DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, S.W., WASHINGTON, D.C. 20032
OFFICE OF THE GENERAL MANAGER
TEL: 202-787-2609
FAX: 202-787-2333

July 31, 2006

Mr. Jon M. Capacasa, Director
Water Protection Division
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Status of Nitrogen Removal Conditions for the Blue Plains Permit

Dear Mr. Capacasa:

As agreed during our July 12, 2006 meeting in EPA's offices, our staff participated in additional discussions regarding technical points related to the proposed annual total nitrogen (TN) interim limit and an annual TN effluent concentration goal. Two telephone conferences were held and information was exchanged. The telephone conferences were held on July 17 and 19, 2006.

During the telephone discussions, EPA proposed the following:

1. A TN effluent concentration of 7.2 mg/l which, based on a design flow of 370 mgd, translates to a TN interim permit limit of 8,109,482 pounds per year.

2. An annual TN effluent concentration goal of 4.2 mg/l.

When asked whether the proposed annual TN interim permit limit would be accompanied by boundary conditions, EPA responded that they found WASA's proposed boundary conditions (see WASA letter of June 21, 2006) to be unattractive but did not initially preclude alternative conditions. Subsequently, EPA stated that they could not include boundary conditions as part of a permit.

Based on the telephone discussions and information exchange, WASA understands EPA's proposal to be based on the following:

1. For the annual TN interim limit, EPA employed methodology from the Technical Support Document for Toxicity (TSD). EPA used the dataset provided by WASA, calculated an annual rolling average long term effluent concentration, calculated the standard deviation for that dataset and used standard statistical procedures to project a 90th percentile concentration. This 90th percentile concentration was selected as the interim limit. The rationale is that if future annual average effluent concentrations exceed this 90th percentile value, it would show that plant performance is not consistent with the recent past. When questioned about the uncertainties of having to deal with variable wet weather conditions, low temperature periods and the fact that Blue Plains was never designed to simultaneously meet its existing permit limits and a TN limit, EPA

responded that, in their opinion, calculating the concentration using the 90th percentile and applying that to the design flow provided a sufficient "cushion" against uncertainties and a permit exceedance.

2 For the annual goal, EPA advised that the proposed concentration was based on the final Chesapeake Bay TN concentration for Blue Plains.

WASA also prepared statistical analyses using TSD and Monte Carlo methodology. WASA pointed out that the existing dataset of plant performance does not include a sufficient period dataset to simply apply the TSD approach as EPA did and be statistically certain that the results are reliable to the extent that the available data accurately characterize the mean and standard deviation of existing plant performance. For a reliable characterization, the dataset should comprise at least ten years of performance rather than the four years used.

Because of the uncertainty in the estimate of the mean and standard deviation of existing plant performance, WASA had studies conducted by LTI – Limno-Tech to assess the probability of exceeding EPA's proposed annual TN interim limit (8,109,482 pounds per year) and that proposed by WASA in our June 21, 2006 letter (9,021,000 pounds per year). They are summarized in Attachment No. 1 and conclusions based on EPA's value under Scenario No. 3 are as follows:

- There is a significant probability that the EPA-proposed effluent limit will be exceeded strictly due to natural variability, even if plant performance has identical characteristics as in the past.
- There is approximately a 50-50 chance that the permit would be exceeded due to no fault of WASA (i.e. due strictly to natural variability) over the next 10 years.
- When the limited size of the existing data base is considered, there is approximately a 50-50 chance that the permit would be exceeded due to no fault of WASA within the next 5 years.
- Also, the probability of exceedance will be greater than 50-50 if some of the years are wet years as shown under Scenario No. 2.

The studies show there is a significant statistical probability of an exceedance of the annual TN interim limit based on EPA's value. While there is a lower probability based on WASA's value, neither limit takes into account the variable process, capacity, flow and temperature conditions that WASA explained in our June 21, 2006 letter.

Because experience shows that these variable conditions are almost certain to occur over the extended period that the interim limit would be in effect, they add considerably to the probability of an exceedance. Furthermore, the combined circumstances clearly show that EPA's proposed interim limit cannot be consistently met within the capacity of the existing facilities and WASA's control of the process, regardless of how well WASA manages plant operations.

Additionally, WASA pointed out that, with respect to the proposed 4.2 mg/l goal, that level of annual performance has never been achieved by the existing facilities.

With respect to EPA's stated position on boundary conditions, we wish to point out that the existing permit already includes a number of such conditions that are similar to those suggested by WASA. By way of

clarification, we have, in our discussions, been using the term "boundary conditions" to refer to permit provisions that qualify or restrict the application of a permit limit or condition. Some of the more significant of these qualifying and restrictive provisions that are in the existing permit are found at:

1. Part IV. SECTION E. TOTAL NITROGEN, where the condition allows the permittee to meet the nitrogen goal; "to the extent such operation does not preclude permittee's ability to meet its other obligations pursuant to this permit."

2. Part I. SECTION B. (1) (1c), "When CSSF conditions exist, . . . up to a maximum rate of 336 mgd, shall receive Excess Flow Treatment and be discharged from Outfall 001."

3. Part III. SECTION C. LONG TERM CONTROL PLAN (LTCP), includes a number of boundary conditions regarding the application of limitations on the diversion and capture of CSOs and the compliance conditions.

Also attached (see Attachment No. 2) is an excerpt from the Richmond, Virginia permit and SWCB approved nutrient waste load allocations for the James River basin. As you are aware, Richmond is a CSO community and the permit and the waste load allocations include qualifying conditions that limit the nitrogen mass load to dry weather flow and conditions.

Based on the above information, it is clear that conditions of the type that WASA is seeking are consistent with conditions that are established and approved elements of NPDES permits.

At this point, EPA's proposal would place WASA in the position of having to accept the following:

1. Substitution of a TN permit limit that is essentially equal to the existing TN goal without the boundary conditions established for that goal which were based on the recognized inability of the facility to remove nitrogen under all conditions of load, temperature, flow and process conditions and; still meet the other permit limits.

2. Meeting an annual TN concentration goal at a level of annual performance never achieved by the facility.

We have repeatedly advised and demonstrated to you that the above approach is not realistic or achievable. Therefore, if we are not afforded our qualifying provisions we will require that the annual TN interim permit limit be based on an annual concentration of 8.5 mg/l which, at 370 mgd, translates to a load of 9,573,695 pounds per year. This is based on our consultant's analyses in Attachment No. 3.

Additionally, WASA will need exemptions during the construction period of the $84 million planned improvements to the nitrification and denitrification facilities that will be under construction starting in 2007. The construction period will extend for over 42 months and is expected to be completed in late 2010. These exemptions are required because one of the twelve reactors will be out of service during the entire construction period for upgrading and we always anticipate that a second reactor will be out of service intermittently for normal maintenance. Having one reactor out of service will reduce the plant BNR capacity to 91.7 percent of full capacity and for those times when a second reactor is out of service, capacity is reduced to 83.3 percent. All of WASA's BNR experience is based on having all twelve reactors in service with only one reactor out of service for maintenance on an intermittent basis. During the period when construction conditions are in effect

and with no qualifying provisions, the annual TN limit would be 9.3 mg/l which, at 370 mgd, translates to a load of 10,474,748 pounds per year. This is based on the ratio of full reactor capacity to construction capacity or 12/11 x 8.5 mg/l = 9.3 mg/.

In summary, WASA is unwilling to accept an interim limit of less than 8.5 mg/l or a construction period limit of less than 9.3 mg/l because the Authority should not be exposed to potential permit violations when we are producing the best effluent quality feasible under adverse circumstances. Therefore, a permit that is to include an interim limit and a construction period limit must be based on these concentrations; or alternatively include lower limits with qualifying conditions.

WASA has been a willing and cooperative volunteer in providing and operating nitrogen removal facilities in support of the Chesapeake Bay Program. In doing so, we have consistently produced a quality nitrogen effluent and, at the same time, met our permit limits. Now we are being asked to convert our voluntary efforts to a permit condition and we are willing to do just that, but we need sufficient provisions to qualify that limit with a clear recognition of the capacity, load and temperature limitations of the existing facilities. For EPA to proceed in a manner that does not include this recognition is unfair and penalizes WASA for its past efforts.

At this point in the process, and as a follow up on your discussions with Ms. Russell on July 12, 2006, it appears that a meeting of the principles involved may be beneficial and should be scheduled as soon as possible to discuss the interim limit issue and other points. I will call your office in a few days to discuss such a meeting.

Sincerely,

John T. Dunn, P.E.
Chief Engineer/Deputy General Manager

Enclosures

c: Jerry N. Johnson
Avis M. Russell

ATTACHMENT NO. 1

LTI Memorandum, July 25, 2006

Statistical Analysis of Compliance Probability with Proposed Total Nitrogen Limits for Blue Plains

Limno-Tech, Inc.
Excellence in Environmental Solutions Since 1975

Memorandum

DATE: July 25, 2006
PROJECT: DCMP06

TO: Ron Bizzarri
DC WASA

FROM: Dave Dilks
CC:

SUBJECT: **Statistical Analysis of Compliance Probability with Proposed Total Nitrogen Limits for Blue Plains**

Summary

EPA is proposing to include an annual total nitrogen (TN) interim limit in the Blue Plains permit. According to information received from EPA, the interim limit is based on plant performance at Blue Plains remaining consistent with the performance observed in the recent past. The permit limit value therefore represents an annual effluent concentration that, if exceeded, would show with high probability that the plant is not performing as well as in the recent past.

LTI conducted a statistical evaluation of different permit limits under consideration to estimate the probability of a violation occurring strictly due to natural variation, i.e. assuming that plant performance has identical characteristics as in the past. The conclusions of this analysis (based on EPA's proposed mass load and a flow rate of 350 MGD as represented in Scenario 3 below) are that:

- There is a significant probability that the EPA-proposed effluent limit will be exceeded strictly due to natural variability, even if plant performance has identical characteristics as in the past.
- There is approximately a 50:50 chance that the permit would be exceeded due to no fault of WASA (i.e. strictly due to natural variability) over the next ten years.
- When the limited size of the existing data base is considered, there is approximately a 50:50 chance that the permit would be exceeded due to no fault of WASA within the next five years. The probability of exceedance will be greater than 50:50 if some of the years are wet years as shown in Scenario 2.

Details of the calculations and results are provided below.

Calculations and Results

A statistical analysis was conducted to determine the probability of exceeding different annual average permit values over a four year permit cycle, given that plant performance remains the same (i.e. "Probability of a false positive"). The steps/assumptions inherent to this analysis are:

- Use EPA's calculated mean (6.01 mg/l) and standard deviation (0.91 mg/l) based on 2002-2006 data to define the statistical properties of current plant performance
- For different permit scenarios, determine the probability of exceeding the permit limit, based on the assumption of a normal distribution. This term is referred to a "Permit %ile" below.

- Calculate the probability of a false positive. The basis for this calculation is to first determine the probability of seeing no false positives for any of the four years. This is calculated by taking the Permit %ile to the fourth power. The probability of seeing a false positive is therefore:

$$P(\text{False positive}) = 1 - (\text{Permit \%ile})^4$$

- Conduct a similar analysis using a larger (2000-2006) data set, with a mean of 6.2 mg/l and an estimated standard deviation 0.99 mg/l.

The above analyses all assume that the available data accurately characterize the existing mean and standard deviation of current plant performance. Additional Monte Carlo analyses were conducted to define the probability of a false positive for some of the scenarios, accounting for the uncertainty in the estimate of the mean and standard deviation of current plant performance. Results are provided below for both the original (2002-2006) and expanded (2000-2006) data sets.

Scenarios		2002 – 2006 data				2000 – 2006 data		
No.	Condition	Effective Permit Conc.	Permit %ile	P(False positive) no uncertainty	P(False positive) w/ uncertainty	Permit %ile	P(False positive) no uncertainty	P(False positive) w/ uncertainty
1	Concentration-based EPA (or Q=370)	7.18	90%	34%	45%	84%	51%	55%
2	Load-based EPA (Q=398[1])	6.67	77%	65%	Not examined	68%	78%	Not examined
3	Load-based EPA (Q=350[2])	7.43	94%	22%	36%	89%	37%	44%
4	Load-based EPA (Q=338[3])	7.86	98%	8%	23%	95%	18%	28%
5	Concentration-based WASA (or Q=370)	8	99%	6%	20%	96%	13%	24%
6	Load-based WASA (Q=398)	7.44	94%	21%	Not examined	89%	36%	Not examined
7	Load-based WASA (Q=350)	8.45	99.6%	1.4%	Not examined	98.8%	5%	Not examined
8	Load-based WASA (Q=338)	8.76	99.9%	0.5%	Not examined	99.5%	2%	Not examined

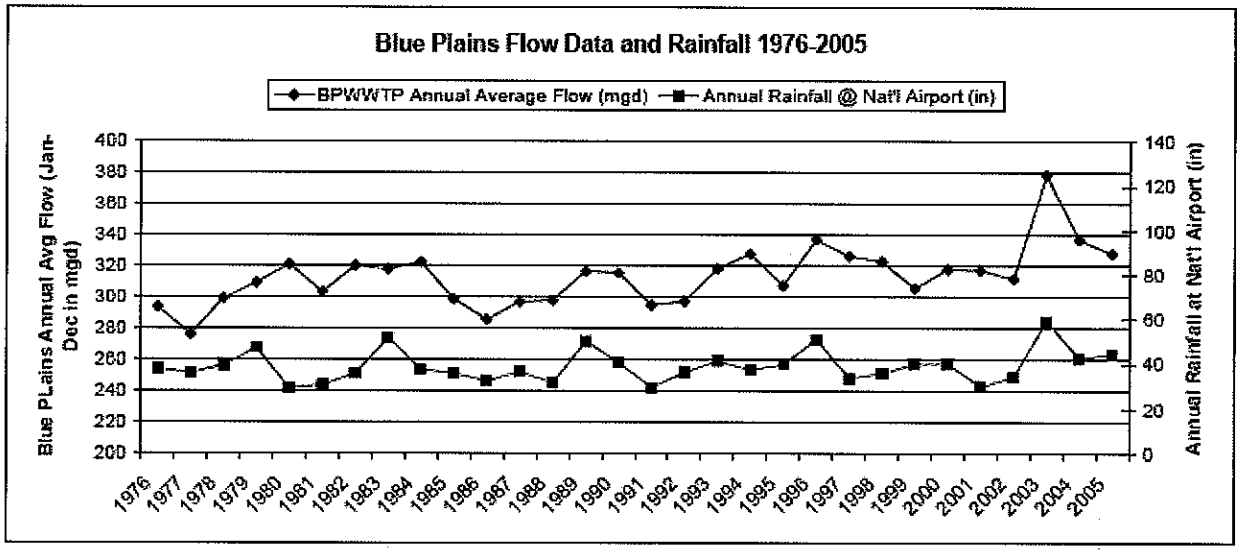
(1) Represents a wet year flow condition based on 60 MGD of wet weather-generated flow added to 338 MGD which is the annual average flow for the relevant period of record (See Exhibit No. 1).
(2) Represents near future average condition based on COG projections (See Exhibit No. 1).
(3) Represents annual average flow for the relevant period of record

Exhibit No. 1

WASA EPMC-3

BPWWTP Flow Data 1976-2005

Calendar Year	BPWWTP Annual Average Flow (mgd)	Annual Rainfall @ Nat'l Airport (in)
1976	294	38.1
1977	276	36.1
1978	299	39.6
1979	309	47.3
1980	321	29.3
1981	303	30.7
1982	320	35.8
1983	318	51.9
1984	323	37.7
1985	299	35.9
1986	286	32.6
1987	297	36.6
1988	298	31.7
1989	317	50.3
1990	316	40.8
1991	295	29.6
1992	297	36.4
1993	318	41.4
1994	328	37.6
1995	308	39.9
1996	337	51.0
1997	328	33.8
1998	323	35.9
1999	306	40.2
2000	318	40.2
2001	317	30.0
2002	312	34.3
2003	379	59.3
2004	337	42.5
2005	328	44.4



Projection to 2015

Average flow 1999-2005 excluding 2003	319.6 mgd
Average rainfall 1999-2005 excluding 2003	38.6
Flow in 2003	378.8
Difference in flow	59.1 i.e. There is an extra 60 mgd of I/I and captured CSS in a really wet year

COG Round 6.3 adjusted forcast for approximately 2015 = about 350 mgd

Could expect average flows in next 10 years during a wet year to be 350+60=410 mgd

H:\1166\LTCP\ALTERNAT\Blue Plains\Strategic Plan\[2006-07-19 BP Flow Analysis.XLS]Sheet1

ATTACHMENT NO. 2

Excerpt from Richmond, VA NPDES Permit and SWCB approved nutrient waste load allocations for the James River Basin

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Permit No.	VA0063177
Effective Date:	March 21, 2005
Expiration Date:	March 20, 2010

AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM AND THE VIRGINIA STATE WATER CONTROL LAW

In compliance with the provisions of the Clean Water Act as amended and pursuant to the State Water Control Law and regulations adopted pursuant thereto, the following owner is authorized to discharge in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in this permit.

Owner Name:	City of Richmond
Facility Name:	Richmond Wastewater Treatment Plant
City:	Richmond
Facility Location:	1400 Brander Street, Richmond, VA

The owner is authorized to discharge to the following receiving stream:

Stream Name:	James River
River Basin:	James River (Lower)
River Subbasin:	N/A
Section:	1
Class:	II
Special Standards:	NEW-18

The authorized discharge shall be in accordance with this cover page, Part I: Limitations and Monitoring Requirements and Part II: Conditions Applicable To All VPDES Permits, as set forth herein.

Director, Department of Environmental Quality

3/21/05

Date

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date the permittee is authorized to discharge from outfall 001 at the Richmond Wastewater Treatment Plant.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS	
		MONTHLY AVERAGE		7 – DAY ROLLING* AVERAGE		MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
		mg/l[f]	kg/day[f]	mg/l[f]	kg/day[f]	mg/l[f]	mg/l[f]		
Flow (MGD)		NL		NA		NA	NL	Continuous	TIRE
$CBOD_5$[h]	June - Oct	NL	NL	8.0	1362	NA	NA	1/Day	24 HC
	Nov - May	14.3	2434	21.4	3653				
Total Suspended Solids[h]	June - Oct	NL	NL	10	1703	NA	NA	1/Mo	24 HC
	Nov - May	18	3066	27	4599				
Ammonia – N[h]	June - Oct	6.4	1090	9.6[a]	1635[a]	NA	NA	1/Day	24 HC
	Nov - May	15.2	2589	22.8[a]	3883[a]				
Orthophosphate		NL	NL	NA	NA	NA	NA	1/Day	24 HC
Total Phosphorus[h]		2.0	NL	NA	NA	NA	NA	1/Day	24 HC
Total Phosphorus (kg/month)[g]		NA	NA	NA	NA	NA	NL	1/Mo	Calculated
Total Phosphorus (kg/Calendar Yr)[g]		NA	NA	NA	NA	NA	49,000	1/Mo	Calculated
Total Kjeldahl Nitrogen (as N)		NL	NL	NA	NA	NA	NA	1/Day	24 HC
Nitrate plus Nitrite (as N)		NL	NL	NA	NA	NA	NA	1/Day	24 HC
Total Nitrogen[e]		NL	NL	NA	NA	NA	NA	1/Day	Calculated
Total Nitrogen (kg/month)[g]		NA	NA	NA	NA	NA	NL	1/Mo	Calculated
Total Nitrogen (kg/Calendar Yr)[g]		NA	NA	NA	NA	NA	760,000	1/Mo	Calculated
Total Residual Chlorine (TRC)[b]		0.07	NA	0.07[a]	NA	NA	NA	1/(2 Hours)	Grab
E. coli (N/100ml)[c]		126		NA		NA	NL	1/Day[d]	Grab
pH (standard units)		NA		NA		6.0	9.0	1/Day	Grab
Dissolved Oxygen		NA		NA		5.6	NA	1/Day	Grab

Notes:

NL = No Limitation, monitoring only
NA = Not Applicable
24HC = 24 hour composite
TIRE = Totalizing Indicating and Recording Equipment

* The "7-Day Rolling Average" is the total mass and the average daily concentration for any calendar day and the preceding six calendar days divided by seven. Flow tiered 7-Day Rolling Averages calculated in accordance with Note h below shall not include data from more than 2 consecutive months.

a. Weekly average.

b. See Part I.B. for TRC limitations.

c. Geometric mean.

d. E. coli samples shall be taken between 7:30 am and 1:30 pm.

e. Total Nitrogen is the sum of Total Kjeldahl Nitrogen and Nitrates plus Nitrites and shall be derived from the results of those tests.

f. Unless otherwise noted.

g. For each calendar month, the DMR shall show the total monthly load (kg) and the cumulative load for the calendar year-to-date (kg). Monthly loads and calendar year-to-date loads shall include the nutrient loads associated with the first 45 MGD of flow on each day. The total nitrogen load and total phosphorus load for each calendar year shall be shown on the December DMR due January 10th of the following year.
Guidance Memorandum (GM#04-2017) "Nutrient Monitoring and Maximum Annual Loads" implements DEQ's best professional judgment decision to limit increases in nutrient loading from facilities listed on the Chesapeake Bay Program Significant Discharger List. Guidance Memorandum "Nutrient Monitoring and Maximum Annual Loads" provides the basis for this decision and specifies the procedure for determining annual effluent limitations for these parameters for each affected facility, as well as monitoring requirements.

h. This facility shall comply with all of the discharge limitations listed above when treating a dry-weather flow up to 45 MGD. This facility shall comply with all of the discharge concentration limitations when treating a combination of dry-weather flow and stormwater at flows of up to 75 MGD. In the event that concentration and/or loading limitations are met without regard to the flow tiering, then the facility will be considered to be in compliance with the applicable limitation. This facility shall comply with all of the discharge limitations listed above for TRC, Dissolved Oxygen, pH and E. coli regardless of flow.
Dry-weather flow = Total sanitary sewage, industrial wastewater, and Infiltration/Inflow

2. At least 85% removal for BOD and TSS must be attained for this effluent.

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

James Basin: SWCB-Approved Nutrient Waste Load Allocations (9 VAC 25-720-60-C.)					Total Nitrogen Waste Load Allocation		Total Phosphorus Waste Load Allocation	
Facility	VPDES Permit No.	County or City Location	River Basin	Design Flow (MGD)	Total Nitrogen Concentration (mg/l)	Discharged TN Waste Load Alloc. (lbs/yr)	Total Phosphorus Concentration (mg/l)	Discharged TP Waste Load Alloc. (lbs/yr)
Buena Vista STP	VA0020991	Buena Vista	James	2.25	6.00	41,115	0.50	3,426
Clifton Forge STP	VA0022772	Clifton Forge	James	2.00	6.00	36,547	0.50	3,046
Covington STP	VA0025542	Alleghany	James	3.00	6.00	54,820	0.50	4,568
Georgia Pacific	VA0003026	Bedford	James	10.87	3.70	122,489	1.50	49,658
Lees Carpets	VA0004677	Rockbridge	James	2.00	5.00	30,456	2.00	12,182
Lexington-Rockbridge Regional WQCF	VA0088161	Rockbridge	James	3.00	6.00	54,820	0.50	4,568
Alleghany Co.-Low Moor STP	VA0027979	Alleghany	James	0.50	6.00	9,137	0.50	761
Alleghany Co.-Lower Jackson River WWTP	VA0090671	Alleghany	James	1.50	6.00	27,410	0.50	2,284
MeadWestvaco	VA0003646	Alleghany	James	35.00	3.70	394,400	1.50	159,892
Amherst-Rutledge Creek WWTP	VA0031321	Amherst	James	0.60	6.00	10,964	0.50	914
BWX Technologies, Inc.	VA0003697	Campbell	James	0.50	122.80	187,000	1.00	1,523
Greif Inc.	VA0006408	Amherst	James	6.50	3.70	73,246	1.50	29,694
Lake Monticello STP	VA0024945	Fluvanna	James	1.00	6.00	18,182	0.50	1,515
Lynchburg STP (1)	VA0024970	Lynchburg	James	22.00	8.00	536,019	0.50	33,501
RWSA-Moores Creek Regional STP	VA0025518	Albemarle	James	15.00	6.00	274,100	0.50	22,842
Powhatan Correctional Center STP	VA0020699	Powhatan	James	0.47	6.00	8,588	0.50	716
Crewe WWTP	VA0020303	Nottaway	James	0.50	6.00	9,137	0.50	761
Farmville WWTP	VA0083135	Prince Edward	James	2.40	6.00	43,856	0.50	3,655
R. J. Reynolds	VA0002780	Chesterfield	James	2.10	4.00	25,583	0.30	1,919
E. I. DuPont-Spruance	VA0004669	Chesterfield	James	23.33	2.83	201,080	0.11	7,816
Chesterfield Co.-Falling Creek WWTP	VA0024996	Chesterfield	James	10.10	5.00	153,801	0.50	15,380
Henrico Co. WWTP	VA0063690	Henrico	James	75.00	5.00	1,142,085	0.50	114,209
Honeywell-Hopewell	VA0005291	Hopewell	James	121.00	2.96	1,090,798	0.14	51,592
Hopewell RWTF	VA0066630	Hopewell	James	50.00	12.00	1,827,336	0.50	76,139
Philip Morris USA-Park 500	VA0026557	Chesterfield	James	2.90	15.82	139,724	0.30	2,650
Chesterfield Co.-Proctors Creek WWTP	VA0060194	Chesterfield	James	27.00	5.00	411,151	0.50	41,115
Richmond WWTP (1)	VA0063177	Richmond	James	45.00	8.00	1,096,402	0.50	68,525
Dominion-Chesterfield (2)	VA0004146	Chesterfield	James			352,036		210
So. Central Wastewater Authority WWTF	VA0025437	Petersburg	James	23.00	5.00	350,239	0.50	35,024
Chickahominy WWTP	VA0088480	New Kent	James	0.41	5.00	6,167	0.10	123
Tyson Foods-Glen Allen	VA0004031	Hanover	James	1.07	6.00	19,552	0.10	326
HRSD-Boat Harbor STP (3)	VA0081256	Newport News	James	25.00		740,000	1.00	76,139
HRSD-James River STP (3)	VA0081272	Newport News	James	20.00		1,250,000	1.00	60,911
HRSD-Williamsburg STP (3)	VA0081302	James City	James	22.50		800,000	1.00	68,525
HRSD-Nansemond STP (3)	VA0081299	Suffolk	James	30.00		750,000	1.00	91,367
HRSD-Army Base STP (3)	VA0081230	Norfolk	James	18.00		610,000	1.00	54,820
HRSD-VIP WWTP (3)	VA0081281	Norfolk	James	40.00		750,000	1.00	121,822
J.H. Miles & Co.	VA0003263	Norfolk	James	0.35	202.16	153,500	28.32	21,500
HRSD-Chesapeake/Elizabeth STP (3)	VA0081264	Virginia Beach	James	24.00		1,100,000	1.49	108,674
39			James Totals =	**669.84**		**14,901,739**		**1,354,292**

Notes:

(1) Waste load allocations for localities served by combined sewers are based on dry weather design flow capacity. During wet weather flow events the discharge shall achieve a TN concentration of 8.0 mg/l and a TP concentration of 1.0 mg/l

(2) Waste load allocations are "net" loads, based on the portion of the nutrient discharge introduced by the facility's process waste streams, and not originating in raw water intake.

(3) Hampton Roads Sanitation District TN Waste Load Allocation: total nitrogen waste load allocation based on an aggregate figure of 6.0 million pounds per year for HRSD James Basin facilities.

ATTACHMENT NO. 3

M&E Analyses of Permit Limit

METCALF & EDDY | AECOM

Metcalf & Eddy Management, P.C.
5000 Overlook Avenue S.W., Washington, D.C. 20032
T 202.787.2516 F 202.787.2509 www.m-e.aecom.com

July 27, 2006

Leonard R. Benson, Director
Department Of Engineering and Technical Services
DC Water and Sewer Authority
5000 Overlook Avenue S.W.
Washington D.C. 20032

Dear Mr. Benson:

In response to your request, we have developed an approach to predict annual total nitrogen load that WASA could discharge in the future, as a result of variable flows and temperatures as well as projected annual increases in flow. As the plant operating data is limited to just over four years, we developed an approach using the existing TN data and process modeling.

We noted that 2003 was a very wet year, while 2004 had lower temperatures than 2003 at a time when flows were still elevated. The consecutive twelve-month period from May 1, 2003 through April 30, 2004 reflects both high flows and low temperatures. The actual TN discharge for this twelve-month period was approximately 7.7 million pounds. To determine projected plant performance we developed additional BIOWIN process models for the existing plant with none of the planned improvements in place. Our process modeling for maximum month flow and low temperatures indicates that the plant could lose the BNR process during periods when temperature is less than 12 degrees. WASA would respond to such an event by increasing the reactor volume for nitrification and stopping methanol feed. We estimate the plant would not effectively denitrify wastewater for a period of two months, which includes the cold weather period and a period of recovery. We modified plant TN data for February and March of 2003 to reflect the loss of denitrification. We assumed that 80 percent of the total nitrogen applied to the BNR process would not be removed, while 20 percent of the nitrogen would be utilized by the cell mass. The projected annual TN load for this condition is 8,025,200 lbs.

As WASA anticipates the interim permit limit could be in effect for an extended period of time we increased this projected annual load by a ratio of 410 mgd/379 mgd. (Reference Limno-Tech memorandum to Ron Bizzarri, dated July 25, 2006, Exhibit No. 1) Applying this ratio to the projected load results in a projected future annual TN load of 8,681,600 lbs. Prudent design practice would require a safety factor of 10 percent when committing to a new permit condition. Applying the safety factor results in an annual TN load of 9,549,800 lbs, which is equivalent to 8.5 mg/l at 370 mgd.

For the period of construction in the BNR process beginning in 2007, we increased the TN load by 10 percent to reflect one reactor at a time out of service. The reduced capacity results in an annual TN load of 10,504,800 lbs, which is the equivalent of 9.33 mg/l at 370 mgd.

Sincerely,

Edward R. Locke

Edward R Locke
Program Manager