allowed provided that the effluent mixes rapidly with the receiving water, a zone of passage is maintained, and environmentally sensitive organisms will not be adversely impacted by the

expanded zone. This analysis is only necessary if the ratio of the seasonal receiving water low flow to the design effluent flow is greater than 3:1. [Below 3:1, KDHE assumes that 100% mixing occurs. If acute toxicity is an issue, an analysis may be needed to justify an extended zone of initial dilution.]

Where an expanded mixing zone is sought, the discharger must demonstrate that the additional dilution occurs within the longitudinal extent of the mixing zone (*e.g.*, 300 meters). This demonstration may be made through modeling and/or field investigation. If the receiving water is designated for special aquatic life, an investigation as to whether the special aquatic life will be affected by the expanded mixing zone will be required. This investigation may consider habitat requirements and the presence of those habitats within the expanded mixing zone, a field investigation to determine whether the special aquatic life are supported in the area, and an evaluation of the sensitivity of the special aquatic life to ammonia (*i.e.*, sensitive or resistant).

If the mixing zone is projected to extend beyond 300 meters, the permittee will need to provide justification demonstrating that an extended longitudinal zone will not cause adverse environmental impacts. In most cases, this justification will take the form of a time weighted average exposure analysis and field impacts study.

## CASE STUDY

An example of the potential for permit relief is presented below for the City

<b>AMMONIA LIMITATIONS FOR INDEPENDENCE (MG/L)</b>				
<b>Regulatory Basis</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>
Old Rules	2.7	2.3	2.1	2.3
New Rules	53	37	12	39

of Independence. Prior to the adoption of the revised water quality standards, KDHE developed seasonal ammonia limits for the City. The City conducted a preliminary review of the amount of relief that could be obtained if all of the site-specific factors contained in the new rules were utilized. Revised ammonia limits were calculated using the updated water quality standards with site specific adjustments for river flow, ammonia standards absent early life stages (fall and winter), and an allowance for enhanced mixing. A comparison of these limits is summarized on the table on page 231.

The revised limits represent a situation in which little additional treatment is necessary for compliance compared to the original limits. In addition, the ability of the facility to achieve reliable compliance is greatly enhanced as stringent winter/spring limitations should not apply. In most instances, it should be expected that significant relaxation of stringent winter limitations will be allowed, because few fish spawn during this period. Thus, a factor of 3 multiplier should be allowed for most communities. As winter ammonia limits are often the factor controlling plant capacity, establishing less restrictive winter limits may allow for re-rating of plant capacity, saving construction costs related to growth.

## SUMMARY

The recent modifications to state rules affords municipalities an opportunity to obtain more cost-effective and appropriate NPDES permit requirements, particularly for ammonia. Obtaining relief will require some effort on behalf of the regulated community. However, given the costs of construction and potential enforcement liabilities involved, the benefits to be achieved are well worth the expenditure in local resources.

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# League Annual Conference Schedule of Events

SATURDAY, OCTOBER 2	
10:00 - 6:00 pm	KMIT Golf Tournament (De Soto, KS)
2:00 - 5:00 pm	MLA Workshop (Marriott)
6:00 - 8:00 pm	Early Bird Reception (Doubletree)
SUNDAY, OCTOBER 3	
10:00 - 5:00 pm	Registration (Doubletree - Tucson Room)
10:30 - 11:30 am	City Clerks and Municipal Finance Officers Meeting (Doubletree)
11:30 - 12:30 pm	Lunch Buffet / Trade Show (Doubletree)
12:30 - 2:00 pm	General Session (Doubletree)
2:00 - 2:30 pm	Nominating Committee Meeting (Doubletree)
2:30 - 4:00 pm	Municipal Practice Roundtables (Marriott)
4:00 - 4:30 pm	League Governing Body Meeting (Marriott)
4:00 - 5:00 pm	Sister Cities Exchange Meeting (Marriott)
4:00 - 5:00 pm	Break / Trade Show (Marriott)
4:30 - 5:00 pm	Nominating Committee Meeting (Marriott)
5:00 - 7:00 pm	Evening Social Event — A Night at Nordstrom
MONDAY, OCTOBER 4	
7:30 - 5:00 pm	Registration (Doubletree - Tucson Room)
7:30 - 8:30 am	KMIT Breakfast and Annual Meeting (Doubletree)
7:30 - 8:30 am	Kansas Ready Mixed Breakfast (Marriott)
8:00 - 9:00 am	Trade Show (Doubletree and Marriott)
9:00 - 10:15 am	"The Future of Kansas Youth" Forum (Doubletree)
10:30 - 11:30 am	General Session (Doubletree)
12:00 - 1:30 pm	Awards Luncheon (Marriott)
1:45 - 2:45 pm	Workshops (Marriott)
2:00 - 3:00 pm	Kansas Human Resources Meeting (Doubletree)
3:00 - 4:00 pm	Workshops (Marriott)
4:00 - 5:00 pm	Break / Trade Show (Marriott)
4:15 - 5:30 pm	Kansas Human Relations Association Meeting (Marriott)
6:00 - 11:00 pm	Evening Social Event — Santa Fe Jamboree
TUESDAY, OCTOBER 5	
7:30 - 10:00 am	Registration (Doubletree - Tucson Room)
7:30 - 8:30 am	Municipal Association Breakfasts (Marriott)
8:30 - 4:30 am	City Attorneys' Meeting (Doubletree)
9:00 - 10:30 am	General Session (Doubletree)
10:45 - 11:30 am	Convention of Voting Delegates (Doubletree)
11:30 - 12:30 pm	League Governing Body Meeting and Lunch (Doubletree)
Noon	Conference Adjourns