ATTACHMENTS TO DC WASA LETTER TO EPA

SUBJECT: PROPOSED AMENDMENTS TO BLUE PLAINS NPDES PERMIT

JANUARY 18, 2007

ATTACHMENT I

TO THE JANUARY 18, 2007 COMMENTS

Strategic Process Engineering

Liquid Treatment Processes at the Blue Plains Advanced Wastewater Treatment Plant

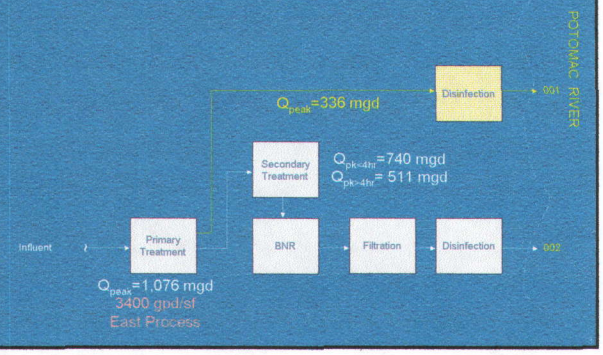
Introductory Workshop
for
Blue Plains Users and Regulators
November 16, 2004

Today's Agenda

- Scope of Strategic Planning
- Blue Plains BNR Performance
- Planning Issues and Constraints
- Wet Weather Treatment Options
- Enhanced Nitrogen Removal Options

- Audience participation is encouraged

Blue Plains Flow Scheme



Current Regulatory Environment - Uncertainty

- Chesapeake Bay Program goals for 2010?
  - Tributary Strategies released, not yet final
  - Permit based on TMDLs (>2010)
- Long Term Control Plan?
  - Treat 193 MG tunnel pump out at Blue Plains over 2 days
  - Complete Treatment called for in LTCP
  - Implementation date? (>2010)
- Draft Blending Policy?
  - Goal to protect biological processes if water quality is met
  - May require more stringent permit limits on 001
  - Implementation date? (>2010?)

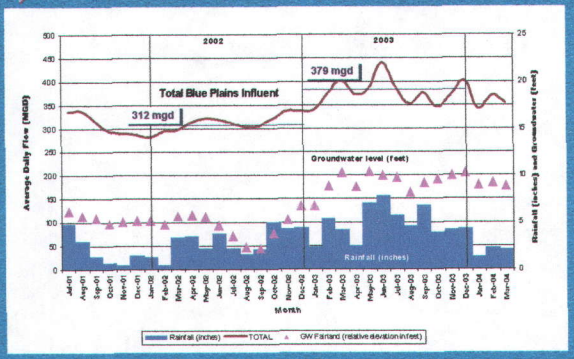
Need for Planning

- Blue Plains now at 90% of capacity
- BNR process now degrades during storm flows
- Chesapeake Bay Program calls for higher N removal
  - Cost effective approach - limit peak flows to BNR
- LTCP Tunnel Pump out increases storm flow duration
  - Sustained flows at 450 MGD for 2 days after storm
  - Back to back storms could extend high flows one week
  - BNR performance will degrade further
- Result is competing needs for treatment processes
- *Holistic approach to planning is needed*

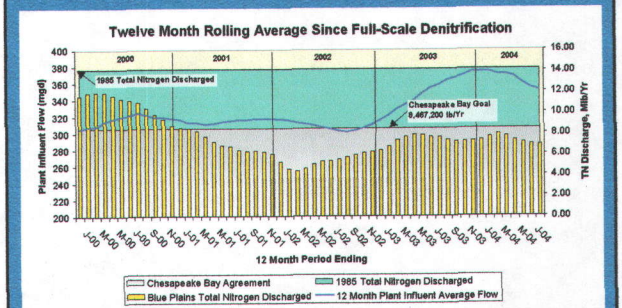
WASA's Implementation of Low Cost BNR

- Use existing tankage
  - Denit Demonstration
  - Full scale BNR @ 7.5 mg/l
  - DC 1ST to achieve goal
  - Nit/Denit Upgrade design
- Operational changes
  - Waste Nitrification sludge to Secondary
  - Ongoing DWT Research

Monthly Flow into Blue Plains 2001-2004



Nitrogen Removal Performance



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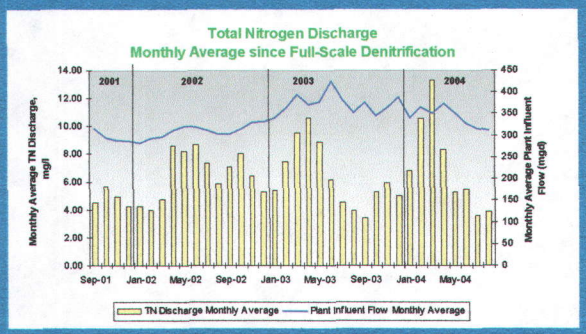
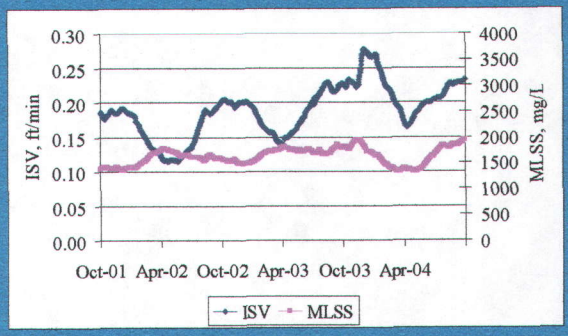


Winter BNR Sludge Settleability Impacts



BNR Performance Summary

- Blue Plains has met CBP goals
- BNR performance is most influenced by:
  - Temperatures – BNR Rates and Sludge Settleability
  - Groundwater infiltration – High rainfall years
  - Storm flows – Spring rainfall coincides with low temps
- BUT, peak flows have been limited by:
  - Construction – lower peak wet weather flows – 511 v. 740
  - Upstream pump station capacity
- ENR Design Challenge:
  Blue Plains has to handle years with above average rainfall and expected temperature range

CHALLENGES FOR ENR

- Blue Plains is at 90% capacity
- Primary clarifier capacity limits performance
- Biological Clarifier capacity also limited
- Full scale BNR has reduced plant safety factor
- New digesters will increase N load to BNR process by 30%
- Pump station rehabilitation will result in higher peak storm flows to Blue Plains
- LTCP tunnel pump out brings higher sustained flows to Blue Plains after the storm event

WASA Needs Answers

- How does WASA respond to CBP initiatives for higher TN removal? (2010)
- How does WASA achieve LOT for TN, if a goal and if a permit requirement?
- What facilities are needed to treat CSS tunnel pump-out flow?
- How does WASA achieve higher levels of treatment for excess flow?
- What are roles of nutrient trading and creative permitting?

Planning Approach

- Define Performance-based alternatives for nutrient levels and wet weather flows
- Define new facilities/costs for alternatives
- Define Worst-Case Scenario
  - CS tunnel pump out mixed with plant influent
  - Excess flow requires meeting 002 limits
  - Limit of technology for nitrogen removal
- Define costs and benefits
- Expert Technical Advisory Panel
- Stakeholder input to focus alternatives

Two-tier Stakeholder Involvement Plan

- Tier I – Blue Plains Users
  - BP Technical Committee and Regional Committee
  - Loudoun County, invited to BPTC/RC for strategic planning topics
- Tier II – Blue Plains Users and Regulators
  - DCDOH (nutrient, CSO)
  - EPA Region III (nutrient, CSO, capacity)
  - EPA CBP (nutrient, CSO, capacity)
  - EPA Headquarters (nutrient, CSO, capacity)
  - MDE/ MD DNR (nutrient)
  - VA DEQ (nutrient)

Tier 2 Stakeholder Involvement Provides:

- WASA an opportunity to provide information on technologies, costs, and practical limitation to the regulators.
- Feedback from the regulators on acceptability of options.
- A forum to discuss technical issues, costs and benefits of alternatives, and set priorities.

WASA wants to be proactive in the "creative regulatory" process

Outreach Activities

Purpose:

- To inform the public and interested groups.

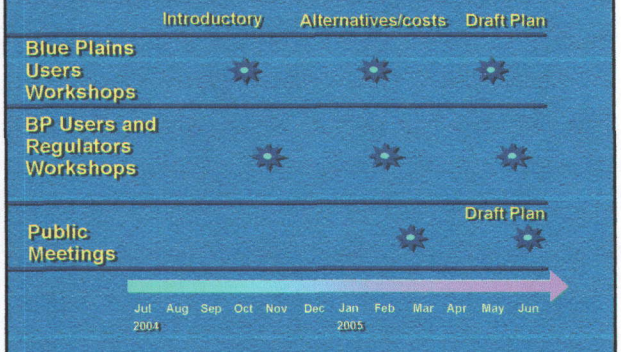
Target Audience:

- ANCs and environmental groups.

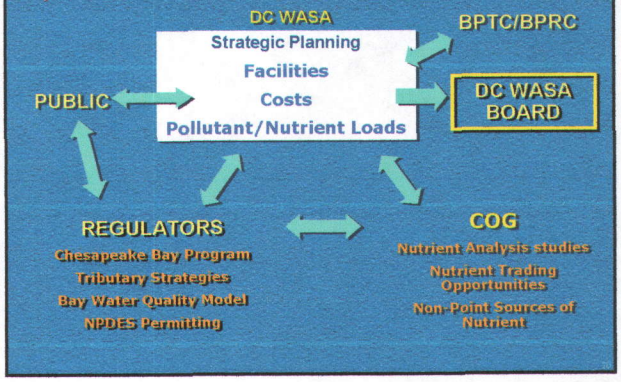
Information Available:

- On WASA's Website
- At public meetings
- Draft Facilities Plan for public review.

Stakeholder Activities Plan



Inputs to WASA's Decision Making Process



Discussion
Wet Weather Treatment Options

Wet Weather Issues

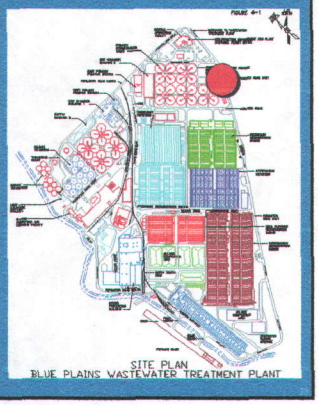
- Primary Tanks overloaded at Peak Flows
  - East Primary tanks at 3400 gpd/sf at 1.076 mgd
- Bio-processes go into wet weather modes
  - Step feed modes in Secondary
  - Wet Weather and Return Only modes in Nit/Denit
  - Return to normal mode takes up to 48 hours
- Pump station rehabilitation will bring higher peak storm flows to Blue Plains
- LTCP tunnel pump out brings higher sustained flows to Blue Plains after storm

Wet Weather Flows

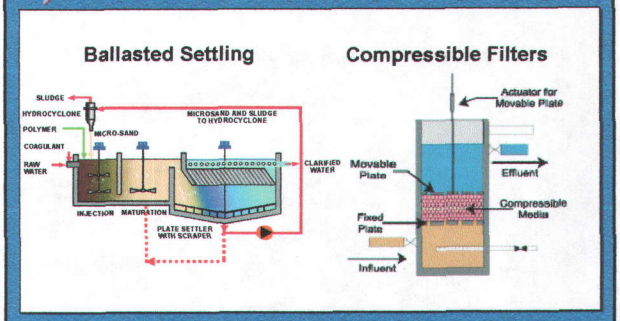
Excess flow options
- Primary Treatment only
- Equivalent to secondary
- Meeting 002 limits

CSS tunnel pump out
- Mixed with plant influent
- Separate treatment

Regulatory Issues:
- What level of treatment is required?
- Can storm peaks to biological processes be reduced?

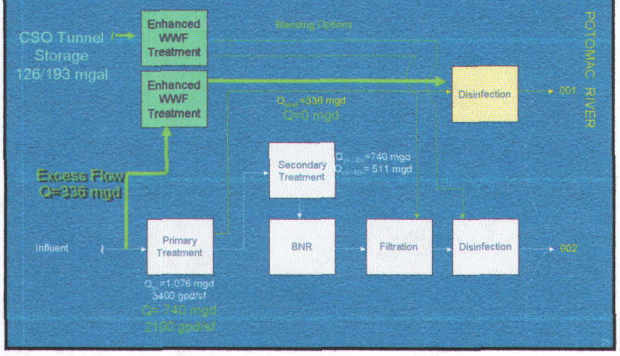


Wet Weather Flow Treatment options



Are there other options we should include???

Wet Weather Treatment Flow Schemes



CSO Characterization for Tunnel Pump Out

- Event Mean Concentrations*, mg/l
  - Total Suspended Solids – 145
  - Total Nitrogen – 5
  - Total Phosphorus – 1

  *Flow weighted, Source: CSS LTCP

Relative TN Loads, Lb/Year

CSO Tunnel	BP Outfall 002
73,500	8,447,000 - 370 mgd @ 7.5 mg/l
(untreated)	5,632,000 - 370 mgd @ 5 mg/l
	3,379,000 - 370 mgd @ 3 mg/l

PROJECTED EFFLUENT QUALITY FOR BALLASTED SETTLING PROCESS FOR CSS TUNNEL PUMP OUT
Source: LTCP CSO Overflows (Fig 4-2)

	Flow weighted Ave conc. To BP mg/L	% Particulate	Projected Particulate % removals	Projected Effluent Quality mg/L
Flow				
CBODt	45.86	77%	90%	14.04
CBODd	10.50	0%		10.50
TSS	145.02	100%	90%	14.50
VSS	61.60	100%	90%	6.16
NH4	1.23	0%		1.23
NOx	0.74	0%		0.74
TKN	4.25	50%	90%	2.34
Ogn N	3.02	70%	90%	1.12
TN	4.99	42%	90%	3.09
TP	0.98	N/A	90%	0.098

Discussion

Enhanced Nutrient Removal Treatment Options

Effective Blue Plains 2010 Annual TN Goal

Jurisdiction	Allocated IMA Flows (MGD)	Proposed State TN Goals (mg/L)
DC	152.5	7.5
WSSC	169.6	3.0
Fairfax	31.0	4.0
Loudoun	13.8	4.0
Other VA	3.1	4.0
Blue Plains	370.0	4.98

Alternative Strategies for ENR

- Alternative TN Discharge from Blue Plains
  - Current NPDES Permit – 7.5 mg/l
  - Current 2004 Tributary Strategies – 5.0 mg/l
  - Limit of Technology – 3.0 mg/l
- TN Load to Potomac at 370 mgd
  - 8,447,200 lbs/yr 7.5 mg/l
  - 5,631,600 lbs/yr 5.0 mg/l
  - 3,378,900 lbs/yr 3.0 mg/l

CHALLENGES FOR ENR

- Blue Plains is at 90% capacity
- Primary clarifier capacity limits performance
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- Full scale BNR has reduced plant safety factor
- New digesters will increase N load to BNR process by 30%
- Pump station rehabilitation will result in higher peak storm flows to Blue Plains
- LTCP tunnel pump out brings higher sustained flows to Blue Plains after the storm event

ENR Alternatives

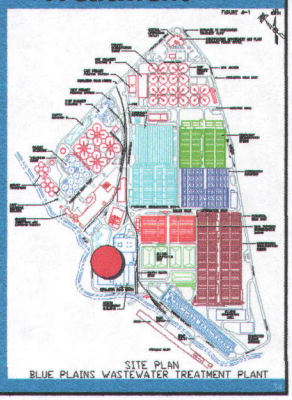
- Build new tankage
- Enhance performance of existing processes
- Role of Peak Flow Shaving

ENR New Tankage Alternatives

- Add Nit. Reactors
- Add Denit. Filters (BAF technology and moving bed bioreactors)
- Convert filters to deep bed & add units
- Convert to single sludge system
- Other options?

Sludge Digestion Centrate Treatment

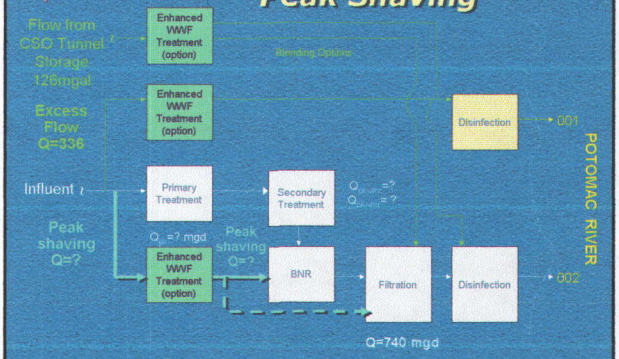
- Increases load to BNR by 30%
- Side stream options:
  - NYC DEP
  - Sharon
  - Anamox
  - Others?
- Return to:
  - Secondary
  - Nitrification



ENR Performance Enhancing Alternatives

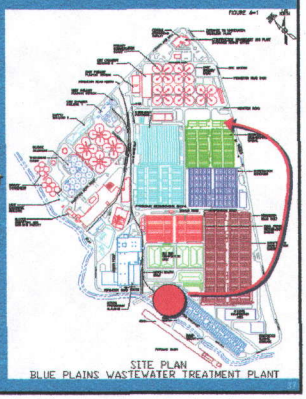
- Role of IFAS technology in Secondary and Nitrification tanks
- Partial Nit/denit in secondary process
- Other technologies?
- Other operational changes

Blue Plains Flow Scheme Peak Shaving



Spent Washwater

- Filter Backwash
  - 30 mgd average day recycle
  - High "Instantaneous" Hydraulic Peaks
  - Removal of recycle will lower loading to clarifiers
- Folded flow DAF pilot
  - Successful performance
  - Likely cost effective



Regulatory Issues

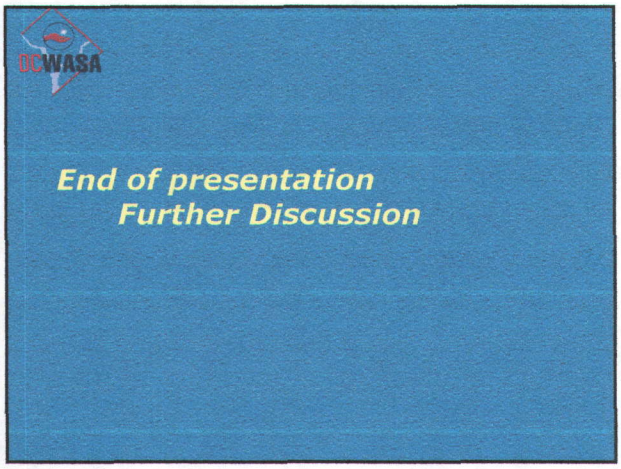
- Treatment level for wet weather flows
  - Excess flow
  - CSS Tunnel pump out
  - Peak flow ratio to complete treatment
- Bubble permit for Outfalls 001 and 002
- Blue Plains NPDES Permit
  - Relative to varying state Tributary Strategies
  - TN removal – goal versus permit requirement
  - Likelihood of "Limit of Technology"?
  - Permit limits – average annual vs. weekly, monthly requirements

Nitrogen Discharge Limit of 3 mg/l BP Outfall 002

- $820M
- Assumes that the limit is a goal
- Planning level estimate (+50%/-30%)
- Includes the following facilities:
  - High Rate settling system for wet weather flows
  - Improved Secondary System
  - Additional Nitrification Reactors
  - Upgraded and Expanded Multimedia Filtration Facility to provide denitrification
  - Spent Washwater Treatment system
  - Digester Centrate Treatment System
  - Post Aeration Facilities

Next Steps in Strategic Planning Process

- Develop Details on Alternatives
  - Technical Considerations
    - New Facility Size and Location
    - Operational Impacts
  - Environmental Considerations
    - Plant Effluent Nitrogen
    - Plant Effluent Phosphorus
    - Plant Effluent Total Suspended Solids
  - Economic Considerations
    - Capital Cost
    - Operations and Maintenance Costs
- Refine based on Legal/Regulatory Issues
- Develop Cost/Benefit
- Present and discuss at next workshop – early 2005


DCWASA
End of presentation
Further Discussion

Strategic Process Engineering

Liquid Treatment Processes at the Blue Plains Advanced Wastewater Treatment Plant

Alternatives Workshop for Blue Plains Users and Regulators March 23, 2005

Recap & What's New from Previous Workshop

- Recap
  - Blue Plains is meeting TN Goal of 7.5 mg/l
  - Peak storm flows impact entire plant operation
  - Explore improvement to Excess Flow Treatment
  - Implementing ENR is impacted by peak flows
- What's New
  - Defined sedimentation performance limits
  - Defined ENR process limits
  - Identified new facilities to achieve reliable ENR
  - Identified options to reduce peaks to ENR
  - Developed order of magnitude costs
  - Refined regulatory issues to be addressed

Today's Agenda

- Overview
  - Challenges for ENR
  - Planning Assumptions
  - Basic Findings
- Meeting CBP Requirements
  - Hydraulic Constraints & Options
  - Enhanced Nutrient Removal Constraints & Options
- Regulatory Issues
  - Acceptability of Enhanced Clarification for Excess Flow
  - Acceptability of Reducing Peak Flow through Biological Processes
  - Conditions for Blue Plains' Permit
- Summary
  - Load Reductions & Costs
  - Results
- Next Steps

- Audience participation is encouraged

Summary of Load Reduction and Costs

STEP *TN (mg/l) & Peaking Factor*	TN DISCHARGE (M lbs/yr)	COST
Baseline *TN = 7.5 & PF = 2.0*	8.57	[$110 M]
CBP Tier 3 *TN = 5 & PF = 2.0*	5.72	$444 M
ENR Step 1A *TN = 5 & PF = 2.0*	5.72	$405 M
ENR Step 1B *TN = 5 & PF = 1.5*	5.18	$275 M
CBP Tier 4 *TN = 3 & PF = 2.0*	3.59	$820 M
ENR Step 2A *TN = 3 & PF = 2.0*	3.59	$625 M
ENR Step 2B *TN = 3 & PF = 1.5*	3.51	$495 M

CHALLENGES FOR ENR

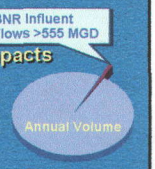
- Capacity Limitations
  - Blue Plains is at 90% capacity
  - Primary sedimentation capacity undersized
  - Secondary and BNR sedimentation capacity undersized
- Flow and Load Increases
  - Digesters increase Nitrogen load by 30%
  - Pump station rehabilitation increases peak storm flows to Blue Plains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

Planning Assumptions for Baseline

- Flows at 370 mgd design conditions
- Upstream pump stations rehabilitated
  - Higher peaks during storms
- Full anaerobic digestion
  - Nitrogen load increase of 30% through digester centrate recycle
- Projects in baseline
  - Nitrification/BNR Upgrade – under design
  - Secondary BNR Upgrade – CIP BI (2013)

Basic Findings

- Primary Sedimentation Tanks are overloaded during storm flows
- Poor Primary Treatment performance impacts biological processes
- Nitrogen removal is impacted by both:
  - Process aeration tank capacity
  - Secondary and BNR sedimentation basin capacity
- Wet weather flows reduce ENR performance
  - 1% of total annual BNR volume (Flows > 555 mgd) causes ENR problems
- Ratcheting TN to 3 – no margin for error



Meeting CBP Requirements

Hydraulic Constraints and Options

Hydraulic Constraints
Plant Issues During Wet Weather

- Primary tanks overloaded at peak flows
  - Poor quality effluent to biological processes
- Operators make changes during wet weather to protect bio-processes
  - Reduces biological treatment capacity
  - Return to normal mode takes up to 48 hours
- Pump station rehabilitation will bring higher peak storm flows to Blue Plains
- LTCP tunnel pump out brings higher sustained flows to Blue Plains after storm

Hydraulic Constraints
Primary Tank Hydraulic Loading

West Primary (16 circular tanks, 106' diameter, 13.7 feet SWD)

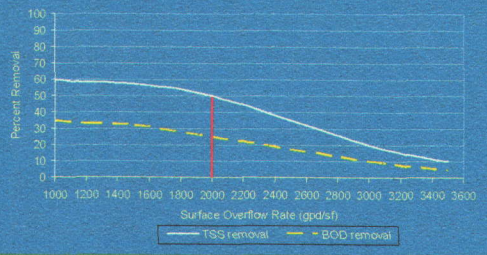
Plant Influent Flow (mgd)	Influent to West Primary (mgd)	Detention Time (Hours)	Surface Overflow Rate (gpd/sf)
370	148	2.4	1,049
740	296	1.2	2,097
1076	296	1.2	2,097

East Primary (20 circular tanks, 120' diameter, 14.3 feet SWD)

Plant Influent Flow (mgd)	Influent to East Primary (mgd)	Detention Time (Hours)	Surface Overflow Rate (gpd/sf)	
370	222	2.6	982	
740	444	1.3	1,964	Max Effective SOR ~ 2000
1076	780	0.7	3,450	
847	643	1.0	2,369	

Hydraulic Constraints
Primary Tank Performance

- Primary tank testing showed reduced removals at Increasing Surface Overflow Rates (SOR)

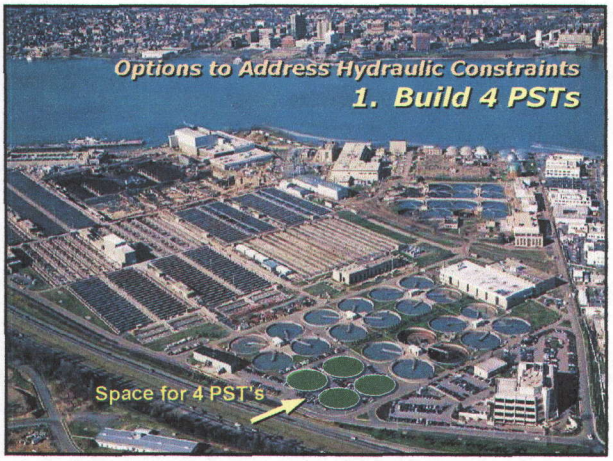


Maximum SOR of 2000 (50% TSS removal) required for ENR

Options to Address Hydraulic Constraints
Primary Treatment

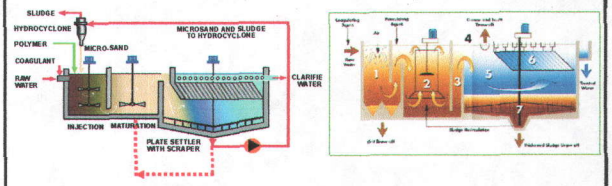
1. Build 4 Additional Primary Sedimentation Tanks (PSTs)
   - SOR Reduced to 2900 gpd/sq.ft. → ~20% removal
   - Potential for primary washout remains
2. Build Enhanced Clarification Facilities (ECF) for flows > 740 MGD
   - Primary SOR held to 2000 gpd/sq.ft. → 50% removal
   - Excess Flow treated to 80+% TSS removal
   - Significant reduction in mass loading to the river

Options to Address Hydraulic Constraints
1. Build 4 PSTs



Options to Address Hydraulic Constraints
2. Enhanced Clarification Facility Uses Ballasted Settling Process

Ballasted Settling – Two Process Alternatives



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Options to Address Hydraulic Constraints
Enhanced Clarification Facilities

Enhanced Clarification Facilities for Wet Weather Flows

- EPA Region 5
  - Greenfield, IN
  - Port Clinton, OH
- EPA Region 6
  - Fort Worth, TX
  - Fort Smith, AR
  - St. Bernard, LA
- EPA Region 7
  - Lawrence, KS
- EPA Region 10
  - Tacoma, WA
  - Bremerton,WA

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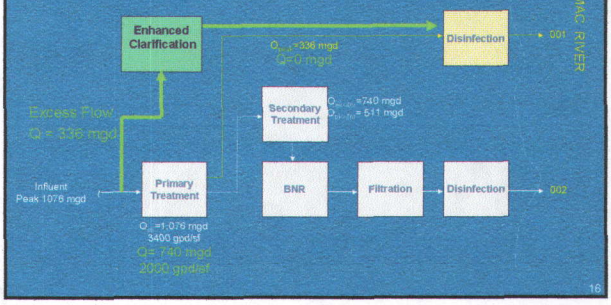
Options to Address Hydraulic Constraints
Enhanced Clarification Facility Flow Scheme



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Options to Address Hydraulic Constraints
Comparison of Primary Effluent Quality

	1. 4 Additional PSTs (per LTCP)		2. Enhanced Clarification Facility (Alternative)	
	To Biological Processes	To Outfall 001	To Biological Processes	To Outfall 001
TSS (mg/l)	112	112	70	14
BOD (mg/l)	84	84	64	37
TN (mg/l)	17	17	14	11
TP (mg/l)	2.1	2.1	1.7	0.2

ECF Improves Disinfection Capability

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Options to Address Hydraulic Constraints
Primary Treatment Summary

- Four additional PST's not sufficient for ENR
- Enhanced Clarification reduces loading to biological processes:
  - Limits primary tank flows to 740 mgd
  - Provides minimum 50% TSS removals in primary
- Added Benefit of Enhanced Clarification
  - Reduction of loads to river
  - Improved disinfection
- Outfall 001 remains CSS outfall

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Options to Address Hydraulic Constraints
Impact of Enhanced Clarification Facility on LTCP

- Changes LTCP
  - Plan requires 4 PSTs in place by 2016
  - *Plan provides for primary treatment of excess flow*
- LTCP based on then-existing TN goal
  - Did not consider reduction in nitrogen discharge limits
  - Tributary Strategies not yet developed
- Enhanced Clarification Facility improves LTCP
  - Substantial improvement in Excess Flow effluent quality
  - Reduced primary effluent load stabilizes biological processes
- LTCP Facilities Plan to evaluate:
  - Tunnel sizing and treatment capacity
  - Treatment options at Blue Plains and near tunnels

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Options to Address Hydraulic Constraints
Discussion of Regulatory Issues

- Enhanced Clarification process provides "equivalent to secondary treatment"
  - Equivalent pollutant concentrations
  - Equivalent disinfection
  - Not a biological process
- Is Enhanced Clarification a viable process for Excess Flow or CSS Tunnel Pump Out?

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Meeting CBP Requirements

Enhanced Nutrient Removal Constraints and Options

Process Engineering 101

Higher mixed liquor levels improve TN removal

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

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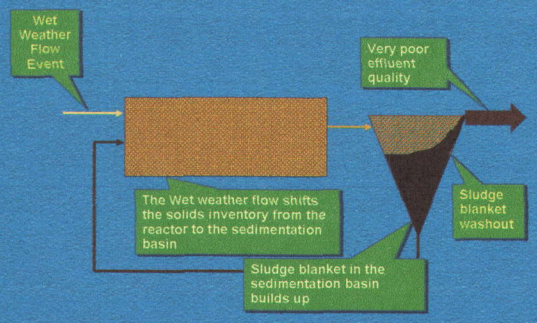
Wet Weather Flow



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Steps to Evaluate Biological Processes

Assess

Primary Sedimentation Hydraulics
Secondary Sedimentation Basin Capacity
Nitrification Sedimentation Basin Capacity

↓

Set Range of Allowable Mixed Liquor Levels in Process Reactors

↓

Estimate Nutrient Removal Performance

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Results of Sedimentation Basin Capacity Analyses

- Secondary sedimentation capacity limited – *550* to *600* MGD versus 740 MGD required with target mixed liquor of *2,000* mg/L
- Nitrification sedimentation capacity limited at ~ *700* MGD versus 740 MGD required with target mixed liquor of *2,000* mg/L

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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Constraints for ENR During Wet Weather

- Sedimentation basin capacity analysis confirms WASA operating experience
  - Operators switch to wet weather modes to avoid overloading sedimentation basins
  - Wet weather mode reduces biological treatment capacity
  - Wet weather mode reduces capacity to remove Nitrogen
  - Return to dry weather mode takes up to *48* hours
- All ENR Options require new facilities for 740 mgd wet weather peak
  - Additional secondary sedimentation basins
  - Spent wash water sidestream treatment

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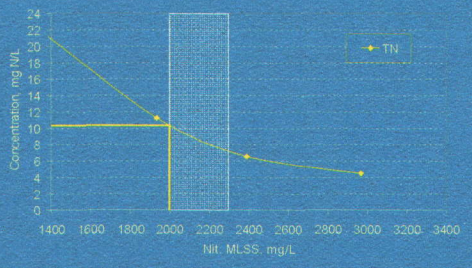
Baseline Nutrient Removal TN=7.5

Max Month – Low temperature
457 mgd - 12 °C



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Effective Blue Plains Annual TN Goal

Jurisdiction	Allocated IMA Flows (MGD)	Proposed State TN Goals (mg/L)
DC	152.5	7.5
WSSC	169.6	3.0
Fairfax	31.0	4.0
Loudoun	13.8	4.0
Other (MD & VA)	3.1	4.0
Blue Plains	370.0	4.98

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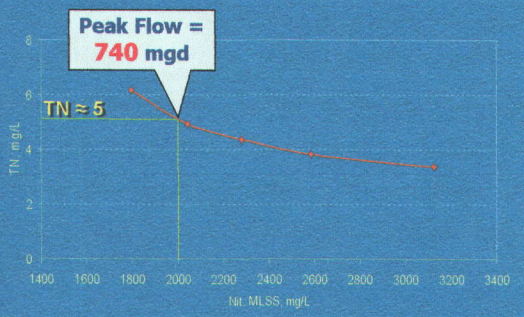
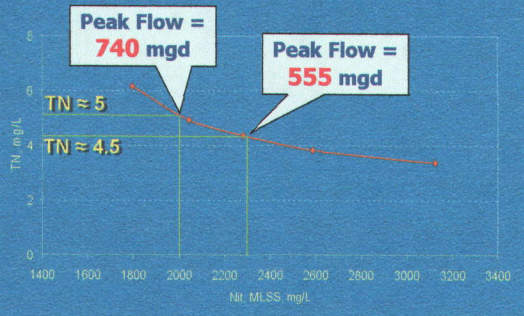
Enhanced Nutrient Removal Options
ENR Step 1A – TN = 5 & PF=2.0
Add Digester Centrate Treatment



Enhanced Nutrient Removal Options
ENR Step 1A – TN = 5 & PF =2.0
Projects Required

- Baseline Condition to maintain 7.5 mg/L
  - Nit/denit upgrade (ongoing design)
  - Secondary BNR Upgrade (CIP 2013)
- ENR Step 1 to get to 5 mg/l (may get to 4 mg/l)
  - Enhanced Clarification Facility
  - Digester Centrate Treatment
  - New Secondary Clarifiers
  - Sidestream Treatment of Spent Wash Water

Enhanced Nutrient Removal Options
ENR Step 1B – TN = 5 & PF= 1.5
Add Digester Centrate Treatment



Enhanced Nutrient Removal Options
ENR Step 1B – TN = 5 & PF=1.5
Projects Required

Peak Flow to Biological Treatment at 555 MGD (PF = 1.5)

- Baseline Condition to maintain 7.5 mg/l
  - Nit/denit upgrade (ongoing design)
  - Secondary BNR Upgrade (CIP 2013)
- ENR Step 1 to get to 5 mg/l (may get to 4 mg/l)
  - Enhanced Clarification Facility
  - Digester Centrate Treatment
  - ~~New Secondary Clarifiers~~
  - ~~Sidestream Treatment of Spent Wash Water~~

Enhanced Nutrient Removal Options
Effect of Limiting Peak Flows to 555/511 MGD (PF = 1.5)

- The biological system can be operated year-round to remove more total nitrogen
- Excess flows (influent > *555* mgd) treated through excess flow enhanced clarification
- Operating at higher MLSS levels could remove an additional *520,000* lbs/yr TN

Equivalent to a 35 MGD WWTP reducing its TN discharge levels from 8 mg/l to 3 mg/l

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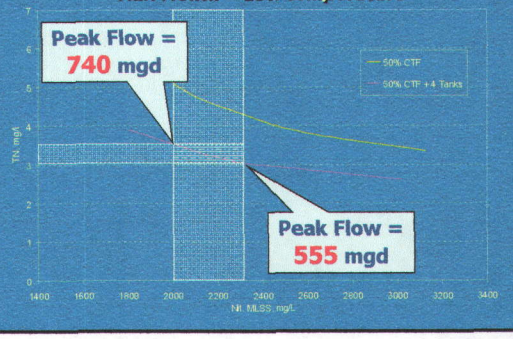
Enhanced Nutrient Removal Options
ENR Step 2A & 2B

ENR Step 1 + Add 4 BNR Reactors
Max Month – Low temperature



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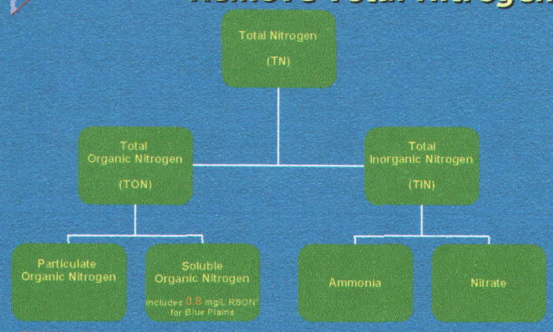
Limit of ENR Process to Remove Total Nitrogen



*RSON = Recalcitrant Soluble Organic Nitrogen, nitrogen fraction not available for biological activity

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Limit of ENR Processes to Remove Total Nitrogen

- Issue raised by the Blue Plains Technical Advisory Panel
  - Dr. Cliff Randall
  - Dr. Glenn Daigger
  - Dr. James Barnard
- Blue Plains averages approximately 0.8 mg/l RSON (i.e., non-biodegradable) in the effluent discharge
- Bay water quality models assume all nitrogen is biologically available
- Need to reflect RSON contribution

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Regulatory Issues

- Acceptability of Enhanced Clarification for Excess Flow
- Acceptability of Reducing Peak Flow through Biological Processes
- Conditions for Blue Plains Permit
  - Outfall 001 remains CSS Outfall
  - TN annual load based on
    - Annual average hydrologic year (i.e., 370 mgd)
    - Minimum wastewater temperature of 12°C
    - Total Inorganic Nitrogen (TIN)

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Summary of Load Reduction and Costs

STEP *TN (mg/l) & Peaking Factor*	TN DISCHARGE (M lbs/yr)	COST
Baseline *TN = 7.5 & PF = 2.0*	8.57	[$110 M]
CBP Tier 3 *TN = 5 & PF = 2.0*	~~5.72~~	~~$444 M~~
ENR Step 1A *TN = 5 & PF = 2.0*	5.72	$405 M
ENR Step 1B *TN = 5 & PF = 1.5*	5.18	$275 M
CBP Tier 4 *TN = 3 & PF = 2.0*	~~3.59~~	~~$820 M~~
ENR Step 2A *TN = 3 & PF = 2.0*	3.59	$625 M
ENR Step 2B *TN = 3 & PF = 1.5*	3.51	$495 M

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CBP Cost Information 2003 Nitrogen Discharge Limit of 3 mg/l BP Outfall 002

- $1.1 Billion for weekly/monthly permit
- $ 820 Million for annual average goal
- Planning level estimate (+50%/-30%)
- Included the following facilities:
  - High Rate settling system for wet weather flows
  - Improved Secondary System
  - Additional BNR Reactors
  - Upgraded and Expanded Multimedia Filtration Facility to provide denitrification
  - Spent Washwater Treatment system
  - Digester Centrate Treatment System
  - Post Aeration Facilities

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Summary of Results

Alternative	Cost under Current Permit (370/740/511) *PF = 2.0*	Additional Nitrogen Removed (M lb/yr)	Cost under Proposed Permitted (370/555/511) *PF = 1.5*	Additional Nitrogen Removed (M lb/yr)
CBP Tier 4, TN = 3	$820	4.98		
ENR Step 1, TN = 5 ~ 4				
• Excess Flow ECF	$130 M		$210 M	
• Centrate Treatment	$65 M		$65 M	
• Secondary Clarifiers	$155 M		----	
• SWW Treatment	$55 M		----	
	$405 M	2.85	$275 M	3.39
ENR Step 2, TN = 3				
• New BNR Reactors	$220 M		$220 M	
Total Cost (ENR Step 1&2)	$625 M	4.98	$495 M	5.09

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Next Steps in Strategic Planning Process

- Refined Information
  - New Facility Size and Location
  - Operational Impacts
  - Process Performance/Environmental Considerations
  - Capital and O&M Costs
- Present and discuss at next workshop – summer *2005*

End of Presentation
Further Discussion

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

May 5, 2005

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

Dear Mr. Capacasa:

Sorry I've been so long in writing this memo to thank you and other USEPA staff for attending and actively participating in the second Blue Plains Strategic Planning Workshop held on March 23, 2005. I feel that this stake-holder approach, which has proven so successful in addressing other issues, will provide positive benefits with respect to meeting the challenges of the next round of NPDES permit negotiations for Blue Plains.

The next permit will likely require DCWASA to deal with different nutrient loading regulations of three jurisdictions, Maryland, Virginia and the District, and wet weather flows from all jurisdictions. In addition, it would be prudent at this time to consider the treatment of the tunnel pump-out flows from DCWASA's Long Term Control Plan (LTCP). Given our present significant financial commitment associated with the implementation of the LTCP and the nexus between that Plan and the cost of any future requirements for nutrient and wet weather control at Blue Plains that would be borne by the District rate payers, it is to everyone's advantage to insure that any required additional facilities be as cost effective as possible.

As outlined at the Workshop, the following three issues represent an opportunity to maximize the cost effectiveness of any increased facility additions that might be required as a result of more stringent limitations included in the next NPDES Permit:

1. Reducing the peak flow factor at Blue Plains from 2.0 to 1.5 which would result in a peak flow value reduction from 740 MGD to 555 MGD

2. Your office's acceptance of the operational concept outlined on Attachment I utilizing enhanced clarification as a side-stream process as meeting USEPA's criteria to provide secondary treatment

3. The utilization of Outfall 001 both as a treated waste water outfall and CSO Bypass

The paradox here is that acceptance of the above issues will not only result in a reduction in capital costs for any additional facilities required but will also result in the reduction of total nitrogen discharged through Outfalls 001 and 002 to the Potomac River. WASA is continuing to develop this proposed approach and, by mid-summer, will be in a position to hold the next work-shop at which time additional information will be presented with respect to facilities, capital and operating costs, discharge loadings as well as water quality impact data.

As we discussed at the close of the last workshop, it would be helpful to memorialize our thinking at appropriate stages of this on-going process and, as such, I have attached a copy of the Power Point presentation used at the above referenced meeting. This letter is WASA's attempt to document our approach and progress to date and I would request that you comment in writing on USEPA's feelings with respect to the path we are pursuing and to offer any thoughts the Agency feels would be helpful as we move forward.

Sincerely,

Jerry N. Johnson
General Manager

Attachment

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

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

JUL 28 2005

Dear Mr. Johnson:

The Environmental Protection Agency (EPA) has carefully reviewed the proposals set forth in your letter of May 5, 2005 and clarified in Walter Bailey's e-mail of July 1, 2005. Provided below are EPA's initial comments and requests for further information. EPA cannot provide a final determination, either verbally or in writing, on whether any of these three proposals is acceptable to EPA until a formal, well documented, proposal is submitted to EPA and undergoes any necessary public review. The proposals may require a modification of the Consent Decree and/or of the NPDES permit.

Proposal 1: Reduce the peak flow factor at Blue Plains from 2.0 to 1.5 (740 million gallons per day (MGD) to 555 MGD).

The current Blue Plains Permit requires peak flows of up to 740 MGD for up to 4 hours to be treated by the full plant and discharged through Outfall 002. Excess flows are discharged through Outfall 001 as a CSO-related bypass. WASA proposes to reduce this requirement so that it needs only to treat peak flows up to 555 MGD for up to 4 hours through the full plant. Any flows above that amount would be directed through a minimum of primary treatment, chlorination and dechlorination, and then discharged through Outfall 001 as a CSO related bypass. WASA has identified the following potential benefits of this proposal:

- Greater operational stability;
- Improved treatment efficiencies;
- Improved adaptability of the Blue Plains facility to accommodate further total nitrogen controls; and
- Reduced cost.

In order for EPA to fully evaluate this proposal, we need the following from WASA:

1. An analysis of how the increased discharge from Outfall 001 would qualify as a CSO-related bypass, in accordance with the CSO Policy;

2. Information on the quantity and quality of these additional discharges through Outfall 001; and
3. An estimate of the total pollutant loading from the plant, if this proposal were adopted.

WASA provided a table of pollutant loadings to the Potomac River that analyzed loads at various peak flows and treatment scenarios. That table did not reflect tunnel pump-out. We would like to see that table expanded to include pollutant load estimates for tunnel pump-out as well.

Proposal #2: Use Enhanced Clarification as a substitute for conventional primary treatment in treating excess flows for discharge through Outfall 001.

The current Long Term Control Plan (LTCP) and the LTCP Consent Decree require the construction of four conventional clarifiers to treat the excess flow entering the Blue Plains Facility. WASA proposes substituting enhanced clarifiers for treatment of excess flows prior to discharge through Outfall 001. During dry weather, these enhanced clarifiers will also provide improved primary clarification of flows treated through the entire plant. WASA has identified the following potential benefits of this proposal:

- Moderate reductions (20-40%) in total nitrogen, total phosphorus, BOD, and TSS levels to the biological processes;
- Significant reductions (35-90%) in total nitrogen, total phosphorus, BOD, and TSS to Outfall 001; and
- Much improved disinfection of Outfall 001.

It would be helpful to receive a separate assessment of the pollutant load reductions expected under this proposal for both Outfall 001 and Outfall 002. EPA needs to assure that the enhanced clarification performs better than conventional primary treatment. Also, please confirm that WASA is proposing to use ballasted floc in its enhanced clarification.

Proposal#3: Direct the CSS tunnel pump out to the enhanced clarification facility and then to Outfall 001 instead of routing this wastewater through the entire biological plant.

The current LTCP requires that the after-storm pump out from the CSS tunnels be treated through the entire Blue Plains Plant and discharged through Outfall 002. WASA proposes to direct the pump out flow through the enhanced clarification facility (and chlorination and dechlorination) and then through Outfall 001. WASA has identified the following potential benefits of this proposal:

- The dilute tunnel wastewater could be treated by enhanced clarification to very low nutrient levels approaching 3 mg/l total nitrogen and 1 mg/l total phosphorus;
- Reduce stress, increase stability, and increase performance at the biological treatment units; and
- Reduced overflows during wet years due to quicker pump out of the tunnel.

WASA has not provided the legal basis for less than full treatment for these flows. Based on information presented, this proposal would not be acceptable.

Other issues of concern

The Bay Partners, including Maryland, Virginia, and the District of Columbia, agreed to nutrient allocations for each jurisdiction to achieve the water quality objectives of the Chesapeake Bay. The Blue Plains Facility is already achieving the phosphorus NPDES permit limits (0.18mg/l 12 month average, 0.35mg/l 1 month average, and 1080 pounds per day 1 month average). While these limits were developed for the protection of the Potomac River, they also would appear to be adequate phosphorus controls for the protection of the Chesapeake Bay. Therefore, it is likely that the current phosphorus limits for Blue Plains will be retained.

Both Maryland and Virginia have identified their portion of Blue Plains as needing to achieve a total nitrogen loading equivalent to 4.0 mg/l for that jurisdiction's portion of the flow to the Blue Plains WWTP. In order to achieve the cap loading for total nitrogen assigned to the District of Columbia, EPA calculates the entire Blue Plains Facility's annual load to be 4.766 million pounds per year (EPA's analysis is enclosed). At a flow of 370 million gallons per day this loading equates to about 4.2 mg/l total nitrogen. EPA intends to place a total nitrogen annual loading limit of 4,766,000 pounds per year (rather than a concentration limit) in the permit to protect the Chesapeake Bay. This preliminary determination will be the subject of further review by the District of Columbia, downstream states and the public as a part of an official notice of the NPDES permit modification.

Further, based on the Chesapeake Bay Permitting Approach, developed by EPA and the Bay States, EPA intends to include nutrient limits for the protection of the Bay when the Blue Plains permit is reopened for any modification. This could occur before the scheduled 2008 renewal date of the permit.

I hope that the above information provides you with some insight on EPA's thoughts and needs with respect to each of these proposals. If you have any questions, please call me or have your staff contact Bob Koroncai at 215-814-5730.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

cc: Robert Summers, MDE
Ellen Gilinsky, VA DEQ
James Collier, D.C. DOH

BLUE PLAINS NITROGEN REQUIREMENTS TO MEET THE CHESAPEAKE BAY CAP LOAD

Summary: The Allocated Load to the Blue Plains facility (full flow) necessary to attain the nitrogen allocations for the Maryland, Virginia, and District of Columbia Portions of the Potomac River is 4,766,000 pounds/year.

Total Nitrogen Loading Calculation:

1) Total Nitrogen Allocation to the District of Columbia: 2.4 Million pounds/year
2) Total Nitrogen Load Allocated to non-point sources (DC): 280,000 pounds/year
3) Total Nitrogen Load Allocated to CSO's (DC, after implementing the LTCP): 5,300 pounds/year
4) Total Nitrogen Load Allocated to Blue Plains (DC): 2,115,000 pounds/year
5) Maryland portion of Blue Plains Allocation: 2,070,000 pounds/year
6) Virginia portion of Blue Plains Allocation: 581,000 pounds/year
7) Total Blue Plains Allocated Load: 4,766,000 pounds per year total nitrogen
8) Total Blue Plains concentration equivalent: 4.2 mg/l

Sources:

1) April 28,2003 Memo from Tayloe Murphy to the Principals' Staff Committee
2) District of Columbia Nutrient and Sediment Strategy
3) District of Columbia Nutrient and Sediment Strategy
4) (1) - (2) - (3)
5) Md Trib Strategy: 4 mg/l x 8.34 x 170 MGD x 365 days/year
6) Virginia Water Quality Management Regulation
7) (4) + (5) + (6)
8) (7) / 8.34 /370 MGD /365 days/year