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1/7/03

U.S. EPA, Region 4  
Standards, Monitoring and TMDL Branch  
Attn: Ms Elizabeth Jones  
61 Forsyth Street SW  
Atlanta, Georgia 30303

Re: Request for final TMDL approval: Sanders Branch/Coosawhatchie  
River; Hampton County, South Carolina

Dear Elizabeth,

The Sanders Branch/Coosawhatchie River Dissolved Oxygen TMDL revision was placed on public notice October 31, 2002. The public comment period has closed and the responsiveness summary is attached (Exhibit D). The TMDL document has received preliminary review by Region 4 staff.

Attached is the complete, final TMDL package. Pursuant to 40 CFR 130, we are requesting approval of this TMDL. If you have any questions or require additional information prior to final approval, please contact Larry Turner at 803.898.4005.

Sincerely,

A handwritten signature in black ink that reads 'Alton C. Boozer'.

Alton C. Boozer  
Chief, Bureau of Water

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TMDL Submittal for Sanders Branch/Coosawhatchie River  
Stations CSTL-010, CSTL-011, CSTL-108, CSTL-109

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**Exhibit A**  
Basis for 303(d) Listing  
Sanders Branch/Coosawhatchie River

Water Quality Standards Being Violated: Dissolved Oxygen

Pollutants of Concern: Biochemical Oxygen Demand (Carbonaceous and Nitrogenous)

Water Classification: Freshwaters

Sanders Branch and the Coosawhatchie River are classified Class Freshwaters with Sanders Branch having site specific criteria for dissolved oxygen and pH. Waters of this class are to be:

"Freshwaters suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses."

Dissolved Oxygen Criteria:

Coosawhatchie River:	Daily average of 5 mg/l, with a minimum of 4 mg/l
Sanders Branch:	A minimum of 4 mg/l

The South Carolina Department of Health and Environmental Control (DHEC) had data from three secondary ambient monitoring stations on Sanders Branch and one primary station on the Coosawhatchie River downstream of its confluence with Sanders Branch: CSTL-108 on Sanders Branch downstream of the Nevamar Co. (formerly International Paper) discharge; CSTL-010 on Sanders Branch downstream of CSTL-108 and upstream of Hampton's discharge; CSTL-011 on Sanders Branch downstream of Hampton's discharge; and CSTL-109 on the Coosawhatchie River downstream of Sanders Branch. The two downstream stations (CSTL-011 and CSTL-109) show aquatic life uses not fully supported due to dissolved oxygen excursions.

**Exhibit B**  
TMDL Technical Basis

Permitted Dischargers In Area of Concern

<u>Permit #</u>	<u>Facility</u>	<u>Receiving Water</u>	<u>Type</u>	<u>Flow(mgd)</u>
SC0001830	Nevamar Co. LLC	Sanders Branch	Ind	1.5
SC0021318	Hampton	Sanders Branch	Mun	2.0
SC0042242	Safety Disposal	Sanders Branch Trib	Ind	MR

Nevamar's Hampton Plant discharges an average 1.5 mgd of process and recirculated non-contact cooling water to the headwaters of Sanders Branch approximately 5.6 miles upstream of the confluence of Sanders Branch and the Coosawhatchie River. The Town of Hampton is permitted to discharge 2 mgd of domestic wastewater to Sanders Branch approximately 2.6 miles upstream of the Coosawhatchie River. Safety Disposal Systems of SC is permitted for an intermittent discharge of stormwater to an un-named tributary of Sanders Branch.

Modeling Effort

The QUAL2E model was used to simulate Sanders Branch from the Nevamar discharge 5.6 miles to the Coosawhatchie River and the Coosawhatchie River for a distance of 4.9 miles below Sanders Branch. The model includes the Nevamar and Hampton discharges. The Safety Disposal discharge was not included since it is an intermittent stormwater discharge and is not expected to contribute loading to the stream under the designated critical conditions. Also, to minimize impact of the discharge under high flow conditions, the permit includes limits of: BOD<sub>5</sub>, 15 mg/l; effluent DO, 5 mg/l; and, fecal coliform, 200 per 100 ml. The model was not calibrated to field conditions. Existing ambient monitoring data, U.S. Geological Survey (USGS) flow and topography information and the State/EPA Agreement on development of wasteload allocations were used to develop model inputs. A hard copy of the model output as well as electronic copies of the input and output files are attached. Also attached are copies of the Wasteload Allocation Worksheet and Coordination Forms for the two modeled discharges. These include documentation of model inputs.

## Critical Conditions

Flow, dissolved oxygen (DO), five day biochemical oxygen demand (BOD) and temperature data were reviewed to determine if low flow, summer conditions were appropriate conditions for development of the total maximum daily load (TMDL). Data available at STORET station CSTL-109 were reviewed to determine the relationship between flow and DO, water temperature and DO and between flow and BOD. It was determined there was a relatively strong correlation between DO and temperature, as would be expected, with lower DOs experienced during periods of high water temperature. There appeared, however, to be very little correlation between flow and DO or flow and BOD. Low DO concentrations were experienced at high and low flows, as were high DO concentrations. BOD concentrations were low (average of 2 mg/l, max of 5 mg/l when flow measurements available) regardless of flow, which ranged from 0 cfs to over 3,000 cfs. Temperature appeared to be the main determining factor.

Review of the Savannah/Salkahatchie watershed document shows the Coosawhatchie River to be a black water system. Such streams are generally associated with wide flood plains that experience swamp-like conditions. Land use in the watershed is: 39 % forest; 28% forested wetlands; 10 % shrub/scrub land; 3 % non-forested wetlands; 14% agricultural land; and, 6% urban land. Based on land use in the watershed, low dissolved oxygen concentrations found under high flow conditions are considered to be natural rather than attributable to an identifiable, correctable, non-point source of pollution.

Based on the above information, high temperature conditions when the minimum volume of water is available for dilution/assimilation will be considered appropriate critical conditions for development of the Sanders Branch/Coosawhatchie River TMDL. A summer temperature of 27° C was utilized in the model, as was a headwater flow of 0.0 cfs, the estimated 7Q10 of both Sanders Branch and the Coosawhatchie River.

## Seasonality

Seasonality is considered for the Sanders Branch TMDL through the use of conservative summer conditions for modeling. Seasonality was considered for the Hampton WWTF by allowing a less restrictive winter NH<sub>3</sub>-N limit of 2 mg/l.

Since approval of the original TMDL, the Town of Hampton requested that the winter NH<sub>3</sub>-N limit be reevaluated using newly issued ammonia toxicity criteria. Modeling efforts have shown that a toxicity based winter NH<sub>3</sub>-N limit of 4.23 mg/l would result in predicted dissolved oxygen concentrations greater than the 5mg/l daily average required for the Coosawhatchie River.

Seasonal limits were not considered appropriate for the Nevamar discharge.

#### Margin of Safety

An implicit margin of safety was incorporated into the modeling effort through the use of conservative assumptions including a critical summer temperature of 27° C, corresponding conservative decay rates as outlined in the State/EPA agreement on wasteload allocations, and use of a 7Q10 flow of 0.0 cfs.

**Exhibit C**  
**Total Maximum Daily Load**  
**Sanders Branch/Coosawhatchie River**

Summer TMDL (May-October)

	BOD <sub>5</sub> (lbs/day)	NH <sub>3</sub> -N (lbs/day)
Load Allocation	*	*
Wasteload Allocation	241.9	23.0
TMDL	241.9	23.0

Winter TMDL (November-February)

	BOD <sub>5</sub> (lbs/day)	NH <sub>3</sub> -N (lbs/day)
Load Allocation	*	*
Wasteload Allocation	241.9	76.4
TMDL	241.9	76.4

\* The Load Allocation is considered zero since the critical conditions is defined as a 7Q10 of zero when there would be no non-point source contribution to the stream.

TMDL Determination:

The Qual2E model described in Exhibit B serves as the technical basis for the above TMDL; however, the TMDL limits for the Town of Hampton are slightly less restrictive than those indicated by the model (BOD<sub>5</sub>, 7 mg/l; NH<sub>3</sub>-N, 0.5 mg/l summer, and effluent DO, 6 mg/l). During the 1992 basin review, limits for the Town of Hampton similar to those determined by this model were recommended to the Domestic Wastewater Permitting Section. The State/EPA Wastewater Allocation Agreement states that limits more restrictive than the limits of technology (BOD<sub>5</sub>, 10 mg/l; NH<sub>3</sub>-N, 1 mg/l summer, and, effluent DO, 6 mg/l) are not appropriate when using an uncalibrated model. Because the QUAL2E model was not a calibrated model the Domestic Wastewater Permitting Section issued a permit using the less restrictive limits of technology, along with a 2 mg/l

limit for winter NH<sub>3</sub>-N, and the upgraded plant went on line in the fall of 1996. The TMDL was originally considered to include the Town of Hampton's discharge at these permit limits. This TMDL is currently being revised to include updated winter NH<sub>3</sub>-N limits for the Town of Hampton as discussed in Exhibit B.

The modeled limits for the Nevamar discharge (BOD<sub>5</sub>, 6 mg/l, NH<sub>3</sub>-N, 0.5 mg/l, effluent DO, 6 mg/l) were accepted by the applicant; placed on public notice with notification the WLA would be part of a TMDL; approved by EPA; and, incorporated into a permit issued September 29, 1997. This loading is incorporated into the above TMDL.

#### Calculations for Point Source Contributions

Nevamar Co. Limits:

Flow:	1.5 mgd
BOD <sub>5</sub> :	6 mg/l
NH <sub>3</sub> -N:	0.5 mg/l

Loading:

BOD <sub>5</sub> :	1.5 mgd x 8.34 x 6 mg/l = 75.1 lbs/day
NH <sub>3</sub> -N:	2 mgd x 8.34 x 0.5 mg/l = 6.3 lbs/day

Hampton Limits:

Flow:	2 mgd
BOD <sub>5</sub> :	10 mg/l
NH <sub>3</sub> -N:	1 mg/l (summer)
NH <sub>3</sub> -N:	4.2 mg/l (winter)

Loading:

BOD <sub>5</sub> :	2 mgd x 8.34 x 10 mg/l = 166.8 lbs/day
NH <sub>3</sub> -N:	2 mgd x 8.34 x 1.0 mg/l = 16.7 lbs/day (summer)
NH <sub>3</sub> -N:	2 mgd x 8.34 x 4.2 mg/l = 70.1 lbs/day (winter)



Total Loading:

BOD

Nevamar Co.	75.1 lbs/day
Hampton	<u>166.8</u> lbs/day
	241.9 lbs/day

NH3-N (summer)

Nevamar Co.	6.3 lbs/day
Hampton	<u>16.7</u> lbs/day
	23.0 lbs/day

NH3-N (winter)

Nevamar Co.	6.3 lbs/day
Hampton	<u>70.1</u> lbs/day
	76.4 lbs/day

**Exhibit D**  
**Public Participation**

The public notice that follows was sent to a mailing list of over one hundred individuals and organizations that have expressed interest in water quality issues. It was also published in the Hampton County Guardian, a newspaper published and circulated in Hampton County, South Carolina, on 10/31/02.

PUBLIC NOTICE

· NOTICE OF AVAILABILITY OF PROPOSED REVISION TO THE TOTAL  
MAXIMUM DAILY LOAD FOR WATERS AND POLLUTANTS OF CONCERN IN  
THE STATE OF SOUTH CAROLINA

**SANDERS BRANCH AND COOSAWHATCHIE RIVER IN HAMPTON  
COUNTY**

Section 303(d)(1) of the Clean Water Act (CWA), 33 U.S.C. '1313(d)(1)(C), and the Environmental Protection Agency's (EPA) implementing regulation, 40 C.F.R. ' 130.7(c) (1), require the establishment of total maximum daily loads (TMDLs) for waters identified as impaired pursuant to '303(D)(1)(A) of the CWA. Each of these TMDLs is to be established at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety, accounting for lack of knowledge concerning the relationship between effluent limitations and water quality. In 1998, the South Carolina Department of Health and Environmental Control (SC DHEC) implemented an approved TMDL for the '303(d)(1)(A) waters of Sanders Branch and the Coosawhatchie River (Hampton County, watershed unit 03050208-070), for the pollutant of concern, biochemical oxygen demand. Since approval of the original TMDL, the EPA has issued new guidance in determining ammonia toxicity limits for fresh water. SC DHEC (R.61-68) adopted these criteria for ammonia toxicity in 2000. The Town of Hampton's wastewater treatment facility discharges into Sanders Branch. It has requested that SC DHEC review and revise their ammonia wasteload limits as put forth in the original TMDL. SC DHEC is proposing a revision to the TMDL based on EPA's current ammonia toxicity criteria that will change the permitted winter (Nov.-Feb.) ammonia loading for the Town of Hampton from 33.4 pounds per day (2 mg/L) to 70.6 pounds per day (4.2 mg/L). All other limits as published in the original TMDL are to remain unchanged. SC DHEC is proposing to establish this as a final TMDL.

Persons wishing to comment on the proposed TMDL or to offer new data regarding the proposed TMDL are invited to submit the same in writing no later than 30 days after publication of this notice:

South Carolina Department of Health and Environmental Control  
Bureau of Water  
2600 Bull St.  
Columbia, S.C. 29201  
Attn. Larry Turner  
803.898.4005  
turnerle@dhec.state.sc.us

The proposed revision to the TMDL, the original TMDL and the administrative record, including technical information, data, and analyses supporting the proposed TMDL, may be reviewed and copied at 2600 Bull Street, Columbia, South Carolina between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, or are available by writing, calling, or e-mailing Mr. Larry Turner at the address above. Copies will be provided at a minimal cost per page.

After review of comments, the proposed TMDL will be sent to EPA for approval.

### **Responsiveness Summary**

Comments were received from Andrew Bartlett of Region 4 EPA. A summary of the comments and responses follows.

- 1) The TMDL states "the Safety Disposal discharge was not included in the model since it is an intermittent storm water discharge and is not expected to contribute to loading to the stream under designated critical conditions." Has South Carolina considered whether the Safety Disposal discharger will cause or contribute to the impairment of the identified water body after an episodic storm event during the critical period?

Response: The Safety Disposal permit was inactivated in August, 2002 and will no longer be a factor in the discharges to Sanders Branch.

- 2) Be aware that the State should assure that the increase in permit load during the winter, when considered for permit issuance, goes through all other applicable State regulations, including, but not limited to anti-degradation and anti-backsliding.

Response: All applicable state regulations will be followed during the process of permit issuance.