BEFORE THE ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY

In the Matter of: NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FOR CITY OF FAYETTEVILLE, ARKANSAS NPDES Permit No. AR00200710	*	NPDES Appeal No. 88-1

DECISION ON REMAND

This matter is before me on a Remand issued by the Judicial Officer on the basis that in my Initial Decision, previously issued, I utilized the wrong standard in deciding the case. The Judicial Officer ruled that use of an "undue impact" and "de minimus" standard was improper under the terms of the Clean Water Act. The Judicial Officer also instructed me as follows:

> "Applying the proper standard on remand, the ALJ should decide whether the permit will result in a detectable violation of the applicable water quality standards. Due to the conflicting testimony in this case, it is important for the ALJ to provide detailed findings. The ALJ should identify which applicable water quality standards, if any, would be violated by the permitted discharge. At a minimum, the ALJ should expressly determine whether the permit must be conditioned to prevent water quality standard violations during periods of low flow. Cf. Transcript pp. 369, 432-33, 702-03. He should also explicitly decide whether nitrogen and phosphorous in the discharge will measurably degrade Oklahoma water quality. If so, he should also consider whether any conditions can be added to the permit to protect Oklahoma's water quality standards."

There is also before me a Motion filed on behalf of STIR seeking Reconsideration and Reopening the Evidentiary Hearing. This Motion is DENIED because its attempts to explore the issue of plant technology and operation which was excluded from this proceeding by the Court in a Pre-Hearing Order which was upheld by the Judicial Officer at page 9 of his Order. Additionally, the Rules of Practice applicable to these proceedings make no provision for such relief. (See Footnote No. 5 of the Judicial Officer's Order.)

Although not wishing to engage in a battle of semantics with the Judicial Officer, my notion of the use of the de minimus principal is in accord with his position on the proper standard to be used in reviewing the record in this matter, "i.e., an infinitestimal impairment perdicted by modeling but not expected to be actually detectable or measurable."

Before discussing the question of whether or not any Oklahoma standard will be violated when the treatment plant comes on line, it is necessary to address several legal threshold issues proffered by the Arkansas parties.

The first question presented is which of Oklahoma's water quality standards apply to this case. The Arkansas parties argue that the 1982 standards should apply. In support of this position they say that the facility was designed, tested and built to meet the 1982 standards and it would not be proper or fair to now decide that the 1985 standards must be met. They argue that the permit was issued based upon compliance with the 1982 standards, which were the only ones in effect, and in fact the 1985 standards were only approved after the hearing in this matter had been proceeding for several months. No authority to support this position was provided, relying instead on basic notions of equity and fairness. Although I sympathize with the equitable argument proffered, I am of the opinion that

the facility must meet the water quality standards in effect at the time of the commencement of its operation, i.e., the 1985 standards.

The Arkansas parties also contend that the Oklahoma "beneficial use" or "new source" standard does not and cannot apply to a discharge in the state of Arkansas. They argue that any other construction would be contrary to the plain meaning of the Oklahoma water quality standards (W.Q.S.). In support of this position they direct my attention to the definition of "waters of the State of Oklahoma" contained in Section 2 of the 1982 and 1985 W.Q.S. which states that such waters are defined as "[A]ll streams, lakes . . . and all other bodies or accumulations of water which are contained within, flow through, or border upon this State or any portion thereof . . ." (emphasis supplied). Based upon this definition they contend that the standards are only applicable to waters within the State of Oklahoma and cannot apply to a new point discharge into tributaries such as Mud Creek and Clear Creek which are not contained within, flow through, or border the State of Oklahoma.

They argue that to allow such standards to apply to a discharge in the State of Arkansas would violate the Clean Water Act (CWA) for two reasons. First, the Act requires all states to adopt W.Q.S. applicable to intrastate waters. (33 U.S.C. § 1313(3)(A)) Citing this authority they say that Oklahoma has no authority to enact W.Q.S. that apply to waters outside the State of Oklahoma. Second, under the CWA, affected states may not establish a separate permit system to regulate an out-of-state source, but may only establish a permit system for waters within its jurisdiction, (33 U.S.C. § 1342(b)); State v. Champion International Corp., 709 S.W. 2d 569 (Tenn. 1986). They then argue that to allow the State of Oklahoma to impose its "no new point source

discharge" standard on a discharge in another state is, in effect, allowing the State of Oklahoma to establish a separate permitting system for discharges in another state, a position contrary to the intent and purposes of the CWA.

The Arkansas parties also argue that a plain reading of the 1985 Beneficial Use Limitation is inapplicable to the Fayetteville discharge. That section states that:

> "All streams and bodies of water designated as (a) in Appendix A are protected by prohibition of any new point source discharge which increases pollutant loading or increased load from an existing point source. All stream segments designated in Appendix A as "scenic river" and the tributaries of those stream segments are designated as (a). . ." (Section 7.11. 1985 W.Q.S.)

They contend that since the tributaries into which Fayetteville proposes to discharge are not located in the State of Oklahoma, that the standard does not on its face apply to a point source that originates in another state.

As to the CWA arguments, supra, I am of the opinion that they must fail. It is clear that an out-of-state source must meet the W.Q.S. of another down-river state. See § 401(a)(2) of the CWA; 40 C.F.R. §§ 122.4(D) and 122.44(d)(4); International Paper Co. v. Ouellette, 93 L.Ed. 883 (1987). Therefore the Fayetteville discharge must meet Oklahoma's W.Q.S. as they exist at the border of the two states. I further find that such W.Q.S. do not amount to an attempt to establish a separate system for out-of-state sources since they apply equally to Oklahoma sources. No separate standards applying only to out-of-state sources has been established by Oklahoma.

As to the Arkansas parties argument that the Beneficial Use Limitations do not apply to the Fayetteville discharge, it too must be rejected. To accept such an argument would violate the principals set out above since it is premised

on the notion that such standards only apply to sources located in the State of Oklahoma. There is no factual issue among the parties that the Illinois River at the border of the two states is a Class (A) River and therefore the standards applicable to pollution crossing that border must comply with Oklahoma's W.Q.S. as they exist at that point. Any other interpretation would allow a source to locate its discharge just across the line in Arkansas and freely violate the Oklahoma standards. Such a result is contrary to the above-cited statutes, regulations and Court decisions.

I will now address the issue as to whether or not the Fayetteville discharge will violate the relevant Oklahoma standards using the interpretation mandated by the Judicial Officer's Remand.

The 1985 Beneficial Use Limitation, cited above, does not define "Pollutant Loading" but the O.W.Q.S. do define "Pollution" as follows:

> "Contamination or other alteration of the physical, chemical or biologicial properties of any natural waters of the State, or such discharge of any liquid, gaseous or solid substance into any waters of the State as will or is likely to create a nuisance or render such waters harmful or detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life. (82 O.S. 1981, section 926.1(1).)"

Using this definition, the Oklahoma parties must show by substantial evidence that the City's discharge will create a nuisance or render the Illinois River in Oklahoma harmful, detremental or injurious to any beneficial use of the river. I will now inspect the various W.Q.S. to determine if the City's discharge will cause the 1985 Beneficial Use Limitation to be violated.

NUTRIENTS

Section 7.10(b) of the Oklahoma W.Q.S. provides that:

> "[T]he total phosphorus concentration and the nitrogen/phosphorus concentration ratio will not be increased to levels which result in man induced eutrophication problems."

Nutrients are defined as "[e]lements of compounds essential as raw materials for organisms growth and development; these include carbon, oxygen, nitrogen and phosphorus."

Eutrophication is defined as:

> "[T]he normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a terrestrial state. During eutrophication the lake becomes so rich in nutritive compounds (especially nitrogen and phosphorus) that algae and other microscopic plant life become superabundant, thereby "chocking" the lake, and causing the lake to advance in serial stages."

It is therefore apparent that the W.Q.S. require a showing that the increases in phosphorus concentrations and phosphorus/nitrogen ratios attributable to the City's discharge will cause eutrophication problems in lakes located in Oklahoma. In this case we are only concerned with Lake Francis and Lake Tenkiller and not with free flowing streams in Oklahoma.

The new plant in Fayetteville is required by the permit at issue here to limit its discharge of phosphorus to one milligram per liter per day. Based upon the average daily flow of the plant of 7.0 mgd its discharge to Mud Creek will be 3.5 mgd when it comes on line and at design capacity in the year 2005 it will release 6 mgd into Mud Creek.

The Arkansas parties argue with some vigor that the Oklahoma witnesses have not taken into account the additional reduction in phosphorus discharges into tributaries of the Illinois River by some cities in Arkansas which are in the process of constructing new sewage treatment plants. They conclude that at the present, without the proposed Fayetteville discharge, approximately 750 lbs. per day of phosphorus is discharged by Arkansas entities into the Illinois River basin. The sources are the cities of Springdale, Rogers and Siloam Springs in Arkansas. When the Fayetteville plant comes on line it will contribute 30 lbs/day of phosphorus and in the year 2005, 55 lbs/day. They say that the record reflects that when all of the new plants come on line there will be a 54% reduction of total phosphorus loading to the Illinois River basin (Arkansas ex. No. 1, pp. 5 - 6; Arkansas ex. No. 4, p. 8). They argue that, in view of these large reductions in nutrients, there cannot be any measurable eutrophication in Lake Francis or further downstream in Lake Tenkiller. They argue that since the Oklahoma nutrient standard only prohibits <u>increases</u> on total nutrients that will then cause eutrophication in lakes, there can be no violation of the nutrient standard because of the 54% decrease in nutrients entering the River system. I will address this argument later.

The Arkansas parties also argue that the standard will not be violated due to the assimilation of nutrients both above and below Lake Francis. The 1985 O.W.Q.S. define assimilation as "[T]he amount of pollution a stream can receive and still maintain the W.Q.S. designated for that stream." (Oklahoma ex. No. 6, p. 95). The mechanisms that are involved in the assimilation process are found at pp. 308 and 319 of the Transcript.

The argue that the increase in flow to the River system resulting from the City's discharge will increase the assimilative capacity of the system

by enlarging the ecosystem. The record reflects that this phenomenon is most effective at periods of low flow in the involved rivers and creeks. (p. 309 Transcript). Since low flows tend to occur during the summer months when the growth of algae are of the most concern, the assimilative processes is at its most effective stage and therefore removes more nutrients upon which the algae feed before they reach the Oklahoma border. Of the total nutrients contained in the Fayetteville discharge, it is estimated that only 20-25% would be available by the time it reaches the Oklahoma border (pp. 311-312 Transcript). Therefore of the approximately 30 lbs. of phosphorus released, only 6 lbs/day would be bio-available to organisms over the Oklahoma border.

Other studies reinforce the existence and magnitude of the assimilative capacity of the River system in Arkansas prior to reaching the border with Oklahoma. The ADPC and E modeling shows a 70 to 75% reductions in phosphorus in the River basin system prior to the Oklahoma border. (Arkansas ex. No 4, p. 8; p. 315 of Transcript). Dr. Thompson testified that the addition of Fayetteville's effluent would only increase the total phosphorus loading to Lake Francis by 2.4%. (Fayetteville ex. No. 3, p. 2). The record also reflects a substantial amount of assimilation in the 50 mile stretch of the Illinois River between Lake Francis and Lake Tenkiller. A survey of this River portion done by Oklahoma for the years 1975-1977 reflect an 80% reduction of phosphorus and a 70% reduction in nitrogen between these two points.

There is a lack of substantial evidence to support the notion that the small increases in phosphorus or the nitrogen/phosphorus ratios would result in an increase in eutrophication of the lakes involved.

Page 369 of the Transcript, to which the Court's attention was directed by the Chief Judicial Officer (CJO), involves the testimony of Dr. Threlkeld, an Oklahoma expert witness, wherein he postulates that it would be theoretically possible to measure the 30% increase in phosphorus loading to Lake Francis caused by the City's discharge. In my opinion, mere theoretical measurements alone do not constitute proof and in any event Dr. Threlkeld could not testify that this increase would increase the levels of euthrophication of the Lake presently occurring. The same is true as to the testimony of Dr. Schornick, another Oklahoma expert, which appears on pages 432-33 of the Transcript. This testimony is flawed for two reasons. Firstly, it is based upon an assumption that the treatment plant will release water containing a 1.8 mpd of phosphorus which is almost twice the amount mandated by the permit, i.e., 1 mpd. Secondly, the witness in testifying that it would be possible to measure this inflated amount of phosphorus, testified on page 433 that under both low and high flow scenarios such measurement amounted to mere "speculation" on his part. I am therefore of the opinion to assign no substantial weight to this testimony. Additionally, Dr. Schornick could not testify that the minute increases involved would violate the Oklahoma W.Q.S. by causing an increase in man-induced eutorphication in the Lake. I am of the opinion that the mere likelihood of being able to measure a difference alone is insufficient to show a violation absent a showing that such increases will cause increased eutrophication.

The Court's attention is also directed to the testimony of Dr. Walker, appearing on pages 702-703 of the Transcript. In this portion, Dr. Walker testifies that one could not measure the increases in phosphorus which his modeling perdicted. He did however say that one could measure an increase

in nitrogen. The increase which he spectulated would occur, allowing for a 50% assimilation rate, was 300 parts per billion, clearly a minute change. Dr. Walker then ventured into areas outside of his field of expertise by positing that this would violate the Oklahoma W.Q.S. since it demonstrated a measurable increase. As I indicated earlier, a mere measurable increase alone is not sufficient to cause a violation of the standard. This notion is reinforced by Dr. Walker's earlier testimony at pp. 692-93 of the Transcript wherein he testified that such increases would not cause a change in algae growth, taste, odor or turbitidy. Another problem with Dr. Walker's testimony is that the parameter which he said could be measured was nitrogen and not phosphorus. The record reflects that it is phosphorus availability and not nitrogen which controls the algae growth in the River system. See the testimony of Dr. Gakstatter and the intensive survey of the Illinois River (1985). Dr. Gakstatter was not cross-examined by the Oklahoma parties and his testimony was unrefuted by other witnesses.

Dr. Schornick was of the opinion that Lake Francis no longer acts as a nutrient trap (Transcript pp. 423-24). However, the data and reports included in his testimony indicate (1) that there is a substantial decrease in phosphorus above as compared to immediately below Lake Francis and (2) that in the 55 mile stretch of River from Lake Francis to Lake Tenkiller, additional assimilation of phosphorus takes place at a substantial rate. On cross-examination Dr. Schornick admitted that all of the phosphorus below Lake Francis would be assimilated out by the time it reached Lake Tenkiller (Transcript pp. 466-67).

Dr. Walker's testimony on the increase in phosphorus in Oklahoma resulting from the Fayetteville discharge are flawed because he failed to

take into account any assimulation thereof either in Arkansas or Oklahoma. Additionally, Dr. Walker's Basin Wide Mass Balance Calculations in Tables 5, 6 & 7 are based upon the output of the plant in the 20 year design flow in 2005 and do not apply to the year the permit actually goes on line. Although the Arkansas parties did not specify when the new treatment plants at the three Arkansas cities will come on stream, the implication was that it would be imminent. There is no doubt however that they will be on line by the year 2005 and none of the Oklahoma witnesses took into account the large phosphorus reductions associated therewith in their calculations. Based upon Dr. Walker's own figures which did not take into account any assimulation or reduction in loadings after 1988, as noted above, he was unable to testify, without qualification, that there would be any measurable violation of Oklahoma's W.Q.S. as they relate to nutrients.

The small percentage increases which Dr. Walker perdicted would occur, would, according to Dr. Gakstatter, be obscured by natural variations and users of the river will perceive no difference in water quality after Fayetteville begins discharging.

I am therefore of the opinion that based upon consideration of the entire record the discharge of the City of Fayetteville will not cause a violation of the Oklahoma W.Q.S. as they relate to nutrients during either high or low flow River conditions.

AESTHETICS

Section 7.10 of the Oklahoma 1985 W.Q.S. defines the Beneficial Use of Aesthetics as follows:

> "[t]o be aesthetically enjoyable, the waters of the State must be free from floating materials and suspended substances that produce objectionable color

> and turbidity. The waters must also be free from noxious odors and tastes, and from materials that settle to form objectionable deposits, and discharges that produce undesirable or nuisance aquatic life."

Section 7.10(a) of the 1985 W.Q.S. provides as to color that:

> "waters of the State shall be virtually free from all coloring materials which produce an aesthetically unpleasant appearance. Color producing substances, from other than natural sources, shall be limited to concentrations equivalent to 70 color units."

Section 4.10(b) of the 1982 O.W.Q.S. Turbidity, under the beneficial use of aesthetics, provides:

> "[t]urbidity from other than natural sources shall be restricted to not exceed the following numerical limits:
>
> (1) Warm Water Streams--50 Nephelometric Turbidity Units.
>
> (2) Warm Water Lakes----25 Nephelometric Turbidity Units.
>
> (3) Cold Water Streams--10 Nephelometric Turbidity Units.
>
> In waters where background turbidity exceeds these values, turbidity from point sources shall be restricted to not exceed ambient levels. Unless due to purely natural or non-man induced conditions the turbidity levels may reasonably be expected to decrease as management of man induced nonpoint sources occur. These nuumberrs apply to normal stream flow conditions with turbidity levels up to seven days after high flow event to be decided on a case by case basis."

(Oklahoma Ex. No. 6(a), p. 10, section 4.10(a), 1982 O.W.Q.S.).

Under the 1985 O.W.Q.S., the section Turbidity has been moved from the beneficial use of Aesthetics to the beneficial use of Fish and Wildlife Propagation and renumbered as section 7.3(m). The only substantial changes in the

section is that Cold Water Streams with the numerical limit of 10 Nephelometric Turbidity Units, states that those streams are the ones designated as smallmouth bass fisheries or trout fisheries. (Oklahoma Ex. No. 6, p. 19, section 7.3(m), 1985 O.W.Q.S.).

Section 7.10(c) of the 1985 W.Q.S. define the Beneficial Use of Solids as follows:

> "[t]he waters of the State shall be maintained so as to be essentially free of floating debris, bottom deposits, scum, foam and other materials, including suspended substances of a persistent nature, from other than a natural source".

Section 7.10(d) of the 1985 W.Q.S. for the Beneficial Use of Taste and Odor provides:

> "[t]aste and odor producing substances from other than natural origin shall be limited to concentrations that will not interfere with the production of a potable water supply by modern treatment methods or produce abnormal flavors, colors, tastes and odors in fish flesh or other edible wildlife or result in offensive odors in the vicinity of the water, or otherwise interfere with beneficial uses.

My reading of the record shows that the only compound of the City's discharge that would result in a violation of the above-quoted standards is nutrients. Since I have already concluded that the nutrient standard is not violated, it logically follows that the aesthetic standards will also not be violated.

The testimony of both the Oklahoma and Arkansas experts appear to demonstrate that no discerniable violation of these aesthetic standards will occur because of the City's discharge.

The testimony of Dr. Walker, Oklahoma's primary expert witness, shows, as quoted above, that there will be no change in terms of algae growth, taste, odor and turbidity.

Dr. Gakstatter, whose testimony was not subjected to cross by the Oklahoma parties, testified that recreational users of the River basin would not be able to discern any change in the above cited standards. He also testified that any observable changes down stream from Lake Francis, to the extent they might be discerned, are caused by naturally occurring clay sediments in the Lake being re-entrained in the water column due to water flow and that such naturally occurring problems would clearly obscure any effects of the City's discharge (1985 intensive survey of the Illinois River in Arkansas and Oklahoma pp. 64-65; Transcript p. 681).

Dr. Cliff Thompson was also of the opinion that the City's discharge would not violate the Beneficial Uses of the River and there was no reason to believe that such discharge would violate the above-mentioned aesthetic standards or that there would be a measurable impact on any such parameters (pp. 255-56, 284, 287, 246-47, 282 of the Transcript).

The Oklahoma State Department of Health wrote in Fayetteville ex. no. 4, that there would be no noticeable impact on water quality in the Illinois River because the level of treatment at the City's plant was equivalent to the most thorough and complete treatment available.

Although Dr. Walker, in his pre-filed testimony, was of the opinion that the City's discharge would increase the spatial and temporal violation frequencies of the nutrient, dissolved oxygen, turbidity and solids water quality standards in Oklahoma, the data associated with such testimony did not support these conclusions. (Oklahoma ex. No. 8, p. 1 summary). These conclusions were also not deemed to be correct in the opinion of Dr. Gakstatter, who testified that although such assessments by Dr. Walker might be <u>theoretically</u> correct,

from a practical stand point it would be difficult, if not impossible, to sufficiently demonstrate increased violation frequency due to the City's discharge (EPA ex. No. 4, p. 2).

Figure 21 of Dr. Walker's testimony, which contains bar graphs showing the predicted changes associated with the City's discharge show little or no change in the parameters involved and would, in any case, be obscured by naturally occurring variations (Gakstatter testimony p. 2). In addition, Dr. Walker, on cross-examination, testified that theses predicted changes could not be percieved or measured (pp. 689 & 711, Transcript). This is true for low and average River flow conditions (p. 613, Transcript). If an aesthetic change cannot be seen or measured, there can be no violation.

The same conclusions apply to Dr. Schornick's testimony. His testimony, in this regard, suffered the same flaws as pointed out above under the discussions regarding nutrients. Dr. Schornick was of the invalid opinion that if theoretically measured increases existed they would automatically constitute violations of the W.Q.S., even if such changes in aesthetic parameters couldn't normally be measured or seen. (PP. 481-82, Transcript). This was not consistent with his opinion that if narrative standards, such as those under discussion here, couldn't be measured because they weren't observable to the human eye they would not cause a violation of the W.Q.S. (p. 482, Transcript). For these reasons as well as those discussed earlier, I am of the opinion that Dr. Schornick's testimony should be accorded little or no weight.

Based upon the record, in its entirety, I am of the opinion that the discharge from the City of Fayetteville will not cause a violation of the various aesthetic components, herein defined, in the State of Oklahoma.

DISSOLVED OXYGEN

The 1985 W.Q.S. on dissolved oxygen, under the Beneficial Use of Fish and Wildlife Propagation appears in section 7.3(a) and states as follows:

> "Dissolved oxygen (D) criteria are designed to protect the diverse fisheries of Oklahoma. Allowable loadings defined in Appendix I are designed to attain these criteria. Except for naturally occurring conditions, the dissolved oxygen criteria are as follows (Oklahoma Ex. 6, pp. 9-10, section 7.3(a) 1985 O.W.Q.S.):

Fishery Class	Date Applicable	D.O. Criteria (Minimum) (mg/L)	Seasonal Temp. 1 (C)
Secondary Warm Water Fishery			
Early Life Stages	April 1-June 15	4.0	25*
Other Life Stages			
Summer Conditions	June 16-Oct. 15	3.0	32
Winter Conditions	Oct. 16-March 31	3.0	18
Primary Warm Water Fishery			
Early Life Stages	April 1-June 15	6.0+	25*
Other Life Stages			
Summer Conditions	June 16-Oct. 15	5.0+	32
Winter Conditions	Oct. 16-March 31	5.0	18
Smallmouth Bass/Trout			
Early Life Stages	March 1-May 30	7.0+	22
Other Life Stages			
Summer Conditions	June 1-Oct. 15	6.0+	29
Winter Conditions	Oct. 16-Feb. 28	6.0	18

1 For use in calculation of the allowable load as defined in Appendix I.

+ Because of natural diurnal dissolved oxygen fluctuation, a 1.0 mg/L dissolved oxygen concentration deficit shall be allowed for not more than eight (8) hours during any twenty-four (24) hour period.

* Discharge limits necessary to meet summer conditions will apply from June 1 of each year.

Under the 1985 O.W.Q.S., the upper Illinois River above the 650 foot elevation level and the upper Illinois River from Tenkiller Dam, including Tenkiller Reservoir, to the 650 foot elevation level are both designated as Smallmouth Bass Fisheries, and require a minimum dissolved oxygen level of 7.0 between March 1, and May 30, and a minimum dissolved oxygen level of 6.0 during the remainder of the year. The lower Illinois River from the headwaters of Robert S. Kerr Reservoir to Tenkiller Dam have been designated as a Trout Fishery under the 1985 O.W.Q.S., requiring the same minimum dissolved oxygen levels as the segments of the river designated as Smallmouth Bass Fisheries. (Oklahoma Ex. No. 6, p. 36, 1985 O.W.Q.S.).

The Arkansas parties, on this issue, rely primarily on the Schornick report and Dr. Walker's testimony. Dr. Schornick's report, regarding dissolved oxygen, relies on increases in phosphorus and other nutrients as the reason for his belief that the City's discharge will violate such standards (PP. 3996-3997, Administrative Record). As discussed above, Dr. Schornick's testimony on nutrients is flawed and he admits on pp. 432-33 of the Transcript that he was "speculating" when he opined that the water quality standards would be violated in Oklahoma. I am therefore of the opinion that his testimony concerning dissolved oxygen are likewise flawed since they rely on increased nutrient levels as an indicator of said violations.

Dr. Walker's direct testimony regarding dissolved oxygen is based, in large measure, on the measurements he made in Lake Tenkiller, showing existing violations of the standards due to "intense algae photosynthesis" (PP. 12 - 13 of Prefiled Test).

Dr. Thompson testified that the oxygen assimilative capacity of Mud Creek and Clear Creek through which the effluent will run for about 16 miles, will protect the beneficial uses of the Illinois River.

The modeling done by the Arkansas Department of Pollution Control and Ecology (ADPC & E) demonstrate that not only will the effluent experience complete oxygen recovery by the time is reaches the Illinois River in Arkansas, but will act as an oxygen resource, actually adding oxygen to the River (PP. 258-59 Transcript). Appendix D of Arkansas's Ex. No. 3, shows, by modeling, that the minimum dissolved oxygen in the receiving stream of 6.1 mg/l for a discharge of 5/5/2 BOD5/TSS/NHB-N. At a discharge of 10/15/1.5, BOD5/TSS/NH3-N the model perdicts a minimum dissolved oxygen of 6.0 lb. These values will not violate Arkansas standards of 6 mg/L of dissolved oxygen in the receiving stream and will improve further down stream due to the high reareation and turbulance in the two creeks as they pass over the spillways and dams near the golf course. The modeling also shows that the dissolved oxygen would be completely recovered by the time the effluent reaches Clear Creek, which is upstream of that Creek's confluence with the Illinois River in Arkansas (Arkansas Ex. No. 4, p. 8).

These modeling results were reviewed by Garret Bondy of Region VI, EPA as to its technical adequacy and kinetic rates used. He testified that these factors were reasonable and would maintain dissolved oxygen standards in Mud Creek, Clear Creek and the Illinois River. Mr. Bondy also testified that approximately 35% of the discharged CBOD and less than 10% of the NBOD would reach the Illinois River in Arkansas and would have no significant impact on the River in Arkansas. He also stated that since the Oklahoma border is approximately 22 miles further down stream there would be even less impact on Lake Francis.

As to Dr. Schornick and Dr. Walker's testimony reelating phosphorus levels to dissolved oxygen limits, the record indicates that no correlation between these two parameters has been attempted or demonstrated in the Illinois River

system (Fayetteville Ex. No. 3, p. 2). As to Dr. Walker's concept that dissolved oxygen levels are reduced by photosynthesis of algae and periphyton, the opposite is true since oxygen is released, not added, by that action.

In view of the evidence showing complete oxygen recovery of the effluent in Arkansas some 37 miles upstream from the Oklahoma border, it is not possible for the City's effluent to violate the Oklahoma dissolved oxygen standards. This is particularly true in light of the fact that dissolved oxygen violations in Oklahoma are occurring without the City's discharge. I found no credible evidence to suggest that the frequency of these violations would increase due solely to the City's discharge.

METALS

Section 7.1(a) of the 1985 standards regarding metals is called Raw Water Numerical standards and states the criteria to be:

RAW WATER NUMERICAL LIMITS

PARAMETERS (MG/L)	NUMERICAL LIMIT
Inorganic Elements	
Arsenic	.10
Barium	1.0
Cadmium	.02
Chromium	.05
Copper	1.0
Cyanide	.2
Fluoride	1.6
Lead	.10
Mercury	.002
Nitrates (as N)	10.0
Selenium	.01
Silver	.05
Zinc	5.0
Organic Chemicals	
Benzide	.001
Detergents (total)	.2
Methylene blue active substances	.5
Phthalate esters	.003
2, 4-D	.1
2, 4, 5-TP Silvex	.01
Endrin	.0002
Lindane	.004
Methoxychlor	.1
Toxaphene	.005

The 1985 W.Q.S. for Toxic Substances under the Beneficial Use of Fish and Wildlife propagation found in section 7.3(h) provides for the Illinois River segment as follows:

Cadmium (Cd)	2.7 ug/L
Copper (Cu)	9.1 ug/L
Lead (Pb)	35 ug/L
Mercury (Hg)	1.1 ug/L
Nickle (Ni)	96 ug/L*
Silver (Ag)	1.7 ug/L
Zinc	127 ug/L

* A methodology to establish protective criteria for Nickel is being developed. Until further criteria are adopted the 1982 criteria for Nickel remain in effect.

STATEWIDE CRITERIA (ug/L)

Arsenic**	40 ug/L
Benzene	2,200 ug/L
Chromium	50 ug/L
Pentachlorophenol	1.4 ug/L
Selenium**	35 ug/L
Toluene	875 ug/L

** A methodology to establish protection criteria for Arsenic and Selenium is being developed. Until further criteria are adopted the 1982 criteria for Arsenic and Selenium remain in effect.

The City of Fayyetteville's pretreatment standards, which are more stringent than required by E.P.A., provides that the following concentrations may not be exceeded at the head works of the City's new plant:

Arsenic (As)	.05 m/l
Barium (Ba)	5.00 m/l
Boron (Bo)	1.00 m/l
Cadmium (Cd)	0.02 m/l
Chromium (Cr)	0.05 m/l
Copper (Cu)	0.02 m/l
Cyanide (Cn)	0.05 m/l
Lead (Ph)	0.10 m/l
Manganese (Mn)	0.50 m/l
Mercury (Hg)	0.002 m/l
Nickel (Ni)	0.08 m/l
Selenium (Se)	0.02 m/l
Silver (Ag)	0.01 m/l
Zinc (Zn)	0.05 m/l

> or other heavy metals or toxic materials, except by permit from the City specifying conditions of pretreatment, concentration, volumes, and other applicable provisions. (Fayetteville Ex. No. 2, p. 3).

These influent concentrations are equal to or more stringent than the 1985 Oklahoma W.Q.S. (Transcript P. 262). In 1986 the effluent from the City's old plant show the following for metals:

	Annual Average (mg/l)
Cadmium	0.010
Copper	0.0269
Chrome	0.0472
Lead	0.123

These levels are roughly equivalent to the 1985 Oklahoma W.Q.S.

According to Dr. Thompson, the new plant although not specifically designed to remove heavy metals, such removals will nevertheless increase due to its treatment process, to a level of approximately 50% compared to a level of 35% for the old plant (PP. 249-50, 283, 251, Transcript). When the above-quoted influent levels are decreased by 50%, the discharge of the new plant will not contain measurable concentrations of metals and thus will cause no change in these parameters in the Oklahoma segment of the Illinois River (PP. 252-53, Transcript). In addition to the metal removal inherent in the new plant's treatment system, the added flow to the River when it reaches the Oklahoma border will result in further reductions in concentration of these values (PP. 250-51, Transcript).

Based upon the record, in its entirety, I am of the opinion that the discharge from the new Fayetteville facility will not cause a violation of the Oklahoma W.Q.S. as they relate to toxics or metals.

The Chief Judicial Officer also asked that I suggest any changes to the City's permit which might result from my analysis of the record. I feel that

no changes are necessary since the permit already contains a mechanism for change should it be required, as follows:

> "d. Permit Modification.
>
> (1) A joint Arkansas/Oklahoma/EPA water quality study of the Illinois River Basin is currently being conducted to determine the existing water quality causative factors and possible nutrient control measures.
>
> (2) If the findings of this study indicate that more stringent limitations for Fayetteville's effluent are necessary to insure that water quality standards are met, then this permit will be modified to incorporate the more stringent limitations. This may require that additional treatment be provided or that the City's discharge to Mud Creek cease."

In my judgement, this section would apply to all river flow conditions and thus low flow situations need not be separately addressed.

CONCLUSION

Based upon the entire record, including my Determinations as to Witness Credibility and Demeanor, I am of the opinion that the NPDES Permit herein discussed, should be issued as written.

Date: September 19, 1988

Thomas B. Yost
Administrative Law Judge

CERTIFICATION OF SERVICE

I hereby certify that the original of the foregoing was served on the Regional Hearing Clerk, Region VI (service by first class U.S. mail); and that true and correct copies were served on counsel for Complainant and Respondent (service by certified mail return receipt requested). Dated in Atlanta, Georgia this 19th day of September, 1988.

Marsha P. Dryden
Secretary, Hon. Thomas B. Yost

HONORABLE THOMAS B. YOST
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