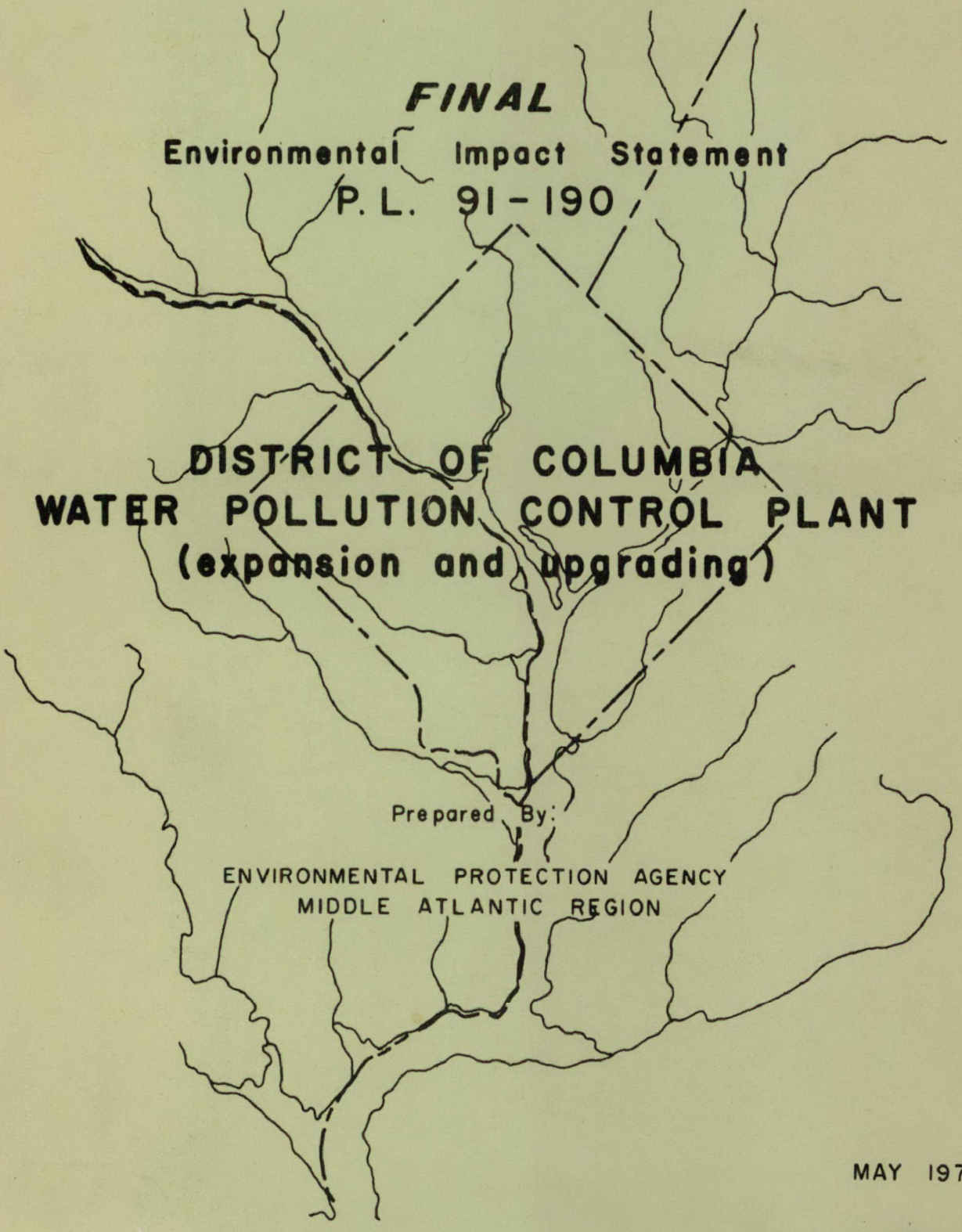
FINAL

Environmental Impact Statement

P. L. 91-190

DISTRICT OF COLUMBIA WATER POLLUTION CONTROL PLANT (expansion and upgrading)



Prepared By:

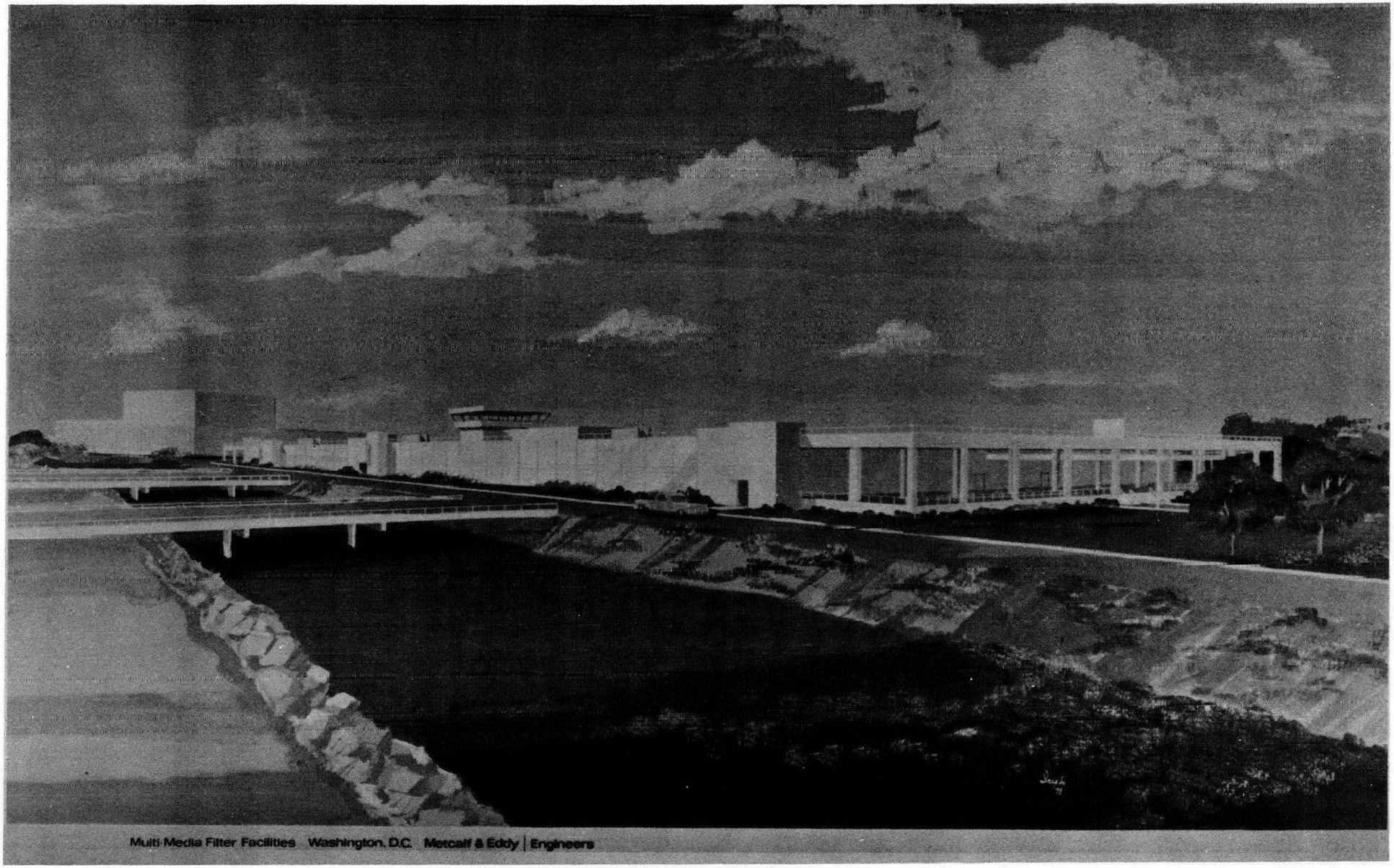
ENVIRONMENTAL PROTECTION AGENCY
MIDDLE ATLANTIC REGION

MAY 1974

Re: 3MGS-FS-DC-1

FRONTISPIECE

EXISTING WATER POLLUTION CONTROL FACILITIES, DISTRICT OF COLUMBIA


Multi-Media Filter Facilities Washington, D.C. Metcalf & Eddy | Engineers

FINAL ENVIRONMENTAL IMPACT STATEMENT
DISTRICT OF COLUMBIA WATER POLLUTION CONTROL PLANT
(Expansion and Upgrading)

Prepared Pursuant to Section 102(2)(c)
of the National Environmental Policy Act of 1969

ENVIRONMENTAL PROTECTION AGENCY
REGION III
Philadelphia, Pennsylvania
May, 1974

Approved by:

Daniel J. Snyder, III
Regional Administrator

SUMMARY SHEET
District of Columbia Water Pollution Control Plant
(Expansion and Upgrading)

( ) Draft (x) Final Environmental Impact Statement

ENVIRONMENTAL PROTECTION AGENCY
REGION III
Philadelphia, Pennsylvania

1. Type of action: (x) Administrative ( ) Legislative

2. Description of action: The proposal would expand from 240 million gallons per day (mgd) to 309 mgd and upgrade (from secondary to tertiary treatment) the existing District of Columbia Water Pollution Control Facilities. On-site disposal of undigested plant sludge by incineration is planned, with the ash residue transported to approved sanitary landfills for ultimate disposal. The areas to be serviced by these facilities include Washington, D. C. proper and suburban portions of Maryland and Virginia.

3a. Beneficial Environmental Impacts:

(1) Significant water quality improvements in the Potomac estuary.

(2) Long-term enhancement of Dyke Marsh once the restoration project is completed by the National Park Service (NPS).

(3) Minimization of plant odor problems.

(4) Reduction in the probability of pathogenic organisms escaping into the environment.

(5) Permanent removal of sludge stockpiles which presently produce runoff problems, odors, and general unhealthy conditions.

3b. Adverse Environmental Effects:

(1) Minimal effects on ambient air quality.

(2) Potential for spillage during fuel transfer and other unloading operations.

(3) Minor long-term effects produced by the project include noise generation, aesthetic intrusion, and the potential for adverse land use changes.

(4) Short-term effects during construction activities include:

(a) Increased turbidities during dredging and spoiling operations.

(b) Fugitive dust emissions.

(c) Erosion and siltation caused by disturbed areas at the site.

(d) Increased noise levels.

(e) Inconvenience to the surrounding communities.

4. Alternatives Considered:

a. Treatment

(1) No action.

(2) Retain capacity at 240 mgd but upgrade plant.

(3) Various combinations of (a) independent physical-chemical; (b) biological treatment systems.

(4) South Tahoe Design

(5) Spray Irrigation (Muskegon Plan)

b. Sludge Disposal

(1) Ocean Disposal

(2) Land Disposal

(i) Pumping digested sludge to dry beds.
(ii) Pumping digested sludge to farmland for irrigation and fertilizing.
(iii) Disposal of digested sludge in lagoons.
(iv) Disposal of partially dewatered digested sludge as a soil conditioner or to a landfill.
(v) Disposal of flash-dried digested sludge as a soil conditioner.
(vi) Pyrolysis.

c. Transportation of Equipment and Materials

(1) Highway

(2) Rail

(3) Waterway

5. Review and Comment Requests:

Comments were solicited from Federal, State and local agencies, private

organizations, and individuals. Copies of all comments received will be found in Appendix a. A list of those parties submitting formal comments follows.

6. Date Draft Statement Made Available to CEQ and Public:

   April 20, 1972

7. Date Final Statement Made Available to CEQ and Public:

   May 1974

COMMENTS RECEIVED ON DRAFT EIS

LIST OF FEDERAL, STATE AND LOCAL AGENCIES, PRIVATE ORGANIZATIONS AND INDIVIDUALS

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Mr. Rod Kreger, Deputy Administrator
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Mr. L. E. DeCamp, Director
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Advisory Council of Historic Preservation
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Mr. John S. Winder, Exec. Director
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Washington, D.C. 20036

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Washington, D.C. 20036

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Washington, D.C. 20036

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APPENDICES

Preface to the Final Statement

An Environmental Impact Statement for the Blue Plains project was prepared by the Regional Office and released in draft form on April 20, 1972. Comments on the draft were received throughout the summer and fall of that year and during the initial review of the comments it became evident that the most serious objections to the project were aimed at the proposed sludge incinerators. Construction of the solids processing building which was designed to house the incinerators began in 1971 and was underway while the draft statement was being reviewed. Also, prior to the beginning of the review period the applicant had decided to adopt the biological nitrification-denitrification system in favor of the two-stage lime precipitation treatment method. This change was prompted by research results obtained at the EPA-DC pilot plant. One effect of this decision to change processes was that additional sludge handling capacity was required. The District requested an "increase in scope" to accommodate the additional sludge processing equipment on April 20, 1972. This request was subsequently conditionally approved on November 3, 1972, and accepted by the applicant on November 7, 1972, The approval condition is shown below.

"On behalf of the Government of the District of Columbia, I hereby accept the increase in Federal assistance in the amount of $4,538,990, provided under the Federal Water Pollution Control Act, as amended, for construction of the sewage treatment facilities project designated C-11-23, and reaffirm all of the assurances applicable to the former grant offer in connection with this project. In addition, the increase in project scope and grant is further subject to completion of a review required by the National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. The District hereby agrees to furnish information and otherwise cooperate with EPA regional office staff in the NEPA evaluation and further agrees that no additional costs or obligations for incineration equipment will be incurred unless and until the Regional Administrator notifies the District in writing that the NEPA review has been satisfactorily completed. The Regional Administrator may annul this increase if he determines as a result of the NEPA review, that the project for which this grant has been awarded is environmentally unsound."

On April 19, 1973, a highly technical and very serious critique of the proposed incinerators was submitted to the Regional Office by the Natural Resources Defense Council, Inc. The commenting period for the draft statement was held open until the questions raised by NRDC could be resolved. The Regional Office called on air pollution experts at EPA's National Environmental Research Center (NERC) in Research Triangle Park, North Carolina, to study the health aspects of the incinerator emissions.

In June 1973 the NERC produced a report entitled "Evaluation of Potential Mercury and Beryllium Emissions from Proposed Sludge Incinerators to be Located at the Blue Plains Waste Treatment Facility in Washington, D. C." which found that while the mercury and beryllium emissions "should not constitute a threat to public health in the vicinity of the sewage treatment plant" that there is a "lack of specific information concerning the composition of the sludge and the fate of materials processed in sludge incinerators". Clearly,

the Regional Office needs more information before it can allow the District to proceed with the incineration equipment contract. However, it is also clear that the longer construction of advanced wastewater treatment units is deferred, the longer marginally treated wastewater effluents from Blue Plains will continue to undermine attempts to achieve compliance with water quality standards for the Upper Potomac Estuary. Therefore, the following strategy has been developed and adopted as the Region's response to this dilemma. We will continue to award grant support for those AWT units which are not yet funded while continuing to defer approval on the incinerator units until firmer conclusions concerning the effect of incinerator emissions can be reached.

The District has recently requested an award of grant support for the construction contracts listed below.

Contract Title	Estimated Amount
Denitrification Reactors	$26,200,000
Denitrification Sedimentation	27,100,000
Multi-Media Filters	13,000,000
Additions to Pump Station No. 2	4,000,000

The three large contracts are expected to require 33 months for execution. Also, they are scheduled to be awarded in a staged fashion, that is, they are interdependent and cannot all begin at once. Another aspect is that experience has shown an interval of four to six months is required to advertise for bids, open and evaluate the bids, and to award the contracts. This bidding process cannot begin until after the award of grant support has been made. An examination of the overall project timetable clearly shows that if the schedule set forth in the draft NPDES permit (see Appendix b) is to be met, grant support must be made available for these four contracts before the end of June.

Once the contracts discussed above have been funded, there will be only one major contract not funded. The final contract provides for advanced wastewater treatment instrumentation and it is estimated to include $9,000,000 worth of work. The contract is presently in the design stage and the design work is scheduled for completion by January 1975. There are also several minor contracts which are not yet funded. These contracts include such work as landscaping, final paving, additions to the supply building, etc.

One predictable consequence of the funding program described in the above paragraphs is that as these AWT units are constructed and become operational, quantities of sludge produced by the plant will increase. Since sludge disposal at Blue Plains is already a volatile subject, would not the additional sludge produced by the denitrification and filtration facilities aggravate an already chronic problem? One way of answering this question is with figures taken from a table entitled "sludge quantities" which was published

in a paper[1] developed by the design engineers. The figures are shown below and the table's format has been modified to differentiate between funded and unfunded contracts.

	Source	Quantity (1,000#/day, dry basis)
Funded Contracts	Primary	359
	Secondary (includes first step phosphorus removal)	395
	Nitrification	38
Unfunded Contracts		
	Denitrification (includes second step phosphorus removal)	31
	Filtration	39
	Total	862

Thus, the unfunded contracts provide facilities which produce only 8% ($\frac{70}{862}$) of the total sludge - a relatively slight increase.

While the calculations and conclusions presented above are correct, a much more positive approach would involve facing up to the sludge disposal problem and that is what the Regional Office plans to do. During meetings with officials of the District's Department of Environmental Services, it was agreed that this Agency would assume the responsibility for further investigating the health aspects of the incinerator emissions since the results of the investigation would probably have nationwide ramifications. The District officials in turn agreed to investigate alternatives to incineration and the following paragraphs describe those alternatives which are being given serious consideration.

1. Flash Drying - Fortifying

The District, Maryland Environmental Service, and Organic Recycling, Inc. are parties to an agreement which provides for Organic Recycling, Inc. to build and operate a patented flash dryer demonstration facility at Blue Plains. The Maryland Environmental Service and the District will

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1. Design of advanced wastewater treatment facilities for District of Columbia Blue Plains Water Pollution Control Plant. George K. Tozer and Donald E. Schwinn, Metcalf & Eddy, Inc., Boston, Mass. October, 1973.

pay Organic Recycling, Inc. a treatment charge for each ton of sludge the facility processes. Organic Recycling, Inc. expects this fee plus revenues derived from sale of the end product will enable the venture to return a profit.

The heart of Organic Recycling's process is a high rate toroidal (doughnut) shaped flash dryer whose configuration causes combustion turbulances to selectively classify sludge particles and to allow the dried sludge fraction to leave the dryer. As the dried sludge is removed, it can be enriched with controlled amounts of nitrogen, potassium, and phosphorous so that the end product is a well balanced fertilizer which would appeal to gardeners and nurserymen..

The demonstration unit began operation early in April and will be run on a "shakedown" basis for a few weeks prior to full scale operation. When operating at peak capacity the unit is expected to convert 240 wet tons/day of either raw or digested sludge into approximately 60 tons/day of fortified organic fertilizer. While the manufacturer reports that the flash dryer has been used for a number of years in industrial applications with materials similar to sewage sludge, it must be kept in mind that this unit is involved in a demonstration project and cannot be adopted on a large scale until it has demonstrated conclusively its environmental, technical, and economic feasability.

Should the demonstration project yield favorable results, an appropriate number of flash dryer units could be installed in the solids processing building in lieu of incinerators. A portion of the fuel requirements for the dryers could be satisfied by utilizing the methane gas produced by the existing anaerobic digesters. It is likely that the service agreements described above would be revised to provide for outright purchase of the equipment.

2. Construct proposed incinerators and operate as dryers.

This particular alternative involves proceeding with the constructing of the multiple hearth incinerator units as described in the draft Impact Statement and operating them as sludge dryers rather than incinerators. The furnace designer reports this change could be accomplished by redirecting the flow of air through the incinerator units so that air flow is concurrent with sludge flow rather than countercurrent. This redirection could be accomplished by repositioning components of the air supply ductwork and furnace hearth systems.

If the dryer mode of operation were adopted, the product would be approximately 850 tons/day of sludge dried to 50% moisture content. Theoretically, this product could be fortified and used as a fertilizer just as the product from the flash dryer system that was previously described can be converted to a fertilizer. One further advantage of this alternative is that a reduction in certain air pollutants is to be expected. While detailed calculations concerning the expected reductions are not yet available, it is logical to assume that the emissions

attributable to the combustion of sludge will be eliminated, while those attributable to the combustion of fuel will remain. Finally, since this alternative requires the same facilities that would be required for incineration, no significant change in project financing, scheduling, costs, etc. would be required.

The fuel requirements for this mode of operation are about the same as for incineration and are reported to be 15,700,000 gallons of oil per year. This figure is the result of a statistical analysis of sludge flow and fuel requirements conducted by the furnace designer and is lower than originally reported in the draft statement.

3. Composting

On March 30, 1973, a full scale trial of the feasibility of composting Blue Plains sludge by the Windrow Method was begun at a site near Beltsville, Maryland. The project was sponsored jointly by the U. S. Department of Agriculture's Agricultural Research Service and the Maryland Environmental Service (MES). USDA provided land for the composting operation and scientific supports while MES designed, constructed, and operates the project.

The sludge was hauled from Blue Plains in enclosed concrete trucks and mixed with wood chips at the compositing site. The wood chips were added as a bulking agent to improve air flow to the aerobic microorganisms which convert the sludge to compost. This biological reaction also produces heat which elevates the temperature in the compost windrow to a point which destroys most pathogenic (Disease causing) organisms. After several weeks in the composting windrow, the mixture of compost and wood chips is screened and the compost is cured for at least 30 days in a storage pile. The cured compost is then ready for incorporation into soil where it acts to improve aeration, water retention, and other soil characteristics in addition to serving as a low grade fertilizer.

While operation of the composting program has produced generally favorable results, one period marked by odor complaints from neighbors is said to have occurred during a interval in which the type of sludge which was composted was switched from digested sludge to raw sludge. This problem deserves further attention since Blue Plains lacks both digester capacity and the land on which to build additional digester capacity should it turn out that only digested sludges can be composted. Other aspects deserving further consideration are enclosing the operation to improve wet weather performance and the development of a controlled aeration system.

One of the most obvious advantages of this alternative is that its energy requirements are substantially below those of the alternatives previously considered. At present, much of the energy input is used to move the sludge from Blue Plains to the Beltsville site. This input could be reduced by locating the composting site in the vicinity of Blue Plains. However, no such site is presently available.

4. Land Disposal and Reclamation

The District is presently disposing of the bulk of the sludge generated at Blue Plains by trucking it to a location in Montgomery County and depositing it in trenches dug for that purpose. The trenching technique is primarily a disposal method while the previous alternatives are designed to produce a useful end product.

Another alternative that has been pursued on a limited scale involves spreading the sludge on farmland. This method holds promise for reclaiming marginal land but care must be exercised to avoid contamination of groundwater and nearby streams. This Agency is presently working to develop policy which will govern loadings and permissible toxic metal concentrations for sludges disposed of on land. While the policy is still in the formative stage, it is clear at this point that some form of stabilization such as digestion will be a required prerequisite for application on the land. It will be difficult to assess the applicability of this method as a long-term solution until Agency policy in this field is firmly established.

5. Incineration

For the sake of completeness, we are pointing out the obvious fact that one alternative open to the District would be to proceed with incineration as described in the draft statement. Should the EPA studies previously mentioned find that incineration can be practiced without danger to the public health, this may well be the soundest course of action.

Summary

Each of the alternatives listed on the above pages has advantages and drawbacks associated with its implementation. At this point in time it cannot be demonstrated that any one alternative is clearly superior to the others although incineration appears to have the advantage of a long history of reliable operation. Six months from now this situation should be reversed. The Organic Recycling, Inc. flash dryer will have accumulated nearly six months of operating records that will be available for analysis. EPA studies on the effects of sludge incineration on public health should at least be advanced to the stage where some conclusions are possible. Agency guidance on the subject of land disposal and reclamation with sewage sludges should be available. Six months from now it will be necessary to decide which alternative will be adopted since some of the alternatives have not construction times. Therefore, this office plans to release a supplement to this statement in approximately six months. The supplement will report on recent developments connected with each of the sludge disposal alternatives, point to the alternative selected for implementation at Blue Plains, and present a discussion of the consequences of that selection.

Final
Environmental Impact Statement
(P.L. 91-190)
District of Columbia Water Pollution Control Plant
(Expansion and Upgrading)

I. INTRODUCTION

A. General Background

The primary cause of pollution in the upper Potomac estuary is municipal wastewater discharges. This includes raw sewage released from overloaded sewer systems, sewage treatment plant effluents, combined sewer overflows, and storm water. A listing of prior District of Columbia sewerage systems and a detailed description of existing water pollution control facilities is presented in Appendix F of the draft statement. The amount of water used for industrial processes is insignificant. Industrial use consists primarily of cooling water used in power generation facilities.

Applications have been received from the States of Maryland and Virginia and from Washington, D. C., for Federal construction grant funds to expand and upgrade the Blue Plains sewage treatment facility. In order to evaluate the environmental impact of the proposed treatment facility it is necessary to define the problem and determine the sphere of influence of the treatment facility. The sphere of influence includes the air affected by emissions from the sludge incinerator, the reaches of the Potomac estuary affected by the effluent discharge, and the service area contributing wastewater to the Blue Plains facility.

The Blue Plains treatment plant is a regional facility; i.e., its service area is not limited by governmental boundaries. While it is owned and operated by the District of Columbia, it treats wastewater from portions of Prince Georges and Montgomery Counties, Maryland; wastewater from portions of Loudoun, Arlington, and Fairfax Counties, Virginia; and wastewater from the Washington, D. C. area. Currently the Blue Plains plant is treating between 75 and 80 percent of the total domestic wastewater generated in the Washington Metropolitan area.

The breakdown of the existing flow of approximately 295 million gallons per day (mgd) is as follows:

Washington Suburban Sanitary Commission (Prince Georges and Montgomery Counties, Md.)	135 mgd
District of Columbia	143 mgd
Potomac Interceptor	10 mgd
Pimmit Run Interceptor (Fairfax County, Va.)	7 mgd

The Potomac River, from its headwaters on the eastern slope of the Appalachian Mountains to the Fall Line above Washington, D. C. is a freshwater river. Below the Fall Line the Potomac is tidal for approximately 114 miles to the Chesapeake Bay. Throughout this impact statement the tidal portion of the Potomac River will be referred to as the Potomac estuary.

While this impact statement is primarily concerned with the Blue Plains sewage treatment facility, the discharge from the facility is an integral part of the total water quality management plan which must be developed for the Potomac River Basin.

In June 1967 pursuant to the provisions of the Water Quality Act of 1965, the District of Columbia adopted water quality standards for its interstate waters. The water quality standards consist of (1) planned water uses; (2) quality criteria designed to protect those uses; and (3) a plan for implementation and enforcement of the criteria. These standards were submitted to the Secretary of the Interior on June 29, 1967. The Secretary gave his full approval in January 1969, thus making the District of Columbia's water quality standards Federal standards.

The stated purpose of the District's standards is primarily intended to provide improved recreational opportunities as a result of water quality improvement. With the exception of the criteria related to water contact recreation (swimming, etc.), water quality objectives were to be realized in 1972. Water quality to permit contact recreation was planned for 1975 in limited zones of the Potomac River and Rock Creek.

Dissatisfied with pollution control progress, the Secretary of the Interior reconvened the third session of the conference on the Matter of Pollution of the Interstate Waters of the Potomac River and its tributaries in the Washington Metropolitan area (Potomac Enforcement Conference) in April 1969. The conferees represented the water pollution control agencies of Maryland, Virginia, and the District of Columbia; the Interstate Commission on the Potomac River Basin; and the Department of the Interior - Federal Water Quality Administration (now part of the Environmental Protection Agency).

The Conference resulted in the issuance of 15 recommendations to enhance water quality of the Potomac estuary. The most significant recommendation called for construction of advanced waste treatment facilities.

In accordance with conference recommendations, the District proceeded to implement its phased developed plan for the Blue Plains site. This was to include reclamation of 51 acres of

Potomac River mud flats for plant expansion to 419 mgd, the expected flow for the year 2000. However, subsequent Department of the Interior opposition to the reclamation proposal made approval by the Federal Government unlikely. As a result, it was necessary to abandon plans for full expansion of the plant to 419 mgd.

In recognition of this impasse, the conferees reached a compromise set forth in a "Memorandum of Understanding" completed on October 7, 1970 (see Appendix G of draft statement. The Memorandum called for the development of the Blue Plains site to provide advanced waste treatment for 309 mgd by the end of 1977 and it recognized that an alternate regional plant (or plants) would be needed to treat flows above the 309 mgd limit. Thus the size of Blue Plains was limited by physical constraints rather than by the normal procedures of designing for a population projection in the service area.

The "Memorandum of Understanding" agreed to an expansion of Blue Plains to 309 mgd with the following breakdown of flows:

Washington Suburban Sanitary Commission (Prince Georges and Montgomery Counties, Md.)	148 mgd
District of Columbia	135 mgd
Potomac Interceptor	18 mgd
Pimmit Run Interceptor (Fairfax County, Va.)	8 mgd
	309 mgd

As a result of the subsequent request from the Secretary of the Interior, the District of Columbia agreed to advance the completion date of the Blue Plains treatment plant improvements to December 1974 provided certain conditions were met, including the availability of adequate Federal assistance in the form of construction grants. This deadline will not be met, however, and completion is again predicted for late 1977. For details concerning the treatment plant completion schedule, please see the draft NPDES permit reproduced as Appendix b of this document.

B. Existing and Proposed Studies

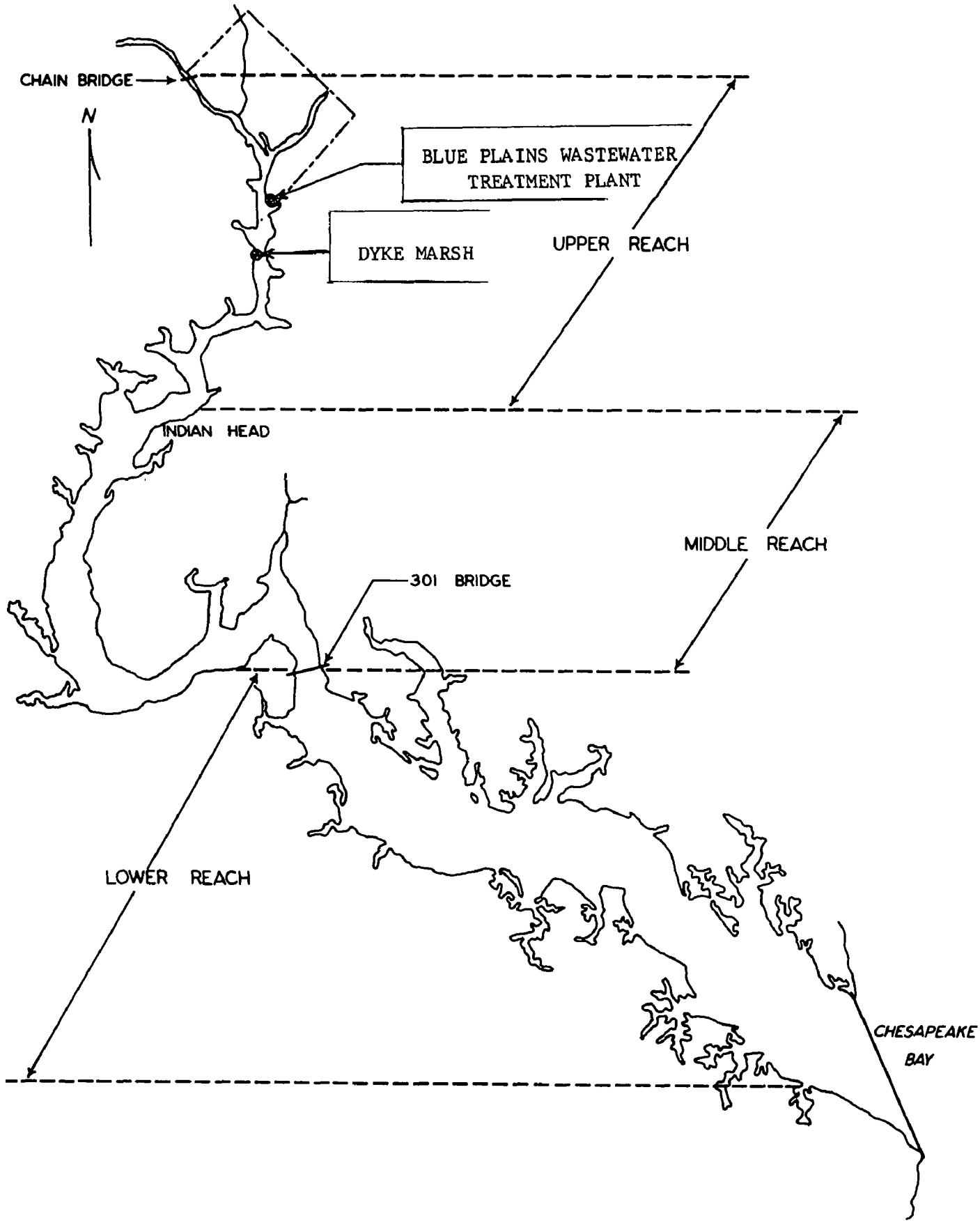
1. Water Quality and Water Supply

In November 1969 a technical advisory committee was established to determine the studies required to evaluate water quality management needs of the upper Potomac Estuary. In addition, the Assistant Secretary of the Interior requested a study of the water supply potential of the upper Potomac Estuary. Thus, a detailed water quality - water resources study of the Potomac Estuary was undertaken by the Chesapeake Technical Support Laboratory. In April 1971, a study, Water Resources - Water Supply Study of the Potomac Estuary, Technical Report 35, was completed by the Chesapeake Technical Support Laboratory, Environmental Protection Agency, to provide technical information for the Potomac River Enforcement Conference. A synopsis of TR-35 is enclosed as Appendix E of the draft Environmental Impact Statement.

For purposes of Conference discussion and investigation, the Potomac Estuary was divided into three zones (1) upper zone - beginning at Chain Bridge and extending southward to well below Indian Head, Maryland; (2) middle zone - Indian Head to U. S. Route 301 Bridge; and (3) lower zone - U. S. Route 301 Bridge to Chesapeake Bay. (Please see Figure III-1 which follows this page. This figure has been reproduced from TR-35 and modified to show the location of the Blue Plains Wastewater Treatment Plant and Dyke Marsh.)

The study included: (1) an evaluation of pollution sources including nutrients; (2) the development and refinement of mathematical models to predict the effects of the various pollutants on water quality; (3) the projection of water supply needs and wastewater loadings; (4) an evaluation of the estuary as a potential water supply source; (5) the determination of the maximum pound loadings by zone for the various pollutants under various flow conditions; (6) an investigation of alternative waste treatment plans; and (7) an estimate of the cost of achieving wastewater quality standards.

To evaluate the effects of effluent discharge locations on the water quality of the upper Potomac Estuary, the Water Resource - Water Supply Study of the Potomac Estuary investigated three basic alternative treatment systems. Two of the three alternatives assumed that expansion at Blue Plains is not restricted. However, this has since proved impractical because of the physical constraints and ecological considerations at the Blue Plains location. The third option, Alternative III, is similar to the proposals expressed in the "Memorandum of Understanding" in that Blue Plains was limited to a maximum capacity of 309 mgd. Additionally, it was assumed the appropriate parties would provide another regional plant or plants to accommodate the projected increases in wastewater.



POTOMAC RIVER TIDAL SYSTEM

FIGURE III - 1

For the study purposes, it was assumed that increased wastewater volumes would be treated at one or more of three proposed locations: Upper Potomac (near Chain Bridge), Anacostia River above the D. C. line and the existing Piscataway Treatment Plant. Whether increased flows are treated at these locations or other locations is not important. The important fact is that the increased volumes will occur in the vicinity of the proposed locations and the treated effluent discharged into the Potomac Estuary.

Water quality simulations for establishing zonal pollution loadings were made using the Dynamic Estuary Model developed by Federal Water Quality Administration personnel and future wastewater loadings formulated from the COG population projections.(a) The maximum allowable ultimate oxygen demand (UOD)loadings determined for the upper Potomac Estuary were derived using the following criteria:

Temperature	29°C. (Centigrade scale)
Freshwater inflow to estuary after water supply diversion.	300 cfs (cubic feet per second)
Dissolved Oxygen (DO) in the treated effluent.	6 milligrams per liter (mg/l)
Dissolved Oxygen standard for receiving water, average.	5 mg/l

Simulation of phosphorus (P) discharged into the Potomac Estuary was made using a mathematical model with second-order reaction kinetics. Allowable phosphorus loadings in pounds per day were determined using the following criteria:

Average freshwater flow into estuary after water supply diversion.	300 cfs
Average maximum phosphorous in upper reach from Chain Bridge, Washington, D. C. to Indian Head, Md.	0.067 mg/l
Average maximum phosphorous below Indian Head, Md. for algal control.	0.03 mg/l

(a) The Metropolitan Washington Council of Governments (COG) is a Federally-approved areawide planning organization for the Washington Metropolitan Area. It is responsible for coordinating the Office of Management and Budget's (OMB) A-95 review procedures in the Metropolitan Area.

Inorganic nitrogen was simulated using a mathematical model which has been verified based on observed data. Allowable nitrogen loadings in pounds per day were determined using the following criteria:

Average freshwater flow into estuary after water supply diversion.	300 cfs
Average maximum inorganic nitrogen in upper reach from Chain Bridge to Broad Creek.	0.5 mg/l
Average maximum inorganic nitrogen in upper reach from Broad Creek to Indian Head.	0.4 mg/l
Average maximum inorganic nitrogen in upper reach from Indian Head to Smith Point.	0.3 mg/l

To facilitate the determination of wastewater loadings and water supply requirements for the Metropolitan Area, population projections were distributed over 13 service areas using 1960-1970 population trends with consideration given to land use potential and other attenuating factors.

Utilizing the population projections and waste flows at existing treatment facilities, future wastewater trends were developed for the 13 service area in the Washington Metropolitan Area. Wastewater flows are summarized below:

Year	Washington Metropolitan Area Flow (mgd)	Washington, D. C. Flow (mgd)
1970	325	252 *
1980	473	140
2000	861	160
2020	1,342	180

Since the District's allocation according to the "Memorandum of Understanding" is limited to 135 mgd, it is evident that provisions will have to be made for additional capacity at another location. The need for another regional facility (or facilities) has been recognized in the "Memorandum of Understanding". Recent plans envision relief treatment plants in Montgomery County, Maryland and near the existing Piscataway Treatment Plant.

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* The wastewater flows shown for the District of Columbia for the year 1970 represent the total flow to Blue Plains which includes flow from Maryland and Virginia as well as the District proper. Flows for 1980, 2000, and 2020 reflect wastewater from the District only.

The major source of freshwater inflow into the Potomac Estuary is from the upper Potomac River Basin. In water resource management, low flow frequencies are used to determine assimilation and transport capacities of receiving waters. The 7-day low flow with a recurrence interval of once in 10 years (7-10 low flow) is the standard used by Maryland, Virginia, and the District of Columbia to determine assimilative capacity for water quality aspects. For the Potomac at Washington, the 7-10 low flow is 954 cubic feet per second (cfs) or 616 mgd. Water Resource - Water Supply Study of the Potomac Estuary takes into consideration the fact that the need for water supply is projected to use all of the river flow during critical flow conditions; therefore, a water quality management design flow of 300 cfs was used in determining the assimilative capacity of the upper Potomac Estuary. It is stated in the report that a minimum flow of 300 cfs will maintain an ecological balance and preserve aesthetic appearance in critical stream reaches during low flow periods. This design flow is used throughout the report and in all discussions within this environmental impact statement.

Water supply demands and per capita usage were obtained from the major water suppliers in the metropolitan area and used as a baseline for the water supply projections. Total projected water requirements for the Washinton Metropolitan Area are listed below:

Year	Water Demand mgd (yearly average)
1969	370
1980	556
2000	1,009
2020	1,568

In addition to existing sources of water supply, it appears that the District of Columbia's water supply and a major part of the water supply for the Metropolitan Area in Maryland and Virginia must come from the Potomac River. The water quality design flow (7-10 low flow) for the Potomac at Washington, D. C. is 616 mgd; therefore, it can readily be seen that the water supply requirement in 1980 is about equal to the critical 7 day low flow. Additional provisions for water supply must be undertaken.

The estuary can be used as a supplementary water supply source if wastewater discharges and water supply withdrawals are adequately treated. In addition to the EPA work on water quality, close cooperation was maintained with the U. S. Army Corps of Engineers who were investigating water supply potential of the upper Potomac Estuary as part of their Northeast Water Supply Study (NEWS) for the Washington Metropolitan Area.

House Document 91-343 (Potomac River Basin Report) prepared by the U. S. Army Corps of Engineers evaluated the total water resources of the Potomac River Basin including water supply requirements to the year 2010.

The Federal Water Pollution Control Act Amendments of 1972, and implementing regulations, provide a sound basis for developing water strategies that are aimed at assessing the situations, monitoring to continually keep abreast of water quality, establishing of a planning process to eliminate sources of pollution, implementation of actions to physically abate pollution sources, establishment of a legal framework through the National Pollutant Discharge Elimination System, and enforcement actions upon violation of the NPDES permit.

The water quality situation in the Potomac estuary has been extensively studied and is well documented in other papers. In addition to the Potomac River Enforcement Conference Proceedings, the "Memorandum of Understanding", and Technical Report 35, there have been several recent developments armed at fulfilling both the requirements of the 1972 Amendments and the needs of the Washington Metropolitan Area.

In 1973 Maryland Environmental Services completed a draft, Potomac-Metropolitan Area Basin Water Quality Management Plan in accordance with Section 303(c) of the Federal Water Pollution Control Act Amendments of 1972. This plan provides for a sewage treatment plant in Montgomery County which will relieve Blue Plains of some of the sewage generated in that area. The plan also provides for expansion of the Pisctaway sewage treatment plant and an interceptor from Blue Plains to Piscataway so that flows in excess of 309 mgd can be shunted to Piscataway for treatment. Through the concept of a three plant operation the problems of overloading of Blue Plains will be eliminated. Also, the increased degree of treatment proposed at Blue Plains will insure that this facility will meet the effluent limitations imposed upon it by the Potomac River Enforcement Conference.

TR-35 notes that the water quality in the estuary is also significantly affected by the quality of the water entering the estuary, especially from the mainstream of the Potomac River. An additional safeguard to the water quality of the estuary can be attained if the concentration of background nutrients entering the estuary is reduced. Provisions for analyzing the upper Potomac water quality are being made through the development of waste load allocations for point discharges in the free flowing portion of the Potomac River and its estuaries. Monitoring systems are being planned which will enable toe states to keep abreast of conditions that affect the quality of water in the area and assist in analyzing non-point pollution source.

The Corps of Engineers is currently proposing construction of an Emergency Pumping Station in the Potomac Estuary to bolster the short-term water supply reliability in the Washington Metropolitan Area. EPA commented on an Environmental Impact Statement developed by the Corps for this facility and recommended further investigation of this proposal.

The State of Virginia is currently studying the Loudoun County Area for the feasibility of constructing a regional sewage treatment facility. The ramifications of this study are that increased flows to Blue Plains may not be a reality if this facility comes into existence.

A discharge permit for the Blue Plains facility is currently being processed by this agency and should be issued in the near future. A draft permit has been circulated, public hearings have been held, and comments are now being reviewed for inclusion in the final permit. The proposed permit establishes schedules that provide for staged improvements in effluent quality. These schedules will supersede part of the Water Quality Standards Implementation Plan. The proposed permit is included into this statement as Appendix b.

C. Land Use and Population Projections

As previously stated, the Metropolitan Washington Council of Governments (COG) is the official metropolitan planning body for the Washington Metropolitan area. As the metropolitan planning agency, COG must direct its efforts to the metropolitan scale; however, coordination of all local planning efforts must be assured. In this effort COG works with local planning agencies to establish areawide policies for orderly development and use of land resources.

The majority of the land area served by the Blue Plains plant is considered to be a developed area rather than a growing one. Loading limitations established in the "Memorandum of Understanding" have essentially limited the Blue Plains service area to the developed area currently sewered. Developing areas outside the current Blue Plains service area will be required to use other wastewater treatment facilities.

COG has projected growth of new communities along urban corridors radiating out from the District of Columbia. Rural areas on the fringe of the metropolitan area are presently capable of sustaining further urbanization. This development will require additional regional facilities which will be substantially distant to Blue Plains.

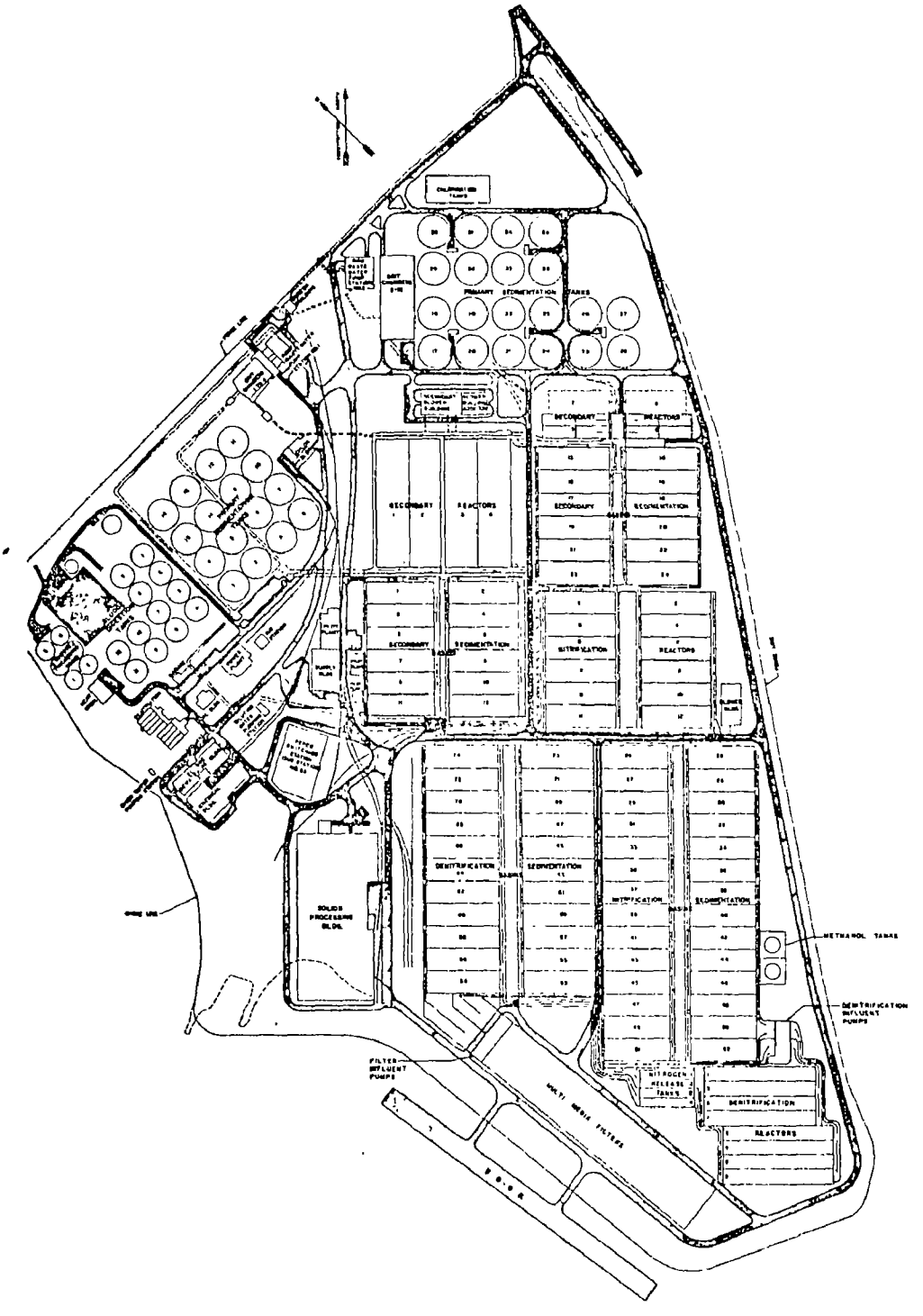
As noted earlier, population projections used in the Water Resource - Water Supply Study of the Potomac Estuary were furnished by COG.* These projections were derived by use of the COG's EMPIRIC Activity Allocation Model. This model consists of a set of simultaneous linear equations that relate changes over time in the distribution of regional population and employment to their original distributions at some base year, their regionwide growth over the forecast period, and the effects of public policy and investment decisions.

The base year information was compiled for COG by Hammer, Green, Siler Associates (HGS). Although local population projections were considered in the development of this information, it was noted that none of these forecasts were mutually acceptable by other agencies. Therefore, HGC Associates made an economic base study for their projections.

The total population projections for the Virginia and Maryland portions of the metropolitan area and the District of Columbia are summarized below:

Year	Population
1969	2,800,000
1980	4,000,000
2000*	6,700,000*
2020*	9,300,000*

*Population projections for the year 2020 were developed by EPA-Region III rather than COG.



DISTRICT OF COLUMBIA
WATER POLLUTION CONTROL PLANT
PLANT LAYOUT

Figure I

II. DESCRIPTION OF THE PROPOSED ACTION

Proposed additional treatment units at the plant include a Raw Sewage Pumping Station, Aerated Grit Chambers, Primary Clarifiers, Aeration Basins, Secondary Clarifiers, Nitrification Reactor Tanks, Nitrification Sedimentation Tanks, Denitrification Reactor Tanks, Nitrogen Release Tanks, Denitrification Sedimentation Tanks, Effluent Pumps, Multimedia Filters, Chlorine Contact Channels and Effluent Conduits to the Potomac River. Sludge Processing Facilities include Flotation Thickening Tanks, Sludge Blending Tanks, Vacuum Filters and Multiple Hearth Incinerators (See Figure 1).

The proposed units, in conjunction with the existing facilities which will be retained, are designed to provide complete treatment for an annual average flow of 309 mgd. The units are designed to handle peak flows up to a rate of 650 mgd. In addition, flows between 650 mgd and 939 mgd will receive grit removal, primary sedimentation, and chlorination in the excess flow facilities before being discharged directly to the Potomac through the existing plant outfall. The excess flow facilities are designed to provide primary treatment for flows emanating during rainstorms from combined sewers in the District. These facilities are expected to be used approximately 400 hours per year. Flows in excess of 939 mgd will be stored within the sewer system until its capacity is exhausted and then bypassed to the Potomac and Anacostia Rivers at various upstream points. Bypassing would be expected approximately 240 hours per year during more intense storms. The draft version of the NPDES permit requires the District to operate the facility in such a manner which will minimize discharges of excessive pollutants and calls for the District to develop a monitoring program and to study abatement measures for the combined system overflows.

Design flows are normally expressed in terms of daily quantities, i.e., 309 mgd. Actual designs of Sewage Treatment Plants are based on the maximum rate that wastes may be expected to be received at a plant as the flow rates vary during the day. The flow rates may be stated in various units, such as cubic feet per second (cfs) or gallons per minute (gpm).

The following flow rates are equivalent:

Average Daily Flow	309 mgd	480 cfs	214,000 gpm
Peak Flow to Complete Treatment	650 mgd	1,000 cfs	450,000 gpm
Excess Flow	289 mgd	450 cfs	200,000 gpm
Total Flow	939 mgd	1,460 cfs	650,000 gpm

It may be interesting to note that a flow of 309 mgd would take approximately 3.8 seconds to fill an average-sized living room (12' x 18' x 8½').

The facilities are being constructed with the aid of EPA grant funds under several projects. Federal grants will total approximately $226 million of the estimated cost of $330 million. In addition to the EPA contribution, the District of Columbia will contribute $51 million, WSSC $26 million, the State of Maryland $25 million, Fairfax County, Virginia, $1.4 million, and the Commonwealth of Virginia $1.2 million. The D. C., Maryland and Virginia shares of the costs are allocated on the basis of capacity assigned in the "Memorandum of Understanding". (See Appendix G of draft statement).

Since the District can recover its capital investment for facilities to handle the flows from the Potomac Interceptor under existing agreements, these flows have been included as part of the District allocation of 153 mgd. Since the plant will provide treatment for wastes emanating from two states and the District of Columbia, the cost of Federal grant projects has been divided among the various state allocations. The projects and their current status is discussed below.

1. Raw Sewage Pumping and Conduits

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Paid
C-110020	$4,285,828	$1,854,440*	12/28/66	$1,854,440

*Eligible for an additional $288,470 under the reimbursable provisions of the FWPC Act.

Status: Construction Complete.

The project consisted of the construction of miscellaneous conduits and raw sewage pumping facilities.

Construction of the Pump Station commenced in November 1967 and was completed in September 1970. Construction of the conduits began in July 1967 and was completed in January 1969.

Final inspection of these facilities by EPA has been made. However, the pumping units cannot be operated until the primary treatment facilities being constructed under project C-110022, etc. (see below) are completed. The primary treatment facilities are to be complete by August 1, 1974.

2. Primary Treatment Facilities

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Payments
C-110022	$11,002,100	$6,051,150*	10/27/70	$4,320,300
C-240283	10,642,600	3,315,510*	11/6/70	2,242,100
C-510351	575,300	316,410	5/18/71	215,000

*Eligible for $2,537,920 under reimbursable provisions of FWPC Act.

Status: Under Construction.

The project consists of the construction of additional grit removal, primary sedimentation and disinfection facilities. Major components are twelve aerated grit chambers, twenty circular primary clarifiers, chlorine contact tanks and miscellaneous appurtenances. The construction contract for the primary sedimentation basins and grit removal facilities was awarded on May 6, 1971, and the work is nearly complete. It is expected that these facilities will be operational by August 1, 1974. The construction contract for additional sludge dewatering facilities was awarded on April 13, 1971, and the work is complete.

Plans and specifications for the chlorination facilities have not been submitted to EPA for review.

3. Solids Handling Facilities

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Payments
C-110023	$23,555,100	$12,955,300*	5/20/71	$3,423,200
C-240296	22,785,300	7,358,170*	5/20/71	1,944,000
C-510352	1,231,600	677,380	5/20/71	178,900

*Eligible to receive $5,173,740 under reimbursable provisions of FWPC Act.

Status: Under Construction.

Originally, the approved project consisted of the construction of eight flotation thickening tanks, four sludge blending tanks, twenty vacuum filters, six multiple hearth incinerators and miscellaneous appurtenances within the solids processing building. On that basis, grant support was awarded in May 1971 and the first construction contract, which provided for the foundations of the solids processing building, was signed in September 1971. The present status of the contract is that the work is essentially complete. Another contract, which provides for the solids processing building's superstructure, was awarded on September 20, 1972, and is presently approximately 85% complete.

On November 3, 1972, the scope of the project was increased to include 10 additional flotation thickening tanks, 10 additional vacuum filters, and two additional multiple hearth incinerators at an estimated cost of $11,618,000. These additional solids processing facilities were required as a consequence of the applicant's decision to adopt the biochemical treatment process instead of two-stage lime precipitation process. EPA approval of this increase in scope was expressly conditioned on the satisfactory completion of the NEPA process begun by the draft EIS and the applicant has been directed not to proceed with the incinerator unit contract until this Agency has completed its studies into the feasibility of incineration and provided the applicant with written notice to proceed.

The applicant has advised this Agency that design of the incinerator units is complete and that the plans and specifications for the contract will be delivered to the Regional Office early in May. The incinerator design will be reviewed with respect to its ability to satisfy recently adopted emission requirements and in light of public health issues surfaced during the NEPA review. The results of this review and the subsequent Agency decision on the incinerator contract will be made public in a "supplement" to this document.

4. Secondary Treatment Units

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Payments
C-110024	$18,569,900	$13,927,420	9/28/71	$3,578,400
C-240299	17,963,100	11,533,550*	10/7/71	2,953,800
C-510354	971,000	728,250	10/7/71	187,100

*Eligible to receive an additional $1,938,770.

Status: Under Construction.

The project consists of the construction of two aeration basins, twelve secondary sedimentation basins, additional aeration facilities, chemical feed facilities and miscellaneous plant modifications and appurtenances to increase secondary treatment capacity and to provide the initial step in phosphorus removal.

The construction contract for initial chemical feed facilities was awarded on February 29, 1972, and is complete. The contract which provides for alterations to the existing secondary treatment facilities is approximately 97% complete. The contract which provides the additional secondary treatment facilities is approximately 20% complete. A contract award to provide for primary treatment flow metering facilities was recently approved. A contract which provides instrumentation for primary and secondary treatment facilities is in the design stage.

The various facilities described above will provide secondary treatment and initial phosphorus removal and they are scheduled for completion by January 1, 1976.

5. Excavation, Dredging, Dock and Substation Work

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Payments
C-110026	$15,987,600	$8,793,180	7/28/71	$6,095,900
C-240297	15,465,200	8,505,860	8/24/71	5,415,600
C-510353	836,000	459,800	9/9/71	257,500

Status: Under Construction.

The approved project consists of dredging and construction of docking facilities, mass excavation, and the construction and purchase of substation facilities.

The dredging and dock construction contract for the amount of $4,376,175 was awarded on December 14, 1971, and is virtually complete. The excavation contract was awarded on February 24, 1972, and is essentially 100% complete. The substation work is underway and was reported to be approximately 40% complete in late 1973.

6. Nitrification and Chlorination

Project No.	Eligible Cost	Grant Amount	Date of Grant Offer	Grant Payments
C-110027	$47,151,200	$35,363,400	6/28/73	-0-
C-240309	45,610,400	34,207,800	6/29/73	-0-
C-510358	2,465,400	1,849,050	6/29/73	-0-

Status: Under Construction.

The project consists of construction of 12 nitrification reactors, 28 nitrification sedimentation basins, the foundation of the multimedia filter building (serves as chlorine contact tank), the secondary effluent conduit, chemical building, operations building, and landscaping. Contract awards for the secondary effluent conduit and the chemical building have been approved. Plans and specifications for the nitrification sedimentation tanks and the multimedia filter foundation have been reviewed and approved. The plans and specifications for the nitrification reactors and the operations building are under review in the Regional Office.

7. Denitrification and Filtration

	Project No.	Eligible Cost	Anticipated Grant Amount	Date of Grant Offer
	C-110028	$47,109,300	$35,331,970	not made
Md.	No.-not assigned	45,086,100	33,814,570	not made
Va.	No.-not assigned	2,437,100	1,827,820	not made

Status: C-110028 is under review in the Regional Office.

The project consists of the construction of thirty-six multimedia filters, eight denitrification reactors, four nitrogen release tanks, twenty-two denitrification sedimentation basins, AWT instrumentation, additions to the main pumping station and some additional minor work.

These facilities are the final major treatment units in the system and are scheduled for completion prior to January 1, 1978.

8. Miscellaneous Cleanup

A final project may be provided to cover cleanup operations and

TABLE 1

PROJECTED RESIDUAL POLLUTANTS FROM DCWPC PLANT AFTER VARIOUS STEPS IN THE PROCESS

(From EPA-D. C. Pilot Plant Results for Period July 1972-December 1972)

CHARACTERISTICS	SECONDARY SEDIMENTATION mg/l	NITRIFICATION SEDIMENTATION mg/l	DENITRIFICATION SEDIMENTATION mg/l	FINAL EFFLUENT mg/l	TOTAL LOADING TO POTOMAC AT 309 mgd lbs	STANDARD* lbs
BOD, 5 Day	20	12.8	9.0	2.65	6,829	12,700
Phosphorus, Total	1.5	0.8	0.5	0.18	463	560
Nitrogen, Org	2.7	0.6	1.4	0.74	1,906	--
NH_3	13.4	0.9	0.4	0.36	927	--
$NO_2 + NO_3$	0.1	12.0	0.4	0.30	772	--
Total Nitrogen	16.2	13.5	2.2	1.40	3,605	6,130
Suspended Solids**	20	15	15	3	7,730	18,100
pH				6.9 to 7.2		6.0 to 9.0
Fecal Coliform**				200/100 ml. (30 day aver.)		200/100 ml. (30 day aver.)

*NPDES Permit Requirements (See Appendix b).

**Predicted results for these parameters are not taken from pilot plant data.

other minor facilities not included in previous projects. If necessary, its maximum eligible cost may approach $30,555,700 with an EPA grant of up to $22,916,770.

The expanded facilities when completed are expected to reduce the pollutants in the wastewater to the residuals listed in Table 1.

Upon completion of expansion, the annual operation and maintenance costs are expected to approximate $24,046,000. Of this amount, $9,409,000 may be attributed to primary and secondary treatment and the remaining $14,637,000 to AWT facilities. These figures include the cost of sludge handling and disposal. Approximately 500 employees will be required to properly operate and maintain the facilities.

The existing facilities are operated by a staff of approximately 250 people. The average operation and maintenance cost for two recent years was approximately $4.5 million.

When the expanded facilities are fully operational, approximately 431 tons of sludge per day are expected to be generated. The tonnage mentioned is on a dry weight solids basis. Annual operation and maintenance costs for handling the sludge are expected to total $7,652,000 of which just under half ($3,737,000) is attributable to incineration costs.

During the plant's operational phase the following daily quantities of chemicals are expected to be used in the processes:

Phosphorus removal - Either 290 tons of alum or 145 tons of ferric chloride or a combination utilizing both of these chemicals.

Nitrogen removal - Approximately 86 tons of methanol, 58 tons of lime and 1.3 tons of polymer.

Disinfection and odor control - Approximately 30 tons of chlorine.

Interim Treatment - As required by Section 10 of the Memorandum of Understanding and the October 18, 1971, agreement with Fairfax County and WSSC (Appendix G of draft EIS), the District has provided interim treatment facilities which have reduced the BOD discharged to the Potomac to below 100,000 lbs per day during certain recent periods. Facilities to provide metal salt (alum or ferric chloride) addition to the existing secondary treatment units are operational.

Some of the sludge produced during the construction period is being disposed of by the Maryland Environmental Services at the Agricultural Research Center at Beltsville, Maryland, where it is being used in a research project to determine feasibility of sludge disposal by the composting method.

The District has contracted with a commercial firm to dry sludge on site for sale as a fertilizer. This operation is about to start up and has the potential, if successful, to alleviate the sludge disposal problems experienced at Blue Plains.

Finally, some of the process sludge is also being used to develop the agricultural potential of farmlands at various locations in Prince George's and Montgomery Counties, Maryland.

For more information on the subject of sludge disposal alternatives, please see the "Preface to the Final Statement" which is presented on the pages following the Table of Contents.

Other Projects Affected by the Plant Expansion and Upgrading

A. C-110012; POTOMAC FORCE MAIN from the Potomac Pumping Station at Theodore Roosevelt Bridge to Bolling AFB. The total eligible cost is $5,593,700 and the approved grant $600,000. Construction is complete and the facilities are operational . This is the last section necessary for full operation of the Potomac Pumping Station.

B. C-110018; UPPER POTOMAC INTERCEPTOR RELIEF SEWER (UPIR) between Foundry Branch and 31st Street in Georgetown. This is a continuation of the Potomac Interceptor which serves portions of Fairfax and Loudoun Counties, Virginia and Montgomery County, Maryland. Grants totaling $760,700 were initially approved on October 27, 1965 for a project having a current estimated eligible cost of $3,086,000. Construction contracts have been awarded on all sections of this project and the District recently reported that all the work is complete. Completion of this project resulted in closing of the "Georgetown Gap".

C. C-110019; POTOMAC OUTFALL SEWER from Bolling AFB to the Blue Plains site. The current grant of $758,740 was initially approved December 23, 1965, for a project having a current estimated eligible cost of $3,194,239. The project appears to qualify for a supplemental grant of $838,380 under the reimbursable provisions of PL-92-500. Construction is complete but the facilities will not be operated until the primary treatment units provided for under C-110022 are completed. The primary treatment units should be complete by August 1, 1974.

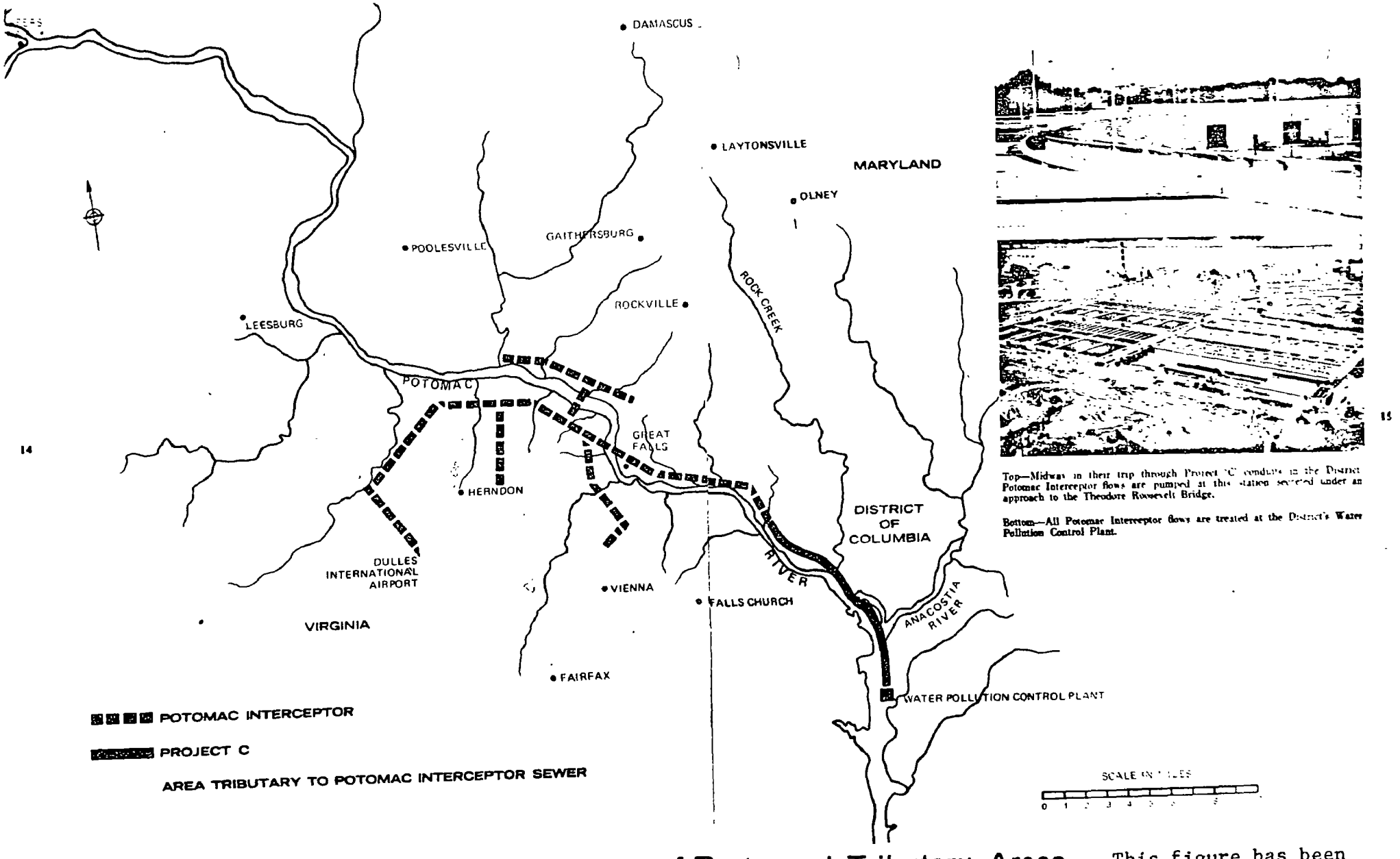
D. C-110025; PORTLAND STREET OUTFALL RELIEF SEWER between the Poplar Point Pump Station and the Potomac Outfall Relief Sewer. The grant offer of $2,506,020 was approved May 3, 1971, based on the District's share of the estimated eligible project cost of $4,556,400. This grant offer was subsequently withdrawn with the understanding that the project will be funded with FY '75 funds.

E. C-240219; WSSC (INDIAN CREEK, PAINT BRANCH AND LITTLE PAINT BRANCH) The project consists of approximately 39,285 lineal feet of intercepting sewer.

Initial Population	4,360
Design Population (year 2000)	47,200
Eligible Project Cost	$1,099,000
Grant Amount	$ 414,610
Date of Grant Offer	February 10, 1969

Status: Under construction - approximately 80% complete

F. C-240209; WSSC (ROCK CREEK - ROCKVILLE INTERCEPTOR) The project consists of approximately 4,700 lineal feet of intercepting sewer to serve the northeast section of Rockville. The project will allow the abandonment of existing inadequate facilities which are presently connected to the Cabin John System.



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Top—Midway in their trip through Project 'C' conduits in the District Potomac Intereceptor flows are pumped at this station secured under an approach to the Theodore Roosevelt Bridge.

Bottom—All Potomac Intereceptor flows are treated at the District's Water Pollution Control Plant.

The Potomac Interceptor General Plan of Route and Tributary Areas

This figure has been reproduced from a booklet entitled The Potomac Interceptor-Symbol of Metropolitan Cooperation published by the District of Columbia in 1968.

Initial Population	6,250
Design Population	19,700
Eligible Project Cost	$201,500
Grant Amount	$ 20,800
Date of Grant Offer	April 12, 1968

Status: Project is complete but final inspection has not been conducted.

G. C-510240; HERNDON, VIRGINIA
Interceptor sewers along Sugarland Run and Folly Lick Branch which connect to the Fairfax County system and thence to the Potomac Interceptor sewer.

Initial Population	5,000
Design Population (year 2000)	30,000
Eligible Project Cost	$781,400
Grant Amount	$257,850
Date of Grant Offer	July 24, 1967

Status: Project is complete but final inpsection has not been conducted.

Grant Applications

In the draft Environmental Impact Statement, four grant applications were described at this point. They were numbered as shown below.

1. WPC-Md-239 WSSC - Holly Springs
2. WPC-Md-240 WSSC - Northeast Branch and Sligo Creek Relief sewers
3. WPC-Md-276 WSSC - Cabin John Creek
4. WPC-Md-249 Rockville

Each of these grant applications has been returned to the Maryland Department of Health and Mental Hygiene since the projects were not entered on the Maryland priority list.

One further Change in the situation with respect to grant applications is that the Regional Office recently received and has begun reviewing an application for the first section of the Anacostia Forcemain project. Addition information on that project is shown below.

A. C-240231-01 WSSC - Anacostia Forcemain
The project consists of the construction of approximately 21,000 l.f. of 108" dia. pressure sewer from the vicinity of Peace Cross along the East Side on the Anacostia River to a point south of the Pennsylvania Railroad Bridge over the Anacostia. The project is the first of a series of projects that will result in Anacostia Basin sewage flows being conveyed to Piscataway for treatment.

Initial population to be served	550,000
Design population	1,600,000
Estimated eligible project cost	$10,485,000
Estimated eligible Grant Amount	$ 7,863,750

III. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

A. Water Resources & Water Quality

The Potomac Estuary is saline in the lower reach, brackish in the middle reach, and fresh in the upper reach near Washington. Variations in salinity and nutrient enrichment from wastewater discharges have a pronounced effect on the biota of the estuary. Historical plant life successions in the upper Potomac Estuary can be inferred from several studies as noted in the Water Resource - Water Supply Study of the Potomac Estuary. Of considerable significance is documentation indicating that in 1952, vegetation in the reaches near the Washington Metropolitan Area was virtually non-existent. In 1958 rooted aquatic plants and blooms of the blue-green algae were reported in the upper Potomac Estuary. Massive blue-green algal blooms, which are associated with large phosphorus and nitrogen loading increases, have persisted since the early 1960's. This problem is primarily attributable, on a proportional basis, to present inadequately-treated sanitary discharges from Blue Plains and other treatment plants in the area.

Biological observations during previous years indicate a succession of more-dominant aquatic species as nutrient discharges increase. During the summer season large populations of blue-green algae are prevalent in the freshwater portion of the Estuary. The blue-green algae are not readily used by the higher trophic forms and are often considered to be a "dead end" of the normal food chain. As the algae respire, an additional demand is placed on the dissolved oxygen in the Estuary, thus reducing the assimilative capacity of the Estuary during critical flow and temperature periods.

Mathematical model simulation of the dissolved oxygen budget for the carbonaceous, nitrogenous, benthic, and algal oxygen demands indicate that the nitrogenous demand is the greatest single cause of dissolved oxygen deficit in the critical reach which includes the major wastewater discharges and that algal growths exert the greatest demand on dissolved oxygen from Piscataway to Indian Head, Maryland. The nutrient enrichment and resultant eutrophication is primarily due to treatment plant discharges supplemented to some extent by loading attributable to non point sources. The most practical control measure is to reduce the level of nutrients discharged from the concentrated point sources. Control of algal standing crops will thus control the dissolved oxygen resources in the Estuary for assimilation of the feasible minimum treated waste discharges. It will also restrict the nuisance aquatic growths which create objectionable odors and aesthetic problems in the Upper Estuary.

The upper reach of the Potomac Estuary received an approximate average of 365.9 mgd of domestic wastewater during December, 1973. It is estimated that the flow will increase to approximately 473 mgd by 1980.

The Blue Plains plant was receiving almost 80 percent of the total domestic wastewater flow in the Upper Estuary and by 1980, is projected to receive approximately 65 percent of the wastewater flow.

It is the opinion of this Agency that advanced wastewater treatment at Blue Plains will be essential in the enhancement of Potomac River water quality by reducing BOD_5[(a)], nitrogen, and phosphorous loadings in the effluent from the Blue Plains plant in the future.

Completion of the current expansion and upgrading of the Blue Plains facility will actually reduce the BOD_5, nitrogen, and phosophorus from approximately 145,500 lbs/day, 47,500 lbs/day, and 17,200 lbs/day[(b)] to less than 12,700 lbs/day, 6,130 lbs/day, and 560 lbs/day, respectively, as directed by the Potomac Enforcement Conference for the District of Columbia. (Please see draft NPDES permit in Appendix b of this text for a description of the scheduling and staging of this reduction in pollutant discharge.) This reduction will enhance the dissolved oxygen content in the Estuary by removing carbonaceous and nitrogenous oxygen demand and reducing nuisance algal growth drastically, reducing the ambient nutrient content. Thus, the project will have a beneficial impact on the aquatic environment of the Potomac Estuary.

The Potomac River is the major sources of water for the Washington Metropolitan Area. A review of the projected water supply requirements by the Metropolitan Washington Council of Governments and the U.S. Army Corps of Engineers indicates that total water supply needs may not be available from the freshwater portion of the Potomac. The Corps has proposed a combination of multipurpose reservoirs in the Potomac Basin; however, it should not be assumed that all of the considered reservoirs will be constructed.

Use of the Estuary for water supply is not a categorical question - certain assumptions and judgments must be made. The Water Resource - Water Supply Study of the Potomac Estuary, aided by data from a previous study (which investigated the use of the Estuary as a water supply source, primarily from the chloride intrusion aspect) concluded that the Estuary was feasible as a water supply source. It was determined that discharge of wastewater out of the Basin would considerably reduce the water supply potential of the Estuary. The number of days that the Estuary could be used for water supply depends on freshwater inflow and location of waste-

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(a) BOD_5 is defined as the quantity of oxygen utilized in the biochemical oxidation of organic matter for five days and at a temperature of 20°C., expressed in parts per million (ppm), milligrams per liter (mg/l) or pounds per day.

(b) Average for July-December, 1971

water discharges, and diversion of wastewater to other basins or to land, if spray irrigation disposal alternatives are found environmentally and economically feasible in future years.

In May 1970, Maryland's Secretary of Health and Mental Hygiene placed a moratorium on sewer connections in portions of Prince George's and Montgomery Counties. This has essentially halted new connections in the sections of Anacostia and Cabin John Creek Watersheds which transport wastewater to the Blue Plains sewage treatment facility.

This action creates artificially higher prices for residential development land because of the decreased supply of approved connection sites. Thus, housing becomes more expensive in one area and development increase in areas not necessarily planned for immediate growth. Patterns of growth are thus dictated by moratorium rather than by logical planning sequence.

Completion of the Blue Plains wastewater treatment facility will not automatically allow the moratoria to be lifted, however, it is the first step in the direction. The alternate regional facilities currently planned for Montgomery County, Maryland and Piscataway in Prince George's County will be needed before the region's wastewater treatment problems are over.

At this point the draft statement discussed the location of the outfall conduit from the Blue Plains facility. Please see "Response to Comments of Charles H. Conrad" in Appendix a of this document for the present thinking with respect to the outfall conduit location.

Fuel oil will be brought to the plant by barge for use in the sludge incinerators as well as in other heating units. Approximately 45,000 gpd will be required for incineration. The District has indicated it plans to pump the oil to on-site storage tanks. As in any installation where oil is transferred, a possibility of spillage exists. The District will be required to construct such facilities and to operate them in such a manner so as to minimize this possibility. The U. S. Coast Guard has prepared regulations concerning prevention of pollution at oil transfer facilities. These regulations will be applied to the Blue Plains operation. Should the barges be used for storage and oil transferred continuously from them directly to the combustion units, the possibility of a barge breaking loose from its moorings during a storm is increased. The possibility of a line developing a leak during a period when the barge would be unmanned would also exist. Should this alternate be selected, construction of a completely enclosed slip should be required to prevent any oil which may spill during the operation from reaching the River. Before final EPA approval of the oil handling facilities is given the District will be required to prepare and to submit an adequate spill prevention counter-measure and control plan. For additional discussion of the oil transferring operation, please see "response to comments of Capt. S. A. Wallace, U. S. Coast Guard in Appendix a.

Chlorination of the plant effluent is being provided for disinfection. The District has been chlorinating the effluent since 1955 and has observed no adverse impacts on the biota of the river.

B. Effects of Plant Operation on Air Resources

Incinerator mass emissions (typically measured in tons per year) of the major pollutants; oxides of nitrogen, particulates, and sulfur dioxide show potential increases of each to be less than ½ of one percent of the current District of Columbia air pollution burden for these pollutants. For the entire metropolitan area, the percentage increase will be reduced to approximately 1/10 of one percent. Emissions of carbon monoxide and organic compounds will be essentially zero. Trace amounts of toxic mercury and lead compounds may also be added to the atmosphere with a negligible effect on ambient air quality. Please see the response to the comments of the National Resources Defense Council, Inc. in Appendix a for a report on the public health aspects of furnace emissions and the preface to this statement for a discussion of alternatives to incineration.

The predicted effect of the emissions of oxides of nitrogen, particulates, and sulfur dioxide show that no meaningful degradation of air quality will occur in the immediate vicinity, the city, or the metropolitan area. Under unusual meteorological conditions, the quality of ambient air may be degraded by small amounts to a level not exceeding 12½% of national air quality standards - such degradation will be restricted to local points generally within the confines of the facility or in nearby non-residential areas east of the Potomac River. The potential degradation at other locations rapidly falls off from the predicted maximum sites. See June 1972 Statement of John S. Winder, Metropolitan Washington Coalition for Clean Air, Inc. in Appendix a. Thus, from the viewpoint of both pollutant emissions and air quality, the incinerator is expected to have a negligible adverse impact. A detailed evaluation of the incinerator is presented in Appendix C of the draft statement.

Odors from the existing plant have been a problem in the area for many years. The adjacent Naval Research Laboratory has complained that odors become intense and produce nausea. There is also claim that structural finishes are damaged by the fumes. Complaints have also been received from persons utilizing the Anacostia Freeway. See (1) July 11, 1972, letter from Naval Research Laboratory, and (2) July 10, 1972, memo from USDA Forest Service. Both found in Appendix a.

Portions of the wastewater received at the plant are conveyed as far as 40 miles and may remain in the system as long as 30 hours. Consequently, under warm weather conditions the sewage frequently becomes septic before it reaches the plant. In passing through the treatment processes hydrogen sulfide and other odorous gases may be released at points where the wastewater is agitated.

Odors originate from the raw wastewater pumping station wet well, the grit chambers, the primary settling basins and the aeration tanks as

well as the sludge processing facilities, particularly the thickening, elutriation, and vacuum filtration unit processes.

Since March 1969 the incoming sewage has been continuously prechlorinated to reduce odors. Under the proposed expansion and upgrading, facilities to control odors are included.

Prechlorination at the raw sewage pump station wet well and at the influent to the primary clarifiers will be provided. Chlorine prevents the release of hydrogen sulfide gas from the wastewater. Capacity is being increased to provide a maximum dosage of 15 mg/l at the design flow.

Exhaust gases from the raw sewage pump stations and the aerated grit chambers will be deordorized by ozone treatment before being discharged into the atmosphere.

The primary sedimentation tanks have been designed so as to allow continuous sludge withdrawal which will alleviate odors caused by sludge standing on the bottom of the tanks for a period of time. The tanks may be covered in the future if this becomes necessary. The exhaust gases would be treated by ozonation.

The gravity sludge thickeners, which will remain in use have been covered. The flotation thickeners, sludge blending tanks, vacuum filters and multiple hearth incinerators will all be housed in the Solids Processing Building. The ventilation in this building is arranged in such a way as to utilize the exhaust air and vacuum pump discharges for incinerator combustion air. Any odors will be destroyed in the incineration process itself or in the fume furnace through which all exhaust gases are passed.

Upon completion of the proposed expansion, the incinerated ash will be hauled directly from the solids handling building to an approved landfill site for disposal. (See July 12, 1972, letter from National Capital Planning Commission Appendix a).

Some concern exists as to the effects of organisms in the wastes which may be discharged to the air by the activated sludge process. However, conclusion number 3 on the following page suggests that this concern is unwarranted.

Studies were conducted at the University of Cincinnati in 1968 on "The Emission, Identification, and Fate of Bacteria, Airborne from Activated Sludge and Extended Aeration Sewage Treatment Plants." The largest plant used in the studies was 12 mgd. Pertinent conclusions reached in the report were:

1. Under the worst conditions, contamination of the air in the vicinity of the waste treatment plants extended 100 - 200 feet downwind of the aerators. These distances and beyond should provide a safety factor. The minimum distance from proposed aeration basins to the plant property line at Blue Plains is approximately 150 feet along the Anacostia Freeway.

2. Approximately 300 total bacteria per cu. m. airborne at 50 feet downwind would result in an inhalation rate of 2 bacteria per minute. This was not considered to be a significant hazard.

3. There is no epidemiological evidence to indicate the danger to public health from sewage treatment plant aerosols.

4. The predominant genera in these aerosols were Klebsiella, Escherichia and Aerobacter. Klebsiella are frequently implicated in respiratory infections.

5. Important factors associated with the recovery of bacteria at increased distances from the emitting source include wind velocity and other climatic factors, the quality of the sewage and the particle size.

The above study was limited to bacteria in its scope. We are unaware of any serious illnesses to STP operating personnel at Blue Plains caused by or attributed to their day-to-day activities in treating sewage.

Since no conclusive evidence has been presented concerning their effects, it is felt that further research must be conducted concerning the public health effects of airborne pathogens from STPs.

Incinerator destruction of all pathogens in the sludge is assured by the high temperatures and sludge residence time in the incinerator. The combustion temperatures and durations to which the gas stream is exposed both in the incinerator and afterburner provide further assurance of pathogen destruction. Thus, neither the gaseous effluent into the ambient air, nor the residue ash which is to be disposed of in a sanitary landfill, offer a potential source of any magnitude for contamination from living organisms.

C. Other Project-Related Environmental Effects

The primary source of noise in a plant of this type is the blowers which supply air to the aeration basins. In the existing blower building the blower room is insulated from the rest of the building to protect the employees. The sounds are also insulated from the outside to reduce their levels to less than objectionable. The additional blowers needed for the expanded facility will also be insulated.

A second source of noise at the plant is in the sludge handling facilities. These facilities will all be housed in one building and are being designed to reduce noise levels to within a safe and comfortable range for operating personnel.

It is anticipated that the impact of noise from the plant during operation will be negligible outside the plant property. Within the various buildings precautions will be taken to reduce noise to satisfactory levels. (See July 12, 1972, letter from National Capital Planning Commission in Appendix a).

The visual impact of the plant from both the River and the Anacostia Freeway will be minor since most of the treatment units are low profile tank structures. The one major building which will be highly visible is the solids processing building which is approximately 600 by 280 feet. A 300 foot section of the building which houses the incinerator equipment will be 91 feet high with 4 stacks having heights of 114 feet above ground.

The building will be architecturally simple in design and in harmony with new architectural designs for this type of building in the Washington area. The basic concrete facing panels encompass the whole in clean, horizontal lines, and interrupted by the introduction of vertical ribs in the entrance way, thereby eliminating monotony. The entrance way and the vertical ribs will protect shadows which will be continuously changing with the sun.

The building is located far enough from the waterline to be properly landscaped with grass, shrubbery and trees to blend with the park strip along the Potomac River proposed by the National Capitol Planning Commission. The District is cooperating with the Commission in their recommendations for the strip as well as other aesthetic considerations.

The incinerator gases will be treated so as to make them invisible when emitted from the stacks.

The project is not expected to have much impact in land use in the Metropolitan Area since immediately upon completion the facilities will be operated at nearly their design capacity. The development of the service area is considered to be mature rather than developing. (See U. S. Department of the Interior letter of August 7, 1972, in Appendix a).

D. Short-Term Effects During Construction

It is anticipated that some siltation will occur during construction of the facilities. This is unavoidable but is and will continue to be minimized by construction procedures. (Appendices J and K in draft statement).

The various contractors are required to promptly provide temporary measures to prevent erosion such as the construction of temporary berms, dikes, dams,slope drains, and use of temporary mulches, mats, seeding or other control devices. See Section 1-B of the District of Columbia construction specifications, included in Appendix J of the draft statement. (See August 7, 1972, letter from U. S. Department of the Interior in Appendix a).

A description of the proposed concrete batch plant was found in the draft EIS at this point. The description has been dropped since the on-site batch plant will not be utilized.

The treatment plant is expected to meet its present or a higher efficiency during the construction of the new facilities. Under a current contract, facilities to provide alum or ferric chloride feed to the existing aeration basins have been constructed. These facilities are in operation and they have managed to present the decrease in efficiency that may be expected as individual units are taken out of service for modification.

EPA guidelines for Design, Operation and Maintenance of Waste Water Treatment Facilities require that the existing plant maintain the same degree of treatment during construction of new facilities. If this is not feasible, a minimum of primary treatment and disinfection must be provided at all times. Bypassing of raw sewage during the construction of the additions is not allowed unless it is absolutely necessary such as inadequate treatment capacity in which case it must be kept to an absolute minimum and receive prior approval from EPA.

During construction of the new power substation and modification of the existing substation, it may be necessary to shut down some of the existing electrical facilities in order to connect new work to them. The contractor will be required to minimize the number and duration of shut downs, or outages. He will also be required to work three shifts of eight hours each to minimize the duration of any outages.

Some dust may be expected to result from construction activities. However, since most construction will be below grade where the soil is moist (continuous dewatering will be required), this is not expected to be a significant problem. The main access road around the the plant site is paved and will reduce dust generation caused by traffic movements. The contractors are required to provide and maintain temporary measures to control dust during construction. (See Appendix J in draft statement).

Some minor siltation may have occurred during dredging operations. It was caused by the disturbance of river bottom materials as they

were lifted into scows and again as it was released by scows in the Dyke Marsh restoration area. Siltation was minimized by use of a clamshell bucket in lieu of hydraulic dredging which mixes the spoil into a slurry and then returns the water solvent to the River. The bottom dump scows drop the spoil in one or several large masses which rapidly sink to the bottom with little breakup as would occur if the spoils were removed by clamshell bucket or by hydraulic means.

EPA monitored the dredging operations continuously. Samples were taken approximately once per week and tests have shown no adverse effect on water quality from the operation. Also, no changes in Benthic biota, attributable to spoil disposal, were observed. The dredging operation is presently complete.

The dredged spoils were utilized at the Dyke Marsh area as part of the National Park Service project to restore portions of the marsh which were previously destroyed by commercial dredging for sand and gravel. NPS plans to recreate a marsh environment. (Appendix A of draft statement).

Heavy metals contained in the bottom sediments at Blue Plains were not in soluble form and would not be expected to migrate and cause environmental damage. The metals were generally more concentrated at the surface than at deeper locations. Since some mixing of dredged materials taken from various depths will occur, the metals will be somewhat uniformly distributed in placement.

The dredged material will be placed in 20 to 40 feet deep holes at the disposal site to fill them to a level approximately 8 feet below the water surface. Clean landfill will be trucked into the site and used to complete the restoration. Any heavy metals in the dredged spoils will be trapped under the fill and should they migrate to the surface through saturated material, they will be sufficiently diluted so as to not be harmful.

During construction operations local noise levels are anticipated to be higher than normal. Most of the construction will take place below ground level and this will have a buffering effect on noise levels beyond the site. Since the surrounding area is not residential in nature, night construction should not be particularly intrusive.

Some degree of general inconvenience will be experienced by the surrounding area during the construction period. This impact cannot be completely avoided but mitigative measures will be employed as discussed in various sections of this report.

IV. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

During the construction and useful life of the project certain adverse environmental effects are associated with the plant but are expected to be minimized, insignificant, or temporary.

Dredging of the navigation channel from the main channel in the Potomac to dockside was completed by use of clamshell bucket and scow in lieu of more efficient and economical hydraulic techniques. Since extensive disturbance and high turbidities are associated with hydraulic dredging, the clamshell method was selected for this operation. Adverse consequences from this project feature were minimal. These findings are documented in Appendix A of the draft statement.

The negative effects of disposal of spoil material downstream in Dyke Marsh was minimal and of a short-term nature. Use of bottom-dump scows reduced the dispersion characteristics of the dredgings. Since this operation is integral to the National Park Service Restoration Plan, disposition of this material at the designated site is considered to be a long-term intangible benefit.

As presently planned, incineration of undigested sludge from future AWT facilities may occur at adjacent multiple hearth furnaces. Although this action will eliminate offensive odors and aesthetic impacts, an additional burden will be placed on ambient air quality. As clearly demonstrated in the previous section of this report and Appendix C of the draft statement, the incinerators will be designed utilizing contemporary abatement techniques and sophisticated equipment. The air quality impact of the incineration features for the D. C. plant is expected to be negligible although it must be conceded that these emissions are additive to the existing regional loadings. The preface to this statement describes the alternatives to incineration that are presently being evaluated.

The plant's aesthetic impact on the Potomac estuary has also been minimized by incorporating certain architectural concepts into the design of the structures (See rendering at the beginning of this report). Noise generated from plant operation will be confined to the facilities and should not affect nearby activities to any significant degree.

Short-term effects associated with construction activities and plant operation are and will be minimized to the greatest extent possible by rigid controls and a well-planned construction timetable. These impacts have been considered in detail in the previous section. Also, planned measures to mitigate these effects have been presented.

The action under consideration is not envisioned to jeopardize or conflict with the goals set forth in Section 101(b) of the National Environmental Policy Act of 1969.

V. ALTERNATIVES TO THE PROPOSED ACTIONS

At this point the draft statement went into considerable detail describing the various alternatives that had been considered for the project. Since very little comment was received on this section, pages 52 through 111 have been replaced by a chart which summarizes the tradeoffs associated with each of the alternatives that was considered for the project. The material which was previously presented at this point will now be found in Appendix C.

SUMMARY OF ALTERNATIVES

Description of Alternative	Summary of Major Adverse Effects	Summary of Major Positive Effects
A. No Action	Serious unacceptable degradation of water quality in the Potomac Estuary would continue to occur.	Temporary disruption attributable to construction operations would not occur.
B. Retain plant capacity at 240mgd and upgrade to AWT.	Since current flows exceed 240mgd by a significant amount and since no relief capacity is available, a lengthly battle over capacity rights would probably ensue and water quality would remain poor until the issue was resolved and relief capacity was constructed.	Water quality would improve with respect to present conditions but not to the degree called for by the Potomac River enforcement conference since flows in excess of 240mgd would not receive satisfactory treatment.
C. 309 mgd AWT		
1. Independent physical-chemical treatment. (two-stage lime treatment, filtration ion exchange, carbon absorption)	System is incompatible with existing facilities.	System consistently produces high quality effluent since it is not upset by occasional "slugs" of toxic materials in the influent wastewater. Minimal amount of land is required for this alternative.
2. Biological treatment		
a. Conventional tertiary treatment system conventional primary-secondary treatment followed by two stage lime (or mineral addition) filtration and either ion exchange or breakpoint chlorination for nitrogen removal.	Two separate solids processing systems are required if lime treatment is utilized. Some subalternatives unable to consistently meet discharge requirements. Some subalternatives would involve multilevel construction.	Existing facilities become integral part of system.

b. Bio-Chemical treatment System conventional primary, secondary treatment, biological nitrification-denitrification, filtration.	Limited amount of multi-level construction re-required. System is susceptable to upsets caused by slugs of toxic material in incoming wastewaters.	Existing facilities become integral part of system. Only one type of sludge disposal system is required. Pilot scale plant results indicate this system can consistently meet discharge requirements.
D. South Tahoe Design conventional primary, secondary treatment followed by single stage lime and ammonia stripping, filtration, carbon adsorption.	Multiple furnace systems are required for sludge disposal. Operational problems encountered with stripping towers. Pilot scale results suggest system unable to meet discharge standards.	
E. Spray Irrigation (Muskegon Plan) Conventional secondary effluent sprayed over land.	Estimates indicate that approximately 127 square miles of land would be required to treat 309 mgd. (Or an area twice the size of the District of Columbia.)	-Natural recycling of organics, Nutrients, and trace elements would occur. -Existing secondary facilities would remain in use. -Eliminate incinerator emissions.

SUMMARY OF SUBALTERNATIVES FOR SLUDGE DISPOSAL

Description of Subalternative	Summary of Major Adverse Effects	Summary of Major Positive Effects
Ocean Disposal	Environmentally unsound and unlikely to win regulatory agency approval.	Possible fertilization of marine environment at dumping site.
Land Disposal	Generally requires digestion--A process which returns large amounts of nutrients to treatment process and thereby inhibits the attainment of effluent discharge standards for nutrients.	Digester gas produced would contain approximately 70% Methane (Natural Gas) which could be used as fuel.
Incineration	Emissions contribute to degradation of air quality.	minimal amount of residual material remains for disposal.

Note: Please see the Preface to this statement for an expansion on the topic of sludge disposal.

SUMMARY OF ALTERNATIVE TRANSPORTATION MODES

Description of Alternative	Summary of Major Adverse Effects	Summary of Major Positive Effects
Highway	-Additional traffic will compound existing traffic problems. -Probability of accident occuring is highest of any mode. -Low payload per delivery ratio.	-Minimal coordination is necessary to arrange delivery.
Railway	-No grade separation at Suitland Parkway crossing	-Ability to deliver large tonnage in a single delivery.
Waterway	-Delivery could be delayed due to low water, severe floods, etc.	-Ability to deliver large tonnage in a single delivery.

VI. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTNEANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Upgrading and expansion of the secondary wastewater treatment facilities to tertiary (AWT) is a significant step toward enhancing water quality of the Potomac Estuary, which is one of the primary functions of the proposed action. Once other sewage treatment plants along the Potomac upgrade the quality of their effluent, future generations will reap the long-range benefits of these improvements. Blue Plains AWT should not be regarded as an individual project, but rather as one vital link in the future wastewater management plan for the Potomac Basin. To accrue the projected environmental benefits of this 309 mgd facility, other area municipalities must cumulatively follow suit or explore and utilize other alternative means of wastewater treatment than that which presently exists.

Selection of the proposed features for Blue Plains in no way precludes other future treatment options for facilities riparian to the Potomac River.

Although it may be the opinion of some that tertiary wastewater treatment and disposal of sludge by incineration only accomplishes a change from one pollution form to another, the environmental benefits of significantly improving Potomac River water when weighed in perspective against the environmental costs of a negligible effect on ambient air quality appears to easily justify this undertaking. It should also be reiterated here that several Federal agencies, including EPA, are undertaking intensive research investigations to determine the environmental and economic feasibility of utilizing agricultural lands for the disposal of undigested sludge. If these techniques prove to be viable, and do not pose an imminent danger to the health, and welfare of the locale, disposal by incineration may be utilized in future years as an alternative or backup method to land disposal.

However, the dire necessity to immediately upgrade and expand the existing facilities is obvious and has been well documented throughout this report. To postpone design and construction of this plant while waiting for land disposal alternatives to become available is entirely unrealistic, especially since a timeframe cannot be provided.

Since disposal of spoil materials at Dyke Marsh is complementing the National Park Service's Restoration Plan, this action is considered to enhance the state of the environment for future generations.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

The planned steps to upgrade and expand existing facilities at Blue Plains can be viewed as an irreversible resource commitment since abandonment of this plant in future years appears to be unlikely. However, it should also be noted that the existing site was devoted to this use years ago when the original plant structures were installed.

If a major accidental spill occurs at the docking facilities during oil transfer or other unloading operations, this could result in irreversible damage to the Potomac Estuary. This impact has been recognized in Section III of the report and implementation of the proposed Coast Guard pollution prevention regulations (Appendix L of the draft statement) will further reduce the probability of this occurrence.

As asserted in the environmental impact section of this report and documented in Appendix C of the draft statement, the project's effects on ambient air quality has been evaluated as being insignificant. Therefore, the air resources of the region are not considered to be irreversibly or irretrievably affected should the expansion and upgrading program at Blue Plains be undertaken.

The project's induced effects on land use changes and future development in the Washington Metropolitan Area is expected to be minor since the plant will operate close to design capacity when the AWT features are placed on line.

As stated previously, the material dredged to secure dependable transportation access to the site will be deposited downstream in Dyke Marsh and is part of a master plan to re-establish wetlands that were previously forfeited to sand and gravel operations.

The only other resource commitments associated with project implementation that are known to this office consist of the labor and various fuels, chemicals, and other materials required to operate the plant throughout its useful life.

VIII. PROBLEMS AND OBJECTIONS

Listed below is a summary of problems and objections received to date for the planned construction of the District of Columbia's Blue Plains advanced waste treatment plant. Appendix M of the draft statement presents pertinent correspondence and information received since EPA commenced funding the expansion and upgrading of Blue Plains.

A. Those groups opposed to the Blue Plains Project:

1. Committee of 100 on the Federal City. It passed a resolution stating that an environmental impact statement should be provided regarding the effect of the proposed incinerator on ambient air quality of the Capitol Region and requested a comprehensive analysis of alternative sludge disposal systems, specifically the feasibility and practicability of a land disposal system for sewage sludge. This Committee feels that sludge incineration will be a major air pollution problem because present technology does not offer proven or practical methods for the control of the sulphur and nitroge oxides produced by sludge incineration.

2. Metropolitan Washington Coalition for Clean Air, Inc. Mr. John S. Winder, Jr., Executive Director stated that the proposed incinerator operations may emit significant quanitities of nitrogen oxides and other harmful pollutants. He expressed concern about the possible environmental effects of the proposed sludge incinerators and urged a halt to construction of the project pending completion of an environmental impact statement.

3. Naval Research Laboratory, Washington, D. C. The NRL stated that the impact of 1000-2000 construction workers at Blue Plains would create an intolerable traffic situation at its main gate and expressed concern over the increase in sludge production. It requested that appropriate action be taken in order that the Blue Plains plans include adequate facilities for increased vehicular traffic and for reducing sludge and processing odors below present levels.

4. Northern Virginia Conservation Council (Former Position) Marian K. Agnew, former President of Council, stated that Blue Plains AWT project will transfer the pollution problem from the water to the air. She feels that the spray irrigation system is better than the physical-chemical treatment and burning of sludge. During 1971, she spoke for the Council before the Potomac Enforcement Conference favoring the recycling of natural resources and the use of natural biological processes in preference to elaborate, highly technological methods.

5. Environmental Defense Fund. Scott H. Lang, Washington Counsel, has raised numerous questions with regard to incineration, dredging and filling, advanced waste treatment, land contained systems, plant capacity and interim treatment at Blue Plains. He has met with EPA on several occasions to discuss these issues and has requested that an environmental impact statement be prepared which covers all elements of the proposed expansion. EDF has been particularly concerned that Blue Plains should be "considered within the context of the total regionwide waste treatment strategy, not just a solitary project".

B. Proponents of the Blue Plains AWT Plant:

1. Northern Virginia Conservation Council (Current Position) On January 12 and 26, 1972, the Board of Directors and the membership respectfully, modified their positions of November 10, 1971. Upon reconsideration, they endorsed the "proposals of the Conference to expand the capacity of the District of Columbia's Blue Plains sewage treatment plant to 309 mgd by December, 1974, and to upgrade it to advanced waste treatment, as partial steps toward solution of the area's" problems. In addition, they requested that EPA comply with NEPA and produce additional statements on effluent quality, sludge removal, and incineration; and that all concerned agencies study land contained systems with the Potomac River Basin.

2. Citizens Council for a Clean Potomac. The Council passed a resolution on January 18, 1972, urging "the U. S. Congress and the political jurisdictions in the Washington Metropolitan Area to continue the Blue Plains expansion and upgrading program". They feel that the volume of wastewater generated and the particular physical conditions in the area make consideration of land disposal methods for Blue Plains impractical from both cost and technological standpoints.

3. Groups that have testified at the Potomac Enforcement Conference regarding the Blue Plains project are listed below. The record shows that these groups have either endorsed or not objected to the report.

a. League of Women Voters.
b. Canoe Cruisers Association of Washington, D. C.
c. Accokeek Foundation, Inc.
d. Cabin John Citizen's Association
e. Chesapeake Bay Foundation
f. National Wildlife Federation
g. Citizens Permanent Conference on the Potomac River Basin

Appendix a

Response to Comments Received on the Draft Statement

Introduction to Appendix a

It was recommended that the EIS be split into two volumes -- Volume One would be designed to present the layman with the basic issues and the second volume would present the detailed technical supporting information. We have adopted this suggestion in our approach to finalizing this impact statement. Considerable detailed supporting information has been eliminated from the final draft and this document should serve as a vehicle for conveying the basic issues to the layman while those who are interested in the detailed technical foundation of the project are directed to the draft statement and its appendices.

INDEX TO COMMENTS

Date	Organization	Signed
May 11, 1972	National Academy of Sciences National Academy of Engineering	Alexander Zucker Executive Director
May 21, 1972	Citizens Council for a Clean Potomac	T. R. Jones, Chairman
May 24, 1972	National Wildlife Federation	Louis S. Clapper Conservation Director
May 31, 1972	Washington Suburban Sanitary Commission	Robert J. McLeod General Manager
June 6, 1972	Northern Virginia Planning District Commission	John W. Epling Executive Director
June 23, 1972	U. S. Department of Commerce Washington, D. C.	Sidney R. Galler Deputy Assistant Secretary for Environmental Affairs
July 3, 1972	U.S.D.A. Soil Conservation Service	Graham T. Munkittrick State Conservationist
July 5, 1972	Metropolitan Washington Council of Governments	Walter A. Scheiber Executive Director
July 10, 1972	U.S.D.A. Forest Service	William E. Nurray Assistant Director
July 11, 1972	U. S. Naval Research Laboratory	Captain Earle W. Sapp Director
July 12, 1972	National Capital Planning Commission	Charles H. Conrad Executive Director
July 19, 1972	U. S. Coast Guard	Captain S. A. Wallace Chief, Marine Environmental Protection Division
July 21, 1972	U. S. General Services Administration	Rod Kreger, Deputy Administrator
August 4, 1972	Baltimore District - U. S. Army Corps of Engineers	William E. Trieschman, Jr. Chief, Planning Division

INDEX TO COMMENTS

Date	Organization	Signed
August 7, 1972	U. S. Department of the Interior	W. Lyon, Deputy Assistant Secretary of the Interior
August 24, 1972	Maryland Department of State Planning	Vladimir A. Wahbe, Secretary of State Planning
November 7, 1972	Metropolitan Washington Coalition for Clean Air, Inc.	John S. Winder, Jr. Executive Director
April 19, 1973	National Resources Defense Council, Inc.	David G. Hawkins
April 6, 1974	Mayor and Town Council of Forrest Heights, Maryland	Dr. James Comas, Councilman

NATIONAL ACADEMY OF SCIENCES NATIONAL ACADEMY OF ENGINEERING

ENVIRONMENTAL STUDIES BOARD
2101 CONSTITUTION AVENUE
WASHINGTON, D. C. 20418

May 11, 1972

Dr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Dr. Furia:

I am responding to your letter of May 8, 1972, to Dr. Handler in which you ask for comments on the draft Environmental Impact Statement for the "District of Columbia Water Pollution Control Plant."

We very much appreciate your sending us this document and we are impressed with the thoroughness with which the evaluations have been made. The Academy, however, cannot comment in detail on the impact statement because we do not have the resources to evaluate it carefully. A superficial evaluation would not be of service to you nor represent a considered position of the Academy.

Sincerely,

Alexander Zucker
Executive Director

cc: Dr. Philip Handler

Citizens Council for a Clean Potomac

T. RAY JONES
(301) 649-2439

P. O. BOX 1972 - WHEATON STATION
SILVER SPRING, MARYLAND 20902

May 21, 1972

Mr Edward W Furia
Regional Administrator
Environmental Protection Agency
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

The Citizens Council for a Clean Potomac, in its meeting of May 16, 1972, unanimously approved a resolution endorsing the draft Environmental Impact Statement P. L. 91-190 on the expansion and upgrading of the District of Columbia Water Pollution Control Plant.

The Council recommends that the Agency proceed with publication of the report in final form.

We appreciate the opportunity to review the report in draft form and to make our views known to you.

Sincerely,

T. R. Jones

T R Jones
Chairman

Citizens Council for a Clean Potomac

. RAY JONES
)01) 649-2439

P. O. BOX 1972 - WHEATON STATION
SILVER SPRING, MARYLAND 20902

RESOLUTION

WHEREAS, the Environmental Protection Agency, in compliance with Section 102 (2) (c) of the National Environmental Policy Act of 1969, has issued a draft environmental impact statement on the expansion and upgrading of the District of Columbia water pollution control plant;

WHEREAS, this statement evaluates the total environmental impact of the proposed action, and considers alternatives to treatment, sludge disposal and transportation of equipment and materials;

AND WHEREAS, the statement satisfactorily answers criticism of and objections to the proposed action;

NOW, THEREFORE, BE IT RESOLVED, that the Citizens Council for a Clean Potomac endorses said draft environmental impact statement and concurs in the conclusion of this statement that the proposed action is a significant step toward enhancement of the Potomac Estuary and is a vital link in the future waste water management plan for the Potomac River Basin.

APPROVED May 16, 1972

Lois Vermillion, Secretary

National Wildlife Federation

1412 16TH ST., N.W., WASHINGTON, D.C. 20036 Phone: 202-483-1550

May 24, 1972

Mr. Edward W. Furia
Regional Administrator
U. S. Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

Reference is made to your letter of May 8, 1972, with the enclosed draft environmental impact statement on the water pollution control plant in the District of Columbia.

We appreciate your consideration in providing us with a copy of the draft environmental impact statement. Because of our limited personnel resources, we are unable to provide meaningful comments on the draft statement. However, I am confident that other conservation organizations which are following this particular problem closely will respond with constructive remarks.

Please be assured that we share your concern for protecting our natural resources and will always do everything without our resource capabilities to work toward the enhancement of the environment.

Sincerely,

Louis S. Clapper
Conservation Director

WASHINGTON SUBURBAN SANITARY COMMISSION
4017 Hamilton Street, Hyattsville, Maryland 20781 | 277-7700

May 31, 1972

Mr. Edward W. Furia
Regional Administrator
U. S. Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

This is in reply to your letter regarding 3MGS-IS-DC-1, May 8, 1972. The following comments and editorial changes apply to Draft Environmental Impact Statement P.L. 91-150, subject "District of Columbia Water Pollution Control Plant (expansion and upgrading)", dated April 1972:

General Comments:

The subject draft represents a massive effort which should be appreciated by all organizations involved with the development of similar Environmental Impact Statements. To WSSC it is an exemplary guide and a useful source document. Our following comments and minor editorial corrections in no way alter our respect for the fine work expressed in this statement.

Page 12:

It is noticed that the water demand for 1980 as shown in the table on page 12 is lower than that shown for 1980 on page E-7. Further, the data in the maximum daily or the maximum monthly water supply needs column shown on page E-7 would be a more realistic basis for comparison with a 7-10 low flow than the needs based on the data in the yearly average column. If the water shortage problem has to be addressed, it should be described forcefully.

Page 12:

Change line 14 to read "....equal to the critical 7 day low flow."

Page 12:

After revised line 14, add:

"When viewed on a one-day low flow basis, even the current supply-demand relationship becomes alarming. For example, on September 10, 1966, the one-day low flow at Washington, D. C. was 388 mgd. Water supply requirements were equal to this flow on July 3, 1969, and exceeded it on July 15, 1971 (402 mgd) and July 17, 1971 (393 mgd)."

Page 12:

After line 18, add:
"....adequately treated, although no permanent water supply facility is programmed for construction and the treatment problems may be insurmountable."

Page 13:

Delete lines 10 and 11.

Page 15:

Edit lines 13 and 14 to read:
".....the units will be designed to handle flows....."

Page 17:

Line 19:

Question accuracy of dollars for WSSC and others. WSSC records show a total cost of $359.3 million instead of $364.0 million and that the WSSC share is approximately $34.4 million instead of $4.4 million.

Page 30:

Line 19:
Change last word to read "to".

Page 46:

Line 14:
Correct spelling of "efficiency".

Page 63:

Last line:
Correct "could by" to read "could be".

Page 68:

Line 14:
Correct spelling of "phosphorus".

Very truly yours,

Robert J. McLeod
General Manager

WAK-H

Response to Comments of Robert J. McLeod

p. 12 While there is a slight discrepancy (556 mgd vs. 570 mgd) between the text and the appendix, the text has been allowed to stand since the value shown is in agreement with the body of Water Resource - Water Supply Study of the Potomac Estuary. While the recommended comparison would be more realistic, it recognized that a forceful discussion of the water shortage problem is beyond the scope of this statement and such a discussion will not be attempted. Readers seeking more information on this subject are directed to more recent reports such as the one produced by the Governor's Task Force.

p. 12 The suggested modification has been made.

p. 12 We are in agreement with the suggested revision but have not inserted it into the text because it is dated and the water supply demand situation may have become even more serious than described.

p. 12 Discussion on page nine of this text points out that an emergency pumping station may be constructed to utilize the stuary as a source of supply for water treatment facilities.

p. 13 The draft text has been allowed to stand since the two regional plants planned for Montgomery and Prince George's Counties will serve the developing areas while Blue Plains will serve an established area.

p. 15 The sentence has been revised to incorporate the comment and to reflect existing circumstances.

p. 17 The sentence has been corrected and revised to reflect the current funding situation.

p. 30 This page has been completely revised so the comment is no longer available.

p. 46 The sentence containing the error has been delted.

p. 63 The correction has been made.

p. 68 The correction has been made.

Northern Virginia

Planning District Commission

7309 Arlington Blvd. • Falls Church, Virginia 22042 • 703-573-2210

June 6, 1972

Mr. Edward W. Furia
Regional Administrator
Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

Dear Mr. Furia:

On May 12, 1972, the Northern Virginia Planning District Commission received the draft Environmental Impact Statement identified below.

This is to advise you that at its regular meeting of May 25, 1972, the Commission decided to make no comment on this statement but to express its appreciation for the opportunity to cooperate in the intergovernmental review process.

I might point out as a matter of information, however, that the Water Pollution Control Plant expansion and upgrading was discussed in the Interim Water Quality Management Plan for the Northern Virginia Planning District published in April of 1972. This interim plan was endorsed by the Metropolitan Washington Council of Governments and the Northern Virginia Planning District Commission. On May 15, 1972, the Virginia State Water Control Board certified the interim plan.

Sincerely yours,

John W. Epling
Executive Director

APPLICANT:	D. C. Department of Environmental Services
PROJECT:	Draft Environmental Impact Statement D. C. Water Pollution Control Plant
CONTROL NUMBER:	P. L. 91-190
STAFF CONTACT:	Austan S. Librach
TELEPHONE NUMBER:	573-2210, Ext. 70

cc: D. C. Department of Environmental Services

RECEIVED
JUN 26 1972
MFB

COMMENTS AND RECOMMENDATIONS

OF

REGIONAL CLEARINGHOUSE

Date: May 23, 1972

Clearinghouse or planning agency:

Name: Northern Virginia Planning District Commission

Address: Loehmann's Plaza, Suite 300
7309 Arlington Boulevard
Falls Church, Virginia 22042

Source of Authority for Establishment of Agency
Virginia Area Development Act and Virginia Project Notification and Review System Procedures Guide for Local and Regional Agencies..

An application is to be made under Section 106 of the Clean Air Act of 1970 to the Air Pollution Control Office of the Environmental Protection Agency. The estimated date the application will be filed: June 1, 1972.

Applicant's Name: Air Quality Planning Committee of the Metropolitan Washington Council of Governments

Address: 1225 Connecticut Avenue, N. W.
Washington, D. C. 20036

Geographic Location of Project: Washington S.M.S.A.

Project Description: Request for funding for three full-time staff positions at COG to provide staff assistance to the Air Quality Planning Committee to develop recommendations for revisions of the region's implementation plans to assure attainment and maintenance of national primary ambient air quality standards by 1975.

Clearinghouse Certification:

The project described above does ( ) does not (X)conflict with the comprehensive plan developed or in process of development for the metropolitan area in which it is located.

Comments and Recommendations:

No further comment. Coordination with local jurisdictions who are responsible for implementation of air quality strategies should be emphasized.

(Signature) John W. Epling, Exec. Dir.
Authorized Representative of Clearinghouse

NORTHERN VIRGINIA PLANNING DISTRICT COMMISSION

.E SOLUTION NO. 72-89 DATE: May 25, 1972

PATRON: Neil M. Walp, Chairman
Natural and Environmental
Resources Committee

A-95 REVIEW OF REGIONAL PROJECTS
BY THE NATURAL & ENVIRONMENTAL
RESOURCES PLANNING DIVISION

WHEREAS, the Northern Virginia Planning District Commission ıas been advised by the Executive Director and the Director of the Division ıf Natural and Environmental Resources that the development of a work ırogram for submittal to the State Water Control Board by July 15, 1972 for ılanning funds in the area of Water Quality Management Planning is an item ıf major importance; and,

WHEREAS, by Memorandum dated May 23, 1972: SUBJECT: \-95 Review of Regional Projects, it is recommended that "No Comment" etters be submitted in connection with two applications (one for three ull time staff positions at COG and the other from the Government of the)istrict of Columbia, being an Environmental statement pertaining to a ıroject to update and expand the Blue Plains plant from 240 mgd to 309 mgd),

NOW THEREFORE BE IT RESOLVED THAT the Executive)irector be authorized to sign "No Comment" letters on the above two ırojects, and where during the next sixty (60) days ending July 24, 1972, ıo substantial regional issue is raised, that the Executive Director be ıuthorized to prepare similar "No Comment" letters for the approval of :he Commission, upon the recommendation of the Natural and Environmental Resources Planning Committee.

CERTIFICATION

The undersigned certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Northern Virginia Planning District Commissior held on May 25, 1972.

C. J. Goll
Executive Assistant

THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

June 23, 1972

Mr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection
Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

The draft environmental statement for the "District of Columbia Water Pollution Control Plant (Expansion and Upgrading)," which accompanied your letter of May 8, 1972, has been received by the Department of Commerce for review and comment.

The Department of Commerce has reviewed the draft environmental statement and has the following comments to offer for your consideration.

The draft environmental impact statement appears complete and accurate in most respects, and in our opinion, the upgrading of the Blue Plains sewage treatment facility should have a beneficial effect on the commercial and sport fisheries in the Potomac River. In recent years, there have been serious soft-shell clam kills that were believed to be caused by oxygen depletion. If the oxygen content of the River is increased as a result of upgrading the plant, summer kills of soft-shell clams may be prevented.

Although the statement appears to treat most of the required topics adequately, we feel it could be improved by additional discussion or clarification of the following points.

It is stated on page 33 that the nitrogenous demand is the greatest cause of dissolved oxygen deficit. On page 34, it is stated that "Completion of the current expansion and upgrading of the Blue Plains facility will actually reduce the . . . nitrogen . . . from approximately . . . 47,500 lbs/day . . . to

NORTHERN VIRGINIA PLANNING DISTRICT COMMISSION

RESOLUTION NO. 72-89 DATE: May 25, 1972

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Natural and Environmental
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C. J. Goll
Executive Assistant

THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

June 23, 1972

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Regional Administrator
U.S. Environmental Protection
Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

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Although the statement appears to treat most of the required topics adequately, we feel it could be improved by additional discussion or clarification of the following points.

It is stated on page 33 that the nitrogenous demand is the greatest cause of dissolved oxygen deficit. On page 34, it is stated that "Completion of the current expansion and upgrading of the Blue Plains facility will actually reduce the . . . nitrogen . . . from approximately . . . 47,500 lbs/day . . . to

less than 61,130 lbs/day . . ." If these figures are correct, greater oxygen depletion would result from the discharge of additional nitrogenous waste. The figure listed on page 58 is 6,130 lbs/day, however, suggesting that the figure on page 34 should be 6,130 instead of 61,130 lbs/day.

2. The last paragraph on page 34 discusses the probability that the Potomac will be unable to supply the future freshwater needs for the Washington Metropolitan area, and the proposal by the Corps of Engineers to construct multipurpose reservoirs in the Potomac Basin. It would be desirable for the statement to include a discussion of the impact on the Potomac Estuary of increased utilization of freshwater inflow, as a result of increased efficiency of pollution abatement, increased diversion of freshwater flow from the Estuary, or a combination of these and other factors. Specifically, discussion should be included concerning the impact on estuarine and marine resources, especially those of commercial or recreational importance, caused by alterations in the salinity pattern that may result from increased use of Potomac River or Potomac Estuary water to satisfy future water supply needs of the area.

3. The last paragraph on page 37 states that the sewage effluent has been chlorinated since 1955 and that no adverse effects on River biota have been noted. On page 38, it is stated that "Since the residual chlorine is expected to be in a different chemical form when the new facilities are completed its effect on the river biota is unknown." In view of the uncertainty expressed here, we suggest that studies be conducted on the effects of residual chlorine on the River biota in order to provide a sound basis for an adequate assessment of the impact of these chemicals on the biota.

4. We note that the meteorological assumptions used in appendix C (pages 24 and 25) maximize the computed downwind concentrations averaged over a one hour period. Consequently, provided the assumed source terms are accurate, the predicated particulate and NO_x concentrations are correct.

We hope these comments will be of assistance to you in the preparation of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Response to Comments of Sidney R. Galler

1. An error was made on p. 34 (of the draft statement) and the text has since been corrected.

2. A discussion of the effect of wastewater treatment plant discharges on Potomac River salinity is presented in Water Resource-WaterSupply Study of the Potomac Estuary on page Xii-8. The study also presents information on the commercial and recreational fisheries of the Potomac (pages III-15 to III-18). In fact, two of the study objectives were to project water supply needs and wastewater loadings and to predict the effect of these withdrawals and loadings on water quality in the Potomac. Another study objective was to evaluate the consequences of utilizing the estuary as a water supply source. In summary, the reader is referred to the report cited above for further information on this topic.

3. This comment was referred to the Annapolis Field Office of EPA-Region III for resolution and their response is shown below.

   "Present effluent is high in organic nitrogen and ammonia content because of inadequate treatment. Chlorination therefore has resulted in a higher chloramine content, particularly due to the latter, which has low disinfectant value and requires higher chlorine dosage to insure an adequate amount of free chlorine. With the high degree of treatment proposed, chlorine dosage can be materially reduced with insignificant chloramines. Residual chlorine can be low and the effects of the resulting hypochlorous acid on the biota unmeasurable for a large treatment plant where proportional feed is practiced. Even in a small plant with uniform chlorine feed rate adjusted for maximum flow, residual chlorine is no threat to the biota unless the volume of diluting water is small."

4. This comment simply confirms the accuracy of calculations made in Appendix C of the draft statement.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE - 4321 Hartwick Road
College Park, Maryland 20740

July 3, 1972

Mr. Edward W. Furia
Regional Administrator
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

We have reviewed the Draft Environmental Impact Statement for the District of Columbia Water Pollution Control Plant, dated April 1972, and have the following comments:

1. We are pleased to see appropriate attention given to constructing sediment control.

2. We concur in the problems raised concerning spray irrigation of effluents. Many areas of Maryland including that portion east of the Chesapeake Bay are characterized with soils with limitations to this operation as described.

3. Our Maryland office having Soil Conservation Service responsibility in the District of Columbia will be pleased to assist in any of the proposals including in the statement for which we have expertise such as soils, erosion control and irrigation water management.

We appreciate the opportunity to review this statement and trust our comments are helpful.

Sincerely,

Graham T. Munkittrick
State Conservationist

cc: K. E. Grant
T. C. Byerly

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D. C. 20036 223-6800

July 5, 1972

Mr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection Agency
Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

RE: COG No. 72-DC-W/S-5
EPA No. 3MGS-IS-DC-1
Draft Environmental Impact Statement, D.C. Water Pollution Control Plant Expansion

Dear Mr. Furia:

In accordance with the provisions of the National Environmental Policy Act of 1969, and the procedures of Circular A-95, the draft environmental impact statement for the project referenced above was circulated to interested and affected parties (as listed on Attachment A) for their review and comment.

The Council of Governments wishes to clarify the references to the population projections found on page 14 of the text. COG furnished regional population projections for the years 1980 and 2000 only. Projections for the year 2020 were developed by the Federal Water Quality Agency's Middle Atlantic Region. (See Environmental Protection Agency Technical Report No. 35, pp. IX-3).

These regional projections were based on the "low-estimate" forecasts prepared for COG by Hammer, Greene, Siler Associates. (See Hammer, Greene, Siler Associates, The Economy of Metropolitan Washington, July, 1969). These "control totals" were then manually distributed to the individual service areas on the basis of 1960-1968 population trends with consideration given to potential land use and other factors.

The EMPIRIC Activity Allocation Model was not fully developed at the time the distributions by jurisdiction were made. However, COG is currently using the completed EMPIRIC Model to evaluate alternative sets of regional policies which will then be the basis of COG's recommended development policies plan for the Year 2000. We anticipate that these recommendations will be available by the end of 1972.

We have received comments (see enclosures) from several agencies which address specific aspects of the draft statement. (Attachment B contains a list of those responding.) In addition to specific comments and questions upon the draft, the Maryland-National Capital Park and Planning Commission requested that COG schedule a conference with the appropriate officials to permit further discussion of the draft statement. However, because of the closeness of the deadline for submitting comments, M-NCPPC has withdrawn that request on the understanding that its concerns can be addressed in the final statement. Since some of its questions are directed to the Maryland Department of Environmental Services and to the District of Columbia Department of Environmental Services; we have transmitted a copy of M-NCPPC's comments to those agencies with a request that they respond to M-NCPPC.

As the Metropolitan Planning Agency as well as the Metropolitan Clearinghouse for the Washington area, we appreciate the opportunity to circulate and to comment on the draft environmental impact statement for a project of such significance to the Washington Metropolitan Area. If we may be of further assistance, please call.

Sincerely yours,

Walter A. Scheiber
Executive Director

WAS/par

Enclosures: Attachment A, List of Referrals Receiving Draft Statement
Attachment B, List of Those Responding
Responses (5)

ATTACHMENT A

DISTRIBUTION LIST

HON. WILLIAM C. CROSSMAN, JR., CHAIRMAN
Loudoun County Board of Supervisors
Mr. Philip Bolen, Executive Secretary
Loudoun County
HON. JOSEPH S. WHOLEY, CHAIRMAN
Arlington County Board
HON. WILLIAM S. HOOFNAGLE, CHAIRMAN
Fairfax County Board of Supervisors
Administrative Response Staff
c/o Dr. George J. Kelley, County Executive
HON. JAMES P. GLEASON, COUNTY EXECUTIVE
Montgomery County
HON. DICKRAN Y. HOVSEPIAN, PRESIDENT
Montgomery County Council
Mr. William H. Hussmann, Director
Montgomery County Office of Program
HON. WILLIAM W. GULLETT, COUNTY EXECUTIVE
Prince George's County
HON. WINFIELD M. KELLY, JR., CHAIRMAN
Prince George's County Council
Mr. Edward Chen, Planning Coordinator
Prince George's County
HON. WALTER E. WASHINGTON, MAYOR
District of Columbia
HON. JOHN A. NEVIUS, CHAIRMAN
District of Columbia City Council
Mr. Comer S. Coppie, Special Assistant
Office of Budget and Program Analysis
HON. MATTHEW J. MCCARTIN, MAYOR
City of Rockville
HON. CHARLES E. BEATLEY, JR., MAYOR
City of Alexandria
HON. LOUIS H. BLAIR, MAYOR
City of Falls Church

Mr. Horace M. Hallett, Director
Loudoun County Sanitation Authority
Mr. Floyd D. Peterson, Chairman
Washington Suburban Sanitary Commission
Mr. Fred C. Morin, Chairman
Fairfax County Water Authority
Col. William Prentiss, Engineer
Baltimore District, Corps of Engineers
Mr. James P. Alexander, Director
D.C. Department of Environmental Services
Mr. Paul V. Freese, Chairman
Regional Sanitary Advisory Board
Mr. James P. Corbalis, Chairman
Water Supply Committee, RSAB
Mr. Philip R. Hogue, Chairman
Maryland-National Capital Park and Planning Commission
Mr. John P. Hewitt, Executive Director
Maryland-National Capital Park and Planning Commission
Ms. Marilyn M. Pray, Chief, General Planning Division
Maryland-National Capital Park and Planning Commission

Mr. Charles R. Burbach, A-95 Information Officer
Va. Division of State Planning and Community Affairs
Mr. Edwin L. Powell, Jr., Chief, State Clearinghouse
Maryland Department of State Planning

ATTACHMENT B

Referral Responses:

Department of Environmental Services, District of Columbia
Office of Planning and Programming, Montgomery County, Maryland
Office of the County Executive, Prince George's County, Maryland
Maryland-National Capital Park and Planning Commission
Northern Virginia Planning District Commission

COMMENTS LOGGED
10/15/72 E.S.
J.P.
6/19/72

PRINCE GEORGE'S COUNTY

Courthouse
Upper Marlboro, Maryland 20870
(301) 627-3000

CHIEF ADMINISTRATIVE OFFICER

June 8, 1972

PRINCE GEORGE'S COUNTY GOVERNMENT A-95 REVIEW COMMITTEE

TO: Walter A. Scheiber, Executive Director
Washington Metropolitan Council of Governments

FROM: Edward W. Chen
Planning Coordinator

SUBJECT: Project Notification Review for:

PROJECT: Environmental Impact Statement-D.C. Water Pollution Control Plant Expansion

A-95 ID: 72-DC-W/S-5

APPLICANT: Environmental Protection Agency

DESCRIPTION: Environmental Impact Statement

PROJECT DISPOSITION:

The project referenced above was received by the Prince George's County Planning Coordinator on May 16, 1972 for review and comment under the A-95 procedures promulgated by the Office of Management and Budget. The project was subsequently referred to appropriate County departments for review and comment, reflective of their functions and responsibilities, prior to the County A-95 Review Committee conference held June 1, 1972 to discuss this project.

As a result of discussion at this conference, the County Government:

_____ 1. Does not wish to comment on the above subject.

_____ 2. Wishes to make the following comments: (See attachment)

_X_ 3. Has reviewed the project referenced above, finds it in conformance with our policies, and recommends a favorable Clearinghouse Review. Subject to following comments:

PRINCE GEORGE'S COUNTY GOVERNMENT

A-95 REVIEW COMMITTEE

Summary of Agency and Department Comments Concerning Summary Notification for Environmental Impact Statement - D.C. Water Pollution Control Plant Expansion. COG No. 72-DC-W/S-5

1. It is stated that the proposed sludge incineration would contribute 1.9 percent of the particulate burden in the Washington area. While this is termed a "very small" effect, we feel that such a contribution coming from a single source is not small and may have an adverse environmental impact.

2. Population projections used in the document and as supplied by COG are based on H.G.S.A. "low projections" which reflect 1960-1970 trends. Due to limitations placed on sewage flows to be accepted and treated at Blue Plains and the need to locate additional treatment capacity at a plant or plants to be located in the suburban jurisdictions as per the October, 1970 Memorandum of Understanding, Prince George's County has been reassessing its growth potential with the view of limiting or further reducing future population growth.

   Further, the H.G.S.A. projections have never been accepted by Prince George's County as the official County projections.

P.51 3. The problems surrounding the disposal of 2,500,000 cubic yards of earth and stockpiled sludge are barely mentioned in the Environmental Impact Statement. Over 100,000 cubic yards will go to "approved landfills" and the Oxon Run Golf Course; no consideration is given to the impact of relocating this material. There are no landfills in Prince George's County that accept sludge and we have not seen plans for the Oxon Run Golf Course. Seeing that 2,500,000 yards of earth and sludge are disposed of in an "approved" manner is apparently a problem left to the jurisdiction receiving the material.

4. The question of the disposal of sewage sludge during the Blue Plains expansion (including the interim chemical precipitation process) is not adequately dealt with in the Statement. Reference was made to an agreement made between D.C. and MES for land disposal of digested and raw sewage sludge on State-owned land in Prince George's County between now and the completion of the sludge handling facilities at Blue Plains. No assessment is made of the impact of the disposal of this sludge in Prince George's County, nor is there an analysis of odor or traffic problems which could result when MES actively begins to handle the project.

During local meetings with MES the question of environmental impact analysis was put forward by County representatives. MES stated that such an assessment would be included in the EPA Statement on Blue Plains.

We find no reference in this report to interim sludge handling or disposal. Such a section should be added to the report or presented as an additional analysis supplementing the Environmental Impact Statement.

5. Miscellaneous Comments

Page 12:

It is noticed that the water demand for 1980 as shown in the table on page 12 is lower than that shown for 1980 on page E-7. Further, the data in the maximum daily or the maximum monthly water supply needs column shown on page E-7 would be a more realistic basis for comparison with a 7-10 low flow than the needs based on the data in the yearly average column. If the water shortage problem has to be addressed, it should be described forcefully.

Page 12:

Change line 14 to read "....equal to the critical 7 day low flow."

Page 12:

After revised line 14, add:

"When viewed on a one-day low flow basis, even the current supply-demand relationship becomes alarming. For example, on September 10, 1966, the one-day low flow at Washington, D.C. was 388 mgd. Water supply requirements were equal to this flow on July 3, 1969, and exceeded it on July 15, 1971 (402 mgd) and July 17, 1971 (393 mgd)."

Page 12:

After line 18, add:

".....adequately treated, although no permanent water supply facility is programmed for construction and the treatment problems may be insurmountable."

Page 13:

Delete lines 10 and 11.

Page 15:

Edit lines 13 and 14 to read:

".....the units will be designed to handle flows....."

Page 17:

Line 19:

Question accuracy of dollars for WSSC and others. WSSC records show a total cost of $359.3 million instead of $364.0 million and that the WSSC share is approximately $34.4 million instead of $4.4 million.

Page 30:

Line 19:

Change last word to read "to".

Page 46:

Line 14:

Correct spelling of "efficiency".

Page 63:

Last line:

Correct "could by" to read "could be".

Page 68:

Line 14:

Correct spelling of "phosphorus".

metropolitan washington
COUNCIL OF GOVERNMENTS
1225 Connecticut Avenue, N.W., Washington, D. C. 20036 223-6800

A-95 METROPOLITAN CLEARINGHOUSE MEMORANDUM

TO: Mr. Warren Giauque
M-NCPPC
8787 Georgia Avenue
Silver Spring, Maryland 20907

May 15, 1972

SUBJECT: PROJECT NOTIFICATION AND REVIEW FOR

PROJECT: Environmental Impact Statement - D.C. Water Pollution Control Plant Expansion

COG NO.: 72-DC-W/S-5

APPLICANT: Environmental Protection Agency

The project title, COG number, and the applicant's name should be used in all future correspondence with COG concerning this proposed project.

PLEASE NOTE ACTION INDICATED BY CHECK MARK IN BOX BELOW OR ON REVERSE

PROJECT NOTIFICATION

☐ The Project Notification for the project referenced above was received on _____ and has been referred to appropriate parties (see attached list) for their review and comment. This review will be conducted as expeditiously as possible.

☑ A copy of the Project Notification for the project referenced above is enclosed for your review and comment, in accordance with OMB Circular A-95 review requirements. Your review should focus on the intended application's compatibility with the plans, programs, and objectives of your organization. You may indicate below your interest in and/or comments concerning the proposed project by returning this sheet to the Metropolitan Clearinghouse by MAY 29 1972.

This organization:

___ does not wish to comment on the above project.
✓ has further interest and/or questions concerning the above project and wishes to confer with the applicant.
___ is interested in the above project and wishes to make the following comments: (use attachment)
___ will submit comments concerning the above project by _____.
___ desires an extension of time until _____ for further consideration of this project. (Subject to certain restraints imposed by the OMB Circular.)
___ has reviewed the project referenced above, finds it in conformance with our policies, and recommends a favorable Metropolitan Clearinghouse review.

Signature _____ 6/21/72

Organization _____ a-28

THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION
REGIONAL AND METROPOLITAN DISTRICTS IN MONTGOMERY AND PRINCE GEORGE'S COUNTIES, MARYLAND

Regional Headquarters Building
8787 Georgia Avenue
Silver Spring, Maryland 20907

589-1480
Area Code 301

June 26, 1972

Mr. Walter A. Scheiber
Executive Director
Metropolitan Washington Council of Governments
1225 Connecticut Avenue NW
Washington, DC 20036

Subject: A-95 Clearinghouse Referral
COG #72-DC-W/S-5
Draft Environmental Impact Statement
DC Water Control Plant Expansion

Dear Mr. Scheiber:

This agency has reviewed the subject draft statement, and it is recommended that a conference with the applicant be scheduled at an early date.

The draft statement, in our opinion, does not contain sufficient information relative to the environmental impact of sludge disposal via a landfill located at Cheltenham, nor the impact of transporting these large quantities of sludge from Blue Plains to the landfill sites in 36 ton trucks.

Our questions and concerns are more specifically enumerated in the staff memorandum attached, and we request the opportunity to further discuss these matters with the appropriate EPA and MES representatives.

Very truly yours,

C. Warren Giauque
Regional Planning Officer

CWG:rt

CC: J. Stillwell, SCS
J. Coulter, Dept. of Natural Resources (MES)
The Hon. W. Kelly, Jr.
The Hon. W. Gullett
Chairman Hogue
Vice Chairman, Brennan
Executive Director, Hewitt

THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION
REGIONAL AND METROPOLITAN DISTRICTS IN MONTGOMERY AND PRINCE GEORGE'S COUNTIES, MARYLAND

Regional Headquarters Building
6600 Kenilworth Avenue
Riverdale, Maryland 20840

277-2200
Area Code 301

PL-PG-20

June 16, 1972

MEMORANDUM

TO: C. Warren Giauque, Regional Planning Officer

FROM: Jorge A. Valladares, Coordinator of Environmental Engineering

SUBJECT: COG #72-DC-W/S-5, Draft Environmental Impact Statement, D.C. Water Pollution Control Plant Expansion

---

After thorough review of the above noted project, I find there are still some major unresolved questions not addressed in the Draft.

1. First and foremost is the question regarding sludge, its treatment (or lack thereof), and its disposal. Ostensibly, research is currently being conducted at the U.S.D.A. in Beltsville to determine the feasibility of land disposal of various types of sludge. However, even before the results are known, the M.E.S. is proceeding with plans to dispose of sludges at Cheltenham in Prince George's County. Nowhere in the Draft does it mention the types of sludges that M.E.S. has agreed to take both before and after Blue Plains expansion, nor does it note where or how the sludge will be disposed. It is imperative that it be made clear to the general public and residents of Prince George's County just what is occurring on this matter before it occurs. The County is responsible for a fair share of the waste it has itself created, but there is serious question that it should accept all the wastes.[1] The types of wastes that I allude to for the period of interim treatment and subsequently, after completion of the plant expansion, includes, screening wastes, grit, sludges from alum and other chemical additions, digested sludge, raw sludge, etc.

2. Also, how is the sludge or sludges to be transported to the disposal site? Are the roads adequate? Is it safe to transport and handle raw sludge?[2] How will the Beltsville research findings be used? Will any effort be made to reclaim the large volume of chemicals used?

---

1 See page G24 of Draft, item #4.

2 See page 90 of Draft Statement.

3.

One of the alternatives noted on page 94 of the Draft included pumping of digested sludge to drying beds. It was abandoned since 77 acres of covered area would be needed and a "vast open area is not available", yet the federal government owns "vast open area" between the Capital Beltway and Blue Plains in the vicinity of Oxon Cove. The immediate question is why should the residents of Prince George's County be asked to support the entire sludge burden when there are other open lands. (Even this federal property is mostly located in P.G. County.)

4. Other items of concern include the use of COG population projections which have consistently been rejected by local authorities and; the still prevalent practice of bypassing the treatment plant approximately 10 days per year during more intense storms. What will be the total cost of the treatment method selected in terms of capital costs and operation and maintenance costs in relation to the population served?

5. Will all sludges be incinerated in the future or only biological sludges? What will be done with chemical sludges? Will they be reused?

6. Further, this Commission has been working for several years on development of a P.L. 566 program in the Piscataway basin which includes an impoundment adjacent to Boys Village at the M.E.S. disposal site and another larger one downstream. Water contact recreation is one of the uses. Will this sludge disposal allow for water contact recreation in tributary watercourses? The development of these lakes involves many millions of federal and local monies and should be looked into at this stage of planning. Assurances by the M.E.S. are not sufficient to dispel concern over leaching problems.

On page 114 of the Draft are listed the irreversible and irretrievable commitments of recourses.

7. What about the final disposition of land at Cheltenham? Certainly its use as a sludge landfill seriously limits any other use of the site. This should be noted in section VII of the Draft.

It is my opinion that these matters ought to be brought out in the open and discussed now. Even if there are logical and sound reasons for handling the sludges as proposed, it should all be a part of the impact statement.

JAV:cmc

Response to Comments of Walter A. Scheiber

Covering Letter - A footnote has been added to the final text which explains that the population projections for the year 2020 were developed in-house and not supplied by COG.

Prince George's County A-95 Review Committee

1. The review committee's comment concerning sludge incinerator particulate emissions was referred to members of the regional staff who had prepared the air pollution sections of the draft EIS. Their response was to the effect that the issue was addressed in sufficient detail on pages C-1, C-32, and C-33 of the draft statement. For convenience several excerpts of these pages are quoted below.

   From page C-32, "It has been determined that the incineration process will result in various forms of environmental degradation. By every measure of acceptability - federal standard, local regulation, guideline, or engineering judgment - the degradation has fallen within acceptable limits," and, "The mass emissions of the major pollutants (NOx, particulates, and SO2) were also related to air quality. The results show no meaningful degradation can be predicted for the immediate vicinity, the City, or the Metropolitan Area."

2. Should Prince George's County take steps to reduce future population growth, this action would not appreciably effect the proposed project since present flows at Blue Plains are not far from the 309 mgd design level. If Prince George's County growth were constrained, it would, of course, have a marked effect on the capacity of the proposed regional plant at Piscataway.

3. The stockpiled sludge and excess excavation have since been disposed of by hauling to the Oxen Cove area, to Andrews Air Force Base, and also to the vicinity of the junction of I-295 with I-495. Since the excavation contractor was able to obtain the necessary County permits to conduct this operation, we assume the County concerns mentioned in the comment were later satisfied.

4. Subsequent to this comment, the Maryland Environmental Service and the U.S.D.A. Agricultural Research Service have constructed and are now operating a joint research and demonstration project that is investigating the feasability of the composting method of sludge treatment with sludge from Blue Plains. An environmental impact statement (which addressed the potential for odor and traffic problems) describing the project was prepared by the Agricultural Research Service and circulated in draft form on December 7, 1972. The statement was released in final form on November 20, 1973.

5. Identical comments were received from the Washington Suburban Sanitary Commission in their letter of May 31, 1972. Please see "Response to Comments of Robert J. McLeod" in this appendix.

The Maryland-National Capital Park and Planning Commission

Paragraph 1 and 2 - Please see response to item number 4 above.

3. The sludge digestion process, if utilized, would produce a supernatant which is highly concentrated in terms of nutrient levels. This supernatant would have to receive extensive treatment if the strict nutrient discharge limits proposed for Blue Plains are to be met. This treatment could be accomplished only if space for additional tankage was available at the Blue Plains site. Thus, this alternative has been dropped from serious consideration since space for both additional treatment tankage and for the sludge drying beds is not available.

   The project, as currently proposed, does not involve utilizing land in Prince George's County for a wastewater treatment plant site.

4. The COG population projections used in the statement were taken from earlier Federal Reports (such as Technical Report No. 35) and accepted for the sake of uniformity.

   Bypassing of combined flows does occur in the District's system but the NPDES permit included in Appendix b directs the District to "operate the treatment works (including treatment plant and sewer system) to minimize the total quantity of pollutant discharge for the parameters identified in the permit."

   The capital cost of the expansion and upgrading program is currently estimated at between 330 and 360 million dollars. The draft statement reported the operation and maintenance costs are estimated to amount to $24,046,000 per year. The population associated with the 309 mgd annual average figure is 2,227,000 (from Development Plan for the Water Pollution Control Plant with Implementation Program for 1969-1972, Metcalf and Eddy, Engineers -- Boston, Massachusetts. February 1969).

5. The applicant proposes to use a three-stage biological treatment system to meet the discharge requirements. This system will produce mainly biological sludges which will be conditioned, dewatered, and incinerated. This treatment system does not produce any appreciable quantity of chemical sludge.

Paragraph 6 and 7 - Since the proposal to dispose of sludge at Cheltenham was not implemented, these comments are no longer applicable.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Northeastern Area - State & Private Forestry
6816 Market Street, Upper Darby, Pa. 19082

REPLY TO: 1940

July 10, 1972

SUBJECT: Draft Environmental Statement, District of Columbia Water Pollution Control Plant

TO: Mr. Edward W. Furia, Regional Administrator
U.S. Environmental Protection Agency, Region III
6th & Walnut Streets
Phila., Pa. 19106

We have reviewed the draft environmental statement for plans to expand and upgrade the existing Water Pollution Control Plant in the District of Columbia.

One feature of the operation of the Water Pollution Control Plant that would have an adverse impact on vegetation is the incineration of sludge. According to tables in the statement, only 200 tons of sulfur dioxide and 200 tons of oxides of nitrogen will be produced every year -- this is a negligible amount even if it is concentrated in the immediate area.

Chlorine is to be applied at the raw sewage pump station wet well, secondary treatment process and as treatment of excess flow (P40, P70, PB2). There isn't any comment on the effect of this chlorine on vegetation - prevailing winds, amount of vegetation in the area, concentration of chlorine gas at different distances from the treatments.

We appreciate the opportunity to comment on this draft statement and would like to receive a copy of the final statement when it is published.

FOR WILLIAM E. MURRAY
Assistant Director
Environmental Protection & Improvement

Response to Comment of William E. Murray

1. In response to Mr. Murray's comment regarding the effects of chlorine on vegetation, the District reports that, "No adverse effects have been observed on the existing shrubbery and lawns in the area to date. No complaints have been received about noticeable chlorine gas odors at the plant or in the vicinity of the plant".

NAVAL RESEARCH LABORATORY
WASHINGTON, D.C. 20390

IN REPLY REFER TO:
1001-18:SLC:blm

11 JUL 1972

Mr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection Agency
Region III
6th & Walnut Street
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

The Naval Research Laboratory (NRL) has received a copy of the draft Environmental Impact Statement on the expansion and upgrading of the District of Columbia Water Pollution Control Plant.

As an immediate neighbor of the Water Pollution Control Plant, NRL has a strong interest in the establishment and maintenance of a healthful and non-obnoxious environment for personnel who live and work on its grounds. NRL also has a strong interest in revitalizing the Potomac River. NRL is therefore in favor of the concept of improving the operations of the Plant.

Our review of the draft Environmental Impact Statement makes it clear that NRL is not in a position to analyze and evaluate the conclusions as to the scope of facilities required and the specific processes proposed for installation at the Plant. We do, however, have a number of comments based on our previous experience with the Plant, bearing on some of the more obvious aspects of the potential impact of the expanded Plant on NRL.

a. Full prechlorination in present operation was not begun until March 1969, and then only after continued protests from NRL. We therefore urge that the plans for prechlorination be specific to require full treatment of the wastewater at all times with accompanying continuous monitoring.

b. In several instances the plans for new installations call for some means of controlling odor formation, without reference to backfitting such systems on similar devices in the present Plant. In all such cases the provision for doming and skimming of sedimentation tanks should be

extended to include the present tanks. Similarly, ozonation, if effective, should be applied to all appropriate stages of the process, such as the pumping station, sedimentation tanks and the grit removal area.

c. Plans for use of ozone should include provision for monitoring the net contribution of ozone to the environment by the ozone generators, and the effect of such ozone release during critical air pollution episodes.

d. Conflicting decisions already made on methods for deodorizing, packaging and transporting the undigested sludge during the construction period leave a situation in which the responsibilities of the Water Pollution Control Plant, the Maryland Environmental Services and the contractor seem at times to overlap and at times to leave a time gap (such as the period between the end of 1973 and the date the incinerators are to be in operation). This should be resolved to provide safe and non-obnoxious handling of the undigested sludge.

e. Positive efforts should continue toward solving the problem of highway traffic congestion caused by construction and sludge handling operations.

f. Operational breakdowns have occurred in the past for lack of manpower and funds. Substantial and continued emphasis should be put on the requirement for adequate staffing and funding of the ongoing operation and maintenance of the Plant, to avoid such breakdowns in the future.

g. Perhaps most important of all is the requirement for the Environmental Protection Agency to monitor the operation of the Plant and enforce its standards with respect to the effect of the Plant's effluents on its surroundings.

NRL fully realizes the ultimate advantages to the entire community of upgrading the Water Pollution Control Plant, and the resultant enhancement of water quality in the Potomac estuary. Fronting on the Potomac as much as on Interstate 295, NRL has special reason to appreciate the aesthetic as well as the utilitarian properties of a great river. Although we cannot comment on the specific processes proposed in this plan, our obligation to provide wholesome working conditions for our staff and our experience with current Plant operations over recent years generates a deep interest on the part of NRL in the improvement of the Plant's capability.

Sincerely yours,

Earle W. Sapp
Captain, USN
Director

Copy to:
CHESNAVFACENGCOM

a-37

Response to Comments of Captain Earle W. Sapp

a. In response to this comment, the District points out that "prechlorination will be used whenever the hydrogen sulfide range reaches the odor threshold. This practice will conserve chlorine which is presently in short supply.

b. The applicant reports out that the "existing primary and secondary sedimentation facilities will be refurbished with new equipment as necessary to bring them in line with new equipment being incorporated in the new facilities."

c. The District reports that, "Ozone usage in grit chambers is estimated as: 1.7 lb./day/10,000 cfm. x 100,000 cfm. = 17 lb./day. Contact time estimated as 5 seconds in summer and 10 seconds in winter. Resulting ozonation will not be detectable and is considered not to be hazardous."

d. A considerable amount of sludge has been successfully transferred to the joint U.S.D.A. Agricultural Research Service-Maryland Environmental Service composting site at Beltsville since this comment was written. The only serious accident occurred when a sludge hauling truck shutoff valve vibrated open causing some sludge to spill on the Beltway. A gasoline tanker which was following the sludge hauling truck overturned and its load was spilled near the highway.

   The sludge hauling vehicles were modified concrete trucks that were completely closed to reduce odor emissions. The sludge was treated with an odor masking chemical that minimized odor production.

   In May 1973 a serious odor problem developed in the vicinity of the Blue Plains STP. This problem occurred because the contents of the existing plant's digesters were transferred to the excavation for the AWT facilities for temporary storage. This transfer was necessary because a slug of toxic material (probably copper, chromium, or zinc) had entered the digesters and was inhibiting the anaerobic digester organisms. The digesters were refilled with non-toxic sludge and brought back on line. This problem will not reoccur once the expansion and upgrading project is complete because the new plant will include an incinerator that will burn raw (non-digested) sludge.

e. The information contained in Appendix c of this document describes the fact that the project is no longer on the "accelerated" construction schedule that was envisioned at the time the draft statement was prepared. Consequently, the work force will be smaller and material and equipment deliveries will be at a slower rate. Less traffic congestion will be the end result.

f&g. The Federal grant offers associated with this project are conditioned in such a manner as to require the applicant to develop a plan to adequately operate and maintain the treatment plant. The plan will be reviewed by the EPA Regional Office and final payment of Federal grant funds will not

be made until the plan is found to be satisfactory. After the project is complete and placed in operation, it will be periodically inspected by the Regional Office's Operation and Maintenance Staff to insure safe and efficient practices have been adopted. Also, the Regional Office's NPDES permit program staff will be monitoring the operation of the plant both during construction and after its completion.

NATIONAL CAPITAL PLANNING COMMISSION

WASHINGTON, D.C. 20576

IN REPLY REFER TO:
NCPC File No. MP 43

JUL 12 1972

Mr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection
Agency, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

re: Draft Environmental Statement,
District of Columbia (Blue Plains)
Water Pollution Control Plant

Dear Mr. Furia:

We appreciate the opportunity to comment on the Draft Environmental Statement for the District of Columbia (Blue Plains) Water Pollution Control Plant Expansion and Upgrading which you transmitted to the Commission for review and comment.

The Commission has taken a number of actions since 1969 on the Water Pollution Control Plant Master Plan and site and building plans submitted by the District of Columbia Government for individual projects included in the Master Plan. On May 5, 1969, the Commission approved a preliminary Master Plan proposing the expansion of the plant capacity to 419 mgd. However, because of objections to the size of the landfill necessary for the 419 mgd capacity, the District Government reduced the proposed capacity to 309 mgd through the Memorandum of Understanding on Washington Metropolitan Regional Water Pollution Control Plant, executed in October 1970, a copy of which is included in the EPA Draft Environmental Statement.

On February 4, 1971, the Commission approved revised Development Concepts for the Water Pollution Control Plant based on the 309 mgd capacity, and the following month, on March 4, 1971, the Commission approved a revised Preliminary Master Plan based on this capacity. At that time, the Commission also approved final site and building plans for the Additional Primary Treatment Facilities which are now under construction. The Commission subsequently approved preliminary site and building plans for the Solids Processing Facility on May 6, 1971.

On August 5, 1971, the Commission approved further revisions to the revised Preliminary Master Plan relating to the location of the Docking Facility and the configuration of the waterfront park along the Potomac River. The Commission also approved the final site and building plans for the Solids Processing Facility on this date. Preliminary site and building plans for the Docking Facility were approved by the Commission on September 2, 1971, and the final plans for this facility were approved the following month, on October 7, 1971.

The Commission again approved revisions to the Preliminary Master Plan on June 29, 1972. These revisions included a new site and configuration for the Multi-Media Filtration Facility and changes in the layout of the tertiary treatment facilities. The preliminary site and building plans for the Multi-Media Filtration Facility were also approved on this date.

In each of its actions on the revised Preliminary Master Plan and on the individual projects within the plant, the Commission has reviewed the Environmental Statement and the appropriate supplements prepared by the District of Columbia Government and included as Appendix I in the EPA Draft Environmental Statement. A supplement to the District Government's Environmental Statement covering the impact of the Multi-Media Filtration Facility, which was not prepared in time for inclusion in the EPA Draft Environmental Statement, was provided for the Commission's June 29, 1972 review of that project.

On the basis of a staff review and analysis of the Draft Environmental Statement, we offer the following comments and suggestions for consideration in the preparation of the Final Impact Statement:

1. Section III on Environmental Impact advises that the Environmental Protection Agency will make the final determination and recommendation regarding the location of the plant effluent outfall. The Final Statement could be strengthened by including not only a description of the definitive location but also the reason(s) for the selected location. If the location has not been fixed at the time of the Final Statement, it would be helpful to include some discussion and comparison of the effects of locating the outfall in the turning basin and directly in the ship channel.

2. Section III states that incinerated ash will be hauled directly from the solids handling building to an approved landfill site. The Final Statement could be strengthened by identifying the landfill site, the mode of transportation of the ash to the site and the steps to be taken to insure that there will be no adverse effects resulting from the hauling and the landfill.

3. Section III includes a general discussion of the impact of noise in the plant operation, particularly in the blower buildings and sludge handling facility and concludes that noise levels within and surrounding these facilities will be reduced to "less than objectionable" and "a safe and comfortable range." This discussion could be expanded to include greater detail regarding the actual expected noise levels and the extent to which the noise impact would be reduced in these facilities, in the surrounding area within the plant, and in adjacent sites including the Naval Research Laboratory. The Final Statement could also include information available with regard to the nature of the environmental health impact of such noise levels on the employees within these facilities.

4. Section III states that trace amounts of toxic mercury and lead compounds may be added to the atmosphere with a negligible effect on ambient air quality. The discussion of impact of the incinerator emissions on air quality also notes that any degradation of the quality of ambient air would be restricted to nearby non-residential areas. Although the area

surrounding the plant is generally non-residential, the District Government does have two existing residential institutions, D.C. Village and Jr. Village, in the immediate vicinity of the Plant, east of the Anacostia Freeway. Jr. Village for children is being phased out, but the District Government currently proposes to build a new Childrens Receiving Home in the same general area. In view of the increasing documentation on the potential health hazards of metals in the air, it would be helpful for the Final Statement to provide any available information on potential health impacts as they may affect these existing and proposed nearby institutions. This discussion could be strengthened by including information on the effect of the prevailing winds on the anticipated impact of the emissions on air quality in these nearby areas.

5. The Supplement to the District Government's Environmental Statement covering the Solids Processing Facility, included in Appendix I, states that the plant effluent temperature is estimated to rise approximately 2°F. in the overall treatment process. The Final Statement might include information on the impact of this increase in temperature on the aquatic animal and plant life in the vicinity of the outfall.

We appreciate the opportunity to comment on the Draft Environmental Statement and look forward to the receipt of the Final Statement.

Sincerely yours,

Charles H. Conrad
Executive Director

Response to Comments of Charles H. Conrad

1. The outfall location is presently tentatively established as the turning basin. It is reported that vigorous current action exists in that vicinity which should contribute to rapid mixing of the effluent with the estuary waters. However, should water quality measurements taken after the AWT facilities become operational indicate that the effluent is not adequately diffused, steps will be taken to install an extension of the outfall to the main channel of the river.

2. In response to this comment, the applicant reports that, "Incinerated ash will be hauled by either rail or enclosed trucks, or both, to the regional landfill in Lorton, Virginia".

3. In response to this comment, the District has submitted the results of a noise survey of the sewage treatment plant that analyzes the sound levels at the existing facility. The report recommends specific actions to reduce noise and the applicant advises that these recommendations have been implemented at the existing plant and will be followed in the design of the expanded facility. The Noise Survey Report has been included in the text at this point.

   During the construction phase, noise will be produced by construction equipment, delivery trucks, etc. Should the volume of noise endanger the health and safety of workmen employed at the site, the provisions of the Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) require that appropriate corrective action be taken.

4. A detailed investigation of the potential for adverse public health effects due to the incinerator emissions was conducted in response to the comments of the Natural Resources Defense Council, Inc. (See "Response to Comments of David G. Hawkins", this appendix). While the investigation found that the emissions, "should not constitute a threat to public health in the vicinity of the sewage treatment plant" it also pointed to the need for further investigation of this problem. As the results of these further investigations become available, they will be compiled and released as a supplement to this final impact statement. Should these studies find that incineration is not acceptable because of public health considerations, one of the alternate sludge disposal techniques described in the preface to this statement will be adopted.

5. In response to this comment, the applicant replies, "During the most critical months of June, July, and August the temperature of the wastewater is several degrees cooler than the river water temperatures, and therefore, the estimated $2^{o}F$ rise in wastewater effluent should have no adverse effect on the animal and plant life in the vicinity of the outfall".

50 Moulton Street
Cambridge, Mass. 02138
Telephone (617) 491-1850

Bolt Beranek and Newman Inc.

15 March 1972

Metcalf & Eddy
Statler Building
Boston, Massachusetts 02116

Attn: Mr. George K. Tozer

Subject: Noise Survey of Sewage Treatment Plant
District of Columbia
BBN Job No. 138741

Gentlemen:

On 8 March 1972 a series of noise and vibration measurements were conducted in the existing blower building of the District of Columbia Sewage Treatment Plant to determine appropriate measures for reducing the interior noise levels. Included in this brief letter report are the main results of these measurements and our principle conclusions.

The essential results of the noise level measurements are shown in Fig. 1. In this figure the sound pressure levels (SPL's) in decibels are given for each octave band covering the audio frequency range. As can be seen in every location, the highest sound level was found to occur in the 1000 Hz (CPS) octave, which covers the range of 700-1400 Hz. The sound in this band is strongly dominated by a tone, or a siren-like sound. Analysis of tape recordings made at the site show that the tone frequency is about 1200 Hz.

Combining this tonal data with information obtained from the blower manufacturer, Cooper-Bessemer, it is now clear that the tone at 1200 Hz, which is clearly the annoying sound, is due to the blowers. The two stage centrifugal blowers, Type RF2S, and rated at 1750 HP, are driven at a speed of about 3600 RPM, or 60 RPS. As it has been found that each compressor stage has 20 blades, it is seen that the blade passage frequency is 1200 Hz (60 RPS x 20 blades), and thus the tone is clearly generated by the blowers.

Recommendations

From the results in Fig. 1, plus other measurements close to the pipes and blowers, and vibration measurements on the pipes, it is clear that the sound at 1200 Hz is radiated principally from the piping. Also in particular the sound is radiated from the flexible expansion joints at the intake and discharge flanges just beneath the blowers. At these joints, we found the highest SPL, namely about 130 dB at 1200 Hz.

To reduce the sound at 1200 Hz, it is quite clear that the most effective measure would be to provide a noise control wrapping for the blower system pipes, including the expansion joints just below the blowers. The piping that is radiating the highest levels appears to be the discharge pipe between the blower and the cone valve system, and then the discharge piping in the cross corridor. However, the intake pipe is also radiating at 1200 Hz and should also be treated. Thirdly, even the compressor housings on the blower are radiating to some extent. It is, however, believed that the SPL in the blower room and the control room at 1200 Hz is primarily controlled by the radiation from the expansion joints and the piping in the basement. Thus, wrapping the basement piping and the expansion joint should reduce the noise in the blower room by a significant degree before the sound radiated directly from the blower becomes controlling.

Finally, in regard to the piping, the mufflers in the intake and discharge piping can do a reasonably good job of reducing the sound transmitted in the air. However, the pipe wall also carries the sound and the energy in this path can by-pass the muffler and couple back into the air path. Thus, to enhance the performance of such mufflers, it might be useful to provide a resilient break in the pipe wall before and after the muffler. If this cannot be done, it is perhaps preferable in a new system to omit the discharge mufflers and just provide pipe wrapping. However, in the intake system, the muffler in the present installation is probably doing some good, as there is no extensive piping after the muffler.

Based on the data in Fig. 1, it would be desirable to reduce the SPL at 1200 Hz by the order of 30 dB in the basement, 20 dB in the corridors, and 10 dB in the blower room, as well as 10 dB in the control room. If the 30 dB reduction is achieved in the basement, it is expected that the 10 dB reduction would also be achieved in the blower and control rooms. To accomplish

this reduction, the pipe wrapping should consist of several inches of glass fiber, and an outer impervious wrapping. The glass fiber should be between 2 and 4 in. thick, and the outer cover should weigh close to 1 lb/sq.ft. However, the thickness and fiber size of the glass fiber can influence the requirements for the outer cover. Another possibility is to use one form of wrapping for the piping nearest the blower, and a less expensive wrapping in the corridor.

For the discharge pipe between the blower and the cone valve, and for the intake pipe between the blower and the intake muffler, it is suggested that you consider using a 3 in. thick wrapping of Owen Corning Type 702, and a leaded asbestos cloth, Type 8266 (wt. 1.25 psf), as made by the Thermoid Division of H. K. Porter Co. in Charlotte, N.C. For the remaining piping, the outer wrapping could be a less expensive cloth, and possibly the glass fiber thickness could be reduced to 2 in.

Please let us know if you have any questions on this letter report, or if we can be of further assistance.

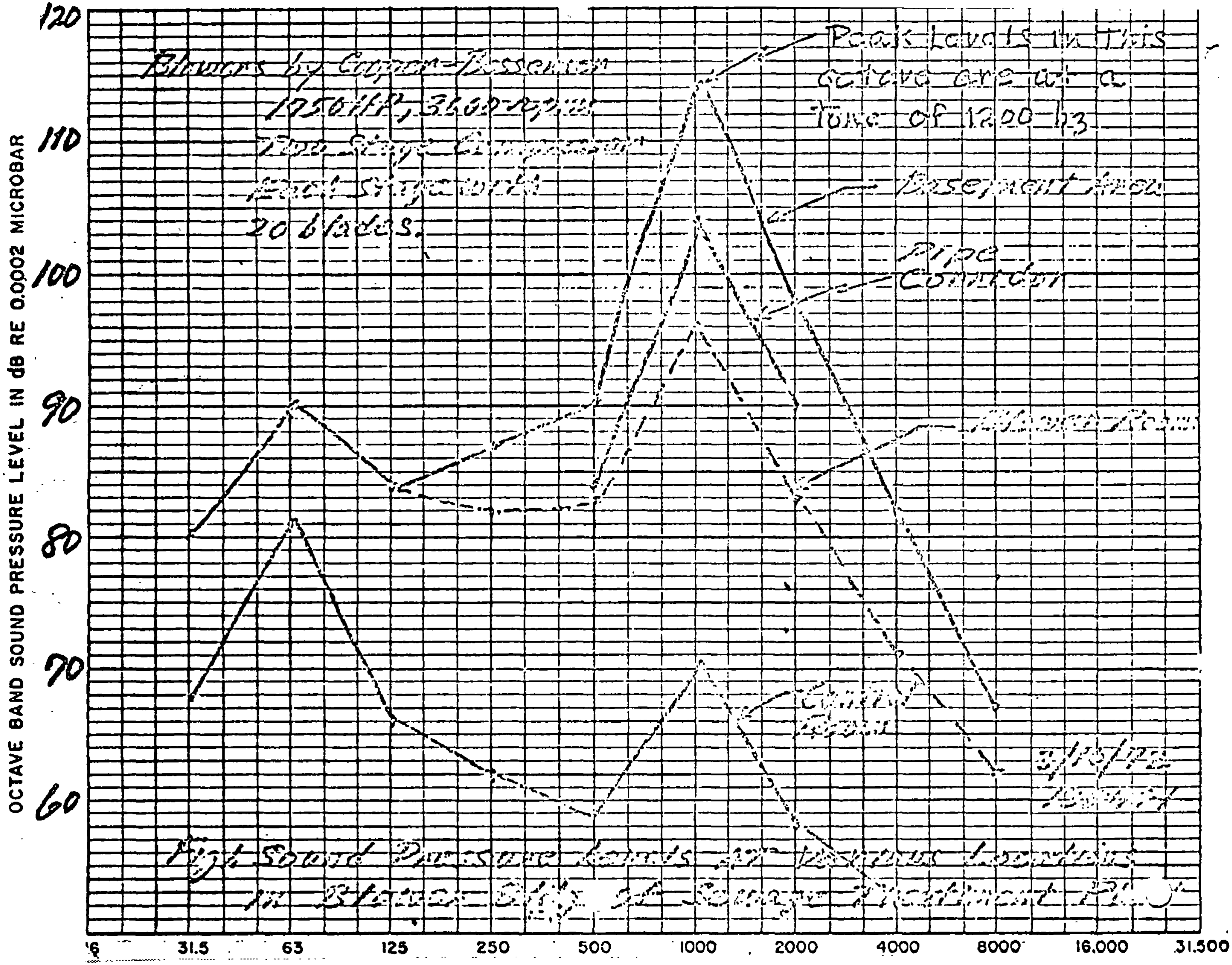
Sincerely,

BOLT BERANEK AND NEWMAN INC.

Robert M. Hoover

RMH/jpk

Enclosure: Fig. 1



BOLT BERANEK & NEWMAN INC

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U S COAST GUARD (WEP-2/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: 202-426-9573

• 5922/19

19 JUL 1972

Mr. Edward W. Furia
Regional Administrator
Environmental Protection Agency
6th & Walnut Sts.
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

We have reviewed the draft environmental impact statement for the Water Pollution Control Plant in the District of Columbia and have the following comment to offer.

Although the proposed regulations for oil transfer facilities will pertain only to the area in which the actual transfer is taking place, and not to adjoining tank farms, we would like to recommend that provision be made for placing dikes around each of the storage tanks to insure that any accidental leakage from the tanks is contained.

Thank you for the opportunity to review this environmental statement.

Sincerely,

S. A. WALLACE
Captain, U. S. Coast Guard
Chief, Marine Environmental
Protection Division
By direction of the Commandant

Response to Comments of Captain S. A. Wallace

In response to this recommendation, the applicant reports that suitable dikes will be provided to contain any accidental leakage that may occur.

UNITED STATES OF AMERICA
GENERAL SERVICES ADMINISTRATION
WASHINGTON, D.C. 20405

Mr. Edward W. Furia
Regional Administrator
Region III
U.S. Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

As requested in your recent letter, the General Services Administration has reviewed the draft environmental impact statement in conjunction with plans to expand and upgrade the existing Water Pollution Control Plant in the District of Columbia.

On page 24, under the item "Interim Treatment," there is the statement that consideration is being given to the addition of metal salt (alum or ferric chloride) to the existing secondary treatment units. It may be of interest that results of similar activities at our Pentagon Sewage Treatment Plant lead us to strongly recommend this consideration. By feeding 400 to 500 pounds per day of liquid ferric chloride along with a polymer, we were able to reduce the phosphate content of our effluent from 30 parts per million to one-half part per million. As an interim treatment, this procedure has much benefit in reducing nutrient content.

Our review of this draft environmental statement discloses no problems of concern to this agency.

Sincerely,

ROD KREGER
Deputy Administrator

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MARYLAND 21203

NABPL-E

4 August 1972

Mr. Edward W. Furia
Regional Administrator
Region III
U.S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Furia:

In reply to your letter of 8 May 1972, we have reviewed the draft environmental impact statement in conjunction with plans to expand and upgrade the existing Water Pollution Control Plant in the District of Columbia. Our comments are submitted in accordance with provisions contained in the National Environmental Policy Act of 1969 (Public Law 91-190).

1. It is desirable that the potential for flooding at the site be considered and the resulting consequences if the site or a portion of the facilities are flooded. The plant should remain in operation during high water if possible and damages avoided or minimized including resulting pollution of the Potomac River due to untreated sewage. By-passing flow from combined storm sewer and sewage pipelines should also be avoided if possible. The elevations of the 100-year and 50-year flood frequency in the vicinity of the site are 13.2 feet above msl and 10.8 feet above msl, respectively.

2. A map of the general area would be beneficial to show the three reaches referred to on page 6 of the EIS, to show the relationship of the Blue Plains site to Dykes Marsh, and to provide a better understanding of the site in relation to the surrounding area. Figure 1 on page 16 is of poor quality. The earth berm shown on Figure 1 should be identified and its purpose explained in the text.

3. The relationship of the water demands, wastewater flows, and population projections between the Washington Metropolitan Area and the Blue Plains Service Area as given on pages 6 through 14 could be better explained to avoid the possibility of confusion to the reader. A clearer explanation of the need for other additional regional wastewater treatment facilities would also aid the reader.

4. A map showing the sewer lines discussed on pages 26 and 27 would enable a better understanding of the effect of the plant expansion and upgrading on that system.

5. On page 33, the EIS says that "eutrophication created by excessive discharges of nitrogen can only be controlled by reducing the level of nutrients discharged from domestic wastewater treatment facilities in the upper Potomac Estuary." Nutrients are most likely also introduced from agricultural sources and from storm sewer runoff causing eutrophication.

6. On page 34, there is a conflict in the values for nitrogen which indicate a reduction from 47,500 lbs/day to 61,130 lbs/day.

7. A Department of the Army permit will be required for any extension of the outfall conduit into the main navigation channel which is mentioned as a possibility for the future on page 36.

8. Genus names given on page 42 should be underlined which is a generally accepted practice in professional writings.

9. There is no section "C" between pages 76 and 80. The EIS is either labeled wrong or a section has been omitted.

10. The discussion on the use of the area north and west of Washington for land disposal should be expanded rather than merely saying on page 84 that they were not considered practical because of pumping through or around the city. This alternative location for land disposal could be further developed and its advantages and disadvantages discussed.

11. Also, on page 84, the areas in Prince George's and Anne Arundel Counties could be preserved for future land disposal. The potential this has as an alternative could be presented.

12. The potential use of areas in Virginia for land disposal and the impact of using those areas should be considered and discussed as an alternative rather than not considering at all as stated on page 84.

13. The EIS refers to pumping raw sewage on page 88, paragraph 2, and discusses its disadvantages. The sewage could receive secondary treatment prior to transmission to the land disposal area rather than secondary treatment at the land disposal site.

NABPL-E 4 August 1972
Mr. Edward W. Furia

14 On page 89, the effects of increased flows in local streams would also be to add to low flows which would be an advantage.

15 Pumping to farm land for land disposal as discussed on page 95 appears to have been abandoned without investigating if arrangements could be agreed on to cross the State line.

16 On page 102, the possibility of obtaining permission to install a parallel railroad line through the military base does not appear to have been investigated

17 In Appendix D, there is no identification of whose design criteria for spray irrigation is included in the appendix.

18 Further data on how often barges will operate due to the facilities and additional information on safeguards against spills during operations associated with barging would be beneficial.

These comments are offered as suggestions to aid your office in preparing a comprehensive and detailed final EIS. As requested, the Council on Environmental Quality has been furnished copies of this correspondence.

Sincerely yours,

William E. Trieschman Jr.

WILLIAM E. TRIESCHMAN, Jr.
Chief, Planning Division

Response to Comments of William E. Trieschman, Jr.

1. In response to this comment, the applicant reports that the potential of flooding was considered in the design of the facility and that the "Site will not be subject to flooding even under 100 year storm frequencies." Also, the "plant site experienced no flooding problems during storm Agnes in 1972." Critical treatment units are above the referred to elevations.
   With respect to bypassing, the NPDES permit found in Appendix b of this statement is designed to require the District to operate the sewerage system in such a manner as to "Minimize the discharge of pollutants to the river and to maximize the achievement of water quality objectives."

2. A map entitled Potomac River Tidal System has been reproduced from T.R.35, modified to show the location of the Blue Plains Wastewater Treatment Plant and Dyke Marsh, and inserted following Page 4 of this statement. Also, Figure 1 has been revised and the reference to the Earth Berm has been eliminated.

3. The material that was presented on Pages 6 through 14 has been revised and updated to reflect present conditions. The role of Alternate Regional Facilities at Piscataway and in Montgomery County are briefly described in this text. For more information on this subject, the reader should consult the "Regional Sanitary Facilities - Potomac Drainage Areas" prepared by the Maryland Environmental Service.

4. Most of the discussion on these pages was devoted to the so-called "Georgetown Gap" which has since been eliminated. Therefore, a map showing the various sewer lines discussed in the draft would serve no useful purpose. A map showing the location of the Potomac Interceptor and the District's Project "C" has been substituted instead.

5. Section III B.1 of this document has been revised to include information which describes the fact that waste load allocation studies are being conducted on the free flowing segments of the Potomac to determine background nutrient concentrations. These studies will provide data which will be used to draw conclusions concerning the impact of non point Sources on the Potomac.

6. The text has been corrected.

7. The applicant is believed to be aware of this requirement.

8. The text has been corrected.

9. Section "C" (Other types of treatment considered) began on Page 58 of the draft statement and extended through Page 80.

Response to Comments of William E. Trieschman, Jr.

10. Several studies made since the date of the comment have examined the feasibility of land disposal in areas adjacent to Washington and recommended in favor of conventional advanced wastewater treatment facilities instead. Selected studies are listed below.

    1. "Wastewater Treatment Study - Montgomery County, Md."
       By CH_2M-Hill Engineers
       November 1972

    2. "Lower Potomac Basin Wastewater Facilities Study"
       By Bechtell, Inc.
       November 1972

11. The second of the studies listed above considered land disposal in Prince George's County but recommended a system based on conventional advanced wastewater treatment.

12. The response to comments Number 10 and 11 are also applicable to this comment.

13. While it is quite true that the transmission of secondary effluents is a possibility and it is also true that a rupture in a conduit carrying secondary effluent would not be as serious as a break in a line carrying raw sewage, the material presented on Page 88 of the draft statement has been included in the final text because land disposal sites located north or northwest of the metropolitan area (as suggested in Comment No. 10) would probably receive raw sewage from nearby Montgomery County rather than secondary effluents which would be pumped all the way from Blue Plains.

14. The draft statement listed the "Advantages", "Disadvantages" and "Unknowns" associated with spray irrigation (Pages 86-90 of draft statement). The effect of increased flows on local streams was addressed in "Unknowns" precisely because the effect could be either adverse or positive, depending on circumstances associated with the specific stream in question.

15. Potential jurisdictional obstacles were only one of the problems associated with this alternative. Please see "Summary of Sub-Alternatives for Sludge Disposal" which is found in Section V of this text for the major disadvantage of this method.

16. The potential for right-of-way acquisition problems was only one of the drawbacks associated with this transportation mode. Please see Section V of this statement for the major disadvantage of this mode.

Response to Comments of William E. Trieschman, Jr.

17. The "Tentative Design Criteria for Spray Irrigation for the Disposal of Sewage Effluents Which Have Received Secondary Treatment" were developed by the Commonwealth of Virginia's Department of Health. Line Number 3 on Page No. 85 of the draft statement pointed out that the design criteria were developed by the State of Virginia.

18. The District reports that "It is proposed that chemicals for treatment purposes and fuel oil may be received by barge. Rail facilities will also be available for receiving chemicals. The frequency of barges arriving and departing from the site will greatly dependent on the results of competitive bidding which would determine whether or not the materials are brought in by barge or by rail. All barging operations will be conducted in accordance with the latest applicable Coast Guard regulations."

    Also, the District reported that "the contemplated design features to safeguard the storage, handling, etc. of treatment chemicals will consist of the following:

    a. 'To prevent overflows, etc. during transfer of chemicals to the Chemical Building, a system of freeboard, alarms, plus automatic overflow in an enclosed gravity pipeline to an underground storage tank outside of the building'.

    b. 'To capture spills, leakages, etc. from pipelines and tanks a system of curbs, sumps, and pumps to send chemicals to the underground storage tank outside of the building'.

    c. 'Such collected overflows, spills, leakages, etc. could then be pumped from the underground tank either back into the system, or if conditions warrant, removed by tank truck for disposal elsewhere'.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-72/535

AUG 7 1972

Dear Mr. Furia:

In response to your letter of May 8, 1972, we have reviewed the draft environmental statement on the proposed expansion and upgrading of the Water Pollution Control Plant in the District of Columbia and offer the following comments.

General Comments

1. The effects of fill construction at the Oxon Cove site may be negligible until work approaches the water's edge. At that time, wave action and flood tides will cause erosion and subsequent sediment action downstream unless bulkheads are constructed. Whether or not bulkheading is planned was not made clear in the description of the Oxon Cove work.

2. With regard to spoil disposal at Dyke Marsh, any necking down of a river causes two reactions: (1) channel and edge scouring and (2) back pressure upstream. In effect, this is what created the original Dyke Marsh. During the future marsh development period, which includes plant root development and the completion of secondary consolidation, ordinary and extreme high water levels may be expected to wash away a portion of the marsh edges, causing long-range siltation. This effect will be duplicated by continued washing of the proposed spoil areas adjacent to the Blue Plains site and the river channel.

3. The plant will be designed for 309 mgd, and it should adequately treat that amount of sewage. The adequacy of adjacent existing, upgraded, or new plant facilities is highly questionable if it is based on the criteria established in the report. The report indicates that by 1980 the Metropolitan Area will increase waste flows by 45 percent, and Washington, D.C., alone by only 4 percent; by the year 2000, the area waste flow will increase 204 percent, and Urban Washington only 14 percent; and by the year 2020, the area increase will be 413 percent and Urban Washington only 28 percent. The reasoning given for such minimal expansion in Urban Washington is that the city has fully expanded. A fallacy in thinking is that 60 percent of Washington now consists of two-story single-family dwellings which are presently being replaced by eight-story multiple-family dwellings. Vertical expansion is far from complete. Because of this, the Blue Plains plant, physically limited in size, could be inadequate at 309 mgd.

4. The water quality design flow, 7-day - 10-year flow, will be 616 mgd. In the 20-year period from 1980 to 2000, the water demand on the Potomac River will increase from 556 to 1,009 mgd. Upon plant completion, the design flow for full treatment will be 309 mgd in 1977.

5. Hydraulically, plant units will be designed to handle flows of 650 mgd. During rains or heavy storms, the input therefore will receive degraded treatment to a point of grit removal only. This is expected to occur approximately 400 hours per year. Flows in excess of 939 mgd will either become septic during the holding period within the sewerage system or else be discharged raw in the upstream Potomac and Anacostia Rivers. This is expected to occur for a period totaling 240 hours every year, or 10 full days. Water quality standards during these periods will be additionally degraded by the retention dams to be constructed at points above the Potomac Estuary which are to control the river design flow to 616 mgd. Therefore, for a period of 640 hours, a flow totaling 630 mgd of partially treated and/or raw sewage will enter the upper Potomac, 14 mgd in excess of the future design flow.

6. The major weakness is a lack of certainty as to how the sludge incinerators will perform. The elaborate calculations on percentage increase of air pollutants are meaningless, since they are based only on estimates of the quantities of materials in furnace effluents.

7. Another unresolved problem is the effect of dredging upon water quality and aquatic organisms. A third uncertainty is the efficiency and operational maintenance of the newly developed and unproven denitrification process.

8. The applicant should determine the probable effect of the heat load on the river water temperature under the worst conditions anticipated, such as minimum flow at times of maximum seasonal ambient water temperature. The results determined should then be evaluated in terms of State and Federal standards. The estimated increase of 2°F in the effluent from the subcooler may represent a sizeable heat load in view of the 309 mgd design specifications for the plant.

Specific Comments

9. Page 34, paragraph 2. The figure given for reduced nitrogen, 61,130 lbs/day, is apparently a typographical error, if it is to agree with line 2 of the paragraph.

10. Page A-2, paragraph 3. The sentence should read, "...restricted to areas deeper than eight feet."

11. Page A-4, paragraph 2. The discussion in this paragraph should be revised to reflect the National Capitol Parks amendment to dumping permits, which defines maximum amounts of heavy metals that will be accepted as fill at the Dyke Marsh area of the George Washington Memorial Parkway.

12. The final environmental statement should reflect compliance with the Historic Preservation Act of 1966 by indicating consultation with the National Register of Historic Places.

We appreciate the opportunity to review this statement.

Sincerely yours,

Deputy Assistant Secretary of the Interior

Mr. Edward W. Furia
Regional Administrator
U.S. Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Response to Comments of W. Lyon

1. During fill construction, stone rip-rap was placed in that portion of the fill susceptible to wave action. Also, sewage sludge was available for application to seeded areas; therefore, vegetation quickly became established and minimized erosion. Finally, silt collection basins were constructed to contain the sediment load carried by the plant storm drainage system.

2. This comment is difficult to interpret. If it is an objection to dredged spoil disposal at Dyke Marsh, Appendix A of the draft statement addressed that subject in considerable detail and reported (in the summary on Page A-6) that "Tests have disclosed no adverse effect on water quality from spoil disposal." If it is an objection to fill construction at the Blue Plains site, it is addressed in Response No. 1 above. Finally, if it is directed to the disposal of stockpiled sludge and excess excavation, a substantial portion of this material was subsequently disposed of on land owned by the Department's National Park Service and located quite a distance from the river.

3. Recent wastewater planning for the Maryland portion of the metropolitan area has recognized that the 309 MGD design capacity of Blue Plains is inadequate to serve the area's future needs and design work is underway for a relief facility to be located in Montgomery County, Maryland. Another relief facility is planned for the Piscataway, Maryland vicinity. The plans also propose a transmission facility connecting the Anacostia drainage area to Blue Plains and to Piscataway. Ultimately, the Maryland side of the Potomac in the Washington area will be served by three regional, connected treatment plants: Montgomery County - Blue Plains - Piscataway.

4. Section I-B of this text has been updated and it points out that serious consideration is presently being given to constructing facilities that will tap estuary water as a supplemental source of water supply.

5. With respect to the contention that: "For a period of 640 hours, a flow totaling 630 MGD of partially treated and/or raw sewage will enter the Potomac", the reader is directed to the draft NPDES permit found in Appendix b of this text which will establish effluent quality requirements for the plant discharge. Once the expansion and upgrading project is complete (by January 1, 1978), the discharge is limited to 12,700 lbs/day of BOD_5, 18,100 lbs/day of suspended solids, 560 lbs/day of total phosphorus, and 6,130 lbs/day of total nitrogen during any consecutive 30-day period. Furthermore, the permit requires that "Short-term flows at a rate of up to 650 million gallons per day (MGD) or 2,460,000 cubic meters per day shall receive complete treatment." Finally, with respect to the combined sewer system, the applicant is required by the permit to

operate the treatment plant and sewerage system in such a manner as to minimize the total quantity of pollutants discharged and eventually to develop long-range solutions to eliminate or abate pollution discharges from the system.

6. Please see "Response to Comments of David G. Hawkins" in this appendix for a detailed discussion of this topic.

7. Appendix A of the draft statement addressed the subject of dredging and spoil disposal and described the precautions taken to minimize adverse impacts by selecting equipment that would produce minimal disruption to the environment. The summary found on Page A-6 of that appendix indicated that water quality measurements were taken at Dyke Marsh, Blue Plains, and in the Potomac across from the marsh and that no adverse effects were found.

   Table I (see Page 16) has been revised to include the results of the EPA-DC Pilot Plant operation in place of projections made by the designer. During the period from July to December 1972, the concentration of total nitrogen averaged 1.40 mg/l in the pilot plant effluent. This concentration is well below the 2.39 mg/l concentration that can be calculated from the NPDES permit limitations of 6,130 lbs/day and 309 MGD.

8. Please see "Response to Comments of Charles H. Conrad", No. 5

9. An error was made and the text has since been corrected.

.0, 11. These comments are noted but it is felt that there is no need to include Appendix A of the draft statement with this final statement merely to make the suggested relatively minor revisions.

12. Copies of this final statement are being directed to the District of Columbia's State Liaison Officer on Historical Preservation and to the Advisory Council on Historic Preservation. However, no Historical Register Properties are believed to be affected by this project.

MARYLAND
DEPARTMENT OF STATE PLANNING

301 WEST PRESTON STREET
BALTIMORE, MARYLAND 21201
TELEPHONE 301-383-2451

MARVIN MANDEL
GOVERNOR

VLADIMIR A WAHBE
SECRETARY OF STATE PLANNING
EDWIN L. POWELL, JR.
DEPUTY SECRETARY

August 24, 1972

Mr. Edward W. Furio
Regional Administrator
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT REVIEW

Applicant: Environmental Protection Agency

Project: District of Columbia Water Pollution Control Plant - Expansion and Upgrading

State Clearinghouse Control Number: 72-5-184

State Clearinghouse Contact: Edwin L. Powell, Jr. (383-2467)

Dear Mr. Furio:

The State Clearinghouse has reviewed the above noted Environmental Impact Statement. In accordance with the procedures established by the Office of Management and Budget Circular A-95, the State Clearinghouse received comments (copies attached) from the following:

Department of Health and Mental Hygiene: the Division of Water Supply and Sewerage found the statement acceptable and reiterated approval of the project. The Bureau of Air Quality Control recommended approval and noted that incinerator emission controls are satisfactory.

Department of Natural Resources: evidenced approval by stating that the improvement to the treatment facility is a top priority goal in the effort to improve water quality in the upper Potomac estuary.

1. Our staff suggested that the statement should address the implicit adverse environmental effect of the project on water quality in other Maryland water courses if the Federal share of Maryland's portion of the financing is taken from those Federal funds normally allotted to Maryland for water quality control projects. This negative impact will be avoided if the Federal share of the State's funding is allocated from discretionary funds, thus permitting the continued funding of other projects designed to improve water quality throughout the State.

We hope that these comments will assist you in the preparation of your final statement and look forward to continued cooperation with your agency in the Clearinghouse review of the complete project presentation.

Sincerely,

Vladimir Wahbe

Enclosures

cc: W. McLean Bingley
Jean J. Schueneman
Anthony Abar
Larry Fogelson
Walter Scheiber

72-5-184

State of Maryland

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Neil Solomon, M.D., Ph D., Secretary
ENVIRONMENTAL HEALTH ADMINISTRATION
610 N. HOWARD STREET • BALTIMORE, MARYLAND 21201 • Area Code 301 • 383-2763

June 9, 1972

Mr. Edwin L. Powell, Jr.
Deputy Secretary
Maryland Department of State Planning
301 West Preston Street
Baltimore, Maryland 21201

RE: Water Pollution Improvements
District of Columbia

Dear Mr. Powell:

We have your letter of May 16 attaching a draft of the Environmental Impact Statement prepared by the Environmental Protection Agency concerning the Blue Plains Water Pollution Control Plant. The summary sheets shown on Pages i through iii are in agreement with the comments we have previously made and you will recall that my memorandum of October 15, 1971, included as sheet M27 of this document, clearly indicated our approval to the project.

It is, therefore, our judgment that the Environmental Impact Statement adequately fulfills the legal requirements for the preparation of the Statement and is acceptable to this office.

Very truly yours,

W. McLean Bingley

W. McLean Bingley, P. E.
Chief, Division of Water and Sewerage

WMcLB:ib

STATE OF MARYLAND—:—DEPARTMENT OF HEALTH AND MENTAL HYGIENE

MEMORANDUM

Copies Washington D.C. Health Dept.
Air Pollution Division

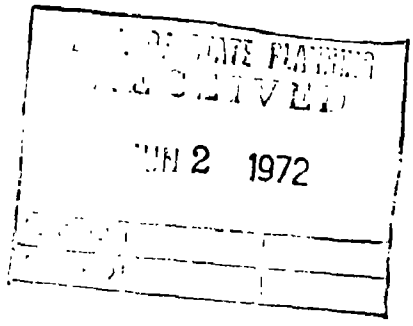
TO Mr. Edwin L. Powell, Jr., Chief
State Clearinghouse

From Jean J. Schueneman, Director
Bureau of Air Quality Control

Date May 31, 1972

Subject Water Pollution Plant Improvements - D.C.; Control No. 72-5-184

The Bureau of Air Quality Control is satisfied with the plans for the Blue Plains sludge incinerator. Emissions are being controlled as much as technically feasible and should pose no health hazard. We recommend approval of the project.



P

Date: August 21, 1972

Maryland Department of State Planning
State Office Building
301 West Preston Street
Baltimore, Maryland 21201

SUBJECT: PROJECT SUMMARY NOTIFICATION REVIEW

Applicant: Environmental Protection Agency

Project: Water Pollution Control Plant Improvements - D.C.

State Clearinghouse Control Number: 72-5-184

CHECK ONE

1. This agency does not have an interest in the above project._____

2. The above project is consistent with this agency's plans or objectives and we recommend approval of the project._____

3. This agency has further interest in and/or questions concerning the above project and wishes to confer with the applicant._____ Our interest or questions are shown on enclosed attachment.

4. This agency does not believe a conference is necessary, but wishes to make favorable or qualifying comments shown on enclosed attachment. XXX

Signature [signature]

Title Chief, Planning & Evaluatic

Agency Dept. of Natural Resources

ES D. COULTER
SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
STATE OFFICE BUILDING
ANNAPOLIS 21401

JOSEPH H. MANNING
DEPUTY SECRETARY

August 21, 1972

COMMENTS OF THE DEPARTMENT OF NATURAL RESOURCES ON PROJECT #72-5-184
Water Pollution Control Plant Improvements - D.C.

The Department of Natural Resources wishes the proposed improvements of the Water Pollution Control Facilities to proceed as quickly as possible.

The expansion and upgrading of the District of Columbia Water Pollution Control Plant at Blue Plains is an essential element in the ongoing effort to improve the water quality of the upper Potomac estuary.

This treatment plant now receives considerable flow from Montgomery and Prince George's Counties in Maryland, and since the Potomac River supports valuable natural resources of direct and indirect value to the State, improvement of treatment at this plant is viewed by Maryland as a top priority goal.

Response to Comments of Vladimir Wahbe

1. The Federal Water Pollution Control Act was amended in October of 1972 to provide that Federal Construction Grant Funds be allocated to the States on the basis of their "Need" for wastewater treatment facilities as measured in a joint Federal-State "Needs" survey. Maryland's share of Blue Plains was entered as a "Need" in the survey so it would seem that the construction grant funds should be taken from the normal State allotment. The 1972 ammendments also provide that funds which are not used by a State within one year after the end of the fiscal year for which they were appropriated shall be realloted among all the other States which have used their full allotment. Therefore, there is no possibility of a "Discretionary" appropriation as suggested in the comment.

METROPOLITAN WASHINGTON COALITION FOR CLEAN AIR, INC.
1714 MASSACHUSETTS AVENUE, N.W., WASHINGTON, D.C. 20036 (202) 785-2444

November 7, 1972

Mr. Robert J. Blanco
Environmental Impacts Statements Branch
EPA - Region III
6th & Walnut Street
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

I have been informed that you never received the MWCCA comments on the Blue Plains treatment plant 102 Statement. Enclosed is a copy of said statement which was endorsed and sent to the Region III office by Scott Lang, Environmental Defense Fund.

I hope you will be able to discover why this statement never reached you.

Thank you for your attention.

Very truly yours,

John S. Winder, Jr.
Executive Director

JSW/sh

Enclosure:

METROPOLITAN WASHINGTON COALITION FOR CLEAN AIR, INC.
1714 MASSACHUSETTS AVENUE, N.W., WASHINGTON, D.C. 20036 (202) 785-2444

STATEMENT OF JOHN S. WINDER, JR., EXECUTIVE DIRECTOR
METROPOLITAN WASHINGTON COALITION FOR CLEAN AIR
RE: DISTRICT OF COLUMBIA WATER POLLUTION CONTROL PLANT
(DRAFT ENVIRONMENTAL IMPACT STATEMENT)
BEFORE: U.S. ENVIRONMENTAL PROTECTION AGENCY

June 1972

These comments are directed at those portions of the above-cited Draft Environmental Impact Statement which relate to the impact of the proposed facility on the air resources in the National Capital Interstate Air Quality Control Region, (particularly page 38-42 -- "Effects of Plant Operation on Air Resources; and pages C 1 - C 40 -- Appendix C - "Sludge Incineration").

(1) The Impact Statement "Summary Sheet (p.i) included the following statement: "Adverse Environmental Effects: (1) Negligible effects on ambient air quality." This statement is highly categorical, unsupported, and, in fact, open to question by the data cited in the Statement. The Statement, for example, states that the incineration process will create the following major air pollutants: NO_X -- 198 tons/year; SO_2 -- 206 tons/year. It is inaccurate to suggest that an impact of this magnitude is "negligible."

(2) The air pollutants will have a particularly adverse effect on the high concentration of persons in the three facilities immediately adjacent to the proposed facility -- D.C. Village, U.S. Naval Research Laboratory, and the Anacostia Freeway.

(3) This large concentration of emissions is inconsistent with and in violation of the District of Columbia Air Quality Implementation Plan, adopted pursuant to the Federal Clean Air Act of 1970. In general, these emissions will violate the non-degredation policy embodied in the Clean Air Act, supported by the EPA Implementation Plan Guidelines, and required by the recent Federal Court decision in Sierra Club et al. v. Ruckelshaus.

In particular, the increased emissions from this facility will make increasingly difficult, if not impossible, the attainment of the Federal ambient air quality standards for NO_x -- (0.05 ppm). Data compiled from the District of Columbia CAMP station for a period from May 21 through December 13, 1970 and from January 4 through March 14, 1971 indicated an arithmetic mean concentration of NO_x of 0.054 ppm -- currently exceeding the federal standard.

(4) The wind patterns for the District of Columbia indicate that during the warmer months the prevailing winds are southerly and southwesterly -- which will carry the pollutants over the most heavily populated, low income area of the District. It is also during this time of year that the formation of photochemical smog, which is increased by the addition of NO_x, is most prevalent.

(5) It is undisputed that the automobile traffic on the Anacostia Freeway is a substantial source of NO_x; and during the warmer months these pollutants will mix with the NO_x concentrations

caused by the proposed facility to create a more intense and harmful burden on the residents north of the facility.

(6) IN CONCLUSION, it is clear that additional controls of air pollutants from this proposed facility must be required. A commitment must be made for not only the application of the maximum existing control technology but also the periodic application of future advances in control technology.

Response to Comments of John S. Windner, Jr.

In response to these comments, the Staff which prepared Appendix C replied:

1. "That our conclusion of a negligible effect on ambient air quality is 'highly categorical, unsupported, and in fact, open to question' is false. A thorough analysis was performed, and its results (on pps. C24, C25*) support our contention of an acceptably minimal impact."

2. "D.C. Village, the U.S. Naval Research Laboratory, and a portion of the Anacostia Freeway all are within the distances for which ambient air concentrations of pollutants from the incinerator were calculated (pps. C24, C25*). These indicate that concentrations at the above facilities will increase only slightly because of incinerator emissions."

3, 4, and 5:

"Although strategies for attainment of the ambient NO_x standard in Washington, D.C. have not been fully defined yet, it is anticipated that the standard will be attained within the time constraints allowed."

6. "This proposed facility will already employ controls at the limits of present technology (p. C33*). The recommendation that '...additional controls ... must be required' thus cannot be acted upon."

Natural Resources Defense Council, Inc.

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April 19, 1973

Mr. William D. Ruckelshaus
Administrator
Environmental Protection Agency
Room 1200
Waterside Mall Building
401 M Street, S. W.
Washington, D. C. 20460

Dear Mr. Ruckelshaus:

I am writing on behalf of the Natural Resources Defense Council, the Metropolitan Washington Coalition for Clean Air, the Montgomery Environmental Coalition, the Prince Georges Environment Coalition, and the Center for Environmental Strategy regarding EPA's Draft Environmental Impact Statement (EIS) on the Blue Plains Sewage Treatment Plant. ("District of Columbia Water Pollution Control Plant", Draft Environmental Impact Statement, Environmental Protection Agency, Middle Atlantic Region, April 1972.)

In our view the Draft EIS is wholly inadequate in its discussion of the environmental impact of emissions to the air resulting from incineration of sludge at the plant. The inadequacies in the statement are of such magnitude that we urge EPA to prepare a new draft statement to provide a reasonable basis for comprehensive comment and criticism.

The draft statement does not adequately treat the subject of total emissions of sulfur oxides, sulfates, sulfuric acid aerosols, lead, mercury, beryllium, asbestos, and other toxic elements from the plant's incinerators. Documents relating to these pollutants, released by EPA since the publication of the draft EIS, demonstrate the need for a complete reassessment of the safety of operating a large scale sludge incinerator such as that proposed for Blue Plains. I am attaching a preliminary analysis of the nature of the hazards posed by such pollutants in the context of the Blue Plains project. This analysis was prepared by James L. Repace, a scientific consultant who is very familiar with problems of sludge incineration.

Sulfur Oxides, Sulfates, Sulfuric Acid Aerosols.

The draft statement discusses potential sulfur oxides emissions from the Blue Plains incinerators but offers no discussion of sulfates or sulfuric acid aerosols. This is a major shortcoming of the EIS, resulting in a severe underestimation of the potential public health impact of the incinerators. Recent EPA studies state that suspended sulfates and sulfuric acid aerosols may pose significantly greater health hazards than SO_2 alone.[1] Particularly noteworthy is the statement in EPA's Summary Report on Suspended Sulfates and Sulfuric Acid Aerosols that EPA investigators feel that there is "unequivocal evidence that the levels of suspended sulfates necessary to cause adverse health effects were one to two orders of magnitude lower than the levels of sulfur dioxide or total suspended particulates."[2] The Blue Plains project must be reassessed to determine the levels of sulfates and sulfuric acid aerosols which can be expected from the incinerators.

With respect to SO_2 emissions the draft statement should not confine itself to an assessment of whether present primary and secondary standards will be met. There is increasing recognition that the present standards are not adequate to protect public health and welfare. For example, a recent EPA memo on the subject states "we observe increased deaths at levels even below existing national primary short-term (24-hour) standards. Other acute health hazards, such as aggravation of asthma and of cardio-pulmonary symptoms in chronically ill subjects, have now been demonstrated at these low exposure levels. Excess mortality occurs whether we examine SO_2 alone, or the product of SO_2 and particulates."[3] The secondary standards are also under review by EPA and will be proposed in a more stringent form. EPA cannot ignore the fact that the Blue Plains facility will be in operation for a score of years or more and that all evidence indicates that SO_2 and particulate standards will have to be established at more stringent levels during that time to protect public health and welfare. The project must be analyzed for its consistency

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1/ U.S. EPA, National Environmental Research Center, Summary Report on Suspended Sulfates and Sulfuric Acid Aerosols, Draft, December 1972, See CHESS studies cited at page 71, notes 2-6.

2/ Id. at 66.

3/ Memorandum: "Evidence for Change in Significant Harm Levels," from Carl M. Shy, M.D., to Michael James, OGC, Oct. 30, 1972.

with anticipated adverse effects associated with its emissions.

Another defect of the EIS relative to SO_2 and particulate emissions is its failure to assess the health hazards associated with incinerator operation at times when the stack removal systems are inoperative. "EPA engineers estimate that SO_2 flue gas cleaning devices will be inoperative for scheduled maintenance at least two weeks per year and for unscheduled repair an additional 10% of the time."[4] Will the plant incinerators be operative during these periods? If not, how will disposal of sludge be handled? These questions must be answered.

Lead and Mercury.

As Mr. Repace notes in his analysis, the draft EIS relies without justification on levels of lead and mercury purportedly characteristic of primary sludge generated at the Lorton, Virginia sewage treatment facility, while the critical information is, of course, the level of these elements in the activated sludge at Blue Plains. Since the sludge at Blue Plains is the product of a much more urbanized environment than that associated with Lorton it is not reasonable to assume that these contaminants will be at the same level in Blue Plains sludge as in Lorton sludge. Moreover, EPA's report on Sewage Sludge Incineration states that as a general matter activated sludge (as at Blue Plains) will include more of such contaminants than primary sludge (as at Lorton).

EPA has recently promulgated a national emission standard for mercury (38 Fed. Reg. 8831, April 6, 1973). As Mr. Repace's analysis indicates the standard of 2,300 grams of mercury emitted per 24-hour period will be violated by the Blue Plains sludge incinerators even when operating at average load. The fact that EPA's mercury regulations by their terms do not apply to sewage sludge incinerators is not controlling since EPA has determined that an emission limitation of 2,300 grams per day by a source is necessary to prevent ambient concentrations of mercury from reaching levels hazardous to health. The Clean Air Act requires hazardous pollutant emission standards to apply to all sources capable of violating the emission limitation required by the standard.

4/ U.S. EPA, Staff Paper, Intermittent Control Systems, April 1973 at Tab. 2, p. 1.

Beryllium.

Mr. Repace's analysis also demonstrates that the recently promulgated national emission standard for beryllium (38 Fed. Reg. 8830, April 6, 1973), will be violated by the Blue Plains incinerators when operating at average load. The Draft EIS offers no discussion whatsoever of beryllium emissions from the incinerators.

Asbestos.

Since the draft EIS fails to discuss asbestos emissions from the incinerators we do not have an adequate basis for commenting on the specific hazard posed by Blue Plains with respect to this pollutant. Mr. Repace's analysis simply offers the observation that asbestos is likely to be present in Blue Plains sludge and is not likely to be prevented from being emitted to the air. The EIS must be redrafted to discuss this question.

In summary, we urge you to consult EPA's own recent work on the air pollutants discussed above and undertake a complete reevaluation of the proposed sludge incineration component of the proposed Blue Plains project. This reevaluation is essential if EPA is to ensure that the health of persons near the project will not be jeopardized. It is our position that this reevaluation must include a comprehensive chemical analysis of Blue Plains activated sludge and must be accompanied by the preparation of a new draft EIS, which provides a thorough discussion of the results of this analysis.

We would appreciate the courtesy of an early reply to the points raised in this letter.

Sincerely,

David G. Hawkins

cc: Robert Sansom
John Quarles
Daniel Snyder, Region III
Sheldon Meyers

DGH/scr

PRELIMINARY ASSESSMENT OF THE BLUE PLAINS SEWAGE TREATMENT PLANT DRAFT ENVIRONMENTAL IMPACT STATEMENT

I have read the Environmental Impact Statement[1] dated April 1972, on the sludge incinerator under construction at Blue Plains. Since the publication[2] of emission standards for asbestos, beryllium and mercury, and in light of the EPA Task Force document on Sewage Sludge Incineration,[3] I must express my grave reservations as to the adequacy of Blue Plains Impact Statement in particular, as to the safety of sludge incineration in general, and as to the adequacy of national air quality standards in protecting human health.

1. The Blue Plains facility is being designed to handle an average flow of 309 million gallons per day (MGD) in 1975 with a peak capacity of 650 MGD.[1] The average flow through the plant during 1972[4] was 283 MGD, and the month of June averaged 297 MGD. Moreover, the population in the area served by the plant is expected to increase by 30% by 1980.[1] It seems clear, therefore, that there is a probability, increasing with time, that the plant will be operated at maximum capacity just to handle the average flow.

2. The incinerator emissions of SO_2, NOx, and particulates presented in the Impact Statement are based only on average throughput rates for sludge in the incinerators. If all eight incinerators at Blue Plains were to be operated at maximum design throughput (a probable occurrence) the emissions of air pollutants from the incinerators would be 52% higher than presented in the Impact Statement.

3. It is planned that the incinerators and their afterburners will operate using #2 distillate fuel oil, which is used for home heating, and which is to contain 0.5% Sulfur by 1975. In view of newspaper reports of the scarcity of fuel[5] and of possible political decisions to suspend the requirement that #2 fuel oil be limited to 0.5%S[6] it is probable that the sludge incinerators would be restricted to higher sulfur content fuel oil, or even to coal, which might double or triple the SO_2 output of the incinerators.

4. Since the sludge will be burned at approximately 75% moisture, and since sludge contains appreciable concentrations of manganese and iron, which are catalysts for the oxidation of SO_2 to SO_3, the SO_2 in the incinerator emissions may be largely converted to sulfuric acid, which has been

shown to be as much as four times as irritant as SO_2[7]. Therefore, an estimate of the health impact of the Blue Plains incinerator should probably be based upon H_2SO_4, rather than SO_2. Moreover, sulfates have been shown to be up to 20 times more irritant than SO_2;[9] in addition there is a particle size effect; all of which indicates that atmospheric levels of SO_2 and their implications to human health should be assessed in terms of the potential formation of more irritant factors.

5. Mercury and lead. Estimates of the concentration of mercury and lead in the sludge were based on primary sludge samples taken from Lorton, Va. No evidence was presented to indicate that Lorton sludge was representative of Blue Plains sludge. Why was not activated Blue Plains sludge analyzed? According to the task force document on sludge incineration[3] mercury may be present in domestic activated sludge to a concentration of 20 µg/g dried sludge. (Table VI, p. 64). If we apply this figure to the Blue Plains Incinerators, based on <u>average</u> throughput, the mercury output could be expected to be 8600 g/day as compared to 2300 g/day which is the maximum allowable for a mercury smelter.[2] <u>This would be nearly 400% more than the maximum allowable mercury emissions permitted by law</u>. Moreover, the mercury content of sludge at Lorton according to the task force document was 6 µg/g <u>not</u> µg/g[1] which could indicate an emission of 2580 g/day which is beyond the legal maximum. Furthermore, if one were to operate the incinerators at maximum throughput, substantially greater emissions could be expected. In view of the fact that mercury is a cumulative poison, sludge incineration would appear to pose insurmountable safety hazards to human health.

6. Asbestos. According to the EPA National Emission Standard for Asbestos[2], "it would be highly imprudent to permit additional contamination of the public environment with asbestos. Continued use at minimal risk to the public requires that major sources of man-made asbestos emission into the atmosphere be defined and controlled." In view of this, and in view of the results of Selikoff[8] which indicate that airborne concentrations of 20-60 ng/m^3 contaminate the air over Philadelphia and New York, it is very reasonable to presume that sewage sludge, which contains street runoff, must contain asbestos fibers. Common sources of asbestos in the urban environment include construction and demolition debris and dust from automotive brake linings.

According to Selikoff, single 10^{-9} gram fibers from chrysotile asbestos (95% of the asbestos in U.S. is chrysotile) are proven to fragment into as many as one million 300-400

ngstrom wide fibrils by 2000 angstroms in length; these can nly be detected by electron microscopy. Since the water crubbers to be used at Blue Plains are very inefficient or submicron particles these fibrils would have a high proability of escaping capture. Since sludge incinerators re in use all over the country it appears that an immediate nvestigation is in order. On this count alone, it would ppear that sludge incineration is most unwise.

. Beryllium. National standards have been promulgated for beryllium which limit emissions to not more than 10g/day.[2] According to the task force report on sludge incineration, beryllium may be present in activated sludge to 4 g/g. Based on average throughput in the Blue Plains incinerator, 10.32 g of beryllium per day would be emitted, which is in excess of the legal maximum. However, if the incinerators were operated at maximum capacity, this limit would be exceeded by 52%. Again, on this point alone, sludge incineration at Blue Plains would be condemned.

8. All of the above emissions would be additive to existing body burdens, and to existing sources of pollutants in the area of the incinerators. For example, ~35,000 cars/day pass the plant site on Route 295. There are 900 overflights a day by aircraft serving National Airport. A neighboring PEPCO power plant burns ~3000 gallons of oil/hr. All this will be in addition to the emissions of the Blue Plains incinerators. I have calculated that the incinerators will emit as much as 10^{14} submicron particles per minute. During a moderate air stagnation a neighbor of the plant may inhale up to 10^9 of these particulates per day in the pressence of NOx and SO_2. NOx tends to facilitate deposition of particles in the lower respiratory tract, SO_2 retards lung clearance, and submicron particles can penetrate to the alveolic and are up to 100 times more irritant than micron sized particles.

9. There may be as many as 10,000 people who live or work within a 1,000 meter radius of this incinerator. In view of the extreme hazards posed by the emissions of the incinerator already mentioned above, especially as the dose per kg of body weight might be a factor of 100 times greater for infants and fetuses, it seems incomprehensible that sludge incineration can be seriously contemplated as a method of disposal.

In addition to the above considerations there are a number of other toxic[10] substances found in sludge: silicon dioxide, manganese, copper, zinc, barium, chromium,

boron, cadmium, antimony, arsenic, nickel, and lead. Boron and lead, like mercury, are cumulative poisons. Nickel, chromium, arsenic, like beryllium, are associated with carcinogenesis. Cadmium, antimony, manganese, and silicon dioxide are highly toxic inhalation hazards. Emission factors for compounds must therefore be determined and the very real probability of synergy must be considered.

10. In summary, the Blue Plains sludge incinerator poses extremely grave environmental hazards which I believe have not been adequately identified or discussed by the draft environmental impact statement.

James L. Repace

References

1. "District of Columbia Water Pollution Control Plant", Draft Environmental Impact Statement, Environmental Protection Agency, Middle Atlantic Region, April 1972.

2. 38 Federal Register, 8820, Friday, April 6, 1973.

3. "Sewage Sludge Incineration", PB 211 323 (EPA-Ra-72-040), August 1972, distributed by the National Technical Information Service.

4. Quarterly Report on Interim Treatment Results in the D.C. Sewerage System, June 1972, Water Resources Management Administration, District of Columbia.

5. Washington Star, March 8, 1973, p. A1.

6. Washington Post, April 3, 1973, p. A2, "Administration Weights Delaying Air Cleanup."

7. "Aerosols Formed by Oxidation of SO_2", M. Amdur, Arch. Env. Health 23, Dec. 1971, p. 460.

8. "Asbestos Air Pollution," I. Selikoff et al. Arch. Env. Health 25, July 1972, p. 1.

9. "Toxicity of Long-Term Exposure to Oxides of Sulfur", T.R. Lewis, et al., Arch. Env. Health 26, Jan. 1973, p. 16.

10. Dangerous Properties of Industrial Materials, N.I. Sax, Reinhold, N.Y., 1957.

Response to Comments of David G. Hawkins

The comments made by Mr. Hawkins in his letter generally overlap and expand on the "Preliminary Assessment of the Blue Plains Treatment Plant Draft Environmental Impact Statement: prepared by James L. Repace. Therefore, the response to both the letter and the assessment has been integrated and presented in a topic-by-topic fashion on the following pages.

Sulfur Compounds

In response to comments which claim that sulfur compounds will be converted to sulphuric acid, the incinerator designer reports that he questions "the statement that the SO_2 will be 'largely converted to sulfuric acid' since iron and manganese compounds are relatively poor catalysts and the short exposure to high temperatures in this combustion train should give low oxidation rates of SO_2. The degree of SO_2 oxidation suggested in the comment is of questionable validity without further substantiating evidence".

EPA reviewers agreed that sulfate emissions would be minimal. Their response is reproduced below.

"There is little information available on the sulfate content of the particulates emitted from sludge incinerators. However, the (relatively) small amount of fuel required, its low sulfur content, and a high degree of particulate control will serve to minimize such emissions. As for health effects, EPA publication AP-111 (p.V) states that 'although sulfuric acid is known to be a much greater irritant than SO_2 to man, the combined effect of particle size and concentration of sulfuric acid mist on exposed human subjects is still undetermined, 'and'.... little is known of the actual atmospheric concentrations and chemical forms present under varying meteorological conditions and of the toxicologic significance of this group of compounds under different ecological conditions'. There are at present no air quality standards for sulfates."

Reliability

The incinerator designer has developed the following response in rebuttal to criticisms concerning operational dependability of the incinerators:

"The discussion criticizes the draft EIS for 'failure to assess the health hazards associated with incinerator operation at times when the stack removal systems are inoperative' and then refers to an estimated period of two weeks per year for scheduled maintenance plus an additional 10% of the time for unscheduled repair.

"The entire incinerator plant design was developed to provide a separate flue gas cleaning system for each sludge furnace to provide a one-on-one arrangement and preclude the operation of a furnace when its associated flue gas cleaning equipment was inoperative or malfunctioning. The control system is

arranged to automatically take a furnace out of operation if the flue gas cleaning equipment or other critical components of the combustion train malfunction. As is stated in the draft EIS no operating by-pass flue exists in the design to prevent even manual override operation if the equipment malfunctions.

"The District's decision to install eight furnaces even now that the plant is not planned for expansion beyond the present 309 mgd flow rate results in one total furnace alignment complete with the flue gas cleaning equipment being always available on stand-by even during periods of 3-day peak operation with the larger quantities of sludge anticipated from the advanced waste treatment process. Conversely, when the sludge production rates are lower than the annual average production rates, additional furnace capacity is available for back-up and system operating flexibility if an unscheduled outage occurs on an operating unit.

"The individual furnaces were selected with reserve capacity beyond the maximum 3-day peak loading rate and the auxiliary equipment, including the flue gas cleaning devices, were sized to offer the necessary operating safety even under a possible increase in the sludge feed rate beyond the listed maximum range.

"While the above items have added to the installation cost of the project, they were considered necessary to provide the degree of environmental protection required in a modern incinerator facility and we believe satisfy the objections set forth in this comment."

Mercury and Beryllium

The question of the potential for public health hazards due to mercury and beryllium emissions from the incinerators was referred to the Agency's National Environmental Research Center in Research Triangle Park, North Carolina. EPA scientists reviewed the situation and developed an analysis which concluded that "the foregoing calculations for mercury (and beryllium) under existing conditions show that the emissions from the proposed Blue Plains waste treatment facility are not expected to cause hazardous ambient concentrations to occur". While several "work case assumptions" were made during the analysis which tend to provide factors of safety, the researchers also pointed out that there is a "lack of specific information concerning the composition of the sludge and the fate of material processed in sludge incinerators". Therefore, this Agency proposes to hold open the discussion period on the topic of incineration until a comprehensive and conclusive investigation can be completed. The applicant has been cautioned not to proceed with the installation of the incinerators until explicit authorization is supplied him by this Agency. Furthermore, it is our understanding that the applicant has nearly completed an investigation of alternatives to incineration. The findings of this investigation coupled with guidance from the National Environmental Research Center in North Carolina should provide this Agency with the data necessary to make an unbiased decision with respect to the fate of the proposal to incinerate sludge at Blue Plains. Please see the preface to this statement for further discussion on this topic.

The EPA analysis referred to above is included in the final statement following the next page.

Lead

Appendix C (page c-37) of the draft EIS contained an estimate of lead emissions from the incinerators which was based on the lead content of particles collected from the Lorton, Virginia, incinerator. However, additional information has become available since the draft statement was prepared. Dr. R. L. Chaney recently supplied EPA Headquarters personnel with information which included a table entitled "Toxic Metal Content of Washington Area Wastewater Treatment Plants". This table reported the lead content of Blue Plains digested (raw sludge presumably would be lower) sludge as 540 mg/kg dry sludge.

This concentration can be used to calculate the incinerator emission if certain calculations made in the EPA report discussed above are accepted. The report adopts a maximum throughput rate of 1,069,000 $\frac{\text{lbs. dry solids}}{\text{day}}$ and a scrubber efficiency of 98.9%. This information is used in the following calculation.

$$(540 \text{ mg.Pb/kg. solids})\left(\frac{1{,}069{,}000 \text{ lbs. dry solids}}{\text{day}}\right)(1-.989) = 6.35\#\text{Pb/day}$$

The 6.35#Pb./day is a negligible emission. It is noteworthy that this amount is far below the 26#Pb/day calculated for the Piscataway installation. At the present time there are no standards for the emission of lead from stationary sources.

Asbestos

In response to comments which suggest that asbestos is likely to be present in the incinerated sludge, EPA Technical Staff believe that, "The Blue Plains sludge incinerator is not anticipated to be a significant source of asbestos emissions. At any rate, the use of a 40" W.G. scrubber allows the incinerator to meet the asbestos emission standard promulated by EPA on April 6, 1973 - which includes regulations controlling emissions during construction and demolition."

Incinerator Operating Rates

Repace Comments No. 1 and 2 contend that population growth in the service area will eventually compel the treatment plant operators to process sludges at maximum design rates rather than at average rates. This comment fails to consider the fact that alternate regional facilities are presently planned for two locations in Montgomery and Prince George's Counties. Construction of these facilities will enable the Blue Plains Plant to process sludge at average rates as described in the draft statement. For a description of the incinerators system's reserve capacity, please see the incinerator designer's response under the topic of "Reliability".

Fuel Sulphur Content

In response to Repace Comment No. 3, EPA staff reports, "It is highly unlikely that fuel with a higher sulfur content would be allowed for use in this incinerator, unless Federal ambient air quality standards for SO_2 have earlier been attained in the District.

Health Effects

In response to Repace Comments No. 8, 9 and 10, EPA technical staff reports that, "Unfortunately, the state of the technology is such that there are no environmental indices keyed to the total assault on the human body attributable to the simultaneous presence of all potential pollutants. Thus the issue raised here is not unique to Blue Plains, but could indeed be fairly raised on any construction of a potential source of pollution."

As previously stated, this Agency plans to hold open the commenting period on sludge incineration in expectation that the results of ongoing research will become available to answer some of the serious questions which simply cannot be answered at this point in time.

Evaluation of Potential Mercury and Beryllium Emissions from Proposed Sludge Incinerator to be Located at the Blue Plains Waste Treatment Facility in Washington, D. C.

ENVIRONMENTAL PROTECTION AGENCY
Emission Standards and Engineering Division
Research Triangle Park, North Carolina 27711
June 1973

Evaluation of Mercury and Beryllium Emissions at the Blue Plains Incinerator Located in Washington, D. C.

Background

The existing Blue Plains waste treatment facility is operating at a rate of 280 million gallons per day (mgd) of raw sewage. The sludge disposal processes currently being used at the existing facility consist of thickening, anaerobic digestion (bacterial decomposition), elutriation and dewatering followed by stockpiling of the digested sludge. The new system being constructed is designed to treat 309 mgd of raw sewage. The system consists of primary sedimentation, modified aeration with chemical addition for phosphorous removal, and nitrification and denitrification followed by filtration. The sludges from these processes will be disposed of raw by thickening, dewatering, and incineration. Another method of sludge disposal that is being investigated as an alternative to incineration is composting. The details of this method are not known, however, the operator of the waste treatment plant indicates that a decision concerning the use of this alternative will be made within two months. If this alternative is used, the incinerators at the site will be used as sludge driers. The management of Blue Plains indicate that the old facility will be retired when the new facility starts up.

The incineration of the sludge will be accomplished by eight 24-foot diameter, 12 hearth, multiple hearth furnaces each having a maximum capacity of 6900 lbs/hr of dry solids. Five to seven furnaces will normally be on line with at least one furnace used as a standby. The average capacity of each furnace will be 5200 lbs/hr of dry solids. The sludge is incinerated with the aid of auxiliary fuel at a temperature of 1700°F.

The furnace gases are cooled from 700°F to 180°F in an evaporative cooler, then passed through a venturi scrubber, which is maintained at 40 inches of water (wc) pressure drop. The furnace gases at about 180°F then enter a sub-cooler, a fan, and a fume furnace. The fume furnace is maintained at 1500°F by burning auxiliary fuel. The gases cool to 520°F and are exhausted to the atmosphere through a 5-foot diameter, 110-foot stack. The gas velocity will be 1800 fpm. The furnace gas flow rate with average excess air of 75 percent is 36,700 CFM at stack conditions and 18,300 SCFM dry for each furnace. The total effluent would be 260,000 ACFM or 130,000 SCFM with seven furnaces in operation. The total particulate collection efficiency of the control system is quoted at approximately 99.8 percent but for reasons stated below it may be only 98.9 percent.

The contractor and operator have stated that the average burning rate on an annual basis will be 862,000 lbs/day of dry sludge and the maximum five-day average will be 1,069,000 lbs/day.

Assessment of Particulate Control

The 40 inch wc venturi scrubber should provide better control of particulates than is now being employed at any U. S. sludge incinerator However, the facility is much larger than any existing sludge facility such that particulate emissions also will be greater. The scrubber should collect beryllium but probably won't have any appreciable effect on mercury vapor. It is reasonable to expect that the collection efficiency of beryllium will be the same as for total particulate.

In a multiple hearth incinerator, most of the ash is discharged from the bottom hearth. Only about 10 percent of the ash is carried out with exhaust gases from the top hearth. Under these conditions,

particulate concentrations in the gas stream to the scrubber are about 0.9 grain per dry standard cubic foot (gr/dscf). This value would be expected to vary with sludge composition and with particle size of the ash.

Although the scrubber should provide extremely good collection, we have reservations that it can achieve 99.8 percent efficiency. As stated above, the average concentration of particulates exiting from multiple hearth incinerators is 0.9 gr/dscf. To achieve 99.8 percent particulate removal would require an exit concentration of 0.002 gr/dscf. While this level may be achieved, we feel that a concentration of 0.01 gr/dscf is more reasonable to expect on a day-to-day basis. Under these assumptions, the scrubber efficiency would be 98.9 percent. At a concentration of 0.01 gr/dscf, 11 lbs/hr or 264 lbs/day of particulate will be released from the facility. In the case of beryllium, it is reasonable to add a safety factor and assume that as much as 30 percent of the beryllium is carried to the scrubber with the stack gases.

Incineration of Tail Gases

It is indicated that exhaust gases from the scrubber will be incinerated at 1500°F apparently to destroy odorous compounds and carcinogens. Based on the information available, it might be advantageous both from the standpoint of fuel economy and pollution control as well, to place the afterburner upstream of the scrubber. Under the latter arrangement, the temperature increment in the afterburner would be only 800°F (1500°-700°) rather than 1320°F (1500°-180°). Assuming that gases from the incinerator do not contain more than about 50 percent moisture, the arrangement should improve

fuel economy. Besides costs, the latter configuration would have the advantage of allowing a cooler and drier exhaust stream which could be more readily treated for removal of toxic materials if the need should arise. The supplementary control schemes suggested later in this report would be more effective and more flexible at ambient temperatures than at 500°F.

Beryllium Emissions

Concentrations of beryllium in sewage sludge samples are not precisely known because they have been generally below the level of detection of the analytical methods used. According to data obtained by EPA during the investigation of this industry for new source performance standards (Section 111 of the Clean Air Act), the beryllium content of sludge is below 4 ppm on a dry basis. The concentration of beryllium in raw sewage sludge from Blue Plains is not available.

In order to evaluate the emissions of beryllium from the sludge, the following assumptions are made:

1. The beryllium content of the raw sludge to be incinerated at Blue Plains is 4 ppm, dry basis.
2. Thirty percent of the beryllium that enters in the sludge will leave in the furnace combustion gases with 70 percent being retained in the bottom ash.
3. The control system will remove beryllium particulate with the same efficiency as for gross particulate (98.9 percent).

Using these assumptions, the following is calculated:

$$\text{Daily Beryllium Emissions} = (4 \times 10^{-6})(1{,}069{,}000)(.011)(0.30)(454)$$

$$= 6.4 \text{ g/day}$$

Using these very conservative assumptions, the estimated beryllium

emissions are less than the 10 g/day standard that was derived for NESHAPS. The meteorological assumptions and stack conditions used to calculate the 10 g/day emission limit for NESHAPS are much more restrictive than the meteorological conditions that exist at Blue Plains.

Another method of calculating beryllium emissions can be used. In Table 10 of the EPA Task Force report, all seven of the beryllium analyses of particulates from sludge incinerators were 1.0 ppm or less. The estimated total particulate emission rate from the Blue Plains furnaces as indicated earlier will be 264 lbs/day. Using this rate and beryllium concentration in the particulate matter give a beryllium emission rate of 0.12 gram/day.

Using the same conservative meteorological conditions that exis at Blue Plains that are explained later for mercury, an emission of 710 g/24-hour period would be required to cause the NESHAP ambient guideline level of 0.01 $\mu g/m^3$ to be exceeded for a 30-day average. It the Blue Plains facility would emit 6.4 grams of beryllium per da the 30-day average beryllium concentration would be 0.00009 $\mu g/m^3$.

Mercury Emissions

Data obtained by EPA during investigations of sewage sludge incinerators and the Blue Plains facility indicate that emissions of mercury will not pose a threat to public health.

Data taken from the EPA Task Force report on Sewage Sludge Incineration show that mercury concentrations of sludge ranged from 3.0 ppm to 5.5 ppm. Mercury analysis of Blue Plains digested sludg by Dr. Chaney of the Department of Agriculture in Washington, D. C.

indicates a concentration of 3.6 ppm. Dr. Farrell of EPA's Water Programs in Cincinnati, Ohio, indicated through a telephone conversation that the mercury content of digested sludge on a dry solids basis is probably a conservative concentration because:

1. Approximately 50 percent of the raw sludge solids is decomposed into gases.
2. Most of the mercury that enters the digesters remains with the undigested solids. Only small amounts leave in the water and decomposition gases.

Assuming the above, the concentration of 3.6 ppm of mercury in raw sludge to the incinerators may be high by a factor of two and lesser concentrations probably will be experienced.

Dr. Chaney has also stated that analysis of raw samples of primary, secondary, and mixed sludges have ranged from 0.5 to 15 ppm from analyses made at several laboratories employing various techniques of mercury analysis. He indicated, however, that these analyses were not reliable in his opinion because of sample, laboratory, and analytical variations.

To compute the maximum emissions of mercury from the Blue Plains incinerator, the following worst-case assumptions were made:

1. The total weight of mercury that enters with the raw sludge will be emitted to the atmosphere in stack gases. (In actual practice, however, some mercury is adsorbed on particulate matter which will be removed by the venturi scrubber.)
2. The plant is operated at its maximum 5-day incineration rate of 1,069,000 lbs/day of dry solids. (The average rate is anticipated to be 862,000 lbs/day of dry solids.)

Under the above assumptions, the mercury emissions can be calculated to be:

Maximum Daily Mercury Emissions = $(3.6 \times 10^{-6})(1,069,000)(454)$

= 1750 g/day

The mercury emission from the incinerators is less than the 2300 g/day emission limit that was set for primary mercury extraction plants and mercury cell chlor-alkali plants on the basis of dispersion calculations assuming effective emission heights at near ground level and a maximum ambient concentration of 1.0 $\mu g/m^3$ (30-day average). To evaluate the hazard that would exist at the Blue Plains incinerators, the meteorology and emission release conditions at the facility must be considered.

The emission rate that would cause 1.0 $\mu g/m^3$ to be exceeded can be calculated by using the meteorological equations used to calculate the 2300 g/day emission for ground level.

Calculation Method

The calculation method used is based on that given in the background report (APTD-0753).[1] It assumes that:

1. A source emits at a constant rate.
2. Wind direction frequency is the maximum percentage occurrence of wind flow from one of sixteen 22.5-degree sectors during any 30-day period.
3. Wind flow is random from all directions within a sector during a 30-day period. Correspondingly, the effluent is uniformly distributed horizontally within a sector.

The equation in the form used to estimate maximum allowable daily emissions is:

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[1] "Background Information - Proposed National Emission Standards for Hazardous Air Pollutants: Asbestos, Beryllium, Mercury", EPA, APTD-0753, December 1971, pp. 23-28.

$$Q_{max} = \frac{8.64\ 2\pi^{3/2} \chi_{max}\ U\ \sigma_z x}{16F \exp\left[-1/2\ \left(\frac{H}{\sigma_z}\right)^2\right]} = \frac{4.23\ \chi_{max}\ U\ \sigma_z x}{F \exp\left[-1/2\ \left(\frac{H}{\sigma_z}\right)^2\right]}$$

where: Q_{max} = maximum allowable daily emission, g/day

χ_{max} = maximum 30-day average concentration, $\mu g/m^3$

U = representative average wind speed, m/sec

σ_z = vertical dispersion term as function of stability and distance, m

x = distance downwind, m

F = maximum frequency of wind direction from a 22.5-degree sector, %

H = effective stack height, m

Meteorological Assumptions

There are three principal meteorological parameters for which representative values are selected. These parameters are:

1. Average wind speed, U.
2. Average atmospheric stability, which determines values of the vertical dispersion term, σ_z.
3. Maximum frequency of wind direction from any one sector, F.

An examination of the monthly meteorological data for the Washington, D. C. area for a recent five-year period indicates that the following conditions represent the worst dispersion condition that would be expected to occur during a 30-day period.

Average Atmospheric Stability	C
Average Wind Speed	2 meters/sec
Maximum Wind Direction Frequency	30 percent

Calculation: For mercury - $\chi_{max} = 1.0\ \mu g/m^3$

$$Q_{max_{(Hg)}} = \frac{(4.23)(1)(2)(70)(1200)}{(30)(.335)} = 70{,}700\ g/day$$

$$[Q_{max_{(Be)}} = 710\ g/day]$$

Note: Maximum concentration occurs at about 1.2 kilometers from the plant. Values for plume rise were calculated using a method described by Briggs[1] and the effective stack height is calculated to be 104 meters.

As can be seen from the calculations above, the emissions of mercury could be substantially greater than 2300 grams before the ambient mercury concentration of 1.0 $\mu g/m^3$ would be exceeded. Under certain conditions, aerodynamic down wash may cause short-term ground level concentration to exceed 1.0 $\mu g/m^3$ but these conditions are expected to occur a small proportion of the time and will often be confined within the plant's boundary lines.

The expected maximum concentration of mercury that would occur under the above conditions is:

$$\chi_{max_{Hg}} = \frac{(1750)(30)(.335)}{(4.23)(2)(70)(1200)} = 0.025\ \mu g/m^3$$

$$[\chi_{max_{Be}} = \frac{(6.4)(30)(.335)}{(4.23)(2)(70)(1200)} = 0.00009\ \mu g/m^3]$$

The foregoing calculations for mercury (and beryllium) under existing conditions show that the emissions from the proposed Blue Plains waste

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[1] Draft Environmental Impact Statement P. L. 91-190, District of Columbia Water Pollution Control Plant (expansion and upgrading), EPA, April 1972, Appendix C - Sludge Incineration.

treatment facility are not expected to cause hazardous ambient concentrations to occur.

Planned EPA Testing at Blue Plains

Although there appears to be little likelihood of hazardous concentrations of mercury and beryllium emissions from the Blue Plains incinerator facility, EPA has been ready for several months to test the emissions of the incinerator exhaust gases of the Blue Plains pilot plant. Equipment and personnel problems have caused a delay in this testing program. Currently, EPA has initiated a short-term program to analyze several samples of a formulation of raw sludge which will be incinerated at the new facility. Initial data from this short-term sampling program is expected within 4 to 6 weeks. This data will enable a better assessment to be made.

Control Technology

No technology is available to remove mercury and/or beryllium from the raw sludge prior to incineration.

In addition to venturi scrubbers, technology is available at significant cost to remove residual particulates, including beryllium, from stack gases. Fabric filters or HEPA absolute filters could be installed for this purpose. In such instances, it would be desirable to pretreat the gases by: (1) cooling to ambient temperature, (2) remove remaining mist, and (3) reheating the gases 20° or 30°F to lower humidity. The installation of fabric filters downstream of the scrubbers would cost $250,000 in capital expenditure and $75,000 in annualized costs. Costs would be greater if the baghouse were to be used to treat hot gases. Such baghouses would have little effect on mercury vapors in the gas stream regardless of the gas temperature.

The installation of HEPA filters might require less capital expense but the operating cost could be much greater depending on the replacement rate.

Technology to remove mercury from the stack gases is available, but the cost is great, and its removal efficiency has not been commercially established. The only feasible control method for such application is adsorption with molecular sieves or chemically impregnated activated carbon. The vendor of the molecular sieve system guarantees only that mercury concentrations in stack gases will not exceed 500 $\mu g/m^3$. The concentrations of mercury at stack conditions can be calculated to be 165 $\mu g/m^3$; therefore, a molecular sieve control system would not be applicable in this situation. Although not proven on a commercial scale, it is generally accepted that an impregnated activated carbon system can remove about 90 percent of the vaporous mercury in the gas stream. The blinding effect of residual particulates has not been evaluated. Using this carbon system to remove mercury, costs and emissions can be calculated. Costs for such a system have been developed for control of mercury emissions from chlor-alkali plants and can be used to roughly estimate the cost of a system necessary to treat the incinerator gases.

Assumptions:

1. Install a separate system for each incinerator (7 total).
2. 1075 ACFM gas stream can be treated with activated carbon at a capital cost of $132,000.
3. Each incinerator has a gas flow rate of 36,000 ACFM.
4. Estimate the cost of the equipment by use of the six-tenths rule.

Calculation of Capital Cost:

$$\text{Capital Cost (7 incinerators)} = \left(\frac{36{,}000}{1075}\right)^{.6} (132{,}000)(7)$$

$$= \$7.7 \text{ million}$$

The annualized operating cost is estimated to be 30 percent of the capital cost or $2.3 million. Assuming 90 percent control, the mercury concentration in effluent gases would be reduced from 165 $\mu g/m^3$ to 17 $\mu g/m^3$, and from 1750 g/day to 175 g/day.

OFFICE OF

THE MAYOR AND TOWN COUNCIL

FOREST HEIGHTS, MARYLAND

20021

April 6, 1974

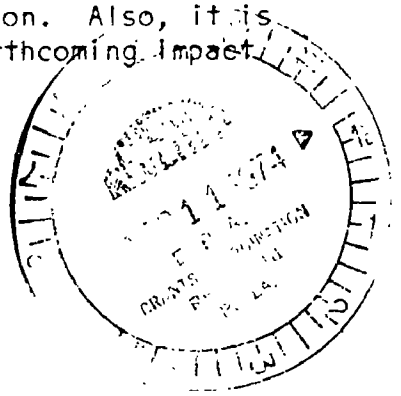
Mr. R. Blanco
Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

1. In response to the Piscataway Environmental Impact Statement, I wish to express the concern of the residents of the Town of Forest Heights as to the technical accuracy and the many deficiencies of the statement. The Town of Forest Heights is located approximately 7 miles from the Piscataway Plant and approximately one mile from the Blue Plains Sewage Treatment Plant. Being physically close to Blue Plains and having sludge dumped next to our town, we are aware of the problems and odors connected with sewage treatment and sludge handling. The remarks on the Piscataway EIS also pertain to the Blue Plains EIS as both statements are incomplete or inadequate in many overlapping areas.

2. The residents of Forest Heights are users and neighbors of the sewage system and have a sincere interest in its working efficiency. Careful planning should not be neglected for what might be a quick solution to the sludge disposal problem. Irreversible commitments, especially with regard to the sludge incinerator system, should not take place until a pilot system has been carefully studied and data on its operation documented. What is initially stated as a negligible effect on the ambient air quality from sludge incineration is found to be a very serious health and pollution problem after reading the published information on existing systems.

3. The Piscataway and Blue Plains Environmental Impact Statements are in severe need of editing and data documentation. There are many technically misleading statements, e.g., the 1-3% average increase in the pollution level from the Blue Plains incinerators over 100 square miles is not valid as it is coming from a point source. Local increases in pollution, such as in Forest Heights or the Oxon Hill area, should be given. Noticeably absent in the incinerator discussions are details on: 1, scrubber efficiency with respect to particle size and the correlation of particle size with health aspects; 2, temperature inversion effects; 3, plume dynamics; 4, the health hazards of toxic metals, e.g., Hg, Be, Cd, Pd and As. It is requested that the sludge incineration aspects at Piscataway and Blue Plains be given serious technical attention. Also, it is requested that the areas above be addressed and added to the forthcoming impact statements on Piscataway and Blue Plains.



There are inconsistencies in the EPA's statement concerning sludge incineration. In the EPA publication No. PB211323, Sewage Sludge Incineration, it is stated on page 89 by Dr. Shy, Deputy Director, Division of Health Effects Research, concerning toxic metals that, "... are likely to represent a true health hazard, especially if sewage sludge incinerators proliferate in urban areas." Also, on page 56 of the same EPA report with regard to sludge incineration, "The chemistry of the potentially hazardous substances in sludge should be investigated by literature study and experimentation so that predictions can be made of their behavior upon incineration." Cited also are information needs to determine the fate of toxic metals, pesticides, and other hazardous materials.

In contrast to the above statements, without supporting scientific evidence or data documentation, it is stated on page 94 of the Piscataway EIS with regard to sludge incineration that, "In addition, it has proven to be a reliable process which can handle various types of sludges. All the other processes considered have not proven to be either reliable, economical, or able to treat various types of sludges." It is requested that scientific proof be presented to establish the validity of the above statements.

Another disturbing comment by the EPA was observed in the Fact Sheet on the Piscataway EIS distributed on March 7, 1974, at the Public Hearing at Oxon Hill, Maryland. Under Air Quality, page 2, it is stated, "Studies by EPA show no appreciable degradation to ambient air quality resulting from incinerators at Piscataway." In the same section, "Research into the range and toxicity of particulates and heavy metals is continuing at EPA." The health hazards should be established prior to stating that there is no degradation of air quality from incineration. Documented data is again needed so there will be a basis for EPA's credibility.

There are available reports, for example the EPA report No. 430/9-73-006, Survey of Facilities Using Land Application of Wastewater, on alternate systems for sludge disposal. Composting and land based systems have been successfully used. More attention should be given to such recycling methods, as opposed to incineration which is expensive and represents a health hazard. It is also important to consider the Vander Jagt amendment to the Federal Water Pollution Control Act in which is is stated that the ultimate disposal of sludge should be in a manner that will not result in environmental hazards. The recycling of waste is national policy.

In the Federal Code of Regulations (#40), the purpose and function of the EPA is defined. The Environmental Protection Agency was created to permit coordinated and effective governmental action to assure the protection of the environment by abating and controlling pollution on a systematic basis. The endorcement by the EPA of sludge incinerators while the health aspects have not been verified is not in keeping with its charter.

It is contradictory statements, such as those above concerning incinerators, that add to the increasing concern as to the accuracy and integrity of the EPA reports.

Acknowledgment of the receipt of this statement and its incorporation into the forthcoming Piscataway EIS would be greatly appreciated.

Sincerely,

James Comas

Dr. James Comas, Councilman

Please send reply to:

Forest Heights Community Center
108 Arapahoe Drive
Forest Heights, Maryland 20021

cc: Russell Train, Administrator
Environmental Protection Agency

RESPONSE TO COMMENTS DR. JAMES COMAS

1. The letter states that, "Being physically close to Blue Plains and having sludge dumped next to our town, we are aware of the problems and ordors connected with sewage treatment and sludge handling".

   Odor problems are not an intrinsic characteristic of properly designed and operated wastewater treatment systems. Rather they are indicative of an overloaded or poorly operated facility. As previously reported, a serious odor problem developed in the Blue Plains vicinity during May and June of 1973. This problem was traced to toxic amounts of heavy metals which were inhibiting the growth of anaerobic organisms in the sludge digesters. Attempts were made to neutralize the heavy metal influx but they were not successful and finally the digester contents were emptied into the AWT excavation so that the digester operation could be resumed utilizing uncontaminated sludge. The contaminated sludge caused a serious odor problem which resulted in many complaints. Had the upgrading and expansion project been complete, this incident would not have occured since raw sludge will be dewatered and fed directly to the incinerators without prior digestion.

2. This comment recommends a pilot system for the incinerator operation. The material presented below was developed by the incinerator designer to outline the procedure used in determining the sludge characteristics.

   "The sludge characteristics used in our design and in the emission characteristics we transmitted by letter dated February 22, 1972, to Mr. Paul Freese of the District were for District sludge sampled at the Blue Plains facility. The samples were collected by the DES staff and test data reported on October 20, 1969, by Crobaugh Laboratories of Cleveland, Ohio. The analysis of the sludge was transmitted to us by Mr. John Zelinski, Chief, D. C. Water Pollution Control Division by letter dated October 24, 1969. The ultimate analysis we used was essentially the average of six laboratory samples reported in that data. Outlet predictions were based on equipment operating efficiencies considered to be reasonable and the basic stoichiometry of the combustion reaction.

   While we recognize that the final D.C. sludge will only be experienced after the plant renovation has been completed, we believe that the information used is realistic as proven by comparison with sludge characteristics from other locations using the treatment processes being installed at the Blue Plains facility. Obviously, the only accurate method for determining the characteristics of the exhaust gas emission is to burn the actual sludge from the advanced treatment process in an incinerator that is a duplicate of those designed for Blue Plains with the control system developed for that specific facility.

This is, of course, a practical impossibility and our prediction of emission characteristics as set forth in the previously mentioned letter of February 22, 1972 is in our opinion, still valid for the items covered". (These predictions were used in the draft statement.)

3. The immediately preceeding pages contain an EPA Report entitled, "Evaluation of Potential Mercury and Beryllium Emissions from proposed sludge incinerators to be located at the Blue Plains waste treatment facility in Washington, D.C." The report assesses the particulate control devices and makes a conservative assumption with respect to scrubber effiency. The report makes several "Worst case assumptions" and then goes on to calculate the maximum concentrations of pollutants and their distance from the plant. After discussing the potential for plume downwash to cause short-term intervals of relatively high pollutant concentration near the plant, the report concludes that "The foregoing calculations for Mercury (and Beryllium) under existing conditions show that the emissions from the proposed Blue Plains waste treatment facility are not expected to cause hazardous ambient concentrations to occur". The EPA scientists who developed the report also point out that there is a "Lack of specific information concerning the composition of the sludge and the fate of materials processed in sludge incinerators". It is in recognition of this need for further definitive information that the Agency has decided to hold open the comment period on the topic of incineration until further studies are complete.

Appendix b

National Pollutant Discharge Elimination System Permit

(Draft Version)

Introduction to Appendix b

This appendix contains a draft version of the National Pollutant Discharge Elimination System (NPDES) Permit. A public hearing on the subject of the proposed Blue Plains permit was held in Washington, D. C. on March 28, 1974. Testimony was taken from local government officials and representatives of environmental groups. The District of Columbia presented testimony which suggested this Agency consider changes in the following aspects of the draft permit:

1. Planning, management and reporting schedules.

2. Sludge disposal problems associated with satisfying the permit conditions.

3. Nitrogen removal standards.

These suggestions are presently being given serious consideration by the Regional Office's Permit Program Staff and subsequent decisions will be reflected in the final version of the permit which should be available in the near future.

Application NO. DC0021199

Effective Date

Expiration Date

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

DISCHARGE PERMIT

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. s 1251 et. seq.) (hereinafter referred to as "the Act"), the

District of Columbia, Department of Environmental Services
(hereinafter referred to as "the permittee")

is authorized by U.S. Environmental Protection Agency, Region III
(hereinafter referred to as "the permitting authority")

to discharge from point sources with discharge serial numbers 001 through 060 (See attachment A for listing and location of sources) to the Potomac River and its tributaries

in accordance with the attached general and special conditions contained herein.

Daniel J. Snyder, III
Regional Administrator

Date

SPECIAL CONDITIONS

1(a) EFFLUENT LIMITATIONS - INITIAL

Beginning on the effective date of this permit and lasting through December 31, 1975, the permittee is authorized to discharge from point sources 001 and 002 which shall be limited by the permittee as specified below:

A. For any 12 consecutive month period, the average quantity of effluent discharge shall not exceed 299 million gallons per day (mgd) or 1,131,700 cubic meters per day. A 12 consecutive month average is used to account for seasonal variations in the flow. Therefore, historical flow data pre-dating permit issuance will be used initially to determine average flows.

B. The quality of effluent shall be limited at all times as follows:

Parameter	Average Effluent Concentrations		Average Effluent Loadings	
	30 Consecutive Day Period	7 Consecutive Day Period	30 Consecutive Day Period	
			lbs/day	Kg/day
Biochemical Oxygen Demand (5-day)	40 mg/1	40 mg/1	100,000	45,360
Suspended Solids	40 mg/1	40 mg/1	100,000	45,360
pH	within limits of 6.0 to 9.0 at all times		———	———
Total Phosphorus	5.0 mg/1	5.0 mg/1	12,500	5,670
Provide Continuous Disinfection				

1(b) EFFLUENT LIMITATIONS - INTERIM I

Beginning on January 1, 1976, and lasting through March 31, 1977, the permittee is authorized to discharge from point source 002 which shall be limited by the permittee as specified below:

A. For any 12 consecutive month period the average quantity of effluent discharged shall not exceed 309 million gallons per day (mgd) or 1,169,500 cubic meters per day. A 12 consecutive month average is used to account for seasonal variations in the flow. Therefore, flow data from the Initial permit period (1(a)) will be used to determine average flows.

B. Short term flows at a rate of up to 480 million gallons per day (mgd) or 1,817,000 cubic meters per day shall receive complete treatment.

C. The quality of effluent shall be limited at all times as follows:

	Average Effluent Concentrations		Average Effluent Loadings	
Parameter	30 Consecutive Day Period	7 Consecutive Day Period	30 Consecutive Day Period lbs/day	Kg/day
Biochemical Oxygen Demand (5-day)	30 mg/1	35 mg/1	77,400	34,800
Suspended Solids	30 mg/1	35 mg/1	77,400	34,800
pH	within limits of 6.0 to 9.0 at all times		———	———
Total Phosphorus	3.0 mg/1	3.0 mg/1	7,700	3,500
Provide Continuous Disinfection				

1(c) EFFLUENT LIMITATIONS - INTERIM II

Beginning on April 1, 1977, and lasting through December 31, 1977, the permittee is authorized to discharge from point source 002 which shall be limited by the permittee as specified below:

A. For any 12 consecutive month period the average quantity of effluent discharged from the wastewater treatment facility shall not exceed 309 million gallons per day (mgd) or 1,169,500 cubic meters per day. A 12 consecutive month average is used to account for seasonal variations in the flow. Therefore, flow data from the Interim I permit period (1(b)) will be used to determine average flows.

B. Short term flows at a rate of up to 650 million gallons per day (mgd) or 2,460,000 cubic meters per day shall receive complete treatment.

C. The quality of effluent shall be limited at all times as follows:

	Average Effluent Concentrations		Average Effluent Loadings	
Parameter	30 Consecutive Day Period	7 Consecutive Day Period	30 Consecutive Day Period lbs/day	Kg/day
Biochemical Oxygen Demand (5-day)	20 mg/l	20 mg/l	51,600	23,400
Suspended Solids	20 mg/l	20 mg/l	51,600	23,400
Fecal Coliform	200/100 ml	400/100 ml	———	———
pH	within limits of 6.0 to 9.0 at all times		———	———
Total Phosphorus	1.5 mg/l	1.5 mg/l	3,870	1,760
Total Kjeldahl Nitrogen	5.0 mg/l	5.0 mg/l	12,900	5,850

1(d) EFFLUENT LIMITATIONS - FINAL

Beginning on January 1, 1978, and lasting through January 1, 1979, the permittee is authorized to discharge from point source 002 which shall be limited as specified below:

A. For any 12 consecutive month period the quantity of effluent discharge from the wastewater treatment facility shall not exceed 309 million gallons per day (mgd) or 1,169,500 cubic meters per day. A 12 consecutive month average is used to account for seasonal variations in the flow. Therefore, flow data from the Interim I and Interim II periods (1(b)) and (1(c)) will be used to determine average flows.

B. Short term flows at a rate of up to 650 million gallons per day (mgd) or 2,460,000 cubic meters per day shall receive complete treatment.

C. The quality of effluent shall be limited at all times as follows:

Parameter	Average Effluent Concentrations		Average Effluent Loadings	
	30 Consecutive Day Period	7 Consecutive Day Period	30 Consecutive Day Period lbs/day	30 Consecutive Day Period Kg/day
Biochemical Oxygen Demand (5-day)	5.0 mg/l	5.0 mg/l	12,700	5,760
Suspended Solids	7.0 mg/l	7.0 mg/l	18,100	8,200
Fecal Coliform	200/100 ml	400/100 ml	———	———
pH	within limits of 6.0 to 9.0 at all times		———	———
Total Phosphorus	0.22 mg/l	0.22 mg/l	560	250
Total Nitrogen	2.4 mg/l	2.4 mg/l	6,130	2,780
Dissolved Oxygen	Not less than 5.0 mg/l at all times			

2. SCHEDULE OF COMPLIANCE FOR EFFLUENT LIMITATIONS

The permittee shall achieve compliance with the preceding effluent limitations based on the following construction and operational schedule:

a. Initiate construction of nitrification units of advanced waste treatment facilities by March 31, 1974.

b. Report construction progress as of June 30, 1974, and quarterly thereafter until complete. Progress reports shall be submitted to the permitting authority and postmarked no later than 14 days after the last day of each quarter.

c. Complete construction of the expanded primary facilities by August 1, 1974.

d. Complete construction of expanded secondary treatment units and achieve compliance with Effluent Limitations Interim I as stipulated in Special Conditions Item 1(b) by January 1, 1976.

e. Complete construction of nitrification units and achieve compliance with Effluent Limitations - Interim II as stipulated in Special Conditions Item 1(c) by April 1, 1977.

f. Complete construction of denitrification units and related advanced treatment facilities and attain operational compliance with Effluent Limitations - Final as stipulated in Special Conditions Item 1(d) by January 1, 1978.

The permittee shall submit to the permitting authority a written notice of compliance or non-compliance with each of the above scheduled dates, postmarked no later than 14 days following each elapsed date.

3. FACILITY OPERATION AND QUALITY CONTROL

All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

a. At all times, all facilities shall be operated as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out the operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

c. Maintenance of treatment facilities that results in degradation of effluent quality shall be implemented in such a manner that the effluent limitations are not violated.

4. SELF-MONITORING AND REPORTING REQUIREMENTS

A. The permittee shall effectively monitor the operation and efficiency of all treatment and control facilities and the quantity and quality of the discharge. Monitoring data required by this permit shall be summarized on an average monthly basis. Reports of these monthly values are to be submitted quarterly. Quarterly reports will be required for periods beginning on the first day of December, March, June, and September. Duplicate original copies of the discharge monitoring report form (to be furnished by the permitting authority) properly completed and signed, must be submitted within 28 days after the end of each quarterly report period to the Regional Administrator at the following address:

Environmental Protection Agency
Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

The monitoring reports submitted shall be based on the following parameters and testing frequencies:

POINT SOURCES 001 AND 002

Effluent Characteristics	Minimum Frequency of Analysis	Sample Type
5-day BOD	Daily	Composite
Suspended Solids	Daily	Composite
Total Phosphorus	Daily	Composite
Nitrogen Series (NH_3,NO_2,NO_3,&TKN)	Weekly*	Composite
pH	Daily	
Flow	Daily	Recording
Temperature	Daily	
Dissolved Oxygen	Daily	
Zinc	Monthly**	Composite
Mercury	Monthly**	Composite
Copper	Monthly**	Composite
Chromium	Monthly**	Composite
Nickel	Monthly**	Composite
Oil and Grease	Monthly**	Composite
Fecal Coliform	Daily	Grab

* The nitrogen series shall be performed daily after April 1, 1977.

** For all monthly composites, a portion of each daily composite shall be composited for seven (7) consecutive days to make up the sample.

B. Minimum and maximum values shall represent the results of a 24-hour day. In some situations, this may be the result of a single analysis while in others, it may be the average of analysis of three 8-hour composite samples.

C. Sampling and Analysis Methods

Test procedures for analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act under which such procedures may be required. These regulations (40 CFR Part 136) were published on October 16, 1973.

5. RECORDING

The permittee shall record for all samples the date and time of sampling, the sampling method used, the date analyses were performed, the identity of the analysts, and the results of all required analyses and measurements.

All sampling and analytical records mentioned in the preceding paragraph shall be retained for a minimum of three years. The permittee shall also retain all original recordings for any continuous monitoring instrumentation, and any calibration and maintenance records, for a minimum of three years. These periods will be extended during the course of any unresolved litigation, or when so requested by the Regional Administrator.

6. SOLIDS DISPOSAL

Collected screenings, slurries, sludges, and other solids shall be disposed of in such a manner as to prevent entry of those wastes (or runoff from the wastes) into navigable waters or their tributaries.

7. SYSTEM OVERFLOWS

Approximately 35% of the total area of the District of Columbia is served by combined sewers which carry sanitary sewage and stormwater. The permittee shall be required to treat varying portions of the combined wastewater flow in accordance with EPA policy concerning

operation of systems with combined sewers. The fact that the permittee shall be required to treat combined flows at the treatment plant will likely cause the quantity of flow discharged by the plant to exceed the discharge limitations (flow quantity) set by this permit. Upon approval of the preliminary report and interim operational plan specified in this section of the permit, the quantity of combined flow that will be treated will be more accurately defined and adjustments to the discharge limitation (flow quantity) will be made accordingly. Inasmuch as the user allocations are based on the present discharge limitations (flow quantity), a reallocation of the flows may be required by the permittee. The following two-phase program shall be implemented to: (1) provide for optimum operation of the present system, and; (2) accurately define the extent of the combined sewer problem and seek long-range alternatives with respect to attainment of water quality standards.

A. Operation of the System with Combined Sewers

The permittee shall operate the treatment works (including treatment plant and sewer system) to minimize the total quantity of pollutant discharge for the parameters identified in the permit during overflow conditions. The following shall be required to achieve optimum operation of the treatment works with respect to system overflow:

(1) A preliminary report must be submitted by the permittee to the permitting authority within three months of the date of permit issuance. The preliminary report must contain the maximum treatable flow rates for the treatment plant for each separate calendar month. The maximum treatable flow rates for the treatment plant, or any complete unit process, must at least be equal to one of the following:

a. the maximum hydraulic flow rate for the sewage treatment plant (or the maximum hydraulic flow for partial treatment), or;

b. the flow rate based on historic records or theoretic determinations, that would cause a treatment plant upset such that other permit conditions could not be achieved, or in lieu of the above;

c. a detailed plan of operation which can show from existing data that implementation of such a plan will provide a total system discharge of pollutants which is less than that occurring if the maximum flow rate specified above was used for wet weather operation.

The preliminary report shall specify procedures for maximum utilization of the existing primary treatment facilities when the new primary facilities become operational by August 1, 1974. The preliminary report, upon approval by the permitting authority, will establish the flow rates for each separate calendar month that can be treated in each unit operation at the treatment plant prior to a combined sewer discharge, if such a flow rate can be hydraulically delivered to the plant.

The permittee shall periodically update the preliminary report to take into consideration the addition of new treatment facilities as construction of the expanded plant progresses. Modifications to the wet weather operating procedures to further minimize the total system pollutant discharge shall be proposed three months prior to the start-up of the expanded secondary treatment facilities, the nitrification facilities and the denitrification/filtration facilities and be implemented, upon approval by the permitting authority, when each of these facilities become operational.

(2) An interim operational plan must be submitted by the permittee to the permitting authority within two and a half years of the date of permit issuance. The interim operational plan must address the coordinated operation of the sewage treatment plant and the contributing sewer systems.

The plan shall include, if applicable, a section on the number, location, types and kinds of regulators and their respective operating history, maintenance program and performance efficiency. The operational plan shall minimize the total system discharge of pollutants. In addition to defining the maximum treatment plant flow capacity, the plan must contain operational procedures which will provide for utilization of at least 80 percent of the available capacity of interceptors and trunk lines (prior to causing flooding or surging conditions) upstream of any control device, pump station, or regulator, that can be so controlled, prior to any combined sewer discharge. If such control capabilities are not available, the plan must contain operational procedures which provide for the maximum use of storage prior to any combined sewer discharge. The operational plan should contain the calculated or estimated storage capacities of the sewer system upstream from all control devices, pump stations, regulators, or combined sewer discharges. An operational method to determine if the upstream storage capacity was utilized prior to any event discharge from interceptors and trunk lines must be submitted with the operational plan.

The interim operation plan, upon approval by the permitting authority, will establish the procedures that must be implemented prior to any combined sewer discharge.

B. Monitoring and Long-Range Planning

Point sources 003 through 060 are overflows currently resulting when the hydraulic flow capacity of the system has been exceeded (see Attachment A for a listing of these point sources). As soon as possible after January 1, 1976, but no later than January 1, 1977, wet weather flows in excess of 480 mgd shall receive at least primary treatment with disinfection. After April 1, 1977, wet weather flows in excess of a rate of 650 mgd shall receive at least primary treatment with adequate disinfection. These discharge points may be utilized for wet weather overflows or bypasses to the extent specified by the approved preliminary report and interim operational plan. No dry weather overflows are permitted after August 1, 1974. For all wet weather overflows, the permittee is required to take the following actions:

(1) Implement a monitoring program prior to November 1, 1974, to determine the frequency, duration and volume of flow and the quantity of wastes discharged (average and maximum kilograms per day) from these point sources. Effluent quantities determined should include five-day BOD, suspended solids, total nitrogen, and phosphorus. A plan for implementing this monitoring program must be submitted to the permitting authority for approval by April 1, 1974.

(2) Institute a survey and study to develop an abatement program to eliminate or significantly reduce pollution from these sources so as to maximize the achievement of the required water quality standards. The study must include the consideration of alternative solutions, associated costs, and a schedule of implementation. A report on the results of this study shall be presented to the permitting authority not later than January 1, 1975, with an interim status report due not later than July 1, 1974. upon final approval by the permitting authority, the plan presented in the report shall be implemented according to the approved schedule of implementation.

8. EFFLUENT LIMIATIONS ON POLLUTANTS ATTRIBUTABLE TO INDUSTRIAL USERS

A. Not later than 365 days following issuance of this permit, the permittee shall have promulgated an enforceable industrial waste ordinance. This ordinance should allow the permittee to enforce all pre-treatment requirements necessary to ensure compliance with the terms and conditions of this permit, as well as to ensure compliance by all major contributing industries* with the pre-treatment standards and any other applicable requirements

promulgated pursuant to Section 307 of the Act. A copy of this ordinance is to be submitted for approval by the permitting authority, such approval being an enforceable provision of this NPDES permit. This ordinance shall require each major contributing industry to submit to the permittee periodic notice (at intervals not to exceed 9 months) regarding specific actions taken to achieve full compliance with the requirements of Section 307.

The permittee shall submit to the permitting authority a report summarizing the progress of all known major contributing industries subject to the requirements stated above towards full compliance with such requirements. Such reports shall be included with the first and third quarterly reports required under Section 4.A. of this permit and shall include at least the following information:

(1) A narrative summary of actions taken by the permittee to develop, promulgate and enforce the local industrial waste ordinance and thereby ensure that all major contributing industries comply with the requirements of Section 307.

(2) The number of major contributing industries using the treatment works, divided into Standard Industrial Classification group categories.

(3) The number of major contributing industries in full compliance with the requirements of Section 307, or not subject to these requirements (e.g., discharge only compatible pollutants).

(4) A list identifying by name those major contributing industries presently in violation of the requirements of Section 307.

These semi-annual reports must be filed with the permitting authority within 28 days after the end of the first and third quarter as a part of the self-monitoring report required by Section 4.A. of this permit for each year until compliance is achieved. Thereafter, submission will be required should a major contributing industry reverts to violating the requirements stated above.

B. Immediately upon issuance of this permit, the permittee shall establish and implement a procedure to obtain from all major contributing industries specific information on the quality and quantity of effluents introduced by such industrial users. This information shall be reported to the permitting authority on a quarterly basis beginning within 180 days of permit issuance. Quarterly reports reflecting no change from the previous quarter may simply relate this fact, without submitting repetitive data.

Based on the information regarding industrial inputs reported by the permittee pursuant to the preceding paragraph, the permittee will be notified by the permitting authority of the availability of industrial effluent guidelines on which to calculate allowable inputs of incompatible pollutants based on BPT for each industry group. Copies of guidelines will be made available upon request. Not later than 120 days following receipt of this information, the permittee shall submit to the permitting authority calculations reflecting allowable inputs from each major contributing industry. The permittee shall also require all such major contributing industries to implement necessary pre-treatment requirements (as provided for in 40 CFR Part 128), providing the permitting authority with notification of specific actions taken in this regard. At that time, the permit may be amended to reflect the municipal facility's effluent requirements for incompatible pollutants.

* A major contributing industry is one that: (a) has a flow of 50,000 gallons or more per average workday; (b) has a flow greater than five percent of the flow carried by the municipal system receiving the waste; (c) has in its waste a toxic pollutant in toxic amounts as defined in standards issued under Section 307(a) of the Act; or (d) has significant impact, either singly or in combination with other contributing industries, on the treatment works or the quality of its effluent.

9. PLANNING AND MANAGEMENT ACTIONS

Since August 22, 1957, the Federal Government has held various progress meetings of the Potomac River Enforcement Conference in an attempt to eliminate the pollution of the Potomac River in the Washington, D.C. Metropolitan Area. In October 1970, the participants of the Enforcement Conference adopted a memorandum of understanding which, in part, established the capacity of the Blue Plains plant at 309 mgd and allocated the flows to the plant among the user jurisdictions. The principal signatories of this agreement were the District of Columbia, the Washington Suburban Sanitary Commission; and Fairfax County, Virginia.

Also associated with the Enforcement Conferences, the District of Columbia, the Washington Suburban Sanitary Commission and Fairfax County, Virginia agreed to an interim treatment program for the Blue Plains facility. This agreement was accepted and adopted by the Conference on November 11, 1971. The Maryland Department of Health and Mental Hygiene, the Maryland Department of Natural Resources, and the Virginia State Water Control Board concurred in this agreement.

The agreement, in part, set out the following requirements:

(a) Reduce the total BOD pollutant load to the Potomac River from the D.C. Sewerage system to approximately 100,000 lbs per day of BOD or less.

(b) Establish flow allocations into the Blue Plains facility through 1975.

Based on these two Enforcement Conference agreements, flow allocations were as follows:

	1969 Base	Annual 6-yr. Increase	1970	1971	1972	1973	1974	1975	Ultimate Plant Flow
D.C.	115	3.3333	118.33	121.67	125.00	128.33	131.67	135.00	135.00
WSSC (Pot. Int.)	4	0.1667	4.17	4.33	4.50	4.67	4.83	5.00	5.33
Va. (Pot. Int.)	10	0.3333	10.33	10.67	11.00	11.33	11.67	12.00	12.67
WSSC (excld. Pot. Int.)	105	5.6667	110.67	116.33	122.00	127.67	133.33	139.00	148.00
Va. (excld. Pot. Int.)	6	0.3333	6.33	6.67	7.00	7.33	7.67	8.00	8.00
	240	9.8333	249.83	259.67	269.50	279.33	289.17	299.00	309.00

Thus the total allocations by user jurisdiction, were as follows:

	1970	1971	1972	1973	1974	1975	Ultimate Plant Flow
D.C.	118.33	121.67	125.00	128.33	131.67	135.00	135.00
WSSC	114.84	120.66	126.50	132.35	138.16	144.00	153.33
Va.	16.66	17.34	18.00	18.66	19.34	20.00	20.67
	249.83	259.67	269.50	279.33	289.17	299.00	309.00

Should there be a violation of any conditions of the permit, the Environmental Protection Agency has the authority under Section 402(h) of the Federal Water Pollution Control Act Amendments of 1972 to proceed in a court of competent jurisdiction to restrict or prohibit the introduction of any pollutant into the Blue Plains plant by a source not utilizing such treatment works prior to the finding that such condition was violated. It is intended that, in the event of a permit violation, this provision will be implemented by the permitting authority.

In order for the Blue Plains facility to adequately meet its effluent requirements stipulated in this permit, the following specific planning and management actions shall be undertaken:

(1) The District of Columbia Department of Environmental Services, in consultation with the user jurisdictions to the Blue Plains treatment system, shall develop a schedule of new extensions, connections and hook-ups of new sources (e.g., dwelling units) to the waste treatment system over the duration of the permit. A copy of this schedule or schedules, along with a statement of concurrence (or nonconcurrence) from the local governments, shall be provided to the States of Maryland and Virginia and to the permitting authority by June 1, 1974. Thereafter, a monthly report should be submitted to the states, the permitting authority and the various local agencies tracking the rate of actual hook-ups, connections and extensions against the agreed-upon schedule.

(2) The permittee shall undertake a overall program of public accountability, including quarterly summary reports to inform all users of the sanitary system and local government officials and the general public of the extent of actual compliance with permit requirements and conditions. Reports shall be provided to at least the following:

Maryland:

Secretary, Maryland Department of Health and Mental Hygiene
Secretary, Maryland Department of Natural Resources
Chairman, Washington Suburban Sanitary Commission
Office of the Executive, Montgomery County
Office of the Executive, Prince George's County

Virginia:

Chairman, Virginia Water Control Board
Chairman, Fairfax County Board of Supervisors
Director of Public Works, Town of Vienna
Airport Manager, Dulles Airport
Loudoun County Sanitation Authority

Other Jurisdictions and Agencies:

Maintenance Branch, U.S. Naval Research Center
Chief of Maintenance, National Parks Service
Director, Interstate Commission on the Potomac River Basin
Director, Metropolitan Washington Council of Governments

GENERAL CONDITIONS

1. All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act. Facility modifications, additions, and/or expansions that increase the plant capacity must be reported to the permitting authority and this permit then modified or re-issued to reflect such changes. The permittee shall provide notice to the authorizing permitting official of the following:

   (a) Any new introduction of pollutants into the treatment works from a source which would be a new source as defined in Section 306 of the Act if such source were discharging pollutants;

   (b) Except as to such categories and classes of point sources or discharges specified by the Administrator, any new introduction of pollutants into the treatment works from a source which would be subject to Section 301 of the Act if such source were discharging pollutants; and

   (c) Any substantial change in volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into such works at the time of issuance of the permit.

   The notice shall include:

   (1) The quality and quantity of the discharge to be introduced into the system, and

   (2) The anticipated impact of such change in the quality or quantity of the effluent to be discharged from the permitted facility.

2. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

   (a) violation of any terms or conditions of this permit;
   (b) obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or,
   (c) a change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

3. The schedule of compliance in this permit may, upon request of the applicant, and after public notice, be revised or modified by the permitting authority, if it is found that good and valid cause exists for such revision.

4. Notwithstanding 2 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit; or if this permit contains no limitations on such pollutants, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee shall be notified.

5. Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

   (a) Wastes which create a fire or explosion hazard in the treatment works.

   (b) Wastes which will cause corrosive structural damage to treatment works.

   (c) Solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment works.

   (d) Wastewaters at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so as to cause a loss of treatment efficiency.

6. The permittee shall allow the head of the state water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

   (a) to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit; or,

   (d) to sample at reasonable times any discharge of pollutants.

7. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, state, or local laws or regulations.

8. Except for data determined to be confidential under Section 308 of the Act, all monitoring reports required by this permit shall be available for public inspection at the offices of the head of the state water pollution control agency and the Regional Administrator. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

9. The diversion or bypass of any discharge from the treatment works by the permittee is prohibited, except: (1) where unavoidable to prevent loss of life or severe property damage; or, (2) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the terms and conditions of this permit. The permittee shall notify the permitting authority in writing of each such diversion or bypass in accordance with the procedure specified below for reporting non-consistency compliance. The permittee shall within 30 days after such incident submit to the permitting authority for approval a plan to prevent recurrence of such incidents.

10. If for any reason the permittee does not comply with or will be unable to comply with any effluent limitation specified in this permit, or should any unusual or extraordinary discharge of wastes occur from the facilities herein permittee shall immediately notify the Regional Administrator and appropriate state agency by telephone and provide the same authorities with the following information in writing within five days of such notification:

    (a) A description of the non-complying discharge including its impact upon the receiving waters.

    (b) Cause of non-compliance.

    (c) Anticipated time the condition of non-compliance is expected to continue, or if such condition has been corrected, the duration of the period of non-compliance.

    (d) Steps taken by the permittee to reduce and eliminate the non-complying discharge.

    (e) Steps to be taken by the permittee to prevent recurrence of the condition of non-compliance.

11. Permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from non-compliance with any effluent limitation specified in this permit. The permittee will also provide accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

12. The permittee shall require any industrial user of the permitted facility to provide pre-treatment as required under Section 307, and to provide any records, reports or information related to any pre-treatment or new source performance standards as required by Section 306 of the Act. Any industrial user of the permitted facility shall be required by the permittee to prepare and submit to the permitting authority periodic notices of progress toward full compliance with the requirements of Section 307 of the Act. Such notices shall be submitted at intervals not to exceed 9 months or as required elsewhere in this permit.

13. The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators or retention of inadequately treated effluent. Should the treatment works not include the above capabilities at the time of permit issuance, the permittee must furnish within 90 days a program, including an implementation schedule for their installation to the permitting authority for their approval. The set program shall include all the necessary steps to correct the deficiency.

14. Except as provided in permit condition 9 on bypassing, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for non-compliance.

15. Nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

16. This permit cannot be transferred or assigned, nor shall a new owner or successor be authorized to discharge from this facility until the following requirements are met:

    (a) The permittee shall notify the succeeding owner or successor of the existence of this permit by a letter, a copy of which shall be forwarded to the state water pollution control agency and the Regional Administrator.

(b) The new owner or successor shall submit a letter to the state water pollution control agency and the Regional Administrator stating that he will comply with the requirements of the permit on this facility and receive confirmation and approval of the transfer from the state water pollution control agency.

17. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

ATTACHMENT A

Discharge Serial No.	Overflow Structure Location (or discharge)	Discharge Receiving Water	Frequency Occurrence
001	Existing D.C. Water Pollution Control Plant Outfall	Potomac River	Continuous
002 (Proposed)	New D.C. Water Pollution Control Plant Outfall	Potomac River	
003	Bolling Air Force Base	Potomac River	Wet & Dry Weather
004	Poplar Point Sewage Pumping Station S.E.	Anacostia River, East Side	Wet Weather
005	Chicago Street and Railroad Avenue, S.E.	Anacostia River, East Side	Wet Weather
006	Good Hope Road, West of Nichols Avenue, S.E.	Anacostia River, East Side	Wet Weather
007	13th Street and Ridge Place, S.E.	Anacostia River, East Side	Wet Weather
008	Anacostia Avenue, West of Blaine Street, N.E.	Anacostia River, East Side	Emergency By Pass
009	2nd Street 300 feet north of N Place, S.E.	Anacostia River, West Side	Wet Weather
010	O Street Sewage Pumping Station, S.E.	Anacostia River, West Side	Wet Weather
011	Main Sewage Pumping Station	Anacostia River, West Side	Wet Weather
012	North of Main Sewage Pumping Station, S.E.	Anacostia River, West Side	Wet Weather
013	4th & N Streets, S.E., Both Extended	Anacostia River, West Side	Wet Weather
014	6th & M Streets, S.E.	Anacostia River, West Side	Wet Weather
015	9th & M Streets, S.E.	Anacostia River, West Side	Wet Weather

Discharge Serial No.	Overflow Structure Location (or discharge)	Discharge Receiving Water	Frequency Occurrence
016	12th and M Streets, S.E.	Anacostia River, West Side	Wet Weather
017	14th & M Streets, S.E.	Anacostia River, West Side	Wet Weather
018	Barney Circle & Pennsylvania Avenue, S.E.	Anacostia River, West Side	Wet Weather
019	N.W. Boundary Trunk vic. of 25th & E Sts. S.E. extended	Anacostia River, West Side	Wet Weather
020	23rd Street, North of Constitution Avenue, N.W.	Potomac River, East Side	Wet Weather
021	Northeast of Roosevelt Bridge, N.W.	Potomac River, East Side	Wet Weather
022	27th & I Streets, N.W.	Potomac River, East Side	Wet Weather
023	29th & K Streets, N.W.	Potomac River, East Side	Wet Weather
024	30th & K Streets, N.W.	Potomac River, East Side	Wet Weather
025	31st & K Streets, N.W.	Potomac River, East Side	Wet Weather
026	Wisconsin Avenue and K Streets, N.W.	Potomac River, East Side	Wet Weather
027	Water Street West of Potomac Street, N.W.	Potomac River, East Side	Wet Weather
028	36th & M Streets, N.W.	Potomac River, East Side	Wet Weather
029	Canal Road 1000 ft. East of Foxhall Road, N.W.	Potomac River, East Side	Wet Weather
030	Foxhall & Canal Roads, N.W.	Potomac River, East Side	Wet Weather

Discharge Serial No.	Overflow Structure Location (or discharge)	Discharge Receiving Water	Frequency Occurrence
031	Pennsylvania Ave., East Side of Rock Creek, N.W.	Rock Creek, East Side	Wet Weather Rare
032	26th & M Streets, N.W.	Rock Creek, East Side	Wet Weather Rare
033	N Street Extended West of 25th Street, N.W.	Rock Creek, East Side	Wet Weather Rare
034	23rd and O Streets, N.W.	Rock Creek, East Side	Wet Weather Rare
035	22nd Street South of Q Street, N.W.	Rock Creek, East Side	Wet Weather Rare
036	23rd Street South of Q Street, N.W.	Rock Creek, East Side	Wet Weather Rare
037	N.W. of Belmont Road and Rock Creek & Potomac Parkway	Rock Creek, East Side	Wet Weather Rare
038	North of Belmont Road, East of Kalorama Circle, N.W.	Rock Creek, East Side	Wet Weather Rare
039	Connecticut Avenue, East of Rock Creek, N.W.	Rock Creek, East Side	Wet Weather Rare
040	Biltmore Street, Extended, East of Rock Creek, N.W.	Rock Creek, East Side	Wet Weather Rare
041	Ontario, Extended, and Rock Creek Parkway	Rock Creek, East Side	Wet Weather Rare
042	Harvard Street & Rock Creek Parkway, N.W.	Rock Creek, East Side	Wet Weather Rare
043	Adams Mill Road, South of Irving Street, N.W.	Rock Creek, East Side	Wet Weather Rare
044	Kenyon Street and Adams Mill Road, N.W.	Rock Creek, East Side	Wet Weather Rare
045	Adams Mill Road and Lamont Street, N.W.	Rock Creek, East Side	Wet Weather Rare

Discharge Serial No.	Overflow Structure Location (or discharge)	Discharge Receiving Water	Frequency Occurrence
046	Park Road, South of Piney Branch Parkway, N.W.	Rock Creek, East Side	Wet Weather Rare
047	Ingleside Terrace, Extended, and Piney Branch Parkway	Rock Creek, East Side	Wet Weather Rare
048	Mt. Pleasant Street, Extended and Piney Branch Parkway	Rock Creek, East Side	Wet Weather Rare
049	Piney Branch Parkway, West of 16th Street, N.W.	Rock Creek, East Side	Wet Weather Rare
050	28th Street, West of Rock Creek Parkway, N.W.	Rock Creek, West Side	Wet Weather Rare
051	Olive Street, Extended, and Rock Creek Parkway, N.W.	Rock Creek, West Side	Wet Weather Rare
052	O Street, Extended, and Rock Creek Parkway, N.W.	Rock Creek, West Side	Wet Weather Rare
053	O Street, West of Rock Creek N.W.	Rock Creek, West Side	Wet Weather Rare
054	West Side of Rock Creek, 300 ft. South of Mass. Ave., N.W.	Rock Creek, West Side	Wet Weather Rare
055	Massachusetts Avenue and Whitehaven Street, N.W.	Rock Creek, West Side	Wet Weather Rare
056	Normanstone Drive, Extended, West of Rock Creek, N.W.	Rock Creek, West Side	Wet Weather Rare
057	28th Street, Extended, West of Rock Creek, N.W.	Rock Creek, West Side	Wet Weather Rare
058	Connecticut Avenue and Rock Creek Parkway, N.W.	Rock Creek, West Side	Wet Weather Rare
059	16th & Rittenhouse Streets, N.W.	Rock Creek, West Side	Wet Weather Rare
060	Little Falls Branch	Little Falls Branch	Emergency By Pass

Appendix c

Alternatives to the Proposed Action
(Formerly Pages 52 to 111 of Draft Statement)

ALTERNATIVES TO THE PROPOSED ACTION

TREATMENT ALTERNATIVES

A. No Action. Since the plant is currently severely overloaded (annual average flow of 294 mgd in FY 73 vs. the annual average design flow of 240 mgd), this is not considered to be a practical alternative. The continuing discharge of this quantity of secondary-treated effluent to the Potomac without advanced wastewater techniques would continue to degrade the River in the future no matter how sophisticated the treatment of discharges from other plants in the area.

Additional equipment and modifications must be made to increase the plant reliability. Increased conduit capacity between the primary sedimentation and the aeration tanks is necessary to prevent bypassing of primary effluent. Also, additional sludge handling facilities would have to be installed to provide adequate capacity to handle existing loads and loads that would persist even if the flows were reduced.

Reduction of pollution loadings to the Potomac is mandatory. Without substantial upgrading or abandoning Blue Plains facilities, this cannot be achieved. Therefore, a no action plan is considered to be unrealistic.

B. Retain capacity at 240 mgd but upgrade plant. This proposal was presented at the May 21, 1970 session of the Potomac Enforcement Conference by Vinton W. Bacon, Professor of Civil Engineering, University of Wisconsin, Milwaukee, who was retained as a consultant by the Department of the Interior. In his report, Mr. Bacon recommended the following for Blue Plains.

1. The capacity at the plant be limited to 240 mgd for the present.

2. Washington Suburban Sanitary Commission's (WSSC) flows other than through the Potomac Interceptor Sewer be limited to 45 mgd.

3. WSSC should immediately commence design and construction of facilities for tertiary treatment of flows in excess of 67 mgd.

4. Blue Plains be upgraded on the following schedule:

a. Primary facilities - contracted immediately for 240 mgd capacity, including excess flows;

b. Secondary facilities - begin design immediately and complete within one year; complete construction by December 31, 1972.

c. Tertiary facilities - begin design within one year and complete within one year; complete construction by December 31, 1975.

Mr. Bacon recommended that flows to the D. C. plant be allocated as follows:

Flows from:	Actual Present Inflows (mgd) Year 1970	Projected Inflows (mgd) Year 1980	Year 2000
District of Columbia	124	135	180
Potomac Interceptor:			
Maryland	1	10	22
Virginia	4	14	42
Other than Potomac Interceptor:			
Virginia	7	6	8
Maryland (WSSC)	113	45	45

As noted in the preceding table, flows from WSSC (other than through the Potomac Interceptor) would be reduced to 45 mgd. This was considered to be WSSC's capacity rights based on their capital investment of $5.5 million at the time Bacon's report was prepared. The formula used is as follows:

$$\frac{\$5.5\text{ M Invested by WSSC @ B.P. X 240 MGD}}{\$29\text{ M total Investment @ B.P.}} = 45.5\text{ MGD}$$

Under the 1954 Agreement between the District and WSSC, the latter agency requested that it be allocated a capacity of 88.6 mgd in the 240 mgd plant. Payments to the District were made on the basis of the WSSC share of expansion after 1954. Provisions exist in the Agreement for WSSC to amortize the cost of sewerage facilities existing in 1954 based on their flows through these facilities. The question of WSSC's "capacity rights" must be settled in the courts and would entail several years delays. It is doubtful that any design or construction of facilities to accommodate flows between 45 and 88.6 mgd would be undertaken by the Commission prior to final disposition of this matter. Therefore, the Blue Plains facilities would continue to be overloaded, thus discharging inadequately-treated wastes for several years after its completion in December, 1975.

Bacon stated in his letter report to the Department of the Interior that the Blue Plains plant "cannot be expanded to treat the waste load which will be generated in the metropolitan area by the year 2000 (420 mgd estimated) simply because the Potomac estuary does not have the capacity even if the degree of treatment exceeds 99% removal." Professor Bacon based his conclusions upon a review of the work done primarily by Dr. Norbert Jaworski, Federal Water Pollution Control Administration, Chesapeake Technical Support Laboratory (CTSL is now part of the Region III Office of EPA).

CTSL's Technical Report #35 indicated that the Water Quality Standards minimum Dissolved Oxygen (D.O.) of 5.0 could be met if 57,000 pounds of Ultimate Oxygen Demand (U.O.D. is a combination of the carbonaceous and the nitrogenous oxygen demands) is discharged to Zone 1.[(a)] This report stated that at a capacity of 419 mgd, Blue Plains would have to provide 98% removal of 5-day BOD, 93% removal of nitrogen, and 98% removal of phosphorus.

The 240 mgd capacity Bacon recommended was arbitrarily established since it is the current average annual flow that the existing plant was designed to treat. The plant is designed to treat an average daily flow of 290 mgd during the maximum summer months. However, with the necessity to bypass the secondary units when flows exceed a 300 mgd rate, use of the 290 mgd design figure does not seem practical.

The pros and cons of Bacon's argument are listed below:

1. ADVANTAGES:

a. Initially, a smaller design flow will be handled at the plant, i.e. 240 vs. 309 mgd. However, the total discharge of pollutants to the Potomac at this point will remain approximately the same in either instance so any advantages would be minimal. Under Bacon's proposal the design capacity would ultimately be increased to 297 mgd which is only 4% less than the current project.

2. DISADVANTAGES:

a. Other plants in the area which would complement Blue Plains in enhancing water quality of the Potomac would probably be further delayed as a result of future court actions concerning "capacity rights".

(a) Zone 1 is that reach of the Potomac River between Chain Bridge and Broad Creek, as delineated in Technical Report #35, April, 1971, CTSL, EPA.

Mr. Bacon's proposal was never fully considered by the District and shortly after it was introduced by Professor Bacon, the FWPCA requested that the various interested parties meet to discuss and develop an acceptable alternative. The October 1970 "Memorandum of Understanding" (Appendix G of Draft EIS) led to the establishment of plant capacity at 309 mgd.

Bacon recommended that disposal of digested sludge on a crop rotation basis be given consideration since solids disposal by incineration can be both a source of air pollution and expensive. He stated that a loading factor of 20 dry tons per acre per year is a conservative design criterion. With an annual sludge production of 157,000 tons this would require an area of 7,850 acres of 12.3 square miles. The area of Alexandria is approximately 9,600 acres or 15 square miles. Sludge disposal alternatives will be discussed in detail later in this section.

C. Other Types of Treatment Considered.

General: Prior to reconvening, the Potomac Enforcement Conference in April and May 1969, The District of Columbia's Consulting Engineers prepared a report recommending that the plant be upgraded and enlarged to meet the then existing standards for 90% removal of BOD and suspended solids, with flexibility to meet anticipated higher standards for BOD, phosphorus, and nitrogen removals. The initial phase of the plan involved expansion of primary treatment facilities, construction of additional secondary treatment facilities using the step-aeration activated sludge process, and construction of a new sludge processing facility for all sludges generated from primary and secondary treatment. Upon completion of the first phase, the plant would have a capacity of 309 mgd which would be adequate until approximately 1980. At that time, additions to increase the capacity to 369 mgd, which would be sufficient for another ten years, would be constructed. In 1990, the capacity would be increased to its ultimate of 419 mgd which should suffice until the year 2000.

The May 1969 Potomac Enforcement Confrerence recommended the following effluent criteria at a flow of 309 mgd:

Parameter	lbs/day	mg/l
BOD	12,700	4.95
Total P	560	0.22
Total N	6,130	2.39

All alternatives considered since that time were compared on the basis of their abilities to meet the criteria listed above. The various methods of treatment studies were reported in June 1970. This report did not include a detailed discussion of all aspects of each alternative, but did include

factors for each of the primary systems which possess a major bearing on project feasibility. The two major treatment systems investigated with various alternate combinations for use at Blue Plains were:

1. Independent physical-chemical treatment.

2. Biological treatment.

   a. Conventional-tertiary treatment (physical-chemical additions)

   b. Bio-chemical treatment (nitrification-denitrification)

The costs, advantages, and disadvantages of each system are discussed in the following paragraphs and were supplied by the District of Columbia and its consultants from their report dated June 1970.(1) A detailed discussion of these processes follows:

1. Independent Physical-Chemical Treatment System

The independent physical-chemical treatment system involves the use of two-stage lime precipitation of either raw wastewater or primary settled wastewater for removal of organic material and phosphorus. The lime precipitation stage is followed by filtration, ion exchange for nitrogen removal, and carbon absorption for removal of remaining organic materials. Sludge from the lime precipitation stages would be dewatered and recalcined to reclaim a portion of the lime for reuse. Nitrogen removed by ion exchange would be discharged to the atmosphere as ammonia. Three alternatives of this system were investigated. Each alternative varied only in the method by which excess flows, which were to receive at least the equivalent of primary treatment and disinfection, were handled.

Capital Cost @ 309 mgd	350 - 395, $ Millions
Annual Operating Cost	31.5 - 34.0 $ Millions
Total Annual Cost	56.5 - 62.5, $ Millions

A major advantage of the system was that it occupied the least amount of area of the systems studied. In addition, as a physical-chemical system it was not subject to biological upset.

The system incorporated the use of an ion exchange process for ammonia removal which could result in the direct discharge to the atmosphere of approximately 25 tons per day of ammonia. It was not known what objectionable or hazardous conditions this discharge might create during quiescent atmospheric conditions such as inversions. Investigations were scheduled for evaluation of ion exchange in the EPA-DC pilot plant

(1) Metcalf & Eddy Report - Comparative Evaluation of Advanced Waste Treatment Systems 6/17/70

to determine if it would be feasible to reclaim the ammonia from the off-gas leaving the ion exchange system before it was discharged to the atmosphere. At the time of the plant design selection no such reclamation system existed, and if such a system were feasible, it would require additional costs.

Air stripping at a high pH of ammonia from the plant flow was considered, but was determined to be inapplicable because of known operating problems with scaling and freezing, and the inability to meet effluent nitrogen criteria during the winter season.

The system incorporated the use of a carbon absorption system which appeared to present serious and unresolved problems in controlling slime growths on the carbon. There were also several unknown parameters involved in handling combined chemical and organic sludges from first and second stage lime precipitation.

A final and major disadvantage of the system was that it required the demolition of all existing treatment units at the plant and would be the most difficult to incorporate in the system without affecting the continuous operation and the maintenance of present treatment levels during construction.

At this time (6/70) the District elected to eliminate this process from further consideration and decided to expand the existing facilities by the use of advanced biological processes (Conventional-tertiary or biochemical treatment).

The three alternatives for treating the excess flows considered were as follows:

a. Excess flows to receive two-stage lime treatment and disinfection.

Capital Cost, $Millions	395
Operating Cost, $Millions/Year	34.0
Total Annual Cost, $Millions/Year	62.5
Total Cost/mil gal treated, $	554.00

This would result in the production of a higher quality excess flow effluent which would offer more protection to the estuary for reuse. A 419 mgd plant can be accommodated on the existing site without the use of multi-level settling tanks. Omission of primary sedimentation would cause widest variation in influent concentrations. These variations would require good operating control of chemical dosages and sludge recirculation. Rag accumulations on mixers and flocculations would be severe without primary settling and would require screening to prevent their entrance into the process.

b. Excess flows to receive primary sedimentation in storm tanks followed by disinfection.

Capital Cost, $Millions	350
Operating Cost, $Millions/Year	31.5
Total Annual Cost, $Millions/Year	56.5
Total Cost/mil gal treated, $	501.00

A 419 mgd plant can be accommodated at the existing site without the use of multi-level settling tanks. Disadvantages and advantages to this action are the same as for (a) above, except that the use of storm tanks for excess flow treatment would reduce the range of flows to be handled by the lime precipitation process. The estimated average frequency of tank filling and emptying (about every four days) would result in a continually unpredictable and relatively frequent cleaning chore that would be undesirable from an operating standpoint insofar as personnel staffing and odor control are concerned.

c. All flows, including excess flows to receive conventional primary treatment with excess flows disinfected and discharged after primary treatment.

Capital Cost, $Millions	360
Operating Cost, $Millions/Year	32.0
Total Annual Cost, $Millions/Year	58.5
Total Cost/mil gal treated, $	519

This variation would require the use of multi-level settling tanks at an additional cost of $5 million to accommodate a 419 mgd plant at the site. The excess flow effluent would be of somewhat lower quality than that produced by (a) above.

Biological Treatment

The biological treatment employed the basic facilities already existing at the District of Columbia plant but required the addition of various advanced biological or physical-chemical processes to achieve the desired discharge standards. These processes can be put together in many different treatment systems. The individual treatment processes considered include the following:

1. Secondary treatment processes

    a. Step aeration
    b. Oxygen activated sludge
    c. Modified aeration

2. Phosphorus Removal processes

    a. 2-stage lime precipitation
    b. Single-stage lime-soda precipitation
    c. Metal ion precipitation (mineral addition)

3. Nitrogen Removal processes

a. Ammonia stripping
b. Ion exchange
c. Biological nitrification-denitrification
d. Breakpoint chlorination

Secondary Treatment Processes

a. Step-Aeration System

The step-aeration activated sludge process is based upon an aeration tank divided into 3 or 4 equal compartments or passes. Primary effluent can be introduced in varying amounts to any or all of the passes. Sludge from the secondary sedimentation tanks is returned to the first pass. Usually, primary effluent is not introduced into the first or even into the first and second passes. This permits the return sludge to undergo re-aeration and regeneration, and to oxidize the organic matter absorbed from previous contact with the primary effluent. This process was proposed for the secondary treatment units in the February 1969 engineering report prepared by Metcalf and Eddy.

Research conducted at the EPA-DC pilot plant in 1970 and 1971 encountered severe operational problems. These were possibly caused by filamentous organisms in the District's wastewater which, when introduced into the step-aeration system employing a relatively long biological growth period, could stimulate the reproduction of these organisms.

During the operation of the system, it became apparent that filamentous growths could be eliminated only by addition of hydrogen peroxide, a very costly method for control. Very careful operational control of the biological system would be essential to prevent the recurrence of the filamentous growth. It was further observed that the filamentous organisms in the effluent prevented satisfactory operation of subsequent nitrification systems if employed after step-aeration. Wide variations in the amount of nitrification which occurred in the step-aeration system were also detrimental to the growth of nitrifying organisms in the subsequent nitrification system or to nitrogen removal by breakpoint chlorination of ion exchange. Some denitrification occasionally occurred in the secondary settling tank with a resulting loss of solids in the overflow. The results of pilot plant testing strongly indicated that use of the step-aeration system would result in a process that is extremely difficult to control, particularly with respect to maintaining effective biological or physical-chemical nitrogen removal. The low process reliability observed during the operation of the step-aeration system in the pilot plant was not consistent with the degree of reliability necessary for discharge of effluent into the Potomac River.

b. Oxygen Activated Sludge Process

The oxygen activated sludge process uses oxygen gas to operate the secondary activated sludge wastewater treatment process. The system is based on a series of enclosed, concurrent gas-liquid contracting stages which enable high overall oxygen absorption efficencies at a high overall

average energy transfer. The contacting units are fitted with a gas-tight cover to contain the oxygen aeration gas. On-site oxygen gas generation plants are the most economical and desirable form of oxygen supply for most applications of the oxygen process.

Use of the oxygen process could result in a cost savings due to the utilization of smaller aeration tanks. This system has been operating at the EPA-DC pilot plant since May 1970 and problems of solids separation in the settling tank became difficult and solids escaped into the effluent. The difficulty in solids separation required larger than desired sedimentation tanks.

The oxygen process produced appreciable nitrification during the summer months which would create a similar adverse impact on the subsequent nitrogen removal processes as previously described in the step-aeration section.

During the study period, alum was added to the system to explore the possibility of phosphorus removal by this process. The limited research did not reveal that the low phosphorus residuals required by the discharge standards could be achieved and also revealed that lime would be required to control the pH during mineral addition.

c. Modified Aeration System

The modified aeration system is presently employed in the District's plant and is capable of achieving 70 - 80% BOD and suspended solids removals. Since interim requirements of the October 1970 Memorandum of Understanding called for 90% removal of suspended solids and BOD prior to the construction of the advanced waste treatment facilities, this method was not seriously considered prior to the summer of 1971. It was also believed that the higher BOD and SS concentrations in the process effluent would interfere with the nitrification process.

Research conducted at the EPA-DC pilot plant indicated that modified-aeration effluent was a satisfactory feed to the nitrification system for the following reasons:

1. The variation in effluent quality from the mean values was markedly less than in the step-aeration and oxygen systems as operated at the EPA-DC pilot plant.

2. The ability to nitrify the modified effluent was demonstrated in the pilot plant.

3. Nitrification did not occur in the modified-aeration system even in the summer months.

4. Filamentous growth was not a problem in solids separation.

?hosphorous Removal Processes

The April 1969 Enforcement Conference effluent requirements resulted in limiting phosphorus concentration in the effluent to 0.22 mg/L at 309 mgd. Studies at the EPA-DC pilot plant indicated that these requirements could be met by two-stage lime precipitation and possibly single-stage precipitation using a lime-soda process. However, the use of lime precipitation would be more expensive than use of a metal salt (i.e., alum or ferric chloride) for precipitation of phosphorus within the biological treatment systems. Research work conducted prior to June 1970 indicated that it was not feasible to achieve specific phosphorus removal levels with the mineral addition method.

After June 1970 the three methods of phosphorus removal that were considered are:

a. Two-stage lime precipitation

In two-stage treatment, sufficient lime is added to the water in the first stage to raise the pH above 11. Precipitation of hydroxyapatite, calcium carbonate ($CaCO_3$), and magnesium hydroxide ($MgOH_2$) occurs. Between the first and second stage settlers carbon dioxide (CO_2) is added to reduce the pH to 10 where additional $CaCO_3$ precipitation occurs. Phosphates included in the hydroxyapatite are removed when the precipitate settles. The sludges are then removed, thickened, centrifuged and recalcined in multiple-hearth furnaces and the recovered lime is reused in the treatment process. Approximately 90% of the phosphorus can be removed in the centrate when 25% of the solids entering the centrifuge are allowed to remain in that stream. Approximately 15% of the recoverable lime is lost in the process and make-up lime is required.

The data obtained from operation of the two-stage lime precipitation process when a high-quality step-aeration effluent could be obtained clearly demonstrated this system's ability to achieve phosphorus removals after subsequent filtration which could meet stipulated effluent quality criteria, provided satisfactory biological (90% BOD removal) treatment was achieved.

The results indicated that use of two-stage lime precipitation on a modified-aeration effluent or any other secondary effluent containing high concentrations of suspended solids and BOD did not produce an effluent after filtration containing acceptably low concentrations of phosphorus.

b. Single-Stage Lime-Soda Precipitation

In the single stage process a combination of lime and sodium carbonate (Na_2CO_3) is added to the wastewater to raise the pH to a desired value, usually less than 10, where the calcium carbonate (C_aCO_3) precipitates and removes the phosphorus with it. The settled lime sludge may be recalcined for recovery of lime similar to the process in the two-stage system.

Tests conducted at the EPA-DC pilot plant indicated that using modified-aeration effluent, the single-stage system with subsequent filtration was not capable of consistently obtaining acceptable phosphorus removals. The single-stage lime precipitation system seems to depend more heavily on a consistently high quality feed than the two-stage system. The consulting engineer decided to drop further consideration of this process in the summer of 1971.

c. Metal Ion Precipitation

In this process phosphates are removed by combining them with Aluminum or Iron (Ferric) ions to form a precipitate when alum (or ferric chloride) is added to the system between the aeration and the secondary sedimentation tanks for any activated sludge process. Additional tank capacity is not required with this process. Lab pilot research demonstrated that with proper pH control and filtration, residual phosphorus levels of approximately the discharge standards could be achieved.

A two-point mineral addition can be employed if activated sludge process is followed by nitrification-denitrification system. With the two-point application and filtration, phosphorus levels in the effluent at both EPA-Manassas and EPA-DC pilot plants were consistently lower than the Enforcement Conference requirements.

Alternates involving the use of alum or ferric chloride encounter the problem of chemical supplies, especially during the initial years. Contacts by the District representatives with Allied Chemical, Olin Chemical, American Cyanamid, Dow Chemical and Pennwalt Corporation all have indicated either limited supplies and/or higher costs unless long-term contracts could be negotiated. Approximately 71,500 tons per year of alum, or 36,000 tons per year of ferric chloride would be required initially. Neither Allied Chemical, Olin Chemical, or Dow Chemical have surplus alum or ferric chloride. By using both ferric chloride and alum, the initial demand could be met.

In the long-term, the demand for these chemicals at other advanced wastewater treatment plants should result in increased industrial production. All of the manufacturers are aware of the potential demand and are following the market carefully.

Nitrogen Removal Processes

The May 1969 Potomac Enforcement Conference required an effluent from the Blue Plains plant to contain not more than 2.39 mg/l total nitrogen. The methods of nitrogen removal studied were as follows:

1. Ammonia Stripping

2. Ion Exchange

3. Biological Nitrification-Denitrification

4. Breakpoint Chlorination

The ammonia stripping and ion exchange processes were previously described in the physical-chemical systems.

3. Biological Nitrification-Denitrification

Nitrification and denitrification are the last two stages of a three-stage activated sludge system. Nitrification is the biological oxidation of ammonia and nitrite in the wastewater to nitrate. It is accomplished in two steps (ammonia to nitrite and nitrite to nitrate) by two types of bacteria commonly found in the activated sludge process. Denitrification is an anaerobic process (carried out in the absence of oxygen) where bacteria use the oxygen in nitrate (NO_3) to oxidize a carbonaceous source, such as methanol. In the reaction the nitrate is reduced to nitrogen gas, driven from solution by agetation, and discharged to the atmosphere where it is not a pollutant since the atmosphere is mainly nitrogen gas to begin with.

Research at various installations has indicated conclusively that a properly designed and operated nitrification-denitrification system can achieve the nitrogen standards required for discharge of the Blue Plains effluent into the Potomac River. Research indicated that careful control of influent BOD was required for satisfactory operation of the system. Too low a BOD (less than 20 mg/l) prevented satisfactory bio-flocculation within nitrification. Too high a BOD loading (a function of the detention time within nitrification) interferes with nitrification efficiency.

4. Breakpoint Chlorination

In this process, chlorine is added to the wastewater in sufficient quantities to convert ammonia in the wastewater to nitrogen gas which is released to the atmosphere. Breakpoint chlorination does not achieve any significant destruction of organic nitrogen; therefore, its success in meeting Potomac River effluent requirements depends largely upon the installation of upstream processes which are capable of reducing organic nitrogen to low levels. Nitrification in upstream systems cannot be tolerated since the nitrate nitrogen would not be removed by the process.

Breakpoing chlorination would not appear to be compatible with the step-aeration or oxygen process in which nitrification occurs unless operating techniques are employed to prevent nitrification. Lake Tahoe has attempted to control nitrification within conventional aeration by chlorine. Breakpoint chlorination could be used with the modified aeration system. The use of breakpoint chlorination is feasible only when applied to a secondary treatment effluent in which nitrification is prevented. The process requires the addition of approximately 100 to 150 mg/l of chlorine. Sodium hydroxide is also added for pH control. Thus, the effluent will contain relatively high concentrations of sodium and chloride ions. If the water is to be reused the removal of these ions may be essential to develop the full reuse potential of the effluent.

Processes employing breakpoing chlorination would require a supply of approximately 130 tons per day of chlorine. If purchased, this amount would be transported by rail or truck. An additional 500 to 1,000 tons of liquid chlorine would be stored on site for treating peak loads and as a reserve for shipping delays. Serious safety hazards would be associated with shipment and storage of such large quantities of chlorine.

An alternate supply could be obtained by the construction of a chlorine production plant. Approximately 25,000 kw (kilowatts) of additional power would be required for on-site production. Sources of supply of the 240 tons per day of salt required would have to be developed. Normally, a chlorine production plant of this size would contain about 100,000 pounds of mercury in cells. The plant would have to be environmentally acceptable.

2. Biological Treatment System

The unit processes previously described were evaluated by the District of Columbia and its consultants in the following treatment systems configurations:

A. Conventional Tertiary Treatment Systems

The conventional-tertiary treatment systems involved the use of conventional primary and biological secondary treatment followed by two-stage lime precipitation, filtration, and ion exchange or breakpoint chlorination. Mineral addition within the biological secondary could be considered as an alternate to two-stage lime precipiation. Primary and secondary sludges would be handled by conventional methods of dewatering and incineration. Sludges from the lime precipitation stages would be handled in the same manner as the independent physical-chemical system. The conventional-tertiary system involved capital and operating costs which were essentially similar to the independent physical-chemical process. Several separate alternates within this system were evaluated. These combinations were as follows:

1. Step-aeration biological secondary treatment, two-stage lime precipitation, filtration and ion exchange.

2. Oxygen activated sludge secondary treatment, two-stage lime precipitation, filtration and ion exchange.

3. Step-aeration, two-stage lime precipitation, filtration and breakpoint chlorination.

4. Oxygen activated sludge, two-stage lime precipitation, filtration and breakpoint chlorination.

5. Step-aeration, mineral addition, filtration, breakpoint chlorination, carbon adsorption.

6. Oxygen activated sludge, mineral addition, filtration, breakpoint chlorination, carbon adsorption.

7. Modified aeration, mineral addition, filtration, breakpoint chlorination, carbon adsorption.

The following is a summary of the reasons given by the District and its consultants for rejection of the various alternates:

1. Step-aeration, two-stage lime precipitation, filtration and ion exchange.

This process was rejected for the following reasons:

a. It contained the same disadvantages as the physical-chemical system insofar as ammonia removal by an ion exchange system was concerned.

b. Inability to consistantly meet phosphorus requirements due to the difficulties in operating the step-aeration process on D.C. wastewater.

c. Further research would be necessary to evaluate potential lime scale accumulation in main conduits.

d. The system would require two completely separate sludge processing methods - one for primary and biological secondary sludges, and a second system for the first and second stage lime precipitation sludges.

e. Nitrification which occasionally occurred in the step-aeration process prevent nitrogen removal requirements from being met.

f. This alternative would require the use of multi-level construction to accommodate the plant on the existing site.

2. Oxygen activated sludge, two-stage lime precipitation, filtration and ion exchange.

This system was rejected for the same reasons as alternative 1 plus the following:

a. The conversion of existing aeration tanks for pure oxygen use would present major hydraulic and construction difficulties to integrate with existing aeration and secondary sedimentation tanks, thus creating additional difficulties in maintaining present treatment levels during construction.

b. Nitrogen removal requirements could not be met due to the nitrification which occurred in the oxygen process during the summer months.

c. Further research to more fully evaluate the oxygen activated sludge process would be required.

3. Step-aeration, two-stage lime precipitation, filtration and breakpoint chlorination.

This system was rejected for reasons b, c, d and e under alternative 1 as well as:

a. Safety hazards associated with the shipment or production and storage of large quantities of chlorine.

b. Possibility of necessity to remove sodium and chloride ions from effluent in the future to develop its full reuse potential.

4. Oxygen activated sludge, two-stage lime precipitation, filtration and breakpoint chlorination.

This system was rejected for the reasons given under alternative 3 plus the oxygen process problems listed under alternative 2.

5. Step-aeration, single-stage mineral addition, filtration, breakpoint chlorination, carbon adsorption.

This system was rejected for the following reasons:

a. The nitrogen removal requirements would not be met as in alternative 3.

b. Problems associated with chlorination as listed in reasons b and c under alternative 3.

c. It was not felt that single-stage mineral addition would consistently produce an effluent which would meet phosphorus requirements, even with filtration.

6. Oxygen activated sludge, single-stage mineral addition, filtration, breakpoint chlorination, carbon adsorption.

This system was eliminated for the same reasons as alternative 5 plus reasons a, b and c under alternative 2.

7. Modified aeration, mineral addition, filtration, breakpoint chlorination, carbon adsorption.

This system was eliminated for the following reasons:

a. Reason c under alternative 5.

b. Problems associated with the use of chlorine listed in reasons b and c under alternative 3.

It should be noted that with the modified aeration system in which nitrification is prevented the nitrogen removals required to meet effluent standards could be accomplished

B. Bio-Chemical Treatment Systems

The bio-chemical treatment system incorporates conventional primary and biological secondary treatment, biological nitrification-denitrification for removal of nitrogen, and filtration. The bio-chemical treatment system substitutes the use of nitrification-denitrification process for nitrogen removal, thus eliminating many of the disadvantages associated with ion-exchange or breakpoint chlorination which were considered in the other two major systems for nitrogen removal. This system, however, requires the largest land area, although a substantial reduction could be obtained if aluminum (or ferric chloride) addition to the secondary facilities would produce adequate phosphorus removal. If two-stage lime precipitation was required for phosphorus removal, extensive use of multi-level settling tanks would be necessary to accommodate a 309 mgd facility at the existing site.

The District felt that the major advantage of this system was that it incorporated components which contain the highest degree of confidence in achieving BOD, nitrogen, and phosphorus removals and employed a single sludge disposal system for which design and operating experience had long been established. Also, the system could be added to the present plant with a minimum of interruption to plant operation and efficiency.

Nine separate alternates within this system were evaluated. These combinations are as follows:

1. Step-aeration, nitrification-denitrification, two-stage lime precipitation and filtration.

2. Oxygen activated sludge, nitrification-denitrification, two-stage lime precipitation and filtration.

3. Modified aeration, nitrification-denitrification, two-stage lime precipitation and filtration.

4. Step-aeration, nitrification-denitrification, single-stage lime precipitation and filtration.

5. Oxygen activated sludge, Nitrification-Denitrification, Single-Stage Lime Precipitation, and Filtration.

6. Modified aeration, Nitrification-Denitrification, Single-Stage Lime Precipitation, and Filtration.

7. Step-aeration, mineral addition, nitrification-denitrification, filtration.

8. Oxygen activated sludge, mineral addition, nitrification-denitrification, filtration.

9. Modified aeration, mineral addition, nitrification-denitrification, filtration.

The following is a summary of the reasons given by the District and its consultants for acceptance or rejection of the various alternatives:

1. Step-aeration, nitrification-denitrification, two-stage lime precipitation and filtration.

This series was rejected for the following reasons:

a. Operational difficulties in the step-aeration process and unwanted nitrification prevented the satisfactory operation of the nitrogen removal processes.

b. This system would require the largest land area or the maximum utilization of multi-level construction to be accommodated on the existing site.

c. Further research would be necessary to evaluate potential lime scale accumulation in main conduits.

d. The system would require separate sludge processing systems - one for biological sludges and the second for first and second stage lime precipitation sludges.

2. Oxygen activated sludge, nitrification-denitrification, two-stage lime precipitation and filtration.

This system was rejected for the reasons b, c and d in alternative 1 plus:

a. The conversion of existing aeration tanks for pure oxygen use would present major hydraulic and construction difficulties to integrate with existing aeration and secondary settling tanks, thus creating additional difficulties in maintaining present treatment levels during construction.

b. The nitrification which occurred in the oxygen aeration stage during summer months prevented the satisfactory operation of the nitrogen removal process.

3. Modified aeration, nitrification-denitrification, two-stage lime precipitation and filtration.

This system is capable of producing an effluent of high quality which would meet the requirements set by the Potomac Enforcement Conference. It was considered until the final design decision was made and was rejected when it was determined that two-step mineral addition could achieve the required phosphorus removals within the available plant site. Should this system have been selected, an additional eight multiple-hearth furnaces identical to the eight utilized in the current project would be required for lime recalcination.

4. Step-aeration, nitrification-denitrification, single-stage lime precipitation, filtration.

This system was dropped from consideration for the following reasons:

a. Same as reason "a" in Alternative 1.

b. The single-stage lime precipitation process was not considered sufficiently reliable due to its dependence on a very high quality influent for use at this facility.

5. Oxygen activated sludge, nitrification-denitrification, single-stage lime precipiation, filtration.

This system was rejected for the reasons a, b and c in alternative 2 and reason b under alternative 4.

6. Modified aeration, nitrification-denitrification, single-stage lime precipiation, filtration.

This system was rejected for reason b listed under alternative 4.

7. Step-aeration, mineral addition, nitrification-denitrification, filtration.

This system was rejected for the following reasons:

a. Reasons "a" under alternative 1.

b. The system could not be constructed on the existing site without the use of multi-level construction.

8. Oxygen activated sludge, mineral addition, nitrification-denitrification, filtration.

This system was dropped from consideration for reasons a, b and c under alternative 2.

9. Modified aeration, mineral addition, nitrification-denitrification, filtration.

This is the process sequence which was accepted by the District for use. It was felt that it would produce an effluent which meets all Potomac Enforcement Conference requirements.

The use of mineral addition to the modified aeration process can produce an unnitrified effluent of consistently high quality for the nitrification and denitrification reactions to be optimized. The addition of a second dose of metal ions in the nitrogen release tanks can reduce the residual phosphorus to a satisfactory level.

The process has the disadvantage of being based on biological reactions and therefore subject to disruption by toxic materials which may occasionally be present in the wastewater.

It is this office's opinion, however, that the system selected by the District if properly designed and operated is capable of consistently producing an effluent which will meet Enforcement Conference requirements.

South Tahoe Design

The 7½ mgd South Tahoe treatment plant consisted of conventional biological treatment including primary settling, aeration, and secondary settling, followed by chemical treatment and phosphate removal, nitrogen removal by ammonia stripping, mixed media filtration, activated carbon adsorption, and disinfection. There are three solids (sludge) handling systems, each utilizing multiple hearth furnaces. The sewage sludges are incinerated to insoluble, sterile ash; the granular carbon is thermally regenerated and reused, and the lime sludge recalcined for reuse.

The biological treatment units are of conventional design. Phosphates are removed by two-stage lime precipitation using a rapid-mix basin where lime is added to the wastewater, and a flocculation tank and clarifier where the phosphate-laden sludge is settled. The wastewater is then recarbonated using carbon dioxide to recover calcium carbonate in the second stage clarifiers. The wastewater is passed through mixed-media filters which remove all suspended solids and significant amounts of phosphorus from the water as well as protect the carbon columns from interruptions in biological and chemical treatment. The carbon columns "polish" the wastewater, removing much of the remaining soluable BOD, color and detergents.

Some problems have occurred which are caused by calcium deposits in pipelines carrying lime slurry with high pH water, or lime sludge. The lines must be maintained frequently using cleaning pigs. The addition of lime raisers the pH to a level where the ammonium ions are

converted to ammonia. Initially the wastes are passed through a stripping tower where the ammonia is discharged to the air. This process has been abandoned because of freezing problems and calcium carbonate deposits. The plant managers are now considering breakpoint chlorination for nitrogen removal.

The wastes are finally disinfected by chlorination before discharge to Indian Creek Reservoir. Tests were made for viruses during two summers and none were recovered from the chlorinated effluent. Although the results (which are based on extremely limited data) are favorable, it is not possible to make any substantial conclusions at this time.

No serious breakdowns have occurred at Tahoe with the exception of the ammonia stripping towers. Since all treatment units are duplicate, when one is inoperable the load is treated by the other unit.

Individual units from the Tahoe type plant were evaluated in various combinations. Results from the EPA-DC pilot plant indicated that adequate phosphorus removal could not be achieved using single-stage lime precipitation with the effluent from modified aeration basins. Two-stage lime precipitation was abandoned when it was determined that alum precipitation could meet the Enforcement Conference effluent requirements.

The ammonia stripping and breakpoint chlorination considered at different times at Tahoe were considered at Blue Plains but discarded due to reasons stated previously in this section.

Mixed media filtration and chlorination are being utilized in the proposed expansion at Blue Plains.

Carbon columns for adsorption of remaining organics were considered as part of the independent physical-chemical system but not in other systems since the required treatment levels probably would not be achieved even with carbon columns but can be met in the selected system without their use.

The portions of the project necessary to meet Potomac River requirements were considered but discarded at the time the basic design decisions were made for the reasons described previously in this section.

E. Spray Irrigation (Muskegon Plan)

The Muskegon system consists of a collection network, pump station and approximately 11 miles of force main to transport the raw sewage to the treatment site, 24 acres of aerated lagoons, 2 -850 acre storage lagoons and approximately 6,000 acres of irrigation land which acts as a "living filter" for the treated effluent. A drainage network

is being provided to prevent the soil from becoming saturated. The entire system is designed to treat an average daily flow of 42 mgd from both domestic and industrial sources.

Before a system of this type can be designed or its cost estimated with reliability, a location or locations for the facilities must be determined. It was felt that the spray area must be within a 100-mile radius circle passes near Richmond and Charlottesville, Virginia; Cumberland, Maryland; and Harrisburg, Pennsylvania. Nearly all the Maryland and Delaware portions of the Delmarva Peninsula with the exception of the easternmost 10 miles is included. The area is effectively reduced on the west by the presence of the Blue Ridge Mountains; unless the Potomac River was followed, the wastes would have to be pumped over or through (by tunnel) the Blue Ridge Mountains.

Any areas which are planned for other than agricultural use in the next 50 years or so could not be effectively utilized since the pipes are considered to be permanent fixtures.

Areas north and west of Washington were not considered practical since the wastes would have to be pumped back through the city or pumped around it to reach those locations. Should further consideration be given in the future to facilities in this direction it is recommended that wastewaters be intercepted along the Potomac River, Rock Creek, and Anacostia Rivers near the District of Columbia Line and pumped back from those locations to lessen the flows which would be pumped from the District. This would allow the pipelines through the District to be smaller and they could be constructed with less difficulty and disruption to established communities.

Areas in Prince George's and Anne Arundel Counties were not considered practical since they will be virtually developed in the next 50 years.

From discussion with Maryland Environmental Service staff it was suggested that some suitable areas might be found in Calvert or St. Mary's Counties. However, it is doubtful that the acreage available would be adequate to serve the District's needs. Therefore, the remaining area in Maryland which appears to be most desirable is the Delmarva Peninsula. Possible areas in Virginia were not considered.

It is highly recommended that the flows be retained in the Potomac River Basin since the discharge of these quantities of waste beyond the Basin would probably preclude the Upper Potomac Estuary as a possible future source of water supply. (For further discussion on the subject of a possible location for a spray irrigation system, please see the August 4, 1972 letter from Baltimore District, Corps of Engineers in Appendix a).

Potential land areas were calculated for several systems. Design criteria similar to Muskegon's were used where practical and Virginia's "Tentative Design Criteria For Spray Irrigation For The Disposal Of Sewage Effluents Which Have Received Secondary Treatment" (Appendix D) were also utilized. The following is the basis of the estimates:

1. Treatment facility - Aerated lagoons having a depth of 15 feet (Muskegon).

2. Holding ponds - 120 day capacity having a depth of 9 feet (Muskegon). These are necessary to provide storage for flows during winter months and rainy weather. The detention time could possibly be reduced for the District of Columbia area since it has a milder climate. A minimum 30 day detention time is required by Virginia Standards.

3. Spray application rate - Used two inches per week maximum which is the tentative Virginia standard. It is noted that soil characteristics might require lower rates. Muskegon used three inches per week.

4. Border zones - Tentative Virginia standards require a fence to be located 60 feet beyond the normal projected spray area with an additional 400 - 600 feet from the fence to the property lines of existing or proposed residences or highways. The minimum 400 foot distance was used in the calculations.

Areas required for the following flows were calculated:

1. 309 mgd - Blue Plains design flow

473 mgd - Anticipated flow, District of Columbia Metropolitan Area, year 1980

861 mgd - Anticipated flow, District of Columbia Metropolitan Area, year 2000

1342 mgd - Anticipated flow, District of Columbia Metropolitan Area, year 2020

The areas in acres needed are shown in Table 2 along with the land utilized at Muskegon. All areas are net and do not include embankments, dikes, etc.

TABLE 2

Acreage Required to Accommodate Spray Irrigation Techniques

	Muskegon	Blue Plains	D.C. Metropolitan Area		
			1980	2000	2020
Flow, mgd	42	309	473	861	1,342
Aerated lagoons	24	63	97	176	275
Holding pond	1,700	12,700	19,354	35,231	54,913
Spray field	6,000	66,300	101,627	184,990	288,340
Border zone	2,276*	2,500	3,084	4,160	5,190
Total (Rounded)	10,000	81,600	124,200	224,600	348,800

*Adjusted to equal total of 10,000 acres purchased.

A brief discussion of the advantages and disadvantages of spray irrigation versus the proposed Blue Plains expansion follows:

a. Advantages

1. Nutrients in the wastewater would be returned to the natural cycle and be used as fertilizer for crops.

2. Increased crop yields due to irrigation and fertilizer effects.

3. Wastewater will be cleaned as it passes through the soil.

4. Nutrients would be completely removed from the Potomac Estuary where they are currently responsible for algae growth.

5. Blue Plains site could be utilized for other purposes, i.e., parks. Removal of existing facilities would involve considerable cost.

6. Removal of incinerator emissions from atmosphere.

7. Less susceptible to shock loadings or industrial discharges, however, there is minor industrial wastes in the District of Columbia area.

b. Disadvantages

1. Delay in reducing pollution in the Potomac. A spray irrigation system would probably take several years to complete. Site and rights-of-way acquisitions for force mains would take three years minimum, unknown maximum. The District's Department of Environmental Services does not have the power of condemnation beyond District boundaries. All land must be acquired by negotiation or by another cooperating agency such as the Maryland Environmental Services. Design time would require about 1-2 years, and construction time 2-3 years, assuming that the project would be fragmented into many small contracts. The total time necessary to commence spray irrigation operations (absolute minimum) is 6 years. A more realistic timeframe is estimated to be 11 years. Project design could proceed concurrently with rights-of-way acquisition.

2. Pumping raw sewage - Should a leak or break in the force main occur, serious health hazards and/or severe water pollution might result from the discharge of untreated sewage. Air must be injected into the system periodically to prevent the wastes from becoming septic. This results in obnoxious and explosive gases being produced.

3. Power required for pumping - It takes 532 kw power to raise 309 million gallons of water 10 feet in elevation. In order to pump the wastes out of the District of Columbia area they must be raised at least 200 feet in elevation. The total power required to pump wastes a distance of 100 miles would be approximately 37,220 kw, which is sufficient to meet the average demand of 52,000 homes.

4. Reliability of pumping and treatment - Several pump stations must be constructed with electrical power supplied to them. Should any one station in the transmission system become inoperable due to power failure, the total system would fail. At Blue Plains, power is delivered to the substation on site from four different independent sources. Should any one fail the system can immediately be switched to another source. The substation transformers are also designed to be operated to compensate for voltage drops which may occur in the system during "brownouts". This may not be feasible in a series of facilities.

5. The spray irrigation system extends over many square miles and would be much more difficult to supervise than a more compact system.

6. The possibility of crossing Chesapeake Bay where the maximum depth ranges from 60 to 120 feet would cause severe construction difficulties as well as potential pollution problems should a leak occur. Underwater leaks would be difficult to discover and repair.

7. The land required for spray irrigation of 309 mgd is approximately 81,600 acres (or 127 square miles which is an area approximately twice the size of the District of Columbia.

8. Approximately 200 families had to be relocated under the Muskegon project at an estimated cost to the Federal Government of $1,600,000 under the Relocation Assistance Act, PL 91-646. Relocation requirements for Blue Plains wastewater would probably be substantially greater.

9. Transfer of large volumes of water out of the Potomac Basin.

10. A large percentage of land required will be devoted to border zoning. For each mile of highway through the irrigation field an additional 111.5 acres of land will be required.

11. Siltation During construction of sprayfields may be a serious problem.

C. Unknowns

1. Effects of increased flows in local streams due to spray irrigation. Will this increase the chances of flooding downstream? (See August 4, 1972 letter from Baltimore District - COE - in Appendix a).

2. Effects of waterfowl utilizing storage ponds for nesting areas. Will they transmit pathogenic viruses and bacteria?

3. Long-term effects of discharging trace elements to the soil. Boron, for instance, is detrimental to plant life in sufficient quantities. After many years of irrigation practices, will the land become infertile? Some current research being conducted at Virginia Tech indicates this may be a reality.

SLUDGE DISPOSAL ALTERNATIVES

Solids removed by sedimentation tanks are withdrawn from the tanks as a liquid-solid mixture which contains 94 - 99% water, is highly putrescible, contains pathogenic organisms and is unsatisfactory for disposal on land or in water. The process selected to convert this offensive material to a relatively innocuous residue, permitting its ultimate disposal without nuisance or hazard, has a profound effect on the efficiency, nature, and cost of the basic treatment processes. The method of sludge processing selected should not result in recycling to the treatment process in excessive amounts of solids, organics and nutrients which could overload the process and result in plant effluent quality deterioration.

Various sludge processing and disposal systems were compared on their abilities to afford optimum removal of pollutants, minimize deleterious effects on all phases of the environment, and offer reasonable construction and operating costs.

Appreciable amounts of phosphorus and nitrogen are removed in sludge by the sedimentation processes, but upon digestion they are converted to soluble forms which, after elutriation, must be returned to the incoming wastewater flow and hence find their way into the plant effluent. The phosphorus removed by alum coagulation remains with the sludge and is not present in appreciable quantities in the supernatant liquor.[a] Each of the processes currently employed at the District's plant (gravity sludge thickening, anaerobic sludge digestion, digested sludge elutriation, and dewatering) involves a return to the treatment process of varying amounts of BOD, SS and nutrients. The magnitude and effect of these returns can be reduced but not eliminated by additional sludge processing and treatment facilities to compensate for the recycled loads. The facilities needed to digest all sludge produced by the selected system would include 35 additional digesters. The resulting nitrogen load recycled to the system in the supernatant would require a 28% increase in the size of the nitrification and denitrification reactors. A smaller increase in the other nitrogen removal facilities would also be required. The site is not sufficiently large to accommodate these additional facilities.

A variety of sludge processing methods are employed in the United States and in foreign countries. Most of these involve disposal of the resultant residue on land or ocean after various degrees of pre-processing. The residue may range from a partially stabilized liquid-solid mixture to an inert ash. The methods applicable to this project logically divide into two broad categories based on the ultimate disposal of the processed solids:

(a) Ocean Disposal

Both the Federal Water Pollution Control Act Amendments of 1972 and the Marine Protection, Research, and Sanctuaries Act of 1972 are concerned with the ocean disposal of sewage sludge. Final regulations to control the issuance or denial of permits for this practice were published in the Federal Register on Monday, October 15, 1973. The permit program's policy with respect to ocean dumping of sewage sludge is such that it would be permitted only when all other feasible alternatives have been explored and found to be impractical.

The District's consulting engineer's have recognized that ocean disposal is not a feasible solution to the sludge problem and they dismissed the idea during their initial screening of alternatives.

(a) Culp Advanced Wastewater Treatment, P. 180

(b) Land Disposal

Prior to January 1969, when Metcalf and Eddy's preliminary report recommending expansion of the plant was issued, the District considered several methods of sludge disposal on land. Such methods which were studied and abandoned as not practical were:

1. Pumping digested sludge to drying beds.

2. Pumping digested sludge to farm land for irrigation and fertilizing.

3. Disposal of digested sludge in lagoons.

4. Disposal of partially dewatered digested sludge as a soil conditioner or to a landfill.

5. Disposal of flash-dried digested sludge as a soil conditioner.

All the above-listed alternatives with the exception of incineration specified digested sludge. As mentioned previously, nutrients removed in the primary sedimentation process plus additional BOD would be returned to the treatment process with the supernatant if anaerobic digestion was used. The phosphorus removed by alum coagulation would not be returned in appreciable amounts. Research indicates that the use of alum has no effect on the digestion process. No information was found concerning the effects on digestion of the use of ferric chloride as a precipitant.

Besides nutrient problems, anaerobic digestion presents operational difficulties and requires much attention. It was reported that digester problems generally have increased because of the conversion to biodegradable detergents.

Anaerobic digestion has one advantage in that the process results in the production of methane gas which may be used as a fuel, however, much of the heat produced must be used to maintain the 95°F optimum digester temperature.

Alternatives considered for disposal of digested sludge are as follows:

1. Pumping to drying beds.

This was studied and abandoned since "a vast open area is needed and is not available". Approximately 77 acres of covered or 102 acres of uncovered drying beds would be required. (See letter of June 16, 1972 from Maryland - National Capital Park and Planning Commission in Appendix a). Should uncovered beds be desired, a buffer

zone surrounding them would be necessary to reduce the effects of odors on nearby residences. Should covered beds (resembling greenhouses) be chosen, a smaller buffer zone would be required to reduce vandalism by objects thrown through glass panels. None of the areas include provisions for access roads to remove the dried sludge.

The dried sludge would probably be disposed of through the fertilizer market or by landfill operations. Channels for disposal must be sought to accommodate these substantial quantities.

Siltation and erosion would occur during construction of the pipeline and beds, although this can be reduced by the use of proper construction methods.

2. Pumping to farm land for irrigation and fertilizing.

This method was abandoned because the only agricultural land available was in another State and it was felt that permission to cross State lines would not be granted. (See August 4, 1972 letter from Baltimore District - COE - in Appendix a).

For this method to be presently considered, a suitable site would have to be acquired or contracted. Also, right-of-ways for the pipeline must be obtained. Since the District does not possess condemnation powers beyond its area, this could present a problem without the sincere cooperation of the other affected States. It is felt that some delay will be experienced in completing the solids handling facility should a pipeline be constructed. Siltation would occur during construction of the pipelines.

3. Disposal of digested sludge in lagoons.

This alternative was rejected for the following reasons:

a. Digestion problems described previously.

b. The need to acquire large and well isolated tracts of land. Lagoons may be filled to a depth of approximately 4 feet with detention for 2-3 years. Using sludge with approximately 95% moisture and a 3 year detention time, lagoon areas of 1700 acres would be required. Additional areas for buffer zones and for odor control would be necessary.

c. Possibility of ground water pollution.

d. Necessity to treat excess liquid which would overflow from a lagoon.

e. Necessity to dispose of dried sludge or acquire additional lagoon sites.

f. Need for porous ground - the septic tank problems in the metropolitan area indicate that the subsurface soils are not suitable for lagooning.

g. Possibility of insect infestation.

h. Right-of-way problems getting to the site.

Lagooning of sludge appears practical only when inexpensive land is available and located relatively close to the treatment plant site. This is not the case in a major metropolitan area such as Washington, D.C.

4. Disposal of partially-dewatered sludge as a soil conditioner or to a landfill.

This method is currently practiced by the District but is felt to be impractical in the future due to the greater quantities of material produced with the AWT processes, and gradually decreasing demand for such sludge. Areas would be required to store the sludge before it was hauled away, especially during winter months when it could not be used as a soil conditioner.

Disposal to a landfill was also considered inapplicable due to the undesirability and expense of hauling, and the lack of available land within a reasonable distance.

5. Disposal of flash-dried digested sludge as a soil conditioner.

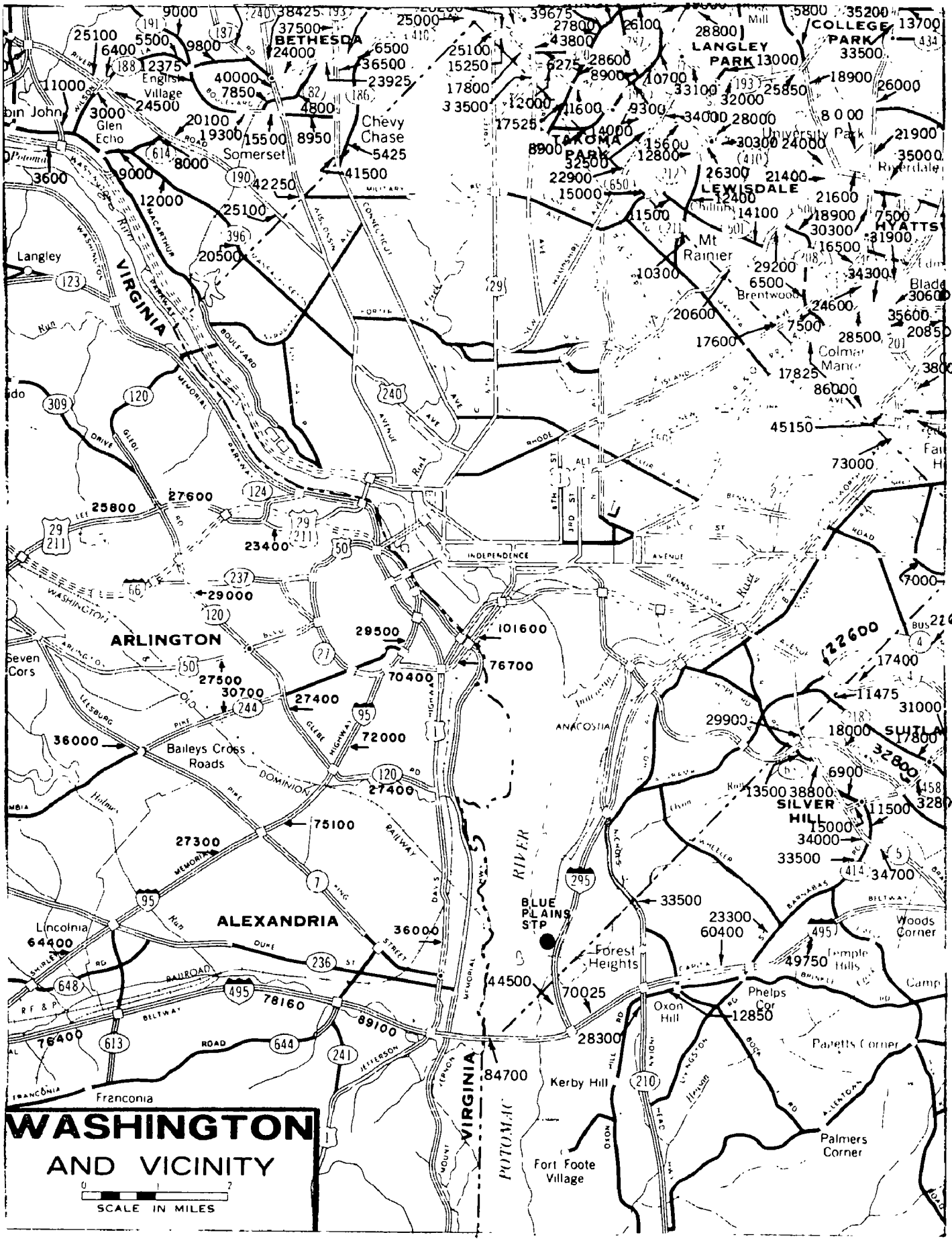
This method would utilize a flash-drying system similar to the one constructed in the early 1950's at Blue Plains. Due to a decreasing demand for this material as a fertilizer, this method was abandoned due to its limited potential. Air pollution would result from the flash-drying units although this may be reduced by control equipment.

The flash-drying system has the major disadvantages of complexity, potential for explosions, and potential for air pollution by fine particles. It is not considered equal to other furnace designs in comparative situations.

6. Disposal of incinerated sludge ash to a landfill.

This is the method of disposal selected by the District. It has the advantage that the smallest amount of material to be disposed of results. The ash is generally inert and causes a minimum environmental impact at final disposal.

The major disadvantage of this method is the potential air pollution which may be caused by incineration. It is felt that this pollution can be adequately controlled so as to meet applicable standards.



AVERAGE DAILY TRAFFIC (1971) IN THE WASHINGTON METROPLITAN AREA

Figure 2.

SOURCE: FEDERAL HIGHWAY ADMINISTRATION
U.S. DEPT. OF TRANSPORTATION

Air pollution implications resulting from the incineration feature of this project is addressed in detail in Section III and Appendix C of the Draft Statement.

7. Other Methods of Sludge Treatment

The use of pyrolysis was not considered by the District as a means of sludge treatment. Pyrolysis of sewage sludge is in the early research and development stage, with any results being at least 5 to 10 years away.

The pyrolysis process results in decomposition and the formation of a fuel gas (part carbon monoxide, part hydrogen). The gas is used to support the unit's combustion and to drive off water. Overall, the process would probably not be cheaper than incineration since filtration would continue to be required.

Several circumstances have changed since the Draft Statement was released. For example, the Draft Statement reported that approximately 2,500,000 cubic yards of excavated material would be removed from the plant site. This work has since been accomplished. The excess excavated material was removed by truck over a temporary bridge constructed over the Anacostia Freeway and disposed of by dumping near the Junction of Routes I-295 and I-495 and in the Oxen Cove vicinity.

The project is no longer on the accelerated construction schedule that was designed to provide completion of the project by December of 1974. Therefore, the plans for constructing an on-site batch plant have been dropped. Also, the size of the labor force has been reduced from a maximum of 2300 workers to a maximum of 1000.

Several alternatives for conveying construction materials, chemicals, process wastes, etc., to and from the plant site have been considered. Access to the site is limited to three possible transportation modes: highway, rail and water.

1. Highway. There are two roads which provide access to Blue Plains. The major route is the Anacostia Freeway, I-295, which provides access from both the North and the South Freeway (Figure 2). Traffic from the north must exit from the freeway at the Naval Research Laboratory exit and follow Overlook Drive to the plant site. Traffic is controlled by a traffic light at the intersection with Chesapeake Street and by a stop sign at the entrance to the NRL.

   Traffic from the south must exit at the NRL interchange, cross under the Freeway and turn left at the entrance to the Laboratory.

Egress from the site southbound is directly onto the access ramp to the freeway. Traffic would be a serious problem during the evening rush hours.

Egress northbound can only be accomplished by making a left turn across the southbound freeway access ramp, and then proceed to the stop sign at the NRL entrance. Traffic may turn onto the freeway at this intersection.

Traffic from the north may also reach the site by using South Capitol Street and Overlook Drive which parallels the freeway. This traffic would cross the entrances of the Anacostia Naval Air Station and Bolling AFB, before reaching Chesapeake Street, and then proceed to the plant as described above. A special freeway interchange was considered but was abandoned since it would probably take as long to construct as construction of the plant itself. To delay the plant construction until the interchange was complete would mean a several year delay in cleaning up the Potomac.

2. Rail. A single railroad spur presently provides rail access to the plant site. This line generally parallels the Anacostia Freeway for about 6 miles from the railroad yards between E. Capitol Street and Massachusetts Avenue, S.E. The railroad passes through residential and industrial-commercial areas from the yards to near South Capitol Street, then passes along the Anacostia Naval Air Station and through Bolling AFB and the NRL. The railroad crosses the Suitland Parkway near its intersection with the Anacostia freeway without the use of a grade separation structure.

   The railroad is presently used to convey chlorine, ferric chloride and polymers to the Blue Plains facility. Approximately 2.27 tank cars of chlorine are used per week on an annual average. During the peak summer months nearly three carloads are utilized each week.

   Use of the railroad to convey large quantities of materials would require a parallel line and marshalling yard at the site. Since virtually all the land at the site is occupied by existing structures or will be occupied by facilities being constructed, there is no space for the marshalling yard on land. Permission to parallel the line through the military bases would probably not be given for security purposes. (See letter dated August 4, 1972 from Baltimore District COE in Appendix a). With a substantial increase in rail traffic there is a definite possibility that a

grade separation structure would be necessary at the Suitland Parkway crossing to limit the adverse effects on traffic on that road. This would necessitate a substantial delay in the completion of the treatment facility.

3. Water. A navigation channel in the Potomac and a turning basin have been dredged and dock facilities have been constructed. This access will provide for efficient transport of construction materials and will guarantee timely shipment of chemicals during the operational life of Blue Plains. Should extensive transportation delays of incoming chemicals occur, the Potomac River would be extremely vulnerable to an effluent of very poor quality. Waterborne access to the site greatly reduces the probability of an incident of this type when compared to highway transportation in the Washington Metropolitan Area.

At this point, the Draft Statement described the off-site assembly and storage yard that was planned for the project. This idea has been dropped because the project is no longer on the "Around the Clock" construction schedule that was envisioned when the Draft Statement was prepared. Another concept that has been discarded for the same reason is the idea of off-site parking and bus service for contractor's employees. The applicant presently propose to conduct all erection and fabrication operations on-site and to designate on-site areas for contractor storage and parking use.

Estimates on the size of the contractor's workforce have been substantially reduced from those reported in the Draft Statement. The Draft Statement estimated from 1000 to 2300 workers would be employed at the site while the present estimate ranges from 300 to a peak of around 1000. This reduction in the workforce coupled with the fact that construction trades normally start and finish work earlier in the day than Government Employees should reduce traffic inconveniences for Naval Research Laboratory employees.

The following quantities of materials will be required during construction and operation of the treatment facilities:

1. During Construction:

1a. At this ppint, the Draft Statement contained a description of the District's plans to construct a concrete batching plant. This technique has been dropped from consideration since the "Around-The-Clock" construction schedule has been abandoned. The currently adopted plan calls for concrete delivery by conventional ready-mix truck.

1b. Excavated material and stockpiled sludge were conveyed by truck to the Oxen Cove landfill and to an area near the Junction of I-295 with I-495. In addition some sludge was disposed of at Andrews Air Force Base and at other locations for further discussion on this subject, please see "Response to Comments of Walter A. Scheiver" - Prince George's County A-95 Review Committee - No. 3" in Appendix a.

1c. Process Equipment: Some of the larger pieces of equipment which will be used in the process are expected to be too large to be readily transported to the site by either road or rail. By the use of barges this equipment may be preassembled and then transported by water at a possible considerable savings in cost.

2. During Operation

a. Fuel oil: Approximately 45,000 gallons per day of fuel oil will be used in the plant, most of it in the sludge incinerators. Virtually all oil used in the Metropolitan Area is transported in by barge. Should the dock facilities not be utilized it would be necessary to truck oil to the plant site from another dock area. This could be expected to cost an additional $3800 per day and would create an increased possibility of damage from spillage due to double handling of the oil.

b. Alum or ferric chloride: Approximately 290 tons of alum or 145 tons of ferric chloride will be used each day in the treatment plant operation. This amount of alum would require approximately 6 railroad cars per day to transport. The cost of alum delivered to the site by various modes is as follows:

(1) Barge - $5.00 per ton

(2) Rail - $8.50 per ton

(3) Truck - $20.40 per ton

Annual savings by barge would be expected to amount to $750,000 over rail and $3,300,000 over truck.

c. Methanol: The 86 tons of methanol used each day is expected to be supplied by barge. No cost savings over other transportation methods was calculated.

The use of barges to transport chemicals is expected to reduce the daily traffic to the site by a total of 12 railroad cars or 33 trucks during operation.

The lime and chlorine is expected to be transported to the site by rail and the polymers and laboratory chemicals by truck.