Strategic Process Engineering

Meeting CBP 2010 Goals at Blue Plains

Alternatives Workshop
for
Blue Plains Users and Regulators
August 10, 2005

Today's Agenda

- Overview
  - Background
  - Challenges for Meeting CBP Requirements
- Meeting CBP Requirements
  - Excess Flow Treatment
  - Enhanced Nutrient Removal
- Summary
  - Cost Estimates
  - ENR Limitations
  - Research and Pilot Tests
  - Current Timeline Going Forward
  - Discussion of EPA letter to DC WASA

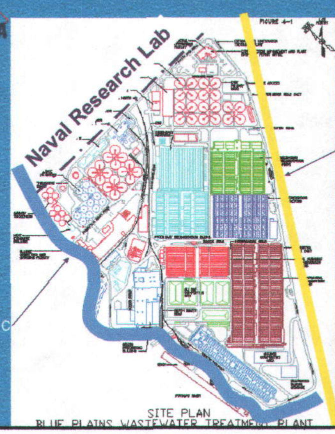
Audience participation is encouraged

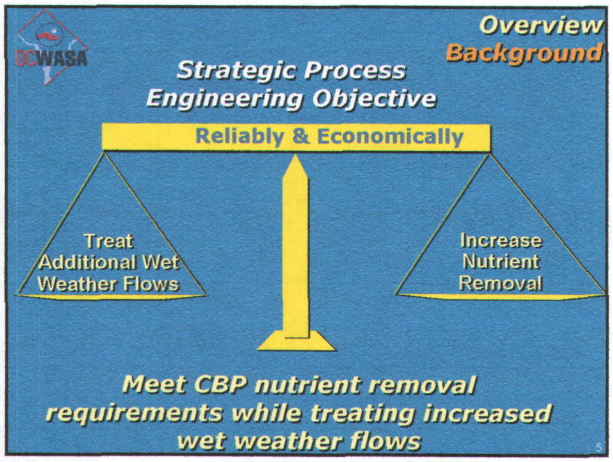
Overview
Background
Leading up to the Strategic Process Engineering Plan

- At the request of CBP, WASA developed cost of nutrient load reduction at BP for Tier II & Tier III
- Recognized space limitation at Blue Plains
- Assumed daily/weekly TN discharge limits under NPDES permit

Cost estimates approached $1Billion

Overview
Background





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Overview
Background

Strategic Process Engineering Steps

- Evaluate current BNR process
- Identify constraints
- Explore alternative solutions
- Evaluate water quality impacts
- Develop cost estimates
- Identify potential regulatory constraints
- Develop schedule

A holistic approach to planning is required.

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Overview
Background

Current Assumptions for ENR

- State Tributary Strategies provided initial guidance
- States have adopted nutrient WQ standards, regulations and policies
- Annual average effluent load limits will be included in NPDES permits
- WASA received July 28, 2005 letter from EPA
- Permit requirement schedule unknown

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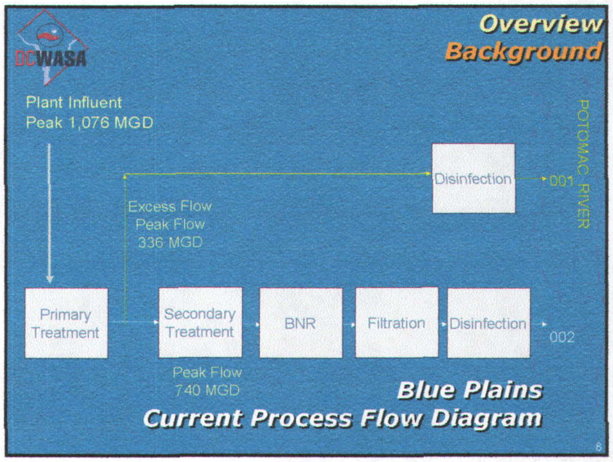


Overview
Challenges for Meeting CBP Requirements

- Capacity Limitations
  - Blue Plains is at *90%* capacity
  - Primary sedimentation capacity undersized
  - Secondary and BNR sedimentation capacity undersized
- Flow and Load Increases
  - Digesters increase Nitrogen load by *30%*
  - Pump station rehabilitation increases peak storm flows to Blue Plains (*2008*)
  - LTCP tunnel pump out extends high flows to Blue Plains after the storm event (*2017*)
  - Peak month flows coincide with cold temperatures

Overview
Challenges for Meeting CBP Requirements

Wet Weather Flow Impacts

- Peak storm flows impact entire plant operation
- Primary tanks are overloaded
- Poor Primary Treatment overloads Secondary
- Secondary and BNR sed basins inadequate to achieve ENR
- Operators intervention to protect bio-processes
  - Reduced biological treatment capacity
  - Return to normal mode takes up to *48* hours
- *1%* of total annual BNR volume (flows > *555* mgd) causes ENR problems

Total flow to BNR

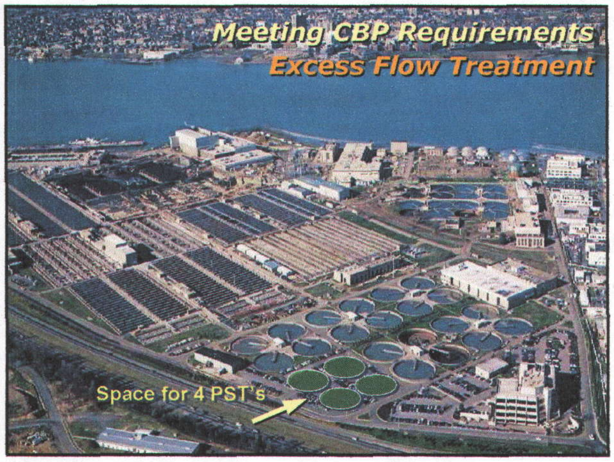
Meeting CBP Requirements

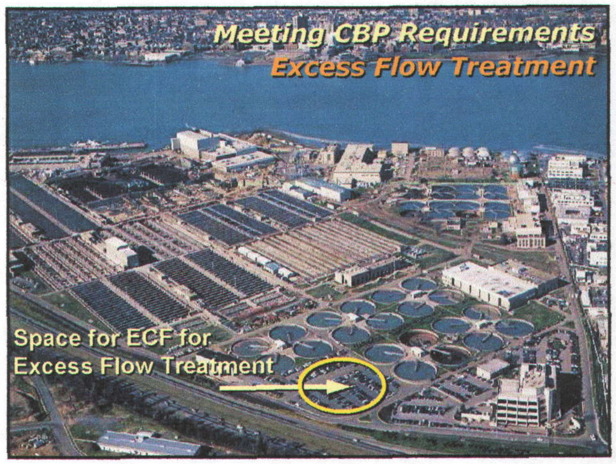
Excess Flow Treatment

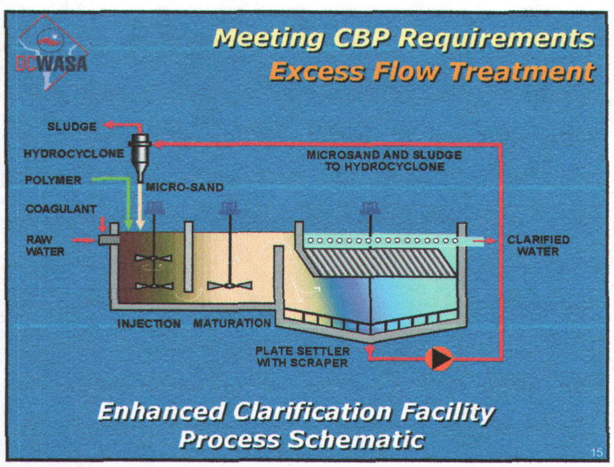
Meeting CBP Requirements
Excess Flow Treatment

To manage excess flow:

- LTCP recommended 4 additional Primary Sedimentation Tanks (PSTs)
- WASA is considering an Enhanced Clarification Facility (ECF) to treat excess flows to:
  - Reduce peak flows to the primary process
  - Produce better quality effluent


Meeting CBP Requirements
Excess Flow Treatment
Space for 4 PST's


Meeting CBP Requirements
Excess Flow Treatment
Space for ECF for
Excess Flow Treatment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Meeting CBP Requirements
Excess Flow Treatment
SLUDGE
HYDROCYCLONE
POLYMER
MICRO-SAND
COAGULANT
RAW WATER
MICROSAND AND SLUDGE TO HYDROCYCLONE
CLARIFIED WATER
INJECTION
MATURATION
PLATE SETTLER WITH SCRAPER
Enhanced Clarification Facility
Process Schematic
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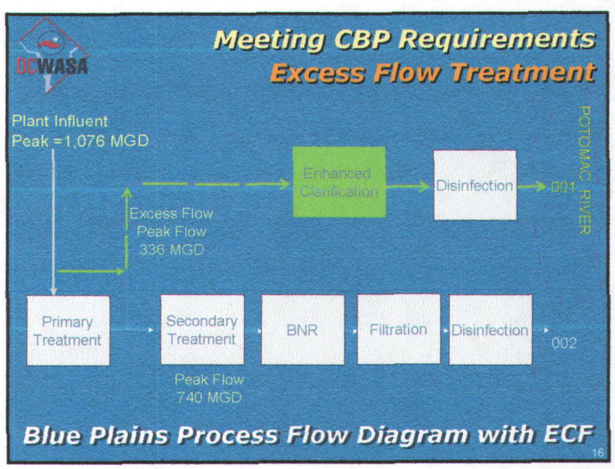
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Meeting CBP Requirements
Excess Flow Treatment
Plant Influent
Peak = 1,076 MGD
Excess Flow
Peak Flow
336 MGD
Enhanced Clarification
Disinfection
001
POTOMAC RIVER
Primary Treatment
Secondary Treatment
BNR
Filtration
Disinfection
002
Peak Flow
740 MGD
Blue Plains Process Flow Diagram with ECF
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Meeting CBP Requirements
Excess Flow Treatment

- Benefits of Enhanced Clarification Facility
  - Solves hydraulic overload problem in Primary
  - Allows limiting peak flow to Primary to 740 mgd
  - Provides separate excess flow treatment
  - Effluent quality is better than primary treatment
  - Reduction in nutrient mass loading into the Potomac River from Blue Plains
  - Improved ability to disinfect ECF treated excess flow

Meeting CBP Requirements
Excess Flow Treatment

- ECF Impact on Pathogens (tech memo)
  - Physical-chemical process
  - Forms floc
  - Floc captures/absorbs pathogens
  - Lower turbidity effluent improves the effectiveness of disinfection
  - Disinfection standard can be met
- ECF Impact on Metals
  - Process using metal salts precipitates metals

Meeting CBP Requirements
Excess Flow Treatment

Impact of ECF on Potomac River Water Quality
Potomac River Segment 129

	# days D.O.<5	No. of Days FC>200/100 ml	No. of Days EC>126/100ml
WQS		30 day geo-mean	None yet
4 new PST	7	18	21
ECF 336 MGD PF=2.0	1	3	3

*CSS tunnels in place, storm water 40% decrease, upstream 80% of WQS, nutrients 40% decrease

Meeting CBP Requirements
Excess Flow Treatment
Summary

- ECF for Treatment of Excess Flows
  - Improves primary treatment during wet weather events
  - Provides benefit for biological processes
  - Reduces loading to river from LTCP loads
  - Improves water quality
  - Improves effectiveness of disinfection processes
- Pilot testing of ECF (ballasted flocculation) would be prudent

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Meeting CBP Requirements

Enhanced Nutrient Removal

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Meeting CBP Requirements
Enhanced Nutrient Removal
Introduction

- WASA has achieved BNR by denitrifying in the nitrification reactors
  - Used buffer capacity for upset
  - Effluent TN now less than 5 mg/l in warm months
  - BUT, peak flows are limited by construction
- Secondary process capacity is 555 mgd
  - Defined by clarifier analysis
  - Confirmed by need to store solids to prevent washouts
- Higher wet weather flows will reach BP
- Digester recycle load will add nitrogen load

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Meeting CBP Requirements
Enhanced Nutrient Removal

Process Engineering 101

Higher mixed liquor levels improve TN removal

BUT, high wet weather flow peaks require the plant to operate at lower mixed liquor levels

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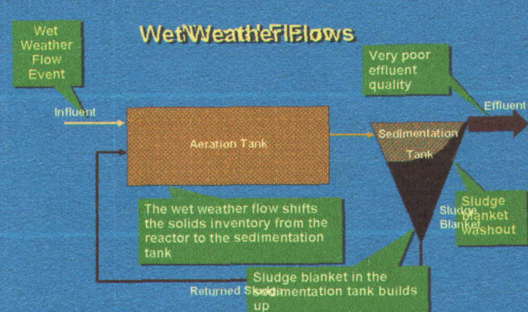

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Meeting CBP Requirements
Enhanced Nutrient Removal

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Higher mixed liquor levels improve TN removal. However, high peak wet weather flows require the plant to operate at lower mixed liquor levels.

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Therefore, two items are both needed

1) Solutions to improve biological processes

AND

2) Solutions for hydraulic problems

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Meeting CBP Requirements
Enhanced Nutrient Removal

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Solutions to Improve Biological Processes

- Baseline Projects to maintain 7.5 mg/L
  - Nit/denit upgrade (ongoing design)
  - Secondary BNR Upgrade (CIP 2013)
- ENR Projects
  - Enhanced Clarification Facility
  - Digester Centrate Treatment
  - Additional Nitrification/Denitrification Reactors

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Meeting CBP Requirements
Enhanced Nutrient Removal

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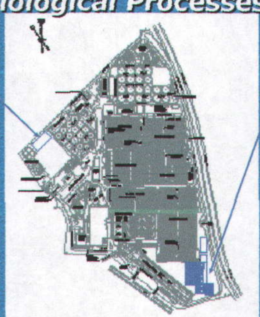
Solutions to Improve Biological Processes

Proposed Centrate Treatment Facility



Proposed Additional Nitrification Reactors

Site Plan

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Meeting CBP Requirements
Enhanced Nutrient Removal

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Solutions for Hydraulic Problems

- Option A: Provide additional infrastructure
  - Provide additional secondary sedimentation basins
    - Difficulty routing flows to and from new basins
    - Requires pumping effluent to BNR process
    - Requires redistribution of flow between east and west processes
    - Requires storing solids during wet weather to stabilize the process
  - Provide side stream treatment for spent wash water
- Option B: Limit Peak Flows to biological processes to 555 mgd
  - Reduce Peaking Factor (Ratio of Peak to Average Flow) to 1.5
  - Operate a more stable biological system
  - Treat additional excess flow through larger enhanced clarification facility

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Meeting CBP Requirements
Enhanced Nutrient Removal
Impact of Reducing Peak Factor

Impact of ECF on Potomac River Water Quality Potomac River Segment 129			
	# days D.O.<5	No. of Days FC>200/100 ml	No. of Days EC>126/100ml
WQS		30 day geo-mean	None yet
4 new PST	7	18	21
ECF 336 MGD PF=2.0	1	3	3
ECF 521 MGD PF=1.5	1	3	3

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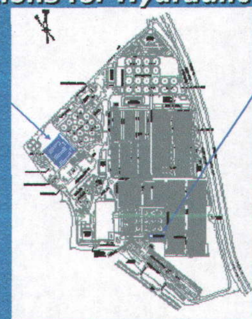
Meeting CBP Requirements
Enhanced Nutrient Removal
Solutions for Hydraulic Problems

Proposed New Secondary Clarifiers



Proposed Spent Washwater Treatment Facility

Site Plan

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Meeting CBP Requirements
Enhanced Nutrient Removal
Summary

- Baseline Projects to maintain 7.5 mg/L
  - Nit/denit upgrade (ongoing design)
  - Secondary BNR Upgrade (CIP 2013)
- ENR Projects
  - Enhanced Clarification Facility
  - Digester Centrate Treatment
  - Additional Nitrification/Denitrification Reactors
- Reduced Peaking Factor from 2.0 to 1.5 would result in:
  - Larger Enhanced Clarification Facility (for flows >555 mgd)
  - Meeting Potomac River Water Quality Standards
  - Elimination of need for new secondary clarifiers and SWW treatment facility
  - More reliable and stable biological process

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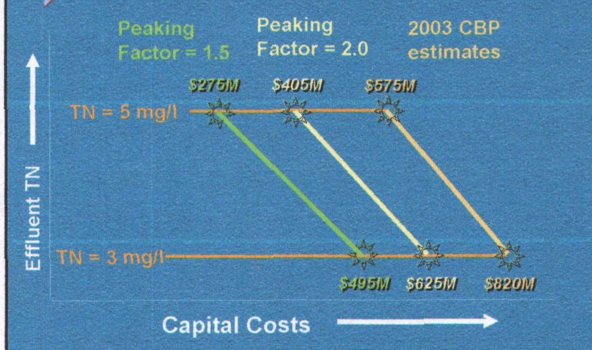
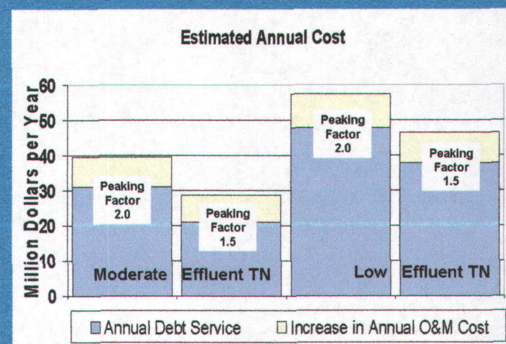
Summary
Estimated Costs



Summary
Estimated Costs

Parameter	Estimated Cost Range				
	Baseline	1A ENR	1B ENR	2A ENR	2B ENR
TN Goal	7.5	5.0	5.0	3.0	3.0
Peak Factor	2.0	2.0	1.5	2.0	1.5
Facilities Needed	1- Nit/Denit. Sec. BNR	1- Nit/Denit. Sec. BNR 2- ECF 336 MGD 3- Sec. Sed. Basins 4- SWW SST 5- Centrate SST	1- Nit/Denit. Sec. BNR 2- ECF 521 MGD 3- Centrate SST	1- Nit/Denit. Sec. BNR 2- ECF 336 MGD 3- Sec. Sed. Basins 4- SWW SST 5- Centrate SST 6- BNR Reactors	1- Nit/Denit. Sec. BNR 2- ECF 521 MGD 3- Centrate SST 6- BNR Reactors
Capital Cost, $M		405	275	625	495
Annual Debt Service		31.0	21.1	47.9	37.9
Additional O&M Cost, $M/Yr		8.5	7.6	9.6	8.7
% Increase O&M		19%	17%	22%	20%

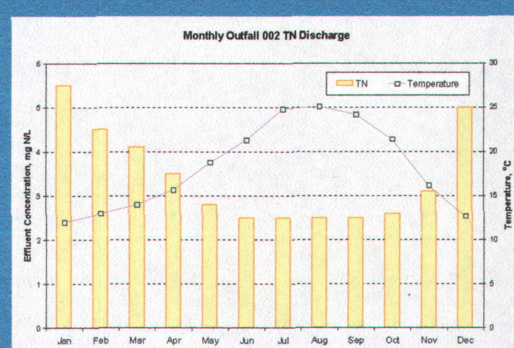
Summary
Estimated Costs



Summary
ENR Limitations

- Uncertainties in design assumptions
  - Nitrification/Denitrification growth rates
  - Low temperature impacts on growth rates
  - Temperature impacts on settling capacity
  - Seeding efficiency of centrate treatment
- Possible increase in number of BNR reactors could be required by:
  - Lower growth rates than now assumed
  - Requiring TN removal at less than 12ºC

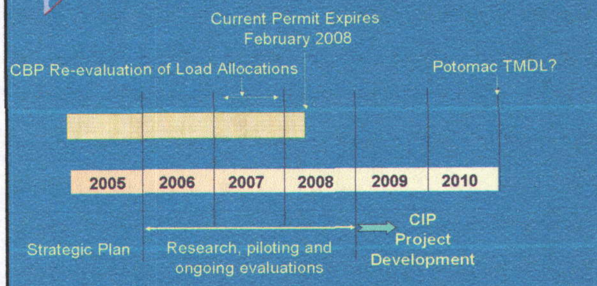
Summary
ENR Limitations



Summary
Research and Pilot Tests

- Current Research
  - Settling velocity analysis
  - Full scale bio-augmentation (BNR sludge wasted to Secondary)
  - Evaluation of alternate substrate for denitrification
  - Bio-availability of organic nitrogen in plant effluent
- Future Research
  - Pilot test of ECF (pathogens, metals, etc.)
  - Pilot test of centrate treatment options
  - Potomac River nitrate research
  - Boundary condition research – low temperatures
  - Inhibition – from low alkalinity/low pH

Current Timeline Going Forward



EPA Letter to DC WASA
Proposal # 1
Reduce Peak Flow to biological processes from 2.0 to 1.5

- EPA Response
  - Flows>555 mgd would be directed through a minimum of primary treatment
- WASA Clarification
  - Minimum treatment would be enhanced clarification
- EPA Request
  - Analysis of how increased discharge from Outfall 001 would qualify as a CSO-related bypass, in accordance with CSO policy
- WASA Response – Discussion
  - Formal response will be prepared

EPA Letter to DC WASA
Proposal # 2
Acceptability of Enhanced Clarification Facility for Excess Flow Treatment

- EPA Requests
  - Information on quantity and quality of discharges through Outfall 001 and Outfall 002
  - Confirm use of ballasted floc
- WASA Response
  - Preliminary Estimate of Load and Water Quality Data provided (see handout)
  - Piloting and research of enhanced clarification performance planned
  - Enhanced clarification facility will use ballasted flocculation

EPA Letter to DC WASA
Proposal # 2
Acceptability of Enhanced Clarification Facility for Excess Flow Treatment

Preliminary Estimates of
Anticipated Loading to the Potomac River for Various Scenarios

Currently Approved LTCP
Construction of 4 Additional Primary Clarifiers
Plant Peaking Factor of 2.0, (370/740/511)
TN goal of 7.5mg/L at Outfall 002

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,331	135,050	136,381
TSS Load	(Mlbs/yr)	1.2	5.6	6.8
BOD Load	(Mlbs/yr)	0.9	7.9	8.8
TN Load	(Mlbs/yr)	0.2	8.4	8.6
TP Load	(Mlbs/yr)	0.02	0.2	0.22

Alternative A - Peaking Factor of 2.0
Construction of ECF for treatment of Excess Flow (Outfall 001 Flow)
Plant Peaking Factor of 2.0, (370/740/511)
TN limit of 4.2mg/L at Outfall 002 (per EPA letter 7/28/05)

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,331	135,050	136,381
TSS Load	(Mlbs/yr)	0.2	5.6	5.8
BOD Load	(Mlbs/yr)	0.4	7.9	8.3
TN Load	(Mlbs/yr)	0.1	4.7	4.8
TP Load	(Mlbs/yr)	0.002	0.2	0.202

Alternative B - Peaking Factor of 1.5
Construction of ECF for treatment of Excess Flow (Outfall 001 Flow)
Plant Peaking Factor of 1.5, (370/555/511)
TN limit of 4.2mg/L at Outfall 002 (per EPA letter 7/28/05)

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,826	135,050	136,876
TSS Load	(Mlbs/yr)	0.2	5.6	5.8
BOD Load	(Mlbs/yr)	0.5	7.9	8.4
TN Load	(Mlbs/yr)	0.2	4.6	4.8
TP Load	(Mlbs/yr)	0.003	0.2	0.203

Numbers presented in this table are based on the best available information as of

EPA Letter to DC WASA
Proposal # 3
Acceptability of CSS Tunnel Pump Out Treated with ECF and Discharged via Outfall 001

- EPA Response
  - Needs legal basis
  - Unacceptable given current information
- WASA Response
  - Will evaluate

EPA Letter to DC WASA
Other Issues
TN Load Limit for Blue Plains

- EPA
  - Provided load limit and calculations for TN
  - Stated intention to include annual total TN load limit in NPDES permit if permit modified, or by 2008 renewal date.
- WASA
  - Outfall 001 remains a CSO-related bypass
  - TN annual load based on
    - Annual average hydrologic year (i.e., 370 mgd)
    - Minimum wastewater temperature of 12°C
    - Total Inorganic Nitrogen (TIN)

DCWASA

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

December 22, 2005

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

Re: Blue Plains Excess Flow Treatment

Dear Mr. Capacasa:

Attached are two documents titled, Legal Analysis and Technical Analysis that respond to your July 28, 2005 letter, which included a request for additional information and analysis regarding excess flow treatment at Blue Plains.. EPA's response to the attached information, analysis and conclusions, particularly the legal analysis and conclusions, will greatly assist us as we proceed with our alternatives evaluation.

We would appreciate the opportunity to meet with you and appropriate members of your staff, including regional counsel, in the event you have additional questions or concerns regarding the information and analysis that has been provided in these documents.

Sincerely,

for Jerry N. Johnson
General Manager

Attachments

LEGAL ANALYSIS

TO DECEMBER 22, 2005 LETTER FROM DC WASA GENERAL MANAGER TO CHIEF, WATER PROTECTION DIVISION OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY

The following responds to the two legal questions in Jon Capacasa's July 28, 2005 letter to Jerry Johnson regarding WASA's evaluation of alternatives to treat excess flow while meeting anticipated new nitrogen control requirements called for by the Chesapeake Bay Program.

I. Policy Considerations

The CSO Control Policy does not specifically address EPA's questions, nor is WASA aware of any other case which would serve as precedent. In fact, to WASA's knowledge, this is the first time that a CSO permittee has had to face the very difficult challenge of meeting effluent limits for total nitrogen that reflect limit-of-technology while treating hundreds of millions of gallons of wet weather flow from a combined sewer system. The difficulties inherent in maintaining high levels of denitrification while treating large volumes of wet weather flow under varying temperature and load conditions are well known; and WASA expects that many other CSO communities will face similar challenges in the years ahead as more LTCPs are completed and as new water quality standards for nutrients are adopted and implemented. Therefore, EPA's questions raise significant policy issues that will directly affect the ability of CSO communities nationwide to meet the dual challenges of complying with stringent nitrogen control requirements while treating large volumes of wet weather flow.

Success is assured if the affected CSO communities and the regulatory authorities work together to employ the creativity and innovation that the CSO Policy seeks to promote. WASA is exploring several creative and innovative alternatives, and believes that EPA has the authority, if not the duty, to respond in kind. Indeed, the CSO Policy encourages permittees and permitting authorities to "consider innovative and alternative approaches and technologies that achieve the objectives of [the] Policy and the [Clean Water Act]." CSO Policy at I.F. Among the key objectives and principles of the CSO Policy are

> *[p]roviding sufficient flexibility to municipalities, especially disadvantaged communities, to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting [Clean Water Act] objectives and requirements.*

CSO Policy at I.A.2.

The alternatives under consideration by WASA are entirely consistent with the foregoing, and WASA believes that if EPA judges them with these same objectives and principles in mind, it will concur in the following analysis and conclusions.

II. Overview of Relevant Facts

The Blue Plains permit and WASA's LTCP presently call for WASA to provide complete treatment for peak flows of up to 740 MGD for up to four hours during wet weather events. Flows above this quantity up to 336 MGD are diverted to excess flow treatment which consists of screening, grit removal, primary treatment, and disinfection. The total plant flow during the first four hours is 1,076 MGD. After four hours, the flow to complete treatment is reduced to 511 MGD and excess flow treatment remains up to 336 MGD, for a total plant flow rate of 847 MGD. WASA must empty the tunnels within 59 hours following wet weather events and provide treatment for the contents of the tunnels in accordance with its permit. The LTCP calls for WASA to add four primary clarifiers at Blue Plains to provide the treatment capacity needed to treat excess flow. WASA is confident that it can comply with the above requirements while meeting its existing effluent limits and goals following installation of the primary clarifiers and completion of the remaining upgrades now underway at Blue Plains.

However, the anticipated addition of a new limit in the Blue Plains permit that will require the installation of nitrogen controls at or near the limits of technology will dramatically affect WASA's ability to provide complete treatment for the volumes of wet weather flows presently called for in the LTCP and by the conditions in the current permit. This is a significant change to the assumptions and projections used in the development of the LTCP, the permit, and the consent decree LTCP implementation schedules. As noted above, high wet weather flows can have a significant adverse impact on the denitrification processes. Further, these adverse impacts are magnified significantly under cold water temperatures that regularly prevail during winter snow melt and rainfall events.

WASA's alternatives evaluation is designed to produce the most cost-effective approach to compliance with a new nitrogen limit while achieving the same, if not better overall pollutant load reductions and water quality as the load reductions and water quality projected for the current permit and LTCP. However, the alternatives under consideration involve elements which raise the following legal issues. These issues must be resolved before WASA can conclude its evaluations and present a specific proposal to EPA.

First, would increasing the flow discharged from Outfall 001 due to a reduction in the peak flow factor from 2.0 to 1.5, qualify as a CSO bypass under the CSO Policy?

Second, would treating tunnel pump-out through excess flow treatment be authorized (a) as a CSO bypass if conveyed to Blue Plains through the existing conveyance system and head works, or (b) as a CSO discharge if conveyed to Blue Plains through a new conveyance system that would enter the plant through a new separate head works?

III. Analysis

A. *Increased Flow Discharged From Outfall 001*

The first question (ie, would the increased flow discharged from Outfall 001 qualify as a CSO-related bypass pursuant to the CSO Policy) corresponds to the first question in Jon Capacasa's July 28, 2005 letter.

At the outset, it should be noted that the current Blue Plains permit already authorizes a CSO-related bypass for excess flows above peak flow factors of 2.0 and 1.38 times annual average. Accordingly, the first question is directed only at the increased flow from Outfall 001 that would result from the reduced peak flow factor.

As EPA knows, Section II.C.7 of the CSO Policy ("Maximizing Treatment at the Existing POTW Treatment Plant") builds upon EPA's bypass regulations at 40 CFR 122.41(m) to establish a framework for authorizing bypasses on a case-by-case basis at POTWs receiving combined sewer flows.[1]

An intentional diversion of wet weather flow from any portion of a treatment facility must meet the following criteria in order to be approved as a CSO-related bypass under Section II.C.7 of the CSO Policy. First, the permittee must show that the bypass was unavoidable to prevent loss of life, personal injury or severe property damage. Second, the permittee must show that there was no feasible alternative to the bypass. Third, the bypass may be approved only after consideration of adverse impacts. Finally, the LTCP must provide a justification for the cut-off point at which flows will be diverted from secondary treatment, and a cost-benefit analysis demonstrating that conveyance of wet weather flow to the POTW for primary treatment is more beneficial than other CSO abatement alternatives. The following demonstrates that the increased flow from Outfall 001 that would result from a reduced peak flow factor would clearly satisfy each of these criteria.

With regard to the first criterion, the CSO Policy indicates that "severe property damage" could include adverse affects on the performance of the treatment system; and identifies situations where flows above a certain level wash out the POTW's secondary treatment system as an example of severe property damage. WASA's evaluation indicates that providing complete treatment to flows above a 1.5 peak flow factor would have consequences similar to those described in the above example. Therefore, the effects of Blue Plains flows above this peak flow factor are within the scope of the kinds of damage contemplated by the CSO Policy. The studies completed to date show that flows above a

[1] It is important to note that now that the CSO Policy has been incorporated into the Clean Water Act, it does more than simply interpret EPA's bypass regulation. Rather, the Policy now serves as it own Clean Water Act authority, and, therefore, can be interpreted to authorize CSO-related bypasses that might otherwise be viewed as beyond the scope of EPA's bypass regulation.

1.5 peak flow factor would undermine Blue Plains' operational stability, risk washing out the nitrifying bacteria, and prevent the plant from consistently meeting a stringent nitrogen limit without a total reconstruction of major processes at the plant. Given the importance attached to nitrogen control at Blue Plains, it would appear that there could be few consequences more severe than damage to the plant's denitrifying processes and its inability to consistently meet its nitrogen limit.

Further, any alternative which incorporates increased flows from Outfall 001 to protect the plant and plant performance must be viewed in light of the CSO Policy's objectives and principles discussed above which necessarily require a broader interpretation of the term "severe property damage" when applied to a combined sewer system. Non-CSO bypasses are generally associated with infrequent, extraordinary events such as hurricanes or large equipment failures, and, therefore, are intended principally to prevent treatment plants from being damaged under the severe conditions resulting from these events. CSO bypasses authorized by the CSO Policy, particularly those that are elements of LTCPs, on the other hand, are intended to serve an entirely different purpose; namely, to meet the Policy's site specificity and cost effectiveness goals by ensuring that wet weather treatment capacity is utilized to the maximum extent possible. The foregoing necessarily means that the excess capacity must be utilized not only in ways that would not damage the plant, but also without significantly interfering with plant operation, particularly interference that would result in permit non-compliance. WASA's studies show that it can not protect the denitrification processes at the plant and cost effectively comply with a nitrogen limit while providing complete treatment for flows above 555 MGD (1.5 peak flow factor). Therefore, the consequences of providing complete treatment to flows above a 1.5 peak flow factor are plainly serious enough for EPA to conclude that they would constitute the kind of severe property damage envisioned by the CSO Policy.

Under the second criterion, the permittee must show that there was no feasible alternative to the bypass. The CSO Policy offers the following explanation of this criterion in the CSO context:

> *[T]he feasible alternatives requirement of the regulation can be met if the record shows that the secondary treatment system is properly operated and maintained, that the system has been designed to meet secondary limits for flows greater than the peak dry weather flow, plus an appropriate quantity of wet weather flow, and that it is either technically or financially infeasible to provide secondary treatment at the existing facilities for greater amounts of wet weather flow.*

59 Fed. Reg. 18,688, 18,694 (April 19, 1994).

Applying the above to Blue Plains, WASA can, of course, show that the secondary and advanced treatment systems are properly operated and maintained. Further, as EPA knows, Blue Plains has been designed to treat to levels more stringent than secondary treatment for significant quantities of wet weather flow. With average plant flows currently at approximately 370 MGD, the projected peak dry weather flow is about 425 MGD. Under these conditions, the plant would be providing full treatment, including limit-of-technology nutrient control, for about 130 MGD of wet weather flow at 555 MGD (1.5 peak flow factor). Moreover, WASA believes that any alternative incorporating a 1.5 peak flow factor and a resulting increase in flow discharged from outfall 001 would meet the financial infeasibility test based upon the cost projections that we have shared with EPA. Those projections indicate that it would cost millions of dollars in additional debt service and operation and maintenance costs to provide nutrient removal down to 3.0 mg/l for wet weather flow at a 2.0 peaking factor instead of the proposed 1.5 peaking factor.

The CSO Policy also provides that the bypass may be approved only after consideration of adverse impacts. Presumably, the reference is to adverse water quality impacts rather than adverse plant impacts. In either event, however, any alternative incorporating a 1.5 peak flow factor and a resulting increase in flow discharged from outfall 001 would satisfy this criterion if WASA can show that it would produce the same, if not better water quality conditions projected with the current LTCP derived performance standards while preventing adverse impacts on plant performance.

Finally, the LTCP together with the technical studies completed to date and submitted to EPA provide (1) the technical justification supporting the 555 MGD cut-off point at which the flow would be diverted from full treatment, and (2) the cost-benefit analysis demonstrating that conveyance of wet weather flow to Blue Plains for primary treatment is more beneficial than other CSO abatement alternatives.

B. *Treatment of Tunnel Pump-Out*

The alternatives under consideration involve directing either all or a portion of the wet weather flow from tunnel pump-out through excess flow treatment prior to discharge from Outfall 001 rather than complete treatment prior to discharge from Outfall 002 as currently provided in the LTCP. The alternatives include two possible approaches - conveying tunnel pump-out to Blue Plains using (a) the existing conveyance system and head works, or (b) a new conveyance system which would enter Blue Plains through a new separate head works. Although they have a different legal basis, WASA believes that either approach would be authorized under the CSO Policy.

Under the first approach (existing conveyance system and head works) the legal basis is Section II.C.7 of the CSO Policy ("Maximizing Treatment at the Existing Treatment Plant"), which, as discussed above, establishes several criteria for authorizing bypasses on a case-by-case at POTWs receiving combined sewer flows. But before turning to these criteria, it is important to point that while this particular approach may appear at first glance to offer less treatment and load reduction than would be the case if tunnel pump-out was directed to complete treatment, the opposite is, in fact, true. WASA's studies and analysis show that the combination of faster tunnel pump-out, enhanced clarification, and the dilute nature of the tunnel contents will produce pollutant removals equivalent to those that would be achieved through complete treatment, and that overall pollutant loads would be less under this approach than they would be if the tunnel contents were sent through complete treatment. The foregoing, together with the cost savings associated with this approach and the CSO Policy's goals of promoting cost effectiveness, innovation, and new technologies, strongly suggest that the cost-benefit criterion is the overriding consideration in evaluating this approach. WASA's analysis, in turn, shows that this approach is without question more cost beneficial than providing complete treatment to the contents of the tunnels.

The other criteria would be easily satisfied once the compelling cost-benefit of this approach is recognized. Applying the broad interpretation of the "severe property damage" criterion as discussed above, EPA can, and should readily conclude that this approach would satisfy this criterion because it enhances overall operation of the Blue Plains processes resulting in greater load reductions at less cost. As discussed above, the second criterion (alternatives) is dependent upon a showing of technical or economic infeasibility which is also satisfied if WASA can demonstrate that this approach would produce greater load reductions at less cost. Obviously, the final criterion would be satisfied because there would be no adverse impacts from this approach.

The only difference between this approach and the existing and proposed bypass authorizations discussed above is that it would provide for treatment of wet weather flow that is captured in the tunnels before being released to the sewer system rather than wet weather flow that is treated at the plant without first being captured in the tunnels. The CSO Policy does not prevent use of the bypass authorization for treating the contents of the tunnels. Although Section II.C.7 refers to "the delivery of flow during wet weather", the reference is not a limitation, but rather is descriptive of the benefits of bypass authorizations under the situations discussed is the section. Therefore, Section II.C.7 can not be construed as limiting bypass authorizations to "flow during wet weather" in cases such as this where the proposed authorization meets all the criterion in Section II.C.7 and clearly advances the principles and objectives of the CSO Policy.

Under the second approach (new pipeline and new separate head works), the discharge of the treated contents of the tunnels from Outfall 001 would be a CSO rather than a bypass because it would be a discharge at a point prior to the POTW. *See*, CSO Policy at I.A. As CSOs, the discharge of the treated contents of the tunnels would be authorized if it met the CSO Policy's technology-based standards and did not cause or contribute to a violation of water quality standards. The evaluation completed to date indicates that this approach would meet both of these criteria. First, it would easily meet the technology-based requirements established by the CSO Policy because the tunnel contents would receive treatment far above the minimum primary clarification, solids disposal and disinfection requirements at Section II.C.4.a of the Policy. Second, as reflected in the modeling and analysis submitted to date, this approach would not cause or contribute to a violation of water quality standards.

IV. Conclusion

Based on the foregoing, WASA believes that the above legal questions should be answered in the affirmative, and, therefore, are not an obstacle to selecting the most cost-effective approach to treating excess flow while meeting the anticipated new nitrogen control requirements.

TECHNICAL ANALYSIS

TO DECEMBER 22, 2005 LETTER FROM DC WASA GENERAL MANAGER TO CHIEF, WATER PROTECTION DIVISION OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY

Introduction
At the workshop held on August 10, 2005, EPA requested clarification and documentation of several aspects of the strategic process engineering planning. The specific questions and issues raised were:

1. Why doesn't the total flow from Outfall 002 shown on Table 2 (handout at workshop) decrease when the peaking factor is reduced from 2.0 to 1.5?
2. Does reducing the peaking factor from 2.0 to 1.5 provide the capability to treat more wet weather flow?
3. What steps does WASA take during a wet weather event and what effect does that have on treatment performance? What are the lingering effects and how long does it take to return to normal operations?
4. What are the effects of storm events on treatment performance?
5. Provide a more specific plan, including costs, to address meeting the proposed TN limit of 4.2 mg/l.
6. Provide updates on the continuing research on the bioavailability of organic nitrogen.

This document provides WASA's responses to these requests for technical information. We note that the research defined in Question 6 is ongoing and updates on this project will be provided separately.

Thus far, WASA has presented two options for CSS tunnel pump out and treatment at the stakeholder workshops. As pointed out at the September 12, 2005 workshop, the enhanced clarification facility option will require a Section VII modification to the LTCP Consent Decree. The options presented are:

- Pump Out to Blue Plains Complete Treatment Processes. This is the pump out and treatment plan included in the Long Term Control Plan. The strategic planning has identified that this scheme has a detrimental impact on achieving higher levels of nitrogen removal as it extends the period of high flows after a wet weather event.
- Pump Out to Blue Plains Enhanced Clarification Facility. This option, as generally presented at the workshops, would use a new force main to deliver flows to the enhanced clarification facility that is provided for treatment of Excess Flow. This option minimizes the detrimental impacts of extended high flows on nitrogen removal.

However, because there will be a more stringent nitrogen removal requirement under the Chesapeake Bay Program, a modification to the LTCP will be necessary. In order to establish the overall effective modification, WASA is studying several other options to provide cost effective conveyance and treatment of the captured CSS flows, while meeting the need for higher levels of nitrogen removal.
These additional options include, at this point, the following:

- Pump Out to Blue Plains Enhanced Clarification Facility Via the Existing Interceptor System. This option would utilize the existing interceptor system to convey flows to the enhanced clarification facility. This option would utilize the capacity of the interceptor system and enhanced clarification facility to pump out the tunnel in a shorter period of time.
- Pump Out Directly to Enhanced Clarification Facility at Blue Plains. This option would extend the tunnel to Blue Plains and provide a new pump station to convey flows to the enhanced clarification facility. This option would result in Outfall 001 becoming CSO rather than a CSO Related Bypass.

WASA considers the three options that utilize the enhanced clarification facility for CSS tunnel pump out to be advantageous because they minimize the detrimental impacts of extended high flows on nitrogen removal. WASA is exploring the costs, technical and water quality attributes of each of these options and will be providing further information to EPA on its findings.

Additionally, as WASA finalizes these studies, other alternatives may develop that can achieve results comparable to those options already being considered.

Response to Questions

Question 1: Why doesn't the total flow from Outfall 002, shown on Table 2, decrease when the peaking factor is reduced from 2.0 to 1.5?

Response: Table 1, distributed at the workshop, shows the projected flows and loads for the alternative peaking factors. The intent of the table is to provide a comparison of mass loading for selected parameters at the rated capacity of Blue Plains. The confusion results from showing the same flow and loads for Outfall 002 for both peaking factors. It is true that if the peaking factor were reduced from 2.0 to 1.5, approximately 500 million gallons per year less flow would be discharged from Outfall 002. This would reduce the annual average flow by about 1.4 mgd to 368.6 mgd.

However, the permitted flow for Blue Plains is 370 mgd through Outfall 002 and WASA would not propose reducing the permitted flow for Outfall 002 below 370 mgd. Thus, the annual average flow and associated loads were not reduced for the lower peaking factor. The impact of reducing the peaking factor is that it provides a nominal increase in treatment capacity for the Blue Plains service area.

Table 1. Preliminary Estimates of Anticipated Loading to the Potomac River for Various Scenarios

Currently Approved LTCP
Construction of 4 Additional Primary Clarifiers
Plant Peaking Factor of 2.0, (370/740/511)
TN goal of 7.5mg/L at Outfall 002

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,331	135,050	136,381
TSS Load	(Mlbs/yr)	1.2	5.6	6.8
BOD Load	(Mlbs/yr)	0.9	7.9	8.8
TN Load	(Mlbs/yr)	0.2	8.4	8.6
TP Load	(Mlbs/yr)	0.02	0.2	0.22

Alternative A - Peaking Factor of 2.0
Construction of ECF for treatment of Excess Flow (Outfall 001 Flow)
Plant Peaking Factor of 2.0, (370/740/511)
TN limit of 4.2mg/L at Outfall 002 (per EPA letter 7/28/05)

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,331	135,050	136,381
TSS Load	(Mlbs/yr)	0.2	5.6	5.8
BOD Load	(Mlbs/yr)	0.4	7.9	8.3
TN Load	(Mlbs/yr)	0.1	4.7	4.8
TP Load	(Mlbs/yr)	0.002	0.2	0.202

Alternative B - Peaking Factor of 1.5
Construction of ECF for treatment of Excess Flow (Outfall 001 Flow)
Plant Peaking Factor of 1.5, (370/555/511)
TN limit of 4.2mg/L at Outfall 002 (per EPA letter 7/28/05)

		Outfall 001	Outfall 002	To Potomac River
Annual Flow Volume	(MG)	1,826	135,050	136,876
TSS Load	(Mlbs/yr)	0.2	5.6	5.8
BOD Load	(Mlbs/yr)	0.5	7.9	8.4
TN Load	(Mlbs/yr)	0.2	4.6	4.8
TP Load	(Mlbs/yr)	0.003	0.2	0.203

Numbers presented in this table are based on the best available information as of 8/4/2005 and are subject to change based on new information.
Distributed at August 10, 2005 Tier II Workshop

Question 2: Does reducing the peaking factor from 2.0 to 1.5 provide the capability to treat more wet weather flow?

Response: Yes, for the option presented at the workshop. The plant currently has the capability to treat 740 mgd through complete treatment for up to 4 hours as well as provide primary treatment for 336 mgd of excess flow for a total of 1,076 mgd. After 4 hours, the flow to complete treatment is reduced to 511 mgd to protect the biological processes. After this 4-hour period, the treatment capacity is 511 through complete treatment plus 336 mgd of excess flow, for a total of 847 mgd. This condition applies to a peaking factor of 2.0. Flows exceeding the 847 mgd limit that are pumped by the pump stations upstream of Blue Plains during severe storms would be discharged from CSO Outfall 003 at Bolling Field.

If the 4-hour peaking factor is reduced to 1.5, WASA could provide the capability to treat additional flows after the 4-hour period either by increasing the capacity of the enhanced clarification facility, as described at the workshop, or providing additional tunnel storage.

Question 3: What steps does WASA take during a wet weather event and what affect does that have on treatment performance? What are the lingering affects and how long does it take to return to normal operations?

Response: Each day, the plant operations staff measure process variables, assess the condition and performance of the plant, and make changes to maintain process performance and permit compliance. The key measurements in the two biological processes are: sludge settleability, mixed liquor concentrations, and sludge blanket levels in the sedimentation basins. Sludge wasting rates are changed daily to maintain mixed liquor concentrations at the target levels in the secondary and nitrification/denitrification processes to both maximize treatment and ensure preparation for a wet weather event.

<u>Preparation for a Storm Event</u>

When a wet weather event is predicted, even closer attention is paid to the process. The biological process that occurs in the reactors is controlled by sludge wasting rate and the biological mass cannot be adjusted in a matter of hours; rather it takes days for the secondary process and weeks for the nitrification/denitrification process. For that reason, the mixed liquor is consistently maintained at the level that would be required to prevent washout of the sludge in the sedimentation basins at the peak flow rate defined in the permit.

The capacity of the sedimentation basins to handle peak wet weather flows depends on the settling characteristics of the mixed liquor. Plant operators measure the rate at which the sludge settles on a daily basis. When a wet weather event is predicted, the number of reactors that are switched into various wet weather modes depends on how well the sludge is settling. The intent of the wet weather modes is to hold some solids in the reactors to prevent overloading the sedimentation basins and consequent solids washout.

For the secondary reactors, approximately 12 hours before the peak flow is to arrive at the plant, the influent gate to Pass 1 is closed and secondary effluent is fed to passes 2, 3 and 4. Figure 1 shows the operating modes for the secondary reactors.

For the nitrification/denitrification reactors, if the settling rate is poor and a storm is predicted that day, 6 reactors are placed in return only operating mode and 6 reactors are placed in wet weather operating mode. The return only mode stores return sludge, which continues to be fed to the reactor. Since no secondary effluent is fed to the reactor, the reactor is essentially off line and provides no nitrification or nitrogen removal. In wet weather operating mode, the influent gate to Stage 1 of the reactor is closed; return sludge continues to be fed to Stage 1, and all of the secondary effluent is fed into Stage 2. As sludge is stored in Stage 1, the capacity of the reactor to nitrify and denitrify is reduced. Figure 2 shows the operating modes for the nitrification/denitrification reactors.

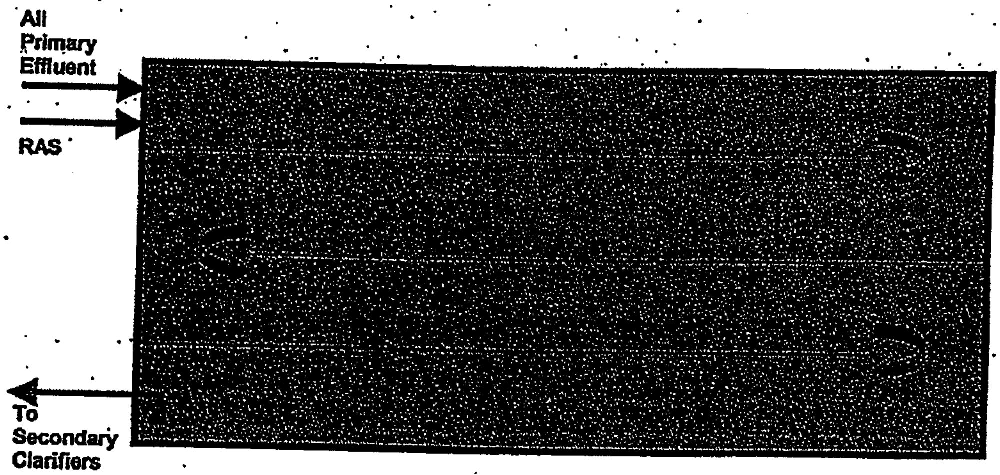
<u>Lingering Affects of a Storm Event</u>

After the peak flow subsides, pairs of secondary reactors are put back into dry weather mode every 8 hours. The reason for placing the reactors back slowly is to prevent overloading the sedimentation basins with the solids that were stored in the reactors during the storm. The secondary treatment process can handle sustained high flows up to 450 mgd in normal operating mode.

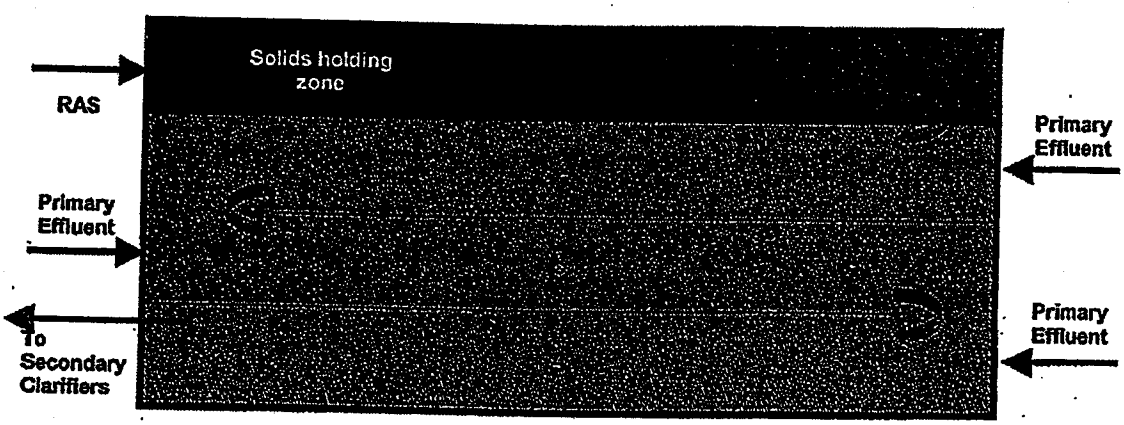
In the nitrification/denitrification process, once the storm is over and lower flows are projected for more than a day, the 6 reactors that are in return only mode are placed in wet weather mode, 2 at a time (one odd and one even) over a 24-hour period. Once all the reactors are in wet weather mode and no storms are predicted, pairs of reactors (one even, one odd) are placed in normal mode every 8 hours. It is noted that it takes 3 days after the storm to get the 6 reactors in return only mode back in wet weather mode and another 2 days to return all of the 12 reactors to dry weather mode. Nitrogen removal is reduced during this 5-day period after the storm event.

The LTCP calls for Blue Plains to operate at a sustained high flow rate of 450 mgd after the storm has passed to empty the tunnel. The CSS tunnel pump out rate would be adjusted so that the plant influent flow would not exceed a rate of 450 mgd. The projected time to empty the combined sewer tunnels, which is the period of sustained high flow, is 2 1/2 days. If the tunnel pump-out is treated by the enhanced clarification facility rather than the nitrification/denitrification system, the time to return the nitrification/ denitrification reactors to normal mode would be reduced. The impacts these lingering effects of a storm event on nitrogen removal are described in the response to Question 4.

Figure 1
Operating Modes for Secondary System

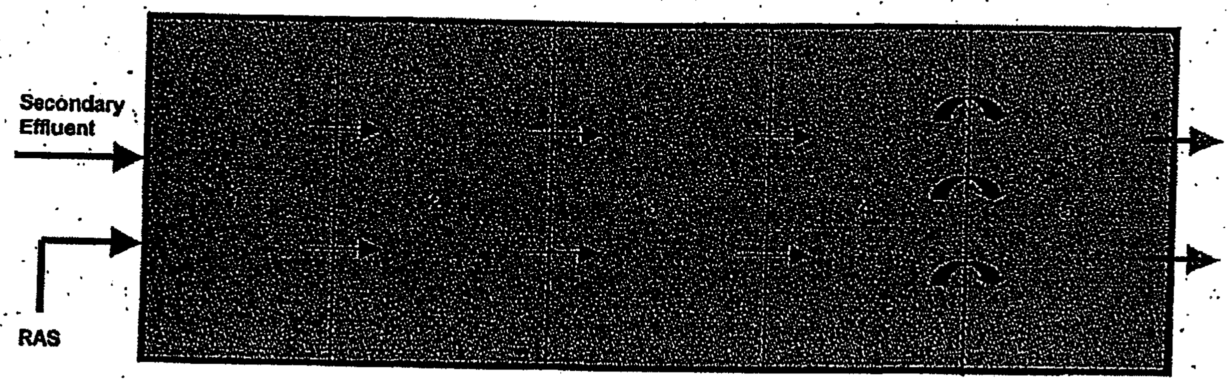


Normal Operating Mode (NOM)

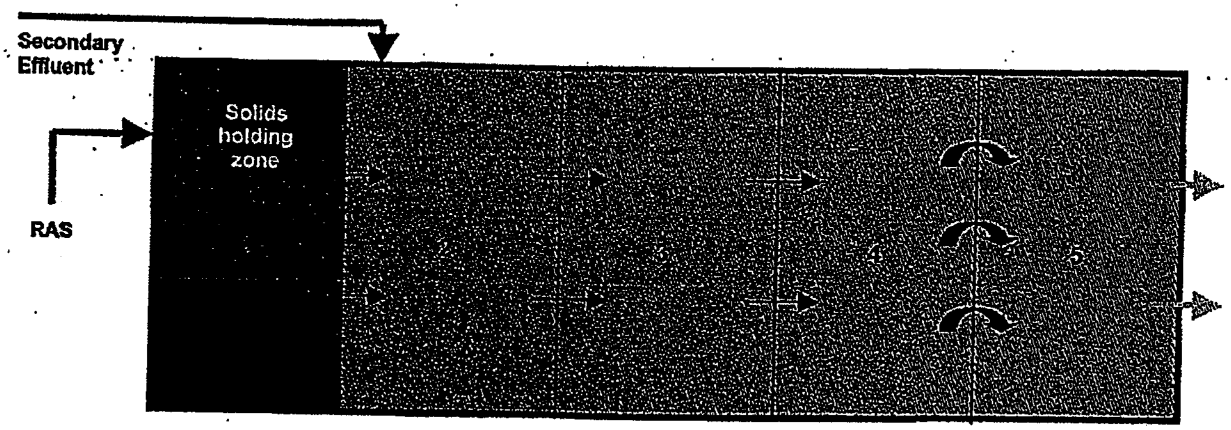


Wet Weather Operating Mode (WOM)

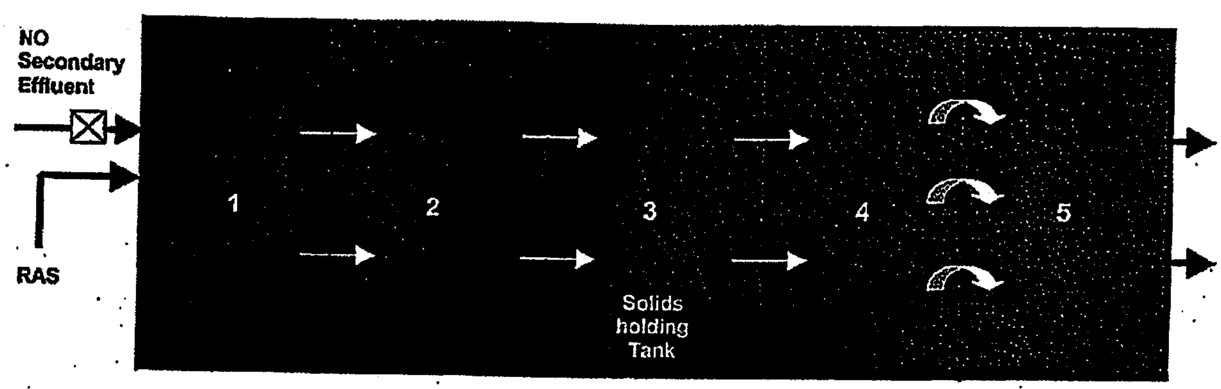
Figure 2
Operating Modes for BNR System



Normal Operating Mode (NOM)



Wet Weather Operating Mode (WOM)



Return Only Operating Mode (ROM)

Question 4: What are the affects of storm events on treatment performance?

<u>Wet Weather Operation Model</u>

A wet weather operation model was developed using the calibrated BioWin plant model to simulate the effect of wet weather events on nitrogen removal. The model was constructed with sufficient detail in the biological reactors to accurately simulate the plant operational response, as described in Question 3, and predict the treatment performance. The temperature selected was 15 °C, which is the average temperature for May, the month during which the storm was predicted.

The process model was used to evaluate the treatment performance for various scenarios to reflect different peaking factors for complete treatment, as well as treatment options for the CSS tunnel pump out. The scenarios result in different peak flows through complete treatment as well as different durations of sustained high flow.

In each scenario, all dry weather flow (i.e., plant influent flow up to 511 mgd) receives complete treatment. For the first four hours after the plant influent flow exceeds 511 mgd, a peak flow rate is required to be treated through the complete treatment process. The ratio of the peak flow rate to the average annual rated capacity in mgd (i.e., 370 mgd) is called the peaking factor (PF). Plant influent flows above those that are provided complete treatment are called excess flow and will be treated in an Enhanced Clarification Facility and discharged to the river via Outfall 001. Enhanced clarification will use a physical-chemical process that is effective in removing particulate matter from the wastewater. The process is appropriate for treatment of wet weather flows because it takes a short time initiate. An ideal clarifier was used into the model to mimic the expected performance of the enhanced clarification system.

The Long Term Control Plan calls for pumping flows out of the CSS tunnel into the collection system to provide complete treatment at Blue Plains after the storm event. The tunnel-pump-out (TPO) would occur over 59 hours to ensure that the plant influent flow did not exceed 450 mgd. An alternative scenario that was presented at the workshops would pump the CSS tunnel contents directly to the enhanced clarification facility for treatment and discharge through Outfall 001. This scenario allows emptying the tunnel in a shorter period of time because the pump out rate is not constrained by the plant influent flow rate. The following four scenarios were evaluated:

1- The excess flow is treated in an Enhanced Clarification Facility (ECF) and discharged to Outfall 001, and the remaining flow, including CSS tunnel-pump-out (TPO), is treated through complete treatment and discharged to Outfall 002. Two flow scenarios were evaluated:

   a. Peak 4-hr flow to the biological processes = 740 MGD; PF = 2.0, and TPO through Outfall 002

   b. Peak 4-hr flow to the biological processes = 555 MGD; PF = 1.5, and TPO through Outfall 002

2- The excess flow is treated in the ECF and discharged to Outfall 001; and the remaining flow is treated through complete treatment and discharged to Outfall 002. The tunnel-pump-out flow is treated in the ECF and discharged through Outfall 001. Two flow scenarios were evaluated:

   a. Peak 4-hr flow to the biological processes = 740 MGD; PF = 2.0, and TPO through Outfall 001

   b. Peak 4-hr flow to the biological processes = 555 MGD; PF = 1.5, and TPO through Outfall 001

The operational modes both preceding and after a wet weather event are also important to consider. The operations can be classified into 3 phases:

1. Dry Weather – Phase 1
2. Wet Weather – Phase 2
3. Recovery – Phase 3

Table 2 presents the operational modes associated with each phase for the secondary and nitrification/denitrification reactors for the four scenarios. Figure 3 shows the switching of the 12 nitrification/ denitrification reactors over time from Phase 1 through Phase 3.

Phase 1 is the normal dry weather flow mode. The model begins with 1 day of normal dry weather flow (i.e., 370 mgd).

Phase 2 comprises the wet weather event during which reactors are switched into wet weather mode to hold solids in the reactors to prevent washout. The 5-day wet weather period includes instances of plant influent peak flows, followed by several days of sustained plant influent at a rate of 450 mgd. The projected hourly influent flow to Blue Plains for the 5-day wet weather period was obtained from the sewage collection system model that was developed under the LTCP.

Phase 3, the recovery phase, begins when the wet weather event has ended and the combined sewer storage tunnel has been pumped-out. The recovery phase entails switching the reactors from the wet weather modes back to dry weather modes. For purposes of modeling, normal flow (i.e., 370 mgd) was assumed for the 4-day recovery period

Figures 4 and 5 show the wastewater flow through the biological processes for the 10 days simulated in the model for Scenario 1. Specifically, Figure 4 corresponds to Scenario 1.a, the current 4-hour maximum peak flow rate of 740 mgd (PF=2.0) while Figure 5 corresponds to Scenario 1.b, the proposed 4-hour maximum peak flow rate of 555 mgd (PF=1.5). While this figure shows 521 mgd of ECF capacity, other conveyance options may require a lower capacity for the ECF.

Table 2. Operation Modes for Process Modeling Simulations for the Wet Weather Flow Scenarios

Phase 1: Dry weather phase				Phase 2: Wet weather phase				Phase 3: Recovery phase			
Scenario 1.a PF = 2.0 (TPO to 002)	Scenario 1.b PF = 1.5 (TPO to 002)	Scenario2.a PF = 2.0 (TPO to 001)	Scenario2.b PF = 2.0 (TPO to 001)	Scenario 1.a PF = 2.0 (TPO to 002)	Scenario 1.b PF = 1.5 (TPO to 002)	Scenario2.a PF = 2.0 (TPO to 001)	Scenario2.b PF = 2.0 (TPO to 001)	Scenario 1.a PF = 2.0 (TPO to 002)	Scenario 1.b PF = 1.5 (TPO to 002)	Scenario2.a PF = 2.0 (TPO to 001)	Scenario2.b PF = 2.0 (TPO to 001)
East Secondary Process – Reactors 3&4											
NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	WOM – *EPE* to stages 3a & 3b, *RAS* to stage1	WOM – *EPE* to stages 3a & 3b, *RAS* to stage1	WOM – *EPE* to stages 3a & 3b, *RAS* to stage1	WOM – *EPE* to stages 3a & 3b, *RAS* to stage1	Back to NOM	Back to NOM	Back to NOM	Back to NOM
East Secondary Process – Reactors 5&6											
NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	NOM – *EPE* to stage1, *RAS* to stage1	WOM – *EPE* to stage2, *RAS* to stage1	WOM – *EPE* to stage2, *RAS* to stage1	WOM – *EPE* to stage2, *RAS* to stage1	WOM – *EPE* to stage2, *RAS* to stage1	Back to NOM	Back to NOM	Back to NOM	Back to NOM
West Secondary Process – Reactors 1&2											
NOM – *WPE* is step-fed to stages1 through4; *RAS* to stage1.	NOM – *WPE* is step-fed to stages1 through4, *RAS* to stage1	NOM – *WPE* is step-fed to stages1 through4, *RAS* to stage1	NOM – *WPE* is step-fed to stages1 through4, *RAS* to stage1	WOM – *WPE* is step-fed to stages 3 & 4, *RAS* to stage1	WOM – *WPE* is step-fed to stages 3 & 4, *RAS* to stage1	WOM – *WPE* is step-fed to stages 3 & 4, *RAS* to stage1	WOM – *WPE* is step-fed to stages 3 & 4, *RAS* to stage1	Back to NOM	Back to NOM	Back to NOM	Back to NOM
Nitrification/Denitrification Process – Reactors (1 – 12)											
NOM – *SE* to stage1, *RAS* to stage1	NOM – *SE* to stage1, *RAS* to stage1	NOM – *SE* to stage1, *RAS* to stage1	NOM – *SE* to stage1, *RAS* to stage1	6 reactors in ROM – No *SE*, *RAS* to stage1 & 6 reactors in WOM – *SE* to stage2, *RAS* to stage1	All reactors in WOM – *SE* to stage2, *RAS* to stage1	6 reactors in ROM – No *SE*, *RAS* to stage1 & 6 reactors in WOM – *SE* to stage2, *RAS* to stage1	All reactors in WOM – *SE* to stage2, *RAS* to stage1	6_ROM reactors back to WOM – 2 reactors every 24 hrs Then 12_WOM reactors back to NOM – 2 reactors every 8 hrs after sustained flows are over	12_WOM reactors back to NOM – 2 reactors every 8 hrs after sustained flows are over	6_ROM reactors back to NOM – 2 reactors every 24 hrs & 6_WOM reactors back to NOM – 2 reactors every 8 hrs	12_WOM reactors back to NOM – 2 reactors every 8 hrs after sustained flows are over

NOM = Normal Operation Mode; WOM = Wet weather Operation Mode; ROM = Return only Operation Mode; EPE = East Primary Effluent; WPE = West Primary Effluent; SE = Secondary Effluent; RAS = Return Activated Sludge.

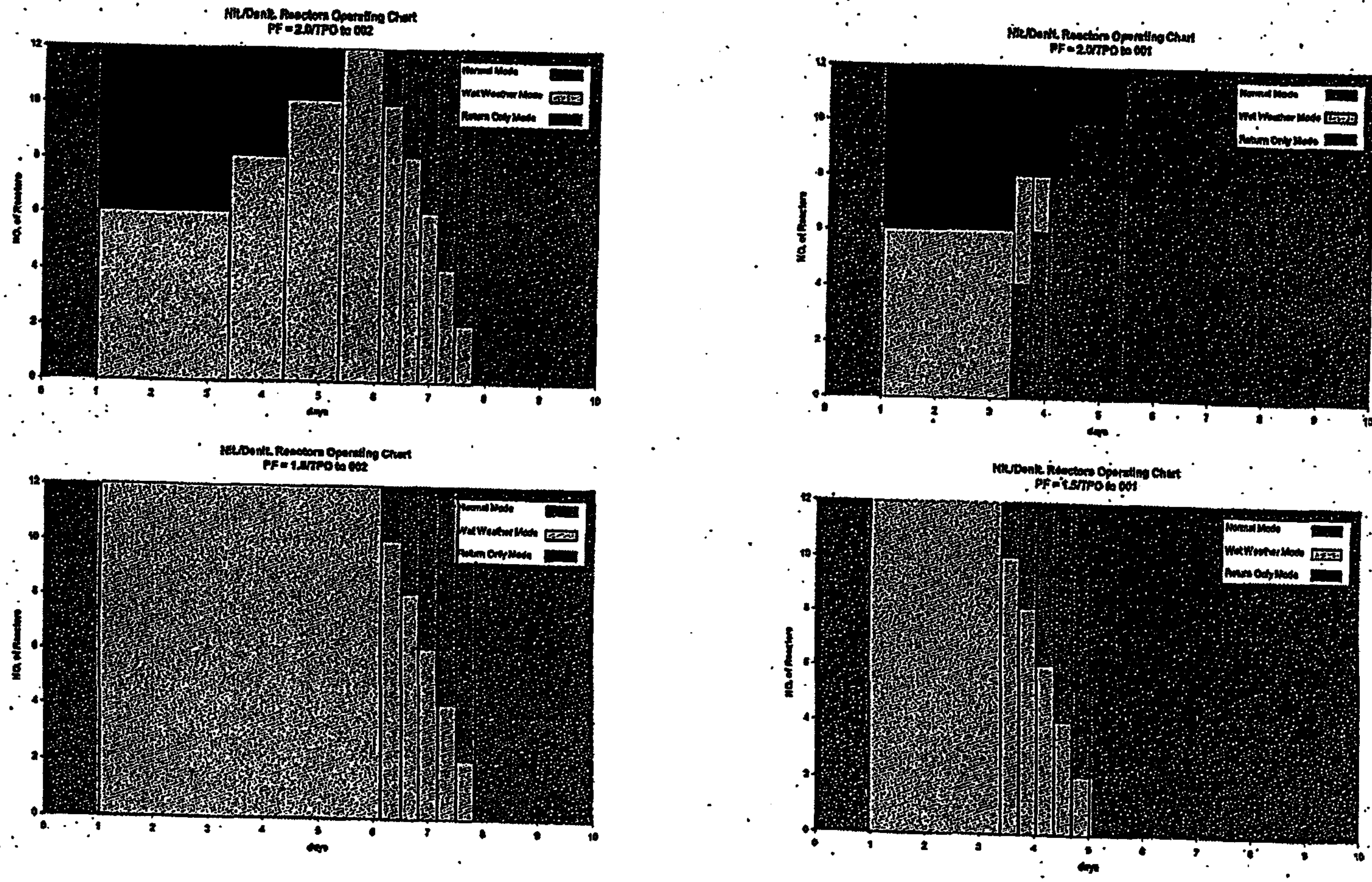


Figure 3. Number of Nitrification/Denitrification Reactors by Mode over Time

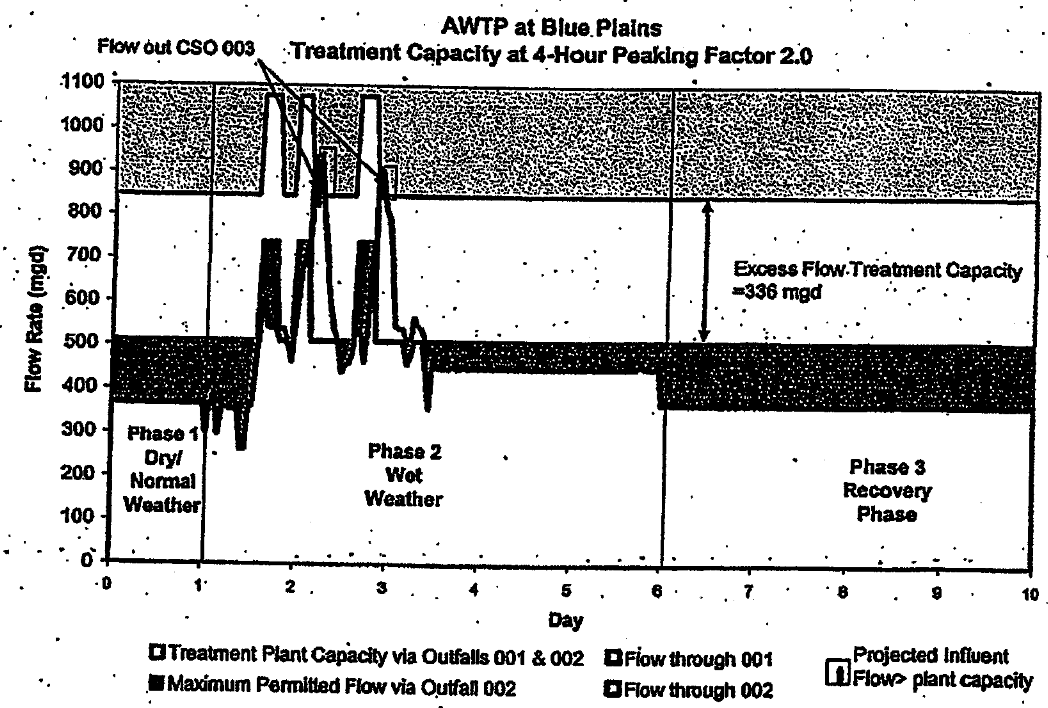
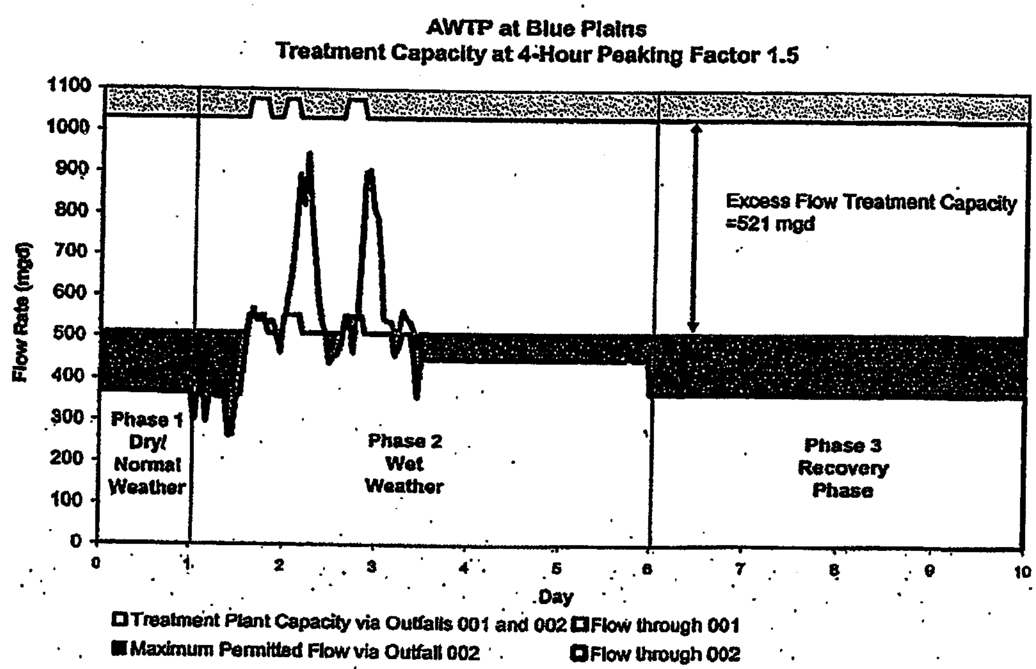


Figure 4. Scenario 1.a PF=2.0 TPO via 002 Wastewater Flow



(Note: Other CSS conveyance options may not require 521 mgd Excess Flow capacity)

Figure 5. Scenario 1.b PF=1.5 TPO via 002 Wastewater Flow

Dynamic Simulation Results – TN discharges

Scenario 1.a: 4-hour Peaking Factor = 2.0, TPO to 002

Figure 6 shows the results of the modeling run for TN discharge loads through Outfall 002 and Outfall 001 during the simulation period. The time increments are 4 hours and the load is shown in the rate of pounds per day (lb/d). In the initial dry weather mode, the plant operated at 370 MGD and the effluent TN loading from Outfall 002 was approximately 11,600 lbs/d. During the wet weather event, the TN discharge through Outfall 002 significantly increased due to reducing nitrification capacity as a result of switching some of the nitrification/denitrification reactors and stages into solids holding tanks. In addition, the TN discharged remained high because sustained high flows from emptying the tunnels after the wet weather event extended the time required to switch reactors back to normal operation. The plant performance was slowly improving as reactors were switched back from return only to wet weather operation and eventually to dry weather operation. A total of 263,000 pounds of TN were discharged from Outfalls 001 and 002 over the simulated 10-day period. The peak nitrogen load shown corresponds to a maximum effluent TN concentration of approximately 10 mg/l from the nitrification/denitrifcation system.

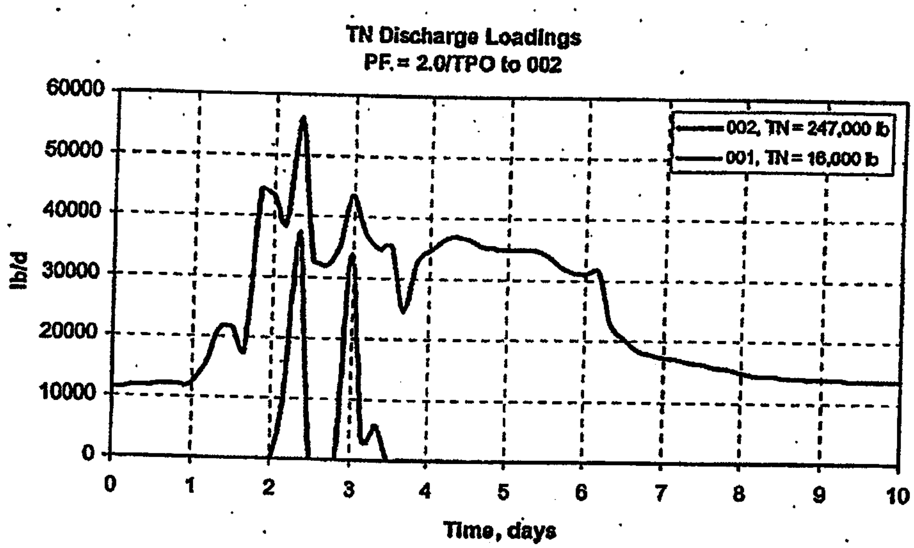


Figure 6. Nitrogen Discharged Via Outfalls 001 and 002 for Scenario 1.a

The TN discharged through Outfall 001 during the wet weather event was approximately 16,000 pounds while the TN discharged through Outfall 002 during the 10 days of simulation was approximately 247,000 pounds. If wet weather had not occurred, the plant TN discharge would have been 116,000 pounds from Outfall 002. An estimated additional 131,000 pounds of TN was discharged via Outfall 002 as a result of the wet weather event.

As expected, total nitrogen load increased as the flow through the system increased. The treated excess flow during the storms (days 2 and 3 on Figure 6) resulted in a nitrogen load to the river from Outfall 001 only during the wet weather event and the loads were directly proportional to flow discharged.

On the other hand, the variation in total nitrogen discharged from Outfall 002 was related to cascading effects of the wet weather event. Prior to the storm, the nitrogen concentration from the nitrification/denitrification system increased as reactors were switched to wet-weather and return-only modes. The result of using these modes to store solids was reduced reactor volume and thus reduced capacity to remove nitrogen. Once the wet weather peak reaches the nitrification/denitrification system (day 2 on Figure 6), the nitrogen load increased due to a combination of higher flow and higher concentration. Following the storm, the total nitrogen load discharged through Outfall 002 decreased but remained at higher than normal loads due to the sustained high plant influent flow from the combined sewer storage tunnel pump-out. During the recovery phase (days 8 to 10 on Figure 6), the total nitrogen discharge concentration returned to normal levels as the reactors were sequentially switched back into dry weather mode. Consequently, as the flow and concentration returned to normal levels, the total nitrogen loading to the river also returned to dry weather values.

Scenario 1.b: 4-Hour Peaking Factor = 1.5, TPO to 002

Figure 7 shows the effect of reducing the 4-hour peaking factor from 2.0 to 1.5 (i.e. 740 mgd to 555 mgd) on TN discharge loads through Outfalls 001 and 002. As shown on the figure, the TN load through Outfall 002 for the simulation period was reduced to a total of 195,000 pounds. The reduction of the peak flow through the nitrification/denitrification process enabled the plant to maintain more process reactor capacity on-line to remove nitrogen during wet weather.

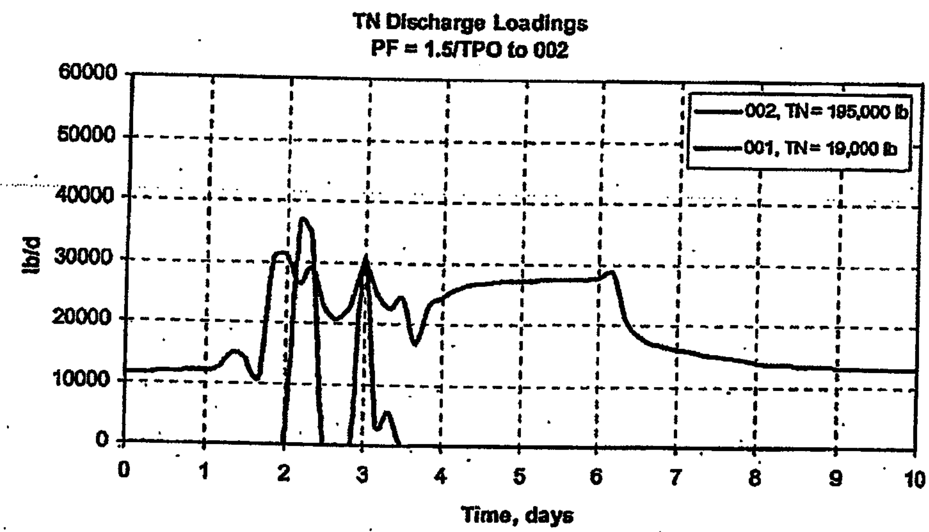


Figure 7. Nitrogen Discharged Via Outfalls 001 and 002 for Scenario 1.b

Despite the fact that TN load through Outfall 001 increased to 19,000 pounds, as compared to 16,000 pounds for Scenario 1.a, the total TN discharged through Outfalls 001 and 002 was approximately 49,000 pounds less than Scenario 1.a. The positive effect of reducing the 4-hour peaking factor from 2.0 to 1.5 on process performance is observed in the TN values.

The maximum effluent TN concentration from the nitrification/denitrification system dropped from approximately 10 mg/l to approximately 7.5 mg N/L.

The patterns of nitrogen loading in scenarios 1.a and 1.b were similar. That is, the nitrogen discharge through Outfall 001 increases in direct proportion to excess flow during the peak wet weather while the nitrogen discharge through Outfall 002 varies through the wet weather and recovery phases. Scenario 1.b yielded a greater total nitrogen load to the river through Outfall 001 than Scenario 1.a due to the increased excess flow volume.

On the other hand, the TN discharge from Outfall 002 for Scenario 1.b was less than for Scenario 1.a because the nitrification/denitrification system was more stable due to the reduction in peak flow through the system. Prior to the storm, the nitrogen concentration from the nitrification/denitrification system increased because the twelve reactors were switched to wet-weather modes, as opposed to switching six of the reactors to return only mode, as required to handle the 740 mgd peak. As described previously illustrated in Figure 2, the return only mode prevents overloading the sedimentation basins, which, while protecting the overall process, reduces the process reactor capacity and results in reduced nitrogen removal capacity. During the storm, when the peak flow reached the nitrification/denitrification system, the nitrogen load through Outfall 002 increased due to a combination of higher flow and higher nitrogen concentration. However, the difference between Scenario 1.a and Scenario 1.b (Figures 6 and 7) is that both the peak flow and the peak concentration are less for the reduced peak flow and therefore the peak nitrogen load is significantly less. Following the storm, the reactors remained in wet weather operation to handle the sustained high flow to Blue Plains from pump-out of the CSS storage tunnels. During this period, the total nitrogen load discharged through Outfall 002 was directly proportional to the flow. During the recovery phase (days 8 to 10 on Figure 7), the total nitrogen discharge concentration returns to normal levels as the reactors were sequentially switched back into normal dry weather mode. Consequently, as the flow and concentration returned to normal levels, the total nitrogen loading to the river also returned to dry weather values.

Scenario 2.a: 4-Hour Peaking Factor = 2.0, TPO to ECF & 001

The hourly plant influent flows used for Scenario 1 included flow from the CSS tunnel pump-out (TPO) in the plant influent flow after the storm event as this flow was routed through complete treatment. Scenario 2 removes the TPO from the plant influent flow and directs the TPO flow to an enhanced clarification facility with discharge via Outfall 001. Figure 8 shows the total plant influent hourly flows used for modeling Scenario 2. Specifically, for Scenario 2, after the wet weather event (between day 4 and day 6), the flow rate through the nitrification/denitrification system was variable and averaged approximately 400 mgd while the flow rate during the same period for Scenario 1 remained constant at 450 mgd.

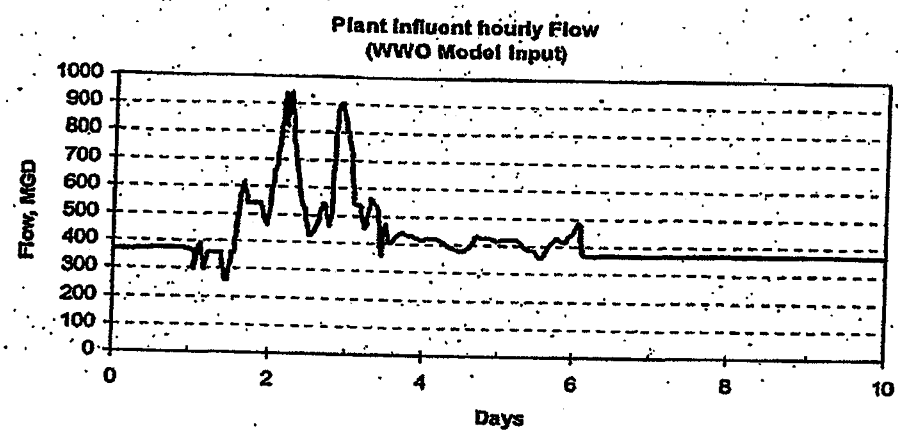


Figure 8. Plant Influent Flows used to Model Scenarios 2.a and 2.b

The TN discharge loads through the plant Outfalls 001 and 002 are shown on Figure 9 for Scenario 2.a. Scenario 2.a assumes a 4-hour peak flow rate through complete treatment of 740 mgd (PF of 2.0) and treatment of TPO through enhanced clarification and discharged through Outfall 001. A total TN load of approximately 240,000 pounds was discharged to the river during the 10 day simulation period. This equates to 23,000 pounds less of TN load discharged to the river compared to Scenario 1.a. because the biological process was more stable and recovered from the wet weather event more quickly.

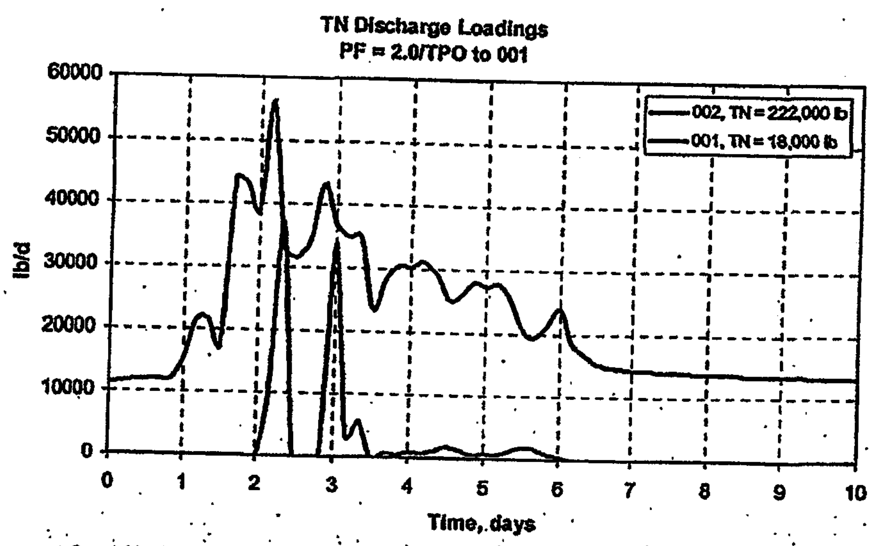


Figure 9. Nitrogen Discharged Via Outfalls 001 and 002 for Scenario 2.a.

The effluent TN load through Outfall 001 increased by 2,000 pounds over Scenario 1.a, as a result of treating the TPO in the enhanced clarification facility, while the TN load through Outfall 002 was reduced by 25,000 pounds over Scenario 1.a. The nitrogen loading through Outfall 002 prior to and during the wet weather event was the same for Scenario 2.a as for

Scenario 1.a because the conditions are the same. The new condition for Scenario 2 is that the 450 mgd high flow rate is not sustained for two and a half days as it is for Scenario 1. The positive impact on nitrogen removal is shown by TN discharge rate decline in the days following the storm. By day 6, all reactors were in dry weather mode under Scenario 2.a. and the total nitrogen concentration was lower than it was for the same day of Scenario 1.a.

Scenario 2.b: 4-Hour Peaking Factor = 1.5, TPO to ECF & 001
The TN discharge loads through plant Outfalls 001 and 002 are shown on Figure 10 for Scenario 2.b. Scenario 2.b assumes a 4-hour peak flow rate through complete treatment of 555 mgd (peaking factor of 1.5) and treatment of TPO through enhanced clarification and discharge through Outfall 001. A total TN discharge load of approximately 193,000 pounds was discharged to the river through Outfalls 001 and 002 during the simulation period, which was the lowest total load to the river of the four scenarios. Reducing the peaking factor and directing TPO flows to Outfall 001 allowed for a more stable operation and quicker recovery of the process from wet weather operations, which reduced the impact of the wet weather event on TN loads to the river through Outfall 002.

The patterns of nitrogen loading in scenarios 2.a and 2.b are similar. That is, the nitrogen discharged through Outfall 001 increased in direct proportion to excess flow during the peak wet weather flows and TPO after the wet weather event, while the nitrogen discharged through Outfall 002 varies through the wet weather and recovery phases.

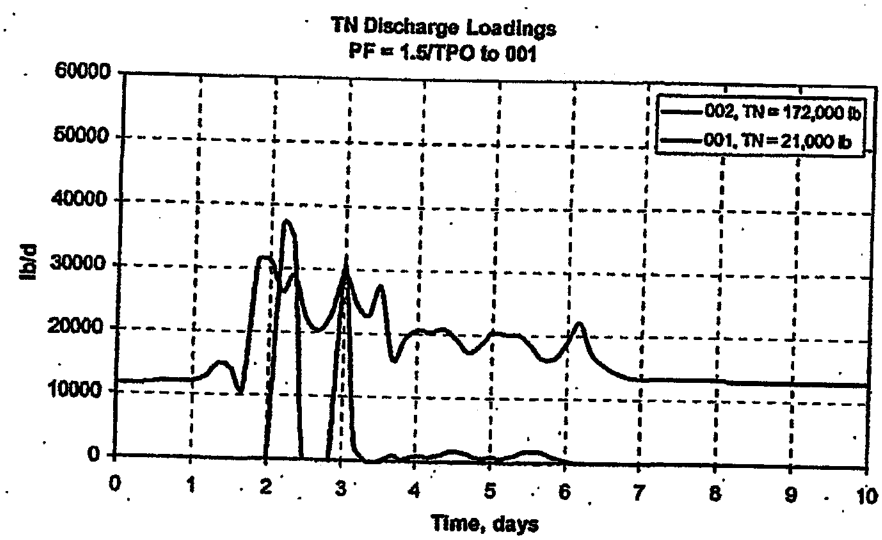


Figure 10. Nitrogen Discharged Via Outfalls 001 and 002 for scenario 2.b

While Scenario 2.b yielded a greater TN load to the river through Outfall 001 than the other scenarios, this increase was more than offset by the significantly lower TN discharged from Outfall 002 compared to the other scenarios. The nitrification/denitrification system was more stable because of the reduced peaking factor and the system recovered from wet weather event more quickly due to elimination of sustained high flow of 450 mgd.

Prior to and during the storm, the nitrogen loading for Scenario 2.b was the same as that for Scenario 1.b because both scenarios reflected the lower peak flow rate of 555 mgd. Following the storm, the pattern of nitrogen load from Outfall 002 is similar to that of Scenario 2.a because it is related to switching reactors back into normal mode. However, the estimated load is less because of the reduced peak flow during the wet weather event. During the recovery phase, the total nitrogen discharge concentration returns to normal levels.

In each of the scenarios, the TN discharge rate was slightly higher at the end of the dynamic simulation period than at the beginning. Comparing the MLSS concentrations for these two points showed that at the end of the simulation the MLSS concentration was higher than that at the beginning. However, the ratios of the different types of microorganisms (i.e. Heterotrophs, autotrophs, and anoxic methanol degraders) also changed. The model showed a shift in the biomass species where the heterotrophs concentrations increased, and the autotrophs & the anoxic methanol degraders concentrations decreased, which caused a slight degradation in nitrogen removals. The shift may have been due to heterotrophic biomass carry over from the secondary system to the nitrification/denitrification system as a result of the wet weather event.

Summary

Table 3 quantifies the TN discharge loads for each scenario. The simulation was performed to illustrate the challenges that wet weather events present at Blue Plains. These numbers are specific to the wet weather event simulated and should not be extrapolated to other events.

Table 3. Predicted Total Nitrogen Discharge to the Potomac River for the Simulated Wet Weather Event

	Scenario	Outfall 001 TN, lb	Outfall 002 TN, lb	Total Load To River TN, lb
1	1-a PF=2.0, TPO to 002	16,000	247,000	263,000
	1-b PF=1.5, TPO to 002	19,000	195,000	214,000
2	2-a PF=2.0, TPO to 001	18,000	222,000	240,000
	2-b PF=1.5, TPO to 001	21,000	172,000	193,000

The following conclusions can be drawn from the modeling results:

- Wet weather flows negatively impact TN removal due to limiting the capacity of nitrification in the Nitrification/Denitrification process. The limitation results from switching some of the stages and entire reactors to solids holding zones. In addition, switching back the reactors to normal operation, i.e. recovery period, is directly related to the magnitude and duration of the plant influent flows through complete treatment. Minimizing peak flows both during and after a storm results in a stable process that achieves the highest TN removal.

- Reducing the plant influent 4-hour peaking flow from 740 MGD (PF=2.0) to 555 MGD (PF=1.5) provides for more on-line process reactor capacity during wet weather, a more stable operation, and a quicker recovery period, which results in significant reduction in the total TN load to the river.

- Treating the tunnel pump out flow separately in an enhanced clarification facility, and then discharging this flow through Outfall 001 reduces the impact of the high sustained flows after the wet weather event, providing for a quicker recovery period, and hence lower TN loads to the river through Outfall 002.

Question 5: Provide a more specific plan, including costs, to address meeting the proposed TN limit of 4.2 mg/l.

Response: In a letter to DC WASA, dated July 28, 2005, EPA provided its rationale for a total annual nitrogen load limit of 4,766,000 pounds for the next permit. At the rated capacity of 370 mgd, that load corresponds to a concentration of 4.2 mg/l.

The facilities required to achieve a lower TN discharge have to reflect additional flows and load that are anticipated in the future. The added nitrogen load from digester recycle is expected to increase the loading to nitrification/denitrification process by 30%. Additional flows are expected from the ongoing upgrade of the upstream pump stations that will restore their capacity to pump storm flows. The LTCP will capture combined sewer flows for treatment at Blue plains.

The strategic planning has identified the need for two construction projects to maintain a TN discharge of 7.5 mg/l to handle the increased flows and loads described above. These are the Nitrification/Denitrification Upgrade project and the Secondary BNR Upgrade project. These projects have a combined cost of $110 million and are presently in WASA's Capital Improvement Program, however the latter project is not scheduled to start until 2013.

The following table presents the list of facilities and preliminary capital costs considered at this point to be necessary to achieve higher levels of nitrogen removal with the alternative peaking factors for flow to complete treatment. These facilities are needed to improve the biological processes and to solve the hydraulic problems. We have reviewed the ability of the plant to meet a TN permit condition of 4.0 mg/l with various improvements. Given the

TN=5.0	PF = 2.0 $ million	PF = 1.5 $ million
Enhanced Clarification Facility	130	210
Digester Centrate Treatment Facility	65	65
Secondary Clarifiers	155	-
Spent Washwater Treatment	55	-
TN=3.0		
New Nitrification/Denitrification Reactors	220	220

current level of uncertainty on a number of issues, we currently believe that the facilities proposed for the TN permit limit of 3 would be required for a TN permit condition of 4.0 mg/l. These uncertainties include:

- Temperature impacts on settling velocity and capacity
- Seeding efficiency of digester centrate treatment
- Lower microorganism growth rates than now assumed during the coldest months of the year
- Permit conditions for operation at cold temperature (less than 12 degree C)
- Requirement to treat CSS tunnel pump out through complete treatment
- Permit conditions related to wet years (50 mgd base flow increase due to infiltration and impact of cold water)
- Permit conditions related to non-biodegradable organic nitrogen

Many of these issues are presently under study in various WASA research projects. The manner in which these issues and boundary conditions are defined in the NPDES permit requirement for nitrogen removal could require additional facilities to be constructed. For example, the process modeling has been performed using a minimum monthly wastewater temperature of 12°C. WASA anticipates there may be several weeks during the coldest month when temperature excursions below 12°C will be experienced. Treatment of CSS tunnel pump out in the nitrification/denitrification process increases the likelihood of this to occur. Should the plant be required to meet low nitrogen levels below a wastewater temperature of 12°C then additional reactor capacity or alternative denitrification processes may be required beyond that now proposed. This additional capacity would be required to ensure complete nitrification of the wastewater during extreme cold conditions. The additional reactor volume required would be dependent on and/or a function of the temperature below 12°C that the plant would be required to operate.

W. BAILEY

FYI

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

February 7, 2006

Mr. Jerry Johnson
General Manager
District of Columbia Water and Sewer Authority
5000 Overlook Ave., S.W.
Washington, D.C. 20032

Re: Blue Plains Permit No. DC0021199

Dear Mr. Johnson:

I am writing to you as a follow-up to my letter of July 28, 2005, where I indicated that the Environmental Protection Agency (EPA) intends, as part of its ongoing efforts to implement the Chesapeake Bay Agreement and the Nutrient Permitting Approach, to include additional nitrogen requirements in the Blue Plains permit at the earliest opportunity. Based upon recent discussions among EPA, the District of Colombia Water and Sewer Authority (WASA) and Earth Justice, it appears this opportunity may arise as a result of a potential settlement of the current Blue Plains permit appeals.

As set forth in my July 28, 2005 letter, EPA anticipates that WASA will need to achieve a reduction in nitrogen discharges to a limit of 4,766,000 pounds per year. We are beginning the process to develop modified permit provisions that will assure achievement of that limit as soon as possible. We anticipate that the permit modification will need to include specific actions, with associated deadlines for completion, that WASA will take towards that end.

As in the past, EPA intends to work cooperatively with WASA to arrive at mutually acceptable permit terms. We will be in contact with you shortly to begin discussions on the appropriate nutrient control provisions of the permit. We request that WASA provide to EPA, by March 3, 2006, a proposal to achieve the nitrogen limits by December 31, 2010, or as soon as possible. EPA envisions that such a proposal might include pilot studies, preliminary engineering and design plans, proposed treatment changes and an implementation schedule for achieving the modified limits (including interim and final milestones).

EPA understands that there are matters related to the nitrogen controls that will need to be resolved, including those that have been discussed in WASA's strategic planning process and in WASA's December 22, 2005 letter to EPA. EPA will continue to work with you on these related issues and determine which of these need to be addressed in an upcoming permit modification, in the full renewal of the permit in 2008, or through other avenues.

We look forward to meeting with WASA shortly to begin this process. If you have any questions in the meantime, please call me, or have your staff contact Mary Letzkus, at 215/814-2087.

Sincerely,

Jon M. Capacasa, Director
Water protection Division

cc: John Dunn, WASA

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

March 10, 2006

Mr. Jon M. Capacasa, Director
Water Protection Division
United States Environmental Protection Agency
REGION III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: District of Columbia
Blue Plains Advanced Wastewater Treatment Plant
NPDES Permit No. DC0021199
Nitrogen Limits/Wet Weather Plan

Dear Mr. Capacasa:

Thank you for your letter of February 7, 2006 and for taking the time to meet with WASA staff on February 15, 2006. These exchanges have been very helpful in our efforts to develop a mutually acceptable approach to meet EPA's proposed nitrogen limits through a comprehensive plan and within a practicable timeframe.

As you know, WASA has a proven record of being in the forefront of providing nitrogen removal to support the Chesapeake Bay program. Since 1996, WASA has been practicing nitrogen removal at its Blue Plains AWWTP. A summary of our nitrogen removal efforts and progress is attached as Exhibit No. 1. Under our voluntary goal we have achieved a reduction in annual TN effluent from 14.5 mg/l to 5.3 mg/l. This performance currently provides approximately 90 percent of EPA's anticipated final mass load limit that equates to an effluent concentration of 4.2 mg/l.

However, in moving forward to meet the Blue Plains nitrogen allocation, we face several challenges; some of which we have already started to address. Perhaps our greatest challenge is to identify a viable nitrogen removal plan that can be technically and financially blended with the regions wet weather flows as well as obligations we already have under our long term plan (LTCP) for CSO control.

As part of our strategic planning process, we have been conducting studies to achieve a workable blend of the two programs and have shared some of our initial findings with you. Those studies show that simply adding nitrogen removal to the LTCP projects for Blue Plains would likely be unaffordable for the District under the existing LTCP Consent Decree schedule. Although we have considerable work to do in defining a workable plan, it is apparent that we cannot achieve the proposed nitrogen limits by December 31, 2010.

Other important issues that need to be addressed in the overall nitrogen removal planning process include:

- Agreement on a technical and financial plan among the Blue Plains user jurisdictions.
- The development and implementation of pilot testing programs to support the technical plan.
- Developing a plan and schedule to modify the technical plan for Excess Flow Treatment at Blue Plains now included in the LTCP Consent Decree. This action will be required if the selected nitrogen removal technical plan includes a change in the LTCP Consent Decree project.

We have developed a phased schedule which includes milestones designed to provide time to reconcile the technical and financial issues facing WASA and to continue to improve nitrogen removal until facilities are in place to achieve the final limits. Our proposed schedule together with established and target deadlines is summarized in Exhibit No. 2 and its principal features are as follows:

- The schedule provides time for WASA to prepare a comprehensive technical plan incorporating the evaluations and comparisons requested by EPA at our February 15, 2006 meeting. It also provides WASA time to review options with the Blue Plains users.
- It will provide the information needed in time to include a compliance schedule in the next Blue Plains NPDES permit while providing for reopening the existing permit to include the final TN limits and initial milestones.

WASA believes that the proposed schedule provides a rational and responsive approach to deal with the complexities of developing a plan that must incorporate nitrogen removal and wet weather requirements along with maintaining our responsibilities under the LTCP Consent Decree. WASA also believes that our approach and timing is consistent with approaches being used in Virginia and Maryland.

We look forward to your comments and suggest that we meet to discuss actions and activities necessary to move forward. In the meantime, we are continuing our studies to develop the draft technical plan.

I will contact you to schedule a meeting and find out if you have any questions or need additional information. Thank you again for your assistance.

Sincerely,

Jerry N. Johnson
General Manager

Enclosures

EXHIBIT 1
HISTORICAL NITROGEN REMOVAL PERFORMANCE AND INVESTMENT

DC WASA has made significant commitments in funding (capital and operations) as well as engineering and operations resources to reduce the nitrogen discharged from the AWTP at Blue Plains. Approximately 8 million dollars and two years were invested in a denitrification demonstration facility. With an additional 8 million dollar capital investment, the process was expanded to full-scale and the plant achieved the Chesapeake Bay 2000 agreement goals well before other dischargers met the 40% reduction goal. The annual average TN effluent concentration for the year 2005 was 5.3 mg/l. The current operating performance has been possible because of the peak flow limiting strategy that is a direct result of our current permit, which has the provision to limit peak flow to complete treatment to 511 mgd for 4 hours and 450 mgd thereafter. This condition was necessitated by the ongoing major construction program but has resulted in a high level of nitrogen removal. The TN effluent concentration in 1985 was 14.5 mg/l and the EPA proposed TN effluent limit is 4.2 mg/l. Therefore, WASA has already achieved 89% of the currently anticipated reduction to reach a target of 4.2 mg/l since 1985.

As you are aware, WASA's ability to go to the next step, to operate in the vicinity of limit of technology (3.0 to 4.2 mg/l) as a permit requirement, will require a substantial capital investment. WASA is presently completing a design project to upgrade the nitrification/denitrification facilities. This project has an estimated capital cost over $60 million. Construction on this 3-year project is expected to start late this year. While this project is primarily intended to rehabilitate the existing facilities, improvements for flow distribution to the reactors, nitrate monitoring in each reactor, and improved methanol feed control are included. We anticipate that this project may provide the capability to achieve an annual TN discharge of less than 5 mg/l, assuming a continued reduced peak flow limitation.

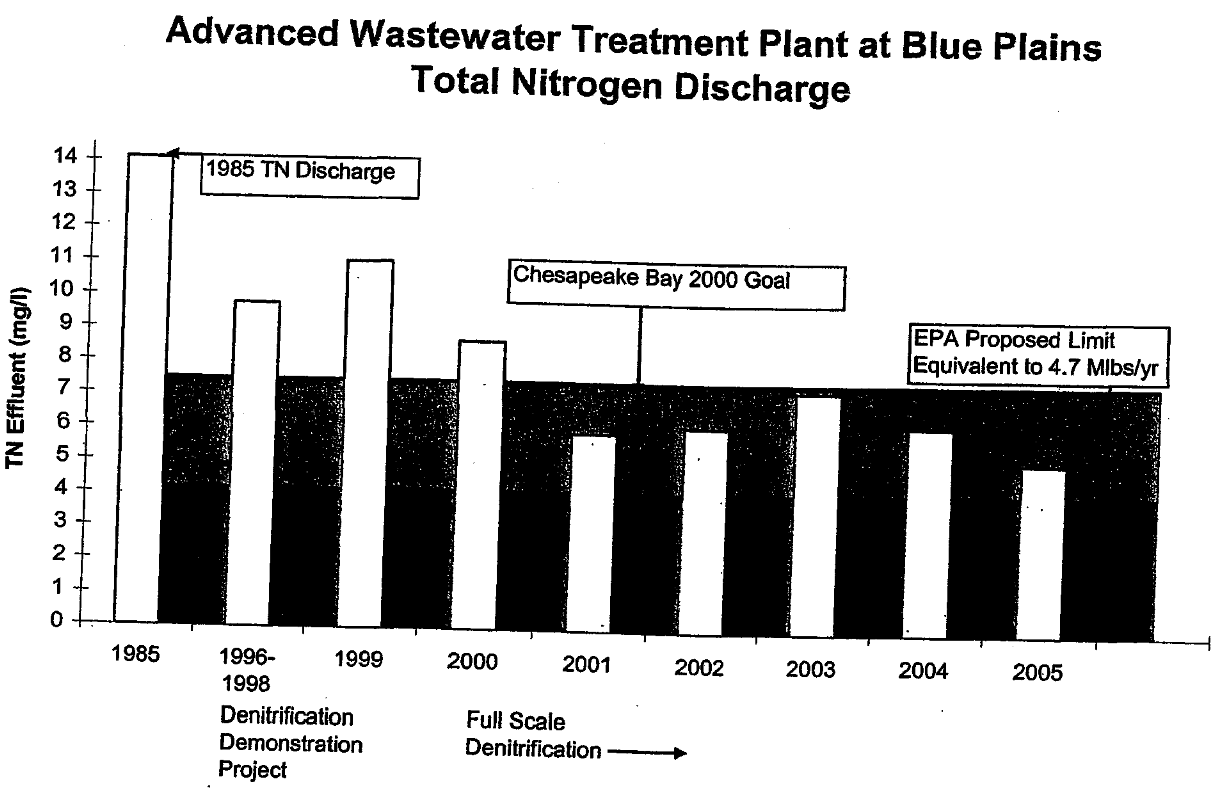


Exhibit No. 2
DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
BLUE PLAINS NPDES PERMIT NO. DC0021199

Proposed Nitrogen Removal/Wet Weather Program Schedule

March 8, 2006

Activity	Time Required in Months	Calendar Deadline [1] [2]
1. Reopen NPDES Permit. Include TN limits (to be effective per Action Plan and Schedule) and program schedule.	n/a	7-25-2006
2. Submit draft comprehensive TN removal/wet weather technical plan to EPA and Blue Plains users.	6	10-31-2006
3. Start pilot studies needed to support draft technical plan.	n/a	10-31-2006
4. Submit final comprehensive TN limits/wet weather technical plan to EPA.	9	1-31-2007
5. Submit TN Action Plan and Schedule to EPA (include timetable to reduce existing TN effluent goal and achieve final TN limits).	12	5-1-2007
6. Submit NPDES Permit reissuance application.	n/a	8-25-2007 (Established)
7. Blue Plains NPDES Permit expires.	n/a	2-25-2008 (Established)

(1) Deadlines are target dates unless otherwise noted.

(2) Deadlines are based on an agreed upon legal and technical approach by May 1, 2006.

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

June 21, 2006

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

Re: Proposed Nitrogen Language for the Blue Plains Permit

Dear Mr. Capacasa:

This responds to EPA's draft nitrogen language for the Blue Plains permit. You will recall that you distributed this language during your April 12, 2006 meeting with WASA staff.

EPA's draft nitrogen language includes (1) a proposed interim nitrogen limit, (2) a proposed schedule, and (3) proposed fact sheet language. I will address each of these proposals in order.

A. EPA's Proposed Interim Nitrogen Limit

EPA's draft permit and fact sheet language proposes a total nitrogen (TN) limit of 5,959,480 pounds per year as an interim limit for the Blue Plains permit. This proposal is based on the TN load discharged by the plant in calendar year 2005. As WASA staff stated during the April 12 meeting, this performance would not have been achievable but for (1) the very favorable hydrologic conditions that existed that year, and (2) the peak flow limitation in the current permit. The following demonstrates why EPA's proposed TN limit is generally unattainable, and, therefore, can not be accepted by WASA. In addition, as you requested, we are proposing a different approach to establishing an interim limit that we hope will serve the needs of both EPA and WASA.

1. <u>Evaluation of Blue Plains TN Performance and Operating Data (2002 to 2006)</u>

Attachment 1 is a record of the Blue Plains effluent TN performance data for the years 2002 through 2006 along with pertinent plant flow and wastewater temperature data. The following review of the data outlines WASA's position and provides the basis for an alternative approach to establishing an interim TN limit:

(a) <u>Wastewater Temperature and Flow:</u> Daily temperature of the wastewater as measured in the nitrification/de-nitrification reactors is indicated by the green blocks with the seven-day (7) moving average (MA) of this temperature shown by the solid green line.

(b) Plant Flow: The 30-day MA of plant effluent flow is shown as a red line. As Blue Plains receives wet weather flows and snowmelt during periods of low ambient temperature, the wastewater temperature (and TN removal performance) is significantly impacted generally during the January to April period. The year 2002 was a very dry year with low precipitation during the January to April period. The highest wastewater temperatures were experienced during this same period. The year 2003 and into 2004 was a wet period and had the lowest wastewater temperatures during the corresponding January to April periods. The above average rainfall increased the groundwater table throughout the Blue Plains service area and significantly increased infiltration for an extended period of time.

(c) Effluent TN Concentration: Daily effluent TN concentrations are indicated by the brown blocks with the thirty-day (30) moving average (MA) indicated by the solid brown line.

- (i) The data show that effluent TN performance degrades significantly when temperatures fall below 13° C. We also note that during the coldest winter months, the poorest TN performance lags the coldest temperatures. This is the result of switching one stage of the reactors from an anoxic stage (denitrification) to an aerated stage (nitrification) so that WASA can protect the nitrifying organisms and maintain plant capacity necessary to meet existing permit effluent limits.
- (ii) In addition, it takes weeks to re-establish the growth rate and amount of denitrifying organisms after a cold period.

(d) Annual TN Load: The annual TN load, shown by the orange line, is the cumulative sum of the daily TN load values over each year, starting on January 1st of each year. Daily TN load is calculated as follows: [flow (mgd) x TN concentration (mg/l) x 8.34]. As shown, WASA would not have met EPA's proposed annual permit limit in three of the four complete calendar years in the figure. The primary reasons for this are related to temperature and rainfall-induced infiltration during the cold-weather months, which are beyond WASA's control. While TN removal has improved over the period shown as staff has gained a better knowledge of the denitrification process and how to control it, WASA must anticipate years with wet, cold winters in agreeing to an interim permit limit.

2. WASA's Proposed Interim Nitrogen Limit and Goal

Construction is nearly complete on process facilities for the grit and screenings facilities at the head works through secondary treatment; however, WASA expects to advertise construction projects for the remaining two process facilities, the Nitrification/De-nitrification Facility and the Filtration Facility, by mid-summer at an estimated cost of $110 million. Construction for these two major contracts would start in about one year with completion expected in 2010.

WASA's TN removal performance over the past four years has been based on having all BNR reactors in service. The upcoming construction projects will require that one, and at times two, nitrification reactors be out of service for the duration of the construction. Thus, the proposed new TN requirements notwithstanding, it will be necessary for WASA to obtain a continuation of reduced peak flow limits for the modified permit and the next permit cycle.

It is clear that the TN removal performance that WASA has achieved would not have been attained without the peak flow limitation of 511 mgd in the current permit. On the basis of WASA's operating experience, we request that the peak flow limitation contained in the current permit be extended as part of any proposed reopening of that permit. It has been demonstrated in our workshops that limiting peak flows to the biological processes actually increases nitrogen removal as it allows WASA to operate a more stable process. The infrequent peak flows that receive only primary treatment contain a small nitrogen load in comparison with the main process flow. This results in a lower total TN load from the plant.

Based on the above and with a peak flow limitation of 511 mgd, WASA could consider a TN permit limit of 9,021,000 lbs per year (8.0 mg/L @ 370 mgd) and a TN goal of 6,766,000 lbs per year (6.0 mg/L @ 370 mgd) with appropriate boundary conditions for the limit. The proposed goal is 1,689,500 pounds lower than the current goal and would serve as a guideline for operation of the facility.

Boundary conditions would need to be included in the permit. These conditions would be footnotes for the nitrogen limitation for Outfall 002. WASA proposes the following boundary conditions:

1	For the purpose of determining permit compliance, captured combined sewer flow shall be deducted from the flow at outfall 002 when calculating the effluent TN load. Captured combined sewer flow shall be determined annually using the LTCP model.
2	If the effluent TN for the calendar year is below the goal, the difference between the goal and the actual discharge will become a credit that can be used to offset discharges above the permit limit for the following two years.
3	When the average daily effluent temperature is less than 13 degrees centigrade, the plant will be deemed to be in a cold weather mode (CWM). The CWM shall remain in effect for a period measured as two mean cell residence times (2MCRT) that start on the day when the average daily effluent temperature rises above 13 degrees centigrade; and where one MCRT is equal to 20 days. A CWM is shall be deemed to start on any day that the average daily effluent temperature is less than 13 degrees centigrade. Effluent TN loads on the days when this condition exists would be excluded when computing the annual effluent TN load for determining permit compliance. The annual TN load limit would be the permitted load (9,021,000 lbs/yr) calculated for the days when the boundary conditions did not exist.

Additionally, the existing construction phase flow limitation at Part II.B for Outfall 002 would continue for the term of the modified permit.

It has to be recognized that Blue Plains was designed for nitrification down to a very low effluent concentration, which was consistently achieved for several decades. WASA has now provided denitrification, as a demonstration facility, by utilizing 40 percent of the nitrification capacity. The plant at this point does not have the capacity under all conditions of temperature and load to simultaneously meet existing permit limits and a new total nitrogen permit limit. Therefore, we cannot accept an interim limit based on a concentration lower than 8 mg/l and without the above stated boundary conditions.

The TN data in Attachment 1 demonstrate a high degree of variability throughout the data set. This is the result of unequal flow distribution to the reactors and the lack of process control instrumentation which does not allow methanol feed to be based on a "real time" measurement of the amount of nitrogen to be removed. These issues will be addressed in the pending construction contract, which provides for improved flow distribution to the reactors and nitrate analyzers for each reactor. However, the improved facilities will not be in place for four years and, until then, will not provide the capacity that WASA requires for a lower TN permit limit. The proposed goal and limit is based upon staff and consultant technical review of the plant's historical performance and capabilities. Also, as discussed in your recent meeting with WASA staff, it would be impossible for WASA to agree to any permit limit without understanding the compliance methodology and the penalties that would be associated with a violation of the TN limit.

B. EPA's Proposed Schedule

WASA wishes to modify the schedule proposed by EPA to include an additional milestone for starting operation of the pilot testing facilities for enhanced clarification and to adjust the date for submission of the action plan and schedule. The modified schedule would read as follows:

Activity	Deadline
Submit draft comprehensive total nitrogen removal/wet weather technical plan to EPA	October 31, 2006
Initiate pilot studies to support draft technical plan	October 31, 2006
Submit final comprehensive total nitrogen removal/wet weather technical plan to EPA.	January 31, 2007
Start operation of pilot testing facilities	July 31, 2007
Submit total nitrogen removal action plan and schedule to EPA*	November 30, 2007

* The action plan shall include the activities, pilot nitrogen removal work and a timetable to achieve an effluent limit expressed as an annual mass load of 4,766,000 pounds of total nitrogen.

This modification would provide WASA and EPA with the benefit of some results from the pilot testing when preparing and reviewing the action plan and schedule.

On a related subject, you will recall that in the course of developing our technical and action plans and schedule, WASA will be examining alternatives which include use of the bypass authorization or classifying Outfall 001 as a CSO outfall for purposes of treating excess flow including CSO flows captured in the tunnels. You will also recall that some time ago, we provided you with a detailed legal analysis in support of using these alternatives. Thus far, EPA has not responded to this analysis, which is important to the development of our technical and action plans. Therefore, we ask that EPA respond to the analysis within the next 30 days. Otherwise, we will have no choice but to proceed on the assumption that EPA agrees with our legal analysis and conclusions.

C. EPA's Proposed Fact Sheet Language

The proposed fact sheet language that you distributed during your April 12 meeting with WASA staff is an accurate summary of the source and apportionment of the District's nitrogen allocation as well as WASA's nitrogen control efforts to date and the challenges that WASA faces in meeting the Blue Plains allocation while complying with its CSO obligations. However, we believe that the explanation, rational and justification for the interim TN limit and the schedule must be expanded to include the information provided in this letter as well as the additional information to justify both the interim limit and the schedule in Attachment 2 to this letter. This would provide a compelling justification for the interim limit and schedule that we are proposing, and we believe there is less likelihood that third parties will object to the interim limit and schedule if this same information is included in the fact sheet.

Because of the anticipated expense of the enhanced nutrient reduction program in addition to existing LTCP commitments which have been identified as the DC rate payers' limit of affordability exclusive of the cost of nutrient reduction, WASA's Board of Directors has requested that they be consulted prior to any final action in this regard. In order to respond to your office in a timely manner, this letter should be considered as a proposal for discussions subject to approval by the Board.

Further, as you know, our lawyers have been in negotiations for several months to resolve the pending appeals of several Phase II CSO conditions that were added to the Blue Plains permit when it was last modified. WASA has made specific proposals for resolution of these issues in a June 6, 2006 letter from Dave Evans to Deane Bartlett and David Baron. A copy of this letter in enclosed. WASA wishes to resolve both the nitrogen-related and Phase II-related issues at the same time so that we might settle the pending appeals while avoiding further appeals. To that end, we request a meeting as soon as possible to discuss resolution of both the nitrogen and Phase II CSO issues. Both of our technical and legal teams should be present to discuss resolution of these matters.

Sincerely,

Jerry N. Johnson
General Manager

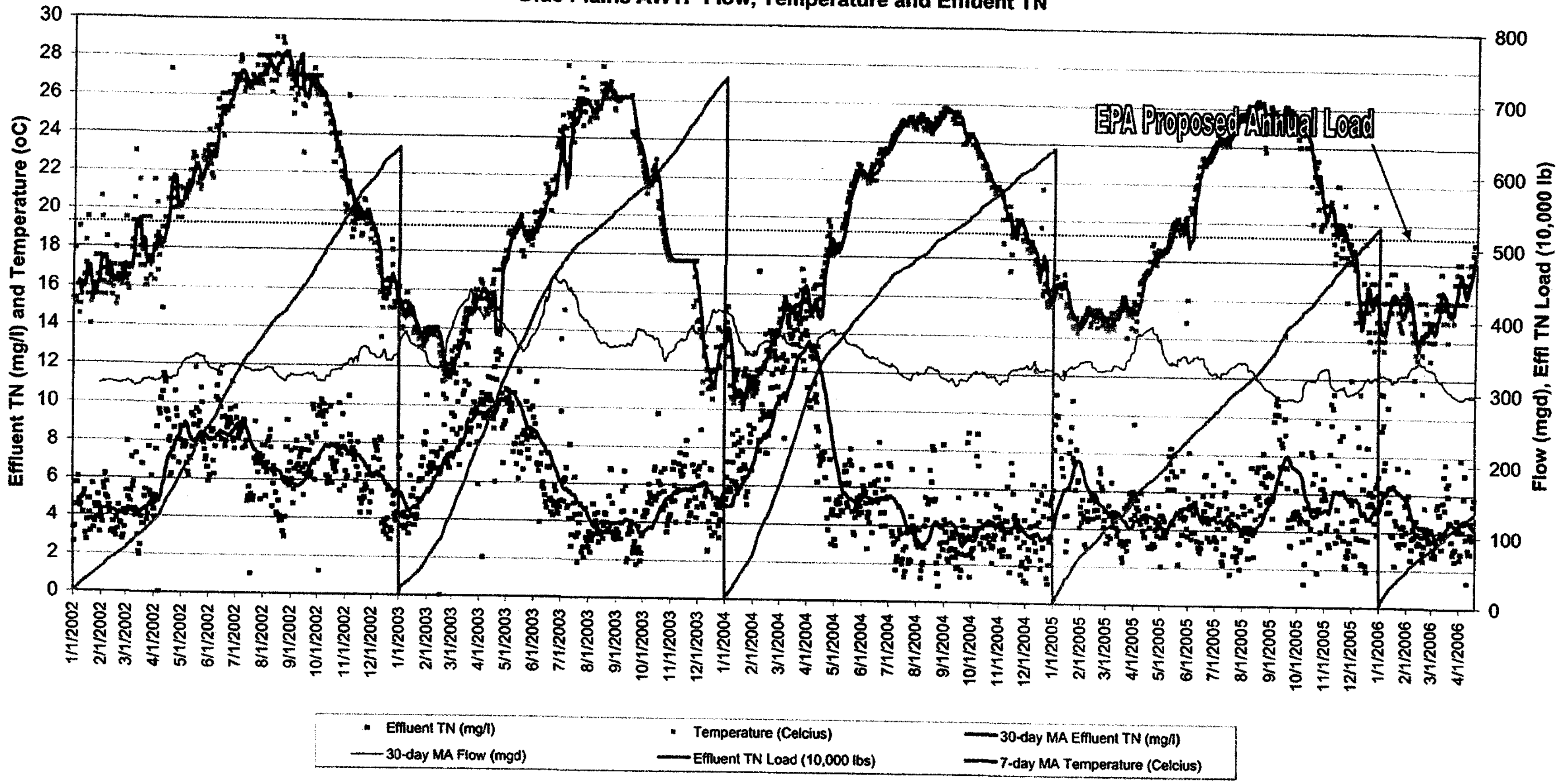
Attachments

c: Deane H. Bartlett, US EPA
David E. Evans, McGuire Woods
John Dunn, Chief Engineer/Deputy General Manager, DC WASA
Avis M. Russell, General Counsel, DC WASA

Attachment 1 to June 21, 2006 Letter to Jon Capacasa

Blue Plains Operating Data

Blue Plains AWTP Flow, Temperature and Effluent TN



ATTACHMENT I

Attachment 2 to June 21, 2006 Letter to Jon Capacasa

Proposed Fact Sheet Language

PROPOSED FACT SHEET LANGUAGE

[Note for EPA - Insert the language (including Attachment 1) providing justification for WASA's proposed interim nitrogen limit and goal and proposed schedule from pages 1 through 5 of June ___, 2006 letter to Jon Capacasa. In addition, insert the following language immediately following the language from the letter.]

When WASA prepared the LTCP for the District's combined sewer system, the Blue Plains permit did not include an effluent limit for total nitrogen. Consequently, there was no need for the LTCP to address the technical and financial implications of adding total nitrogen as an effluent limit in the permit.

The existing permit and the LTCP require treatment under combined sewer system flow conditions (CSSF) at Blue Plains to be as follows:

- *Maximize flow to complete treatment. This requires use of complete treatment under wet weather conditions in the combined sewer system to treat in excess of the 370 mgd annual average design flow whenever capacity may be available to the extent that permit effluent limits for Outfall 002 are not exceeded;*
- *When CSSF conditions exist a Blue Plains, treat up to two (2) times the 370 mgd annual average design flow (or 740 mgd) through complete treatment during the first four (4) hours following the start of CSSF conditions;*
- *After the first four (4) hours, convey up to 511 mgd through complete treatment; and*
- *From the time that CSSF conditions exist a Blue Plains, treat up to 336 mgd through excess flow treatment.*

The LTCP requires WASA to construct and place in operation, four (4) additional primary clarifiers to enhance excess flow treatment.

Substantial expansion of the Blue Plains complete treatment facilities will be required to meet the proposed total nitrogen limit of 4,766,000 (4.2 mg/l) pounds per year. With EPA's concurrence, WASA has completed studies which show that simply adding nitrogen removal to the LTCP projects for Blue Plains would likely result in a capital cost of between $0.85 billion and $1.3 billion. Based on the financial analysis included in the LTCP, the above additional cost would not be affordable for the District under the existing LTCP consent decree schedule.

However, WASA has also completed studies to identify a viable nitrogen removal plan that can technically and financially accommodate the region's wet weather flows and an annual average nitrogen limit of 4,766,000 pounds. This plan would provide *equal or better performance as the existing LTCP and comprises the following principal elements:*

- *Continued maximization of flow to complete treatment that would treat in excess of 370 mgd annual average design flow whenever capacity may be available;*
- *When CSSF conditions exist at Blue Plains, treat up to one and a half (1.5) times the 370 mgd annual average design flow (or 555 mgd) through complete treatment during the first four (4) hours following the start of CSSF conditions;*
- *After the first four (4) hours, convey up to 511 mgd through complete treatment for up to 24 hours;*
- *After the first twenty eight (28) hours, convey up to 450 mgd through complete treatment; and*
- *From the time CSSF conditions exist at Blue Plains, treat the difference between 1076 mgd and 555 mgd through new excess flow treatment facilities.*

Under the above plan, new enhanced clarification facilities would replace the four (4) additional primary clarifiers now included in the LTCP. WASA's studies show that with enhanced clarification, the effluent from Outfalls 001 and 002 would equal or exceed the performance expected with the additional primary clarifiers.

Subject to confirmation through a pilot testing program, EPA agrees that the above wet weather plan would provide an effective and approvable approach for accommodating the new total nitrogen effluent limit and the wet weather treatment requirements under the LTCP.

###########

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PRIVILEGED AND CONFIDENTIAL SETTLEMENT COMMUNICATION

June 6, 2006

Deane H. Bartlett
Senior Assistant Regional Counsel
U. S. Environmental Protection Agency
Region III
1650 Arch Street (3RC20)
Philadelphia, PA 109103-2029

David S. Baron
Earthjustice
1625 Massachusetts Ave, N.W.
Suite 702
Washington, D.C. 20036-2212

Re: Blue Plains Phase II Permit Appeals

Dear Deane and David:

This responds to your proposed fact sheet language which was attached to Deane's April 24, 2006 email. This language is intended to implement the concept settlement proposal that we offered, and that you tentatively accepted earlier this year. You will recall that our proposal, which was a counteroffer to your original offer, consisted of the following three elements:

1. Replace the current general water quality standards compliance condition at Part III.E.1 with the general standards compliance condition in the previous permit, but limit the life of the condition to the period of LTCP implementation. In other words, the condition would end when the LTCP facilities were constructed and placed in operation.

2. Remove the TMDL-derived limits and related monitoring and reporting requirements from Part III.E.2 of the permit, and

3. WASA would withdraw its appeal of EPA's refusal to include a LTCP implementation schedule in the permit.

The following responds to your proposed language for items 1 and 2 above:

1. <u>Part III.E.1 – Water Quality-Based Requirements for CSOs</u>

The proposed language is unacceptable to WASA for three reasons:

First, it proposes to use the fact sheet rather than the permit to limit the life of the general water quality standards condition. If the limitation is not included in the permit, WASA could be precluded from having the condition removed in the future due to the anti-backsliding rules. WASA can not accept language limiting the life of this condition unless it is in the permit.

Second, the proposed language, which states that "... EPA *anticipates* that this general language will be removed ..." (emphasis added), falls far short of an unqualified commitment that EPA will remove the condition from the permit. This can be remedied by adding language to the condition as it appears in the permit (rather than in the fact sheet) which expressly provides that the condition will terminate on the date that the LTCP facilities are placed in full operation.

Third, the proposed language states that EPA anticipates that the general condition will be removed from the permit "... when the permittee fully implements the LTCP and *demonstrates by post-construction monitoring that the CSO controls are meeting water quality standards and protecting designated uses*" (emphasis added). Removing this condition after the standards compliance demonstration would defeat the very purpose of ending the condition because it is during the period of post-construction monitoring that WASA would be exposed to enforcement action and citizen suits for violating the condition. WASA can not accept language which does not end this condition on the date that the LTCP facilities are placed in full operation.

2. <u>Part III.E.2 – TMDL-Derived Limits</u>

Since the proposal is to remove the limits and related conditions entirely from the permit, unlike Part III.E.1 above, there is no need to add language to the permit. However, it is important that the fact sheet language be as clear as possible that the LTCP-derived performance standards reflect the CSO allocations in the TMDLs, and, therefore, are the only water quality-based CSO requirements that will be included in the permit following construction and operation of the LTCP facilities. Your proposed language, which states that "... EPA will require additional controls, if necessary, to ensure consistency with the assumptions and requirements of the applicable TMDL WLAs" is far from the definitive statement needed to protect WASA against an effort in the future to put TMDL-derived limits back in the permit. WASA's concerns can be addressed only with language in the fact sheet which specifically states that in the event EPA ever determines that the LTCP-derived performance standards are not consistent with the TMDL WLAs, this inconsistency will be addressed through revisions to the LTCP and the LTCP-derived performance standards, and not by adding TMDL-derived limits to the permit.

Finally, you will recall that we discussed the need to include language reciting the terms of the settlement in the stipulation that would be the basis for the EAB's dismissal of the appeals. WASA believes it is important to include language such as this to memorialize the terms of the settlement and minimize the potential for future permit appeals based on the same issues resolved in this settlement. Your email does not mention the stipulation, but we assume that you will have no objection to it if we settle the appeals and can agree on the language to be included in the stipulation.

I suggest that we arrange a conference call as soon as possible to discuss these issues and determine whether to continue our negotiations. In the meantime, please let me know if you have any questions regarding the above.

Sincerely,

David E. Evans

cc: Avis M. Russell
Gregory Hope

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, S.W., WASHINGTON, D.C. 20032
OFFICE OF THE GENERAL MANAGER
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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

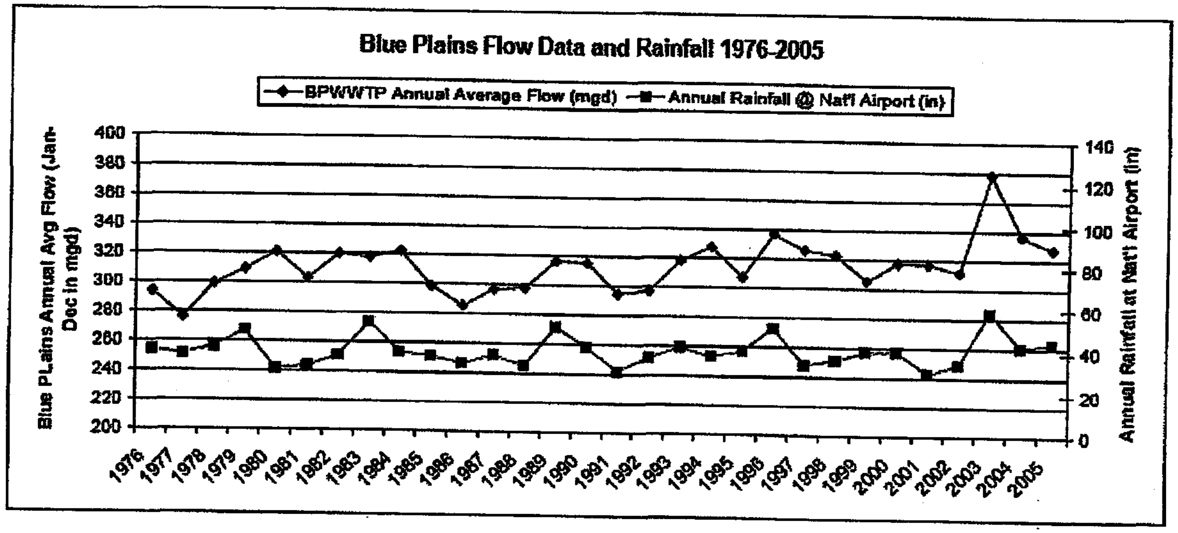
Exhibit No. 1

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	278	36.1
1978	299	39.8
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	32.8
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	42.6
2005	328	44.4

H:\1160\LTCP\ALTERNAT\Blue Plains\Strategic Plan\[2006-07-19 BP Flow Analysis.XLS]Sheet1



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

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. LIMIT…IONS 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 <u>concentration</u> 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	33,601
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

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

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Sincerely,

Edward R. Locke

Edward R Locke
Program Manager

This method was developed using WASA's operating data to create scenarios that could be expected. Issue is low temperatures and high flows, with both occurring in the same calendar year.

Inspection of plant data shows 2003 as worst year for flows. This was way above average rainfall and was at about the 94th percentile. 2003 had the highest TN load. The lowest temps over the 4-year record were in 2004. 2004 had the highest TN load for the first 4 months of the year.

Scenario 1 - The 12 consecutive month period of May 1 thru Dec 31, 2003 load (highest flow) and Jan 1, 2004 thru Apr 30, 2004 (lowest temperature). This is actual load data.

2003 May - Dec	4,182,400			
2004 Jan - Apr	3,543,600		7.2 EPA	
			6.86 Actual	
	7,726,000	6.86 mg/l	0.34 Delta	Safety Factor = 5%

Scenario 2 - Use 2003 high flow year and assume loss of nitrification due to cold temperatures. Assume no dentrification for 2 month period of Feb - march.

2003 Modified data	8,025,200	7.13 mg/l	7.2 EPA	
			7.13 Projected w/ loss of process	
			0.07 Delta	No safety factor

Unknowns

1. How much added flow will uptown pump stations deliver after all are upgraded
2. How low will temperatures go over life of the interim permit.

TN Permit Level without Limiting Conditions for flow and temperature

Use 2003 Base Year with loss of Process for 2 months

Base Load	8,025,200 lbs /year		
Flow Increase for 10 years	410 mgd		per Limno-Tech Exhibit No.1
Annual average Flow in 2003	379 mgd		
Flow ratio	1.0817942		
Projected TN Load (by ratio)	**8,681,615**	**7.71 mg/l**	
Safety Factor	10%		
Projected TN Load (10% safety)	**9,549,776**	**8.48 mg/l**	
Increase for 1 reactor O/S	10%		
Projected TN Load (construction)	**10,504,754**	**9.33 mg/l**	

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, S.W., WASHINGTON, D.C. 20032

SEP - 8 2006

Ms. Mary M. Letzkus
U.S. Environmental Protection Agency, Region III
MD/DC Branch, Mail Code 3WP13
Office of Watersheds
1650 Arch Street
Philadelphia, PA 19107

Subject: Draft Modified NPDES Permit No. DC002119 District of Columbia Wastewater Treatment Plant at Blue Plains
Request for Information and Extension to Comment Period

Dear Ms. Letzkus:

This is to confirm the subject request included in the e-mail (copy attached) sent to you on September 6, 2006 by Mr. Ronald E. Bizzarri on behalf of WASA. We would appreciate it if you would let us know when we may expect to hear from you regarding our request for information and time extension.

Thank you for your assistance.

Sincerely,

Walter F. Bailey, Director
Department of Wastewater Treatment

Attachment

cc: J. Dunn
A. Russell
L. Benson
M. Siddique
D. Evans
R. Bizzarri
J. Cassidy
E. Locke

John Cassidy

From: Ronald E Bizzarri
Sent: Wednesday, September 06, 2006 4:06 PM
To: letzkus.mary@epa.gov
Cc: devans@mcguirewoods.com; ddilks@limno.com; Avis M Russell; John Dunn; Leonard Benson; Walter Bailey; John Cassidy; Edward Locke
Subject: Blue Plains Draft Permit. Request for information and extension to comment period

Dear Mary:

During our telecon on 9-5-2006 I pointed out that the Fact Sheet did not include any specifics on how EPA arrived at the proposed interim TN limit and goal and the time periods included in the interim schedule.

You pointed out that this information was in the administrative record on file at the Martin Luther King, Jr. Libarary in D.C.

We have obtained a copy of the material on file at the library and the attached file includes all that we could find that appears to have any relationship or application to the information we are seeking.

Unfortunately, the information available in the permit, Fact Sheet and administrative record does not provide the information we are seeking or sufficient explanations for the actions proposed by EPA.

Because critical information is missing, WASA is unable to prepare a complete set of comments.

In view of the lack of information, WASA requests that EPA furnish the following:

1. The regulatory authority used to impose the interim TN limit and goal.

2. The technical (engineering and process calculations) bases for developing and establishing the interim TN imit and goal. We note that the existing performance (noted in the Fact Sheet as used for the interim limit) vas achieved when peak flows to complete treatment were limited to 511/450 mgd; but the draft permit equires treating peaks at 740/511 mgd, see I.B.(1). Please explain and show how this difference in peak low handling was addressed in developing and establishing the interim limit and goal. If it was not ddressed, why not? Additionally, as you are aware, the rehabilitation of all our major pumping stations will e completed by 2008. This means that wet weather peaks may be expected to be greater and of longer urationthan those which occured during the performance periods used by EPA. Please explain and show how his change in wet weather peaks was addressed in developing and establishing the interim limit and goal. If was not addressed, why not?

. The interim schedule includes a time period of 180 days between initiating pilot studies and initiating peration of testing facilities. Please explain the activities included and how this time period was developed nd selected.

addition to the information outlined above, WASA requests that the comment period be extended (30) ys. Since information related to the underlying bases and rationale for EPA's proposed actions is not ailable, and because several of our key staff involved in the permit negotiations were away for about two eeks following the notice date (issued during the traditional August vacation time), we believe that the quested extention will give us both time to conduct a review and correct any confusion or misinterpretations garding the proposed actions.

ank you for your assistance. Ron Bizzarri