The Blue Carpet Treatment Program

A Proposal for Development of a New Approach to Water Cleanup and Management

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Executive Summary

It has become clear that the laws and enforcement mechanisms intended to protect and nurture the natural environment in which we live, in large measure, failed. The National Environmental Protection Act of 1969 (NEPA) expressed a goal of maintaining and creating "conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

Yet, 40 years later, climate change presents a clear and present danger to every species inhabiting our planet. Polar ice caps are melting at an alarming rate, posing serious risks that species such as the polar bear may cease to exist in the wild. Coastal states have found it necessary to enact laws specifically to deal with rising sea levels. Air and water pollution problems are rampant, causing disease, and creating the risk of more species extinctions. Coastline damage occurs when marine traffic is not subject to adequate controls.

We would like to propose a program based on new paradigms for restoring and managing those "conditions under which man and nature can exist in productive harmony", and to suggest two pilot projects to begin the transition to a more effective manner achieving the NEPA goals. We refer to the program under which these projects would fall as the "Blue Carpet Program". These pilot projects would show the world what can be accomplished through collaboration, cooperation, and innovation by diverse government agencies and environmental advocacy groups.

The first major paradigm shift would involve the transfer of responsibility for monitoring and enforcement to a non-governmental organization (NGO). There is considerable evidence that clearly demonstrates that local authorities often fail to address local water issues and, we believe, a new approach is required.

The second critical new paradigm that we believe essential is the integration of sustainability and development. For example, we believe that in the Estero Bay region, the State Marine Reserve should be regarded as the "hub" of a sustainability system that requires an increase in wetlands, whether in the SMR or other areas of the region, to compensate for every new land development project. In this way, the capacities of carbon sequestering areas can be balanced with the carbon footprints created by development.

The Blue Carpet Treatment Program will focus on the areas of land/sea interface along our coast lines: On the land side, the subject area is bordered by the coastal watersheds and on the sea side, by the navigable waters. This sphere of influence is referred to as the contiguous zone, and is recognized as an area of importance for the promulgation of sustainability and the practice of conservation.

The two pilot projects would be conducted in the Estero Bay region on the Central Coast of California, and in the Atooi Islands, also known as Kauai and Nihau, in Hawaii. Specific project activities would include upgrading of wastewater management facilities and processes, including full adherence to the National Green Standard of Performance (Green Standard) for wastewater treatment, new programs to control ocean litter, marine traffic control to prevent damage to marine life and coastlines, new programs to address sea level rise, and a multi-level monitoring program to monitor the ability of the ocean to sequester greenhouse gases. Additional benefits would include development of sustainable water supplies for the pilot regions' communities. The Estero Bay pilot would be conducted first, and knowledge gained from that effort applied in the second project, Hawaii.

Key roles in both projects would be filled by leaders and representatives of the areas' original inhabitants, members of cultures that have historically understood and respected the precarious balance between man and nature. This includes the members of the Kingdom of Atooi, and those of the Chumash and Selina people of the West Coast of California. The coming together of the native populations of the Hawaii and California Central Coast regions to bring about change

to restore the Pacific Ocean, on which their peoples have depended for thousands of years, is, in our opinion, a powerful symbol.

Background

The system of laws and enforcement mechanisms intended to protect and nurture the environment have failed. This system is, we believe, traceable to a very specific set of problems which have been observed in numerous communities nationwide. These consist primarily of enforcement failures due to:

- Bowing to pressures from special interest groups and local governments, resulting in the granting of waivers and exceptions to allow continuation of "business as usual"
- Inadequate funds to pay for human resources and technology needed to enforce the law
- "Infiltration" of enforcement bodies by representatives of big business and other special interest groups, resulting in weakening of those groups' ability to enforce the law
- Jurisdiction issues, including gaps, overlaps, and confusion with regard to enforcement responsibilities

Case Study (Morro Bay / Cayucos)

Located on the Estero Bay, a tourist destination on the Central Coast of California, Morro Bay, a City of approximately 10,000, and Cayucos, a town of approximately 2500, boasts a picture-perfect setting by the sea, and is home to the Morro Bay National Marine Sanctuary, a State Marine Reserve, and a bird sanctuary. Unfortunately, hidden beneath the area's idyllic exterior are very serious environmental problems that we believe have been caused, in large part, by failure of a number of government entities to enforce the law.

Evidence of the problems is significant.

- Beach closures due to sewage contamination occur on a regular basis, and in some cases, although contamination has occurred, no closures are ordered, resulting in significant risks to the public.
- The two aquifers that once supplied Morro Bay's public drinking water requirements have become severely contaminated, and both of those aquifers are connected to the ocean. Years of test data from samples of well water drawn from the aquifers reveal frequent detection of high nitrate and coli form levels. Both aquifers are connected to the Estero Bay.
- Residents of a rural area over one of the aquifers have reported smelling sewage and detergent in private wells.
- A once thriving local fishing industry has been decimated. Fish populations have been significantly reduced, and many name pollution, not over-fishing, as the cause.
- The sea otter death toll in the Morro Bay area is nine times that for the coastline of California as a whole.

Local clean water experts point to six major causes for the problems cited.

- Sewage exfiltration from Morro Bay sewer lines: Video inspections of the city's wastewater collection system reveal hundreds of large openings through which sewage can exfiltrate and enter the ground water. Lines all over the city exhibit serious damage. The system's main

trunk line lies in very close proximity to the ocean, and is in a particularly dilapidated condition. It is clear that these conditions have existed for many years.

- Sewage exfiltration from Cayucos sewer lines: Video inspections of the collection system of Cayucos, a neighboring community on the Estero Bay, reveal damage as bad as, if not worse than, that found in the Morro Bay system. In 2004, the California Office of Emergency Services and FEMA identified Cayucos' sewage collection and conveyance system as a disaster.

- Wastewater treatment plant capacity and location: The wastewater treatment plant shared by Morro Bay and Cayucos s located on the beach, and surcharges occur due to capacity problems. As a result, raw sewage is discharged into the ocean.

- Unpermitted and failed wastewater disposal facilities at a large commune: A commune located directly over one of the aquifers has, for years, been using unpermitted septic tanks and leach fields that are believed to be improperly engineered, and discharging untreated sewage into the Chorro Basin aquifer, which supplies several City of Morro Bay drinking water wells, and several private wells.

- Storm runoff management problems: Storm runoff in both Morro Bay and neighboring Cayucos has been improperly managed, and, in some cases, not managed at all

- Inappropriate financing: Cayucos and Morro Bay finance their wastewater conveyance and treatment systems as enterprise funds, something that activists believe leads directly to deferred maintenance.

Local experts have attempted for years to focus attention on these problems and get government agencies to take corrective action. During that time, problems with surcharging from the wastewater treatment plant, with exfiltration from the collection systems, and with contamination of the wells were brought to the attention of the various government bodies and agencies, including the City of Morro Bay, the County of San Luis Obispo, the Central Coast Regional Water Quality Control Board, the State Water Resources Control Board, the Coastal Commission, the Ocean Protection Council, and the California Department of Public Health. To date, the only one of these entities to take any significant action (closure of public wells) is the CDPH. In some cases, jurisdiction issues were cited. In others, complaints and warnings appear to have been simply ignored.

Recently, the California Department of Public Health ordered closure of a Morro Bay City well field that draws water from one of the contaminated aquifers, but unfortunately, while this protects that public, it does nothing to solve the contamination problem.

Even where remedial action is underway, we believe it is clear that the Morro Bay / Cayucos approach to wastewater management is seriously deficient and needs immediate and significant intervention.

- Capacity estimates for the new treatment plant are unreliable, yet the project is moving forward based on those estimates. The plant is shared by Morro Bay and the nearby community of Cayucos. In both communities, the collections systems are in a seriously dilapidated state, and it is clear that there are serious exfiltration problems. With large amounts of sewage never reaching the existing plant, it is clearly impossible to accurately determine the capacity needed for the new one, however, in the face of irrefutable evidence- the collection line video inspections- local authorities continue to vigorously deny that exfiltration is a problem.

- The site for the new treatment plant is in a tsunami zone and a flood zone, and was chosen without consideration of the potential effects of sea level rise. The existing plant is located on

the beach. Planning for the building of a new facility at the same location is underway. For reasons that remain unclear, a viable location located several miles inland was rejected. Interestingly, the City of Morro bay refused to put a new fire station on a lot not far from the treatment plant site, stating that the lot lies too close to the beach-in a tsunami zone. So does the treatment plant site, but officials do not seem to be troubled by the fact.

The Clean Water Act requires all point sources discharging into a publicly owned treatment works be served by pretreatment. The pretreatment technology of today provides a sustainable new water source and totally eliminates the need to construct any more publicly owned treatment works.

The Proposed Pilot Projects

The challenge for the pilot projects is to identify and test a new approach to dealing with water issues affecting our oceans and institute projects that will be a model for ocean cleanup and protection methods. New problem identification, quantification, and resolution methods and mechanisms will be needed, so that the kind of ongoing pollution described in the Morro Bay / Cayucos case study can be reversed, and new enforcement methods will be needed to ensure that past problems do not occur.

Appropriate sites for the pilot will be seaside communities where there is well-documented existing coastal region damage caused by human activity, and a history of failed enforcement of regulations designed to prevent that damage. This will ensure the effectiveness of new approaches can be monitored and measured.

Pilot Objectives

Specific objectives for the pilot projects include the following:

- Develop a protocol for assessing the condition of the land/sea interface for a given region
- Develop a protocol for assessing the impacts of marine traffic on the land/sea interface
- Develop a protocol for establishing priorities and a timetable for remedial measures, based upon condition assessment and unique local factors
- Establish a prototype organization structure for managing remediation
- Test and evaluate promising technologies and practices with pilot projects
- Identify best remediation, maintenance, and enforcement technologies and practices
- Establish a prototype organization structure for ensuring ongoing post-remediation maintenance and enforcement
- Establish a prototype approach for ongoing public education and awareness
- Develop recommendations and methods for measuring carbon footprints and balancing carbon sequestering with development activity

Potentially Applicable Standards and Technology

We believe that any practices and technologies used must support and/or conform to the National Green Standards of Performance. Technologies must have been thoroughly tested and proven effective. We believe that any technology used must support water supply sustainability and self-sufficiency.

We have been favorable impressed with the Reclamator™, a device that is already permitted in San Luis Obispo County, of which the Estero Bay region is a part. This type of device could potentially replace 5,000 existing septic tanks in the community of Los Osos and establish a sustainable new water source at each home and could also be located on sewer easements to provide pretreatment services for clusters of homes in communities where sewer systems are in place. Improved wastewater treatment has been mandated by the local enforcement authorities.

A potentially viable candidate technology for ocean health monitoring is the Circular Sea/Air Program developed by Dr. Francis Jeffrey. This multi-level monitoring computer program was developed to quantify the ability for the ocean to sequester greenhouse gases, a sort of wellness thermometer for ocean health.

Recommended Pilot Sites

We have identified California's Estero Bay and Hawaii's Atooi Islands as ideal sites for the pilot projects, based primarily upon the following:

Both regions:

Need carefully-designed wastewater treatment facilities to stop pollution of the oceans, as well as to protect communities from disease.

- Both regions' treatment facilities are deficient and are identified ocean pollution sources
- Since both are tourist communities, the amount of wastewater generated varies, presenting specific design challenges
- Both regions are potentially affected by tsunamis.

Have significant ongoing issues with harm and potential harm to sea life.

- Both have coastlines along which whale migrations take place
- Morro Bay and Cayucos have significant issues with fish population decline and with otter death rate

Are directly and negatively affected by sea level rise. This will directly have an impact on local economics. (It must be noted that the Island people are more aware of sea level rise and encroachment than mainlanders, hence by collaborating with an island group, such as the Kingdom of Atooi, the mainland public would become more aware of the effects of sea level rise).

- Have significant problems with ocean litter
- Would, with the help of the U.N. or U.S. government, depending on jurisdictional regions, be qualified to apply for carbon sequestering, greenhouse gas reduction credits
- Have significant populations of local experts and stakeholders who advocate stronger and more aggressive measures aimed at stopping and reversing damage to our oceans. This includes members of ancient native cultures- the Atooi people of Hawaii and, in California, the Selina and the Chumash.

In addition,

The Estero Bay region includes the community of Los Osos, which currently uses septic tanks for wastewater disposal, and the communities of Morro Bay and Cayucos, which have sewer systems installed. The two different wastewater management systems offer the opportunity to test both innovative pretreatment and innovative alternative technologies. The Morro Bay / Cayucos Sewer System is required to implement pretreatment as a condition to their 301(h) Waiver. Knowledge gained from a pilot in this region could thus potentially be applied to any other California Community. In addition, there is an urgent need in all three communities for quick remedial action-and thus the potential for significant and immediate benefits to residents and the environment.

Besides its pollution issues, the people of the Atooi region recently faced a serous challenge from "super ferries" that operated along its coastlines. Taking on the U.S. military in the process, they won their fight in Supreme Court of Hawaii, which recently ruled against the use of the super ferries along the state's coastlines because the required Environmental Impact Review was never done. The determination and tenacity of the sovereign Hawaiian people of Atooi was

instrumental in this victory, making them ideal participants in pilot project efforts to address water quality issues in that region.

Recommended Organization Structure

The final recommended structure to support the new paradigm for enforcement of the NEPA would include the following:

- **Enforcement:** Create a non-governmental organization, such as National Standards Enforcement Agency (NSEA), whose function would be to administer enforcement of the Green Standards. The enforcement would be administered by an independent agency. For the Estero Bay project we suggest a joint powers agreement to be made between the California Fish and Game and the NSEA. NSEA, through a joint powers agreement would receive warden status for environmental enforcement.
- The Administrator would enter into a Memorandum of Understanding (MOU) with the National Congress of American Indians (NCAI) to provide oversight and monitoring of the United States permit writers, i.e. building permits, septic permits, etc., nationally. The NCAI would select the tribe to provide monitoring within the jurisdiction of a project site. The tribe should be responsible to providing legal services. Upon a permit violation, the tribe would contact both NSEA and the California Fish and Game or the party to the joint powers agreement for that jurisdiction to issue a citation upon the violator. The legal firm would handle the case against the violator.

- **State level- a "certified state authority":** This body, to be defined by the Ocean Protection Council, would support monitoring and enforcement with programs aimed at ensuring continuous improvement. Made up of scientists and representatives from educational institutions, local environmental group leaders, and representatives of state and local government entities, the responsibilities of the group would include:

- Evaluate reported violations and potential violations to determine specific corrective actions required
- Evaluate and select technologies for violation correction and ongoing monitoring and maintenance
- Evaluate and certify contractors for cleanup and maintenance projects
- Interact with local governments to plan and execute corrective actions
- Establish rules for local governments financing of ongoing and new projects to protect water quality. For example, financing of wastewater treatment and sewer systems as enterprise funds would be forbidden.
- Assist local governments in obtaining outside financing for projects to correct local NEPA violations, and for other situations affecting and/or potentially affecting the land/sea interface in their regions

- **Local level-county and city governments:** Local governments would work cooperatively with the enforcement wardens and the certified state authority. Representatives of these governments would:

1. Cooperate with and support enforcement wardens, providing access, information, and other support as needed
2. Support and execute cleanup and monitoring activities with local resources, as required by law and as instructed by the certified state authority
3. Implement new local regulations as required to support NEPA enforcement

To the maximum extent possible, the organization structure for the pilot projects should model the desired permanent structure, which would replace the current, ineffective State Water Board system.

Financing Options

For the pilot projects, we recommend requesting Federal stimulus bill funding, and exploration of the potential for collaborative public/private partnerships that might be formed with companies and public entities that could directly benefit fro ma local carbon sequestering green project.

- In the Estero bay region, a number of companies, such as PG & E, Chevron, and J.F. Shea might be interested in such a joint venture. The public/private partnerships there could invest in the greenhouse gas reduction program through the Chicago Carbon Exchange

- In the Atooi region, the sovereign local peoples might secure financing through the United Nations, and through partnerships that might be formed with the U.S. military and with companies such as Westpac, a private company involved in land development. These partnerships would utilize the Global Commons Institute's Contraction and Convergence (C&C) system to address the carbon credit issues. In addition, a partnership with the military would hold the U.S. Department of Defense accountable for environmental degradation, and provide the military with an opportunity to gain positive international recognition for its participation in carbon sequestering work.

This combination of approaches would allow the Blue Carpet Pilot project to use multiple sources for financing and for managing carbon sequestering credits.

Suggested High-Level Project Tasks

We recommend that the following tasks be included in the pilot project plan.

1. **Establish initial project organization structure**
    a. Design prototype for final organization structure desired for ongoing, post-pilot NEPA enforcement, including federal, state, and local mechanisms

    b. Develop pilot organization structure model to emulate desired final structure to the maximum extent possible.

    c. Populate the structure as necessary to execute the initial project tasks, through establishment of funding sources.

2. **Choose Pilot Sites**
    a. Evaluate candidates' suitability for the pilot
        i. Potential for significant environmental cleanup
        ii. Potential benefits for area residents
        iii. Potential for cooperation by residents, local government officials, and environmental groups
    b. Make final selections

3. **Identify Specific Pilot Project Objectives**
    a. Perform initial, high-level evaluation of potential for significant improvement to the state of the land/sea interface
    b. Establish specific, measurable objectives for improvement
    c. Identify actions that will provide maximum improvement and maximum cost/benefit

4. **Establish Agreements with Local Government of Candidate Sites**
    a. Define approach for gaining local support
        i. Identify stakeholders
        ii. Quantify financial benefits to the regions
            1. Outside the funding for local cleanup
            2. Creation of "green jobs"

3. Potential for significant increases in tourism, as visitors come to the areas to see the model projects in progress, and to evaluate the results.

5. **Establish Funding Sources**
   a. Evaluate local funding sources allocated to and determine additional funding Needed
   b. Secure funding commitments with the Federal Government and/or with representatives of private firms whose activities create a need for carbon sequestering credits and enhanced public relations.

6. **Expand Project Organization Structure**
   a. Determine structure needed to manage project planning and execution tasks
   b. Recruit and train team members

7. **Develop the Formal, Detailed Pilot Project Plan and Schedule**
   a. Expand and finalize objectives
   b. Define tasks, tying them to specific project objectives, and assigning specific due dates
   c. Determine task dependencies
   d. Develop project schedule
   e. Establish project milestones
   f. Establish reporting requirements, including those when milestone dates are reached
   g. Establish mechanisms for notifying stakeholders when plan or schedule changes are made.

It is recommended that the detailed project plan include the following tasks:

I. **Establish Internal and External Project Status/Progress Reporting Methods**
   a. To help ensure optimal support for the pilots and for the goals and values they represent, we recommend reporting to a wide international audience.

II. **Establish Public Awareness and Education Approach**
   a. Consider a theme focused on the need to recover and re-learn the ancient wisdom that dictates mankind must live in harmony with nature, rather than attempting to master it
   b. Identify target audience
   c. Develop education and awareness campaign

III. **Establish Ocean Health Monitoring and Assessment Methods for the Pilots**
   a. Evaluate technologies, considering universal and long-term applicability in a variety of coastal regions
   b. Choose most promising technologies
   c. Develop methodologies for utilizing selected technologies
   d. Acquire and install required technologies
   e. Determine training requirements for technology usage, and train appropriate project staff

IV. **Execute Detailed Assessment of the Land/Sea Interface for Both Pilot Regions**
   a. Evaluate land/se interface status using the newly established monitoring and assessment technologies and methods
   b. Identify areas capable of significant carbon sequestering, and their capacity. Document and report results.

V. **Identify Specific Pilot Project Actions to Reverse Damage and Sustain a Healthy Land/Sea Interface**

a. Identify and research best practices that have been successfully used in other regions/nations, as well as potential new methods.

b. Analyze Potential Effectiveness, and Choose the Approaches to be used. Application of different methods in the two regions may provide the best opportunity to find the right solutions.

VI. **Choose the Technologies to be Used**

a. Identify the available technologies applicable to the project tasks.
b. Determine the most promising candidates, based on evidence of effectiveness, cost/benefit, and conformance, where applicable, to the Green Standard.

VII. **Perform Remediation Tasks**

a. As tasks are executed, perform ongoing assessments of effectiveness of methods, and fine-tune a set of best practices for future projects.
b. As tasks are executed, evaluate effectiveness of technologies used.

VIII. **Establish Actions Necessary to Sustain Improvements**

a. Repeat the assessment of the land/sea interface to establish a benchmark for sustaining improvements achieved, and for "continuous improvement" activities, as applicable.

IX. **Evaluate Carbon Sequestering Potential**

a. Determine specific locations and their carbon sequestering capability and capacity
b. Determine locations that may have already reached carbon sequestering capacity limits.

X. **Identify Requirements for Federal, State, and Local Laws to Tie Development to Carbon Sequestering**

a. Using carbon sequestering capacity information established during The project, identify recommended changes to existing building codes.
b. Submit recommendations to the appropriate agencies.

XI. **Evaluate, Monitor, Adjust, and Enhance Project Organization Structure and Methods to Develop a Model for Future Projects**

a. Conduct ongoing evaluations throughout the project
b. Develop recommendations to ensure that post-pilot projects are Managed with maximum efficiency and effectiveness.

Conclusions

Reversal of current conditions and planning and preparation for future care and management of the land/sea interface will require new paradigms and significant ongoing effort. The process will likely require a phased approach supported by diverse government entities and NGOs. While the challenges are significant, so is the existing damage, and so is the potential for greater harm if we fail to take action now. It is time to get serious about enforcing the NEPA, and creating those "conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

THE
NATIONAL "GREEN"
STANDARDS OF PERFORMANCE
-
EFFLUENT LIMITATION GUIDELINES
-
CATEGORICAL PRETREATMENT STANDARDS
&
NATIONAL STANDARDS REGULATIONS

Applicable to classes and categories of point sources, other than publicly owned treatment works

(US Code Title 33 Chapter 26 - Water Pollution Prevention and Control)
(US Code Title 42 – The Public Health and Welfare, Chapter 133 - Pollution Prevention)

FIFTH GRADE EDITION
(August 2009 Revision)

EXECUTIVE DIRECTIVE

POLLUTION PREVENTION AND CLEAN WATER

NATIONAL STANDARDS REGULATIONS

NATIONAL STANDARDS ENFORCEMENT AGENCY

EXECUTIVE SUMMARY

(Pending Final Edition)

PREFACE

These Green Standards and National Standard Regulations are developed with the intent of satisfying the National Goals of the National Environmental Protection Act of 1969, the Clean Water Act of 1972 and the Pollution Prevention Act of 1990. The National Goal means for a sustainable alternative water source to be established at all point sources of discharge to achieve the objectives of these Acts. Such objectives are:

- Protection, restoration and conservation of all State's waters (Nation's waters)
- Pollution prevention to be accomplished through application of at-source reduction control technology
- Eliminate the discharges of all point sources into publicly owned treatment works and navigable waters by implementing innovative and alternative control at all point sources so as to control both point and nonpoint sources of pollution
- Establish a National standard to prevent the discharge of pollutants equal to the Primary Standards for drinking water applicable to all classes and categories of point sources
- Eliminate sewage flows through implementation of sustainable alternative water source control technology providing containment for pollutants at the source and recycle and reuse new water at the source to 1) prevent pollutants from migrating to cause water or other multi-media environmental pollution and 2) reduce demand on State's public water supplies.

The following is provided to achieve the intent and purpose of the National Goal in the interest of the public health and welfare and protection of oceanic life and wildlife through restoring and maintaining the chemical, physical, and biological integrity of the State's waters.

EXECUTIVE DIRECTIVE

TO ALL STATES:

All States pursuant to US Code Title 33 Chapter 26 Section 1370 – State Authority, as expediently as practicable in the interest of public health or welfare, shall adopt and enforce the herein defined Water Quality Standard, Pretreatment Standard Requirements and Effluent Limitation Regulations.

(Applicable to all point sources of discharge, other than publicly owned treatment works, in compliance with the requirements of US Code Title 33 Chapter 26 – Water Pollution Prevention and Control, Sections 1311, 1312, 1313, 1314, 1316, 1317 and 1342(b)(8))

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1.0 - GENERAL PROVISIONS

1.1 - Green Standard Objective

The objective of the Green Standards of Performance is to implement sustainable alternative water sources utilizing best available innovative and alternative demonstrated control technology (BADCT) in compliance with the National Standards Regulations (NSRs) at all point sources, a standard of practice to achieve the National Goal for water quality, the Primary Standards of the National Primary Drinking Water Regulations' (NPDWRs), the Maximum Contaminant Level Goal (MCLGs).

1.2 - Green Standard Goals

1.2.1 In the interest of public health and welfare pursuant to the Pollution Prevention Act of 1990, prevent the discharge of all pollutants at the source through application of best available cost-effective innovative and alternative control technology.

1.2.2 In the interest of the public health and welfare and protection of oceanic life and wildlife, restore and maintain the chemical, physical, and biological integrity of the Nation's waters pursuant to the requirements of the Clean Water Act of 1972.

1.2.3 Achieve the Green Standard Effluent Limitations for point sources established pursuant to the USEPA's MCLGs for water quality, in compliance with the NPDWRs.

1.2.4 Establish a sustainable alternative new water source (SAWS) at each point source.

1.2.5 Eliminate sewage flows so as to prevent the discharge of pollutants into Nation's waters, State's waters, underground waters, ground waters, navigable waters, waters of the contiguous zone and the oceans.

1.2.6 Provide means to economically recycle and reuse water at each point source to prevent wasting of water.

1.2.7 Reduce or eliminate the Greenhouse Gas (GHG) and toxic gas emissions generated by conventional treatment works and septic systems.

1.3 - Green Standard Priorities

It is the Green Standard's Enforcement Priorities, in the interest of public health, to as expediently as practicable –

1.3.1 Take action to address all State orders regarding the conservation and protection of State waters, including orders addressing drought and cease and desist orders regarding discharges of pollutants.

1.3.2 Take action to eliminate the discharges into the Navigable waters.

1.3.3 Take action to prevent the permitted toxic discharges in toxic amounts through implementing control of both point and nonpoint sources.

2.0 - DEFINITIONS

All definitions and clarifications herein are intended to define the intent and purpose of the National Environmental Protection Act of 1969, Clean Water Act and the Pollution Prevention Act. Additionally defined are terms common in the wastewater industry (industry).

"301(h) Waiver" (also known as 301(h) Variance) means a National Pollution Discharge Elimination System (NPDES) permit as defined in subsection 1311(h). A conditional requirement of a "301(h) Waiver" is to implement "pretreatment requirements" at sources (other than public owned treatment works) introducing waste into publicly owned treatment works pursuant to 33USC26§1317 and 33USC26§1311(h)(5) pursuant to enforcement requirements of 33USC26§1370. See "Categorical Pretreatment Standard" and "Classes and Categories of point sources (other than publicly owned treatment works)"

"A hazardous waste" is waste that poses substantial or potential threats to public health or the environment and generally exhibits one or more of these characteristics:

- carcinogenic
- ignitable (i.e., flammable)
- oxidant
- corrosive
- toxic
- radioactive
- explosive

U.S. environmental laws (see Resource Conservation and Recovery Act) additionally describe a "hazardous waste" as a waste (usually a solid waste) that has the potential to:

- cause, or significantly contribute to an increase in mortality (death) or an increase in serious irreversible, or incapaitating reversible illness; or
- pose a substantial (present or potential) hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

These wastes may be found in different physical states such as gasses, liquids, or solids. Furthermore, a hazardous waste is a special type of waste because it cannot be disposed of by common means like other by-products of our everyday lives. Depending on the physical state of the waste, treatment and solidification processes might be available. In other cases, however, there is not much that can be done to prevent harm. "Municipal wastes", i.e. domestic wastewater or sewage from sources in a community, are the source of toxic and carcinogenic substances. "Municipal wastes" are "hazardous waste." See "Municipal wastes" and "Toxic pollutants". See "Toxic waste (pollution)"

"Administrative review" means a review of the Administrator's, or any State or political subdivision authorized pursuant to 33USC26§1369, action (A) in promulgating any standard of performance under section 1316 of the

Clean Water Act, (B) in making any determination pursuant to section 1316(b)(1)(C) of the Clean Water Act, (C) in promulgating any effluent standard, prohibition, or pretreatment standard under section 1317 of the Clean Water Act, (D) in making any determination as to a State permit program submitted under section 1342(b) of the Clean Water Act, (E) in approving or promulgating any effluent limitation or other limitation under section 1311, 1312, 1316, or 1345 of the Clean Water Act, (F) in issuing or denying any permit under section 1342 of the Clean Water Act, and (G) in promulgating any individual control strategy under section 1314(l) of the Clean Water Act, may be had by any interested person in the Circuit Court of Appeals of the United States for the Federal judicial district in which such person resides or transacts business which is directly affected by such action upon application by such person. See "Knowing violation" and "Knowing endangerment"

"Accumulated sources" means an accumulation of the discharges from the classes and categories of point sources (other than publicly owned treatment works) via a sewer system, i.e. publicly owned treatment works, creating and causing a nonpoint source of pollution. See "Classes and categories of point source (other than publicly owned treatment works)"

"Administrator" means Administrator of these "National Green Standards of Performance, Effluent Limitation Guidelines, Categorical Pretreatment Standards and Regulations". Administrator shall have authority pursuant to 33USC§§1251(e) – Public Participation, 33USC§1364 – Emergency Powers, and 33USC§1370 – State Authority. The "Administrator" shall have authority to declare emergencies in the interest of public health and welfare under 33USC§1364 See "Joint Participation Agreement"

"Advanced waste treatment techniques" means a best available innovative and alternative control technology which will cost effectively achieve the National Goal to eliminate the discharge of pollutants at all classes and categories of point sources (other than publicly owned treatment works). See "Alternative", "Pretreatment", "Mini I.D.E.A. BESTEP 10", "I.D.E.A." and "RECLAMATOR".

"AES Technology" is the "brand name" of the best available demonstrated control technology (BADCT) which, based upon demonstrated and proven performance, achieves the effluent limitations, effluent standard, prohibition requirements, pretreatment standard, or standard of performance in effect under 33USC26. See "State authority"

"Alternative" means an "at-source" innovative and alternative waste management control device required to achieve effluent limitations established for "classes and categories of all point sources (other than publicly owned treatment works)" which achieves the MCLG drinking water standard in compliance with the National Green Standards of Performance. For clarification, any conventional waste management methods or practices, such as a sewer collection and conveyance system with centralized treatment (aka publicly owned treatment works) or an OWTS, i.e. septic system, cannot be construed as an "alternative". See "BADCT", "SAWS" and "RECLAMATOR".

"Alternative requirement" means for all pollutants identified in section 1311 (b)(2)(C), (D), (F) and 1317 (b), "effluent limitations" for categories and classes of point sources, other than "publicly owned treatment works", which shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants at the source.

"Alternative water source project" means a project designed to provide municipal, industrial, and agricultural water supplies in an environmentally sustainable manner by conserving, managing, reclaiming, or reusing water or wastewater or by treating wastewater to meet critical water supply needs pursuant to 33USC§1300. Also see "Sustainable Alternative Water Source" and "SAWS".

"Ammonia" (NH_3) means a toxic and hazardous gas which has the sharp odor characteristic of household ammonia [NIOSH/OSHA 1981]. This gas can severely irritate the eyes, nose, throat, and lungs. Exposure to high concentrations can be fatal. Ammonia is converted to carbamoyl phosphate by the enzyme carbamoyl phosphate synthetase, and then enters the urea cycle to be either incorporated into amino acids or excreted in the urine. Urine is a precursor of "N-nitrosamines", the toxic pollutants listed on the USEPA Toxic Pollutant List as #50. All sources of urine, i.e. municipal wastes, are subject to innovative and alternative or innovative pretreatment requirements if such source were to discharge into a publicly owned treatment works. Upon being mixed with water, it is referred to as ammonium. Ammonia even at dilute concentrations is highly toxic to aquatic animals, and for this reason it is classified as dangerous for the environment. Ammonia is a pollutant subject to pass through publicly owned treatment works and is therefore subject to alternative waste management methods to eliminate discharge from its source so as to prevent it being discharged into navigable waters by publicly owned treatment works. Sources of ammonia have been subject to pretreatment requirements since 1977. See "Nitrosamines", "Pollution", "Pollutants", "Methane gas", "Hydrogen sulfide gas" and "Carbon footprint".

"Areawide basis" means waste treatment management, to the extent practicable, shall provide control or elimination of all point and nonpoint sources of pollution, including in place (at-source) or accumulated pollution sources pursuant to 33USC§1281(c). See "Regulate".

"Ash" means bug bones and digested organic residuals that is removed from a BADCT Technology as necessary. "Ash", unlike sludge, has been fully stabilized having little or no organic value remaining.

"At-source" means within the property boundaries or domain of a source within which the owner or operator of such source has authority. See "Onsite" and "In-place"

"BADCT" means "best available demonstrated control technology". BADCT is that sustainable alternative water resource (SAWS) technology which is the best practicable control technology currently available and is listed as

either "brand name or equal" on the Green Standard "Official Comparator", based upon demonstrated performance. Only onsite systems qualifying as "BADCT" shall be specified by "brand name or equal" to serve any source or point source of discharge within the State.

"BADCT Technology" is innovative alternative or innovative pretreatment technology that achieves the Green Standard.

"Basin Plan" means an areawide waste treatment management plan which is specific to the land and waters within a watershed.

"Beneficial reuse application" means a direct or indirect reuse of reclaimed water at the source resulting in a reduction of the public water supplies and sewage flows.

"Best Available Technology Economically Achievable" means the "brand name" of the "Certified BADCT" listed in the Green Standard of Performance.

"Best management practices for (wastewater) industry" means a practice of adopting and enforcing the National Green Standards of Performance, Effluent Limitation Guidelines, Categorical Pretreatment Standards and National Standards Regulations (Green Standards) specified under section 1314 (b) and section 1314 (c) for a class or category of point sources (other than publicly owned treatment works), for any specific pollutant which the Administrator (or a State under section 1370) is charged with a duty to regulate as a toxic or hazardous pollutant under section 1317(a)(1). The applicable controls established within the "Green Standards" shall be considered a requirement for the purposes of section 1311, 1312, 1316, 1317, or 1343 of the Clean Water Act, as the case may be, in any permit issued to a point source pursuant to section 1342 of the Clean Water Act.

"Best practicable control technology currently available" means "BADCT Technology", i.e. "SAWS", required in compliance to the "NSRs" of the "Green Standards".

"Brand name or equal" means the identification of the BADCT Technology that established the highest standard of performance as defined in the Green Standard Official Comparator that is required to be applied for control of all classes and categories of point sources. See "Classes and categories of point sources (other than publicly owned treatment works)"

"Carbon footprint" a measure of the amount of Greenhouse gas emissions (GHG) or "CO2 Equivalents" produced by a "person" or a "source" in a given time period. See "Methane gas".

"Categorical Pretreatment Standard" means a standard which applies applicable "pretreatment requirements" to

sources (other than public owned treatment works) introducing waste into publicly owned treatment works pursuant to 33USC26§1317 and 33USC26§1311(h)(5) pursuant to enforcement requirements of 33USC26§1370. See "301(h) Waiver", "Indirect Potable Reuse Standard" and "National Green Standards of Performance"

"Certified" means listed as a "brand name or equal" on the Green Standards Official Comparator.

"Certification" means a qualified independent third party evaluation of the performance of a control technology. See "BADCT".

"Certified Installer" means a licensed contractor holding at a minimum a State excavating and plumbing contractor's license. Additionally, a "Certified Installer" must also hold a "Certified Installer's Certificate" issued to such licensed contractor by the manufacturer of the BADCT Technology or its Licensee(s) demonstrating proper training has been completed, validating his qualifications for installing a "BADCT Technology". The "Certified Installer" shall be responsible for acquiring any permits for such installation and for completing all documentation and reports in regard to such installation, i.e. as-built drawings, etc. Copies of all documents shall be provided to the "Permitting Agency" and manufacture of the "BADCT Technology".

"Certified Service Provider" means a person who is a manufacture or who has been licensed by a manufacturer of a "BADCT Technology". "Certified Service Provider" additionally means a person who has been trained and is qualified to provide service for "BADCT Technology" and holds a Certificate of Certification issued by the NSEA. No person shall provide service to any "BADCT Technology" without such certification.

"Chapter" means the "US Code Title 33 Chapter 26 – WATER POLLUTION PREVENTION AND CONTROL" or "Clean Water Act". See "Water Pollution Prevention and Control".

"Classes and categories of point sources (other than publicly owned treatment works)" means point sources of "pollutants" subject to the most strict control, or abatement of pollution in compliance with any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard or standard of performance ("Green Standards of Performance" or "Green Standards") in compliance with 33USC§§1311, 1312, 1316, 1317 and 1342 no later than July 1, 1977, otherwise NSRs. A partial list of classes and categories of point sources (other than publicly owned treatment works) that are subject to such effluent limitations are, but not limited to, the following:

- Apartment / Multi-Family (per unit)
- Bars without Dining
- Car Wash with Recycling
- Car Wash without Recycling
- Commercial Laundry/Dry Cleaning
- Condos (per unit)

- Delicatessen
- Fitness / Beauty Salon
- Grocery Stores
- Hospital / Convalescent
- Hotel / Motel (per room)
- Hotel / Motel with Restaurant (per room)
- Industrial
- Laundromat
- Libraries
- Mortuaries
- Nurseries/Bottled Water
- Parks
- Professional Offices
- Repair Shop / Service Shop
- Residential
- Restaurants
- Retail / Convenience Store
- RV Parks (per space)
- Schools
- Schools with Cafeteria
- Schools with Gym / Cafeteria
- Septage Haulers
- Theaters

Pursuant to the requirements of section 1311(b)(1), each point source shall require the application of the best practicable control technology currently available pursuant to section 1314 (b) of the Clean Water Act as defined in this Green Standard's Official Comparator, or in the case of a discharge from a class and category of a point source (other than a publicly owned treatment works) into a publicly owned treatment works which shall require compliance with the "Categorical Pretreatment Standard". Pursuant to 33USC§1251(a)(7), it is the National Policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of the Clean Water Act be met through the control of both point and nonpoint sources of pollution. The only way to control both point and nonpoint sources of pollution is to prevent any discharge from point sources becoming a nonpoint source discharge. See "Nonpoint sources", "Discharge", "Pollutants", "Effluent" and "NSRs"

"Clean Water Act" means the "US Code Title 33 Chapter 26 – WATER POLLUTION PREVENTION AND CONTROL". The Clean Water Act requires a water quality for all point source of discharge through applications

of innovative and alternative control technology to prevent the discharge of all pollutants, achieving a water quality as defined in the MCLGs, a standard which defines clean water, hence satisfying the National Goal.

"Collection system" means an underground infrastructure consisting of a series of pipes and laterals which are connected together to collect and transfer "waste streams" consisting of pollutants, collectively "effluent", to a centralized treatment facility. Collection systems are typically a publicly owned. Collection systems are a nonpoint source of pollution. "Collection system" additionally means a publicly owned treatment works subject to the pretreatment requirements pursuant to 1317 for any new source discharging into them since 1977.

"Confined disposal of pollutants" means to contain and control all pollutants at the source to prevent pollutants from migrating (to any other source) to cause water or any other environmental pollution. See "Disposal of pollutants".

"Conflict of interest" is what occurs when an individual or organization has an interest that might compromise their actions.

"Contiguous zone" means a part of a navigable body of water which extends approximately 12 miles from a shoreline of such body of water. Any "direct discharge" into such a body of water shall not compromise the chemical, physical or biological integrity of such body of water. The primary pollutants of concern are thermal, pharmaceuticals and personal care products, phosphates, nitrosamines, nitrosamine precursors and acidic pH levels. See "Acidic discharge"

"Control" means application of a device consisting of "technology", processes, operating methods or other "alternatives" required to prevent, reduce or eliminate the discharge of pollutants through application of such best available "control technology" at all "point sources". US Code, Title 33, Chapter 26, Subchapter III – Standards and Enforcement, Sec. 1316.- National standards of performance (a)(1) states: the best available demonstrated control technology, processes, methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants. Control additionally means application of technology to achieve a standard to prevent the discharge of pollutants and which will reflect the greatest degree of effluent reduction. See "Control technology" and "Nonpoint source of pollution".

"Control technology" means 21st Century "control technology" that achieves the National Goal, to eliminate all discharges of all pollutants from all classes and categories of point sources, other than publicly owned treatment works. See "Classes and categories of point sources (other than publicly owned treatment works)", "BADCT Technology" and "Categorical Pretreatment Standard"

"Conventional treatment works" means "sewer systems" and "septic systems". "Conventional treatment works"

have been identified as the number one source of pollution of our Nation's waters. They are also a major contributor to uncontrolled GHG emissions. "Conventional treatment works" are century-old technology that treated wastewater for disposal. See "OWTS", "Alternative" and "Pretreatment".

"Critical water supply needs" means, at a minimum, emergency need for protection and conservation of public water supplies as defined by a state executive order declaring droughts or orders requiring the cease and desist of pollution of State's waters.

"Definite barrier" means a barrier of a physical nature, typically a back-flushable spiral wound membrane, having 100% integrity and of which is a mandatory component of a SAWS technology that cannot be breached to allow disease carrying pathogens (fecal coliform and E. coli) generated by a source or its alternative or pretreatment facilities to leave the works to enter the environment via discharge into either an underground excavation or a publicly owned treatment works. Such is a control technology component and is required to be specified by "brand name or equal" based upon such performance and criteria. Hollow fiber type membranes are not a 100% integrity "definite barrier" membrane technology and as such, shall not be acceptable.

"Demonstrated performance" means performance has been shown clearly by evidence. The minimum demonstrated performance requirement for any "equal" control technology shall be provided by an accredited third party performance evaluation entity such as NSF International, a performance standards organization. Such standards organization shall provide evaluation which will equal the level of criteria defined within the National Green Standards of Performance that has been established by the "name brand" BADCT Technology. All owners of BADCT Technology shall additionally demonstrate the validity of such performance evaluation by executing the Green Standards Performance Guarantee for each application of their control technology, assuming 100% liability for the ongoing field performance of their control technology. Any manufacture of a BADCT Technology shall have the right to perform in-field testing of any BADCT Technology at anytime.

"Department" means a state agency, political subdivision, county, municipality, community services district, special district or any other authority within the state assigned, authorized and having the right to enforce the effluent limitations, standards or prohibition established or defined under 33USC26.

"Device" means any control technology which eliminates the discharge of pollutants. Additionally, a "device" is an innovative alternative which does not require or utilize soil treatment, i.e. disposal field.

"Direct potable reuse" means "new water" that meets the "MCLG" drinking water standard for reuse and recycle for all beneficial reuse applications. See "Indirect Potable Reuse"

"Direct Potable Reuse Standard" means the "Green Standard of Performance" that provides for a "Sustainable

Alternative New Water Source" at all classes and categories of point sources (other than publicly owned treatment works). Such standard provides for a "new water" quality, enabling 100% reuse of original consumer's water for all above ground beneficial potable water applications. (See Appendix 8.2)

"Discharge" means for any person to allow any pollutant to leave the jurisdictional boundaries of a source within the sphere of influence or authority of such person, owner or operator of a source. Additionally, "discharge" means failure to confine pollutants [at the source] so they will not migrate [via a disposal field or sewer system or ocean out-fall] to cause water or other [multi-media] environmental pollution. Section 1311(a) states, "the discharge of any pollutant by any person shall be unlawful."

"Discharger" means any person that allows any pollutant to leave the jurisdictional boundaries of a source within the sphere of influence or authority of such person, owner or operator of a source. Additionally, a "discharger" is any person who fails to confine pollutants [at the source] so they will not migrate [via a disposal field or sewer system or ocean out-fall] to cause water or other [multi-media] environmental pollution. Section 1311(a) states, "the discharge of any pollutant by any person shall be unlawful." See "Source", "Person" and "Pollutant"

"Discharge permit" means a permit to discharge pollutants that is issued to an owner or operator of a source by a regulatory authority to allow a non-controllable discharge, subject to 33USC§1311(a), of a pollutant or pollutants into a disposal field, sewer system or ocean out-fall.

"Discharge of pollutants into navigable waters be eliminated by 1985" means to eliminate all discharges of pollutants into publicly owned treatment works by 1985 through implementation of best available innovative alternative control technology at all classes and categories of point sources (other than publicly owned treatment works), or in the case of discharge into a publicly owned treatment works, innovative pretreatment in compliance with 33USC§1317.

"Dispersal system" means a leachfield, seepage pit, mound, at-grade, subsurface drip field, evapotranspiration and infiltration bed, or other type of system for final wastewater treatment and subsurface discharge, i.e. "disposal systems". Dispersal systems are not lawful.

"Disposal" means discharge of pollutants.

"Disposal system" means a nonpoint source of discharge that is unlawful pursuant to 33USC§1311(a).

"Domestic wastewater" means municipal wastes or municipal sewage produced by classes and categories of point sources other than publicly owned treatment works and industrial point sources. See "Classes and categories of point sources (other than publicly owned treatment works)

"DUE" means Dwelling Unit Equivalent. A DUE is measure of the average amount of effluent (pollutants) which is expected to be generated by a single family residential user class point source. A DUE equals 2.5 people, 150 gallon per day and .425 pound of organics per day (based on the national average of .17 lb/person/day.

"Duty of Care" is "Common Law" which states: "a requirement that a person act toward others and the public with the watchfulness, attention, caution and prudence that a reasonable person in the circumstances would use. If a person's actions do not meet this standard of care, then the acts are considered negligent, and any damages resulting may be claimed in a lawsuit for negligence." In tort law, a **duty of care** is a legal obligation imposed on an individual requiring that they exercise a reasonable standard of care while performing any acts that could foreseeably harm others.

"Easement" means the right to use the land of another for a specific purpose, such as a right of way for utilities.

"Economically achievable" means possible to be purchased.

"Effluent" means any quality of water still having levels of contaminants which are in the Maximum Contaminant Level (MCL) range and does not achieve the Maximum Contaminant Level Goals (MCLGs). The MCLG is the "standard of performance" for the control of the discharge of pollutants which reflect the greatest degree of effluent reduction pursuant to 33USC§1316, a standard permitting no discharge of pollutants. See "Maximum Contaminant Level Goal (MCLG)" and "Maximum Contaminant Level (MCL)".

"Effluent source" is any source of a discharge of a pollutant or discharge of pollutants.

"Effluent standards" means the National Primary Drinking Water Regulation Standards (NPDWRs or primary standards), i.e. the Maximum Contaminant Level Goals (MCLGs), which, by definition, "allow for a margin of safety" pursuant to 33USC§1317 Toxic and Pretreatment Effluent Standards, subsection (a), subparagraph (4) "Any effluent standard promulgated under this section shall be at that level which...provides an ample margin of safety." Such standards are non-enforceable public health goals per NPDWRs. See "Effluent"

"Effluent standard and limitation" means, effective July 1, 1973, it shall be unlawful for any person to discharge any pollutant pursuant to 1365(g). Effluent limitations shall be established in accordance with sections 1311(b)(2)(A) and 1314(b)(2) pursuant to section 1317. The Green Standard defines such effluent standard and limitation. Furthermore, effluent standards and limitations are subject to adoption and enforcement by States and their political subdivisions pursuant to 33USC§1370.

"Effluent limitation guidelines" means guidelines herein defined pursuant to requirements of 33USC§§1311, 1312

and 1314. See "Green Standard of Performance" and "Official Comparator"

"Emergency action" means an action initiated by an authority to mitigate a situation which poses an immediate risk to health, life, property or environment, such action requiring urgent intervention to prevent a worsening of the situation. Example: A State governor issued executive order addressing drought conditions or a State issued cease and desist order.

"Environmental terrorism" means to knowingly and or willfully commit any act which results in the degradation of air or land and or any chemical, physical or biological integrity of any "State's waters". See "Knowing endangerment"

"Environmental terrorist" is a person who commits "environmental terrorism". See "Environmental terrorism"

"Environmental Warden" means a chief administrative officer of the Green Standard; An official charged with supervisory duties and enforcement of the specific laws andNSRsof the Green Standard; The "Environmental Warden" is a "NSEA" official in charge of enforcement over point and nonpoint sources of pollution. See "Administrator", "JPA" and "NSEA"

"EPA Maximum Containment Level Goal (MCLG)" means the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. The MCLGs are "primary standards" established by the EPA's National Primary Drinking Water Regulations. See "Effluent"

"Exfiltration" means uncontrolled discharge of raw sewage from public sewers resulting in a nonpoint source of pollution of State's waters. See "Nonpoint source of pollution".

"Fecal Coliform" means disease-causing agents defined as "toxic pollutants". See "Toxic pollutants"

"Federal standards of performance" means standards established for marine discharges, industrial discharges, and any new source established since 1977 that is owned and or operated by the United States. Federal standards of performance do not apply to classes and categories of point sources which are other than publicly owned treatment works. See "National Standard of Performance".

"Fugitive emission" means escape of gases from vessels (septic tanks) or pipes (publicly owned treatment works) in association with treatment works. The two most common gases associated with treatment works are methane, a Greenhouse gas, and hydrogen sulfide, a toxic and hazardous gas. Methane (CH4), as a fugitive emission, is a hydrocarbon Greenhouse gas with a global warming potential most recently estimated at 24.5

times that of carbon dioxide (CO2). Methane is produced through anaerobic (without oxygen) decomposition of domestic, municipal and industrial wastes. The atmospheric concentration of methane has been shown to be increasing at a rate of about 0.6% per year and the concentration of about 1.7 parts per million by volume (ppmv) is more than twice its preindustrial value. A primary source of Greenhouse gas emissions in the United States are conventional waste management systems, i.e. sewer systems and septic systems. See "Source reduction", "Methane", "Hydrogen sulfide" and "Greenhouse gases".

"Gravel-less chamber" means a buried structure used to create an aggregate-free absorption area for infiltration of reclaimed water which meets the MCLG drinking water quality standard to implement the beneficial reuse application of "indirect potable reuse". Gravel-less chambers are no longer lawful to use for treatment and or disposal of wastewater or OWTS effluent.

"Grease interceptor" means a passive interceptor located at a source and is designed to separate grease (aka FOG, i.e. fats, oils and grease) from a wastewater flow and contain it prior to such wastewater flows entering into a "control" "alternative". Grease interceptors shall be designed to reduce such FOG to a level less than 100 mg/l.

"Green Carbon Credits" means a commodity that is generated by the reduction of global Greenhouse gas emissions through implementation of BADCT Technology versus conventional methods. Such carbon footprint reduction factors to be considered shall include:

- Total flow reduction of public water supply
- Total flow reduction of sewage in publicly owned treatment works
- Total reduction of Greenhouse gas emissions in relationship to conventional systems

"Green Standard of Performance" means a standard that achieves the NPDWRs primary drinking water standard. See "Direct Potable Reuse Standard" and "MCLG"

"Green Standards" means the National Green Standards of Performance, Effluent Limitation Guidelines, Categorical Pretreatment Standards and National Standards Regulations applicable to classes and categories of point sources other than publicly owned treatment works, which are subject to adoption and enforcement by all States and political subdivisions within the United States of America. See "State authority"

"Groundwater" means State's waters below the land surface that is at or above atmospheric pressure.

"Groundwater remediation", in the interest of public health and water quality, means a primary beneficial reuse in compliance with the Green Standard, the "Indirect Potable Reuse Standard", the objective and National Goal of the Clean Water Act by achieving a standard to prevent the discharge of pollutants. Groundwater quality having

nitrate as nitrogen levels greater than 1.6 and or pH levels of less than 7.5 would be construed to be impaired and a public health emergency. See "Zero Effluent Limitation" and "Zero Effluent Standard".

"High-strength wastewater" means wastewater produced by some commercial and industrial sources that exceeds domestic wastewater strengths. Many high-strength wastewater flows will require additional pretreatment, components, devices, techniques or processes to achieve the "Green Standards". See "Areawide application".

"Hydrogen sulfide gas" (H_2S) is a highly toxic gas with a "rotten egg" odor at low concentrations [NIOSH/OSHA 1981]. At high concentrations, hydrogen sulfide can paralyze the olfactory senses [NIOSH 1979]. Like methane, its carrier, hydrogen sulfide gas is produced by decomposition of domestic wastewater (sewage) sludge (organics) by anaerobic bacteria common in publicly owned treatment works and OWTS processes, i.e. septic systems. Because this gas is heavier than air, it can escape through sewer traps which have dried out from lack of use and settle in sources. Hydrogen sulfide is a severe eye irritant and may cause tissue damage [NIOSH/OSHA 1981]. At low concentrations, gas can cause dizziness, headache, nausea, and irritation of the respiratory tract. At high concentrations, hydrogen sulfide can cause unconsciousness, respiratory failure, and death within minutes. In addition, hydrogen sulfide may be explosive at a wide range of concentrations in air--4.3% to 46% by volume [NIOSH 1985a]. Hydrogen sulfide is considered a broad-spectrum poison, meaning that it can poison several different systems in the body, although the nervous system is most affected. The toxicity of H_2S is comparable with that of hydrogen cyanide. It forms a complex bond with iron in the mitochondrial cytochrome enzymes, thereby blocking oxygen from binding and stopping cellular respiration. All sources of toxic and hazardous substances have been subject to control and pretreatment requirements since 1977. See "Methane gas".

"Impaired Water Bodies" means any body of water that does not meet water quality standards and designated uses because of pollutant(s), pollution, or unknown causes of impairment. See "Emergency", "Acid deposition" and "pH".

"In the interest of public health" means to expediently eliminate all toxic nitrosamine and nitrosamine precursor source discharges and to remediate all State's waters through implementation of pretreatment requirements at all point sources of sources subject to the federally mandated requirements as defined per US Code, Title 33, Chapter 26, Subchapter III – Standards and Enforcement, Sec. 1317.- Toxic and Pretreatment Effluent Standards as defined in the Green Standards.

"In the public interest" means in the best interest of public health or welfare and the multi-media environmental resources.

"Indirect potable reuse" means the application of the Indirect Potable Reuse Standard for below ground use of reclaimed water having a quality suitable to restore and maintain the chemical, physical, and biological integrity of

the State's [Nation's] waters achieving the primary standards of the NPDWRs. The "Indirect Potable Reuse Standard"

"Indirect Potable Reuse Standard" means a standard for at-source (onsite) below ground beneficial potable reuse applications defined by the standard of performance promulgated by NSF International in March of 1995, WASTEWATER TECHNOLOGY Report on Evaluation of Advanced Environmental Systems Inc. Mini I.D.E.A. Model BESTEP 10, #94/01/2015/060, under the provisions of NSF Standard 40 on Individual Aerobic Wastewater Treatment Plants. It additionally means the "Categorical Pretreatment Standard". (See Appendix 8.1)

"Individual control strategy" means control of toxic pollutants at each class and category of point sources (other than publicly owned treatment works) to establish a water quality which shall assure protection of public health, public water supplies, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water in compliance with requirements defined in 33USC26 §§ 1311, 1312, 1316, 1317 and 1342 under requirements of the NPDES permit program. See "NPDES" and "Pretreatment".

"Industry" means the people and companies engaged in a particular commercial enterprise, in this case, the "wastewater industry". Prior to adoption of the Clean Water Act, the industry predominantly consisted of municipal public works departments, state and local regulatory authorities, large private engineering and construction companies and equipment suppliers providing conventional wastewater management systems. See "State authority" and "Best management practices for (wastewater) industry".

"Industry wide application" means an innovative alternative control technology which is scalable to serve classes and categories of residential, commercial, industrial and municipal point sources. "Industry wide application is a "BADCT Technology" requirement. See "SAWS", "Indirect Potable Reuse Standard" and "Direct Potable Reuse Standard".

"Innovative technology" means In the case of any facility subject to a permit under section 1342 of 33USC26 which proposes to comply with the requirements of subsection 1311 (b)(2)(A) or (b)(2)(E) by replacing existing production capacity with an innovative production process which will result in an effluent reduction significantly greater than that required by the limitation otherwise applicable to such facility and moves toward the national goal of eliminating the discharge of all pollutants, or with the installation of an innovative control technique that has a substantial likelihood for enabling the facility to comply with the applicable effluent limitation by achieving a significantly greater effluent reduction than that required by the applicable effluent limitation and moves toward the national goal of eliminating the discharge of all pollutants, or by achieving the required reduction with an innovative system that has the potential for significantly lower costs than the systems which have been determined by the Administrator to be economically achievable, the Administrator (or the State with an approved program under section 1342 of the Clean Water Act, in consultation with the Administrator) may establish a date for compliance

under subsection 1311 (b)(2)(A) or (b)(2)(E) no later than two years after the date for compliance with such effluent limitation which would otherwise be applicable under 1311 (k), if it is also determined that such innovative system has the potential for industrywide application.

"Innovative and alternative" means "BADCT Technology" required for classes and categories of point sources other than publicly owned treatment works.

"In-place" means "onsite" or "at-source".

"Integration of facilities" means integration of other than publicly owned treatment works (innovative pretreatment) and publicly owned treatment works in compliance with the requirements of sections 1281, 1288, 1312, 1316, 1317 and 1342. "BADCT Technology" achieving the "Green Standard" renders "integration of facilities" virtually obsolete.

"Interested person" means any person or citizen actively involved in the administration and or implementation of the Green Standards. See "Promulgate".

"JPA" means "Joint Participation Agreement".

"Joint Participation Agreement" (JPA) means an agreement for administration of the Green Standards entered into by and between a State's resource agency, the State's fish and wildlife protection authority and the National Standards Enforcement Agency (NSEA), collectively referred to as "Administrator". See "NSEA", "Administrator" and "Environmental Warden"

"Knowing endangerment" means a premeditated "knowing violation", either by omission or commission, of public health and safety laws by any "person". "Knowing endangerment" additionally means any person who knowingly violates section 1311, 1312, 1313, 1316, 1317, 1318, 1321(b)(3), 1328, or 1345 of the Clean Water Act thereby placing another person in imminent danger of death or serious bodily injury. Such person, upon conviction, shall be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both, for each violation committed. See "Environmental terrorism" and "Knowing violation"

"Knowing violation" mean a premeditated act by any "person" in violation of public health and safety law, posing a potential treat to public health and safety, shall be subject to criminal charges pursuant to 33USC§1319 Enforcement. (c)(2) which says, any person who — (A) knowingly violates section 1311, 1312, 1316, 1317, 1318, 1321(b)(3), 1328, or 1345 of the Clean Water Act shall be punished by a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment shall be by a fine of not more than

$100,000 per day of violation, or by imprisonment of not more than 6 years, or by both. See "Knowing endangerment", "Sewer system", "Pollutant", "Toxic pollutant" and "A hazardous waste"

"Less stringent" means no State or political subdivision or interstate agency may adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, of standard of performance (the Green Standards) which is less stringent than the effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance (the Green Standards) under 33USC§1370. See "Interested person" and "Effluent standard and limitation".

"License" means to have a document which validates a person's right to use and or do business utilizing a patented device.

"License Agreement" means an agreement established between any BADCT Technology manufacture and any other interested person.

"Licensee" means a "Certified Service Provider". See "Certified Service Provider"

"Licensor" mean a party who license another to do business utilizing BADCT Technology.

"List" means the list of "Certified BADCT Technologies" to be specified and required to serve classes and categories of point sources, other than publicly owned treatment works.

"Maximum Contaminant Level (MCL)" means "effluent" having levels of contaminants which fall within the MCL range and are subject to enforcement. See "Maximum Contaminant Level Goal (MCLG)" and "Effluent".

"Maximum Contaminant Level Goals (MCLGs)" are the parameters for the Green Standards of Performance, i.e. the "Direct Potable Reuse Standard". The MCLGs establishes the level of contaminants in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. See "Direct Potable Reuse Standard"

"Maximum degree of effluent reduction" means to achieve the "GREEN Standards of Performance".

"Memorandum of understanding" (MOU) means a formal agreement between two interested persons.

"Meter" shall mean a "new water meter".

"Methane gas" means a highly explosive (Greenhouse) gas of which the molecular density is 65 times greater than that of carbon dioxide (CO2) and which is produced by conventional wastewater management methods, i.e. sewer systems and septic systems. As a hazardous substance, methane is a Greenhouse gas subject to control through application of "innovative alternatives" and "innovative pretreatment" control technologies. See "Carbon footprint" and "Hydrogen Sulfide gas"

"Modification for secondary treatment requirements" (also known as a "301(h) Waiver" or "301(h) Variance") requires application of the best practicable control technology currently available at all classes and categories of point sources, other than publicly owned treatment works. Any less stringent requirements would be unlawful pursuant to 33USC§1311(a). See "Pretreatment requirements", "301(h) Waiver" and "Discharge of pollutants into navigable waters be eliminated by 1985".

"MOU" see "Memorandum of Understanding."

"Multi-media" means water, air and land. See: "Pollution Prevention Act of 1990", "Source reduction" and "Fugitive emissions".

"Municipal discharge" means a discharge from a publicly owned treatment works point source. An example would be an ocean outfall.

"Municipal sewage" means wastes (typically of a liquid nature) originating from classes and categories of point sources (other than publicly owned treatment works) within a community. Such municipal wastes may be composed of both domestic and industrial discharges. (Source: USEPA "Terms of Environment"). All sources of municipal sewage or wastes are subject to effluent limitations standards. See "Effluent limitations" and "Pretreatment standards".

"National Goal" means for a "Sustainable Alternative Water Source" to be established at all point sources of discharge to achieve the objectives of the Clean Water Act. Such objectives are:

- Protection, restoration and conservation of all State's waters (Nation's waters)
- Pollution prevention is to be accomplished through application of at-source reduction control technology
- Eliminate the discharges of all point sources into publicly owned treatment works and navigable waters by implementing innovative and alternative control at all point sources so as to control both point and nonpoint sources of pollution
- A National standard to prevent the discharge of pollutants, a National standard equal to the Primary Standards for drinking water, such being the standard to prevent all discharges of pollutants at all classes and categories of point sources (other than publicly owned treatment works)

- Eliminate sewage flows through implementation of sustainable alternative water source control technology to provide for containment of all pollutants at the source and recycle and reuse of all new water at the source so as to 1) prevent pollutants from migrating to cause water or other multi-media environmental pollution and 2) reduce demand on State's public water supplies.

"National discharge prohibition" means, since July 1, 1973 (33USC26§1365(f)), it has been an unlawful act for any person or persons to discharge any pollutants into publicly owned treatment works without implementation of innovative pretreatment (other than publicly owned treatment works) at each class and category of point sources, other than publicly owned treatment works, consisting of the best practicable (pretreatment) control technology currently available (BADCT Technology) pursuant to the requirements of Section 1317.

"National Standard of Performance" means a standard that prevents the discharge of pollutants applicable to classes and categories of point sources other than publicly owned treatment works. See: "Federal Standard of Performance".

"National Green Standards of Performance" means the most stringent effluent limitation, effluent standard, prohibition, pretreatment standard or standard of performance pursuant to 33USC§1370. See "Direct Potable Reuse Standard" and "Categorical Pretreatment Standards".

"Nation's waters" means "State's waters". See "State's waters".

"Negligent violation" means a criminal act pursuant to 33USC§1319(c).

"New sources" means any "source" established after July 1, 1977, such source being subject to "Categorical Pretreatment Standards" established under 33USC§1317 and subject to standards of performance pursuant to 33USC§1316.

"New water" means any reclaimed water that meets the "MCLGs", the "Direct Potable Reuse Standard", i.e. the "Green Standard of Performance". "New water" is a man-made "valuable commodity" and a "valuable resource".

"New Water for Peace" means an NGO who is the Licensor of the AES Technology. See "AES Technology"

"New water rights" means those rights of the Certified Service Provider to the reclaimed water produced by the "BADCT Technology". The Certified Service Provider has the right to dedicate the new water back to the original consumer for consumer's reuse benefits. Nothing in these Green Standards shall preclude the right for the Certified Service Provider to implement a "system of charges" upon any other person receiving the new water, other than the original consumer.

"New water source" means "SAWS". See "Sustainable alternative water source".

"New water meter" is a "water meter" that measures units of "new water" produced and or usage. See "Valuable commodity"

"New water service" means a service provided to an owner or operator of a source by a "Certified Service Provider" which reclaims used water to a water quality that meets a direct or indirect potable reuse standard. See "Indirect Potable Reuse Standard", "Direct Potable Reuse Standard" and Appendix 8.0

"Nitrates" means a toxic compound responsible for the formation of stomach and nasopharyngeal cancers of which its source is human urine. Nitrate, as is ammonia and nitrite, is a precursor of nitrosamine(s), a toxic pollutant and carcinogen listed on the US EPA Toxic Pollutant List. (All sources of toxic pollutants are subject to a standard of performance as provided by BADCT Technology prior to discharging into either an underground excavation or into a publicly owned treatment works pursuant to the pretreatment standards defined in section 1317(a)) Bacteria cause nitrates in drinking water to undergo a chemical conversion into nitrites, which in turn can be converted into nitrosamines in the gastrointestinal tract to cause birth defects, cancer and even death. The primary source of these toxic substances is human urine in domestic wastewater or sewage. All sources of these toxic substances are subject to federally mandated pretreatment requirements since 1977 pursuant to section 1317(c) and the standards of performance in section 1316(a)(1). See "Nitrosamine(s)" "Nitrosamine precursors", "Pretreatment requirements" and "Toxic substances".

"Nitrosamine(s)" means a toxic carcinogenic pollutant of which the source of it and its precursors is human urine. Nitrosamine(s) also means the toxic pollutant listed as # 50 on the United States EPA Toxic Pollutant List and is a known carcinogen and of which the source of is urine, associated with domestic "wastewater" and "sewage" "effluent", i.e. municipal wastes or sewage. All sources of toxic (poison) pollutants listed on the USEPA Toxic Pollutant List are subject to mandatory pretreatment requirements since 1977. Any source having a shower, urinal or toilet is a source of nitrosamines, i.e. toxic or nonconventional pollutants. Nitrosamines are commonly known as ammonia, nitrate and nitrite, all of which are toxic pollutants. Ammonia, nitrate and nitrites are classified as nonconventional pollutants, i.e. toxic pollutants, which all sources of are subject to "pretreatment requirements" that will provide for prevention, reduction or elimination through containment of such pollutants at the source to prevent them from migrating to cause water and other environmental pollution while eliminating such discharge of such toxic pollutants into either an underground excavation or into a publicly owned treatment works, i.e. collection system of laterals in public right-of-ways. The "BADCT" is required to achieve such "SAWS" standard or Green Standards which achieves the National Goal; to eliminate all discharges of all pollutants at the source. All "sources" of "nitrosamine" are subject to "pretreatment requirements". See "Toxic Pollutant" and "Nitrate".

"Nitrosamine precursors" means human urine, ammonia (ammonium), nitrite and nitrate. Nitrite and nitrate are toxic pollutants. All nitrosamine sources are subject to at-source control via an innovative alternative, or in the case of discharge into a publicly owned treatment works, an innovative pretreatment control technology pursuant to 33USC26§1342.

"Nonindustrial sources" means all residential and commercial sources of municipal wastes or sewage (pollutants) other than industrial and municipal point sources. See "Classes and categories of point sources (other than publicly owned treatment works)" and "Point sources".

"Nonpoint source" means, at a minimum, a septic system and sewer system. See "Conventional treatment works", "Publicly owned treatment works", "Soil-based dispersal field" and "Underground excavations".

"NPDES" means National Pollution Discharge Elimination System. (33USC26§1342(a)) Under the "NPDES" permitting program, it is unlawful to issue any NPDES permit to allow any discharge of pollutants or any combination of pollutants notwithstanding 33USC26§1311(a). Section 1311(a) states "Except as in compliance with this section and sections 1312, 1316, 1317, 1328, 1342, and 1344 of the Clean Water Act, the discharge of any pollutant by any person shall be unlawful." All point sources of any source of a toxic pollutant (domestic wastewater sources) discharge are required to be served by pretreatment alternatives consisting of the best practicable control technology currently available prior to discharging into a publicly owned treatment works since 1977 under the requirements of the "NPDES" permit program, such permit being issued after July 1, 1973.

"NSEA" means the "National Standards Enforcement Agency", an independent agency. "NSEA" means "Administrator" and enforcement authority of the NSRs of the "Green Standards". See "Environmental Warden", "JPA", "National Standards Regulations (NSRs)" and "Administrator"

"NSRs" means "National Standards Regulations" are the parameters that establish the "Green Standards" as defined in the "Official Comparator" and in compliance with the "Primary Standards" as promulgated under the "NPDWRs". The "NSRs" provides for an industry-wide standard that prevents the discharge of pollutants.

"Official Comparator" means effluent limitation guidelines and factors defined in the NSRs pursuant to 33USC§1314 relating to the assessment of best practicable control technology currently available (BADCT) to comply with objectives defined in section 1311(b)(1). (See "Official Comparator" in "NSRs")

"Onsite" means a common industry term which refers to "at-source" or "in-place".

"Onsite Wastewater Treatment System(s)" (OWTS) means onsite wastewater management systems and includes individual disposal systems that discharge pollutants into subsurface excavations for disposal. Such discharge of

pollutants into any underground excavations utilizing soil-based dispersal for disposal of wastewater is unlawful.

"Other environmental pollution" means multi-media, i.e. "Greenhouse Gas" (GHG). See "Fugitive emissions"

"Other than publicly owned treatment works" means classes and categories of point sources other than publicly owned treatment works. See "Classes and categories of point sources (other than publicly owned treatment works)

"Owner or operator" means any "person" who is an owner or operator of any class or category of a point source, such point source subject to innovative and alternative control technology pursuant to 33USC26 §§ 1311, 1312, 1313, 1314, 1316, 1317 and 1342(b)(8)). See "Person" and "Point source".

"Performance Guarantee" means a guarantee provided by the "Certified Service Provider" of a "BADCT Technology". See "Demonstrated performance".

"Performance standard" means "Direct Potable Reuse Standard" or "Indirect Potable Reuse Standard".

"Permit" means a local building permit required to install "BADCT Technology".

"Permitting agency" means any public agency authorized to issue a building permit.

"Person" means an individual, corporation, firm, organization, business trust, company, partnership, association, State, State agency or department, municipality, commission, or political subdivision of a State or any interstate body or unit of local government who is, or that is, subject to the requirements of the Chapter. See "Jurisdictional boundaries", "Knowing endangerment" and "Person's obligation".

"pH" is a chemical in water. pH is a measure of the hydrogen ion in water. A low pH indicates increasing acidity (a "pollutant"), whereas a high pH indicates increasing alkalinity. pH is a measure of healthy water (pH level of 7.4 or greater) or unhealthy water (pH level of 7.4 or less). The acidity or alkalinity of wastewater affects both treatment and the environment. The normal range of pH of [conventional] wastewater effluent is between 6.5 and 7.2. Such pH level degrades the chemical, physical and biological integrity of our Nation's waters which compromises human health and the health of the aquatic life, wild life and the environment pursuant to 1314(a)(1). In humans, cancer cells survive and thrive at pH levels of less than 7.5. A pH level of 7.5 is the potable reuse goal for "new water". See "Categorical Pretreatment Standard" and "Toxic pollutant"

"Point source" means a sewer pipe coming from a "source", i.e. building, structure or facility, having an "owner or operator". Additionally, "point source" means any discernable, confined and discrete conveyance, including but not

limited to any pipe or container from which pollutants are or may be discharged. For example, a "point source", such as a sewer pipe, of a "source", i.e. building, is the first discernable point that control technology is to be implemented. A "point source" of a building or structure is where the sewer pipe extends beyond the plane of the foundation of the structure at which pollutants, i.e. effluent, generated by such source may be controlled through implementation of innovative alternative or innovative pretreatment control technology. See "Classes and categories of point sources (other than publicly owned treatment works)" and "Discharge".

"Pollutant" means having a maximum concentration of any constituents which measures to have a level greater than the greatest level allowable as defined in the EPA Maximum Containment Level Goal (MCLG) Drinking Water Quality Standard or any discharge or "acidic deposition" from a "source" having a "pH" level of less than basic, i.e. 7.5. Specifically, any concentration of any constituent defined in a primary drinking water quality standard that, when measured, exceeds the MCLGs and breaches into the Maximum Containment Level (MCL) range, defines the maximum allowable contaminant level for drinking water quality, then such constituent shall be considered a pollutant. For oceanic waters, any "discharge" having a pH level of less than 8.1 shall be considered an "acidic disposition" and a "pollutant" to such navigable waters. See "Maximum Contaminant Level Goal (MCLG)", "Acidic deposition" and "pH".

"Pollution" means the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water, land or air. See "Multi-media"

"Pollution Prevention Act of 1990" means the United States Code Title 42 - The Public Health and Welfare, Chapter 133 - Pollution Prevention, Sections 13101 – 13109 (42USC133)

"Potable" means suitable to drink but not intended for drinking.

"Pretreatment" means application of the "Categorical Pretreatment Standards" required pursuant to section 1317 and section 1342 prior to discharging into a publicly owned treatment works.

"Pretreatment device" means an innovative pretreatment control technology which achieves the "Categorical Pretreatment Standards". See "Indirect Potable Reuse Standard"

"Pretreatment requirements" are defined by the "Categorical Pretreatment Standard". The "Categorical Pretreatment Standard" is to be applied at classes and categories of sources or point sources (other than public owned treatment works) prior to discharge into a publicly owned treatment works in compliance with requirements under US Code, Title 33, Chapter 26, Subchapter III – Standards and Enforcement, Sec. 1317. - Toxic and Pretreatment Effluent Standards. See "Classes and Categories of point sources (other than publicly owned treatment works)" and Appendix 8.1

"Pretreatment standard" means that "Categorical Pretreatment Standard" (of performance) as demonstrated per the NSF Standard 40 Report #94/01/2015/060 established under section 1317(b) to achieve the pretreatment requirements pursuant to section 1317(a) and which was promulgated to all States and Territories of the United States of America by the NSF International, March 1995.

"Primary Standards" means "National Primary Drinking Water Regulations (NPDWRs)". See "MCLG" and Sec. 6.0

"Promulgate" means to "publish", otherwise make available to the public. Pursuant to 1251(e), the State shall assist, provide for and encourage any person of the public, i.e. "interested persons" or citizens, in the development, revision promulgation and enforcement of this "water quality standard" pursuant to the guidelines provide for in section 1314. Standards may be promulgated by any "person" or "interested persons" pursuant to the provisions of the Chapter. The Administrator and/or State shall assist any person of the public, i.e. "interested persons", in the enforcement of any regulation, standard, effluent limitation, plan, or program (1251(e)) established by the Administrator, State or "interested persons", pursuant to the provisions of section 1314 under this Chapter. See "Interested persons".

"Public interest" means health or welfare and preservation of the water quality.

"Public water supplies" means a "valuable resource". See "Valuable resource".

"Publicly owned treatment works" means "facilities" or treatment works owned and operated by a political subdivision. See "Pretreatment requirements" and "Toxic discharges".

"RME" means a responsible management entity. See "Certified Service Provider"

"Reclaimed water" means "new water". See "New water"

"Receiving waters" additionally means navigable waters, ground waters, underground waters, sewer waste streams and any waters of the States which may be impacted by a discharge and / or effluent from any classes or categories of point sources, including a publicly owned treatment works point source discharge. See "Discharge" and "Pollution Prevention Act of 1990"

"Regulate" means as defined in US Code Title 33 Chapter 26 Sec. 1281(c) which states: "To the extent practicable, waste treatment management shall be on an "areawide basis" and provide control or treatment of all "point and non point sources of pollution", including "inplace" or "accumulated pollution sources." To "regulate" means to implement the applicable innovative alternative point source controls so as to prevent a "point source" from becoming or contributing to a "non point source" of pollution.

"Repair" means repair actions taken in association with existing OWTS. All repairs shall be done in compliance with the Green Standard.

"Responsible management entity" (RME) means any entity authorized to manage the operation, monitoring, maintenance, repair, or oversight of a BADCT Technology. See "Certified Service Provider"

"SAWS" is an acronym for a "Sustainable Alternative Water Source".

"Schedules of compliance" means as defined in the U.S.C. Title 33 Chapter 26 Section 1311 and in no case later than March 31, 1989.

"Septic system" means an "in-place" nonpoint source of pollution. A septic system is a conventional wastewater treatment method that converts a point source of toxic pollution into a nonpoint source of toxic pollution. The national policy of the Clean Water Act (33USC§1251(a)(3)) establishes a prohibition for the discharge of toxic pollutants in toxic amounts. The NPDWRs in conjunction with the MCLs and MCLGs define the parameters of toxic pollutant in toxic amounts. Pursuant to 33USC§1311(a), septic system are unlawful.

"Septic tank" means a conventional method of waste management and a source of toxic discharge which factors provided in the Clean Water Act have precluded use of since 1973. A septic tank is a watertight covered receptacle designed for primary treatment of wastewater and constructed to receive wastewater discharged from a point source or group of point sources. Septic tanks discharge nitrosamine and nitrosamine precursors. Nitrosamine is a toxic carcinogen pollutant listed #50 on the US EPA Toxic Pollutant List of which is subject to pretreatment requirements pursuant to 33USC§1317 and require the application of the best practicable control technology currently available. Additionally, septic tanks produce methane [Greenhouse] gas at a rate of 4 cubic feet per person per day, an average of 10 cubic feet per septic tank (OWTS) per day per "DUE" or approximately 300,000,000 cubic feet per day nationally. Methane molecules are 65 times denser than carbon dioxide molecules as it relates to Greenhouse gas effects. It shall be construed as a "knowing violation" for any person to permit any person to discharge utilizing a septic tank pursuant to 33USC§1319(c). It shall also be construed as a "negligent violation" for such person to discharge utilizing a septic tank pursuant to 33USC§1319(c). See "Toxic discharge".

"Septic tank effluent" means a point source discharge of toxic nitrosamine source subject to the best practicable control technology currently available requirements since 1977. See "Septic tank" and "Effluent" and "Toxic pollutants".

"Sewage" means a "toxic substance" or "source of toxic pollutants" generated by any "person", i.e. "owner or operator" of any "source". See "Wastewater" and "Person".

"Sewage sludge" means any accumulated mass of toxic organics and/or inorganics derived from a treatment works having disease carrying pathogens or pollutants that would pose a threat to public health and requiring disposal of.

"Sewer system" means a system of collection and conveyance and providing centralized treatment of municipal wastes and or municipal sewage owned or operated by any "person". See "Person"

"Sewer vent" means, when a source is served by conventional waste management method, i.e. septic tank or sewer system, a point source of Greenhouse (GHG) emissions and toxic (poisonous) hydrogen sulfide gas discharge. See "Discharge", "Septic tank", "Indirect potable reuse" and "Knowing endangerment".

"Schedule of Compliance" means a schedule of remedial measures including an enforceable sequence of actions or operations leading to compliance with an effluent limitation, other limitation, prohibition, or standard. States and political subdivisions are subject to the schedule of compliance pursuant to their authority under 33USC§1370.

"Significant Source" means any building, structure, facility, or installation from which there is or may be the discharge of pollutants. At a minimum, the defined classes and categories of point sources (other than publicly owned treatment works) are significant. See "Classes and Categories of point sources (other than publicly owned treatment works)", "Toxic pollutants", "Source" and "Point source".

"Site" means "source". See "Source".

"Site Evaluation" means an assessment of a site sufficient to determine the location options for installation of SAWS, or in the case of a discharge into a publicly owned treatment works, innovative pretreatment. However, the SAWS BADCT Technology produces pure potable quality new water. To discharge pure potable quality new water into a publicly owned treatment system would be construed as a negligent wastefulness of a precious resource. Consequently, pretreatment applications are subject to a "system of charges". The site evaluation will consider all beneficial reuse and recycle options to achieve zero waste discharge. See "System of charges"

"Soil-based Dispersal Fields" means an underground excavation which receives pollutants and are not lawful. Soil-based dispersal fields are a primary component of "OWTS", i.e. conventional septic systems. Soil-based dispersal or disposal fields are subject to the "Zero Effluent Limitations". See "Zero Effluent Limitations", "Indirect potable reuse" and "Groundwater remediation".

"Source" means any building, structure, facility, or installation from which there is or may be a discharge of pollutants.

"Source reduction" means to reduce or prevent pollution at the source and is fundamentally different and more desirable than the conventional practices of wastewater management. The United States Congress has declared it to be national policy of the United States to implement "source reduction". "Source reduction" additionally means any practice which - (i) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and (ii) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. The term "source reduction" does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to and necessary for the production of a product or the providing of a service. See "United States Code Title 42 - The Public Health and Welfare, Chapter 133 - Pollution Prevention, Sections 13101 – 13109 (42USC133)"

"Standard of Performance" means the "Categorical Pretreatment Standards" / "Indirect Potable Reuse Standard" and the "Green Standard of Performance" / "Direct Potable Reuse Standard". (See Appendices Sec. 8.0)

"Standard of Performance of 1995" means a standard established under the NSF Standard 40, Report #94/01/2015/060, promulgated by NSF/ANSI International ("interested person") to all States in March of 1995. The "Standard of Performance of 1995" established the "effluent limitation", "effluent standard" and "pretreatment standard" for all classes and categories of point sources (other than publicly owned treatment works) and point sources of publicly owned treatment works. See "Industrywide application".

"State authority" means as defined under section 1370 – State authority, which states, "Except as expressly provided in this chapter, nothing in this chapter shall (1) preclude [stop] or deny [prevent] the right [duty] of any State or political subdivision thereof or interstate agency to adopt or enforce (A) any standard or limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution; except that if an effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance is in effect under this chapter, such State or political subdivision or interstate agency may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance which is less stringent than the effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance under this chapter; or (2) [such State or political subdivision shall] be construed as impairing [committing an unlawful act] or in any manner affecting any right [duty] or jurisdiction of the States with respect to the waters (including boundary waters) of such States." See "Best management practices for (wastewater) industry", "Knowing endangerment", "Discharge", "Standard of Performance of 1995" and "Pretreatment Standard of 1995".

"State's waters" means all waters of the State, such as, but not limited to, all underground waters, ground waters, surface waters, navigable water, etc.

"Sustainable Alternative Water Source (SAWS)" means an innovative alternative control technology or device serving classes and categories of point sources (other than publicly owned treatment works) that reclaims the used water produced by such sources to meet the "Green Standard of Performance", a water qulaity as defined in the MCLGs pursuant to the NPDWRs. "SAWS" achieves "critical water supply needs".

"System abuse" means misuse of an on-site water reclamation system serving a DUE, which would be considered a "neglectful" use which may contribute to a "pollutant discharge" or which would create an "unnecessary" additional cost to operate and maintain or service which would be out of the ordinary.

"System of charges" means a schedule for charging for new water services. It additionally means a schedule for charging for new water, a resource of value, upon change of possession and or right to the beneficial reuse of the new water.

"Telemetric" means the ability to automatically measure and transmit "SAWS" data by wire, radio, or other means.

"TMDL" is the acronym for "total maximum daily load" of pollutants. Consideration of TMDL is no longer required as "BADCT Technology" eliminates discharge of pollutants at each source. See "Zero Discharge".

"Total coliform" means a group of bacteria consisting of several *genera* belonging to the family *Enterobacteriaceae*, which includes Escherichia coli bacteria. Total coliform is not a health threat in itself; it is used to indicate whether other potential harmful bacteria may be present (Source: US EPA Maximum Contaminant Level Goal National Primary Drinking Water Regulations)

"Toxic pollutant" means those pollutants, or combinations of pollutants, including disease-causing agents (viruses), which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. Examples of "toxic pollutants" from sources are:

- Nitrosamine precursors, i.e. ammonia, nitrite and nitrate
- Pharmaceuticals and personal home care products
- Pathogens

"Treated wastewater" means "effluent" that is not in compliance with the "Green Standards". See "Discharge".

"Treatment works" is defined by US Code, Title 33, Chapter 26, Subchapter II – Grants for Construction of Treatment Works, Sec. 1292. Definitions (2)(A) and (B) is "BADCT Technology" which represents the most cost efficient alternative to comply with sections 1311 or 1312 of the Clean Water Act, or the requirements of section 1281 of the Clean Water Act.

"US Code Title 33 Chapter 26" means the Clean Water Act.

"Underground excavations" means any excavation into the ground made by man, whether in a public or a private domain, into which there may be a discharge of pollutants, waste or sewage. "Underground excavations" are, but not limited to, leachfields, disposal or dispersal fields, sewer collection and conveyance systems, publicly owned treatment works. See "Nonpoint source of pollution".

"Used water" means purchased water of a source containing waste subject to being reclaimed and reused and recycled via BADCT Technology, i.e. SAWS

"Valuable commodity" means any "valuable resource" purchased by a person, owner or operator of a source. Water purchased from public water supplies, used and reclaimed, is a valuable resource and a valuable commodity. See "New water".

"Valuable resource" means any public water supplies that meet water quality standards that assure the protection of the public health, public water supplies and the protection and propagation of a balanced, indigenous population of shell fish, fish, fauna, wildlife, and other aquatic organisms, and to allow recreational activities in and on the water. Public water supplies are a valuable resource. See "Valuable Commodity", "New water" and "Reclaimed water".

"Waste" means discarded as worthless, defective, or of no use. Waste is not a "valuable resource" and is to be disposed of. Waste means having pollutants which prevents it from serving a beneficial use. Treated wastewater effluent of OWTS is a waste. It is not lawful to discharge waste for disposal into underground excavations.

"Waste discharge permit" means a permit allowing discharge of pollution. Issuance of a waste discharge permit is unlawful. See "Permits".

"Waste Management Organization" means a "RME". See "Responsible Management Entity" or "RME".

"Wastewater" means "used water" generated by a "source". "BADCT Technology" eliminates wastewater and need for "wastewater management".

"Wastewater treatment" means a practice of treating wastewater utilizing conventional waste management methods. Wastewater treatment is subject to the "Green Standard". See "MCLG".

"Wastewater management" is a business of managing wastewater. Source reduction is fundamentally different and more desirable than wastewater management. See "Pollution Prevention Act of 1990"

"Water" is a natural resource of which States have authority over pursuant to 33USC§1251(g). See "New water"

"Water quality standard" means the "primary standards" provided in the NPDWRs. Such is a standard that poses no threat to health and allows for a margin of safety. See "Green Standards of Performance"

"Waters" means any waters in any State to include but not be limited to navigable, ground water, underground waters, surface waters, etc. Such "waters" are also included in the meaning of the term "Nation's waters" and "State's waters".

"Will-Serve" means a letter of intent to comply with "NSRs" issued from the Certified Service Provider of that area.

"Zero discharge" means to achieve an "effluent limitation" at a point source in compliance with the NPDWRs pursuant to the US EPA Maximum Contaminant Level Goal (MCLG) Drinking Water Quality Standard. See "Green Standards of Performance" and also "Discharge".

"Zero Effluent Limitation" pertains to innovative alternative control technology requirements. Limitations establish alternative requirements for "at-source" reuse and recycle of "new water".

"Zero Effluent Standard" pertains to any innovative pretreatment control technology requirement. Standards established pretreatment requirements prior to discharging [from the source] into a publicly owned treatment works. "New water" is a "valuable resource" and a "valuable commodity" and is subject to purchase.

NATIONAL STANDARDS REGULATIONS

3.0. - NATIONAL STANDARDS REGULATIONS (NSR) AND REQUIREMENTS

NRS 3.0. - Administration and Enforcement of the Green Standards; Authority

The Governor of the State, an Executive branch, shall establish an independent Agency, National Standards Enforcement Agency (NSEA) to administer and enforce The National Green Standards of Performance, Effluent Limitation Guidelines, Categorical Pretreatment Standards & National Standards Regulations under authority provided pursuant to 40CFR§1.1. NSEA, via a Joint Participation Agreement (JPA) with the State's resources agency and the State's fish and wildlife agency, shall be granted Environmental Warden status to provide administration and enforcement of The National Green Standards of Performance, Effluent Limitation Guidelines, Categorical Pretreatment Standards & National Standards Regulations under the authority provided pursuant to 33USC§§1251(e) – Public Participation, 33USC§1364 – Emergency Powers, and 33USC§1370 – State Authority. NSEA (Administrator) shall have authority to declare emergencies in the interest of public health, welfare, oceanic health and wildlife under 33USC§1364.

NSR 3.1 State and Industry-wide Promulgation of Green Standards

The Governor shall promulgate (33USC26 § 1311 (b)(2)(E)) to all State licensing and permitting agencies and political subdivisions the Green Standards of Performance a list of the SAWS technology provider(s) and notify such government entities of their obligation to require persons to choose a brand name or equal from such list, the SAWS technology shall be applied at all point sources of discharge within the State. Those entities shall be, but not limited to, the California Ocean Protection Council, the State of California Environmental Protection Agency, the California Water Resources Control Board, the State of California Board of Professional Engineers and Land Surveyors, Counties and all other political subdivisions having permit writing authority over building, planning, public utilities, etc. Timeline for implementing Green Standards of Performance shall be as expedient as practicable as defined in 33USC26 § 1311 (b)(1)(A).

NSR 3.1.2 BADCT Technology List Requirements (facility selection)

The State and political subdivisions, such as county planning and building departments, shall maintain a list of BADCT Technologies. Such list shall include the "brand name and equals" of BADCT Technologies to provide to permittee.

NRS 3.1.3 Public Notice

The State shall be required to provide public notice upon any new BADCT Technology being added to the List of BADCT Technologies. Such List shall be made available to the public.

NSR 3.1.4 Applicable Entities

The Pretreatment Standard Requirements and Effluent Limitation Regulations ("NSRs") apply to all persons and owners and operators of all classes and categories of sources and point sources (other than publicly owned treatment works) within the State.

NSR 3.1.5 Point of Compliance Requirements

The point of compliance shall be required at the point source as close as practicable, typically within 20 feet of the foundation of any building, structure or facility, and within the boundaries of the property, or within a dedicated adjacent easement.

Point of compliance shall require implementation of a BADCT Technology.

NSR 3.1.6 Administrator's Authority

The National Standards Enforcement Agency (NSEA) shall be recognized as State enforcement authority.

The NSEA shall have authority to revise the Green Standards as practicable to be more strict, but in no case to be less strict.

Any Licensed Authority shall have the right to monitor any other BADCT Technology of any other Licensed Authority in order to insure integrity of performance under the terms and conditions of the Process Guarantee.

The NSEA shall have enforcement authority and the State shall provide its legal resources to the NSEA in any civil or criminal enforcement actions.

NSR 3.1.7 Groundwater Monitoring Requirements

BADCT Technology is a sustainable alternative new water source technology, having definite barrier membrane, that achieves the USEPA Maximum Contaminant Level Goal standard for drinking water quality. Therefore, no groundwater monitoring requirements are justifiable.

NSR 3.2 Sustainable Alternative Water Source (SAWS) General Provisions

NSR 3.2.1 Technology Certification Requirements

The NSEA of each state shall issue a certificate to any manufacture of a BADCT technology to become a Licensed Authority upon such manufacture demonstrating his control technology complies with the Green Standards of Performance.

NSR 3.2.2 Permit Requirements

Installation of a SAWS Technology shall require a Will-Serve from a Certified Service Provider and a county building and planning department permit.

Upon completion of installation, the Certified Service Provider will issue a Final Will-Serve and a report shall be submitted to the county to include at a:

3.2.2.1 A copy of Final Will-Serve

3.2.2.2 A copy of As-built drawings

3.2.2.2. A copy of county recorded easement locations

All other local onsite requirements (except dispersal field requirements)

All permits issued on any source or group of sources shall require implementation of a BADCT Technology at all classes and categories of point source or group of point sources.

NSR 3.2.3 Technical Requirements (facility design)

The minimum technical requirements shall be performance based and shall achieve the Green Standards of Performance for water quality.

The Licensed Authority shall be the sole entity to determine the final technical requirements and shall be liable for achieving the Green Standards and shall guarantee the performance.

All BADCT Technology shall provide at a minimum a definite barrier physical filtration component of a spiral wound technique that is designed to prevent any disease carrying organisms to pass.

NRS 3.2.4 Alert Levels, Discharge Limitations and Monitoring Requirements

All BADCT Technology shall be equipped with a visual or audible alarm as well as a telemetric alarm that alerts the owner and service provider in the event of system malfunction.

BADCT Technology shall provide for 24-hour wastewater storage based on design flow to minimize pollution in the event of a facility malfunction or power outage.

No BADCT Technology shall bypass raw untreated effluent.

The RME or Licensed Authority shall respond to any alert within 12 hours.

A report shall be filled out and submitted to the permitting authority with a detailed description of the cause of the alert within 5 business days of each occurrence.
The permitting authority shall have right of access to any installation of a BADCT Technology at any time upon 24 hour notice. Upon such 24 hour notice, the RME or Licensed Authority shall accompany the permitting authority as necessary.

The telemetric monitoring system shall be capable of continuously assessing the performance of the "definite barrier" to assure no passage of fecal coliform in excess of 2 MPN (Maximum Probable Number).
The owner or operator of any source utilizing BADCT Technology shall be provided: the name, address, telephone number of the Licensed Authority and or RME.
The permitting agency shall be provided with monitoring equipment by the Licensed Authority to enable agency to monitor the installations of the Licensed Authority.

NRS 3.2.5 Reporting Requirements

It shall be a required best business practice for the Responsible Management Entity of a BADCT Technology to maintain a complete record of the history of operation and maintenance of a SAWS for the life of the SAWS. It shall be available to any public entity upon request in writing.
Any spills which may occur as a result of failure shall be reported within 24 hours to the permitting agency.

NSR 3.2.6 Compliance Requirements For New Installations

All new SAWS installations shall comply with the following requirements:
Access openings shall have watertight risers and shall be set at finished grade.
Access openings shall be secured to prevent unauthorized access.
For all new source applications, dual plumbing shall be required to provide for toilet flushing.

NSR 3.2.7 Easement Requirements

The owner of any source shall deed to the Licensed Authority an easement that shall convey the responsibility and liability of the source to the Licensed Authority and such deed shall be recorded with the proper agency.
The easement shall provide Licensed Authority or the Responsible Management Entity access for operation and maintenance services.
The utility easement deed shall be in the name of the entity responsible for performance of the SAWS under the Process Guarantee.
The easement shall extend 5 feet beyond the outermost part of the works of the BADCT Technology. The easement shall transfer with the source from any owner or operator of such source to any new owner.

NRS 3.2.8 Compliance Schedule For Inplace Sources (OWTS)

Any person owning or operating a source having OWTS shall replace the OWTS with a SAWS upon:

Failure of the OWTS;

Change of ownership of the source;

Issuance of any permit pertaining to the source; or

If there is a state program initiated to replace the OWTS with SAWS.

All replacements of inplace OWTS at any source, such source shall be retrofitted as practicable to provide for toilet flushing.

NSR 3.2.9 Design and Performance Responsibility and Liability

The Licensed Authority shall be responsible for providing the proper design flow and performance requirements for the SAWS. The Licensed Authority may employ any professional he may choose to assist in such design. Upon participating in such design, the professional shall assume liability for performance and shall sign and notarize and be subject to a Performance Guarantee in a priority position to the Licensed Authority.

NSR 3.2.10 Inspections, Violations, and Enforcement (certification revocation)

The NSRs establish minimum requirements for installation, monitoring, and operation of SAWS technology and recycle and reuse of the water. State and local agencies shall adopt the NSRs. All violations of NSRs shall be subject to enforcement as defined pursuant to 33USC§1319 and the United States District Court shall have original jurisdiction.

If any BADCT Technology fails to comply with the minimum requirements of the Green Standards of Performance under the testing and evaluation as defined in the Performance Guarantee and is not brought into compliance within 60 days, the Certified Service Provider shall be subject to suspension of his NSR Certification and his BADCT Technology shall be removed from the List of Certified BADCT Technologies available and he shall not be allowed to install any of his BADCT Technology during such suspension. Suspension shall be as follows:

First occurrence – 60 day suspension

Second occurrence – 6 month suspension

Third occurrence – 12 month suspension

Each occurrence thereafter – 12 month suspension

NSR 3.3 BADCT Technology Provisions

NSR 3.3.1 Certified BADCT Technology Design

The Licensed Authority shall be responsible for all design and installations of his BADCT Technology. The performance shall be guaranteed by the BADCT Technology Licensed Authority to achieve the Green Standards of Performance.

Where an OWTS fails or must be replaced or expanded, the Licensed Authority shall be solely responsible for proper installation of his BADCT Technology.

NSR 3.3.2 Certified BADCT Technology Design and Accountability for High-Strength Waste

As part of the area-wide requirements so established in the Green Standards of Performance, a SAWS Technology shall also be designed and applied to accept other wastewater from sources that exclude hazardous waste and reduce high strength wastewater produced by commercial and industrial sources in compliance with the Green Standards of Performance.

The Licensed Authority shall be responsible for all design and performance of his "Certified BADCT Technology" and shall provide a signed and notarized Performance Guarantee under the requirements of the Green Standards of Performance establishing his accountability for each point source pretreatment or control application.

NSR 3.3.3 Certified BADCT Technology Tankage Design, Manufacturing

The Licensed Authority shall be responsible for the design and construction of his SAWS containment/tankage and such drawings of the containment/tankage shall have, at a minimum a seal of a professional mechanical engineer registered in the State. If such containment is concrete, it shall also contain a seal of a professional structural engineer registered in the State. All tankage shall comply with all structural criteria and standards established for septic tanks by the International Association of Plumbing and Mechanical Officials (IAPMO).

NSR 3.3.4 Introduction of Hazardous Substances into BADCT Technology Facilities

It shall be unlawful to introduce any hazardous substance into BADCT Technology facilities. Upon doing so, the owner or operator shall be liable for all costs incurred for removal and remediation of facilities.

Materials in concentrations that are deleterious and inhibiting to SAWS operations shall not be discharged to any SAWS.

Deleterious and inhibiting materials include any material or constituent inhibitory to the chemical, physical or biological process of a SAWS technology process. The Licensed Authority shall provide the owner with a list of such materials.

NSR 3.4 Installation, Operation and Maintenance Requirements

NSR 3.4.1 Installation of a BADCT Technology

The Licensed Authority shall be solely responsible and liable for all installations of his particular BADCT Technology.

A Licensed General Engineering Contractor, General Building Contractor, Sanitation (OWTS) System Contractor or Plumbing Contractor licensed by the state shall be qualified to become a Certified Installer by a "Certified Authority" of such Licensed Authority's BADCT Technology to provide installation services for that particular BADCT Technology and to replace any OWTS in accordance with these regulations.

It shall be unlawful for any owner or operator of any source to be involved in any installation operation or maintenance of a SAWS technology at any time.

NSR 3.4.2 At-Source Investigation For BADCT Technology Facilities Application (setbacks)

The Licensed Authority shall be responsible for all site evaluations for SAWS Technology installations.

Setback requirements, unless otherwise determined, shall be a minimum of five feet from all property boundaries and structure foundations.

NSR 3.4.3 Operation of a BADCT Technology

SAWS shall be operated to accept and treat flows of domestic wastewater, excluding any material not generally associated with household activities (including, but not limited to, toilet and urinal flushing, showers, food preparation, laundry, household cleaning including drain cleaning, personal health care products, pharmaceutical drugs, etc.) to achieve the Green Standards of Performance criteria.

NSR 3.4.4 Operation and Maintenance Plan

The Licensed Authority shall be responsible for defining a plan suitable for his BADCT Technology.

The operation and maintenance procedures shall provide for best management practices and shall be sufficient to provide for continues operation of the BADCT Technology.

Such procedures shall require at a minimum bi-annual visits.

NSR 3.4.5 Certified BADCT Maintenance Requirements

The responsible Licensed Authority or the RME shall provided maintenance in such a manner as to assure optimal performance of each BADCT Technology pretreatment application as necessary. Site visits shall not be less than that recommended by NSF International, bi-annually.

NSR 3.5 BENEFICIAL REUSE AND WATER CONSERVATION

NSR 3.5.1 Recycle and Reuse Requirements

The Licensed Authority shall be responsible for providing methods for recycle and beneficial reuse applications of the water at each source. At a minimum, plumbing shall be installed at each source to implement the beneficial reuse application of toilet flushing at each source. Upon replacing existing OWTS with SAWS, plumbing shall be retrofitted, as practicable, to implement the beneficial reuse application of toilet flushing at each source.
All water not recycled and reused at the source shall be utilized for a beneficial indirect potable reuse application.

NSR 3.6 RESTORATION AND MAINTENANCE OF IMPAIRED WATER BODIES

NSR 3.6.1 Applicability and Requirements.

All OWTS and publicly owned treatment works within 600 feet of any impaired water bodies or which may be discharging into any impaired water body, such water bodies to be considered a current or potential future source of drinking water, shall require priority and immediate replacement with a SAWS technology by each state so as to expediently as practicable cease all toxic, poisonous and acidic discharges from such sources' point sources compromising the chemical, physical and biological integrity of our Nation's waters, causing a threat to public health, the propagation of a balanced population of shellfish, fish and wildlife, and recreational activities.

There shall be no toxic, poisonous or acidic discharge into any underground excavation, publicly owned treatment works or body of water by either an OWTS or a publicly owned treatment works. It shall be a matter of priority that all such occurring discharge(s) into navigable waters or the "contiguous zone" of any state shall be ceased as expediently as practicable.

NSR 3.7 ENFORCEMENT

NSR 3.7.1 Unlawful Activities and Enforcement Requirements

NSR 3.7.1.1 The Following Shall Be Unlawful:

Permit use of an OWTS;
Repair or replace an OWTS or any other failed treatment works after the effective date of the NSRs not in compliance with the Green Standards;

For any owner or operator of any source to discharge;

Issuing a permit to allow any discharge of waste or pollutants by any person to discharge into an underground excavation or into a publicly owned treatment works;

Issue a waiver to allow any discharge of waste or pollutants (including acidic discharges) by any person;

Operate a new OWTS in any state of the United States of America;

Increase the hydraulic or organic loading or the nature of (e.g., from domestic to commercial) any waste stream entering an existing OWTS or SAWS without consulting NSEA;

Compromise in any way the chemical, physical or biological integrity of the Nation's waters.

NSR 3.7.1.2 Enforcement

Except as provided for in State laws, such laws being stricter than federal law, the Governor of the State shall require strict enforcement of the NSRs in his State and shall charge and impose penalties for each such violation of the NSRs as defined and pursuant to all requirements under the US Code Title 33 Chapter 26 Subchapter III – Standards and enforcement, Sec. 1319. - Enforcement.

Each violation shall be considered independently and the person(s) responsible for such violation being committing, upon conviction, shall be charged and penalized to the maximum extent allowable by law per each occurrence of each violation committed by such person(s).

No action by the Administrator or the Secretary (such as unlawfully issuing a waste discharge permit or allowing application of a non-Certified BADCT Technology) shall affect any person's obligation to comply with any section of this Chapter as defined in 33USC26§1319(g)(7).

The enforcement venue for any civil or criminal complaint to be filed against any violation under this Chapter by any person(s) shall be the United States District Court's jurisdiction pursuant to 33USC26§1319(b) and 33USC26§1365(a).

Any citizen, interested person(s) or State Licensed Authority shall have right to assign his enforcement rights to any other third party of authority of his choice. Such third party enforcement entity shall be known as an "Environmental Warden". Environmental Wardens will monitor all permit writers to assure conformance with the requirements of the Chapter. Upon a permit writer issuing any permit to allow any person to discharge any pollutant in violation of the NSRs, such permit writer shall be additionally joined in action taken against the person that is the owner or operator of the source so permitted.

NSR 3.8 OFFICIAL COMPARATOR

NSR 3.8.1 Official BADCT Technology Parameters

FACTORS: (33USC26§1314(b))	**BADCT Technology**	
Conventional Pollutant Reduction: (less than 10/10 BOD/TSS)	Tertiary	
Toxic Pollutant Reduction:		
Maximum levels:		
Total Nitrogen (TN)	less than	8 mg/l
Ammonia (NH4 - N)	less than	2 mg/l
Nitrates (NO3 - N)	less than	4 mg/l
Fecal Coliform	less than	2 MPN
Demonstrated average levels of performance:		
Total Nitrogen (TN)	less than	5 mg/l
Ammonia (NH4 - N)	less than	2 mg/l
Nitrates (NO3 - N)	less than	2 mg/l
Nitrites (NO2 - N)	less than	1 mg/l
Dissolved Oxygen (DO)	greater than	2 mg/l
pH (base)		7.5 – 8.0
Fecal Coliform	less than	2 MPN
Cost (per Dwelling Unit Equivalent (DUE))	less than	$25,000
Public Right-of-Way Encroachment	ZERO	
Facilities Environmental Impact**	ZERO	
Facilities Maximum Environmental Footprint (sq. ft. / Dwelling Unit Equivalent, i.e. source)	less than	100
Engineering Aspects Required	ZERO	
Energy Consumption (KWH/lb BOD removed)	less than	1

*** The best available demonstrated control technology currently available and shall be specified by "brand name or equa**
**** Mitigates toxic methane gas (Greenhouse gas) emissions.**

4.0. – NATIONAL PRIMARY DRINKING WATER REGULATIONS

National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water. The parameters of the NPDWRs are also the parameters for the National Standards Regulations (NSRs).

List of Contaminants & their MCLs

Microorganisms

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Cryptosporidium (pdf file)	zero	TT [3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Giardia lamblia	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Heterotrophic plate count	n/a	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment
Legionella	zero	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems

Total Coliforms (including fecal coliform and *E. Coli*)	zero	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.
Turbidity	n/a	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff
Viruses (enteric)	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste

Disinfection Byproducts

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Bromate	zero	0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chlorite	0.8	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection

Haloacetic acids (HAA5)	n/a[6]	0.060[7]	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	n/a[6]	0.080[7]	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection

Disinfectants

Contaminant	MRDLG[1] (mg/L)[2]	MRDL[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Chloramines (as Cl_2)	MRDLG=4[1]	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl_2)	MRDLG=4[1]	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO_2)	MRDLG=0.8[1]	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes

Inorganic Chemicals

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder

Arsenic	0[Z]	0.010 as of 01/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronicsproduction wastes
Asbestos (fiber >10 micrometers)	7 million fibers per liter	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits

Copper	1.3	TT[8]; Action Level=1.3	Short term exposure: Gastrointestinal distress Long term exposure: Liver or kidney damage People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	TT[8]; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (inorganic)	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands

Nitrate (measured as Nitrogen)	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (measured as Nitrogen)	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Organic Chemicals

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Acrylamide	zero	TT[9]	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment

Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene (PAHs)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines
Carbofuran	0.04	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories

2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2-Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1,1-Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories

trans-1,2-Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories
1,2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl) adipate	0.4	0.4	Weight loss, liver problems, or possible reproductive difficulties.	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use

Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Liver problems	Residue of banned insecticide
Epichlorohydrin	zero	TT[9]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Ethylbenzene	0.7	0.7	Liver or kidneys problems	Discharge from petroleum refineries
Ethylene dibromide	zero	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories

Hexachlorocyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff

Styrene	0.1	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners
Toluene	1	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories

Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories
Vinyl chloride	zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories

Radionuclides

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Ingestion of Water	Sources of Contaminant in Drinking Water
Alpha particles	none[7] --- zero	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none[7] --- zero	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none[7] --- zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits

Uranium	zero	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits

[1] DEFINITIONS:

Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.

Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

[2] Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

[3] EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

Cryptosporidium: (as of1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
Giardia lamblia: 99.9% removal/inactivation
Viruses: 99.99% removal/inactivation
Legionella: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
HPC: No more than 500 bacterial colonies per milliliter.
Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005); Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, Cryptosporidium removal requirements, updated watershed control requirements for unfiltered systems).
Long Term 2 Enhanced Surface Water Treatment Rule (Effective Date: January 4, 2006) - Surface water systems or GWUDI systems must comply with the additional treatment for Cryptosporidium specified in this rule based on their Cryptosporidium bin classification calculated after the completion of source water monitoring.

Filter Backwash Recycling; The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

[4] more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli if two consecutive TC-positive samples, and one is also positive for E.coli fecal coliforms, system has an acute MCL violation.

[5] Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

[6] Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L): chloroform (0.07mg/L).
Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.02 mg/L); monochloroacetic acid (0.07 mg/L). Bromoacetic acid and dibromoacetic acid are regulated with this group but have no MCLGs.

[7] The MCL values are the same in the Stage 2 DBPR as they were in the Stage 1 DBPR, but compliance with the MCL is based on different calculations. Under Stage 1, compliance is based on a running annual average (RAA). Under Stage 2, compliance is based on a locational running annual average (LRAA), where the annual average at each sampling location in the distribution system is used to determine compliance with the MCLs. The LRAA requirement will become effective April 1, 2012 for systems on schedule 1, October 1, 2012 for systems on schedule 2, and October 1, 2013 for all remaining systems.

[8] Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

[9] Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

LIST OF NATIONAL SECONDARY DRINKING WATER REGULATIONS

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

5.0 – EFFLUENT LIMITATION GUIDELINES; CATEGORICAL PRETREATMENT STANDARDS; PROHIBITIONS

5.1 INTRODUCTION

The Green Standards of Performance define a waste management method, consistent with the policy of the United States Congress, designed to achieve optimum water quality management, consistent with the public health and water quality goals and requirements of the Clean Water Act pursuant to 33USC26§1296.
These standards are developed to protect the public health and welfare of the people and enhance the quality of all State's waters and serve the purposes of the Clean Water Act pursuant to 33USC26§1313(c)(2)(A).
All State agencies shall adopt these Green Standards pursuant to 33USC26§1313(c)(2)(B), promulgate and require compliance with the federally mandated pretreatment requirements as defined in US Code Title 33 Chapter 26 §§ 1311, 1312, 1313, 1314, 1316, 1317 and 1342(b)(8)), otherwise NSRs.

All persons of the United States of America and owners and operators of any source, such source being subject to pretreatment standards and effluent limitation requirements, shall be subject to, at a minimum, these standards of performance herein defined pursuant to the goals and objectives pursuant to US Code Title 33 Chapter 26 - Water Pollution Prevention and Control as follows:

5.2 LIMITATIONS, STANDARDS AND PROHIBITIONS

The Governor of all States under authority as defined in US Code Title 33 Chapter 26 shall promulgate these minimum standards for implementation of these federally mandated innovative and alternative (other than publicly owned treatment works / private) waste management systems and pretreatment requirements in the interest of public health and welfare. These Green Standards require application of the best practicable control technology currently available (other than publicly owned treatment works) as is required to be provided at each source point source in compliance with "pretreatment requirements" as defined in US Code Title 33 Chapter 26. The Green Standards shall require application of a Sustainable Alternative Water Source Technology ("SAWS") to achieve the National Goal; eliminating all discharges of all pollutants at each source or group of sources, contain all pollutants at such source(s) to prevent them from migrating to cause water and other environmental pollution, providing for the recycle and reuse of 100% of all source wastewater as a sustainable alternative water source to serve all beneficial reuse applications at such source(s) so as to 1) eliminate all discharges of all pollutants, 2) eliminate sewage flows and associated sewer user fees, and 3) thereby substantially reducing the demand on public drinking water supplies achieving the objectives of the Chapter.

Application of federally mandated pretreatment requirements shall be complied with through implementation of a SAWS Technology that shall be specified by a "brand name or equal" based upon the Green Standards' Official Comparator defining the minimum requirements. The SAWS Technology which qualifies per criteria of the Green Standards' Official Comparator herein provided shall be considered as the Best Available Demonstrated Control Technology ("BADCT") currently available which achieves the National Goal, to eliminate all discharges of all pollutants at their source. A SAWS Technology shall be required, based upon such demonstrated performance and shall be supported by an executed Manufacture's Performance Guarantee and shall be specified by "brand name or equal" in association with every permit issued by any of the State's permitting agencies in association with any and all sources in compliance with these federally mandated pretreatment minimum requirements.

1.0 The Green Standards shall be achieved utilizing the best biological, physical and chemical treatment processes and/or techniques and provide for the following reduction levels of constituents / pollutants per process and/or treatment technique application at the source while containing such constituents / pollutants at same source thereby preventing them from migrating to cause water or other environmental pollution and thereby achieving the

National Goal as defined in 33 USC 26, to eliminate all discharges of all pollutants at their source or group of sources.

The Green Standards Process Guarantee shall be required, provided by the BADCT provider, recorded and shall apply to each application.

NOTE: As of January 1, 2009 the "Brand Name" of the BADCT which has established the National Standard of Performance shall be "AES TECHNOLOGY". It and all equals shall, at a minimum, provide a performance guarantee to achieve the following levels defined herein below:

BIOLOGICAL

The biological process shall be of the latest (newest) biological process technology available and which has been evaluated over a minimum of a six month period by an accredited and nationally recognized third party testing laboratory such as NSF International demonstrating such technology's performance. The biological process shall provide for industry-wide application, scalable from 250 gpd to 2.5 mgd plus. After the pretreatment facilities (other than publicly owned treatment works) have been placed into continuous service, and have achieved equilibrium operating conditions, the innovative and advanced alternative biological process technology shall biologically achieve the levels herein defined and shall provide the following levels of reduction for the source of the toxic pollutant ("nitrosamine") listed on the US EPA List of Toxic Pollutant associated with domestic wastewater flows that require application of pretreatment requirements. The biological process shall eliminate acidic discharges (pH of less than 7.4) through inherent biological alkalinity recovery to a base range of 7.5 – 8.0.

The minimum demonstrated performance limits shall be the established specific numerical criteria for toxic pollutants as follows:

- The **maximum levels** have been (third party) demonstrated to be less than the following:

Total Nitrogen (TN)	**<8 mg/l**
Ammonia (NH4 - N)	**<2 mg/l**
Nitrates (NO3 - N)	**<4 mg/l**
Maximum pH level	**8**

- The **average levels** have been demonstrated not to exceed the following:

Total Nitrogen (TN)	**<5 mg/l**
Ammonia (NH4 - N)	**<2 mg/l**
Nitrates (NO3 - N)	**<2 mg/l**
Nitrites (NO2 - N)	**<1 mg/l**
Average pH level	**7.7**

PHYSICAL ("Beyond Tertiary" Effluent Limitations Achieved)

The physical component shall provide a "definite barrier" to disease carrying pathogens (<2.2 MPN/100ml, California Title 22) utilizing physical ultra-filtration (UF) type membrane filtration technology of the spiral wound type back-flushable membrane filtration technology, having 100% integrity, and shall provide a consistent level of reduction of inorganic contaminants to achieve a standard consistently less than the United States Environmental Protection Agency's Maximum Contaminant Level (MCL) Primary Drinking Water Standards as follows:

Note: All State's "Primary Drinking Water" evaluation standard shall be less than Maximum Contaminant Level, ("MCL"), the highest acceptable concentration of analyte. Levels of contaminants less than the MCL (which comply with the MCLGs) are considered to be non-pollutant. (Source: State of California "Primary Drinking Water" Evaluation Standard)

DISEASE CARRYING PATHOGENS - BACTERIA

BACTERIA	MCL	UNITS
Coliform, Fecal (15 Tube MPN)	**< 2**	**MPN/100ml**

PRIMARY STANDARDS – INORGANIC CHEMICALS

ANALYTE	MCL	UNITS
Aluminum	**1**	**mg/L**
Antimony	**0.0006**	**mg/L**
Arsenic	**0.01**	**mg/L**
Barium	**1**	**mg/L**
Beryllium	**0.004**	**mg/L**
Cadmium	**0.005**	**mg/L**
Chromium	**0.05**	**mg/l**
Cyanide	**0.15**	**mg/L**
Asbestos	**7**	**MFL**
Lead	**0.015**	**mg/L**
Fluoride	**2**	**mg/L**
Mercury	**0.002**	**mg/L**
Nickel	**0.1**	**mg/L**
Selenium	**0.05**	**mg/L**
Thallium	**0.002**	**mg/L**

NOTE: The "definite barrier" control component is a best available demonstrated control technology and as such, shall be specified by "brand name or equal" based upon such criteria and demonstrated "definite barrier" performance.

CHEMICAL

The chemical disinfection process (chlorine, ultra violet or ozone) shall consistently achieve the following levels of reduction for total coliform bacteria. Even though it is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present and shall be controlled to the following level:

BACTERIA	MCL	UNITS
Coliform, Total (15 Tube MPN)	**ZERO**	**MPN/100ml**

The herein defined Green Standards of Performance continuously achieves the Federal Primary Drinking Water Quality Standards and as such achieves the National Goal as defined within 33 USC 26 thereby providing for the maximum degree of effluent reduction and achieving a standard that permits no discharge of pollutants from the source either into a publicly owned treatment works (lateral) or an underground excavation (dispersal/disposal field). (33 USC 26, Sec. 1316)

NOTE: The contaminant levels less than the MCL are in compliance with the National Primary Drinking Water Regulations (NPDWRs), the Maximum Contaminant Level Goal (MCLG) Standard for drinking water quality. The MCLGs define the level of a contaminant in water below which there is no known or expected risk to health (non-pollutant). MCLGs allow for a margin of safety and are non-enforceable public health goals.

2.0 The biological process (conventional pollutants) shall have been demonstrated to provide / achieve the following:

- Requires only a single basin secondary/tertiary process (environmental footprint)
- Tertiary (average less than 10/10/10 BOD/TSS/TN demonstrated over a six month period)
- Inherent hydraulic flow equalization (controlled decants disallowing washouts)

- Shall be a non-plug flow (not susceptible to washout conditions)
- Anti-washout capabilities (40Xs ADDF (average daily design flow)
- Inherent alkalinity recovery to "non acidic" pH levels (7.5 - 8.0)

3.0 Biological process (non-conventional pollutants) shall have been demonstrated to provide for inherent denitrification to consistently reduce toxic nitrosamine source pollutants to the following non-pollutant, i.e. Zero Discharge, levels:

- Total Nitrogen (TN) discharges to less than 8 mg/l
- Nitrate (NO^3-N) discharges to less than 5 mg/l
- Nitrite (NO^2-N) discharges to less than 1 mg/l
- pH (base) discharges to a level greater than 7.4

4.0 Beyond Tertiary Benefits: (Objectives of the U.S.C. Title 33 Chapter 26 shall be achieved)

A "definite barrier" is provided to prevent any possibility of pollutants being discharged either into an underground excavation (leach field) or into a publicly owned treatment works (sewer lateral) and:

- provides the "maximum degree" of effluent reduction by totally eliminating all point source "effluent" discharges at the source
- eliminates sewer flows and associated sewer user fees
- provides for ability for future recycle of water at source
- provides a sustainable alternative water source at each private point source at the same or better quality than the current public drinking water supply quality to serve the original water consumer's beneficial reuse applications
- thereby substantially reducing the demand on our public drinking water supplies
- any water not recycled will remediate and replenish drinking water aquifers with pure water

Eliminates need for publicly owned treatment works and:

- associated discharge into such publicly owned treatment works from private point sources
- eliminates associated energy carbon footprint associated with publicly owned treatment works / collection laterals
- provides for the lowest possible environmental impact requiring no publicly right-of-way encroachment
- contains all pollutants at the source
- therefore preventing pollutants from migrating to cause water and other environmental pollution
- eliminates associated costs for publicly owned treatment works
- qualifies for federal grant assistance as a sustainable alternative water source

Control of PPCPs ("Pharmaceuticals and Personal Care Products") reflecting the greatest degree of control at the source.

Must compare at least as "better" or "equal" on each and every performance criteria provided per 33 USC 26 Sec. 1314 as defined in the **"Official Comparator"** herein provided:

5.3 - OFFICIAL COMPARATOR

~ OFFICIAL COMPARATOR ~

DEMONSTRATED "GREEN STANDARDS" OF PERFORMANCE

Determined Achievable by the National Standards Enforcement Agency ("Administrator")
U.S.C. Title 33 Chapter 26 §§ 1311 (b)(1), 1316 (a) and 1317 (b)

Each compared BADCT technology MUST qualify as "Equal" or "Better". Any "Fail" disqualifies.

FACTORS: (33USC26§1314(b))	**AES TECHNOLOGY***	(Equal/Better/Fail)
Conventional Pollutant Reduction: (less than 10/10 BOD/TSS)	Tertiary	_____
Toxic Pollutant Reduction: Maximum levels:		
Total Nitrogen (TN)	<8 mg/l	_____
Ammonia (NH4 - N)	<2 mg/l	_____
Nitrates (NO3 - N)	<4 mg/l	_____
Fecal Coliform	<2 MPN	_____
Demonstrated average levels of performance:		
Total Nitrogen (TN)	<5 mg/l	_____
Ammonia (NH4 - N)	<2 mg/l	_____
Nitrates (NO3 - N)	<2 mg/l	_____
Nitrites (NO2 - N)	<1 mg/l	_____
Dissolved Oxygen (DO)	>2 mg/l	_____
pH (base)	7.5 – 8.0	_____
Fecal Coliform	<2 MPN	_____
Cost (per Dwelling Unit Equivalent (DUE))	< $25,000	_____
Public Right-of-Way Encroachment	ZERO	_____
Facilities Environmental Impact**	ZERO	_____
Facilities Maximum Environmental Footprint (sq. ft. / Dwelling Unit Equivalent, i.e. source)	100	_____
Engineering Aspects Required	ZERO	_____
Energy Consumption (KWH/lb BOD removed)	< 1	_____

*** The best available demonstrated control technology currently available and shall be specified by "brand name or equal".**
**** Mitigates toxic methane gas (Greenhouse gas) emissions.**

APPENDIX A

INDIRECT POTABLE REUSE STANDARD / CATEGORICAL PRETREATMENT STANDARD

WASTEWATER TECHNOLOGY

Report on Evaluation of
Advanced Environmental Systems Inc.
Mini I.D.E.A. Model BESTEP 10
94/01/2015/060

under the provisions of
NSF Standard 40
on Individual Aerobic
WastewaterTreatment Plants

NSF *International*
3475 Plymouth Road
PO Box 130140
Ann Arbor, Michigan 48113-0140 USA

Report on the Performance Evaluation of the
Advanced Environmental Systems Inc.
Mini I.D.E.A. Model BESTEP 10
Residential Plant

Under the provisions of NSF Standard 40
Relating to Individual Aerobic Wastewater Treatment Plants

Plant Manufactured By:

Advanced Environmental Systems, Inc.
P.O. Box 2019
Kihei, Maui, Hawaii 96753

March 1995

EXECUTIVE SUMMARY

Testing of the patented Advanced Environmental Systems, Inc. (AES) Mini-I.D.E.A. Model BESTEP 10 residential plant was conducted under the provisions of NSF Standard 40 for Individual Aerobic Wastewater Treatment Plants (July 1990 revision). NSF Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the NSF Wastewater Technology Test Facility in Chelsea, Michigan, using wastewater diverted from the Chelsea municipal wastewater collection system. The evaluation consisted of seven months of testing, during which a seven-week stress test was conducted. The evaluation consisted of three weeks of dosing without sampling to allow for plant start-up, sixteen weeks of dosing at design flow, seven weeks of stress test and five weeks of dosing at design flow. Sampling started in the winter and continued through the spring and into summer, covering a full range of operating temperatures.

Standard 40, Section H. (3) of Appendix A, provides for exclusion of up to ten percent of the effluent sample days, not to exceed one during stress testing, in completing the pass/fail determination. Other than samples collected for information only, four sample days were excluded in the pass/fail determination for this evaluation. One of these days was during stress. A malfunction of the site dosing system resulted in excessive dosing of the plant, causing the plant to become flooded, during week 14 of the test. The plant discharge pump brought the plant to the normal operating level and no corrective action was required. The data obtained on the day of the excessive dosing is not included in the pass/fail evaluation.

The AES Model BESTEP 10 plant produced an average effluent BOD_5 of 7 mg/L, ranging between <5 and 21 mg/L, and average effluent suspended solids of 15 mg/L, ranging between <5 and 250 mg/L. The effluent pH ranged from 7.5 to 8.0.

The Model BESTEP 10 plant produced an effluent that successfully met the performance requirements established by NSF Standard 40 for Class I effluent:

> The maximum arithmetic mean of seven consecutive sample days was 17 mg/L for BOD_5 and 43 mg/L for suspended solids, below the allowed maximum of 45 mg/L. The maximum arithmetic mean of 30 consecutive samples days was 11 mg/L for BOD_5 and 14 mg/L for suspended solids, below the allowed maximum of 30 mg/L. Removal rates for BOD_5 ranged from 95 to 97 percent and removal rates for suspended solids ranged from 94 to 97 percent, both above the requirement of 85 percent.

The effluent pH during the entire evaluation ranged from 7.5 to 8.0, within the required range of 6.0 to 9.0. The AES Model BESTEP 10 met the requirements for noise levels (less than 60 dbA at a distance of 20 feet) and for color, threshold odor, oily film and foam.

PREFACE

Performance evaluation of individual aerobic wastewater treatment plants is achieved within the provisions of NSF Standard 40: Individual Aerobic Wastewater Treatment Plants (revised July 1990), prepared by the NSF Joint Committee on Wastewater Technology and adopted by the NSF Board of Trustees.

Conformance with the standard is recognized by issuance of the NSF Mark. This is not to be construed as an approval of the equipment, but rather a certification of the data provided by the test and an indication of compliance with the requirements expressed in the standard.

Plants conforming to Standard 40 are classified as Class I or Class II plants according to the quality of effluent produced by the plant during their performance evaluation. Class I plants must demonstrate performance consistent with the effluent color, odor, oily film and foam requirements of the standard, and must satisfy the requirements of the EPA Secondary Treatment Guidelines[1] for five-day biochemical oxygen demand, suspended solids and pH.

Permission to use the NSF Mark is granted only after the equipment has been tested and found to perform satisfactorily, and all other requirements of the standard have been satisfied. Continued use of the Mark is dependent upon evidence of compliance with the Standard and NSF General and Program Specific Policies as determined by periodic reinspection of the equipment at the factory, distributorships and reports from the field.

NSF Standard 40 requires the testing laboratory to provide the manufacturer of an individual aerobic wastewater treatment plant a report including significant data and appropriate commentary relative to the performance evaluation of the plant. NSF policy specifies provision of performance evaluation reports to appropriate state regulatory agencies at publication. Subsequent direct distribution of the report by NSF is made only at the specific request of or by permission of the manufacturer.

The following report contains results of the entire testing program, a description of the plant, its operation and key process control equipment, and a narrative summary of the test program, including test location, procedures and significant occurrences. The plant represented herein reflects the equipment authorized to bear the NSF Mark.

CERTIFICATION

NSF *International* has determined by performance evaluation under the provisions of NSF Standard 40 (revised July 1990) that the Mini-I.D.E.A. Model BESTEP 10 residential plant, manufactured by Advanced Environmental Systems, Inc., has fulfilled the requirements of Standard 40. The Model BESTEP 10 is therefore authorized to bear the NSF Mark so long as Advanced Environmental Systems, Inc. continues to meet the requirements of Standard 40 and NSF General and Program Specific Policies.

General performance evaluation and stress tests were performed at the Wastewater Technology Site of NSF *International*, located in Chelsea, Michigan. The raw waste utilized in the test was comminuted municipal waste. The characteristics of the waste are included in the tabulated data of this report.

The observations and analyses included in this report are certified to be correct and true copies of the data secured during the performance tests conducted by NSF on the wastewater treatment plant described herein. The manufacturer has agreed to present the data in this certification in its entirety whenever it is used in advertising, prospectuses, bids or similar uses.

Thomas G. Stevens
Manager
Engineering & Research Services

Thomas J. Bruursema
General Manager
Wastewater Certification Program

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1.0 PROCESS DESCRIPTION

The patented Advanced Environmental Systems, Inc. (AES) Mini-I.D.E.A. (Miniature, Intermittent Decant Extended Aeration) Model BESTEP 10 wastewater treatment plant incorporates continuous feed activated sludge extended aeration technology with intermittent cyclic system operation, requiring only a single reactor basin. The non-passive system uses a single tank in which the activated sludge is aerated over a number of pre-determined cycles. Solids/liquid separation occurs during the air-off part of the operation cycle. During the latter part of the air-off cycle, treated effluent is discharged (decanted) from directly below the liquid surface. Because of the influent hydraulic control features of the I.D.E.A. System, influent inflow is continuously accommodated at all times. In this way, the functions of flow equalization, biological oxidation, nitrification, denitrification, secondary sedimentation, clarification, and aerobic sludge digestion are all carried out in a single tank.

The process technology of the AES Mini-I.D.E.A. BESTEP 10 is a combination of extended aeration and sequential batch reactor (SBR) technologies. The result is a non-passive extended aeration activated sludge process that continuously accommodates influent flows and can handle hydraulic and organic load variations. Extended aeration is a modification of the activated sludge process in which the microorganisms are allowed to remain in the treatment process for relatively long periods of time. The large amount of biological solids in the process provides a buffer for shock loading of organic matter. The aerobic environment allows for the organisms in the system to consume themselves through endogenous respiration, reducing the total amount of solids produced by the treatment process. This does not, however, eliminate the need for removal of solids from the system. Removal of solids is necessary to keep from exceeding the capacity of the solids separation process utilized before discharge of the treated wastewater.

The organisms primarily responsible for the degradation of the organic matter are aerobic bacteria. As such, the transfer of oxygen into the wastewater by an aeration systems is a critical component of the treatment process. The aeration system also provides for the mixing of the wastewater and organisms to provide contact between the organic contaminants in the wastewater and the organisms. For this reason, an activated sludge process is referred to as a suspended growth system. Interruption of the aeration system for a long period of time, such as days, can have a serious impact on the process.

2.0 PERFORMANCE EVALUATION

2.1 Description of Plant Evaluated

The AES Mini-I.D.E.A. Model BESTEP 10 residential plant tested has a rated capacity of 500 gallons per day (gpd). The plant operates as a continuous feed cyclic reactor (CFCR) treatment process, which provides for all wastewater treatment operations (aeration, clarification and decant) within a single 1,000 gallon capacity tank. EPDM membrane fine bubble diffusers provide for aeration and mixing of the plant contents. The treatment components of the test plant were contained in a 1,000 gallon reinforced fiberglass tank. Plant specifications and drawings are included in Appendix A.

Wastewater enters the plant through an Influent Velocity Equalization (IVE) Collector which dissipates the energy of the incoming wastewater. The IVE Collector is surrounded by a circular partition (the Omni Flow Partition) that is suspended above the tank floor, providing for low transfer rate of the influent into the biomass in the main part of the tank and for formation of an undisturbed blanket of biomass that acts as a biological filter to wastewater entering the plant during periods of no aeration. Most of the tank volume makes up the Main React Zone. Biomass and wastewater are mixed throughout the plant during periods of aeration. Settling occurs during periods of no aeration. Pumped discharge from the plant is achieved using a solids excluding floating Decanter

that withdraws treated water from directly below the liquid surface during the latter part of air off phase of the operation cycle.

The process is operated by a timer in the control panel, with input from floats in the tank. The floats provide input for shutting down the discharge pump and for the high level alarm, as well as for override of the timers should flow to the plant dictate discharge from the plant before the timer controlled discharge period. The BESTEP 10 used five cycles of aeration, quiescent settling and decant:

Cycle 1: Aeration on - 9:30 p.m. to 12:00 midnight
Settling - 12:00 midnight to 2:00 a.m.
Decant - 1:20 a.m. to 2:00 a.m.
Cycle 2: Aeration on - 2:00 a.m. to 4:00 a.m.
Settling - 4:00 a.m. to 6:00 a.m.
Decant -5:20 a.m. to 6:00 a.m.
Cycle 3: Aeration on - 6:00 a.m. to 8:00 a.m.
Settling - 8:00 a.m. to 10:00 a.m.
Decant -9:20 a.m. to 10:00 a.m.
Aeration on - 10:00 a.m. to 10:15 a.m.
Aeration off - 10:15 a.m. to 10:45 a.m.
Cycle 4: Aeration on - 10:45 a.m. to 1:00 p.m.
Settling - 1:00 p.m. to 2:45 p.m.
Decant -2:00 p.m. to 2:40 p.m.
Aeration on - 2:45 p.m. to 3:00 p.m.
Aeration off - 3:00 p.m. to 3:30 p.m.
Cycle 5: Aeration on - 3:30 p.m. to 6:30 p.m.
Settling - 6:30 p.m. to 8:45 p.m.
Decant -8:30 p.m. to 8:50 p.m.
Aeration on - 8:45 p.m. to 9:00 p.m.
Aeration off - 9:00 p.m. to 9:30 p.m.

2.2 Test Protocol

The NSF Standard 40 Performance Evaluation method and requirements are included in Appendix B. Start-up of the plant is accomplished by filling one-third of the volume with raw wastewater and the remainder of the volume with fresh water. The plant is then dosed at the design loading rate (500 gpd) for three weeks. Doses were made during three dosing periods:

6 a.m. to 9 a.m.	-	35 percent of daily rated capacity
11 a.m. to 2 p.m.	-	25 percent of daily rated capacity
5 p.m. to 8 p.m.	-	40 percent of daily rated capacity

After a start-up period of up to three weeks, the plant is subjected to the following loading sequence:

Design loading	-	16 weeks
Stress loading	-	7 weeks
Design loading	-	3 weeks

During the design loading periods, 24-hour composite samples are collected of the influent and effluent five times per week. The samples are analyzed for BOD_5, suspended solids and volatile suspended solids. Onsite

determinations of the effluent temperature, pH and dissolved oxygen are also made five times per week. In-plant measurements of aeration chamber temperature, pH, dissolved oxygen and aeration chamber suspended solids are also made five times per week.

Stress testing is designed to evaluate how the plant performs under non-ideal conditions, including high and low hydraulic loadings and electrical or system failure. The test sequence includes (1) Wash Day stress, (2) Working Parent stress, (3) Power Failure stress, and (4) Vacation stress. Detailed descriptions of the stress sequences are shown in Appendix B.

During the stress test sequence, 24-hour composite samples are collected before and for seven days after each stress dosing pattern. The analyses and on-site determinations completed on the samples are the same as described for the design load testing. Additional samples are collected during the Wash Day and Working Parent stresses for informational purposes only and are not included in the pass/fail calculations. These samples include two samples collected during the Wash Day stress, two during the Working Parent stress, one sample collected immediately after the power is renewed to the plant during the Power Failure stress and one collected with the start of dosing in the Vacation stress.

In order for the plant to achieve Class I effluent, it is required to produce an effluent which meets the EPA guidelines for secondary effluent discharge[1]:

> BOD_5 and Suspended Solids: (a) the arithmetic mean of all effluent samples collected in a period of 30 consecutive sample days must be ≤ 30 mg/L, with ≥ 85 percent removal; and (b) the arithmetic mean of all effluent samples collected in a period of 7 consecutive sample days must be ≤ 45 mg/L.
>
> pH: Effluent values remain between 6.0 and 9.0.

Requirements are also specified for effluent color, odor, oily film and foam, as well as maximum noise level allowed from the plant. In determining if the plant meets the effluent requirements, ten percent of the samples during the testing, not to exceed one sample during stress testing, may be excluded from the pass/fail determination. A minimum of 118 sample days, 23 during the stress test sequence, must be collected and analyzed for the test to be valid.

2.3 Test Chronology

The plant was installed under the direction of the manufacturer on July 15, 1993. Dosing at the rate of 500 gpd was started on December 19, 1993, and after three weeks of start-up operation, sampling was started on January 10, 1994. The stress test sequence was started on May 2, 1994 and ended on June 22, 1994. The evaluation was completed on July 25, 1994.

On April 13, 1994 (week 14 of the test), a mechanical malfunction of the Chelsea site dosing system resulted in continuous dosing of the plant from approximately 5:00 p.m. to 7:08 a.m. on April 14. Dosing of wastewater to the plant was stopped at that time, with the water level in the plant at 7 inches from the top of the access opening. The plant discharge pump was operating under a high level discharge and was allowed to operate to bring the plant back to the normal operating level. By 8:26 a.m. the plant was back to the normal level

The exact volume of wastewater dosed to the plant during this period can not be determined as the dosing system overflowed during the continuous dosing period. The volume was sufficient to flood the plant and was equal to many times the plant design capacity. The problems causing the overdose were corrected, the plant was place back into operation and the plant operations were monitored to evaluate the impact on the plant. It was

determined that the test could continue with no additional corrective action. As a result of the overdose, data for the sample collected on April 14 was not included in the pass/fail evaluation.

3.0 ANALYTICAL RESULTS

3.1 Summary

Chemical analysis of samples collected during the evaluation were completed using the procedures in *Standard Methods for the Examination of Water and Wastewater*[2], or U.S. Environmental Protection Agency procedures[3]. Copies of the data generated during the evaluation are included in Appendix C. The results of the chemical analyses and on-site observations and measurements made during the evaluation are summarized in Table I.

TABLE I. SUMMARY OF ANALYTICAL RESULTS

	Average	Std.Dev.	Minimum	Maximum	Median	Interquartile Range
BOD_5 (mg/L)						
Influent	182	29	120	230	180	160-210
Effluent	7	3	<5	21	6	5-8
Suspended Solids (mg/L)						
Influent	212	48	110	410	210	180-230
Aeration Chamber	5,813	1,840	1,400	8,200	6,500	4,900-7,100
Effluent	15	34	<5	250	6	5-7
Volatile Suspended Solids (mg/L)						
Influent	182	42	74	360	180	160-200
Aeration Chamber	4,245	1,276	1,100	6,400	4,700	3,700-5,100
Effluent	11	23	<5	170	5	5-6
pH						
Influent	-	-	7.4	8.1	7.5	7.5-7.5
Aeration Chamber	-	-	6.9	7.6	7.2	7.1-7.3
Effluent	-	-	7.5	8.0	7.7	7.6-7.8
Temperature (°C)						
Influent	13	3	10	20	12	11-16
Aeration Chamber	13	5	7	22	10	9-17
Effluent	12	5	5	21	10	8-17
Dissolved Oxygen (mg/L)						
Aeration Chamber	1.8	1.4	0.1	5.0	1.45	0.6-2.8
Effluent	2.4	1.5	0.4	6.2	2.3	1.0-3.3

Note: The median is the point where half of the values are greater and half are less. The interquartile range is the range of values about the median between the upper and lower 25 percent of all values.

Guidelines for evaluating the analytical results from the testing are described in Section 5.1 and Section H of Appendix A in NSF Standard 40. In completing the pass/fail determination of the data generated from the test, ten percent (a total of twelve) of the samples collected during testing (not to exceed one sample during stress testing) can be excluded from the pass/fail calculations. During testing of the AES Model BESTEP 10, four sample days were excluded from the pass/fail determinations. The results from three days during design loading periods were excluded, including data for July 18, 20, and 22. The results from May 14 (the sixth sample day following Wash Day stress) were excluded.

Section 2.9 and Section E of Appendix A of NSF Standard 40 define influent wastewater characteristics as is applies to testing under the Standard. Typical domestic wastewater is defined as having a BOD_5 concentration between 100 and 300 mg/L and a suspended solids concentration between 100 and 350 mg/L. By the Program Specific Policies for *Wastewater Treatment Devices and Related Products and Components* (dated January 1, 1991):

> When the influent Biochemical Oxygen Demand and/or Suspended Solids fall outside the ranges specified in Section 2.9 of Standard 40, the effluent samples for the two calendar days immediately following the occurrence may be excluded in the 7 and 30 sample averages.

The Policy does not require exclusion of data following a day with influent concentrations outside the defined ranges, but allows for discard should the influent strength have an apparent impact on plant performance. There was one sample day when the influent strength fell outside the specified range, but it was not determined to have an impact on plant performance.

3.2 Biochemical oxygen demand

The carbonaceous five-day biochemical oxygen demand (BOD_5) analyses were completed using the EPA Method 405.1. The results of the analyses completed on the samples collected during the testing, except those collected for informational purposes, are shown in Figure 1 and tabulated in Table I.

Influent BOD_5:

The influent BOD_5 ranged from 120 to 230 mg/L during the evaluation, with an average concentration of 182 mg/L and a median concentration of 180 mg/L.

Effluent BOD_5:

The effluent BOD_5 concentrations ranged from less than 5 to 21 mg/L over the course of the evaluation, with an average concentration of 7.5 mg/L.

Standard 40 requires that the effluent BOD_5 not exceed 45 mg/L on a 7-day average and 30 mg/L on a 30-day average, and represent a reduction of not less than 85 percent of the 30-day average influent. The averages refer to seven and thirty consecutive sample averages, and not consecutive days. A plot of the 7 and 30-day average concentrations and 30-day average percent removals is shown in Figure 2.

The 7-day average for effluent BOD_5 ranged from 5 to 17 mg/L, the 30-day averages ranged from 5 to 11 mg/L, and the percent removal ranged from 95 to 97 percent. As shown in Figure 2, the AES Model BESTEP 10 met the requirements of Standard 40 for effluent BOD_5.

Figure 1. Biochemical Oxygen Demand

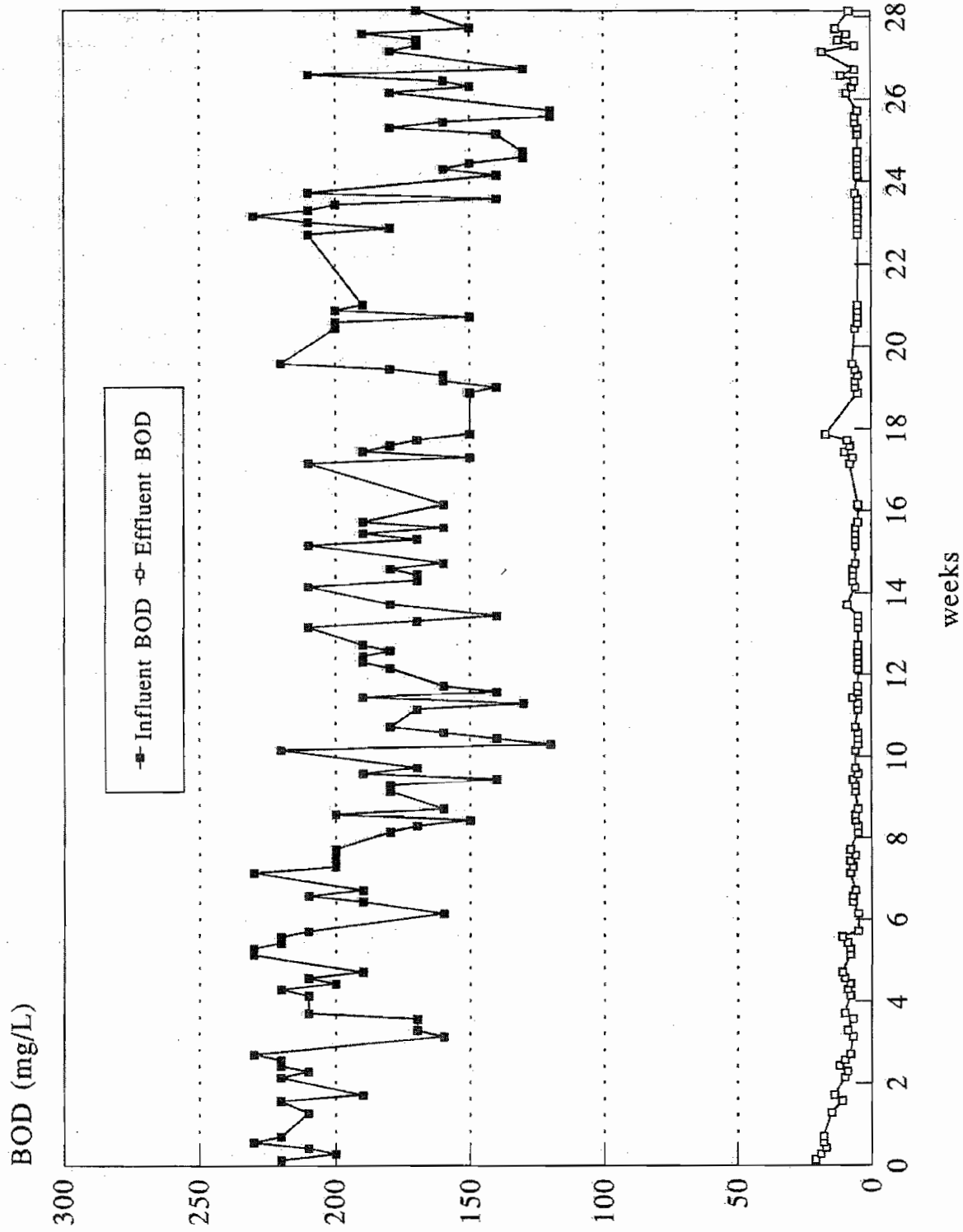
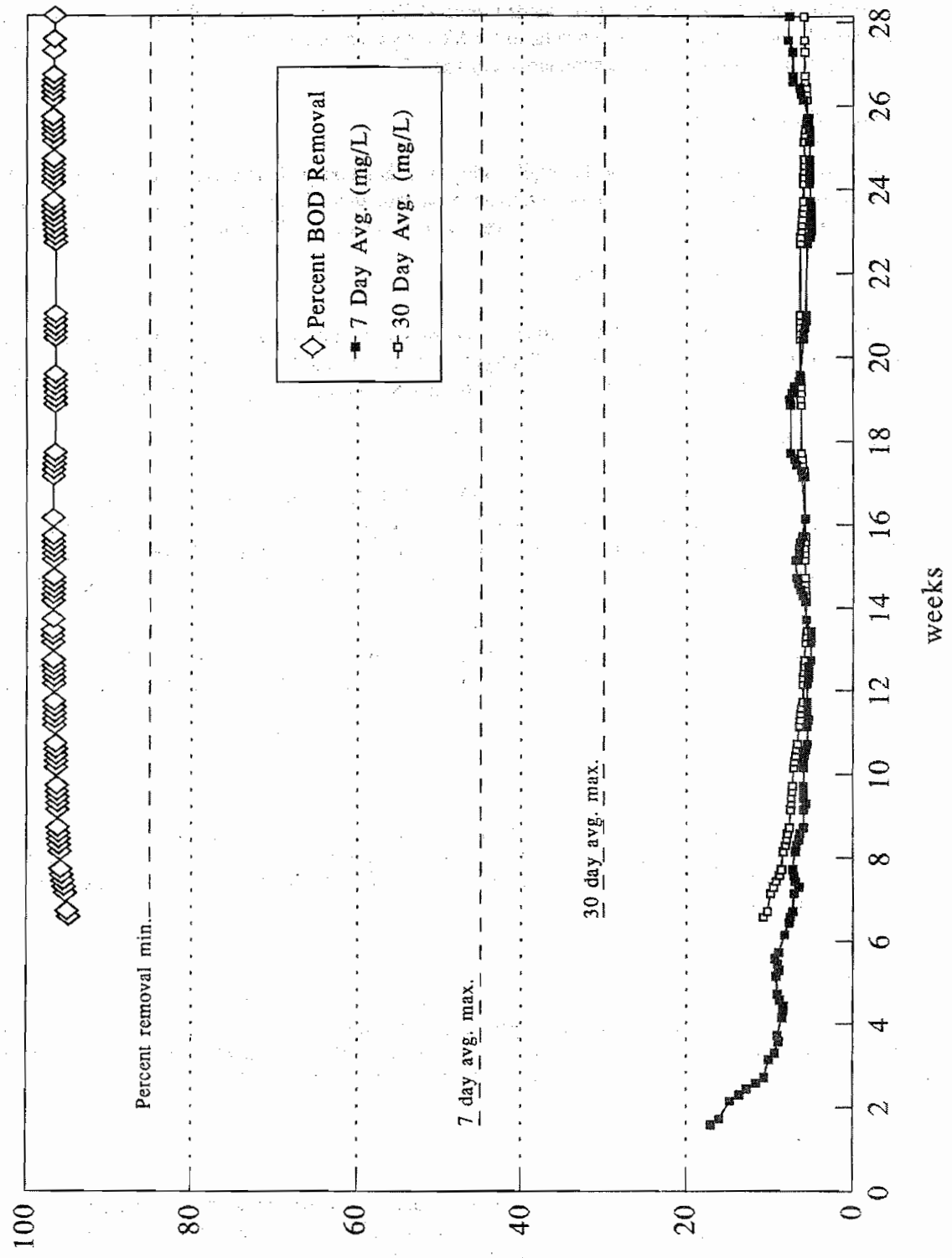


Figure 2. Effluent BOD Averages and Percent BOD Removal



3.3 Suspended Solids

Suspended solids (SS) and volatile suspended solids (VSS) analyses were completed using Methods 209C and 209D of *Standard Methods*. The results of the SS analyses over the entire evaluation are shown in Figure 3. The data from both analyses are summarized in Table I.

Influent Suspended Solids:

The influent SS ranged from 110 to 410 mg/L during the evaluation, with an average concentration of 212 mg/L. The median influent SS concentration during the evaluation was 210 mg/L. The influent VSS ranged from 74 to 360 mg/L during the evaluation, with an average concentration of 182 mg/L and a median of 180 mg/L.

Aeration Chamber Suspended Solids:

The aeration chamber SS ranged from 1,400 to 8,200 mg/L during the evaluation, with an average concentration of 5813 mg/L. The aeration chamber VSS ranged from 1,100 to 6,400 mg/L, with an average concentration of 4245 mg/L. The median values from the aeration chamber were 6,500 mg/L SS and 4,700 mg/L VSS.

Effluent Suspended Solids:

The effluent SS concentrations ranged from <5 to 250 mg/L during the evaluation, with an average concentration of 14.7 mg/L. Over the course of the evaluation, NSF Standard 40 requires that the effluent SS not exceed 45 mg/L on a 7-day average, 30 mg/L on a 30-day average, and that the plant achieve not less than 85 percent reduction of the 30-day average influent SS concentration. A plot of the 7 and 30-day averages, as well as the percent removal, is shown in Figure 4.

The 7-day average SS ranged from 5 to 43 mg/L, the 30-day averages ranged from 6 to 14 mg/L and the percent reduction ranged from 94 to 97 percent. As shown in Figure 4, the AES Model BESTEP 10 residential plant met the requirements of NSF Standard 40 for effluent SS.

3.4 pH

Over the entire evaluation period, the influent pH ranged from 7.4 to 8.1 (median of 7.5), while the aeration chamber pH ranged from 6.9 to 7.6 (median of 7.2). The effluent pH ranged from 7.5 to 8.0 (median of 7.7) during the evaluation, within the 6 to 9 range required by NSF Standard 40. The pH data for the evaluation are shown in Appendix C.

3.5 Temperature

Influent temperatures over the evaluation period ranged from 10 to 20°C (median of 12 C), while aeration chamber temperatures ranged between 7 and 22°C (median of 10°C). Effluent temperatures ranged between 5 and 21°C (median of 10°C). The temperature data are shown in Appendix C.

3.6 Dissolved Oxygen

Dissolved oxygen (DO) was measured in the aeration chamber and effluent during the evaluation. The aeration chamber DO ranged from 0.1 to 5.0 mg/L (median of 1.45 mg/L), while the effluent DO ranged from 0.4 to 6.2 mg/L (median of 2.3 mg/L). All DO data are shown in Appendix C.

Figure 3. Suspended Solids

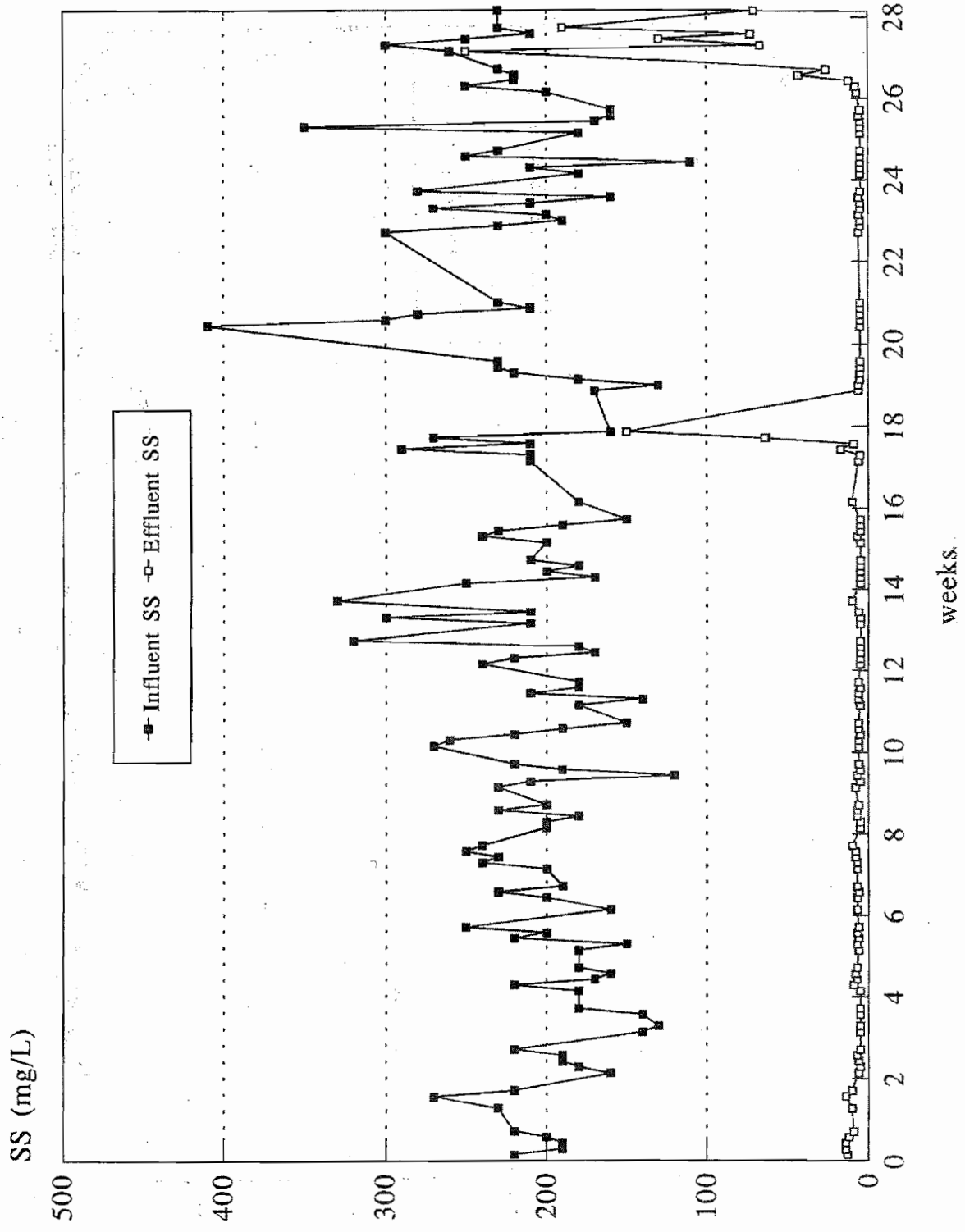
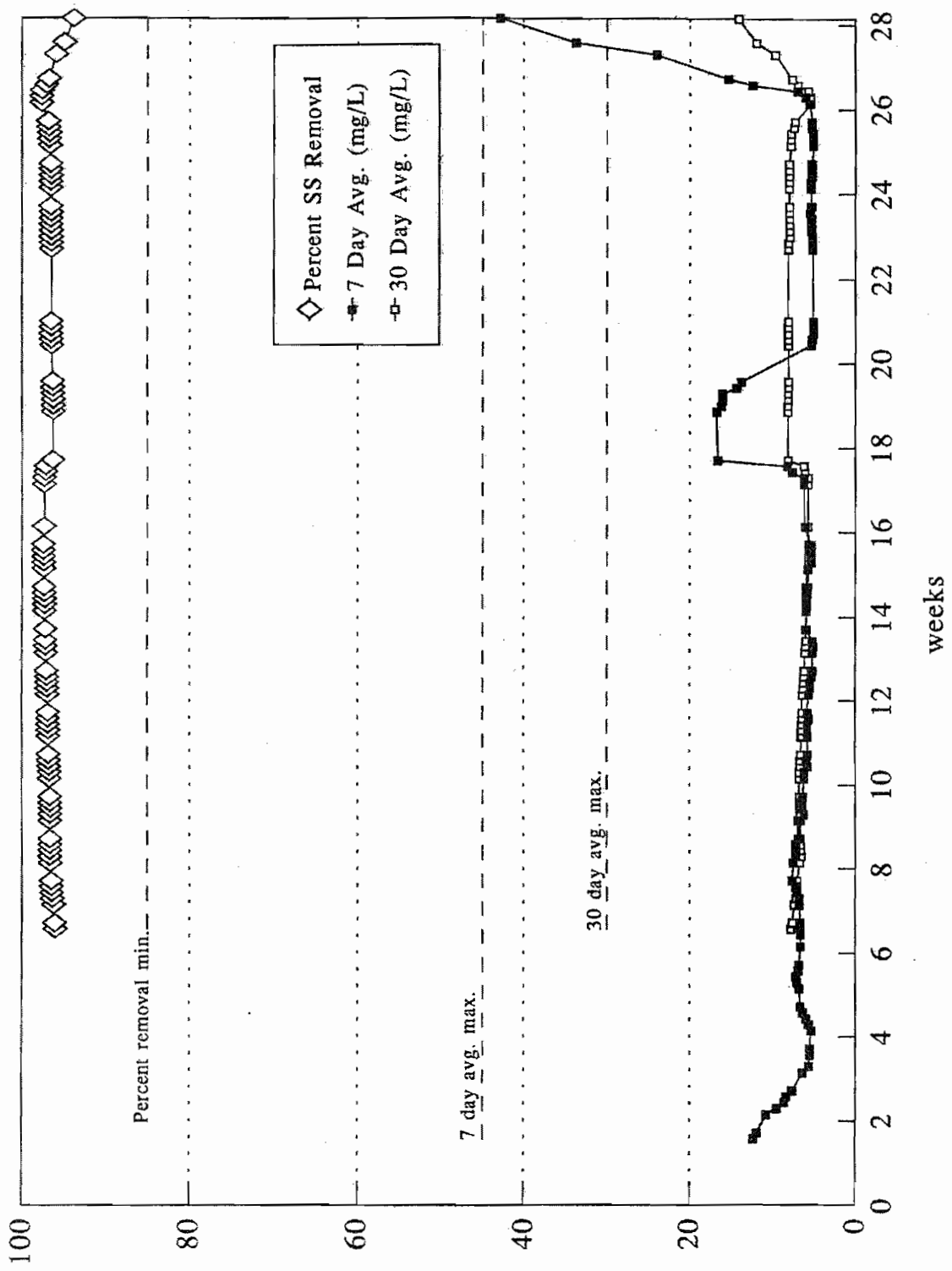


Figure 4. Effluent SS Averages and Percent SS Removal



3.7 Color, Threshold Odor, Oily Film, Foam

Three samples of the effluent were analyzed for color, odor, oily film and foam, as prescribed in NSF Standard 40. The effluent met the requirements in Standard 40, with color less than 15 units, non-offensive threshold odor, no visible evidence of oily film and no foam.

3.8 Noise

The noise level was measured at a distance of 20 feet from the plant while the plant was in operation, using a hand-held decibel meter. The reading was below the 60 dbA required under NSF Standard 40.

3.9 Additional Analyses

Although not required by the Standard 40 protocol, AES requested that additional sampling and analyses be completed to evaluate the performance of the Model BESTEP 10 for nitrification. Samples of the Chelsea influent and plant effluent were collected once every other week over the course of the evaluation, beginning on February 2, 1994. The influent samples were analyzed for total Kjeldahl nitrogen (TKN), and the effluent samples were analyzed for ammonia, nitrate and TKN. Analyses were completed using EPA Method 350.1 for ammonia-nitrogen, EPA Method 300 for nitrate-nitrogen and EPA Method 351.2 for TKN.

The results, reported as mg/L as N, of the analyses are tabulated in Appendix D. The effluent ammonia ranged from 0.5 to 1.6 mg/L (averaging 1.0 mg/L) and effluent nitrate ranged from 0.3 to 4.0 mg/L (averaging 1.6 mg/L). The influent TKN ranged from 21 to 37 mg/L (averaging 27 mg/L), with effluent TKN ranging from 1.4 to 3.8 mg/L (averaging 2.3 mg/L).

4.0 REFERENCES

1. "Environmental Protection Agency Guidelines for Secondary Treatment", Federal Register, Volume 28, No. 159, 1973.

2. APHA, AWWA, WPCF, Standard Methods for the Examination of Water and Wastewater, 17th Edition, American Public Health Association, Washington, D.C..

3. U.S. EPA, Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, Washington, D.C..

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APPENDIX A

PLANT SPECIFICATIONS

Design Specifications

Advanced Environmental Systems
Mini-I.D.E.A. Model BESTEP 10
Residential Plant

Treatment Tank

Capacity	500 gallons/day
BOD_5 Loading	1.25 pounds/day

Aerator

Model	TI-5120
Power Requirements	124 watts, 2.91 amps 115 V/60 Hz/1 Ph
Output	4.2 cfm

Decanter Pump

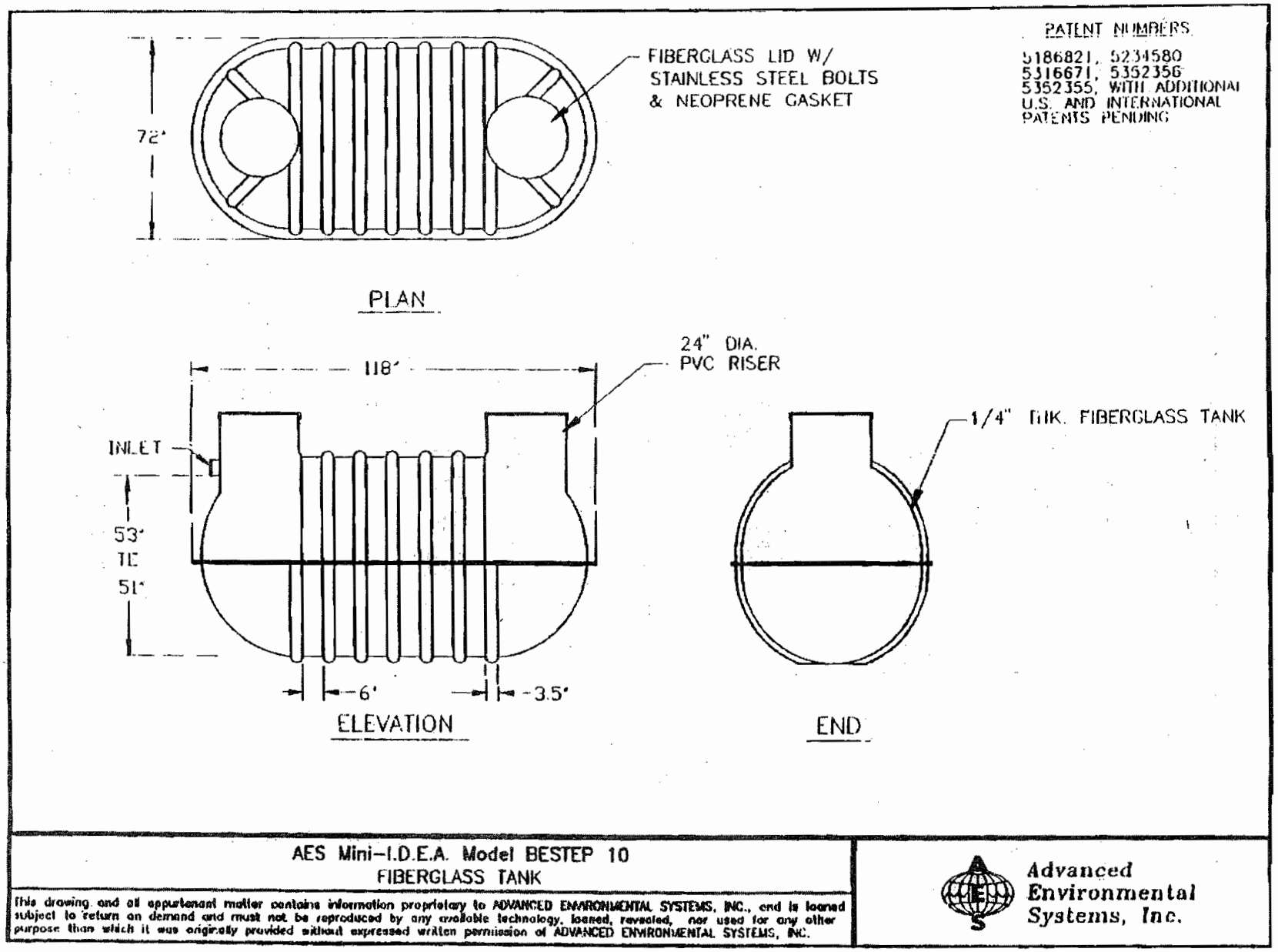
Model	A.B.S. Aquamaster
Power Requirements	1/6 HP, 4.5 amps 115 V/60 Hz/1 Ph
Pump Speed	3450 rpm

Floats

Manufacturer	S.J. Electro Systems, Inc.
Model	JSD

Float Settings

Decanter pump off	44" water depth
Aeration off	46" water depth
Early decant - pump on	48" water depth
High water level alarm	52" water depth



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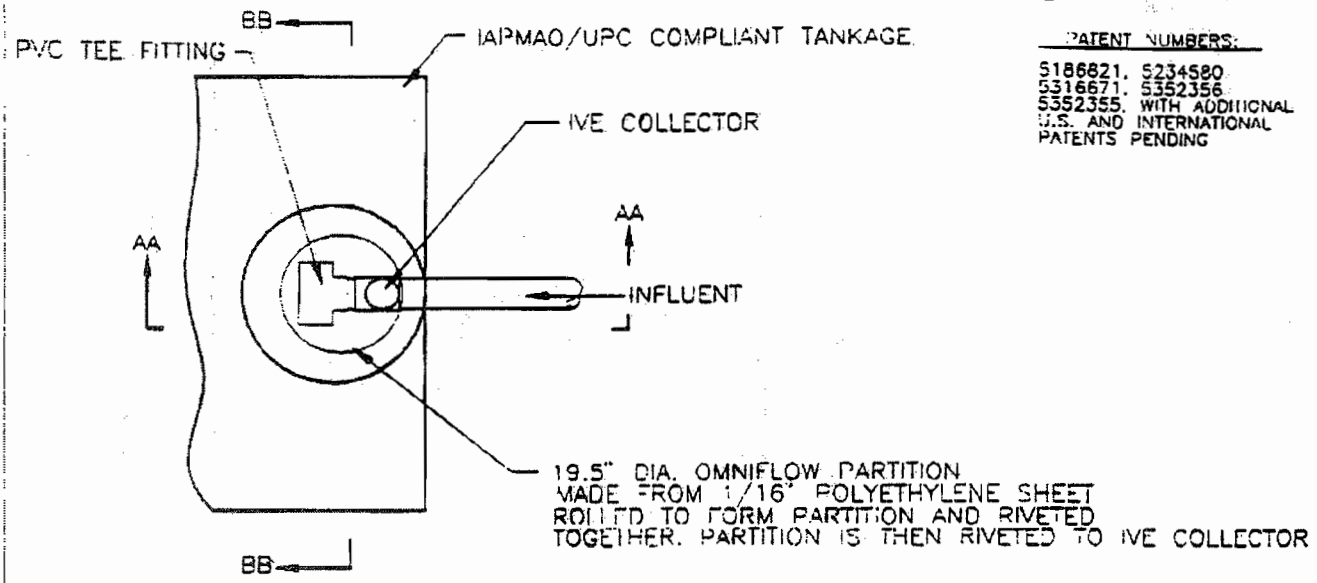

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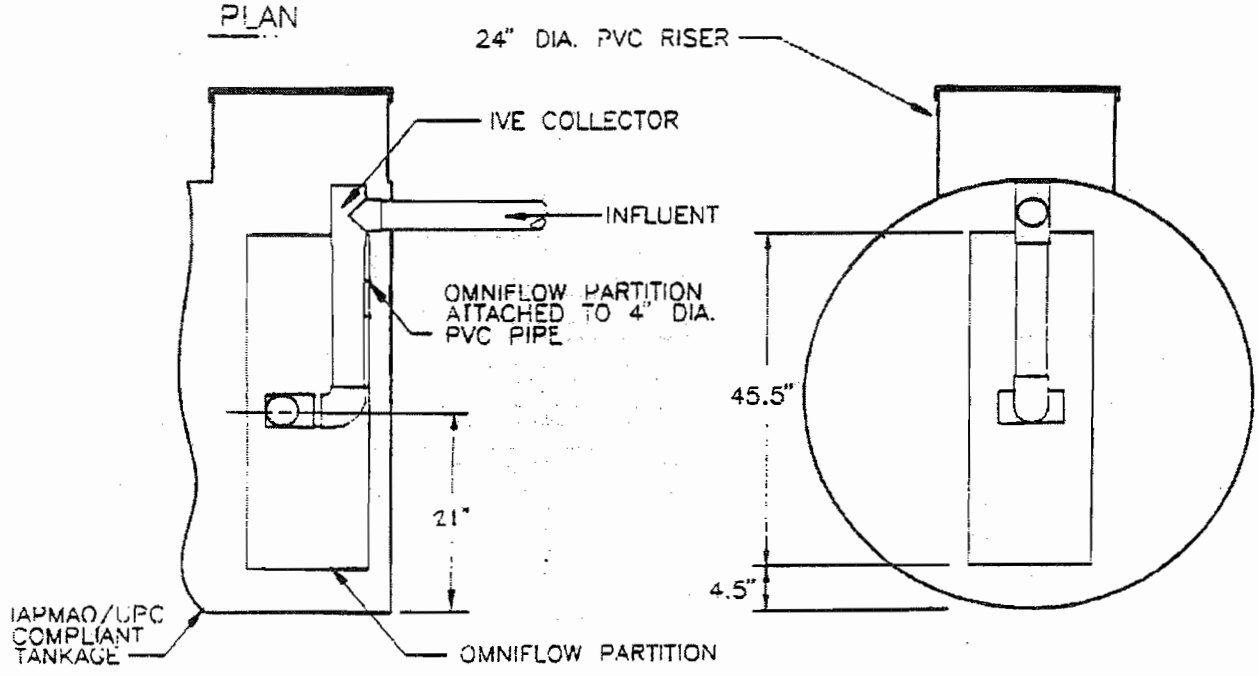
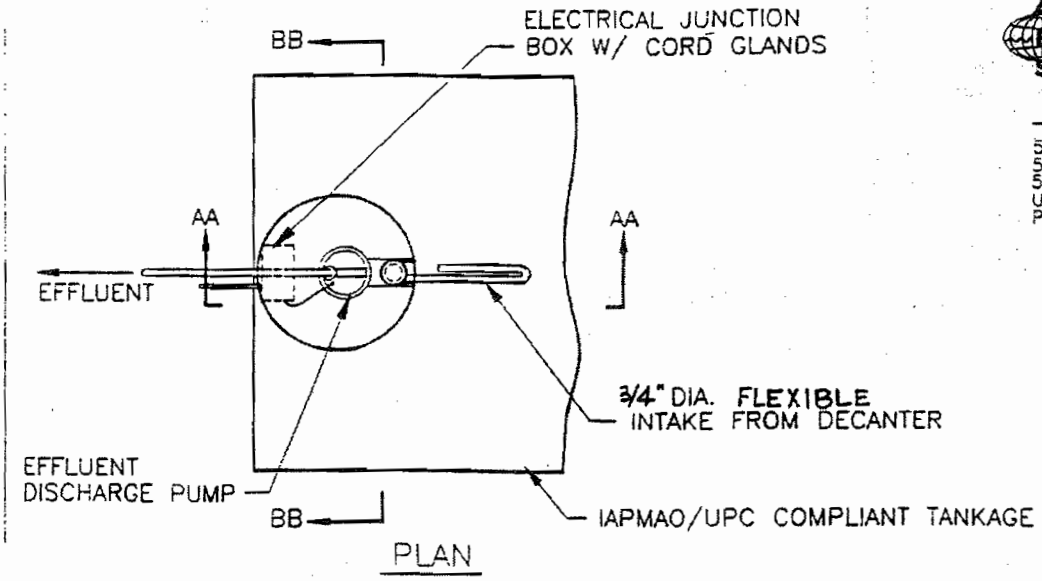


SECTION AA

SECTION BB



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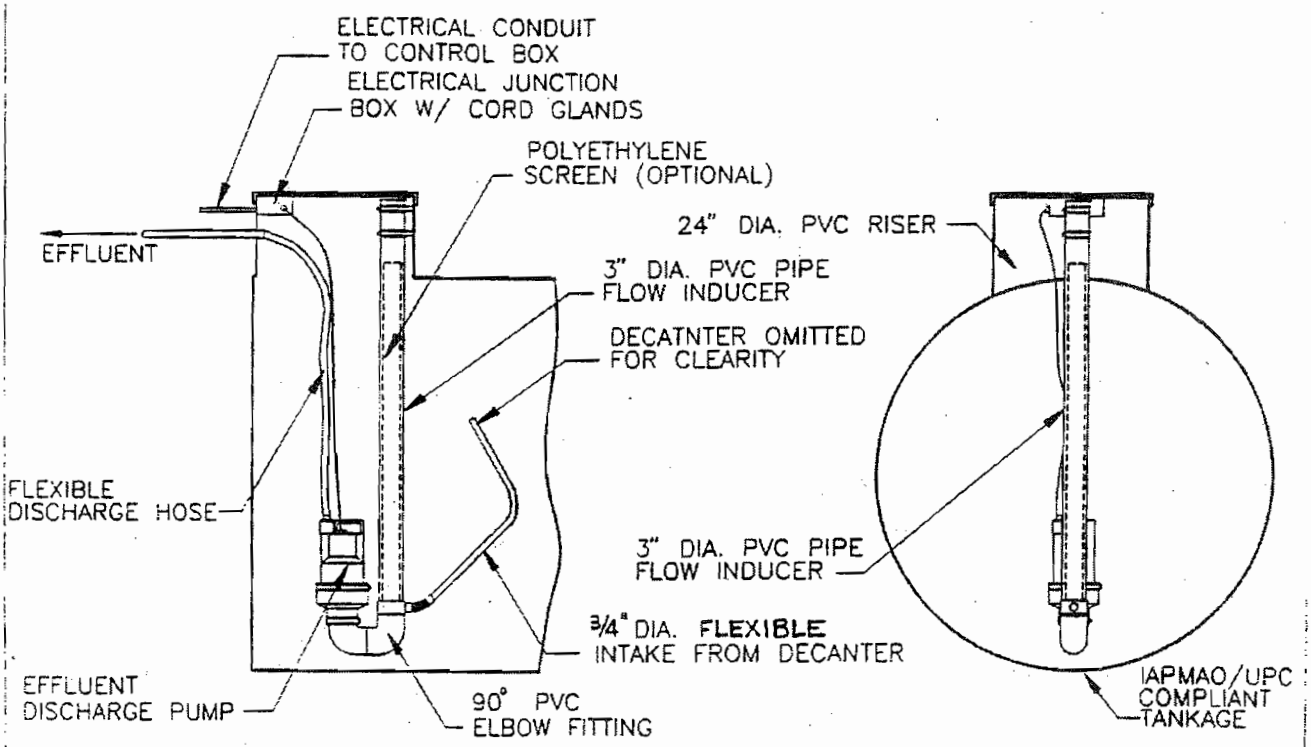

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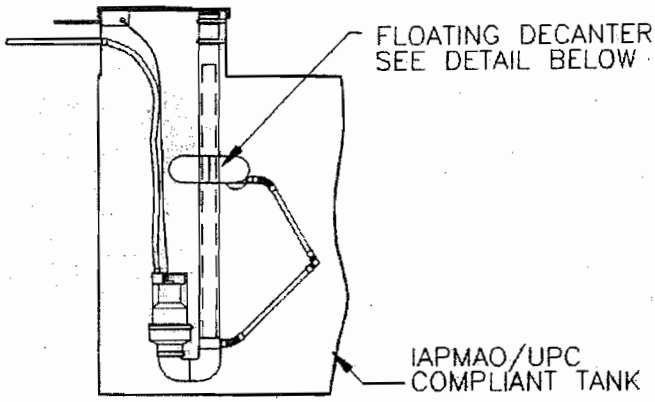

DECANTER DETAIL

Advanced Environmental Systems, Inc.

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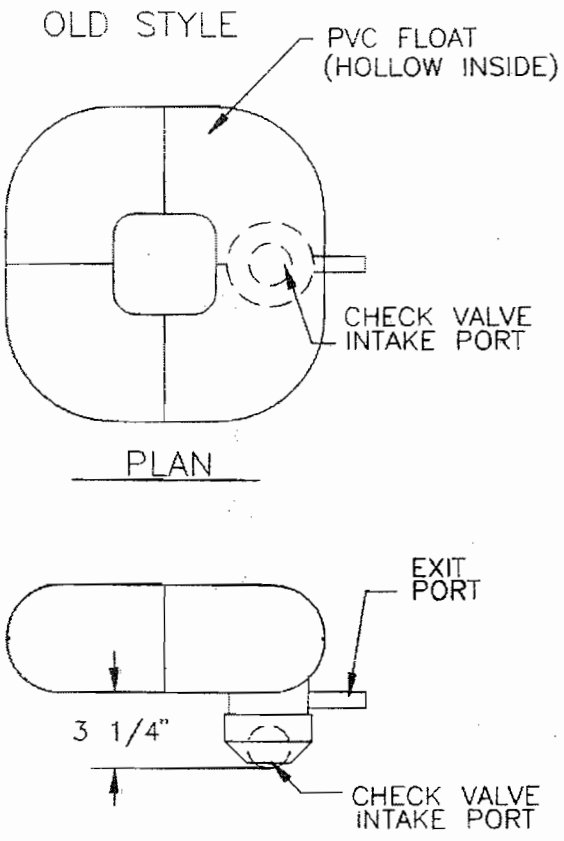
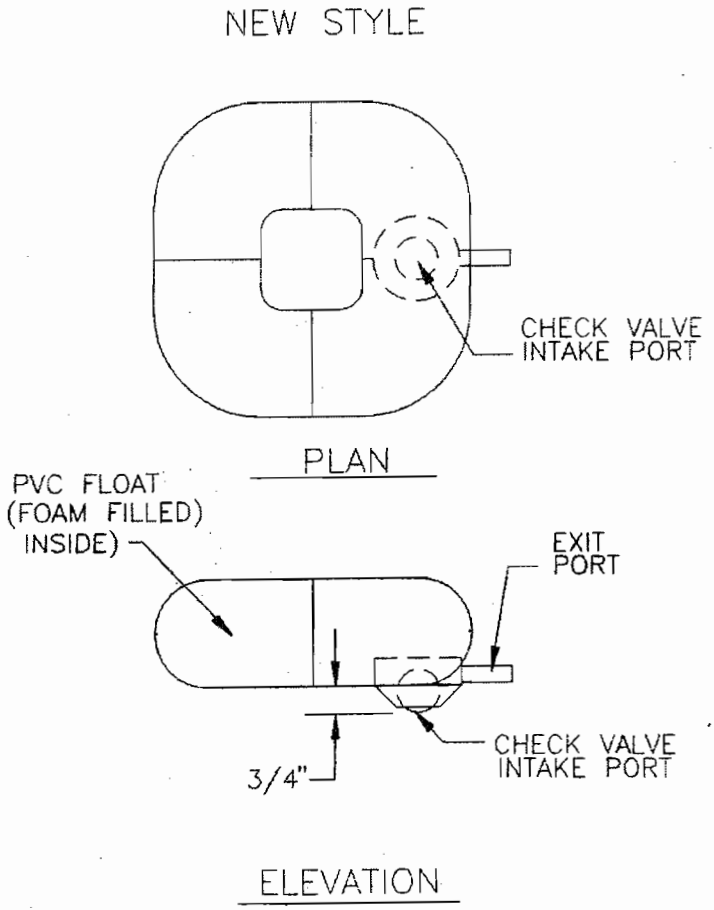
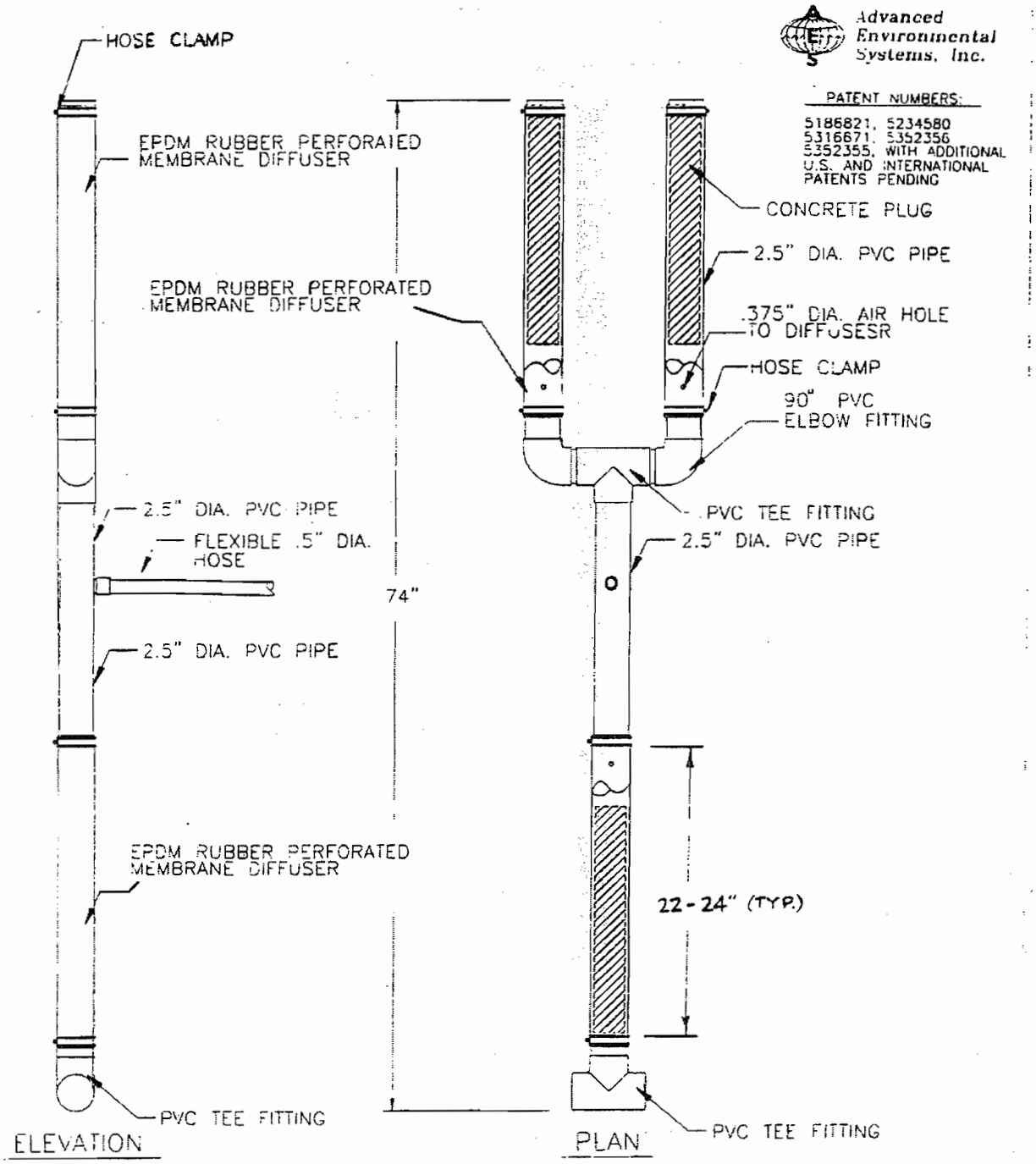
PATENTS PENDING







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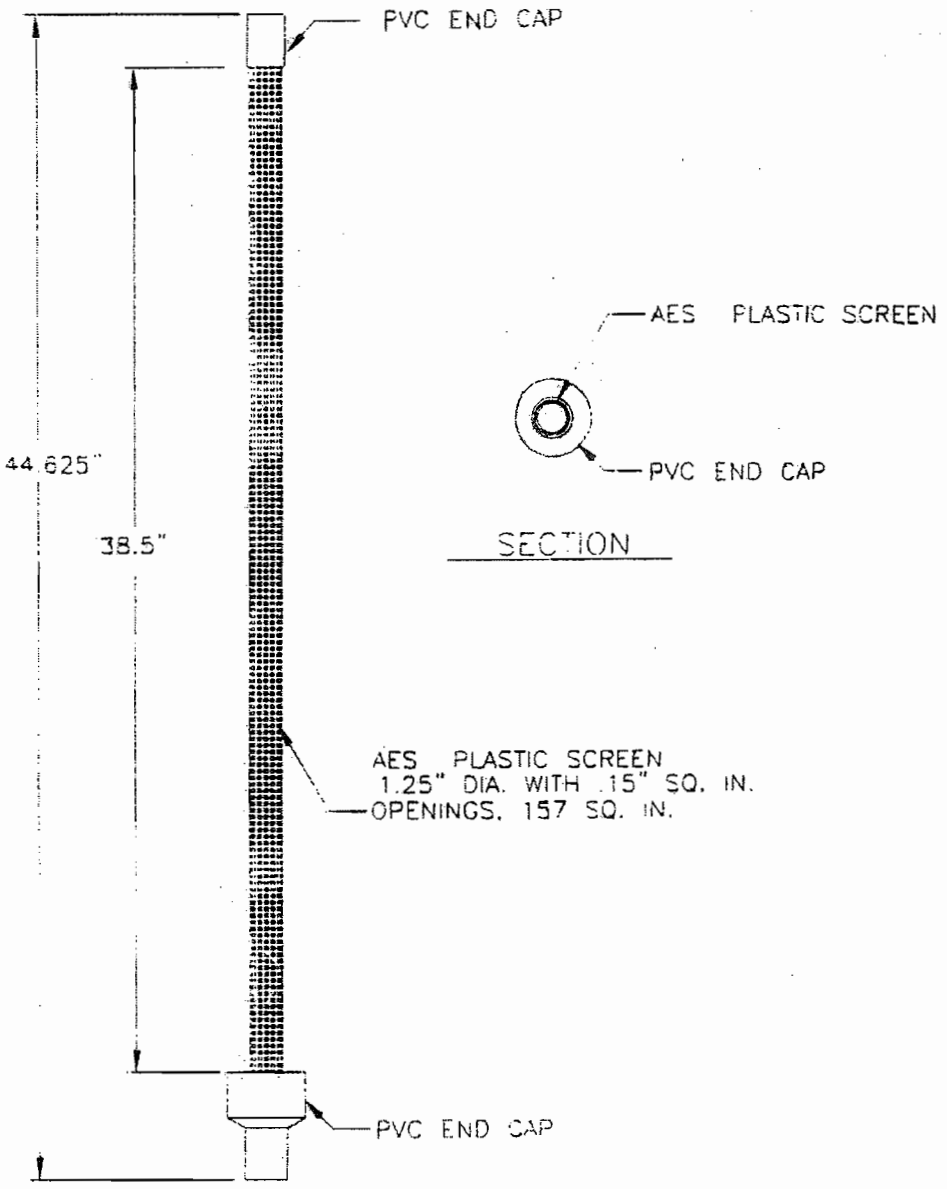


ELEVATION

APPENDIX B

NSF STANDARD 40 PERFORMANCE EVALUATION METHOD AND REQUIREMENTS

TEST METHOD

A. PURPOSE

The purpose of this test method is to verify that a plant complies with the applicable class effluent requirements during a six-month period.

Performance evaluation of the plant shall be independent of design and construction. However, structural weaknesses or defects and failures of process support equipment, shall be reported in the test results.

B. PREQUALIFICATIONS

1. APPLICATION: The application for performance evaluation of a particular model or model series shall include a basic description, design data, drawings, and parts and materials specifications for the plant and all equipment and appurtenances. A complete installation, operation, and maintenance manual, including a thorough discussion of process fundamentals, shall accompany the application.

2. MODEL SERIES: For a series of plants of the same model, varying in rated treatment capacities between 1514 and 5678 L (400 and 1500 gallons) per day, results achieved by the smallest plant in the series shall be indicative of the capabilities of all other plants in the series. The design and configurations of larger capacity plants shall be proportionally identical to the plant tested.[1]

C. TESTING SEASON

The test can be carried out at any time of the year. If the test is conducted during cold weather, the plant and equipment shall be protected from freezing. If the test is conducted during warm weather, the temperature of the aeration compartment contents shall not exceed 30°C (86°F).

D. ANALYTICAL METHODS

All sample collection and analytical methods shall be those in the seventeenth edition of Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association[2], except as otherwise specified.

E. INFLUENT WASTEWATER CHARACTERISTICS

The influent wastewater characteristics shall be equivalent to wastewater generated from a normal household complying with the following typical domestic wastewater parameters:

BOD_5	100-300 mg/L
SS	100-350 mg/L

---

[1]When defining "proportionally identical," some of the parameters that should be considered are hydraulics, dimensions, mixing, and filtration.

[2]American Public Health Association, 1015 Fifteenth St., N.W., Washington, DC 20005.

F. LOADING REQUIREMENTS

1. DESIGN LOADING: The plant shall be hydraulically loaded at its rated daily capacity[3] according to the following pattern of flow:

6 a.m. - 9 a.m.	35% of total daily flow
11 a.m. - 2 p.m.	25% of total daily flow
5 p.m. - 8 p.m.	40% of total daily flow

2. STRESS TESTING[4]: The plant shall be hydraulically loaded as indicated in the applicable figure in the following sequence:

- Wash Day (Figure A1),
- Working Parents (Figure A2),
- Equipment or Power Failure (electrical equipment off) (Figure A3),
- One week vacation followed by shock loading. Typical of a family's return from vacation (Figure A4).

G. TEST METHOD

1. GENERAL:

a. Should mechanical malfunctions at the test facility occur during testing (dosing interruption, comminutor failure, sampler malfunction, etc.) the testing agency shall determine the potential adverse affect on the performance of the system and determine what analytical values shall be included in the thirty- and seven-sample averages.

b. The plant shall be installed, operated, and maintained according to the manufacturer's instructions during the test period. If these instructions conflict with provisions in this Appendix, the provisions in this Appendix shall be used.

---

[3]Rated daily capacity is the designed treatment of the plant. Note the example below:

Effect of Testing at Design Loading
Assume average family = 5 persons
and average water use = 189 L/person/day (50 gals/person/day); then daily household waste = 946 Lpd (250 gpd).
Therefore, testing at rated daily capacity provides greater loading to plant than average family might be expected to contribute.

If minimum plant size = 1892 Lpd (500 gpd), then design loading simulates: Use by 10 persons @ 189 L/person/day (50 gals/person/day); or use by 5 persons @ 378 L/person/day (100 gals/person/day), or equal.

[4]Basis for 60% loading used to simulate working parents, equipment/power failure, and return from vacation:

Assume 5-person occupance and 1892 Lpd (500 gpd) design capacity for aerobic system; Then
2 flushes/person @ 95 L/flush (25 gals) = 189 L (50 gals)
1 shower/person @ 76 L/shower (20 gals) = 379 L (100 gals)
3 loads washing @132 L/load (35 gals) = 379 L (105 gals)
food preparation and dishes (est.) = 114 L (30 gals)
1079 L (285 gals)
= 60% Design Flow (approximately)

c. If the plant under test is installed at a higher grade than a typical field installation, the manufacturer may insulate the plant if normal treatment temperatures could be affected.

2. START-UP PROCEDURES:

a. The plant shall be assembled according to the manufacturer's instructions. Equipment shall be checked by the manufacturer to determine that it is structurally sound. All defects shall be reported. If no defects are detected, that fact shall be indicated by the testing agency.

b. If no defects are detected and the plant is judged to be structurally sound, it shall be filled to capacity with one-third wastewater and two-thirds water[5].

c. The wastewater loading pattern provided in Section F.1 (normal loading) shall begin. Sampling and testing shall begin within three weeks after the plant is filled and placed into operation, and continue without interruption until the end of the test, with the following exception:

The testing agency shall make repairs for unexpected mechanical malfunctions that are explained in the manufacturer's operation manual. Routine service and maintenance of the plant will not be allowed during the test period.

d. LOADING SEQUENCE: The plant shall be subjected to the following loading sequence:

Design loading (Section F.1) - 16 weeks
Stress sequence (Section F.2) - 7 weeks
Design loading (Section F.1) - 3 weeks

The plant shall be returned to design loading for seven days between each stressing sequence.

3. SAMPLING:

a. GENERAL:

- The daily composite sample shall consist of flow-proportional samples collected at least once per hour during periods of influent flow.

b. DESIGN LOADING:

- The evaluation analyses as specified in Appendix A, Table 1 shall be followed.
- All samples shall be collected and analyzed on a five-days-per-week basis.

c. STRESS TESTING:

- Samples collected immediately following each stressing shall include 24-hour composites of influent and effluent and analyzed in accordance with Appendix A, Table 1.
- Samples shall be collected immediately before the beginning of each sequence and each 24 hours for 7 days following each stress sequence.

NOTE: Two samples shall be collected during the working parent and wash day stresses and analyzed for BOD_5, SS, and pH. The data shall not be used in determining acceptance.

[5]Start-up of plant with two-thirds water and one-third wastewater is not intended to dictate actual field start-up procedures.

TABLE 1
GENERAL TEST SAMPLING

Sample Location	Sample Type	Test Frequency	DO mg/L	BOD_5 mg/L	Suspended Solids (SS), mg/L	Volatile Suspended Solids (VSS), Percent	Settleable Solids in mL/L 45 min.	Temp. °C	pH
Raw Influent	24 hr. Composite*	Monday thru Friday		X	X	X		X[1]	X[1]
Final Effluent	24 hr. Composite*	Monday thru Friday	X[1]	X	X	X		X[1]	X[1]
Aeration Chamber	Grab	Monday thru Friday	X[1]		X	X	X	X[1]	X[1]

*See Item 3.a.
[1]In situ measurement.

H. ACCEPTANCE

1. The plant shall meet the applicable performance requirements of Section 5 of this standard.

2. To evaluate the pass/fail criteria set forth in Section 5 of this Standard a minimum of 118 sample days (23 during stressing) shall be collected and analyzed.

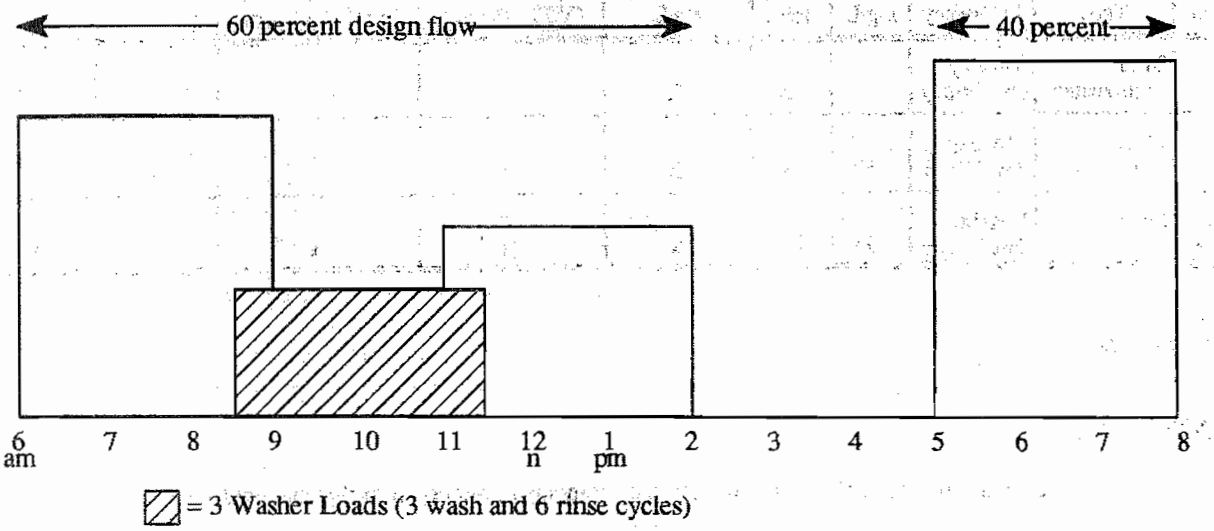
3. Due to the biological process, it is understood that aerobic systems may have days of upset. Therefore, for both Class I and Class II plants, 10% of the samples during testing (not to exceed one sample during stress testing) will not be included in the pass/fail determination.

I. REPORTS

- The testing agency shall provide a report to the manufacturer that includes significant data showing test results for the plant tested in accordance with this standard. Appropriate comments shall be provided. All data shall be included in the report, along with rationale for exclusion of any data due to adverse conditions during testing.

Figure A.1

Wash Day Loading
Added to plants 3 times in one 5-day week with one 24-hour period between each loading



Wash cycle contains low sudsing commercially available household detergent and household bleach at manufacturer's recommended use level

Figure A.2

Working Parents
No loading 9 am to 5 pm for 5 consecutive days

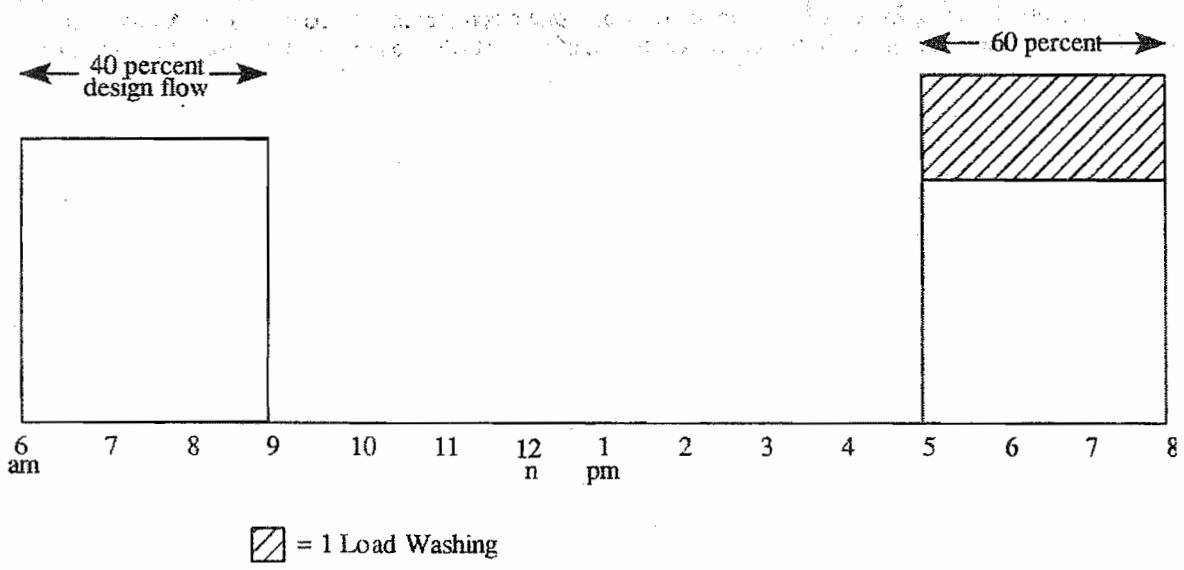


Figure A.3

Equipment or Power Failure
All power to plant off for 48 hours, 1 time only

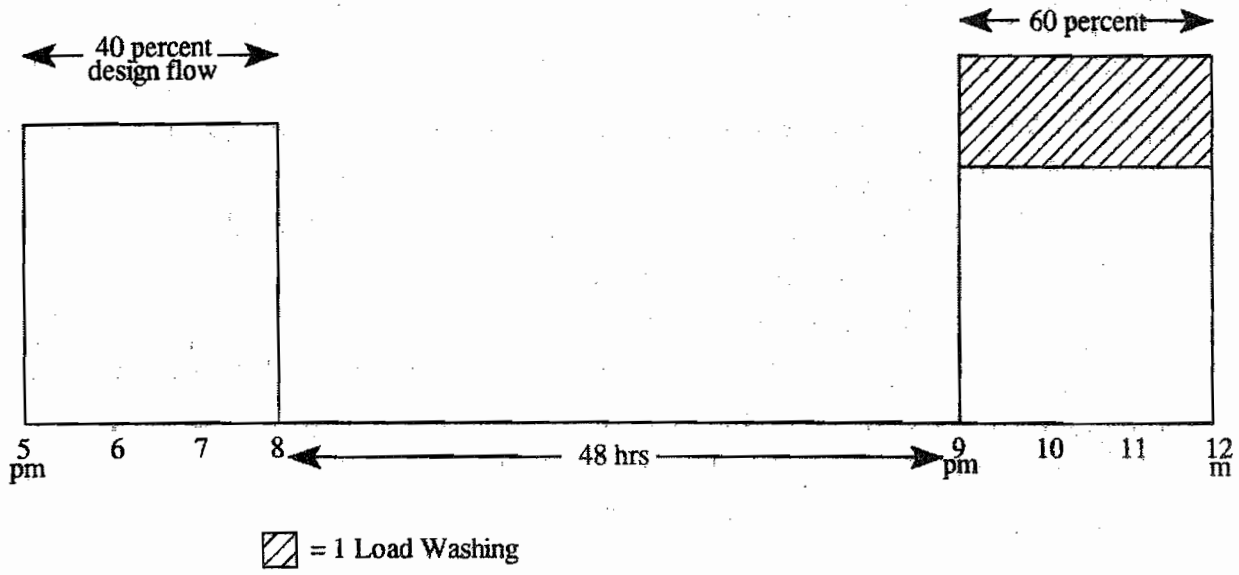
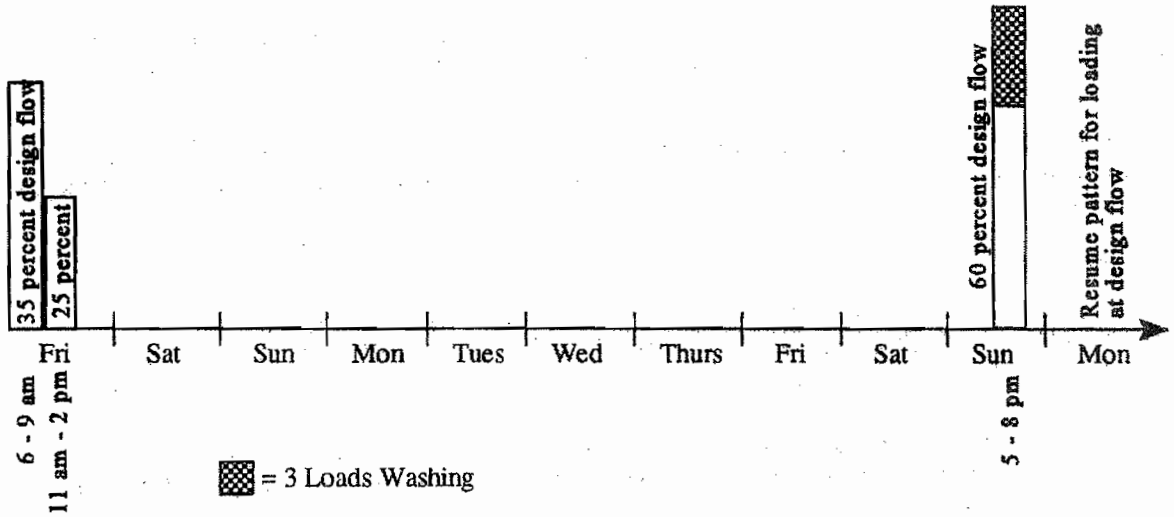


Figure A.4

One Week Vacation
No loading over 9-day period but all power on sudden shock when family returns home



PERFORMANCE REQUIREMENT[5]

5.0 EFFLUENT QUALITY: Plants shall be classified according to the effluent quality results obtained under the loading and operating conditions in Appendix A.

5.1 CLASS I EFFLUENT: Plants providing a Class I effluent shall be shown to meet EPA Secondary Treatment Guidelines[6] for BOD_5, SS, and pH. These are as follows:

5.1.1 BOD_5 and SS

- Arithmetic mean of all effluent samples collected in a period of 30 consecutive[7] days shall be ≤ 30 mg/L and ≥ 85 percent removal.
- Arithmetic mean of all effluent samples collected in a period of 7 consecutive days shall be ≤ 45 mg/L.
- Individual effluent samples shall not exceed a BOD_5 of 60 mg/L and SS of 100 mg/L.

5.1.2 pH - Effluent values shall remain between 6.0 and 9.0.

5.1.3 Effluent shall be tested three times during the six-month evaluation period for color, odor, oily film, and foam. The effluent shall be diluted 1:1000 with distilled water. Plants tested for Class I effluent characteristics shall not exceed:

- Color - 15 units;
- Threshold Odor - nonoffensive;
- Oily Film - nonvisible evidence other than air bubbles;
- Foam - none.

5.2 CLASS II EFFLUENT: Plants providing a Class II effluent shall be shown to meet an effluent quality level for BOD_5 of 60 mg/L and for SS of 100 mg/L. These maximum values shall not be exceeded more than 10 percent of the time.

5.3 STRESS REQUIREMENTS: Measured values for BOD_5 and SS of effluent composite samples collected beginning 24 hours after completion of each stressing condition (48 hours after the power outage stress), as described in Appendix A, shall not exceed the applicable class effluent requirements in Item 5.1 and 5.2.

5.4 NOISE: Mechanical component parts shall be installed or protected so the noise produced does not exceed 60 dbA when measured 6.0 m (20 feet) from the plant or appurtenances.

5.5 MODIFICATION OF TEST METHODS: The manufacturer shall follow the procedures in Appendix C to request a modification of a specific test method. A request for a modification of a test method may be needed due to the following:

- The design of the plant precludes effective testing in accordance with the Standard.
- The manufacturer submits a design change to a previously tested plant that may not require full performance testing.

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[5]The performance limits set forth in section 5 take into account limitations of the respective analytical techniques relative to precision and accuracy. The limits shall be rigidly applied in the evaluation of test data in lieu of statistical interpretation.

[6]Federal Register, Vol 49, September 20, 1987, Title 40 Protection of Environment, Chapter 1 - EPA, Subchapter D - Water Programs, Part 133 Secondary Treatment Information, Item 133.102 Secondary Treatment.

[7]For Standard 40 applications, consecutive days shall be interpreted as consecutive sampling days.

APPENDIX C

ANALYTICAL RESULTS

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: January 9, 1994 *Plant Code:* 1/119

Weeks Into Test: 1

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	4.7	4.0	4.5	3.1	3.3
	effluent	6.2	5.3	6.0	4.5	5.1
Temperature (°C)	influent	13	13	13	13	13
	aeration chamber	10	10	10	10	10
	effluent	10	12	9	9	10
pH	influent	7.6	7.5	7.5	7.4	7.4
	aeration chamber	7.3	7.4	7.2	7.3	7.3
	effluent	7.8	7.8	7.6	7.6	7.6
Biochemical Oxygen Demand (mg/L)	influent	220	200	210	230	220
	effluent	21	19	17	18	18
Suspended Solids (mg/L)	influent	220	190	190	200	220
	aeration chamber	1,400	1,500	1,600	1,600	1,800
	effluent	13	14	14	12	9
Volatile Suspended Solids (mg/L)	influent	190	160	160	180	190
	aeration chamber	1,100	1,100	1,300	1,200	1,400
	effluent	10	11	10	10	6
45 Minute Settleable Solids (mL/L)	aeration chamber	120	150	125	125	140

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

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NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: January 16, 1994 *Plant Code:* 1/119

Weeks Into Test: 2

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	413
Dissolved Oxygen (mg/L)	aeration chamber	3.5	4.1	3.5	3.0	3.2
	effluent	5.5	5.0	4.8	5.0	5.0
Temperature (°C)	influent	12	12	12	12	12
	aeration chamber	10	9	9	9	9
	effluent	9	9	7	8	8
pH	influent	7.5	7.6	7.4	7.6	7.5
	aeration chamber	7.3	7.4	7.2	7.2	7.2
	effluent	(1)	7.7	(1)	8.0	7.7
Biochemical Oxygen Demand (mg/L)	influent	(1)	210	(1)	220	190
	effluent	(1)	15	(1)	11	14
Suspended Solids (mg/L)	influent	(1)	230	(1)	270	220
	aeration chamber	(1)	2,200	(1)	2,300	2400
	effluent	(1)	10	(1)	14	10
Volatile Suspended Solids (mg/L)	influent	(1)	200	(1)	220	190
	aeration chamber	(1)	1,700	(1)	1,800	1900
	effluent	(1)	8	(1)	6	8
45 Minute Settleable Solids (mL/L)	aeration chamber	150	170	220	190	190

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: No final effluent or aeration chamber sample on 1/17 and 1/19 due to sampler problem.
Dosing shortage on 1/21 due to problem with the Chelsea site dosing system.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: January 23, 1994 *Plant Code:* 1/119

Weeks Into Test: 3

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.2	2.0	2.2	2.3	3.2
	effluent	4.1	4.6	4.7	4.7	4.4
Temperature (°C)	influent	12	12	11	12	10
	aeration chamber	9	9	9	9	8
	effluent	8	8	8	6	8
pH	influent	7.7	7.8	7.8	7.8	8.1
	aeration chamber	7.3	7.3	7.2	7.2	7.2
	effluent	7.8	7.9	7.9	7.9	8.0
Biochemical Oxygen Demand (mg/L)	influent	220	210	220	220	230
	effluent	10	9	12	10	8
Suspended Solids (mg/L)	influent	160	180	190	190	220
	aeration chamber	2,300	2,400	2,300	2,300	2,500
	effluent	6	5	6	7	5
Volatile Suspended Solids (mg/L)	influent	130	150	160	160	170
	aeration chamber	1,800	1,900	1,800	1,800	2,000
	effluent	6	<5	5	5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	220	250	250	250	300

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: January 30, 1994 *Plant Code:* 1/119

Weeks Into Test: 4

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.8	2.8	2.5	2.0	2.5
	effluent	5.0	4.5	4.5	4.4	3.5
Temperature (°C)	influent	11	11	11	11	12
	aeration chamber	9	9	9	9	9
	effluent	6	7	8	5	7
pH	influent	7.5	7.6	7.5	7.6	7.5
	aeration chamber	7.3	7.1	7.3	7.1	7.2
	effluent	7.9	8.0	7.9	7.8	7.9
Biochemical Oxygen Demand (mg/L)	influent	160	170	200	170	210
	effluent	7	9	8	7	10
Suspended Solids (mg/L)	influent	140	130	170	140	180
	aeration chamber	3,200	3,000	3,100	2,900	3,100
	effluent	<5	<5	5	5	5
Volatile Suspended Solids (mg/L)	influent	120	120	130	110	150
	aeration chamber	2,500	2,300	2,500	2,200	2,400
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	300	340	425	450	400

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Influent values on 2/2 are from a grab sample - the influent sampler line was plugged.

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NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: February 6, 1994 *Plant Code:* 1/119

Weeks Into Test: 5

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	450
Dissolved Oxygen (mg/L)	aeration chamber	3.1	1.6	1.7	1.7	2.5
	effluent	4.3	4.0	3.3	3.5	3.3
Temperature (°C)	influent	11	11	11	11	11
	aeration chamber	9	8	9	8	8
	effluent	8	9	8	5	6
pH	influent	7.5	7.4	7.5	7.4	7.4
	aeration chamber	7.1	7.2	7.0	7.1	7.2
	effluent	7.8	7.7	7.7	7.7	7.6
Biochemical Oxygen Demand (mg/L)	influent	210	220	200	210	190
	effluent	8	9	8	10	11
Suspended Solids (mg/L)	influent	180	220	170	160	180
	aeration chamber	3,300	3,300	3,500	3,300	3,600
	effluent	5	9	7	8	7
Volatile Suspended Solids (mg/L)	influent	150	170	140	140	160
	aeration chamber	2,700	2,500	2,700	2,500	2,800
	effluent	<5	7	5	6	5
45 Minute Settleable Solids (mL/L)	aeration chamber	550	450	500	525	560

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Dosing shortage on 2/11 due to Chelsea site dosing system being shut down for dosing tub cleaning.

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NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: February 13, 1994 *Plant Code:* 1/119

Weeks Into Test: 6

Weekend Dosing: Sunday - 500 gallons Saturday - 506 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	363
Dissolved Oxygen (mg/L)	aeration chamber	1.6	1.3	1.0	1.0	1.2
	effluent	3.6	2.9	3.0	2.7	3.1
Temperature (°C)	influent	12	12	11	11	11
	aeration chamber	8	8	8	8	8
	effluent	7	8	8	8	8
pH	influent	7.5	7.5	7.4	7.5	7.5
	aeration chamber	7.3	7.1	7.1	7.1	7.0
	effluent	7.6	7.5	7.5	7.6	7.6
Biochemical Oxygen Demand (mg/L)	influent	230	230	220	220	210
	effluent	8	8	9	11	5
Suspended Solids (mg/L)	influent	180	150	220	200	250
	aeration chamber	3,800	4,000	3,500	4,200	5,600
	effluent	6	7	6	7	6
Volatile Suspended Solids (mg/L)	influent	150	130	190	180	200
	aeration chamber	2,900	3,100	2,200	3,100	4,300
	effluent	5	5	5	6	5
45 Minute Settleable Solids (mL/L)	aeration chamber	500	600	700	800	880

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Dosing shortage on 2/18 due to Chelsea site dosing system problem.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: February 20, 1994 *Plant Code:* 1/119

Weeks Into Test 7

Weekend Dosing: *Sunday* - 506 gallons *Saturday* - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	*aeration chamber*	2.5	2.0	1.5	2.0	1.5
	effluent	3.7	3.4	3.5	3.9	3.3
Temperature (°C)	*influent*	11	11	11	11	11
	aeration chamber	7	8	8	8	8
	effluent	7	8	9	8	8
pH	*influent*	7.4	7.5	7.6	7.5	7.5
	aeration chamber	7.1	7.2	7.2	7.1	7.0
	effluent	7.7	(1)	7.7	7.6	7.6
Biochemical Oxygen Demand (mg/L)	*influent*	160	150	190	210	190
	effluent	5	(1)	7	7	6
Suspended Solids (mg/L)	*influent*	160	170	200	230	190
	aeration chamber	4,200	(1)	4,200	4,200	4,900
	effluent	7	(1)	7	6	7
Volatile Suspended Solids (mg/L)	*influent*	120	140	170	200	160
	aeration chamber	3,200	(1)	3,300	3,200	3,700
	effluent	6	(1)	6	<5	6
45 Minute Settleable Solids (mL/L)	*aeration chamber*	725	700	750	750	700

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: No effluent sample on 2/22 due to sampler problem.

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NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: February 27, 1994 *Plant Code:* 1/119

Weeks Into Test: 8

Weekend Dosing: *Sunday* - 500 gallons *Saturday* - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	*aeration chamber*	1.4	1.1	1.0	0.9	1.1
	effluent	3.8	3.2	3.0	3.2	3.2
Temperature (°C)	*influent*	11	11	11	11	11
	aeration chamber	8	8	8	8	8
	effluent	8	8	8	7	8
pH	*influent*	7.5	7.5	7.5	7.4	7.5
	aeration chamber	7.1	7.0	7.0	7.1	7.0
	effluent	7.6	7.6	7.6	7.5	7.6
Biochemical Oxygen Demand (mg/L)	*influent*	230	200	200	200	200
	effluent	8	7	8	6	8
Suspended Solids (mg/L)	*influent*	200	240	230	250	240
	aeration chamber	4,800	4,900	5,200	5,700	5,900
	effluent	7	7	8	8	10
Volatile Suspended Solids (mg/L)	*influent*	170	210	200	220	210
	aeration chamber	3,600	3,700	4,000	4,200	4,300
	effluent	6	6	6	5	6
45 Minute Settleable Solids (mL/L)	*aeration chamber*	750	750	700	800	710

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: March 6, 1994 *Plant Code:* 1/119

Weeks Into Test: 9

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.8	0.4	1.5	0.4	0.6
	effluent	3.5	3.6	3.0	2.8	3.1
Temperature (°C)	influent	10	10	11	10	10
	aeration chamber	9	9	9	9	9
	effluent	8	8	7	8	8
pH	influent	7.4	7.4	7.4	7.5	7.5
	aeration chamber	7.1	7.0	7.1	7.1	7.1
	effluent	7.6	7.6	7.6	7.5	7.6
Biochemical Oxygen Demand (mg/L)	influent	180	170	150	200	160
	effluent	5	5	6	6	5
Suspended Solids (mg/L)	influent	200	200	180	230	200
	aeration chamber	5,100	6,000	5,400	6,100	4,600
	effluent	5	<5	7	7	6
Volatile Suspended Solids (mg/L)	influent	170	170	160	220	180
	aeration chamber	3,800	4,500	4,000	4,500	3,400
	effluent	<5	<5	6	5	5
45 Minute Settleable Solids (mL/L)	aeration chamber	750	800	730	750	750

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: March 13, 1994 *Plant Code:* 1/119

Weeks Into Test: 10

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.9	0.5	0.5	0.6	0.4
	effluent	3.3	2.5	2.5	2.8	2.2
Temperature (°C)	influent	10	10	10	10	10
	aeration chamber	9	9	9	9	9
	effluent	8	8	8	8	8
pH	influent	7.6	7.5	7.5	7.5	7.6
	aeration chamber	7.1	7.0	7.0	7.1	6.9
	effluent	7.6	7.7	7.6	7.6	7.7
Biochemical Oxygen Demand (mg/L)	influent	180	180	140	190	170
	effluent	6	6	7	<5	6
Suspended Solids (mg/L)	influent	230	210	120	190	220
	aeration chamber	5,800	5,400	7,200	7,800	6,300
	effluent	8	5	7	5	6
Volatile Suspended Solids (mg/L)	influent	200	180	110	170	190
	aeration chamber	4,200	4,000	5,400	5,800	4,700
	effluent	7	<5	5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	750	750	850	850	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: March 20, 1994 *Plant Code:* 1/119

Weeks Into Test: 11

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.5	0.6	0.5	0.3	0.5
	effluent	2.6	3.0	2.7	2.5	2.7
Temperature (°C)	influent	10	10	10	10	10
	aeration chamber	9	9	9	9	10
	effluent	8	9	9	9	9
pH	influent	7.4	7.4	7.5	7.4	7.5
	aeration chamber	7.0	6.9	6.9	7.0	7.1
	effluent	7.6	7.6	7.6	7.6	7.6
Biochemical Oxygen Demand (mg/L)	influent	220	120	140	160	180
	effluent	6	5	<5	<5	6
Suspended Solids (mg/L)	influent	270	260	220	190	150
	aeration chamber	5,700	6,300	6,700	7,600	6,800
	effluent	6	6	<5	6	6
Volatile Suspended Solids (mg/L)	influent	210	200	180	160	120
	aeration chamber	4,300	4,600	4,900	5,500	4,900
	effluent	5	6	<5	6	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	780	800	800	800	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: March 27, 1994 *Plant Code:* 1/119

Weeks Into Test: 12

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.4	4.6	4.4	4.7	5.0
	effluent	2.8	2.8	2.8	3.1	2.9
Temperature (°C)	influent	10	11	11	11	11
	aeration chamber	9	9	9	10	10
	effluent	9	10	10	10	10
pH	influent	7.5	7.5	7.4	7.5	7.5
	aeration chamber	7.0	7.0	6.9	6.9	6.9
	effluent	7.6	7.6	7.5	7.6	7.6
Biochemical Oxygen Demand (mg/L)	influent	170	130	190	140	160
	effluent	<5	5	7	5	5
Suspended Solids (mg/L)	influent	180	140	210	180	180
	aeration chamber	6,400	5,700	6,000	6,500	6,300
	effluent	5	6	6	<5	6
Volatile Suspended Solids (mg/L)	influent	160	130	180	150	160
	aeration chamber	4,600	4,200	4,400	4,800	4,500
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	750	780	780	780	750

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 3/29 D.O. Readings taken for plant effluent - 9:40 am. and for the aeration chamber 12:40 pm.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 3, 1994 *Plant Code:* 1/119

Weeks Into Test: 13

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.2	2.8	3.0	3.9	4.2
	effluent	2.3	2.2	2.5	2.3	2.3
Temperature (°C)	influent	11	11	11	11	11
	aeration chamber	10	10	10	10	10
	effluent	10	10	10	10	10
pH	influent	7.4	7.4	7.5	7.5	7.4
	aeration chamber	7.1	6.9	7.1	7.1	7.1
	effluent	7.6	7.5	7.5	7.6	7.5
Biochemical Oxygen Demand (mg/L)	influent	180	190	190	180	190
	effluent	5	<5	5	5	<5
Suspended Solids (mg/L)	influent	240	220	170	180	320
	aeration chamber	6,500	6,800	6,600	6,700	6,600
	effluent	5	5	<5	<5	<5
Volatile Suspended Solids (mg/L)	influent	200	190	150	150	270
	aeration chamber	4,800	4,900	4,900	5,000	4,900
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	750	800	800	800	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 10, 1994 *Plant Code:* 1/119

Weeks Into Test: 14

Weekend Dosing: Sunday - 500 gallons Saturday - 506 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	231 (1)	500	375
Dissolved Oxygen (mg/L)	aeration chamber	4.1	5.0	4.7	0.3	3.1
	effluent	2.0	2.2	2.4	2.4	1.5
Temperature (°C)	influent	11	11	12	12	12
	aeration chamber	10	10	11	10	10
	effluent	11	11	12	11	12
pH	influent	7.4	7.6	7.4	7.6	7.5
	aeration chamber	6.9	6.9	7.2	6.9	7.0
	effluent	7.5	7.6	7.6	7.6	7.6
Biochemical Oxygen Demand (mg/L)	influent	210	170	140	160	180
	effluent	5	<5	<5	100	9
Suspended Solids (mg/L)	influent	210	300	210	180	330
	aeration chamber	7,200	7,100	6,700	5,800	5,900
	effluent	5	5	6	170	10
Volatile Suspended Solids (mg/L)	influent	190	250	170	150	300
	aeration chamber	5,300	5,300	5,000	4,300	4,400
	effluent	<5	<5	<5	130	8
45 Minute Settleable Solids (mL/L)	aeration chamber	800	880	880	800	850

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 4/13 Upper valve stuck open causing straight dosing to plant. Dosed volume reported based on dose count to the plant. Actual dosing unknown.
4/15 Chelsea site influent pump malfunction caused low dosing.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 17, 1994 Plant Code: 1/119

Weeks Into Test: 15

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	3.4	3.9	2.1	3.2	2.0
	effluent	1.6	1.9	1.9	1.6	1.4
Temperature (°C)	influent	12	12	13	12	13
	aeration chamber	12	12	12	12	12
	effluent	12	12	12	12	12
pH	influent	7.5	7.4	7.6	7.5	7.6
	aeration chamber	6.9	7.0	6.9	6.9	7.0
	effluent	7.6	7.5	7.6	7.5	7.5
Biochemical Oxygen Demand (mg/L)	influent	210	170	170	180	160
	effluent	6	7	7	7	6
Suspended Solids (mg/L)	influent	250	170	200	180	210
	aeration chamber	6,600	6,400	7,100	8,200	6,600
	effluent	<5	<5	5	5	<5
Volatile Suspended Solids (mg/L)	influent	220	150	170	160	180
	aeration chamber	5,000	4,900	5,300	6,400	4,900
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	850	850	850	880	880

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/1-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 24, 1994 Plant Code: 1/119

Weeks Into Test: 16

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	3.3	3.9	1.4	1.7	1.9
	effluent	1.0	1.5	1.3	1.5	1.7
Temperature (°C)	influent	13	13	13	13	13
	aeration chamber	13	14	14	14	14
	effluent	13	14	14	13	13
pH	influent	7.5	7.5	7.6	7.5	7.5
	aeration chamber	7.1	7.0	7.1	7.0	7.0
	effluent	7.6	7.7	7.6	7.7	7.7
Biochemical Oxygen Demand (mg/L)	influent	210	170	190	160	190
	effluent	6	6	6	6	5
Suspended Solids (mg/L)	influent	200	240	230	190	150
	aeration chamber	6,900	6,900	7,600	7,500	7,700
	effluent	<5	7	<5	<5	5
Volatile Suspended Solids (mg/L)	influent	170	210	170	140	130
	aeration chamber	5,200	5,100	5,600	5,500	5,600
	effluent	<5	6	<5	<5	5
45 Minute Settleable Solids (mL/L)	aeration chamber	880	880	850	850	880

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: May 1, 1994 *Plant Code:* 1/119

Weeks Into Test: 17

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		450	450	450	450	450	275	500
Dissolved Oxygen (mg/L)	*aeration chamber*		2.9					
	effluent		1.3					
Temperature (°C)	*influent*		13					
	aeration chamber		14					
	effluent		13					
pH	*influent*		7.6					
	aeration chamber		7.4					
	effluent		7.6	7.3		7.7		
Biochemical Oxygen Demand (mg/L)	*influent*		160	130		170		
	effluent		5	<5		7		
Suspended Solids (mg/L)	*influent*		180	150		130		
	aeration chamber		7,300					
	effluent		10	<5		5		
Volatile Suspended Solids (mg/L)	*influent*		150	120		110		
	aeration chamber		5,400					
	effluent		8	<5		<5		
45 Minute Settleable Solids (mL/L)	*aeration chamber*		650					

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 5/2 Start of washday sucs.
Low dosing on 5/6 due to problem with the Chelsea site dosing system.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: May 8, 1994 *Plant Code:* 1/119

Weeks Into Test: 18

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		500	500	500	500	500	525	463
Dissolved Oxygen (mg/L)	*aeration chamber*	0.4	1.7	1.9	(4)	3.0	2.2	0.5
	effluent	1.8	1.4	1.1	1.2	1.5	1.2	1.3
Temperature (°C)	*influent*	13	14	14	14	14	14	14
	aeration chamber	14	14	14	(4)	14	14	14
	effluent	14	14	14	14	14	14	14
pH	*influent*	7.4	7.5	7.6	7.6	7.5	7.5	7.5
	aeration chamber	7.1	7.2	7.2	7.1	7.1	7.2	7.2
	effluent	7.4	7.6	7.7	7.7	7.6	7.7	7.6
Biochemical Oxygen Demand (mg/L)	*influent*	170	210	150	190	180	170	150
	effluent	5	8	7	10	8	9	17
Suspended Solids (mg/L)	*influent*	210	210	210	290	210	270	160
	aeration chamber	8,000	7,300	7,900	8,200	8,200	6,900	6,800
	effluent	6	6	<5	17	9	64	150
Volatile Suspended Solids (mg/L)	*influent*	180	190	190	260	180	240	140
	aeration chamber	5,800	5,200	5,200	5,900	5,900	5,000	4,700
	effluent	<5	5	<5	13	7	47	110
45 Minute Settleable Solids (mL/L)	*aeration chamber*	900	850	900	850	850	880	880

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 5/11 Aeration chamber D.O. and Temperature readings missed.
Overdosing on 5/13 due to problem with the Chelsea site dosing system.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: May 15, 1994 *Plant Code:* 1/119

Weeks Into Test: 19

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		463	463	463	438	500	500	500
Dissolved Oxygen (mg/L)	*aeration chamber*						0.8	0.4
	effluent						1.1	1.1
Temperature (°C)	*influent*						15	14
	aeration chamber						15	15
	effluent						15	15
pH	*influent*						7.5	7.5
	aeration chamber						7.1	7.2
	effluent		7.9		7.8		7.6	7.9
Biochemical Oxygen Demand (mg/L)	*influent*		180		160		150	150
	effluent		18		74		13	<5
Suspended Solids (mg/L)	*influent*		240		110		190	170
	aeration chamber						6,700	6,000
	effluent		110		450		<5	6
Volatile Suspended Solids (mg/L)	*influent*		200		82		160	150
	aeration chamber						4,900	4,400
	effluent		79		330		<5	<5
45 Minute Settleable Solids (mL/L)	*aeration chamber*						800	850

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 5/15-5/18 Working Parent stress.
Dosing shortage on 5/18 due to problem with the Chelsea site dosing system.

TGIS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: May 22, 1994 *Plant Code:* 1/119

Weeks Into Test: 20

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		500	500	500	500	325	0	444
Dissolved Oxygen (mg/L)	*aeration chamber*	0.1	1.0	1.2	0.3	0.9		
	effluent	1.4	0.8	1.0	0.8	1.0		
Temperature (°C)	*influent*	14	15	15	15	15		
	aeration chamber	15	16	16	16	16		
	effluent	15	16	18	17	16		
pH	*influent*	7.5	7.5	7.4	7.5	7.6		
	aeration chamber	7.2	7.2	7.1	7.3	7.2		
	effluent	7.6	7.8	7.8	7.8	7.8		
Biochemical Oxygen Demand (mg/L)	*influent*	140	160	160	180	220		
	effluent	6	6	5	6	7		
Suspended Solids (mg/L)	*influent*	130	180	220	230	230		
	aeration chamber	6,800	6,000	7,100	6,000	6,700		
	effluent	6	5	5	<5	<5		
Volatile Suspended Solids (mg/L)	*influent*	110	160	180	200	200		
	aeration chamber	4,800	4,300	5,100	4,300	4,800		
	effluent	5	<5	<5	<5	<5		
45 Minute Settleable Solids (mL/L)	*aeration chamber*	880	800	800	800	850		

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: 5/26 plant starting power failure stress.

TGIS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: May 29, 1994 *Plant Code:* 1/119

Weeks Into Test: 21

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	*aeration chamber*		(4)	1.8	1.5	1.2	1.3	0.1
	effluent		1.0	0.9	1.0	0.8	0.6	1.1
Temperature (°C)	*influent*		14	16	16	16	16	16
	aeration chamber		(4)	17	17	17	17	17
	effluent		16	17	17	17	17	17
pH	*influent*		7.5	7.5	7.5	7.5	7.4	7.5
	aeration chamber		7.3	7.1	7.1	7.2	7.2	7.2
	effluent		7.9	7.7	7.6	7.8	7.6	7.6
Biochemical Oxygen Demand (mg/L)	*influent*		110	200	200	200	150	200
	effluent		5	<5	6	5	<5	<5
Suspended Solids (mg/L)	*influent*		140	(4)	410	300	280	210
	aeration chamber		5,700	6,800	7,500	7,100	7,100	7,600
	effluent		8	<5	<5	<5	<5	<5
Volatile Suspended Solids (mg/L)	*influent*		110	(4)	360	260	250	190
	aeration chamber		4,200	4,900	5,500	5,100	5,200	5,600
	effluent		7	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	*aeration chamber*		800	850	800	800	840	880

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: No SS influent sample on 5/31 due to laboratory error.
No aeration chamber D.O. or temperature readings on 5/30 due to laboratory error.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: June 5, 1994 *Plant Code:* 1/119

Weeks Into Test: 22

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		125	0	0	0	0	0	0
Dissolved Oxygen (mg/L)	*aeration chamber*	0.2						
	effluent	0.9						
Temperature (°C)	*influent*	16						
	aeration chamber	17						
	effluent	17						
pH	*influent*	7.5						
	aeration chamber	7.1						
	effluent	7.7						
Biochemical Oxygen Demand (mg/L)	*influent*	190						
	effluent	5						
Suspended Solids (mg/L)	*influent*	230						
	aeration chamber	6,500						
	effluent	<5						
Volatile Suspended Solids (mg/L)	*influent*	200						
	aeration chamber	4,800						
	effluent	<5						
45 Minute Settleable Solids (mL/L)	*aeration chamber*	880						

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Vacation stress started on 6/5.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: June 12, 1994 *Plant Code:* 1/119

Weeks Into Test: 23

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		0	0	375	500	500	500	500
Dissolved Oxygen (mg/L)	*aeration chamber*					1.5	2.4	0.2
	effluent					1.1	0.7	1.0
Temperature (°C)	*influent*					17	17	17
	aeration chamber					19	20	19
	effluent					20	20	20
pH	*influent*					7.8	7.5	7.5
	aeration chamber					7.4	7.4	7.5
	effluent					7.9	7.9	7.8
Biochemical Oxygen Demand (mg/L)	*influent*					180	210	160
	effluent					<5	<5	<5
Suspended Solids (mg/L)	*influent*					150	300	230
	aeration chamber					6300	6200	6200
	effluent					7	6	<5
Volatile Suspended Solids (mg/L)	*influent*					130	260	200
	aeration chamber					4400	4400	4300
	effluent					<5	<5	<5
45 Minute Settleable Solids (mL/L)	*aeration chamber*					800	800	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Vacation stress ended on 6/14.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: June 19, 1994 *Plant Code:* 1/119

Weeks Into Test: 24

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		500	500	500	506	500	488	500
Dissolved Oxygen (mg/L)	*aeration chamber*	0.1	0.2	0.2	0.3	0.4	0.7	
	effluent	1.1	0.5	1.2	0.6	0.8	0.8	
Temperature (°C)	*influent*	17	17	18	18	18	18	
	aeration chamber	19	19	20	20	20	20	
	effluent	20	20	21	20	20	20	
pH	*influent*	7.5	7.5	7.6	7.5	7.5	7.5	
	aeration chamber	7.4	7.5	7.5	7.5	7.4	7.4	
	effluent	7.7	7.7	7.8	7.9	7.8	7.8	
Biochemical Oxygen Demand (mg/L)	*influent*	210	230	210	200	140	210	
	effluent	<5	<5	<5	5	<5	6	
Suspended Solids (mg/L)	*influent*	190	200	270	210	160	280	
	aeration chamber	6300	7000	6800	6100	7500	6500	
	effluent	<5	6	5	<5	6	<5	
Volatile Suspended Solids (mg/L)	*influent*	170	170	230	200	130	230	
	aeration chamber	4700	5000	4800	4500	5300	4700	
	effluent	<5	6	<5	<5	5	<5	
45 Minute Settleable Solids (mL/L)	*aeration chamber*	850	800	800	800	800	800	

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: June 26, 1994 *Plant Code:* 1/119

Weeks Into Test: 25

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.6	(4)	0.8	0.4	0.5
	effluent	0.9	0.9	0.8	0.8	0.9
Temperature (°C)	influent	18	18	18	18	18
	aeration chamber	19	(4)	19	20	19
	effluent	19	19	19	19	19
pH	influent	7.6	7.4	7.6	7.5	7.5
	aeration chamber	7.4	7.4	7.4	7.4	7.4
	effluent	7.7	7.8	7.9	7.8	7.8
Biochemical Oxygen Demand (mg/L)	influent	140	160	150	130	130
	effluent	<5	5	5	5	<5
Suspended Solids (mg/L)	influent	180	210	110	250	230
	aeration chamber	6,700	7,300	5,900	7,000	7,200
	effluent	<5	<5	<5	<5	<5
Volatile Suspended Solids (mg/L)	influent	160	180	74	220	200
	aeration chamber	4,700	5,100	4,200	4,900	5,000
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	800	800	800	830	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: No aeration chamber D.O. or temperature on 6/28 due to laboratory error.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 3, 1994 *Plant Code:* 1/119

Weeks Into Test: 26

Weekend Dosing: Sunday - 500 gallons Saturday - 6 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	444	481	506	388
Dissolved Oxygen (mg/L)	aeration chamber	0.5	3.5	0.8	0.7	0.5
	effluent	0.9	0.5	0.9	0.7	0.9
Temperature (°C)	influent	18	20	19	19	19
	aeration chamber	19	20	20	20	21
	effluent	19	20	20	20	21
pH	influent	7.4	7.5	7.4	7.4	7.5
	aeration chamber	7.4	7.4	7.4	7.5	7.5
	effluent	7.7	7.7	7.7	7.7	7.7
Biochemical Oxygen Demand (mg/L)	influent	140	180	160	120	120
	effluent	5	5	6	6	5
Suspended Solids (mg/L)	influent	180	350	170	160	160
	aeration chamber	7,000	6,800	7,100	7,400	7,400
	effluent	<5	<5	<5	6	<5
Volatile Suspended Solids (mg/L)	influent	150	280	150	130	150
	aeration chamber	5,000	4,900	5,100	5,300	5,100
	effluent	<5	<5	<5	<5	<5
45 Minute Settleable Solids (mL/L)	aeration chamber	800	800	800	800	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Problem with influent pump caused dosing shortages on 7/5 and 7/6. Low doses on 7/8 resulted from problem with test site dosing system. Dosing shortage on 7/9 caused by jammed float in test site dosing tub.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 10, 1994 *Plant Code:* 1/119

Weeks into Test: 27

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.5	0.6	0.6	0.4	0.6
	effluent	0.4	0.9	0.6	0.7	0.9
Temperature (°C)	influent	19	19	19	19	19
	aeration chamber	21	21	21	21	20
	effluent	20	21	21	21	21
pH	influent	7.6	7.5	7.5	7.5	7.6
	aeration chamber	7.4	7.4	7.4	7.4	7.4
	effluent	7.8	7.9	7.8	7.7	7.7
Biochemical Oxygen Demand (mg/L)	influent	180	150	160	210	130
	effluent	9	7	6	11	6
Suspended Solids (mg/L)	influent	200	250	220	220	230
	aeration chamber	7,700	7,400	7,900	7,700	7,400
	effluent	7	8	12	43	26
Volatile Suspended Solids (mg/L)	influent	180	210	200	190	200
	aeration chamber	5,400	5,300	5,500	5,400	5,200
	effluent	6	5	10	32	19
45 Minute Settleable Solids (mL/L)	aeration chamber	800	800	800	800	810

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 17, 1994 *Plant Code:* 1/119

Weeks into Test: 28

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	475	500
Dissolved Oxygen (mg/L)	aeration chamber	1.2	1.0	1.1	1.0	0.8
	effluent	1.1	1.0	0.8	1.0	0.8
Temperature (°C)	influent	19	19	19	19	19
	aeration chamber	20	20	21	21	22
	effluent	21	21	21	21	21
pH	influent	7.5	7.5	7.5	7.5	7.6
	aeration chamber	7.4	7.4	7.4	7.6	7.6
	effluent	7.7	7.7	7.7	8.0	8.0
Biochemical Oxygen Demand (mg/L)	influent	180	170	170	190	150
	effluent	18	<6	12	9	13
Suspended Solids (mg/L)	influent	260	300	250	210	230
	aeration chamber	7,600	8,100	8,000	7,500	7,100
	effluent	250	67	130	73	190
Volatile Suspended Solids (mg/L)	influent	230	260	210	180	190
	aeration chamber	5,200	5,700	5,500	5,300	5,000
	effluent	170	48	88	58	130
45 Minute Settleable Solids (mL/L)	aeration chamber	800	800	800	800	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes: Dosing shortage on 7/21 due to comminuter problem.

TGS/3-92

NSF *International*
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 24, 1994 *Plant Code:* 1/119

Weeks Into Test. 29

Weekend Dosing: *Sunday -* 500 gallons *Saturday -* 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.5	0.7	0.3	0.9	0.5
	effluent	0.5	0.8	0.5	0.5	0.8
Temperature (°C)	influent	19	20	19	20	20
	aeration chamber	21	21	21	21	21
	effluent	21	21	21	21	21
pH	influent	7.6	7.5	7.5	7.6	7.5
	aeration chamber	7.4	7.5	7.4	7.4	7.5
	effluent	7.9	7.8	7.9	8.0	7.8
Biochemical Oxygen Demand (mg/L)	influent	170	160	140	170	150
	effluent	8	14	9	11	13
Suspended Solids (mg/L)	influent	230	270	220	270	210
	aeration chamber	7,200	8,400	7,500	8,000	8,800
	effluent	71	160	64	82	210
Volatile Suspended Solids (mg/L)	influent	200	230	190	240	180
	aeration chamber	5,000	5,900	5,300	5,600	6,300
	effluent	52	120	57	58	160
45 Minute Settleable Solids (mL/L)	aeration chamber	800	800	800	820	800

(1) Site problem
(2) Malfunction of system under test
(3) Weather problem
(4) Other

Notes:

TGS/3-92

APPENDIX B

DIRECT POTABLE REUSE STANDARD
GREEN STANDARD OF PERFORMANCE

5.0 – EFFLUENT LIMITATION GUIDELINES; CATEGORICAL PRETREATMENT STANDARDS; PROHIBITIONS

5.1 INTRODUCTION

The Green Standards of Performance define a waste management method, consistent with the policy of the United States Congress, designed to achieve optimum water quality management, consistent with the public health and water quality goals and requirements of the Clean Water Act pursuant to 33USC26§1296.
These standards are developed to protect the public health and welfare of the people and enhance the quality of all State's waters and serve the purposes of the Clean Water Act pursuant to 33USC26§1313(c)(2)(A).
All State agencies shall adopt these Green Standards pursuant to 33USC26§1313(c)(2)(B), promulgate and require compliance with the federally mandated pretreatment requirements as defined in US Code Title 33 Chapter 26 §§ 1311, 1312, 1313, 1314, 1316, 1317 and 1342(b)(8)), otherwise NSRs.

All persons of the United States of America and owners and operators of any source, such source being subject to pretreatment standards and effluent limitation requirements, shall be subject to, at a minimum, these standards of performance herein defined pursuant to the goals and objectives pursuant to US Code Title 33 Chapter 26 - Water Pollution Prevention and Control as follows:

5.2 LIMITATIONS, STANDARDS AND PROHIBITIONS

The Governor of all States under authority as defined in US Code Title 33 Chapter 26 shall promulgate these minimum standards for implementation of these federally mandated innovative and alternative (other than publicly owned treatment works / private) waste management systems and pretreatment requirements in the interest of public health and welfare. These Green Standards require application of the best practicable control technology currently available (other than publicly owned treatment works) as is required to be provided at each source point source in compliance with "pretreatment requirements" as defined in US Code Title 33 Chapter 26. The Green Standards shall require application of a Sustainable Alternative Water Source Technology ("SAWS") to achieve the National Goal; eliminating all discharges of all pollutants at each source or group of sources, contain all pollutants at such source(s) to prevent them from migrating to cause water and other environmental pollution, providing for the recycle and reuse of 100% of all source wastewater as a sustainable alternative water source to serve all beneficial reuse applications at such source(s) so as to 1) eliminate all discharges of all pollutants, 2) eliminate sewage flows and associated sewer user fees, and 3) thereby substantially reducing the demand on public drinking water supplies achieving the objectives of the Chapter.

Application of federally mandated pretreatment requirements shall be complied with through implementation of a SAWS Technology that shall be specified by a "brand name or equal" based upon the Green Standards' Official Comparator defining the minimum requirements. The SAWS Technology which qualifies per criteria of the Green Standards' Official Comparator herein provided shall be considered as the Best Available Demonstrated Control Technology ("BADCT") currently available which achieves the National Goal, to eliminate all discharges of all pollutants at their source. A SAWS Technology shall be required, based upon such demonstrated performance and shall be supported by an executed Manufacture's Performance Guarantee and shall be specified by "brand name or equal" in association with every permit issued by any of the State's permitting agencies in association with any and all sources in compliance with these federally mandated pretreatment minimum requirements.

1.0 The Green Standards shall be achieved utilizing the best biological, physical and chemical treatment processes and/or techniques and provide for the following reduction levels of constituents / pollutants per process and/or treatment technique application at the source while containing such constituents / pollutants at same source thereby preventing them from migrating to cause water or other environmental pollution and thereby achieving the

National Goal as defined in 33 USC 26, to eliminate all discharges of all pollutants at their source or group of sources.

The Green Standards Process Guarantee shall be required, provided by the BADCT provider, recorded and shall apply to each application.

NOTE: As of January 1, 2009 the "Brand Name" of the BADCT which has established the National Standard of Performance shall be "AES TECHNOLOGY". It and all equals shall, at a minimum, provide a performance guarantee to achieve the following levels defined herein below:

BIOLOGICAL

The biological process shall be of the latest (newest) biological process technology available and which has been evaluated over a minimum of a six month period by an accredited and nationally recognized third party testing laboratory such as NSF International demonstrating such technology's performance. The biological process shall provide for industry-wide application, scalable from 250 gpd to 2.5 mgd plus. After the pretreatment facilities (other than publicly owned treatment works) have been placed into continuous service, and have achieved equilibrium operating conditions, the innovative and advanced alternative biological process technology shall biologically achieve the levels herein defined and shall provide the following levels of reduction for the source of the toxic pollutant ("nitrosamine") listed on the US EPA List of Toxic Pollutant associated with domestic wastewater flows that require application of pretreatment requirements. The biological process shall eliminate acidic discharges (pH of less than 7.4) through inherent biological alkalinity recovery to a base range of 7.5 – 8.0.

The minimum demonstrated performance limits shall be the established specific numerical criteria for toxic pollutants as follows:

- The **maximum levels** have been (third party) demonstrated to be less than the following:

Total Nitrogen (TN)	**<8 mg/l**
Ammonia (NH4 - N)	**<2 mg/l**
Nitrates (NO3 - N)	**<4 mg/l**
Maximum pH level	**8**

- The **average levels** have been demonstrated not to exceed the following:

Total Nitrogen (TN)	**<5 mg/l**
Ammonia (NH4 - N)	**<2 mg/l**
Nitrates (NO3 - N)	**<2 mg/l**
Nitrites (NO2 - N)	**<1 mg/l**
Average pH level	**7.7**

PHYSICAL ("Beyond Tertiary" Effluent Limitations Achieved)

The physical component shall provide a "definite barrier" to disease carrying pathogens (<2.2 MPN/100ml, California Title 22) utilizing physical ultra-filtration (UF) type membrane filtration technology of the spiral wound type back-flushable membrane filtration technology, having 100% integrity, and shall provide a consistent level of reduction of inorganic contaminants to achieve a standard consistently less than the United States Environmental Protection Agency's Maximum Contaminant Level (MCL) Primary Drinking Water Standards as follows:

Note: All State's "Primary Drinking Water" evaluation standard shall be less than Maximum Contaminant Level, ("MCL"), the highest acceptable concentration of analyte. Levels of contaminants less than the MCL (which comply with the MCLGs) are considered to be non-pollutant. (Source: State of California "Primary Drinking Water" Evaluation Standard)

DISEASE CARRYING PATHOGENS - BACTERIA

BACTERIA	MCL	UNITS
Coliform, Fecal (15 Tube MPN)	**< 2**	**MPN/100ml**

PRIMARY STANDARDS – INORGANIC CHEMICALS

ANALYTE	MCL	UNITS
Aluminum	**1**	**mg/L**
Antimony	**0.0006**	**mg/L**
Arsenic	**0.01**	**mg/L**
Barium	**1**	**mg/L**
Beryllium	**0.004**	**mg/L**
Cadmium	**0.005**	**mg/L**
Chromium	**0.05**	**mg/l**
Cyanide	**0.15**	**mg/L**
Asbestos	**7**	**MFL**
Lead	**0.015**	**mg/L**
Fluoride	**2**	**mg/L**
Mercury	**0.002**	**mg/L**
Nickel	**0.1**	**mg/L**
Selenium	**0.05**	**mg/L**
Thallium	**0.002**	**mg/L**

NOTE: The "definite barrier" control component is a best available demonstrated control technology and as such, shall be specified by "brand name or equal" based upon such criteria and demonstrated "definite barrier" performance.

CHEMICAL

The chemical disinfection process (chlorine, ultra violet or ozone) shall consistently achieve the following levels of reduction for total coliform bacteria. Even though it is not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present and shall be controlled to the following level:

BACTERIA	MCL	UNITS
Coliform, Total (15 Tube MPN)	**ZERO**	**MPN/100ml**

The herein defined Green Standards of Performance continuously achieves the Federal Primary Drinking Water Quality Standards and as such achieves the National Goal as defined within 33 USC 26 thereby providing for the maximum degree of effluent reduction and achieving a standard that permits no discharge of pollutants from the source either into a publicly owned treatment works (lateral) or an underground excavation (dispersal/disposal field). (33 USC 26, Sec. 1316)

NOTE: The contaminant levels less than the MCL are in compliance with the National Primary Drinking Water Regulations (NPDWRs), the Maximum Contaminant Level Goal (MCLG) Standard for drinking water quality. The MCLGs define the level of a contaminant in water below which there is no known or expected risk to health (non-pollutant). MCLGs allow for a margin of safety and are non-enforceable public health goals.

2.0 The biological process (conventional pollutants) shall have been demonstrated to provide / achieve the following:

- Requires only a single basin secondary/tertiary process (environmental footprint)
- Tertiary (average less than 10/10/10 BOD/TSS/TN demonstrated over a six month period)
- Inherent hydraulic flow equalization (controlled decants disallowing washouts)

- Shall be a non-plug flow (not susceptible to washout conditions)
- Anti-washout capabilities (40Xs ADDF (average daily design flow)
- Inherent alkalinity recovery to "non acidic" pH levels (7.5 - 8.0)

3.0 Biological process (non-conventional pollutants) shall have been demonstrated to provide for inherent denitrification to consistently reduce toxic nitrosamine source pollutants to the following non-pollutant, i.e. Zero Discharge, levels:

- Total Nitrogen (TN) discharges to less than 8 mg/l
- Nitrate (NO^3-N) discharges to less than 5 mg/l
- Nitrite (NO^2-N) discharges to less than 1 mg/l
- pH (base) discharges to a level greater than 7.4

4.0 Beyond Tertiary Benefits: (Objectives of the U.S.C. Title 33 Chapter 26 shall be achieved)

A "definite barrier" is provided to prevent any possibility of pollutants being discharged either into an underground excavation (leach field) or into a publicly owned treatment works (sewer lateral) and:

- provides the "maximum degree" of effluent reduction by totally eliminating all point source "effluent" discharges at the source
- eliminates sewer flows and associated sewer user fees
- provides for ability for future recycle of water at source
- provides a sustainable alternative water source at each private point source at the same or better quality than the current public drinking water supply quality to serve the original water consumer's beneficial reuse applications
- thereby substantially reducing the demand on our public drinking water supplies
- any water not recycled will remediate and replenish drinking water aquifers with pure water

Eliminates need for publicly owned treatment works and:

- associated discharge into such publicly owned treatment works from private point sources
- eliminates associated energy carbon footprint associated with publicly owned treatment works / collection laterals
- provides for the lowest possible environmental impact requiring no publicly right-of-way encroachment
- contains all pollutants at the source
- therefore preventing pollutants from migrating to cause water and other environmental pollution
- eliminates associated costs for publicly owned treatment works
- qualifies for federal grant assistance as a sustainable alternative water source

Control of PPCPs ("Pharmaceuticals and Personal Care Products") reflecting the greatest degree of control at the source.

Must compare at least as "better" or "equal" on each and every performance criteria provided per 33 USC 26 Sec. 1314 as defined in the **"Official Comparator"** herein provided:

5.3 - OFFICIAL COMPARATOR

~ OFFICIAL COMPARATOR ~

DEMONSTRATED "GREEN STANDARDS" OF PERFORMANCE

Determined Achievable by the National Standards Enforcement Agency ("Administrator")
U.S.C. Title 33 Chapter 26 §§ 1311 (b)(1), 1316 (a) and 1317 (b)

Each compared BADCT technology MUST qualify as "Equal" or "Better". Any "Fail" disqualifies.

FACTORS: (33USC26§1314(b))	**AES TECHNOLOGY***	(Equal/Better/Fail)
Conventional Pollutant Reduction: (less than 10/10 BOD/TSS)	Tertiary	_____
Toxic Pollutant Reduction: Maximum levels:		
Total Nitrogen (TN)	<8 mg/l	_____
Ammonia (NH4 - N)	<2 mg/l	_____
Nitrates (NO3 - N)	<4 mg/l	_____
Fecal Coliform	<2 MPN	_____
Demonstrated average levels of performance:		
Total Nitrogen (TN)	<5 mg/l	_____
Ammonia (NH4 - N)	<2 mg/l	_____
Nitrates (NO3 - N)	<2 mg/l	_____
Nitrites (NO2 - N)	<1 mg/l	_____
Dissolved Oxygen (DO)	>2 mg/l	_____
pH (base)	7.5 – 8.0	_____
Fecal Coliform	<2 MPN	_____
Cost (per Dwelling Unit Equivalent (DUE))	< $25,000	_____
Public Right-of-Way Encroachment	ZERO	_____
Facilities Environmental Impact**	ZERO	_____
Facilities Maximum Environmental Footprint (sq. ft. / Dwelling Unit Equivalent, i.e. source)	100	_____
Engineering Aspects Required	ZERO	_____
Energy Consumption (KWH/lb BOD removed)	< 1	_____

*** The best available demonstrated control technology currently available and shall be specified by "brand name or equal".**
**** Mitigates toxic methane gas (Greenhouse gas) emissions.**