Division of Water Quality
Point Source Branch/NPDES Unit
June 5, 2001

MEMORANDUM

To: Tommy Stevens
Through: Coleen Sullins
Bill Reid
Dave Goodrich
From: Tom Belnick

Subject: NPDES Color Permitting Policy
Catawba River Basin Color Dischargers

This NPDES Color Permitting Policy addresses eight color dischargers in the South Fork Catawba River watershed (subbasins 030835 and 030836). The policy provides for a tiered permitting approach, ranging from color monitoring for facilities showing no color plume, up to color reduction limits for facilities exhibiting major color plumes and downstream aesthetic impacts.

Background. The South Fork Catawba River watershed was identified in previous basin plans as having a high concentration of textile dischargers, along with public concerns and complaints regarding color from such discharges. In August 1999 the Division met with selected color dischargers in the watershed to address the color issue. As a result of this meeting, eight color dischargers (Pharr Yarns, Delta Mills, Yorkshire, Cramerton, Lincolnton, Gastonia-Long Creek, Hickory, and Cherryville) elected to form the South Fork Catawba River Water Quality Alliance and undertake a comprehensive color monitoring study to identify current color problem areas in the watershed. The color monitoring was conducted twice per month from April through November 2000, and included color monitoring of effluent, upstream and downstream stations, as well as reference sites. The study included analytical color measurements (ADMI units), visual observations, and photographs. The study period included an extremely dry summer, and should represent worst case conditions. In addition, the study represents the most current assessment of color conditions in the watershed, given the changing nature of textile facilities across the state. The Alliance submitted individual reports to the Division for each sampling event, as well as a Final Color Study Report (AWARE Environmental, Inc., March 2001). One color discharger in the watershed (City of Newton) elected to evaluate color independently from the Alliance members, using similar monitoring protocols.

Color Regulation. According to state regulation [15A NCAC 02B.0211(3)(f)], colored effluent is allowed in "only such amounts as shall not render the waters injurious to public health, secondary recreation or to aquatic life and wildlife or adversely affect the palatability of fish, aesthetic quality or impair the waters for any designated uses." To date, there are no data to show that the colored effluent is posing a human health concern, or that color is a source of impact on the aquatic biota. Therefore, aesthetic concerns are the primary issue associated with the narrative color standard.

Data Evaluation. The evaluation of color as an aesthetic impact is difficult since it is a subjective determination. In addition, a host of factors, such as hue, instream turbidity, suspended matter, dilution, light conditions, and downstream access all play a part in determining when a color impact might be perceived by the public.

The ADMI method used to measure color quantitatively in the study takes into account the entire visible spectrum, and was originally developed to be related to visual perceptibility. During data review, it was realized that ADMI color measurements do not always predict the potential for a color impact. For example, a color plume with downstream aesthetic impact was observed at Cherryville on several sampling events, although the effluent ADMI color was low (summer average = 63 ADMI) and similar to upstream values. The plume was likely due to the particular hue of the effluent and the low instream dilution, rather than an absolute ADMI value. In this situation, consideration of a numerical instream ADMI color standard would be ineffective. However, requiring some percentage reduction in effluent color would help to minimize the size of the color plume. Conversely, some facilities with greater colored effluent (e.g., Pharr Yarns and Yorkshire with summer averages of 844 and 3449 ADMI units, respectively) did not produce major instream color plumes, most likely due to the effluent hue as well as the large dilution available. Therefore, in order to evaluate the data, it was realized that no single criterion, but rather a combination of ADMI measurements, photographs, and plume descriptions were needed to fully assess the instream color conditions.

Specific data utilized from the Final Color Study Report submitted by the Alliance included: 1) frequency of plumes observed at the outfall (**see Appendix A, Table 5-2**); 2) frequency of visual color change at the downstream station (**see Appendix A, Table 5-1**); and 3) statistical color difference between upstream and downstream stations during summer (**see Appendix A, Table 4-2**). The study reported that Pharr Yarns was the only facility that did not produce a color plume at the outfall at any time during the study, while for the remaining facilities, color plumes were reported observed at the outfalls from 60% to 100% of the time. The study also reported that visual changes in downstream color were observed at the following frequencies: Hickory (20%), Cherryville (60%), Delta Mills (87%), and 0% for the remaining facilities. Finally, the study reported the largest measured summer increases in ADMI color at the downstream station at the following facilities: Gastonia-Long Creek (23% increase), Hickory (31% increase), and Delta Mills (58% increase). Downstream stations were located between 0.5 to 2.5 miles below the outfalls, generally at accessible bridge locations. Thus, comparison of various downstream impacts must be made with this fact in mind.

The data from the report was supplemented with visual observations made by Division staff during an August 22, 2000 site visit to all outfalls and downstream stations. The consensus from the site visit was that significant color plumes were evident at outfalls from Delta Mills, Cherryville, Hickory, and Gastonia-Long Creek. These were not single incidents, as report photographs attest to their recurrence during the study. Color pictures of these plumes taken from various sampling dates are included in **Appendix A**. Color plumes at the other facility outfalls were either nonexistent or much less noticeable.

Tiered Classification. The NPDES Color Permitting Policy establishes four tiers of action based on varying aesthetic color impacts to the receiving waters. The tier groupings were based on the data reported in the Final Color Study Report, as well as field observations made by Division staff. The Tier 1 facility showed no visible color plume during the color study. Tier 2 facilities showed minor color plumes at the outfall and limited downstream color impact. Tier 3 facilities showed significant color plumes at the outfall and at times greater downstream

color impact. Finally, the Tier 4 facility showed significant plumes at the outfall and significant downstream color impacts. The data are summarized in **Table 1**.

It should be noted that Gastonia-Long Creek was originally placed in Tier 3 based on color study results. However, after the color study was completed, their major color discharger (Fleishman's Yeast) was removed, resulting in a Tier 2 re-ranking. Also, Cherryville is currently ranked as Tier 3 based on color study results, but is scheduled to lose their lone textile discharger in July 2001. After this color source is removed, Cherryville can request a re-ranking with subsequent reduction in permitting requirements.

TABLE 1- Tiered Classification

Tier	Facility	Frequency of Plumes Observed at Outfall[1] (n= 15 events)	Frequency of Visual Change at Downstream Station[2]	% Difference in Summer ADMI (Upstream to Downstream)[3]	Distance from Outfall to Downstream Station (miles)
1	Pharr Yarns (NC0004812)	0%	0%	-5%	0.59
2	Cramerton (NC0006033)	100% (n= 3)	0%	8%	1.6
	Lincolnton (NC0025496)	60%	0%	12%	2.0
	Yorkshire (NC0005274)	67%	0%	4%	2.56
	Gastonia-Long Creek[4] (NC0020184)	100%	0%	23%	0.53
3	Hickory (NC0040797)	100%	20%	31%	1.64
	Cherryville[5] (NC0044440)	100%	60%	-8%	1.57
4	Delta Mills (NC0006190)	100%	87%	58%	2.01

Footnotes:
1. Final Color Study Report, Table 5-2, AWARE Environmental Inc., March 2001.
2. Final Color Study Report, Table 5-1, AWARE Environmental Inc., March 2001.
3. Final Color Study Report, Table 4-2, AWARE Environmental Inc., March 2001.
4. Ranking accounts for removal of major color discharger (Fleichman's Yeast) in April 2001, after the Color Study was completed.
5. Ranking does not account for scheduled removal of lone textile SIU in July 2001. After textile removal, facility may request re-ranking.

Color Permitting Policy. All eight Catawba Basin facilities are currently up for permit renewal, and the basin renewal schedule will extend the permits into 2005. Based on the tier groupings, progressive permitting actions have been developed for these facilities, ranging from color monitoring (Tier 1), pollution prevention studies (Tier 2), engineering cost studies for end-of-pipe treatment (Tier 3), and finally color reduction limits (Tier 4). Color monitoring will remain a baseline condition for all facilities, as long as color remains a component of the discharge. Instream stations will be monitored for color monthly during summer, when low flows represent the most likely period for instream aesthetic impacts. Effluent will be monitored for color monthly on a year-round basis, to track the consistency of the color input.

All color dischargers will also receive a Color Reopener Special Condition, which will allow permits to be reopened and additional restrictions imposed if color problems persist. The color limits for the Tier 4 facility will be expressed as a 90% color reduction requirement between influent and effluent. As discussed previously, a color limit expressed as a percentage reduction in effluent color should significantly reduce the size of the instream color plume and aesthetic impact, while avoiding the complications of any single numerical ADMI color limit. The color permitting requirements are summarized in **Table 2**, and specific permitting language is included in **Appendix B**.

TABLE 2- NPDES Color Permitting Policy

Tier	Facility	Color Permitting Requirement
1	Pharr Yarns	Tier 1 facilities will receive **color monitoring-only**, consisting of monthly effluent sampling, and summer-only (April-October) instream monitoring (upstream, downstream). If observed, plume descriptions should be recorded. In addition, a **Color Reopener Special Condition** will be added that allows permits to be reopened and additional requirements imposed if color problems persist.
2	Cramerton Lincolnton Yorkshire Gastonia- Long Creek[1]	Tier 2 facilities will receive **Tier 1 requirements plus preparation of a Pollution Prevention (P2)/Best Management Practices (BMPs) report**. This report will address the potential for the facility to reduce effluent color by incorporating P2 measures and/or BMPs prior to treatment. For example, the facility could investigate the dyeing process, looking at the potential for dye substitution, improved dyeing efficiency, etc. The facility could do this work independently with their dye supplier or other resource, or request voluntary assistance from the NC Division of Pollution Prevention and Environmental Assistance. The report will be submitted within 12 months of the permit effective date.
3	Hickory Cherryville[2]	Tier 3 facilities will receive **Tier 2 requirements plus preparation of a Color Reduction Study**. The color reduction study will involve an end-of-pipe treatment evaluation to develop costs to reduce influent color by 75% and 90%. The reports will be submitted within 24 months of the permit effective date.
4	Delta Mills	Tier 4 facilities will receive **color reduction limits** (90% color reduction between influent and effluent) to be implemented by the permit effective date.

Footnotes:
1. Ranking accounts for removal of major color discharger (Fleichman's Yeast) in April 2001, after the Color Study was completed.
2. Ranking does not account for scheduled removal of lone textile SIU in July 2001. After textile removal, facility may request re-ranking with less stringent permitting requirements.

Additional Facilities. As previously mentioned, the City of Newton (NC0036196) was originally identified as a color discharger to the South Fork Catawba River watershed, along with the Alliance members. However, the City of Newton elected to evaluate color conditions independently from the Alliance. The Division conducted a site visit to the Newton WWTP prior to permit renewal, and observed a minor color plume at the outfall. In the permit renewal issued to Newton on March 2, 2001, the permit included monthly summer color monitoring, as well as a Color Reopener Special Condition. Based on the current tiered classification, Newton would rank as a Tier 2 facility. Therefore, it is recommended that the

Newton permit be reopened, and color requirements consistent with Tier 2 facilities be incorporated. This would include the additional requirement for a P2/BMP report.

One facility with colored effluent and a significant color plume which was not evaluated in the color study is the City of Gastonia- Crowders Creek WWTP (NC0074268). This discharge is also located in the Catawba River Basin (subbasin 030837). Several recent color complaints have been received for this facility, and Division staff observed a significant color plume during a recent site visit. This facility is also up for permit renewal. It is recommended that Tier 3 color requirements be placed in the permit renewal.

Conclusion. It is the overall goal of this permitting policy to reduce the magnitude of color plumes to a level where aesthetic color complaints are infrequent. The Point Source Branch requests your comments and concurrence with our permitting policy. Please feel free to call me at extension 543 if you have any questions or comments.

cc: (without Appendix)
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