BEFORE THE OFFICE OF STATE ADMINISTRATIVE HEARINGS
STATE OF GEORGIA

ALTAMAHA RIVERKEEPER, INC.,	:	
	:	
Petitioner,	:	
	:	
v.	:	
	:	
RICHARD DUNN,[1] DIRECTOR, ENVIRONMENTAL PROTECTION DIVISION, GEORGIA DEPARTMENT OF NATURAL RESOURCES,	:	**Docket No.: OSAH-BNR-WQC-1633136-11-Schroer**
	:	
Respondent,	:	
	:	
and	:	
	:	
RAYONIER PERFORMANCE FIBERS, LLC,	:	
	:	
Respondent/Intervenor.	:	

FINAL DECISION

I. INTRODUCTION

Petitioner Altamaha Riverkeeper, Inc. ("ARK") has appealed the decision by Respondent, the Director of the Environmental Protection Division ("EPD") of the Georgia Department of Natural Resources, to issue a National Pollutant Discharge Elimination System ("NPDES") Permit to Respondent/Intervenor Rayonier Performance Fibers, LLC ("Rayonier"). The NPDES Permit allows Rayonier to discharge treated wastewater into the Altamaha River. ARK contends that the NPDES Permit violates the narrative water quality standards established by the Board of Natural Resources pursuant to Georgia's Water Quality Control Act. O.C.G.A. § 12-5-23; Ga. Comp. R. & Regs. 391-3-6-.03. The administrative hearing on ARK's appeal

[1] At the time of the filing of the Petition, Judson Turner was the director of the Environmental Protection Division of the Georgia Department of Natural Resources ("DNR"). Recently, Richard Dunn was appointed the new director, and his name has been substituted for Mr. Turner's in the caption of this case.

took place over two weeks in June 2016 in Atlanta and Blackshear, Georgia, and the record closed on August 26, 2016. Based on the following findings of fact and conclusions of law, the Director's decision is hereby **REVERSED**.

II. FINDINGS OF FACT[2]

A. Introduction

This case is the culmination of a fifteen-year dispute between ARK and Rayonier regarding the appropriate level of pollution control required under federal and state environmental protection laws. Since 2001, ARK has advocated for major reductions in pollutants discharged by Rayonier from its facility, and Rayonier has, over the last decade, responded by making significant capital expenditures and an operational commitment to reducing the level of color and odor in its discharge.

Although both ARK and Rayonier spent considerable time during the hearing presenting evidence on the technical and scientific aspects of the pulp and paper industry generally and Rayonier's operations in particular, in the end, the law did not take into account what was technologically or economically feasible, or allow the Court to consider the estimable efforts of Rayonier's management to improve the plant's environmental performance in a scientifically and fiscally sound manner. Nevertheless, because an understanding of the technology and science provided important context in evaluating the credibility of the experts and assessing the appropriateness of the permit conditions and limitations, the findings of facts include an overview of the industry and Rayonier's operations and products.

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[2] To the extent that certain findings of fact are more appropriately classified as conclusions of law, they should be so construed. To the extent that certain conclusions of law are more appropriately classified as findings of fact, they should be so construed.

B. The Parties

1. Rayonier and its Products

1.

Rayonier operates a pulp plant[3] in Jesup, Georgia ("Jesup Plant"), which discharges treated wastewater into the Altamaha River. The Jesup Plant was built in 1954 and produces a chemical product known as "dissolving pulp," a highly bleached wood pulp from which almost all impurities have been removed. Rayonier's primary product is essentially pure cellulose and is referred to as "cellulose specialty pulp," a high-value, highly-specialized commodity that only a few plants in the world produce.[4] In fact, the Jesup Plant is the largest cellulose specialty plant in the world, producing 330,000 metric tons per year, which is approximately 21% of the global market. Rayonier currently produces two other products at the Jesup Plant, a slightly lower-grade dissolving pulp product, referred to as "commodity viscose," and a non-dissolving pulp called "fluff" pulp. Commodity viscose and fluff pulp account for an additional 24,000 metric tons per year of production at the Jesup Planit. (Written Direct Testimony of William Manzer,[5] at 6-7; WDT Perrett, at 3, 5; WDT McCubbin, at 7; Tr. 1327.)

2.

At the end of production, cellulose specialty pulp or "CS" looks like a large roll of thick, white paper, but is actually cellulose fiber that is sold for its chemical properties. Rayonier's

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[3] The witnesses used the words "plant" and "mill" interchangeably to describe Rayonier's facility in Jesup. William Manzer, Rayonier's Senior Vice President, explained that he usually refers to the Jesup facility as a plant to distinguish it from facilities that manufacture only paper-grade products, which he calls mills. (WDT Manzer, at 6.)

[4] There are three dissolving pulp plants in the United States, and only one other – the Buckeye Plant operated by Georgia Pacific in Perry, Florida – that uses the same "kraft" cooking process, discussed below, as the Jesup Plant. (WDT Manzer, at 7; Tr. 1685, 1714, 1881; RPF Ex. 248.)

[5] The parties agreed to submit written direct testimony ("WDT") of their expert witnesses prior to the hearing. In addition to the WDTs, which were entered into evidence at the hearing, each expert witness testified at the hearing on cross examination and redirect examination. Hereinafter, the Court will cite to WDTs by reference to the witness's last name and the relevant page number from the WDT. Citation to all witness testimony from the hearing will be by reference to the transcript and page number ("Tr.. ___.").

customers dissolve the CS fiber and use it to make a variety of products, from plastics, cigarette filters, cosmetics, and LCD screens to food and pharmaceutical additives for products such as diet drinks, ice cream, and toothpaste. Commodity viscose is a lower-grade dissolving pulp, which is used in products such as rayon clothing. Fluff pulp, which is mechanically fluffed up by Rayonier's customers, is used to make products such as diapers and feminine protection pads. Because of the more exacting purity demands, CS products typically have the highest market price of all of Jesup Plant products. (WDT Manzer, at 6; WDT Perrett, at 4; Tr. 1307, 1309-10, 1318, 1372, 1392-93, 1710-11.)

3.

The Jesup Plant has 750 direct employees and supports another 1500 indirect jobs. Rayonier is the largest private employer in the area and its total economic impact on the region is nearly one billion dollars per year. Particularly in the small town of Jesup and the surrounding Wayne County area, Rayonier is an important part of the economy and several of the witnesses who testified at the administrative hearing have a family member or friend who has worked for or with Rayonier over the past fifty years. Given its position in the community, some residents in the area find it difficult to criticize or complain about Rayonier, fearing the censure of their neighbors. (WDT Perrett, at 4; Tr. 241, 312-13, 315, 486, 569-70, 1326.)

2. Altamaha River and the Riverkeeper

4.

The Altamaha River is over 130 miles long and flows, undammed, from the confluence of the Ocmulgee and Oconee Rivers in Wheeler County, Georgia, to its terminus at the Atlantic Ocean in Darien, Georgia. Witnesses described the Altamaha as a majestic river and a great natural treasure. Some call the Altamaha the "Little Amazon" for its wild and scenic beauty,

particularly in the lower third of the river below the Jesup Plant, which is isolated and largely undeveloped.[6] The Altamaha is a large free-flowing river, with numerous black water tributaries and a bottomland swamp along sections of its banks.[7] For years, residents of Wayne County and other Georgia citizens have used the lower Altamaha River and the surrounding area for fishing, boating, kayaking, camping, hunting, and picnicking. (WDT Sulkin, at 12; Tr. 104, 221, 240-41, 257, 264, 276-78, 282-83, 285-87, 316, 374-75, 539-40, 563-64, 590-91, 917-18, 1032, 1059, 1099; RPF Exs. 253, 254.)

5.

ARK is an environmental advocacy group founded in 1999 to protect the Altamaha River. Since its founding, ARK has dedicated much of its resources and advocacy efforts toward addressing the concerns of its members regarding the environmental impact of Rayonier's wastewater discharge into the Altamaha. ARK was opposed to the terms of EPD's last NPDES permit issued to Rayonier in 2001 and has been active in advocating for stricter permit limits since that time. (WDT Dickson, at 3; WDT Sulkin, at 5; Tr. 103-04, 119-20, 127-28, 812, 885.)

3. EPD and the 2015 NPDES Permit

6.

EPD is one of six divisions of DNR. Within EPD, the Watershed Protection Branch is responsible for issuing NPDES permits. EPD issued an NPDES permit to Rayonier on May 25, 2001. ARK challenged the 2001 permit, but entered into a settlement agreement with Rayonier and EPD in 2002. Thereafter, despite a rule requiring the renewal of NPDES permits every five

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[6] Much of the land along the lower Altamaha is owned by Rayonier, the Nature Conservancy, the State of Georgia, and other groups, which conserve the biosphere around the river from further development. (Tr. 257.)

[7] The level and flow of the river varies depending on the weather and the time of year. Typically, the river is lowest from September through November and highest December through April. Summer flow depends in part on storms, but is generally lower than in winter and early spring. (Tr. 285, 381-82, 436-38; WDT Sulkin, at 778; Ex. P-17.)

years, EPD "administratively extended" the 2001 permit after Rayonier filed a timely renewal application in 2005. In or around 2008, following a citizen complaint regarding Rayonier's wastewater discharge, Rayonier and EPD entered into a Consent Order, whereby Rayonier agreed to, among other things, institute a color reduction plan over the course of approximately eight years. EPD did not renew NPDES Permit No. GA0003620 to Rayonier until December 29, 2015 ("2015 NPDES Permit"). The 2015 NPDES Permit is the subject of this appeal. (WDT Dickson, at 3-4; Tr. 388, 493-94, 1751-52; Jt. Exs. J-1 through J-6, J-13.)

C. Overview of Pulp Plant Operations

7.

The Jesup Plant uses wood chips to make its pulp products. Wood is composed of 50% water, which must be removed during the pulping process. The remaining components of wood are cellulose, hemicellulose, lignin, and extractives.[8] Pure cellulose is bright white, like cotton, but lignin and hemicellulose have color. Lignin is the glue that holds the wood fibers together and is the primary contributor of color to the Jesup Plant's wastewater. In most pulp plants, separating and removing the lignin is the main focus of the pulping process. However, in order to produce Rayonier's CS product, the Jesup Plant must also remove the hemicellulose. For every 100 tons of wood, Rayonier produces only 17 tons of CS pulp once all the water and impurities are removed.[9] (WDT Manzer, at 4, 9, 12; WDT McCubbin, at 4; Tr. at 1314-15; RFP Ex. 232.)

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[8] Extractives in wood are complex organic polymers, some of which have color and some of which have odor. One common extractive in softwood, such as pine, is turpentine, which is colorless, but odorous. The Jesup Plant has an extensive turpentine collection system that collects over 500,000 gallons of turpentine a year, which Rayonier then sells. Other extractives in wood are resins and fatty acids. (Tr. 1315, 1661-63, 1665.)

[9] Rayonier produces 20 tons of viscose and 25 tons of fluff for every 100 tons of wood. (RFP Ex. 232.)

1. Kraft Cooking

8.

In a kraft mill, the pulping process generally has three phases – cooking, washing, and bleaching. In the cooking phase the wood chips are mixed with a caustic solution referred to as "white liquor" and then cooked in a digester under pressure and high temperature. This separates the lignin from the cellulose and hemicellulose, leaving a slurry of solid pulp and "black liquor." Black liquor is composed of lignin and the cooking chemicals, and it looks like molasses. It is highly colored and adding a spoonful to a bathtub full of water would make it look like coffee. Unique to the Jesup Plant's two CS lines,[10] the traditional kraft cook is preceded by a two-hour acid prehydrolysis cook using only water and steam to heat the wood chips, which removes hemicellulose. This extended cooking phase produces a pulp that is very low in lignin and hemicellulose.[11] (WDT McCubbin, at 5 and Ex. 2; WDT Amendola, at 20; WDT Manzer, at 11; WDT Perrett, at 7; Tr. at 1279, 1320.)

2. Washing

9.

After passing through coarse screens called knotters, which remove any large wood particles, the slurry moves into the brown stock washers, where the pulp is separated from the black liquor. The black liquor that is captured during this stage is routed to an evaporator, where

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[10] The Jesup Plant has three separate production lines, referred to as A, B, and C lines. The A and B lines make CS products. The C line, which was converted to a CS line at a cost of almost $400 million in and around 2012, has been producing viscose and fluff products for over a year because of a change in market conditions. Rayonier's long-term plan is to convert the C line back to a CS line when the market improves, which Rayonier projects to be in the next year or two. (WDT Perrett, at 5; WDT McCubbin, at 7; WDT Manzer, at 10; Tr. 1225, 1344-46, 1651.)

[11] The amount of residual lignin remaining in the pulp is measured in Kappa numbers. After a traditional kraft cook, the pulp coming out of the digester has a Kappa number of approximately 25. After the Jesup Plant's two-step cooking, the CS and viscose pulp comes out of the digester with a Kappa number of 8 to 10. For fluff pulp, the Kappa number is about 17. (WDT Manzer, at 10, 13; Tr. 1224, 1342, 1375, 1377; Ex. P-4B.)

the lignin is recovered and sent to a boiler to be burned for fuel. Up to this point in the pulping process, any black liquor spills that make their way into the plant's sewer and, thus, ultimately into the wastewater, are unintentional. Pulp plants can minimize the impact of such spills by having effective operations, vigilant monitoring, and strategic placement of spill recovery sumps around high-color areas. (WDT McCubbin, at 5; WDT Amendola, at 30-31; WDT Mooney, at 7-9, 11-12; WDT Manzer, at 12-13; Tr. 1279-82, 1317, 1349, 1592.)

3. Bleaching

10.

After the washing phase, the pulp is still brown because some lignin remains bound to the fibers. Every pulp mill follows cooking and washing with bleaching to remove more lignin and hemicellulose from the pulp. Bleaching with chlorine dioxide produces a cleaner, brighter pulp without modifying the chemical properties of the cellulose. A mill producing paper-grade products targets a bleached product that is 85% pure cellulose. On the Jesup Plant's A and B lines, the target is closer to 97% to 98% pure cellulose after bleaching. When the pulp leaves the bleach plant, the white pulp is extracted from the remaining lignin by washing the pulp in an alkaline solution.[12] (WDT Manzer, at 11, 13; Tr. 1284.)

4. Oxygen Delignification

11.

Prior to the bleaching stage, most of the black liquor is recycled or disposed of in an environmentally sound manner. However, most of the lignin that remains bound to the pulp when it enters the bleach plant will make its way into the wastewater, which is discharged into

[12] Rayonier adds an additional step after bleaching on the A and B lines to remove any remaining hemicellulose. Information regarding this post-bleaching process is proprietary, and there is no evidence in the record about how this process works or its impact, if any, on delignification. (Tr. 1315, 1741.)

the Altamaha after being treated.[13] As a result, most pulp mills built after the 1990s, including some dissolving pulp plants, add an extra step between the washing and bleaching stages called oxygen delignification or "OD." During OD, the pulp is treated with oxygen under pressure and high temperatures. For the most part, the additional lignin and other organic material that are separated from the pulp during the OD process can be recovered and recycled just like the black liquor from brown stock washing. Consequently, a well-run OD system can significantly reduce the amount of lignin and associated color that goes into the bleach plant and ultimately is carried out in the wastewater. (WDT McCubbin, at 5, 6, 25; Deposition Transcript of Neil McCubbin,[14] at 80-81; Tr. 1285, 1388-89, 1594, 1597, 1835, 1844-45; Ex. P-4B.)

12.

Rayonier does not use OD at the Jesup Plant for a few reasons. First, Rayonier contends that OD cannot be used on its A and B lines because it will change the essential chemical properties of the cellulose and diminish or destroy the quality of its CS and viscose products. In addition, Rayonier points to alternative technologies it uses during the pulping process that reduce the Kappa numbers before the pulp gets to the bleach plant. According to Rayonier, these alternatives work as well as or better than OD and do not damage the cellulose chain in its CS products. For example, as discussed above, a traditional kraft cook results in Kappa numbers of around 25. Adding OD to the traditional process would likely reduce Kappa numbers by about half, to around 12, heading into the bleaching stage. Rayonier reaches Kappa numbers of 8 to 10

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[13] The wastewater that leaves the bleach plant contains chlorine as well as lignin and other organic materials and cannot be recycled in the recovery boilers because the chlorine would cause corrosion. (WDT Amendola, at 22; Tr. 1379, 1595.)

[14] Mr. McCubbin testified on cross examination by deposition on March 29, 2016. A video of the deposition was played on the first day of the administrative hearing and a transcript of the deposition was submitted into evidence. Citation to Mr. McCubbins's deposition will be to the transcript's page number ("McCubbin Depo. Tr. ___").

for its CS and viscose pulp by using its two-step, extended cooking process.[15] Of course, since the Jesup Plant does not use the two-step cooking process when it is producing fluff pulp, adding OD to the current C line would likely result in a reduction of the Kappa number to 8 to 10 when Rayonier is making fluff on the C line.[16] Rayonier estimates that installing an OD system on the C line for use when it is running fluff pulp would cost over $50 million. In exchange for such an investment, Rayonier's witnesses estimates that Rayonier would see only minimal and short-lived benefit. (WDT Perrett, at 7-8; Tr. 1342 -45, 1351-52, 1377-78, 1383, 1598.)

13.

Neil McCubbin, an expert in pulp and paper mills, is skeptical about Rayonier's claims that OD cannot be used when making CS products, particularly because Rayonier has not fully explained how OD would compromise its CS product and because other dissolving pulp plants around the world use OD, including the Bahia plant in Brazil and others. For example, Bahia reduced its Kappa numbers to 2.5 from 10 following installation of an OD system. In addition, Mr. McCubbin opined that if the Jesup Plant's C line were making only fluff pulp, installing OD on just the C line would reduce the color going into the discharge by 20 tons per day.[17] He

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[15] Although Mr. Perrett testified that OD would be "ineffective" at removing lignin because the pulp already had lower Kappa numbers coming out of the two-stage extended cook, the preponderance of the evidence showed that OD would be effective at reducing the Kappa numbers even further on the A and B lines, but that it would likely have a negative effect on the chemical properties of the CS pulp. (WDT Perrett, at 7-8; Tr. 1598.)

[16] In fact, Rayonier had agreed to install OD on the C line as part of the 2008 Consent Order when the C line was producing 100% fluff pulp. However, when Rayonier converted the C line to a CS product line in or around 2012, it sought and received an amendment to the Consent Order, through which EPD agreed that OD was not appropriate for the C line after the conversion. Instead, EPD agreed that other color reduction improvements made by Rayonier during the conversion would allow Rayonier to achieve the target color limits for the C line. (WDT Dickson, at 3; Tr. 1342-45; Jt. Ex. J-3.)

[17] One of the measures of the amount of color in wastewater is tons per day or "TPD." Although color does not have an actual weight, environmental regulators often convert the concentration of color in wastewater to a unit of weight by multiplying the color concentration by the total weight of water. The color concentration is measured in NCASI units, which stands for National Council for Air and Stream Improvements, or Platinum Cobalt Units ("PCU"). (WDT McCubbin, at 9; WDT Booth, at 6; WDT Johns, at 6; WDT Foster, at 13; WDT Amendola, at 14; Tr. 84, 1518, 1527, 1551-52, 1628-29, 1697, 1860.)

further opined that if OD were used on all three lines, overall color in the Jesup Plant's discharge would decrease by 30% to 50%. McCubbin admitted that he did not know the exact mix of products made at other dissolving pulp plants that use OD, nor did he know whether those plants make mostly CS products, like the Jesup Plant, or mostly viscose or fluff pulp, which do not require the same exacting standards and where OD may be more appropriate. (WDT McCubbin, at 25; McCubbin Depo. Tr. at 72-74; Tr. 1835, 1844-45, 1846, 1883, 1887-89, 1893-96.)

14.

At the administrative hearing, Rayonier gave some explanation of why OD would not be appropriate for its CS production lines despite its use at other dissolving pulp plants. According to Jack Perrett, the general manager of the Jesup Plant who is familiar with the technology used at the Bahia plant in Brazil, Bahia is not capable of making some of the high purity CS products that Rayonier does. Moreover, Mr. Manzer testified that 75% of Bahia's product is viscose pulp, which can tolerate OD without significant deterioration in product quality. The Buckeye plant in Florida, which is the only other dissolving pulp kraft mill in the United States, makes CS, commodity viscose, and fluff pulp products. Rayonier admitted that OD may be appropriate for plants like Buckeye that produce fluff, viscose, and even a lower grade CS than the Jesup Plant. (Tr. 1378, 1392, 1598-99, 1681-85, 1724.)

D. **Wastewater Treatment – ASBs and ASTs**

15.

Once the wastewater leaves the Jesup Plant, it must be treated before it can be discharged into the Altamaha. As discussed more below, the United States Environmental Protection Agency ("EPA") and EPD strictly regulate the amount of pollutants that can be discharged into a receiving water of the United States, and a biological wastewater treatment system is designed to

meet those regulations. Pulp mills are among the largest industrial users of water, and one of the primary pollutants targeted during pulp mill wastewater treatment is biochemical oxygen demand or "BOD." BOD is a lab measurement of the oxygen-consuming capacity of the organic material in water or wastewater. If BOD in the discharge is high, less dissolved oxygen will be available to support aquatic life. Another pollutant targeted for treatment in pulp mill wastewater is referred to as Total Suspended Solids or "TSS." TSS measures the weight of organic and inorganic particulate matter that is suspended in water.[18] (WDT McCubbin, at 2, 8, 23, 25; WDT Amendola, at 9; WDT Foster, at 4; WDT Mooney, at 17, 19.)

16.

Biological treatment of wastewater is considered a secondary treatment, what Mr. McCubbin refers to as "end-of-pipe" treatment. The two types of treatment systems discussed below share many of the same attributes. In both systems, wastewater is collected throughout the plant through a series of sewers and sumps and sent to a large circular pool called the weak clarifier. There, the solids settle and are separated from the wastewater.[19] The wastewater then flows into an aeration basin, where it is agitated and where bacteria begin to grow and consume the BOD. When the BOD is consumed, it is converted into biomass. The wastewater then enters a quiescent area, where the biomass can settle out before the wastewater is discharged into the

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[18] To measure TSS, water is weighed before and after the particulate matter is filtered out. The difference between the two measurements is the amount of TSS and is typically expressed as milligrams per liter ("mg/l"). TSS is not the same as turbidity, which is a measure of the clarity of the water – how much light is scattered by material in the water. (WDT Mooney, at 20; WDT Sulkin, at 10; Tr. 1158.)

[19] At the Jesup Plant, color-rich wastewater is collected and diverted to a "strong lagoon," an earthen-pond where the wastewater is retained for four days and treated with an organic polymer before being piped to the weak clarifier. (WDT Foster, at 8; Tr. 1635-37.)

receiving water as effluent.[20] (WDT Mooney, at 23; WDT Foster, at 4, 7; WDT McCubbin, at 8; Tr. 1522, 1566-67.)

17.

There are two variations on this system of biological treatment, referred to in the industry as ASBs and ASTs. An ASB is an Aerated Stabilization Basin, which requires a large pool of water, sometimes referred to as a lagoon, and relatively high temperatures to biologically treat the wastewater. ASBs are used frequently in the southern United States because of available land and favorable climate.[21] In an ASB system, wastewater travels from the clarifier into a large basin, where it is aerated and treated with nutrients if necessary to grow the appropriate mix of bacteria that will eat the organic pollutants. The wastewater flows over a berm into a settling basin, where the biomass will settle out before the wastewater is discharged. The ASB's settling basin is periodically dredged to remove the solid waste at the bottom. Although retention times vary, wastewater typically remains in an ASB for several days, if not longer. An ASB system is considered a "once-through" system, because none of the water or biomass is recycled back into the aeration basin. In contrast, in an Activated Sludge Treatment system ("AST"), the wastewater leaves the clarifier and enters a small concrete aeration basin before flowing into a secondary clarifier. The amount of bacteria used in an AST's aeration basin is

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[20] The bacteria use the BOD as a food source. As the bacteria "eat" the BOD they become larger particles and begin to agglomerate, eventually falling to the bottom of the basin, where they can be removed. This mass of bacteria that collects on the bottom of the basin is the "biomass." (WDT Foster, at 4-5; Tr. 1566-67.)

[21] Although Mr. McCubbin opined that ASBs, which he considers an obsolete and inferior biological treatment system, are used in the Southern United States because of lax environmental regulation, he did not offer any probative evidence to support this opinion. Michael Foster, an expert in biological wastewater treatment systems, testified that 50% of pulp and paper mills in North America and 80% of mills in the Southern United States use ASBs due to the availability of land. Brian Mooney, the Manager of Environmental Affairs for the Jesup Plant, testified that ASBs are the technology of choice in the Southeast because the large ponds can absorb variations in the influent in terms of pH, flow, temperature and pollutant loading without affecting the quality or consistency of the final effluent. Mr. Mooney testified that 33 out of 43 active kraft and dissolving pulp and paper plants in the Southeastern United States use ASBs. (WDT Foster, at 3, 6-7; WDT Amendola, at 32-33; WDT Mooney, at 16; Tr. 1851.)

much higher than in an ASB and typical retention time for wastewater in an AST is only four to eight hours. The solids that settle at the bottom of the second clarifier are continuously collected and either recycled back to the aeration basin for further treatment or removed and disposed of through a system called sludge wasting. (WDT Foster, at 3, 5-7; WDT McCubbin, at 8, 26, 27; Tr. 1562.)

18.

There are positive and negative aspects to both systems. An ASB, because of its large size and longer retention times, provides more mixing and greater consistency in the final effluent despite variations in the levels of pollutants in the influent. ASTs, on the other hand, are more easily upset by changes in the influent quality. ASTs produce a very high quality effluent, especially with respect to BOD and TSS, and require much less land than ASBs to treat large quantities of wastewater. ASTs are considered a more aggressive treatment method, destroying more BOD than an ASB and creating heavier microbes, which separate more efficiently from the effluent than the lighter microbes created in an ASB. (WDT, Foster, at 6; WDT McCubbin, at 26-27.)

19.

The Jesup Plant has two ASBs. One smaller pond, referred to as ASB 1, sits on 53 acres on the banks of the Altamaha south of the U.S. Highway 301 river bridge ("River Bridge") in Jesup. The northern wall of ASB 1 is separated from the river by only a large steel retaining wall, approximately 50 feet from the river's edge. Although ASB 1 only treats five to ten percent of the total effluent from the Jesup Plant, it treats the more colorful streams called "foul condensate." ASB 1 has much longer retention times, approximately 30 days. The other 90% to 95% of the Jesup Plant's wastewater is treated in ASB 2, a much larger lagoon sitting

downstream of ASB 1 on 186 acres. The retention time for ASB 2 is typically eight to ten days. (WDT McCubbin, at 7; WDT Amendola, at 32; WDT Mooney, at 24; Tr. 1666.)

20.

Mr. McCubbin opined that an AST is a superior biological treatment system and, if used at the Jesup Plant, would reduce the color in Rayonier's discharge by 50%. In large part, Mr. McCubbin bases his 50% reduction estimate on a phenomenon called "color reversion," which occurs in some ASBs, but not all. Essentially, when color reversion occurs, BOD in the wastewater is reduced, but the color in the wastewater actually increases by the time the effluent leaves the ASB. According to Mr. McCubbin, wastewater treated in an ASB generally increases in color by about 30% to 50% due to color reversion. Conversely, he testified that the color in wastewater is typically reduced by 30% in an AST system. (WDT McCubbin, at 8, 26; McCubbin Depo. Tr. 55-56.)

21.

At the time of his deposition in March 2016, Mr. McCubbin was unable to confirm that color reversion was, in fact, occurring in the Jesup Plant's ASBs because Rayonier had not made available the influent data, which indicates the color levels of the wastewater when it enters the ASB. Although Rayonier's experts did not dispute that color reversion can occur in ASBs, Michael Foster, an expert on biological treatment systems, testified that typically color does not increase in ASBs. In connection with the administrative hearing, Rayonier released the Jesup Plant's influent data to its own experts, who compared them to the publicly-available effluent data. The data showed that color reversion was not occurring across Rayonier's ASBs. In fact, Rayonier's data showed a 2 to 11% decrease in color from January 2014 through March 2016.

(McCubbin Depo. Tr. 57-60; WDT Amendola, at 6, 37-38; WDT Foster, at 10-11; Tr. 1142, 1253-57, 1519, 1524, 1603-12; RPF Ex. 225.)

22.

Although Mr. McCubbin questioned the accuracy of Rayonier's influent data because he believes color reversion is so common in ASBs, he opined that even without considering color reversion, replacing the Jesup Plant's ASBs with an AST system would decrease the color of the discharge by 25 to 30%, particularly if Rayonier adds polymer to the treatment process.[22] However, Mr. Foster testified that an AST system is not necessarily the solution to a color problem. He described two of his clients that saw less than a 10% reduction in color using AST systems and testified that the worst color in an effluent from a paper mill that he had ever seen was from an AST system. Moreover, although ARK pointed to a plan by the Buckeye plant in Florida to convert from an ASB to an AST system, the evidence showed that Buckeye's conversion was to address problems with ammonia, not color, in the effluent. (McCubbin Depo. Tr., at 59-60; Tr. 1521-24, 1538-42, 1544-45, 1729, 1847-50, 1853-58, 1917-18; RPF Ex. 248.)

23.

Rayonier estimated that the cost of converting to an AST system would be $85 million. Mr. McCubbin testified that an AST system would cost far less than that, but admits that it would be in the tens of millions of dollars to install. Having weighed the testimony of the witnesses, the Court finds that it is more likely than not that replacing the ASBs at the Jesup Plant with an AST system would result in some reduction in overall color in the effluent, but not

[22] There is a family of polymers that target color molecules and can be used in either an AST or an ASB treatment system. Essentially, when these polymers are added, the color bodies tend to coagulate and become heavy enough to settle out, rather than pass through with the effluent. Typically, polymers are added in the primary clarifier before the wastewater reaches the basins. In an AST, they can also be added in the secondary clarifier, where the color bodies that settle will be removed with the sludge. There is an environmental downside to using polymers, however. They can have aquatic toxicity effects if they go out with the discharge, and they generate additional solid waste. (Tr. 1521, 1538-63, 1850.)

as much as Mr. McCubbin predicted. Rather, the evidence in the record supports that an AST system might reduce the color by 10% to 30%, while introducing variability in the final effluent quality. Consequently, the Court finds that a more in-depth study of the issue would need to be done before either party's estimates would be considered reliable evidence. (McCubbin Depo. Tr. 61; Tr. 1272-73, 1546.)

E. **Impact of Discharge into the Altamaha**

24.

The crux of this case involves what the discharge into the Altamaha River does to the river and how that affects how people use the river. This is largely an aesthetic inquiry – how does the discharge make the river look and smell? Does the discharge cause the fish in the Altamaha to have an offensive odor, and if it does, how does that affect whether people use the Altamaha for fishing? For the most part, the evidence in the record on these issues falls into two categories – one, the objective evidence of the amount of color, odor and turbidity that is discharged into the Altamaha from the Jesup Plant, and two, the testimony of the people who use the river regarding what they detect in terms of color, odor and turbidity and how that influences how they use the river. (Tr. 1757.)

25.

Rayonier discharges about 50 to 60 million gallons per day of treated wastewater into the Altamaha River. Because the Altamaha is a large river, the Rayonier discharge makes up less than 1% of the total flow during average flow conditions and approximately 5% when river flow is very low.[23] Five to ten percent of the total discharge, about three to four million gallon per

[23] Critical low flow for a river is considered the lowest seven-day average flow that occurs once every ten years ("7Q10"). Currently, the 7Q10 for the Altamaha is about 1600 cubic feet per second ("cfs"), and it last occurred in 2012 and 2013. Even during 7Q10, over 1 billion gallons of river water flow past the plant each day, which equals 9 billion pounds of water. The average flow for this section of the Altamaha is 13,900 cfs, more than

day, is released through Outfall No. 1, a discharge pipe that flows from ASB 1. Outfall No. 1 is below a catwalk, and the pipe is visible from the river. The vast majority of the total discharge, an average of 54 million gallons per day, is released from Outfall No. 2 through a submerged, multi-port diffuser that flows from ASB 2 and extends underwater approximately one-third of the width of the river.[24] The diffuser allows for more rapid mixing of the effluent with the river water. (WDT McCubbin, at 8-9; WDT Mooney, at 24; WDT Amendola, at 32; Tr. 1159.)

26.

Local residents and visitors use the Altamaha near the Jesup Plant for a variety of activities, including fishing, boating, paddling, picnicking, camping, and occasional swimming and wading. EPD has identified the "designated use" of this section of the river, as discussed more fully below, as fishing, which includes secondary contact with the water for recreational purposes. As part of the "Go Fish Georgia" program, Jaycee's Landing, which is just upriver from the Jesup Plant, has been improved with a large boat ramp and other amenities that attract boaters, paddlers, and others wishing to fish and use the Altamaha for recreation. A number of large fishing tournaments occur on this part of the river, and, in 2012, over 300 people traveled down the Altamaha past the Jesup Plant in kayaks and canoes during Paddle Georgia, an annual, multi-day paddling and camping event. (Tr. 113-14, 146-47, 149, 258, 295, 298-99, 385, 459-60, 505, 756, 1802.)

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eight times the flow at 7Q10. (WDT Booth, at 6; Tr. 939-40, 1090, 1100, 1160.) See also Ga. Comp. R. & Regs. 391-3-6-.03(e)(i).

[24] Last year, six percent of the total effluent came from ASB 1, and the remaining 94% came from ASB 2. (Tr. 1601.)

1. Color

27.

When viewed in a vial or glass, the effluent from the Jesup Plant currently looks something like diluted apple juice, ginger ale, or light beer. It has some color, but is not dark. When the effluent is discharged into the river, depending on river conditions such as the depth of the river, the flow, and recent weather events, the color of the discharge may be distinct from the color of the river water and create noticeable dark spots or plumes. For example, when the river is high or there has been a storm, the river water will be quite muddy and the discharge may be difficult or impossible to see against the murky brown river water. When the river is low and relatively undisturbed, the river water is clearer and appears green or light brown, making the effluent appear darker in comparison. Aerial photographs taken over the past ten years show times where the river appears to be either green or a milky brown until it reaches Outfall No. 2. As the effluent comes to the surface, a dark plume is visible in some of the photographs, beginning below Outfall No. 2 and snaking along the river bank until it reaches Dick's Swift, a sharp curve about a half mile away. From the air, the plume appears to take over the entire river as it rounds the bend, changing the entire river to a dark brown. (WDT McCubbin, at 10, 19; WDT Foster, at 3, 11; Amendola, at 17; WDT Mooney, at 22-23; Tr. 285-287, 1276, 1390-92, 1472-73, 1616; Ex. P-4E.)

28.

In the past, before Rayonier fully implemented the improvements mandated by the 2008 Consent Order, the average color in the effluent was much higher than it is today. Since 2008, the amount of color in the effluent has decreased by 60%. For example, from 2003 to 2005, Rayonier's discharge contained 400 to 500 TPD of color. In 2012, the average was 300 TPD.

By 2013, most of the mandated projects were completed, and in 2014, Rayonier made additional improvements that further reduced color in the effluent. As a result, during the 2014 to 2015 period, color was reduced to an average of 165 TPD, and the twelve-month average from March 2015 to March 2016 was 157 TPD. According to Rayonier's management, Rayonier is continually researching new ways to reduce color in the effluent while maintaining product quality and financial sustainability. (WDT Amendola, at 22; WDT Perrett, at 8; WDT Mooney, at 13; Tr. 1331, 1630, 1671; RPF Ex. 171.)

29.

Nevertheless, even with the significant reduction in color in recent years, there are still times when Rayonier's discharge is visible in the Altamaha, especially when the river flow is low or the weather has been clear. Among the aerial photographs in the record are some taken from 2013 through 2015, when the average color in the discharge was decreasing. In fact, some of the photographs during this time period show a noticeable plume from the discharge on days when Rayonier's discharge records indicate that the effluent color was in the 135 to 175 TPD range. Thus, although an aerial photograph may sharpen the contrast between colors and does not fully reflect the view from the river, the preponderance of the evidence shows that if the average color in the Rayonier discharge remains at current levels, people using the Altamaha will still be able to detect some color from the discharge, distinct from the color of the river water, under low flow conditions. (WDT McCubbin, at 13-14; Ex. P- Exs. P-6X – P-6FF, P-6JJ, P-6KK, P-20F; WDT Sulkin, at 12.)

30.

The harder question, however, is whether the current color levels are so noticeable that the color in the discharge has an ongoing impact on how people use the river. Many of the

witnesses who described the discharge as turning the river "from brown to black" and generally just looking "nasty" were long-time Wayne County residents, who did not specify when they last made such observations. In fact, a number of these witnesses testified that they have avoided that section of the Altamaha for years, even decades, because of their memories of how the river looked and smelled in the past, the odor from the pulp plant that they always smell in the air around Jesup, and aerial photographs that they have seen where the discharge is visible. Other local residents testified that the color is not nearly as pronounced as it was just a few years ago. For example, Cpl. Randy Aspinwall, a DNR ranger who patrols the woods and waters in Wayne County, has lived in the area all his life and spends at least one day per week, if not more, on the Altamaha. He testified that up until about a year and a half ago, he frequently observed a darkish, coffee-colored discharge below Outfall No. 2, which would change the color of the river when water levels were low. Since that time, he sees "almost no color to the discharge," and he testified that the river "doesn't change color like it used to."[25] Similarly, Chief Deputy Doug Lewis of the Wayne County Sheriff's Office, a former DNR employee, also grew up in Wayne County and has spent a considerable amount of time on the Altamaha. He testified that in the 1980s, the discharge "really changed the color of the river," but that recently, the color of the discharge "is nowhere near what it used to be." (Tr. 202-03, 220-21, 238, 259, 279-80, 287, 290, 317, 324, 326, 332, 337, 352, 373-74, 379, 689, 708-10.)

31.

Other witnesses at the hearing were only occasional visitors to this part of the Altamaha, including recreational paddlers and swimmers, as well as some of the expert witnesses who

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[2525] According to Jennifer Hilburn, the current Altamaha Riverkeeper, river levels were low through spring 2015. Since October 2015, which was about eight months before the administrative hearing, river levels were much higher, closer to what she described as "flood stage." Thus, Cpl. Aspinwall's observations regarding the past year and a half would have covered a period of low flow, as well as high flow. (Tr.886.)

visited the river in the past two years in connection with the 2015 NPDES Permit and this appeal. Their testimony was similar, for the most part, to the lifelong residents of the Wayne County area. Some of the visitors who were on the river before Rayonier completed the color reduction improvements described a very noticeable color plume from the discharge. Others, visiting more recently, detected less color. For example, Clark Meyer, an English teacher from Atlanta, provided a very vivid description of the color he observed from the discharge in June 2012, when he took his two sons on the Paddle Georgia trip.[26] Mr. Meyer's testified that the trip began as a "magical" experience, filled with water battles, swimming, and floating outside the canoe. On the fifth day, as they passed the Jesup Plant, he described a very different experience. As they approached the outfalls, he observed dark patches welling up from underwater like shadows, which began to "link hands" about a quarter mile downstream until the whole river was dark. The river remained darkened from bank to bank for a considerable distance past the outfalls.[27] (Tr. 113-14, 756-61, 769; Exs. P-6T, P-6U.)

32.

Wiley Jordan, an avid wildlife photographer, takes long solo kayak trips on Georgia's rivers, including the Altamaha. He spends days kayaking and nights camping along the river banks, filtering water to drink and rinsing out his clothes in the river every night. Two years ago,

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[26] On June 20, 2012, the day Paddle Georgia passed the Jesup Plant, the river flow was approximately 2900 cfs as measured between the two Rayonier outfalls, which is about double 7Q10, but well below the average flow of 13,900 cfs. Rayonier's discharge records indicate that the amount of color in the discharge on that day was 257.6 TPD. (WDT Booth, at 6; Ex. P-2F; Tr. 113.)

[27] Mr. Meyer testified that if he were to visit the Altamaha River again, he would take out his canoe before the outfalls because of the water quality below the Jesup Plant. However, he was also very disturbed by the odor, and it is not clear if he would change his mind if the color from the discharge was eliminated or reduced, but the odor remained. (Tr. 758, 769.)

in October 2014, when the river was low,[28] Jordan kayaked along the Altamaha from Macon to Darien, where the Altamaha meets the Atlantic Ocean. He described approaching the Jesup Plant and seeing red splotches on the river, "almost like the river was sick" or had measles. Further down the river, the splotches merged together and the river got a "weird" reddish color. Mr. Jordan paddled past the Jesup Plant again in November 2015, in a trip from Milledgeville to Darien, and has been downstream of the Jesup Plant on day trips about three or four other times. Mr. Jordan did not testify whether he observed color from the discharge on those trips. However, he did testify that when he canoed downstream of Outfall No. 2 on the day before he testified,[29] he observed only one big reddish spot or stain.[30] (Tr. 345-68.)

33.

The ARK and EPD witnesses had differing observations of the color in the river over the past few years. Deborah Shephard, the Riverkeeper from 1999 to 2014, testified that as recently as May 2016, over Memorial Day weekend, she saw dark stains on the river from the discharge. Although the water was high, she testified that she could still see a black discharge. She also observed a number of people using the river over Memorial Day weekend, including adults and

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[28] According to Rayonier's discharge records for October 2014, the average color in the discharge was 146 TPD. The river level was an average of 3.4 feet, and the average flow was 3847 cfs, which is less than a third of the average flow. (Ex. P-2H.)

[29] Two days of the hearing were conducted in Blackshear, Georgia, for the benefit of the many witnesses who live and work in Southeast Georgia. A few days before the hearing began in Blackshear, a tropical storm passed through the area, causing the river water to be muddy for several days. (Tr. 287, 433.)

[30] Mr. Jordan, like many of the other witnesses, was more disturbed by the odor than the color, as discussed below. In addition, neither the color nor the odor of the discharge appears to have stopped Mr. Jordan from using the Altamaha. He has another trip along the Altamaha planned for his 65th birthday. He does modify his normal practices on the days he paddles past the Jesup Plant. He takes on enough water to drink before he reaches the Jesup Plant so that it will last two days, and he will not have to drink river water that smells like pulp mill effluent. (Tr. 345-47, 350.)

children, camping, picnicking and fishing.[31] ARK's expert witness, Barry Sulkin, an environmental engineer, has visited the river below the Jesup Plant at least six times in the past fifteen years, and most of those times he has observed a significant plume of color from the discharge. However, he acknowledged that when the river is high, the color of the discharge is "obscured." He testified that even when he could not see the discharge, he could still smell the odor of the effluent. Conversely, the EPD witnesses, who have visited the river once or twice over the past three years, testified that they detected no noticeable color from the discharge on their visits. (WDT Sulkin, at 6, 10, 12; WDT Capp, at 6; Tr. 142-43, 146-50, 1089-90; RPF Exs. 252A & 252B.)

34.

Two of Rayonier's expert witnesses, Gary Amendola and Dr. Michael Johns, visited the river in the course of their work on this case – Mr. Amendola in June 2015 and March 2016 and Dr. Johns on four different occasions from 2012 through 2016. Both experts admitted seeing discernable color in the effluent. Dr. Johns testified that on his visits when the river was low, he saw a plume of color that extended down to Dick's Swift, and detected a uniform change in color beyond that point. On high flow days, he could not see a plume of color at all, just an occasional "blob" of effluent. (WDT Amendola, at 3; WDT Johns, at 4-5; Tr. 1276, 1424, 1471-74.)

[31] Although there is no allegation in this case that the discharge is toxic and, in fact, the evidence in the record shows that there is no toxicity, Ms. Shephard testified that she is concerned for the health and safety of local residents, like those she observed on Memorial Day weekend, who continue to swim and wade in the Altamaha below the outfalls. She believes that they use the Altamaha below the outfalls because they have grown accustomed to the color and odor and that it is not safe for them to do so. (Tr. 146, 149, 996-98.)

35.

In his Written Direct Testimony, Mr. McCubbin recommended that the color limit in the permit be reduced to a monthly average[32] of 50 TPD of color and a daily maximum of 75 TPD, rather than the limits in the 2015 NPDES Permit approved by EPD, which allow a monthly average of 229 TPD of color and a daily maximum of 344 TPD. Mr. McCubbin opined, and the evidence in the record supported, that when the color levels in the discharge are as high as 229 TPD, the color of the discharge will be noticeable in the Altamaha when the river is low. However, there is insufficient evidence to prove that the color limits proposed by Mr. McCubbin are the proper limit. Mr. McCubbin testified that he based his proposed limits on what he has seen other pulp plants around the world achieve with available technologies. However, the evidence in the record showed that the other plants referenced by Mr. McCubbin were not dissolving pulp kraft mills using the same types of wood to produce the same types of high-purity CS products that Rayonier produces.[33] (WDT McCubbin, at 16-17, 19, 28-30; WDT Manzer, at 21-22; McCubbin Depo. Tr. 75-83, 88-90; Tr. 1370, 1389, 1392-93, 1599, 1679-85, 1714,-15, 1724-25; Jt. Ex. 13.)

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[32] A monthly average is the combined output for an entire month divided by the number of days in the month. (WDT McCubbin, at 16.)

[33] As Mr. Manzer pointed out, another factor in determining whether one pulp mill's discharge is meaningfully compared to another's is the size and flow of the receiving water. For example, the Pigeon River in Canton, North Carolina, into which the Evergreen Packaging mill discharges its wastewater, is very small and has less than 10% of the average flow of the Altamaha River. Because of the small size and flow of the receiving water, the color limit for the Canton mill is only 16 TPD. However, despite the difference in the total TPD of color discharged by the Canton mill and the Jesup Plant, when the flow of the receiving water is considered, the color concentration of the Canton mill's discharge in the receiving water is actually four times higher than the Jesup Plant's. According to Mr. Manzer, who used to work at the Canton mill when it was operated by Champion International, Champion spent $300 million in 1996 to reduce the color in the effluent. Despite the approximately 90% improvement in color by a mill that Mr. McCubbin described as "a strong environmental performer," there is still color in the Canton mill's discharge, which under some conditions causes a visible plume in aerial photographs. Similarly, the Glatfelter mill in Spring Grove, Pennsylvania, which Mr. McCubbin used as another example of an excellent environmental performer, makes paper-grade products and has a color limit of approximately 51 TPD. However, the Glatfelter mill's discharge makes up 30% of the small Spring Grove creek into which it discharges, as opposed to Rayonier's discharge, which is between .04% and 5% of the flow of the Altamaha. Consequently, in terms of the concentration of color, the Glatfelter mill also discharges more color into the receiving water than does the Jesup Plant. (WDT McCubbin, at 16, 29; McCubbin Depo. Tr. 84-93; Tr. 1729-34, 1900; Exs. RPF 251a-e.)

36.

As a surrogate for a lower color limit, Mr. McCubbin proposed a lower limit on BOD, which he testified would ensure a reduction in the amount of organic waste in the discharge, which would also reduce the amount of color. Mr. McCubbin considers a lower BOD limit an indirect but practical way to improve the overall quality of the wastewater, including color. However, based on the preponderance of evidence in the record, the Court finds that the amount of BOD in the Rayonier discharge is not directly correlated with the amount of color in the discharge and that the evidence is insufficient to prove that color will be reduced to acceptable levels if BOD is decreased to the levels Mr. McCubbin proposed. Mr. Foster's analysis of Rayonier's water quality data persuasively showed that the level of BOD in the discharge is not correlated with the color concentration in the wastewater. Mr. Foster testified that these results were consistent with the difference between BOD and color molecules. The molecules that cause color in pulp mill effluent are like those that create color in tea. If bacteria are added to sweet tea, which has high BOD in the form of sugar, the bacteria will eventually eat all the sugar, converting the sweet tea to unsweet tea, with no BOD. However, the color molecules, which are only minimally biodegradable, will remain. (WDT McCubbin, at 21-22; WDT Foster, at 11-16, 18; Tr. 1536-37, 1566-67, 1912-15.)

37.

Accordingly, the Court finds that if Rayonier's discharge into the Altamaha contains the amount of color allowed by the limits in the 2015 NPDES Permit, the color will be noticeable under low flow conditions. In addition, the Court finds that the preponderance of the evidence showed that some users of the Altamaha will find such color objectionable, and it will affect whether, where and how they use the river for fishing and recreation. However, the evidence is

insufficient to prove that the color limits suggested by ARK are necessary to reduce the color in the effluent to a level where it is no longer noticeable or objectionable to users of the river.

2. Odor

a) Odor in the water

38.

There is ample evidence in the record regarding the general odor from the Jesup Plant. It is pervasive and smells bad to many people. Witnesses described the odor as an acidic, chemical or sulfuric smell. Others just said that it smells like a pulp mill. More than seeing the river change color, the strong odor is what affects people using the river near the Jesup Plant. Mr. Jordan, a coroner by trade, testified that "the smell is what really hit me hard" and that it was like paddling in a sewer. He testified that the smell made him nauseated, even though in his profession he is accustomed to malodor. Similarly, Mr. Meyer testified that in 2012 an acrid smell hit him when he passed the outfalls during Paddle Georgia, and that the smell stung his nose and made his eyes water. His children howled when they were splashed by the water from the oars. Jen Hilburn, the current Riverkeeper, testified that the odor makes her eyes water and her head hurt. (Tr. 137-39, 142, 203-05, 222, 267-68, 291, 317, 323-26, 339-40, 350, 353, 360, 758-59, 887, 889-890.)

39.

The more nuanced question is whether the offensive odor is coming from the ambient air surrounding the plant and the lagoons or whether the effluent causes the river water to smell bad and interfere with the use of the Altamaha. As a starting point, there is a pulp mill odor all around the Jesup Plant. Some witnesses testified that they can smell the pulp mill odor from the

River Bridge and from Jaycee's Landing, both of which are upriver from the Jesup Plant.[34] From the river, many witnesses testified that the odor hits you before you reach Outfall No. 1, around where the large steel retaining wall separates ASB 1 from the river. At that point, the odor is from the ambient air and not the river water. (Tr. 137-38, 339, 887, 1066-67.)

40.

Many of Rayonier's witnesses who acknowledged seeing color in the water denied smelling an offensive odor coming from the river water itself. Rather, those witnesses testified that the odor was coming from the plant, either from the smoke stacks or the lagoons, which in the case of ASB 1, sits just feet away from the river. The EPD witnesses who visited the river during the permitting process could not detect an odor from the river water. For example, Audra Dickson, the manager of the Industrial Permitting Unit in the Wastewater Regulatory Program of the Watershed Protection Branch, did two site visits. Although she admitted she smelled the odor in the air, she did not detect an odor from the discharge on the water. James Capp, the Chief of the Watershed Protection Branch of EPD, also testified that he could not detect an odor from the river water during his two site visits. (WDT Capp, 2, 6; Tr. 566-67, 620, 667-68, 1066-67, 985-86, 987.)

41.

Similarly, Rayonier's expert, Mr. Amendola, who visited in 2015 and 2016, collected samples from both outfalls. The sample from Outfall No. 1 had "a discernable, but not strong odor," and the sample from Outfall No. 2 had even less odor. Mr. Amendola opined that the

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[34] Beth Roach testified on behalf of ARK that the odor from the Jesup Plant interferes with her enjoyment of the river. However, she explained that the offensive odor is from the treatment ponds, which she smells when she drives over the River Bridge and which burns her lungs. She also testified that she smells the odor from the plant when she pulls in at Jaycee's Landing. Ms. Roach admitted that she does not know what the river water smells like because she has not been on the river by the outfalls since the mid-1980s. Another ARK witness, Mark Yeager, who has never been on the stretch of the Altamaha past the Jesup Plant, testified that he smells a sulfuric, pulp mill odor when he drives across the River Bridge. Based on the foul smell, the aerial photographs, and what other people tell him about the discharge, he does not use this part of the river for kayaking. (Tr. 323-26, 335, 337, 339-40, 343.)

levels of odor he observed were not so "overpowering" or "revolting" that odor effluent limits were warranted. He theorized that people that were complaining about the odor were, in fact, smelling the characteristic odor from the pulp mill and lagoons. During Dr. Johns' four trips to the Altamaha from 2012 to 2016, he rode in a boat downriver past the outfalls and got into the water on his hands and knees searching for fresh-water mussels. Two of these visits were during very low flows that were at or below 7Q10. He did not detect any odor in the water on any of these trips, although he did smell odor from the lagoons while on the boat. He also did not detect any odor on his skin or clothing when he left the river. (WDT Amendola, at 41-42; WDT Johns, at 4-5; Tr. 1275-77, 1288, 1406-08.)

42.

Many of the long-time residents who are frequent fishermen on the Altamaha testified that the smell is strong and unpleasant around the outfalls and that, in the past, when they got into the water around the outfalls, they would smell like the discharge when they got out. However, witnesses such as Donny Jones, a life-long Jesup resident who fishes in the Altamaha and passes by the outfalls almost every weekend, testified that the odor in the air is "so strong that you can't tell if it's coming from the water also." He also testified that he no longer goes in the water around the discharge in order to avoid the malodor so he does not have personal knowledge of the current presence or level of odor in the river water downstream of the outfalls. Similarly, Tony Mosley, another lifelong Wayne County resident and fisherman, testified that when the river is low he can smell the discharge in both the water and the air, and he describes the smell as "nasty" and "awful." He tries to avoid fishing by the outfalls because of the odor. Even Don Harrison, a long-time DNR employee who has monitored fish populations on the Altamaha for twenty years, testified that at times over the years he has smelled the effluent in the

river, particularly during low flow periods in the summer. (WDT Harrison, at 2; Tr. 202-03, 208-09, 221-22, 225-26, 238, 525.)

43.

Other witnesses testified that they could distinguish between the airborne odors from the plant and the odor coming from the river water. For example, Mr. Jordan testified that in 2014, while kayaking in low water, he first smelled the odor in the air near the River Bridge. However, once he got to Outfall No. 1, he could detect the odor coming off the water. The smell from the water was much stronger than from the air and continued for miles. Mr. Jordan paddled down river for eight to ten miles before setting up camp and washing out his clothes. Although he could no longer smell the pulp mill odors in the air, his rinsed clothes smelled like the effluent in the morning. Mr. Meyer similarly testified that in 2012, during Paddle Georgia, he had been in the town of Jesup and was familiar with the pulp mill smell. He said the odor near the outfalls was different. When motorboats would pass by and churn up the water, the smell would get very strong, even after traveling downstream ten miles. When the paddlers stopped for lunch on a sandbar, no one played in the water because of the smell. (Tr. 349-52, 360-61, 758-60.)

44.

The testimony of both the current and former Riverkeepers, as well as ARK's expert, was similar. Ms. Shepherd testified that she can distinguish between airborne odors from the Jesup Plant and waterborne odors from the discharge in the river, especially when the wind is blowing away from the plant. When she is in a boat on the river, Ms. Shepherd detects the odor from both outfalls, and she testified that her clothes stink when she gets home from a trip to that section of the Altamaha. Ms. Hilburn also testified that she can distinguish between the odor in the air and in the water. When she travels by boat downriver from Jaycee's Landing, she usually

cannot smell the odor. As she approaches the steel retaining walls separating ASB 1 from the river, the smell becomes noticeable, but then fades until she approaches Outfall No. 1. There, the odor "hits you like a 2 by 4." In addition, Ms. Hilburn testified that when she gets home after a trip, her hands, body and boat stink. Mr. Sulkin, ARK's expert who visited the river and took water samples near the outfalls in 2011, 2012, and 2016, can distinguish between the odor in the air and the odor in the water, and he described the smell of the river water as putrid and noxious. After he touches the water, his skin smells like pulp mill waste for several hours and requires scrubbing with soap to remove. As recently as March 16, 2016, Mr. Sulkin testified that the smell coming off the water was sickening, and that he could still smell a foul odor on his hands even after washing them. (WDT Sulkin, at 10, 15; Tr. 137-39, 142, 143, 815, 823-26, 887-89, 907-09.)

45.

In an attempt to quantify the odor in the river water, Mr. Sulkin arranged for a series of water samples to be taken at various points along the Altamaha, both upriver, downriver, and at or near the outfalls, during 2011, 2012 and 2016. The samples were shipped to an accredited laboratory, which performed an odor test following the protocols in an EPA Manual entitled "Methods for Chemical Analysis of Water and Wastes." Although the testing method used by the lab – EPA Standard Method 140.1 – was not approved for monitoring purposes under the NPDES regulations, Mr. Sulkin opined that it was a valid way of evaluating whether there was discernable odor in the river from Rayonier's discharge. The laboratory technicians assigned a Threshold Odor Number ("T.O.N.") to each sample, where a T.O.N. of one indicated no odor. According to the test results, the samples taken upstream of the outfalls had no odor, but almost all of the samples taken at the outfalls and downstream were positive for odor, meaning those

samples required varying amounts of dilution before they reached a perceived T.O.N. of one. The one exception were samples that Mr. Sulkin collected on May 27, 2016, where the sample from Outfall No. 2 had a T.O.N. of 5, but all other samples tested, including samples from Outfall No. 1 and a sample from Dick's Swift, measured 1 T.O.N., meaning no odor was detected. (WDT Sulkin, at 14; Tr. 785, 791-93, 815, 842-48; RPF Ex. 168; Exs. P-5A, 5C, 5D, 5E, 5G.)

46.

Although Mr. McCubbin did not propose a definitive odor limit in terms of T.O.N. or any other numerical measure, ARK proposed an odor limit of 10 T.O.N. be included in the permit, and Mr. Sulkin concurred. Having weighed the evidence in the record on odor testing and limits, the Court finds that ARK did not present sufficient evidence to prove either the reliability of the suggested testing methodology or the appropriateness of the suggested limit. There was simply no evidence to support a limit of 10 T.O.N. or any other limit on odor based on the methodology in EPA 140.1. In addition, the method is not approved by either EPA or EPD for use in the NPDES permitting process, and no other permit in the country has such a limit. (WDT McCubbin, at 20, 21; WDT Amendola, at 40-41; McCubbin Depo. Tr. 110; Tr. 809-11, 875, 1142, 1809; Ex. P-5G.)

47.

As an alternative to a specific odor limit, both Mr. Sulkin and Mr. McCubbin suggested using color or BOD as a surrogate for odor. Both experts testified that the same constituents that cause color in the water cause the odor, so odor exists when there is a color problem. Specifically, Mr. Sulkin testified that the odor was the result of chemicals, such as sulfur compounds, that give off gases and smells. Mr. McCubbin, agreed, explaining that malodor in

wastewater consisted of organic sulfides and components of turpentine. Similarly, Mr. McCubbin opined that, just like with color, high BOD correlates with increased odor because BOD measures the quantity of biologically active material, which causes color and odor in wastewater. However, neither Mr. Sulkin nor Mr. McCubbin presented any probative evidence to support a direct correlation between the odor in Rayonier's effluent and the amount of color or the amount of BOD in the effluent. (WDT McCubbin, at 20, 21; WDT Sulkin, at 13; Tr. 827-28, 873-74.)

48.

In fact, the preponderance of the evidence showed that there is not a direct correlation between odor, color or BOD in the Rayonier discharge. First, with respect to odor and color, Dr. Johns compared Mr. Sulkin's odor sample data with Rayonier's discharge data for color and with flow data from the United States Geological Survey ("USGS") gauge at Doctortown, which is located on the Altamaha between Outfall No. 1 and Outfall No. 2. He found no correlation between the amount of odor in the samples and the amount of color or flow. In fact, three of the samples with high color values had low odor numbers. Mr. Manzer also opined that there is no direct relationship between the color in the discharge and its odor. He explained that the source of the color in the discharge is primarily lignin, which is essentially odorless, while the source of the odor is primarily extractives, like turpentine, which are colorless. Moreover, Mr. Manzer testified that many of the improvements made in the last few years, including improvements to the aerators and an upgrade to the system that removes turpentine, have improved the odor in the effluent, which he describes as now having only a "very faint" odor. (WDT Foster, at 4; Tr. 435, 1411-17, 1661-62, 1665-71, 1914; RPF Exs. 249, 259.)

49.

In addition, the evidence in the record was insufficient to prove a direct correlation between BOD and odor. As mentioned above, Mr. McCubbin acknowledged that his recommendation that the NPDES permit have lower BOD limits was a means to improve the overall quality of the wastewater, and not a direct means to regulate the amount of odor or color in the effluent. He considers the reduction in BOD to be an important part of pollution control in general because at the low levels of BOD he recommends, all pollutants, including color and odor-causing molecules, will be reduced to "insignificant" levels. However, the BOD limits set in the 2015 NPDES permit are already lower than the minimum national standards set by EPA under the Clean Water Act and were calculated to meet the more stringent numerical water quality standards established by EPD for dissolved oxygen. Without more specific evidence regarding whether BOD and odor are related and how much reducing BOD will reduce odor, the Court finds that ARK's proposed reduction in the BOD limit, as an appropriate surrogate for reducing odor or color, is not supported by a preponderance of the probative evidence. (WDT McCubbin, at 21, 23; WDT Amendola, at 13-15, 16; Tr. 1142-43, 1914-15.)

b. Fish tainting

50.

In addition to the impact the odor from the effluent has on whether people want to swim, boat, or camp on the Altamaha, ARK contends that the odor in the effluent taints the fish, causing them to smell like pulp mill discharge and interfering with the use of the river for fishing. According to Mr. McCubbin, organic materials in the discharge are absorbed by fish flesh. Fish tainting was a common problem downstream of pulp mills in the past, but was resolved in most places around the world due to stricter environmental regulations. Mr.

McCubbin testified that he was involved in a multi-year study in Canada that established a strong correlation between BOD and fish tainting. Although Mr. McCubbin acknowledged that this study was unable to specifically identify what constituents of pulp mill effluent was the cause of the tainting, he testified that the relationship between the pollution in the effluent and the tainting was undisputed. He opined that any attempt to conduct a scientific study about whether Rayonier's discharge is causing fish tainting is unnecessary because it is not a scientific issue. Rather, Mr. McCubbin's opinion is that if people are complaining that fish caught downstream of the Jesup Plant smell bad and taste bad, tainting from the effluent is "self-evident" and not a scientific issue at all. He further opines that if the permit limited BOD, color, and TSS to the lower limits he proposed, the objectionable odor and fish tainting would be eliminated because all these measures go hand-in-hand. (WDT McCubbin, at 20-21, 32; McCubbin Depo. Tr. 21, 36-38, 101-09.)

51.

The Court has considered that Mr. McCubbin was qualified as an expert in pulp mills, but not as an expert on aquatic life. Rayonier's expert, Dr. Johns, who is an aquatic toxicologist, testified that tainting in fish is caused by chemicals and can occur where there is a proliferation of algae or too many nutrients in the water, as well as by pulp mill discharge. Although Dr. Johns testified he would need more information to rule out fish tainting as a current problem, he opined that the specific evidence of fish tainting in the Altamaha near the outfalls was insufficient to determine that fish were being tainted by the chemicals in Rayonier's current discharge. Having considered the evidence of current fish tainting in the record, the Court agrees with Dr. Johns. (Tr. 1489-91, 1493, 1498.)

52.

First, the scientific data regarding the abundance and size of the fish in the Altamaha indicates a healthy fish population both upstream and downstream of the Jesup Plant. In fact, fish populations downstream tend to be more robust than those found upstream of the plant. Dr. Johns testified that the health status of the fish population is considered "an excellent measure of the quality of the environment in which the fish live." Dr. Johns also conducted a freshwater mussel reconnaissance survey in the last four years on the beaches and sandbars along the Altamaha near and downstream of the outfalls. Even in low flow conditions, when odor and color were likely at higher concentrations, he found an abundance of mussels as well as clams. According to Dr. Johns, mussels are an important indicator of the health of freshwater systems. Donald Harrison, a fisheries biologist with DNR, agrees with Dr. Johns on the relative health and abundance of fish populations above and below the Altamaha. (WDT Johns, at 6-7, 13, 18-19; WDT Harrison, at 4; Tr. 537, 545.)

53.

Although the health and abundance of the fish population does not mean that fish are not being tainted by the effluent, there was also considerable evidence in the record of frequent fishing in the area below the outfalls, which is relevant to the issue of whether tainting, if it occurs, is interfering with the use of the river. Dr. Johns also evaluated data from annual creel surveys, which gave the number of recreational anglers fishing at various access points along the Altamaha, but did not capture where on the river the anglers caught the fish. Mr. Harrison has observed that Jaycee's Landing is one of the most popular access points on the Altamaha and creel surveys are often conducted from that location. In addition, Dr. Johns and his staff analyzed aerial photographs taken in 2013 and 2014 that depicted the Altamaha both upstream

and downstream of the Jesup Plant. Whenever the pictures, which numbered around a thousand, depicted boats that were stationary and not alongside a dock or launch, Dr. Johns assumed that the boaters were fishing, and he counted the number of non-moving recreational boats and noted each boat's location. 85% of all the non-moving boats were positioned at or downstream of the outfalls, and 15% of the non-moving boats were in the vicinity of Outfalls No. 1 and No. 2. Dr. Johns found that the disproportionate presence of non-moving boats at or downstream of the mill outfalls was consistent with his personal observation of boat activity during his four visits to the river. (WDT Harrison, at 4-6; Tr. 460-62; WDT Johns, at 20, 26-27; Tr. 1444, 1447.)

54.

Other witnesses confirmed Dr. Johns' observation regarding frequent fishing activity downstream of the Jesup Plant. Bert Deener, a fisheries biologist with DNR who is frequently on the Altamaha, has conducted electro-fishing sampling on behalf of DNR and caught fish recreationally on this part of the river for years. He has observed people fishing both up and downstream of the Jesup Plant, but more people fish downstream. Mr. Deener and a number of others testified that the river is larger downstream of the Jesup Plant and has more desirable fishing holes, including a prime catfish spot right in the vicinity of Outfall No. 1 where a state record catch was recently caught. Mr. Deener himself has a favorite spot for catching mullet across from Outfall No. 2, and he has observed shad nets located near the outfalls. Mr. Harrison also testified that downstream of the Jesup Plant was generally a popular spot for fishing, camping and picnicking. Mike Deal, the Jesup City Manager, testified that he has caught thousands of fish in the Altamaha and 99% of them were from below the outfalls. Many other witnesses testified that they have eaten fish caught downstream of the outfall for years and never

noticed a bad taste or smell. (Tr. 375, 385-86, 421-23, 428-29, 450-52, 463, 539, 617, 635, 670, 693, 1060, 1066.)

55.

Although many seasoned anglers who frequently fish in the lower Altamaha denied ever catching a fish below the Jesup Plant that smelled like effluent, some of the DNR witnesses testified that they have received complaints over the years regarding fish tainting in this area.[35] In addition, Mr. McCubbin has talked to about five fishermen over a ten-year period who have complained about the smell of the fish caught near or below the outfalls. Finally, three witnesses testified at the hearing that they have caught fish downstream of the Jesup Plant that smell bad coming out of the river and taste even worse after they are cooked. Tony Moseley fished on the Altamaha almost every weekend in 2015, and although he would go well downriver from the Jesup Plant to fish, he estimates that a third of the fish he caught smelled like pulp and sulfur, and he had to throw them back. The first and only time he caught a fish that smelled like the mill and tried to cook it, the smell was even worse after cooking, and he had to air out his house. Onnie Youmans, who has lived near Jesup for 81 years and worked at the Jesup Plant as a digester for over 30 years, testified that he used to eat fish caught below the mill, and they were delicious. However, two years ago, he tried to eat a white perch caught below the mill when the river was low, and he almost gagged. It was not edible. Donny Jones, a frequent weekend fisherman, travels fifteen minutes past the outfalls to avoid the smell of the discharge, but still

[35] In addition to receiving some complaints, DNR had one frozen sample from a fish caught somewhere in the Altamaha analyzed and it tested high for phenol, an organoleptic compound that is found naturally in swampy waters. However, there is no evidence of whether that fish was caught above or below the Jesup Plant, when it was caught, or how long and under what condition it was stored before it was tested. Consequently, this evidence was not relevant to the issue of fish tainting in this case. Similarly, Mr. Denner, after receiving a cluster of complaints during the 2000 to 2007 time period, cut open a dozen mullet caught below the Jesup Plant and had some of his employees sniff them to see if any smelled bad. The record does not contain enough information about the results of this informal sampling to be relevant to the issue of fish tainting. (Tr. 424-26, 524, 1111-12.)

catches some fish that smell bad, which he throws back. (WDT Booth, at 6; McCubbin Depo. Tr. 95; Tr. 206, 217-18, 222-25, 229-30, 234-36, 242-43, 389-90, 421-23, 424, 428-29, 615, 620, 1111-12.)

56.

Although the Court finds that there is some evidence of fish tainting caused by the Rayonier discharge, particularly in the past, the evidence is not sufficient to prove by a preponderance that fish tainting is a current problem that interferes with the use of the Altamaha by anglers and others who wish to use the river for fishing.

3. Turbidity

57.

Turbidity measures the cloudiness in a liquid: how much light is scattered by suspended solids in the liquid. As discussed above, it is not the same as TSS, and it is also different from color. A liquid can have color, but not be turbid or cloudy. For example, coffee and Coke have color, but no turbidity. Conversely, milk, or flour mixed with water, have high turbidity, but no color. Having weighed the evidence in the record, including the largely unsupported opinions of ARK's experts that the Rayonier discharge has both color and turbidity, the opinions of Rayonier's experts that turbidity in the discharge is low based on turbidity measurements from Outfall No. 2 and from upstream and downstream of the Jesup Plant, and the almost complete absence of personal observations from witnesses regarding turbidity or cloudiness, as opposed to color, in the river water, the Court finds that ARK failed to prove that Rayonier's effluent is a significant contributor of turbidity to the Altamaha or that turbidity interferes with the use of the river. Rather, it is more likely than not, based on the evidence in the record, that any visible plumes in the Altamaha downriver of the Jesup Plant are caused by color in the discharge, not

turbidity. (WDT McCubbin, at 23; WDT Johns, at 7, 34, 47; WDT Sulkin, at 12; WDT Mooney, at 20-22; WDT Amendola, at 7, 38-40; WDT Capp, at 8; McCubbin Depo. Tr. 51-54; Tr. 833-41, 1003, 1277, 1875-76; RPF Ex. 230.)

F. **The Permit**

1. 2001 Permit

58.

EPD issued NPDES Permit No. GA0003620 to Rayonier on May 25, 2001 ("2001 Permit"). There were no limits for color, odor or turbidity in the 2001 Permit, but Rayonier was required to do weekly monitoring, conduct a color study,[36] and develop best management practices to control color. Although ARK challenged the issuance of the 2001 Permit, seeking, among other things, a specific color limit, ARK and Rayonier entered into a settlement agreement, which was accepted by EPD. On October 31, 2005, Rayonier submitted a timely renewal application for the 2001 Permit, which was set to expire on April 30, 2006. In the renewal application, Rayonier outlined its efforts to investigate color reduction technologies, at times in consultation with ARK. Rayonier also requested that EPD renew the permit without color limits, but with a condition that Rayonier complete its color reduction study in two years and apply for a permit modification to incorporate a numeric color limit. (WDT Dickson, at 3; Jt. Exs. J-1, J-2; Exs. R-33, R-34; Stipulations of Fact, at ¶ 6.)

2. 2008 Consent Order

59.

EPD administratively extended the 2001 Permit, which remained in force, despite the pending renewal application, until after July 31, 2007, when EPD received a citizen complaint

[36] There is no evidence in the record regarding whether this color impact study was ever completed and submitted to EPD. (Tr. 955-56.)

regarding Rayonier's effluent. EPD and Rayonier executed a Consent Order on March 6, 2008 ("2008 Consent Order"), which included EPD's conclusion "that the aesthetic impact of the Facility's discharge has the reasonable potential to violate the Narrative Water Quality Standards because it has the reasonable potential to produce turbidity or other objectionable conditions that interfere with legitimate water quality uses of the Altamaha River and it has the reasonable potential to cause turbidity that results in a substantial visual contrast in the Altamaha River due to man-made activity." Although Rayonier disagreed with EPD's conclusion, in order to avoid litigation it agreed to implement a Color Reduction Plan, which Rayonier estimated would cost between $65 million and $75 million. The Color Reduction Plan included five projects, including (1) improvements to brownstock washing, (2) installation of OD on the C line, with the target of reducing the Kappa numbers to between 12 and 16, (3) upgrading spill recovery systems, (4) modifying the screening operations on the C line, and (5) a semi-annual color balance study to identify the source of untreated color discharges. The 2008 Consent Order also set a series of color limits, which required Rayonier to reduce the annual average color in its discharge to 350 TPD within eighteen months, 300 TPD within 57 months, 270 TPD within 84 months, and 250 TPD, or 115% of the average of the color discharge for the preceding twelve months, whichever was lower, within 96 months. The 2008 Consent Order anticipated that these color limits would be incorporated into the next permit. (WDT Dickson, at 3-4; Ex. R-35; Jt. Ex. J-3; Stipulations of Fact, ¶¶ 7-9.)

60.

On July 29, 2008, Rayonier submitted a revision to its October 2005 NPDES Permit renewal application, which included supplemental information, as well as the capital spending plan for the projects required by the 2008 Consent Order. The 2008 Consent Order was

amended three times, including an amendment in 2011 that allowed Rayonier to dispense with the planned installation of OD on the C line in light of its conversion from a fluff line to a CS line. On July 13, 2012, Rayonier submitted an updated application for renewal of the 2001 NPDES permit, which included the results of Whole Effluent Toxicity ("WET") testing and other supplemental information. The application was again revised to correct typographical errors on June 3, 2013. (WDT Dickson, at 4; Jt. Exs. J-3, J-4, J-5, J-6, J-7; Stipulations of Fact, ¶¶ 10-11.)

3. 2015 NPDES Permit

61.

For reasons that are not altogether clear from the Court's review of the record, EPD did not take formal action on Rayonier's renewal application and its many revisions until early 2015, almost nine years after the 2001 Permit was set to expire. On February 18, 2015, EPD transmitted to EPA and Rayonier a copy of a draft renewal permit, which included the color limits and deadlines established in the 2008 Consent Order ("Draft Permit").[37] Shortly thereafter, EPD issued a Public Notice of Rayonier's application for the renewal of the permit and set a public hearing for March 31, 2015 in Jesup. On March 19, 2015, prior to the public hearing, EPA sent an interim objection to the issuance of the Draft Permit because EPA found the information EPD submitted to be inadequate to determine whether the Draft Permit's limits were stringent enough to ensure that the discharge would not cause or contribute to a violation of Georgia's narrative water quality standards for color, odor and turbidity. EPA also raised

[37] Inexplicably, the color limits, which were listed under "Special Requirements," included an annual average color limit of 300 TPD for January 6, 2013, even though the draft permit was transmitted by EPD in February 2015. It also listed a deadline of March 6, 2015, which was just weeks away, for Rayonier to reach the annual average color limit of 270 TPD. Presumably the final limit in the draft permit had a deadline of March 6, 2016 and was defined as "115% of the average of the color discharge for the immediately preceding 12 months, not to exceed 250 U.S. tons/day annual average." (Jt. Ex. J-8.)

concerns about the adequacy of the design of the Altamaha River Study ("River Study"), which was included as an attachment to the Draft Permit and required Rayonier to perform a water quality study of the stretch of the Altamaha adjacent to the Jesup Plant in order to determine if the designated use of fishing was impaired. The River Study consisted of several modules that required, among other things, (1) the collection and evaluation of data on the behavior of effluent color and mixing under critical and normal flow conditions; (2) a survey conducted by a third party to document whether and why anglers frequent or avoid fishing near the outfalls and whether they eat fish caught from these locations; (3) a fish and mussel study, and (4) fish tissue analysis for odor-causing compounds. The River Study did not have a specified deadline for completion because some of the modules could not be completed until the reoccurrence of 7Q10 conditions. (WDT Dickson, at 10; Jt. Exs. J-8, J-9, J-10; Stipulations of Fact, ¶¶ 13-15.)

62.

On March 31, 2015, EPD conducted a public hearing on the draft permit in Jesup. Several EPD representatives attended, as well as a number of Rayonier employees and community supporters. According to Ms. Dickson, 150 people attended the public hearing, and 99% of those that spoke were in favor of the Draft Permit. Mr. Capp also attended the public hearing and echoed Ms. Dickson's assessment that over 90% of the commenters supported the Draft Permit, with only three opposed. Mr. Capp explained that the number of people in support of the Draft Permit was relevant to whether the water quality standards were being met. However, notwithstanding a statement in the Public Notice that "[w]ritten comments are welcomed," neither Mr. Capp nor Ms. Dickson mentioned or appeared to have given more than cursory consideration to the written comments received by EPD that were submitted in response to the Public Notice and that were opposed to the Draft Permit. They minimized the negative

written comments, many of which Ms. Dickson found to be formulaic, and focused on the favorable comments made during the "pro-Rayonier" public hearing in Jesup.[38] The Court finds that public opposition to the Draft Permit was chilled by the hostile atmosphere toward naysayers at the public hearing. Ms. Roach testified that she attended the public hearing, but was afraid to speak out against the draft permit because so many in the community depend on the jobs Rayonier provides. More disturbing, Ms. Hilburn, the current Riverkeeper, described receiving threatening messages on Facebook prior to the public hearing and explained that she abruptly ended her remarks after just a few comments because a man standing in the back of the room made a "slit your throat" gesture and another made a "gun to the head" gesture. (WDT Dickson, at 10; WDT Capp, at 6; Tr. 315, 891-94, 942-43, 947-48, 951, 1000-01, 1793; Ex. P-10A-C; Stipulations of Fact, ¶ 16.)

63.

Following the public hearing, EPD undertook a "reasonable potential" analysis as required by EPA's interim objection – that is, EPD attempted to determine if there was a reasonable potential for color, odor, or turbidity from the discharge to cause or contribute to a violation of Georgia's narrative water quality standards. In doing so, EPD looked at its current "305(b)/303(d) List," a biennial report on the water quality of Georgia's waterbodies mandated by the Clean Water Act. In the draft 2012 list, the Altamaha River below the Jesup Plant was placed in Category 1, meaning that its water quality supported its designated use. After an objection to this categorization by ARK and in consultation with EPA, EPD moved this section of the Altamaha to Category 3, indicating that there was insufficient data to make a

[38] See generally Mahelona v. Hawaiian Elec. Co., 418 F.Supp. 1328, 1333 (D. Haw. 1976) ("the expression of public concern, or the lack thereof, should be only one of many factors considered" by Corps of Engineers in determining environmental impact from construction of a discharge facility; the Corps should not "place such reliance on the silence of relatively unorganized and ill-formed citizens").

determination as to whether the designated use was being supported. Color was identified as the possible impairment, and EPA approved the 2012 305(b)/303(b) List. Dr. Booth, the manager of the Watershed Planning and Monitoring Program of the Watershed Protection Branch, testified that the data collection required to determine whether this section of the Altamaha is impaired is "resource-intensive," which is why EPD has asked Rayonier to assist with the collection through the River Study. EPD had historic data on color in the discharge, but not enough current data capturing the color reduction improvements made by Rayonier pursuant to the 2008 Consent Order. Dr. Booth was unaware of the odor data collected by Mr. Sulkin and ARK, and the only information she had on odor was the one frozen fish sample that had tested positive for phenol. The necessary data to determine whether the river was impaired was not collected in time for the 2014 List, so this section of the river remained in Category 3. Although EPA anticipated that a study would be completed in time to be considered for the 2016 cycle, there was no evidence in the record of this hearing that the information was currently available or would be ready in time for the formulation of the 2016 305(b)/303(d) List. (WDT Booth, 2-7; WDT Dickson, at 12; Tr. 1111-14, 1127, 1132, 1771-72, 1774; Jt. Ex. J-12; Stipulations of Fact, ¶ 17.)

64.

EPD determined that color limits must be included in a renewal permit because it concluded that there "may be" a reasonable potential for color to cause or contribute to a violation of Georgia's narrative water quality standards, based mainly on the 305(b)/303(d) List. EPD also did a reasonable potential analysis for odor and turbidity. Ms. Dickson testified that EPD considered that the 305(b)/303(d) List did not list the river below the Jesup Plant as impaired for odor or turbidity, and noted the lack of evidence of toxicity and an absence of other in-stream odor and turbidity data. Finally, EPD considered Mr. Capp's and Ms. Dickson's

personal observations during two site visits, during which they did not detect objectionable odor or turbidity in the river water. Based on these factors, EPD determined that there was not a reasonable potential for odor or turbidity to cause or contribute to a violation of the narrative water quality standards.[39] (WDT Dickson, at 12-14; WDT Capp, at 6-8; Tr. 996-99; Jt. Ex. J-13 (Fact Sheet, at 14-15).)

65.

As a result of its reasonable potential analysis, EPD developed daily average color limits as well as daily maximum color limits for the renewal permit. Ms. Dickson consulted a number of EPA manuals and technical support documents to develop these limits, taking into account the demonstrated performance of the installed technology at the Jesup Plant and the discharge data from January 1, 2014 to July 31, 2015.[40] Given the improvements made by Rayonier under the

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[39] At the administrative hearing, for the first time on record, Mr. Capp explained EPD's interpretation of the narrative water quality standards, which require that the waters of the State be free from turbidity, color and odor that interfere with "legitimate water uses." According to Mr. Capp, these standards must be considered in the context of the particular water's "designated use." He further testified that the narrative water quality standards do not require that all people get to use all sections of every waterbody at all times. Rather, for multi-use bodies of water, like the Altamaha, there must be a reasonable accommodation of all legitimate uses, including industrial discharges. This section of the Altamaha's designated use is fishing, the lowest designation in terms of water quality, and the narrative standards should not be interpreted to convert the designated use to some higher use, such as recreation. Mr. Capp opined that for a discharge to "interfere" with legitimate use under the standards it must "obstruct" or "prevent" the ability to use the river, not just create a "preference" to use one section of the river over another. Mr. Capp cited the Canton mill on the Pigeon River as an example of a discharge that interfered with legitimate use. According to Mr. Capp, the Pigeon River was a clear stream that people wanted to use for rafting and fishing. However, because of the color in the discharge, it was not being used for those purposes. After stricter color limits were imposed, according to Mr. Capp's uncorroborated statements, the use of the Pigeon River downstream of the mill increased dramatically. (Tr. 1730, 1778, 1794-95, 1802-05, 1811.) See In the Matter of: Champion Int'l Corp., 1992 EPA ALJ LEXIS 516 (Feb. 12, 1992) (citing numerous studies that showed the Pigeon River below Canton to be severely degraded, and its fish, aquatic life, and recreational use to be adversely affected, by the Champion effluent).

[40] Ms. Dickson testified that she consulted EPA's NPDES Permit Writer's Manual and EPA's Technical Support Document for Water Quality-based Toxics Controls, both of which were attached to her WDT and admitted into evidence. The Court has reviewed these documents and found little, if any, guidance on developing effluent limits for pollutants like color and odor. The Permit Writer's Manual notes that "[t]he goal of the permit writer is to derive effluent limitations that are enforceable, adequately account for effluent variability, consider available receiving water dilution, protect against acute and chronic impacts, account for compliance monitoring sampling frequency, and assure attainment of the WLA [Wasteload Allocations] and water quality standards. In developing WQBELS [water quality-based effluent limitations], the permit writer develops limitations that require a facility to perform in such a way that the concentration of the pollutant of concern in the effluent discharged is nearly always

2008 Consent Order, Ms. Dickson and Mr. Capp testified that it was appropriate to assume that Rayonier was using best management practices and optimizing its color reduction technologies, which justified using the Jesup Plant's recent discharge data to establish the future color limits in the renewal permit. EPD did not conduct any independent review of the available color technologies, and Mr. Capp testified that EPD was not required to do so. Using Rayonier's recent color discharge data, Ms. Dickson calculated a daily average of 229 TPD and multiplied the daily average by 1.5 to create a daily maximum of 344 TPD. The annual average, which was set by the 2008 Consent Order as 115% of the average of the color discharge for the immediately preceding 12 months, was set at 181 TPD. (WDT Dickson, at 11-12, Ex. R-64; Jt. Ex. J-11; Tr. 993-94, 1783-87.)

66.

On or about October 5, 2015, EPD submitted a revised draft renewal permit to EPA, which incorporated the daily maximum and daily averages for color listed above ("Revised Draft Permit"). It also clarified the annual limit on color and made other revisions to the River Study and the reasonable potential analysis. EPA, after sending representatives to the March 2015 public hearing, did not formally object to the Revised Draft Permit, although EPA did notify EPD of two concerns. First, EPA suggested that the permit should have a specific "reopener provision" in the event that data collected during the River Study indicated that stricter color limits were needed to meet water quality standards. Second, EPA repeated concerns that the River Study lacked definitive timeframes for completion and opportunities for direct public input. (WDT Capp, at 11; Jt. Exs. J-11, J-12, J-13; Stipulations of Fact, ¶ 17.)

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below the WLA." Neither of these EPA documents provides any specific, relevant instructions on how a permit writer is supposed to meet these goals when the pollutants at issue cause aesthetic concerns, rather than health or toxicity concerns. (WDT Dickson, at 11, Exs. R-4 (p. 6-32), R-6, R-44..)

67.

On December 29, 2015, EPD issued the 2015 NPDES Permit to Rayonier. In addition to the color limits described above, the 2015 NPDES Permit had effluent limitations on a number of other pollutants, including seasonal limits for BOD and TSS. (Jt. Ex. J-13; Stipulations of Fact, ¶ 18.)

4. ARK's Appeal and Procedural History

68.

On January 27, 2016, ARK filed a timely petition for hearing contesting the issuance of the 2015 NPDES Permit. On February 22, 2016, the Court granted Rayonier's motion to intervene. After Rayonier and EPD filed motions to dismiss, ARK amended its petition for hearing and dismissed two of its claims. Following the Court's Order on Motions to Dismiss issued on May 2, 2016, which granted EPD's motion to dismiss ARK's claim regarding the River Study, the sole count remaining from the Amended Petition was Count I, which alleged that the 2015 NPDES Permit was invalid because it failed to ensure compliance with the narrative water quality standards for color, odor and turbidity. Specifically, ARK contended that the limits for color, TSS and BOD were too high to avoid violations of the narrative standards and that the 2015 NPDES Permit should contain a limit for odor. ARK suggested the following permit limits relating to Count I: 1) color limits of 50 TPD daily average and 75 TPD daily maximum; 2) odor limit of 10 T.O.N. using EPA Standard Method 140.1; 3) TSS limit of 7,200 pounds per day daily average and 10,000 pounds per day daily maximum; and 4) BOD limits of 3,600 pounds per day daily average and 10,000 pounds per day daily maximum. In the alternative, ARK contended that the 2015 NPDES Permit should, at a minimum, explicitly include compliance with the water quality standards as an enforceable permit condition. ARK

sought relief in the form of a declaration that the 2015 NPDES Permit is unlawful, an order invalidating the NPDES Permit, and an order providing instructions to EPD on remand consistent with ARK's suggested permit conditions. (Stipulations of Fact, ¶ 19.)

69.

The administrative hearing took place over seven days. On five days – June 3, 13, 14, 15, and 16, 2016 – the hearing was held in Atlanta at the Office of State Administrative Hearings. The other two days of hearing were held in Blackshear, Georgia at the Pierce County Courthouse on June 9 and 10, 2016. On June 8, 2016, at Rayonier's request and without objection from ARK and EPD, the Undersigned Administrative Law Judge took a view of the Jesup Plant and the Altamaha River, which involved a driving and walking tour of the Jesup Plant and the ASBs, as well as a boat ride on the Altamaha from Jaycee's Landing, upstream of the Jesup Plant and downstream past the two Rayonier outfalls. Counsel and representative of the parties were present during the view, which lasted approximately three hours.

The parties filed post-hearing briefs on July 29, 2016, and counsel for the parties presented closing oral arguments on August 10, 2016.

III. CONCLUSIONS OF LAW

A. Introduction

Georgia law provides that "[a]ny person who is aggrieved or adversely affected by any order or action of the director [of EPD] shall . . . have a right to a hearing before an administrative law judge of the Office of State Administrative Hearings . . . acting in the place of the Board of Natural Resources." O.C.G.A. § 12-2-2(c)(2). The evidentiary hearing is *de novo*, and the administrative law judge, who has "all the powers of the referring agency," must make "an independent determination on the basis of competent evidence presented at the hearing."

O.C.G.A. § 50-13-41(b); Ga. Comp. R. & Regs. 616-1-2-.21(1). In this case, as a third party challenging the issuance of a permit, ARK bears the burden of proving, by a preponderance of the evidence, that the Director of EPD's decision to issue the 2015 NPDES permit to Rayonier was unlawful. Ga. Comp. R. & Regs. 616-1-2-.07(1)(b), .21(4); see also Longleaf Energy Assocs. v. Friends of the Chattahoochee, Inc., 298 Ga. App. 753, 768 (2009) (administrative law judge required "to consider the applicable facts and law anew, without according deference or presumption of correctness to the EPD's decision, and to render an independent decision on whether the Challengers carried their burden to prove by the preponderance of the evidence that the permit should not have been issued"); Hughey v. Gwinnett County, 278 Ga. 740, 741 (2004) (issue before OSAH upon challenge to issuance of a permit by EPD is whether "the permit was wrongfully issued").

B. Statutory Overview

1. Clean Water Act and NPDES Permitting

The Federal Water Pollution Control Act (subsequently renamed the "Clean Water Act"), was enacted "to restore and maintain the chemical, physical and biological integrity of the Nation's waters" pursuant to a "national goal" of eliminating the discharge of pollutants into navigable waters. 33 U.S.C. § 1251(a). Under the Clean Water Act, such discharges are allowed only under an NPDES permit. 33 U.S.C. §§ 1311, 1342. EPA has the authority to issue NPDES permits and to delegate this authority to the States where appropriate. 33 U.S.C. § 1342. Since 1974, EPA has authorized the Director of EPD to issue NPDES permits in Georgia under the Clean Water Act. Hughey v. JMS Dev. Corp., 78 F.3d 1523, 1525 (11th Cir. 1996); O.C.G.A.

§ 12-5-30; O.C.G.A. 12-5-21.[41] See also EPD Ex. 1 (Memorandum of Agreement); Stipulations of Fact, ¶ 4.

2. Water Quality Standards

Under the Clean Water Act, States must establish "water quality standards" that "protect the public health or welfare, enhance the quality of water and serve the purposes" of the Clean Water Act. 33 U.S.C. § 1313(c)(1), (2)(A). The standards must consist of the "designated uses" of the waters involved and the water quality "criteria" for such waters based on their designated uses. 33 U.S.C. § 1313(c)(2)(A). When establishing the designated uses and applicable criteria, States must take into account "their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes," including navigation. Id.; 40 C.F.R. § 131.10. Under the Clean Water Act, States must review their water quality standards at least every three years and send them to EPA for approval. 33 U.S.C. § 1313(c)(1); 40 C.F.R. § 131.5.

Pursuant to the Clean Water Act, the Georgia Board of Natural Resources ("Board") established water quality standards that apply to Georgia's waterbodies. O.C.G.A. 12-5-23(a)(1)(B); Ga. Comp. R. & Regs. 391-3-6-.03. The Board has identified the purpose of these water quality standards as follows:

> The purpose and intent of the State in establishing Water Quality Standards are to provide enhancement of water quality and prevention of pollution; to protect the public health or welfare in accordance with the public interest for drinking water supplies, conservation of fish, wildlife and other beneficial aquatic life, and

[41] Recognizing that the people of Georgia are dependent on the state's rivers, streams and lakes, the Legislature assumed responsibility for the quality of its water resources and the establishment and maintenance of a water quality control program. O.C.G.A. § 12-5-21(a). The policy of the state of Georgia is "that the water resources of the State shall be utilized prudently and for the maximum benefit of the people, in order to restore and maintain a reasonable degree of purity in the waters of the state and an adequate supply of such waters, and to require where necessary reasonable usage of the waters of the state and reasonable treatment of sewage, industrial wastes, and other wastes prior to their discharge into such waters." Id.

> agricultural, industrial, recreational, and other reasonable and necessary uses and to maintain and improve the biological integrity of the waters of the State.

Ga. Comp. R. & Regs. 391-3-6-.03(2). The process of establishing water quality standards begins with creating water classifications, also called "designated uses," to which the water-quality standards will apply. The Board has identified six designated use classifications for Georgia's waterbodies: (a) Drinking Water Supplies, (b) Recreation, (c) Fishing, (d) Wild River, (e) Scenic River, and (f) Coastal Fishing. Ga. Comp. R. & Regs. 391-3-6-.03(4)(a)-(f); 40 C.F.R. § 131.10(a).

Next, the Clean Water Act requires the Board to adopt water quality criteria or standards that will protect the six designated uses. 40 C.F.R. § 131.11(a)(1). EPA regulations require that these standards be "based on sound scientific rationale" and be expressed, if possible, in numerical values. 40 C.F.R. § 131.11(b). If it is not feasible to express the standards in numerical values, the Board must establish narrative standards to protect the designated uses. 40 C.F.R. § 131.11(b)(2). In fulfilling this requirement, the Board has developed both general and specific water quality standards that apply to its six designated use classifications. For example, the specific standards that apply to waterbodies classified as "wild rivers" or "scenic rivers" are narrative and provide that "no alteration of the natural water quality is permitted from any source." Ga. Comp. R. & Regs. 391-3-6-.03(6)(d), (e). For waterbodies that have a designated use of "fishing," like the section of the Altamaha adjacent to the Jesup Plant, the Board has adopted a number of specific numeric standards for dissolved oxygen, bacteria, temperature, and pH levels. Ga. Comp. R. & Regs. 391-3-6-.03(6)(c). According to the Board's specific criteria,

waterbodies whose designated use is fishing require lower water quality than waterbodies that are used for drinking water or recreation.[42] Id.

In addition to the specific criteria for each of the six classifications, the Board has also established "General Criteria for All Waters." Ga. Comp. R. & Regs. 391-3-6-.03(5). These general criteria are referred to as the "narrative water quality standards" because they are not expressed in numerical values, and they are "deemed to be necessary and applicable to all waters of the State." Ga. Comp. R. & Regs. 391-3-6-.03(5). The following narrative water quality standards are at issue in this case:

> (c) All waters shall be free from material related to municipal, industrial, or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses.
>
> (d) Turbidity. . . All water shall be free from turbidity which results in a substantial visual contrast in a water body due to a man-made activity. The upstream appearance of a body of water shall be as observed at a point immediately upstream of a turbidity-causing man-made activity. That upstream appearance shall be compared to a point which is located sufficiently downstream from the activity so as to provide an appropriate mixing zone. . . .

Ga. Comp. R. & Regs. 391-3-6-.03(5)(c)-(d).

3. TBELs and the Pulp and Paper Industry

In addition to water quality standards, which focus on the quality of the receiving water, the Clean Water Act imposes a second set of effluent limits referred to as technology-based effluent limitations or "TBELs," which focus on "how effectively technology can reduce the pollutant being discharged." NRDC v. U.S. EPA, 808 F.3d 556, 563 (2d Cir. 2015) (citing 33 U.S.C. §§ 1311(b), (e), 1314(b)). For existing point sources, the Clean Water Act establishes different technology-based standards depending on the type of pollutant being discharged. 33

[42] The designated use of fishing includes "propagation of fish, shellfish, game and other aquatic life," as well as "secondary contact recreation in and on the water," which is defined as "incidental contact with the water, wading, and occasional swimming." Ga. Comp. R. & Regs. 391-3-6-.03(3)(k), (6)(c).

U.S.C. §§ 1311(b), 1314(a)(4). For all pollutant types, however, EPA must consider the cost of achieving the effluent limitation when establishing the TBELs for a particular industry. Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208 (2009); 33 U.S.C. §§ 1311(b), 1314(b). If EPA has not established TBELs, also known as effluent limitation guidelines or "ELGs," for a particular category or sub-category of an industry, the States must establish TBELs on a case-by-case basis using their best professional judgment. See 33 U.S.C. § 1342(a)(2); 40 C.F.R. § 125.3(c)(2).

EPA has established ELGs for pulp, paper, and paperboard point sources under 40 C.F.R. Part 430. See 47 Fed. Reg. 52,006 (Nov. 18, 1982); 63 Fed. Reg. 18,504 (Apr. 15, 1998); 63 Fed. Reg. 42,238 (Aug. 7, 1998). Part 430 contains 12 separate subcategories for the pulp, paper, and paperboard point source category, including Subcategory A, which applies to discharges resulting from the production of dissolving pulp kraft mills. 40 C.F.R. § 430.10. As discussed in the findings of fact above, Rayonier's Jesup Plant and the Buckeye Plant in Florida are the only two remaining Subcategory A dissolving pulp kraft mills in the United States.

Although previously, in 1974, "EPA [had] identified color as a pollutant of national concern in the pulp and paper industry because of the highly colored effluent resulting from the pulp washing process., . . . EPA withdrew the color limitations in 1982 because it concluded that color was not a problem of *uniform* national concern in the industry and should instead be regulated on a *case-by-case* basis as dictated by water quality requirements." Champion Int'l Corp. v. U.S. EPA, 648 F.Supp. 1390, 1397 (W.D.N.C. 1986) (emphasis in original), vacated and remanded by, Champion Int'l Corp. v. U.S. EPA, 850 F.2d 182 (4th Cir. 1988). In 1993, when EPA undertook to revise the ELGs for the pulp and paper industry as part of what became the "Cluster Rules," EPA recognized that "[c]olor in treated effluents of both bleached and unbleached chemical pulp mills is an easily recognized characteristic of these wastewaters." 58

Fed. Reg. 66,078, 66,103 (Dec. 17, 1993) (Although, at the time, EPA proposed to regulate color as a nonconventional pollutant, it acknowledged that there were limited color data available for most subcategories, including Subcategory A.). When EPA adopted the final rules in 1998, which established new ELGs for a portion of the pulp, paper and paperboard industry, EPA determined that "[t]he potential for significant aesthetic or aquatic impacts from color discharges is driven by highly site-specific conditions and is best dealt with on a case-by-case basis through individual NPDES permits or, when appropriate, through local limits." 63 Fed. Reg. 18,504, 18,538 (April 15, 1998). Accordingly, EPA does not have TBELs or nationwide standards that apply to color for the pulp and paper industry. Id.

4. Reasonable Potential Analysis and Establishment of Water Quality-Based Effluent Limits

When Georgia EPD begins the process of evaluating an NPDES permit application and determining what effluent limitations must be included, it starts with EPA's nationwide TBELs, which are considered minimum standards. 40 C.F.R. §§ 122.44, 125.3(a). If EPD determines that the TBELs alone are insufficient to meet its water quality standards, it must "devise a water-quality based limitation that will be sufficient to the task." NRDC v. U.S. EPA, 822 F.2d 104, 110 (D.C. Cir. 1987) (citing 33 U.S.C. 1312(a)).

Specifically, if EPD determines that a particular pollutant "will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality," EPD must "[e]stablish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use." 40 C.F.R. § 122.44(d). See also WDT Dickson, at 6. Establishing such effluent limit is fairly straightforward if the water quality standard includes

numeric criteria: "the permit merely adopts a limitation on a point source's effluent discharge necessary to keep the concentration of a pollutant in a waterway at or below the numeric benchmark." American Paper Inst. v. U.S. EPA, 996 F.2d 346, 350 (DC. Cir. 1993). When the pollutant has the reasonable potential to cause a violation of a narrative water quality standard, however, establishing the appropriate effluent limit is more difficult. Id.

In order to give guidance to NPDES permit writers, the Clean Water Act's implementing regulations identify three mechanisms to translate narrative criteria into chemical-specific effluent limitations:

> Specifically, the regulation provides that a permit writer must establish effluent limits from narrative criteria by using (1) a calculated numeric water quality criterion derived from such tools as a proposed state numeric criterion or an "explicit state policy or regulation interpreting its narrative water quality criteria"; (2) the EPA recommended numeric water quality criterion, but only on a "case-by-case basis" and supplemented where necessary by other relevant information"; and/or (3) assuming certain conditions are met, limitations on the discharge of an "indicator parameter," i.e., a different pollutant also found in the point source's effluent."

American Paper Inst. v. U.S. EPA, 996 F.2d at 350 (quoting 40 C.F.R. § 122.44(d)(1)(vi)).

Unlike the regulations regarding TBELs, the regulations governing the establishment of water quality-based effluent limits or "WQBELs" do not require or allow the permit writer to take into account the cost of meeting the limit. See NRDC v. U.S. EPA, 808 F.3d at 564-65 ("WQBELs are set without regard to cost or technology availability.") (citing NRDC v. U.S. EPA, 859 F.2d 156, 208 (D.C. Cir. 1988) (WQBEL "begins with the premise that a certain level of water quality will be maintained, come what may, and places upon the permittee the responsibility for realizing that goal.")). Finally, because no permit may be issued when the conditions cannot ensure compliance with applicable WQBELs, "permits must establish limits on discharges that will lead to compliance with water quality standards." NRDC v. U.S. EPA,

808 F.3d at 565 (citing 40 C.F.R. § 122.4(d)); Trs. For Alaska v. U.S. EPA, 749 F.2d 549, 556-57 (9th Cir. 1984).

C. Rayonier's Effluent Has the Reasonable Potential to Cause a Violation of the Narrative Water Quality Standard for Color and Odor.

Based on the findings of fact above, the Court concludes that Rayonier's effluent has the reasonable potential to cause a violation of the narrative water quality standards relating to color and odor during low flow conditions. The applicable narrative water quality standard requires that all waters in Georgia, including the section of the Altamaha adjacent to the Jesup Plant, be free from industrial discharges which cause color or odor "which interfere with legitimate water uses." Ga. Comp. R. & Regs. 391-3-6-.03(5)(c). It is undisputed that the Jesup Plant's effluent contains color, and the preponderance of the evidence proved that the color of the discharge continues to be noticeable and distinct from the receiving water during low flow conditions. Also, the preponderance of the evidence showed that there is some odor in the effluent, separate from the ambient odors from the plant and the lagoons, which is detectable and offensive, especially during low flow conditions. The question is whether the discharge's color and odor during low flow has the reasonable potential to "interfere with legitimate water uses."

1. All legitimate uses are protected by the narrative standard.

The plain language of the narrative water quality standard protects all legitimate water uses from interference due to color and odor. Ga. Comp. R. & Regs. 391-3-6-.03(5)(c). Although the Clean Water Act only requires States to adopt water quality standards that protect the "designated uses" of their waterbodies, the Board, in adopting Georgia's narrative water quality standards, chose to protect "legitimate water uses."[43] Legitimate water uses include the

[43] The Clean Water Act provides that water quality standards must consist of the "designated" uses and criteria based upon such uses. 33 U.S.C. § 1313(c)(2)(A). The Clean Water Act does not use the term "legitimate" uses.

waterbody's designated use, along with other reasonable and necessary uses.[44] Specifically, the Board has defined "reasonable and necessary uses" to include "drinking water supplies, conservation, protection, and propagation of fish, shellfish, wildlife and other beneficial aquatic life, agricultural, industrial, recreational, and other legitimate uses." Ga. Comp. R. & Regs. 391-3-6-.03(3)(j). Thus, if Rayonier's discharge has the reasonable potential to cause interference with any of these legitimate uses, EPD is obligated to establish a WQBEL to protect such use.

2. Interference does not have to be unreasonable.

On the last day of the hearing, Mr. Capp, the Chief of the Watershed Protection Branch, testified that the narrative water quality standard must be interpreted to allow for a "reasonable accommodation" of all legitimate uses, including industrial uses. Positing a slightly different interpretation, Rayonier contended in its post-hearing brief that the narrative standard must be construed to include a "reasonable person" standard, with the "designated use" providing context for what is reasonable. Having considered the plain language of the regulation adopted by the Board, as well as the regulatory scheme as a whole, the Court concludes that the Board's narrative water quality standard does not require a showing of "unreasonable interference" or provide for the balancing of legitimate uses against the designated use.

First, the narrative water quality standards were adopted by the Board, which is empowered by law to establish the general policies to be followed by DNR. Ga. Comp. R. & Reg. 391-1-1-.01; O.C.G.A. § 12-5-23(a)(1). In addition to rules relating to water quality

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[44] Mr. Harrison, a DNR fisheries biologist, testified that swimming and kayaking were legitimate uses of the Altamaha. Ms. Dickson, one of EPD's NPDES permit writers for industrial facilities, testified that legitimate uses are different than designated uses because legitimate uses of a waterbody designated for fishing would also include recreation, boating, and swimming. Dr. Booth, who prepares Georgia's 505(b)/503(d) List, also testified that legitimate uses were broader than the designated use, and she acknowledged that Georgia's water quality standards protect "things beyond just designated uses." Even Mr. Capp, who testified that the narrative standards should be interpreted "in the context of" the designated uses, agreed that legitimate uses include all the "reasonable and necessary uses" identified in the regulation. (Tr. 531, 934-35, 1086, 1801.)

control, the Board has also adopted rules governing air quality control. See Ga. Comp. R & Regs. Chapter 391-3-1. In a rule establishing air emission limitations and standards under the Georgia Air Quality Control Act, O.C.G.A. § 12-9-1, *et seq.*, the Board adopted a rule prohibiting the operation of any air contaminant source that causes air pollution "which is injurious or which unreasonably interferes with the enjoyment of life or use of property. . . ." Ga. Comp. R. & Regs. 391-3-1-.02(2)(a)(1) (emphasis added).[45] See also O.C.G.A. § 12-5-239(i) (Under the Shoreland Protection Act, the legislature provided that permit-issuing authorities must consider whether permit will "unreasonably interfere" with conservation of marine life or "unreasonably interfere" with recreational use and enjoyment of public properties); O.C.G.A. § 12-5-286(g)(1) - (3) (Under Coastal Marshlands Protection Act, committee must consider whether permit will "unreasonably interfere" with conservation of fish, shrimp, and other resources).

A fundamental rule of statutory construction is that "[i]t is generally presumed that the [legislature] acts intentionally and purposely when it includes particular language in one section of a statute but omits it in another." Tolson v. Sistrunk, 324, 330 (2015), quoting BFP v. Resolution Trust Corp., 511 U.S. 531, 537 (1994). See also Griffith v. U.S. (In re: Griffith), 206 F.3d 1389, 1394 (11th Cir. 2000) (en banc) (noting that "where Congress knows how to say something but chooses not to, its silence is controlling"). The same basic rules of statutory construction apply to agency regulations adopted by the Board. Upper Chattahoochee Riverkeeper v. Forsyth County, 318 Ga. App. 499, 502 (2012). With respect to the narrative

[45] Prior to 2010, the Board's rule regarding wastewater pretreatment and permit requirements defined a "significant industrial user" to include any industrial user that "has a reasonable potential to significantly interfere with . . . the treatment works or the quality of its effluent . . . ." Ga. Comp. R. & Regs. 391-3-6-.08(p) (2009). In 2010, the Board amended the definition of a "significant industrial user," referring instead to an industrial user that "has a reasonable potential for adversely affecting" the operation of the publicly-owned treatment works. See Ga. Comp R. & Reg. 391-3-6-.08(u) (2010).

water quality standard at issue in this case, the Board easily could have crafted the standard to provide that all waters must be free from industrial discharges that "unreasonably interfere" with "designated" uses, but it did not. The Court concludes that the Board's omission of a reasonableness standard was intentional.

Moreover, interpreting the phrase "interfere with legitimate water uses" to mean any interference is consistent with the overarching goal of the Clean Water Act to eliminate the discharge of pollutants into navigable waters. 33 U.S.C. § 1251(a). Although the Board could have chosen to include a balancing provision in the narrative water quality standard, which would, perhaps, be more in line with Georgia's policy to maximize the benefit of the state's water resources for all people, the Board did not do so.[46] Rather, it made the narrative water quality standards applicable to all waterways in the state and for all legitimate uses, without exception and without consideration of the designated use. Accordingly, the Court concludes that if there is a reasonable potential for the color or odor in the Rayonier discharge to interfere with a legitimate use of the Altamaha, EPD is required to establish limits that will ensure compliance with the standards even if the designated use is protected.

3. Interference does not require proof of prevention, but rather hindrance or disruption.

The plain meaning of the term "interfere" is subject to many interpretations, depending on its context. For example, in a case regarding an easement on a shared driveway, the Georgia Court of Appeals noted that "[t]he word 'interfere' is defined as '[t]o check; hamper; hinder; infringe; encroach; trespass; disturb; intervene; intermeddle; interpose.'" Huckaby v. Cheatham, 272 Ga. App. 746, 751 (2005) (citing Black's Law Dictionary (5th ed. 1979), p. 730). In a decision by the United States Supreme Court regarding the standard for excusing jurors for bias,

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46 O.C.G.A. § 12-5-21(a).

Justice Rehnquist commented, "If we were so brash as to undertake a treatise on synonyms and antonyms, we could agree that the dictionary definitions of 'interfere' are not identical with the dictionary definitions of 'prevent.' But that, of course, is not the question." Wainwright v. Witt, 469 U.S. 412, 433 (1985). In the context of Water Quality Control rules adopted by the Board, the Board has given some guidance in how it views the term "interfere" in its definition of the term in Rule 391-3-6-.08, entitled "Pretreatment and Permit Requirements." See Ga. Comp. R. & Regs. 391-3-6-.08(j) ("interference" or "interfere" means a discharge which "inhibits or disrupts" a publicly-owned treatment works; "term includes prevention of sewage sludge use or disposal").

In considering what constitutes "interference" under the narrative water quality standard, the Court has considered that the cause of the interference at issue here is an aesthetic quality – color and odor. Color and odor do not physically prevent or obstruct people from using the river for fishing or swimming or boating. Rather, it is the effect of the color and odor on their willingness, not their ability, to use the waterways that matters. It is more than a preference, however; the impact must be such that their use of the river is actually hindered or disrupted.

4. There is a reasonable potential that both color and odor will interfere with the legitimate uses of the Altamaha River during low flow conditions.

Having carefully considered the evidence presented, the Court concludes that there is a reasonable potential that the color and odor in the Rayonier discharge during low flow conditions will interfere with the use of the river downstream of the plant. Although, the Court recognizes that the color of Rayonier's discharge has improved significantly with the implementation of the color reduction improvements mandated by the 2008 Consent Order, the reasonable potential analysis must focus on whether the current levels of color and odor in the discharge, even after all the improvements, have a reasonable potential to interfere with legitimate uses of the

Altamaha. Because the evidence showed that during low flow conditions, the color of the discharge is still distinct from the river water, creating a plume of color that travels along the bank for some distance, and that the unpleasant odor of the effluent is less diluted and more pronounced under such conditions, the Court concludes that the legitimate uses of the Altamaha during low flow is likely to be hindered due to the aesthetic objections of local residents and visitors. Accordingly, EPD is required to develop WQBELs for both color and odor under low flow conditions.

D. Rayonier's Effluent Does Not Have a Reasonable Potential to Cause a Violation of the Narrative Water Quality Standards for Turbidity.

There are two narrative water quality standards that apply to turbidity in an industrial discharge. Ga. Comp. R. & Reg. 391-3-6-.03(5)(c) & (d). Based on the findings of facts above, ARK failed to prove that there is turbidity in Rayonier's discharge that interferes with legitimate uses or that turbidity in the discharge is causing a "substantial visual contrast" in the river. Accordingly, EPD's determination that there is no reasonable potential that turbidity will cause or contribute to a violation of either of the applicable narrative water quality standards was proper and supported by the evidence in this case.

E. EPD Failed to Establish Numeric Effluent Limitations that Will Ensure Compliance with the Narrative Standards During Low Flow Conditions.

As noted above, the task of translating narrative water quality standards for aesthetic pollutants like color and odor into numeric effluent limitations is a challenging one, for which EPA has offered little concrete guidance. Nevertheless, the Court concludes that EPD's attempt to establish appropriate color limits based solely on Rayonier's past performance, plus a 15% cushion, did not comply with its obligation to establish color limits that will lead to compliance with the narrative water quality standard during low flow conditions. See NRDC v. U.S. EPA,

808 F.23d at 565. If the current level of the pollutant in the discharge is causing or has a reasonable potential to cause a violation during low flow, EPD cannot set the effluent limitations at the same or slightly higher levels and expect to achieve compliance under low flow conditions. In addition, EPD did not attempt to develop a limit for odor, admittedly another daunting task unless it can identify a reliable measure of odor in water or an appropriate "indicator parameter" as contemplated in 40 C.F.R. § 122.44(d)(1)(iv).

This Court is without authority to order the Director, on remand, to issue a revised permit with particular limits or conditions. Upper Chattahoochee Riverkeeper v. Forsyth County, 318 Ga. App. 499, 502 (2012). However, there are some additional conclusions that may help guide EPD in any future consideration of the permit. The Court concludes that there was insufficient evidence of fish tainting in the record to support a finding that the odor in the fish from the effluent is currently interfering with, or has the reasonable potential to interfere with, the use of the river for fishing. The Court further concludes that there was insufficient evidence that lower BOD or TSS limits are necessary or appropriate to ensure compliance with the narrative water quality standards. Similarly, the Court concludes that ARK failed to prove that its suggested limits for color and odor were appropriate numeric effluent limits. Finally, the Court's conclusion that EPD's numeric effluent limits for color in the 2015 NPDES permit were too high applied only to the limits during low flow conditions. The evidence in the record did not prove that the proposed color limits were too high during periods of average or high flow. Nevertheless, because WQBELs must ensure compliance with water quality standards even during critically low flow periods, the limits did not comply with the requirements of the Clean Water Act. Consequently, the 2015 NPDES Permit is unlawful.

IV. ORDER

In accordance with the foregoing findings of fact and conclusions of law, the Director's renewal of NPDES Permit No. GA0003620 to Rayonier Performance Fibers, LLC is hereby **REVERSED**.

SO ORDERED, this 30th day of September, 2016.

KIMBERLY W. SCHROER
Administrative Law Judge