Central Docket Section (A-130) Attn:
Docket No. G-81-3 Environmental
Protection Agency Washington, D.C.
20460

November 30, 1983.

RE: Comments on the proposed rules 40 CFR Part 133 (WH-FRL-2410-5)
Secondary Treatment Information.

By: Peter Maier, P.E.
2767 Commonwealth Ave.
Salt Lake City, UT 84109
Tel: (801) 486-1405

The intention of Environmental Policies is the protection of the Environment and Regulations should be the tools to achieve such protection. Therefore it is of the utmost importance that the Regulations are technically sound and that purpose and goal are clearly identified. Buzzwords only should be used in regulations, if they have a distinct technical meaning. The only technical meaning of the word secondary treatment is the fact that it apparently follows primary treatment.

The lack of a proper definition of the word secondary treatment in the regulations, is a prime example of the problems it has created in our present clean water program.
The origin of the problems, of course, is the now adnitted incorrect application and interpretation of the BOD5 test.

BOD means Biochemical Oxygen Demand and indicates the use of oxygen by aerobic organisms as a result of a food' supply.
The value, therefore, not only depends on the food supply itself, but also on the actual presence of organisms.
All elements in nature fit into a certain recycle pattern, but the carbon and nitrogen cycles are most significant when it concerns the co~relation of oxygen use and municipal sewage.
When BOD values are allocated towards the use of oxygen by heterotrophs in the carbon cycle and autotrophs in the nitrogen cycle, then these BOD values become a summation of two biochemical oxygen demands, namely the Carbonaceous BOD and the Nitrogenous BOD.
Technical literature assumes, that when the BOD test is applied on municipal sewage without seeding, the Nitrogenous BOD only will become significant after 6 to 10 days and that the 5-day BOD value therefore can be considered equal to the 5-day Carbonaceous BOD value.
Literature also provides the correlation factors to convert this standard 5-day value into any other (time and temperature) Carbonaceous BOD value. The 5-day C-BOD value only has academical value and only was meant to serve as a timesaver.

Average municipal sewage is considered to contain 200 mg BOD5/1 as a result of carbon sources and 40 mg TKN/1 in nitragen sources. The ultimate C-BOD is 1.5 x 200 = 300 mg/1 (at 200C) and the N-BOD is 4.6 x 40 = 184 mg/1, thus making the total BODe qual to 484 mg/1. Correlating the N-BOD (or new buzzword NOD) with Ammonia only, ms iB ,pr indicated in the new regulations, is incorrect and again will ignore about 40% of the N-BOD.

If water pollution regulations intend to protect the dissolved oxygen levels in open waters, then it is obvious that this oxygen level shouid be protected against the exerted oxygen demand of the total BOD of 484 mg/1 and not as is presently the case against the 5 day C-BOD value of 200 mg/1.
In fact it means, that the present program ignores 60% of the pollution it tries to prevent. It also means that the actual waste of a human body (urine) does not have to be treated.

The incorrect application and interpretation of the BOD5 test has led to even more catastrophic results in the evaluation of treatment plant pegformance with the data required for the discharge permit, namely BOD5 and SSe
Plant performance evaluation with only these data, is not only technically incorrect, it will lead to misleading conclusions. Plants which perform too good are penalized and considered out of compliance with their discharge permits. Undoubtfully some of these plants have been replaced by new plants, which in fact only will treat the sewage half as good.

Summarizing the technical problems in the present Clean Water Program:
1. 60% of the oxygen demand pollution is ignored.
2. The program is technically incorrect.
3. The program can not be legally enforced.
4. ~he program stands in the way of professionals who try to correct it.

With other (kind) words, the present regulations do not provide the proper tools to implement our national environmental policies.

I realize, that the regulations were never intended to substitu~e textbook science and that they therefore can not be blaimed for the engineering problems in the field. But by not adhering to basic principles and science, they have become a shelter for engineering malpractice and they have made any form of accountability in the program nearly impossible.

The new proposed regulations do not correct the technical problems, they only identify them and then only for those individuals, who understan the technical issues.
The involved laymen in the program (administrators, politicians and taxpayers) might not understand the issues and might not realize the tech~: nical consequences of these rule changes.

Expressions like 80 to 90 percent treatment efficiency will stand out most, while the distinction between Carbonaceous and Nitrogenous BOD will probably not be made. Therefore laYmen might not realize, that the proposed regulations do not require 80 to 90 percent treatment, but only 40 to 50 percent.
They probably also would become infuriated if they would realize, that with the proper technology applied in the past, the federal program could have achieved a true 95 percent treatment efficiency at about half the cost.

I could address other technically confusing matters in the proposed regulations, but I am of the opinion, that these matters would be corrected automatically if existing technology is properly incorporated in the necessary new regulations.

I however would like to address the conclusion under VIII Regulatory Impacts.
The proposed rulemaking may be considered not to be "major" within the scope of E.O. 12291, it clearly is a major deviation from the goals set for~nd in our national clean water policy. The change in fact represents a major relaxation of treatment requirements.

This change can be compared with the rule change for disinfection, which occured in 1977. Federal experts at that time must have realized that disinfection of treated sewage was not only ineffective, but also c caused the formation of carcinogenic chlorinated hydrocarbons.
Not wanting to be linked to regulations that created pollution in water pollution control facilities, they simply changed the rules and shifted the responsibility for this disastrous requirement to the States.
The technical justification for this rule change was probably well documented, but again only understood by a few.
States never adapted their own disinfection requirements and so this form of real pollution still continues.
As a result groundwater studies now indicate a 70 percent occurence frequency in wells of the same chlorinated hydrocarbons formed in the disinfection processes with chlorine.
That change of rUles then looks almost as if it were intended to shift the responsibility and blaim for bad requirements from the EPA to States.
The present rule change for secondary treatment appears to be designed with the same intention.

If you have any questions or if you want me to substantiate any of the technical material brought forward in my comments, please don't hesitate to contact me,

Sincerely,

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Peter Maier,P.E.

Encl.
CC: Senate Sub-committee
Congress Sub-committee
State of Utah
et ale

Minutes Meeting of
Utah State's Science Council.

September 11, 1984

d. Mineral Lease Fund Charter - Pete Bukowick - In last month's Science Council meeting, Pete Bukowick passed out copies of the Charter for Council members to review and consider for adoption. Chairman Brophy called for question on the motion to adopt the Charter as submitted (the Charter was brought to the Council by a Subcommittee and considered a seconded motion). The motion carried unanimously.

The Subcommittee had requested two additional members to serve with them. Randy Moon was given the responsibility of securing those additions and stated that he had received the acceptance of one new member, Val Finlayson, Utah Power & Light, and would have the second member in the near future.

The Subcommittee also requested they receive the Mineral Lease Fund Expenditure Reports for fiscal year 1983-84 from the University of Utah and Utah State prior to October 31, 1984. Randy Moon was given the responsibility to support that request.

e. Wastewater Discussion - As an introduction to the discussion, Chairman Brophy reviewed the history of the wastewater issue: In January 1984 as a response to a concerned citizen, Dr.Peter Maier, a committee was formed through this Council (Wastewater Treatment Committee--members; D. Adams, Chairman, L. Merritt, J. Pitkin, J. Reynolds, and M. Wilson) to prepare a report that was submitted to the Council for approval and forwarded to the Governor. The report recommended a six-month study on BOD levels. At a later date an addendum was prepared and forwarded to the Governor; no action was taken regarding wastewater treatment. Dr. Maier felt that his concerns were not adequately represented in the addendum, that the Science Council had not seen the addendum, and requested time to present his views to the Council for reconsideration. After Peter Maier's presentation to the Council (August 14, 1984), new members of the Council were mailed a copy of the Panel on Wastewater Treatment's report to study along with the addendum for today's discussion.

Doug James presented a summary of the report to the Council. After an indepth discussion and clarification of the issue, Gil Moore moved that Science Council reaffirm the report submitted in February 1984, recommend those recommendations be implemented, and the Council will offer to review the six-month study at its conclusion. The motion was seconded by Bartel Jensen. The motion carried unanimously.

NEW BUSINESS

a. Soecial Session Recommendations - Randy Moon identified the recommendations the Science Council suggested for the special session a as follows: (1) Request for 10 million dollars in funding for enginee technology equipment in the nine higher education institutions, (2) Re for $200,000 to fund Phase II of the Superconducting Super Collider (S (3) Funding request for the Science Council of $25,000 to be used for consulting, etc. The SSC request was the only request to go The funding was appropriated to the Science Council and two "no" votes in the Senate. The t the Legislature in January'

Major Concerns, regarding the Clean Water Program in Utah.

by Peter Maier, P.E.
September 27, 1983

Prepared for the Governor's Science Council Sub-Committee on wastewater.

1. The Correct Use of the BOD testvalues.

a. In Regulations.

One of the Goals of the Clean Water Program is the protection of the dissolved oxygen concentration in open waters.
Biodegradable wastewater (sewage) contains food elements, which will stimulate aerobic microbiological life in the water. Both heterotrophic and autotrophic microorganisms will be stimulated and as such will exert an oxygen demand.
When the standard BOD5 test is used on raw sewage, its value refers to th oxygen used by heterotrophs only, also referred to as Carboneceous BOD. However, when the same standard test is used on other samples (for exampl treated sewage) this value refers to the oxygen used by heterotrophs as well as autotrophs.
Using the BOD5 testvalue as the only value, affecting the dissolved oxygen level in open waters, is not only incorrect, but also confusing. It certainly misses the above mentioned goals in the Clean Water Program completely.

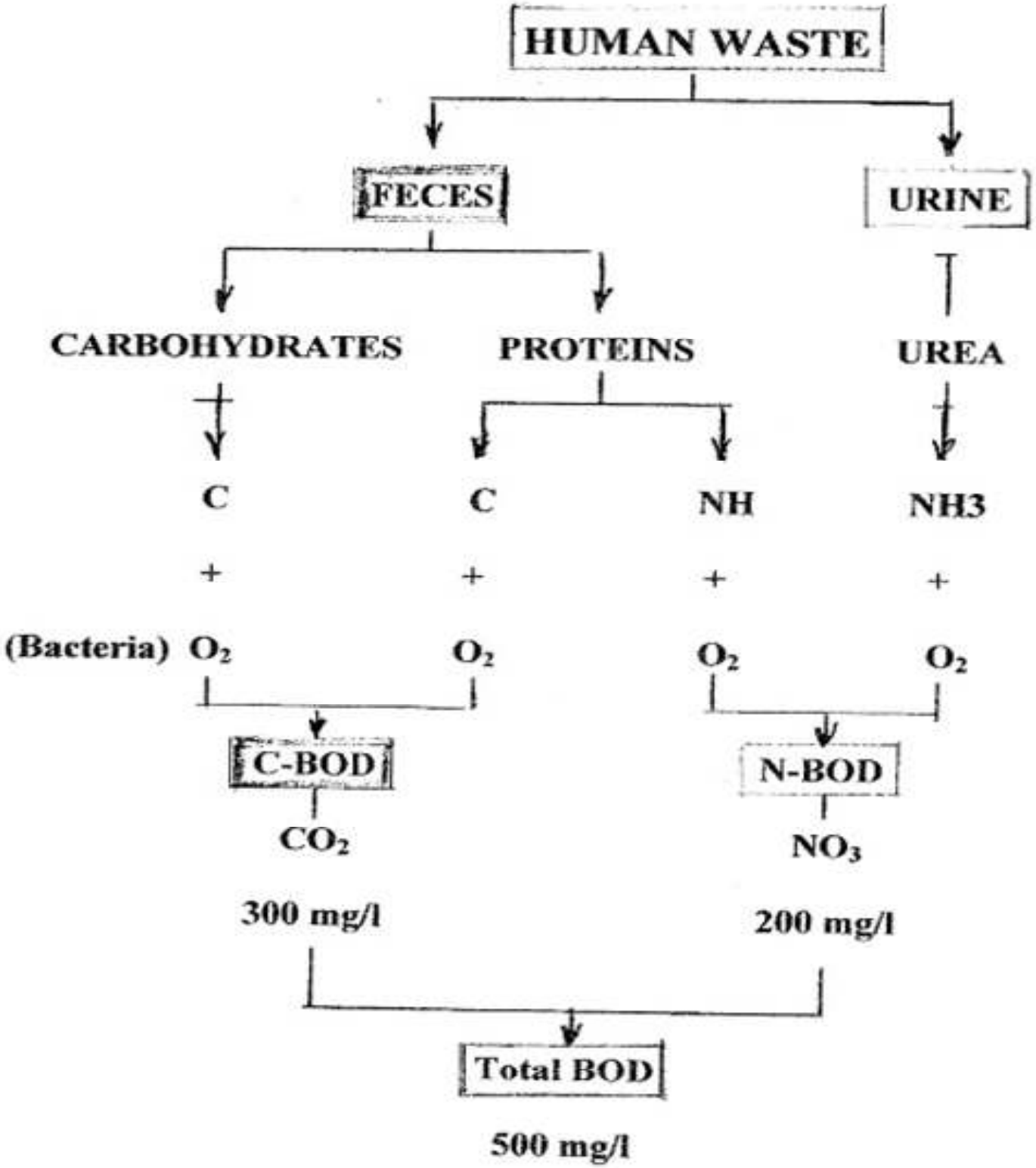
b. In Professional Services.

In evaluating the performance and capacity of existing sewage treatment plants, it is essential to have all operating data.
Most sewage treatment plants, however, do not have any nitrogen data, since this data is not required for the discharge permit.
Evaluating sewage treatment plants solely with BOD5 values is not only technically incorrect, but can lead to serious errors.
High BOD5 values of treated sewage often is caused by nitrification and in such cases plants are penalized for treating too good.

2. Use of Chlorine for Disinfection.

Recent studies by the American Cancer Institute claim that 95 percent of all cancers are caused by chemicals in our environment.
And although there certainly is some scientific skepticism, certain chlorinated hydrocarbons, formed during the chlorination processes, are on the black list of identified carcinogens.
In stead of waiting for hard evidence, it should be questioned if the present disinfection practices are essential and effective in protecting public health.
The Water Pollution Control Board in the State of Illinois came to the conclusion, that even without the argument of carcinogenic chemicals, disinfection practices of treated sewage are not justified. Thereby consenting with the opinion of public health officials worldwide.
One actually can make a strong statement, that the disinfection practices in Utah violate public policy for water pollution.

3. Groundwater Pollution.


HUMAN WASTE
FECES
URINE
CARBOHYDRATES
PROTEINS
UREA
C
C
NH
NH3
+
+
+
+
(Bacteria) O2
O2
O2
O2
C-BOD
N-BOD
CO2
NO3
300 mg/l
200 mg/l
Total BOD
500 mg/l

UTAH STATE UNIVERSITY

COLLEGE OF ENGINEERING
UTAH WATER RESEARCH LABORATORY

February 9, 1984

MEMO

To: Utah Science and Technology Council

From: Waste Water Treatment Committee for Water and Related Natural Resources Technology (D. Adams, Chairman, L. Merritt, J. Pitkin, J. Reynolds, and M. Wilson)

Subject: BOD_5 and Chlorination Issues

After numerous meetings and rather vigorous discussions dealing with the said topics, the committee has prepared a brief review and its recommentations. Operating under various time and budgetary constraints, the study undertaken by our committee has been quite thorough and comprehensive. If there are any further questions or topics to be addressed, we would be happy to be of further assistance.

VDA/alb

cc: Bartell Jensen
L. Douglas James
Randy Moon

Members:

D. Adams : Professor Utah State University. Logan UT
L. Merritt : Professor Brigham Young University, Provo UT
J. Pitkin : Utah State Health Dept.
J. Reynolds: Montgomery Engineers, Salt Lake City. Consulting Engineering firm involved in several Projects in Utah
M. Wilson : Utah State Dept. of Wild life & Fish.

Note: This Committee allowed me to address them on their first meeting. All other meetings were closed.

Problem Statement

The Clean Water Act (P.L. 92-500) provides a basic structure for the broad goal of eliminating "the discharge of pollutants into the navigable waters." Specific requirements must be met by individual point sources. For wastewater treatment facilities the Clean Water Act requires effluent reduction and achievement of effluent limitations based on secondary treatment. Generally, it established levels of effluent quality for the parameters biochemical oxygen demand, suspended solids, and pH. Sampling and testing procedures are also specified. The individual states also have the authority to require more stringent standards where appropriate.

Pollutants, treatment technologies and pollutional effects are constantly changing as our knowledge and understanding of these phenomena increase. The two major issues that our committee has been requested to address are:

1. The use of the 5-day biochemical oxygen demand test as the standard for determining the adequacy of wastewater treatment and effluent limitations.

2. The requirement for disinfection of treated municipal wastes by chlorination.

An objective evaluation of these issues based upon scientific facts has thus been accomplished and is presented.

Biochemical Oxygen Demand (BOD)

"BOD is usually defined as the amount of oxygen required by bacteria while stabilizing decomposable organic matter under aerobic conditions."[1] The oxygen requirement is quantified by a biological assay measuring the oxygen consumed by bacteria while decomposing the organic material in a waste. The test has been standardized and is conducted at 20°C for 5 days, i.e., BOD_5.

For many years the BOD_5 test has been used to determine the pollutional strength of domestic and industrial wastes, primarily for determining the adequacy of wastewater treatment facilities operating efficiency, quality of treated effluent and stream-pollution control activities (oxygen depletion-wasteload allocation). Under certain conditions, the BOD_5 test not only measures the oxygen demand by the carbonaceous matter, but also some nitrogenous oxygen demand.

If sufficient populations of nitrifying bacteria are present in the wastes, ammonia nitrogen is converted to nitrate in a biological process called nitrification and thus nitrogenous oxygen demand is exerted. When nitrifying bacterial populations are low there is little nitrogenous oxygen demand exerted in the BOD_5 test. Nutrients (phosphorus and nitrogen) are not included as a requirement for secondary treatment performance under normal conditions, as secondary treatment does not effectively or consistently remove them. Also water quality models and analytical techniques applied to secondary treatment are usually based on controlling the oxygen demand due to the carbonaceous component of the organic material in the effluent. Here is where the dilemma seems to arise. Usually secondary treatment facilities minimize the growth of nitrifiers,

under most circumstances, effluent from secondary treatment facilities at or near design loadings will contain low nitrifier populations especially during cold weather when nitrifier growth rates are minimal. But some facilities (oxidation ditches, trickling filters, under loaded treatment facilities, etc.) can generate effluents containing high populations of nitrifiers and thus nitrogen can contribute to the oxygen demand in the BOD_5 test. Thus the BOD_5 test may give varying results when trying to compare treatment facility performance. In an attempt to evaluate the BOD_5 test EPA[2] compared 82 months of winter effluent BOD_5 and carbonaceous BOD_5 ($CBOD_5$)[3] values from 26 secondary treatment facilities (data selected to reflect performance during critical design conditions). The objective of this analysis was to determine the NOD in the BOD_5 test under design conditions. From the data analysis and various regressions for a BOD_5 value of 30 mg/l, the $CBOD_5$ was predicted to range from 24-27 mg/l resulting in a nitrogenous oxygen demand (NOD) of 3-6 mg/l. The EPA is proposing that the NPDES authority can use a $CBOD_5$ or the BOD_5 but for a BOD_5 effluent limitation of 30 mg/l a 25 mg/l $CBOD_5$ would be used (i.e., the use of the $CBOD_5$ would result in a 5 mg/l more stringent standard).

The above general facts regarding the BOD_5 test have been known by the professional community for several decades. Accounting separately for the NOD appears to have become an issue only recently because of the potential impact on treatment facilities being required to provide higher levels of treatment. While limited CBOD data have been developed in Utah, it does not appear that unusually high NOD concentrations have occurred in treated effluents or have created compliance problems. The state has also considered the NOD in determining the impact of effluent

discharges on downstream oxygen levels. However, it may be prudent to develop more data on $CBOD_5$ and nitrogen components in treated effluents to more clearly determine and understand potential problems in treatment plant performance and to more accurately assess impacts on the receiving streams.

Recommendations

The recommendations of the committee are:

1. To allow the alternate $CBOD_5$ test, but the standard would be 5 mg/l more stringent than the BOD_5 standard.

2. It is strongly suggested that additional data for treatment facilities in the State of Utah pertaining to the measurements of $CBOD_5$ and BOD_5 be obtained. Data also needed would include total Kjeldahl nitrogen (TKN), ammonia (NH_3-N) and nitrite (NO_2-N) for treatment facilities discharging into rivers or streams which appear to have potential dissolved oxygen (DO) depletion problems.

3. Although oxygen demand is not seen as a serious problem in most of the rivers and streams in the state (there are, however, isolated exceptions), it is recommended that as additional data are obtained wasteload allocations (carbonaceous and nitrogenous input) be reevaluated.

Chlorination

The issue of whether to chlorinate or not to chlorinate wastewater effluents being discharged into the rivers and streams of Utah was expanded to a broader issue of whether disinfection of wastewater effluents should be required at all. Considerable controversy exists over what to do regarding the disinfection of municipal wastewater[4,5,6] Some of the issues relate to aquatic life damage, protection of public health

related to body contact and drinking uses, health hazard to workers at waste treatment plants, health risks associated with recreational waters, potentially harmful or toxic chlorinated hydrocarbon formation, residual chlorine, and chloramine toxicity, pathogen control, etc. Many studies[7,8,9,10,11] have related various diseases and epidemics to drinking water supplies contaminated by sewage. Epidemiological studies with respect to the effects of disinfected or nondisinfected wastewater effluent on the human population are not well documented. Evidence of these effects is very difficult to obtain and verify although there appears to be some evidence that nondisinfected sewage discharged to recreational waters in significant concentrations can spread disease. How much disease, what are significant concentrations, what are infectious doses, proper indicator organisms, standards, etc. are subjects which have been discussed for decades and will continued to be discussed in the future.

There appears to be no doubt that domestic sewage can contain human pathogens (bacteria, viruses, etc.) shed in the fecal discharges of infected individuals. Although there are still many unknowns and variables regarding pathogen sensitivity and survival, it seems only reasonable that some form of pathogen control (disinfection) be practiced prior to effluent discharge.

The means by which this is accomplished is another issue. Chlorination has often been criticized because of potential harmful effects that are associated with this disinfection process (residual chlorine, chlorinated and potentially toxic organics, groundwater contamination, aquatic life damage, etc.). The toxic effects of chlorine on aquatic life receiving secondary discharges are usually mitigated by dechlorination.

The potential impacts of chlorinated organics on aquatic systems are still relatively unknown. Chlorination has been studied more than any other disinfection process and researchers are still unsure of any associated public health risks. Other alternatives for disinfection are receiving wide spread attention (primarily ultra-violet radiation and ozonation) but much more information and research is still required regarding pathogen inactivation, contact and mixing chamber design, mode of action, cost, etc.

Recommendations

In conclusion, until an effective alternate means of protecting our nation's waterways or accepted public health criteria dictates a change in current technologies or practices, the committee recommendations are:

1. Disinfection of wastewater effluent prior to discharge should be continued.

2. Review the current state-of-the-art of disinfection technologies for municipal wastewater disinfecton as there appear to be some potentially cost effective alternatives to chlorination.

3. Continue research to better define and resolve disinfection technologies.

4. As the state of knowledge with respect to the potential for harm to the public health from the disinfection of sewage increases and substantial evidence is obtained, reevaluate the data and make recommendation for changes.

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Prepared for
Office of Technology Assessment.
Washington DC

SUMMARY OF EPA'S INCORRECT IMPLEMENTATION OF THE CLEAN WATER ACT.

BY: Peter Maier, P.E. November 1987.

The Congress passed the Clean Water Act of 1972 with the main goal to eliminate water pollution by 1985 and gave the EPA Administrator a mandate to implement federal regulations to achieve this goal.
In 1986 the Congress overwhelmingly passed an extension to the Act, without realizing (being told) that the EPA Administrator in 1984 had changed the Act's goal for 100% treatment (elimination of pollution) to a mere 30% treatment of sewage, obviously in defiance of the intent of the Act and completely inadequate to control even minor water pollution.

The problems lays with the incorrect application of the BOD (Biochemical Oxygen Demand) test in the regulatory program.
The test (developed 70 years ago) identifies if wastewater is biodegradable and how much oxygen will be required for this biochemical oxidation. Since sewage contains carbonaceous (fecal) and nitrogenous (urine) elements, the test will measure simultaneously the oxygen used for carbonaceous oxidation (C-BOD) and nitrogenous oxidation (N-BOD). The differentiation ~~between~~ can only be achieved by inhibiting the activities of autotrophs (nitrifiers), thereby eliminating the nitrogenous oxidation (N-BOD)
The C-BOD value (fecal waste) represents 60% and the N-BOD value (urine waste) represents 40% of total BOD value in sewage
The duration of the BOD test at standard conditions (20 degrees Celcius) will take 30 days. It, however, is possible to utilize the 5-day value of the test in combination with the TKN (Total Kjeldahl Nitrogen) test value to calculate the total BOD value, but then only if the inhibited BOD5 (C-BOD5) test value is used. The following formula is used to calculate the total BOD:

$$BOD = 1.5 \times C\text{-}BOD5 + 4.6 \times TKN.$$

<u>The 5-day value (BOD5) of the test by itself is not only meaningless, but also extremely misleading.</u>

EPA in its haste to initiate a program based its discharge permit regulatory program solely on the 5 day value of the BOD test (BOD5), in order to achieve secondary treatment. This at that time was considered 85% treatment, but lacked the definition of what type of pollution. Existing practice and State regulations, however used the 5 day value of the BOD test and EPA assumed the same for the federal program, apparently not realizing that it only addressed 65% of 35% percent of the BOD value. The results of this incorrect application of the BOD test have been disastrous, especially since the professionals in the field also ignored the limitations of the BOD test. Existing treatment facilities were incorrectly evaluated on their loading conditions and their performance. Many were considered out of compliance with their discharge permits, while in reality these facilities were treating the sewage better as was required under their permit. In many instances plants have been replaced with plants that only achieve half the treatment of the replaced ones.

The problems were recognized behind closed doors in the late seventies and obviously had an impact on the fact that EPA very seldom pursued a "supposedly" violation of a discharge permit. Except in 1981 when the EPA fined Dubuque Iowa $10,000.- per day for allegedly violating their discharge permit. The City performed the correct BOD test and proved that the facilities performed better as was required under the permit. Forced to correct this situation, EPA modified in 1984 their regulations allowing the inhibited BOD5 test (C-BOD5) in stead of the BOD5 test, thereby quietly lowering treatment standards from 100% treatment (elimination of water pollution) to 30% treatment, in fact ignoring 33% of the fecal waste and 100% of the urine waste in sewage. Ironically EPA considered this a minor change in their regulations and therefore did not deem it necessary to inform the Congress or to obtain its permission. This enormous relaxation of treatment requirements was quietly achieved without any public discussions or interference. The simple rule change only applied to discharge permit violations, it was not forced to be used in the field for waste load allocations or for the design of treatment facilities. In fact it did not eliminate the construction of faulty designed treatment facilities and as such did not stop the horrendous waste of public funds.

EPA justifies the relaxation of treatment requirement claiming excessive cost for communities to meet stricter treatment requirements, but it also openly admits that sewage treatment technology is available to achieve 95% treatment at half the cost the public now pays for 30% treatment. Thereby it violates another section under the Clean Water Act , which demands the application of best available technology (BAT) to achieve the goals of the Act.

It is obvious that EPA's regulations will never achieve or even come close in meeting the goals of the Clean Water Act, in spite of the expenditures of billions of public dollars. The only way to achieve these goals is to apply technology correctly in the regulatory program, which automatically will force the professional society to use correct science and technology in their studies and (more important) in their designs of sewage treatment facilities.

A present situation in Salt Lake County is a typical example of the ludicrous conditions as a result of incorrect testing.
The treatment facility of Salt Lake City achieving 35% treatment, but in compliance with the discharge permit, received recently an award from the EPA, while the treatment facility of Murray City (five miles upstream of the Jordan River) achieving 70% treatment is fined by the same Agency $10,000.- per day of allegedly violating their discharge permit. Although authorities could apply the inhibited test and force the EPA to withdraw their violation case. It has not done so, since it also would show that it is not necessary for Murray City to abandon their plant and hook-up to a brand new $150 million dollar (55% federal funded) treatment facility that only will provide 30 to 40 % treatment.

JOHN H. GIBBONS
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, DC 20510-8025

February 25, 1988

The Honorable Wayne Owens
U.S. House of Representatives
Washington, D.C. 20515

Dear Representative Owens:

Thank you for your letter of December 17, 1987, requesting that OTA consider Mr. Maier's arguments about the BOD-5 test in the Clean Water Act. Dr. Friedman referred your letter to me, since I was the project director for OTA's report on *Wastes in Marine Environments*, which included analyses of some Clean Water Act programs; that report is enclosed for your information. I apologize for the delay in responding to your letter, but I was fully committed to an ongoing assessment when your request came.

Mr. Maier seems to be making two assertions: 1) the BOD-5 test does not address the full range of pollutants that cause biodegradation and subsequent oxygen reduction; and 2) oxidation ditch technology is a cheap and efficient way of treating sewage. His first contention appears to be correct; the second may or may not be, depending primarily on site-specific considerations. The logical relationship between the two assertions is somewhat incomplete. Let me try to explain.

As Mr. Maier asserts, the BOD-5 test does not address nitrogenous wastes, which, along with the carbonaceous wastes the test does measure, generally are biodegradable. Thus, depending on the relative amounts of these different wastes, the test will more or less accurately measure the potential for oxygen reduction. With regard to carbonaceous wastes, though, the BOD-5 test does provide an index of relative treatment, and under current EPA regulations it determines whether a given sewage treatment facility does or does not provide "secondary" treatment. Provision of secondary treatment is required by statute for most sewage treatment plants in the United States.

The nitrogenous wastes -- those for which the BOD-5 test is less appropriate -- can still be treated with "tertiary" or "advanced wastewater" treatment techniques. Such treatment involves chemical processes and builds on the biological processes typical of secondary treatment. However, provision of tertiary treatment is not required by statute.

Mr. Maier's second contention is that the oxidation ditch technology is a cheap and efficient way of providing both secondary and tertiary treatment. This contention is more controversial but is also the more important one, even if only true for certain sites. Unfortunately, the determination of relative costs depends on many factors, including the cost and availability of land

(oxidation ditches require relatively large areas), regional costs of labor and capital, whether or not there is an existing treatment facility, and the specific characteristics of the wastewater stream -- all of which need to be evaluated on a case-by-case basis.

To the extent that Mr. Maier's contention is correct at any site, there is the possibility of both cost savings and desirable environmental results. It would thus seem appropriate to allow comparison of this and other alternatives for any given site needing new or expanded sewage treatment capacity. Federal funding for such capacity is channeled through EPA's Construction Grants program. This program, which has involved tremendous public expenditures during the last two decades (see pages 25-26 in the OTA report), provides grants for constructing new sewage treatment plants or upgrading old ones -- primarily to meet the Clean Water Act requirement for secondary treatment.

I hope this information will help you in your deliberations. You may wish to contact the committees of jurisdiction regarding the possibility of conducting formal hearings on oxidation ditches -- their capabilities and costs, and EPA's role in research and regulation of this technology. For example, the Committee on Science, Space, and Technology has jurisdiction over EPA's research and development activities; the Committee on Public Works and Transportation has jurisdiction over the Construction Grants Program. EPA's Office of Municipal Pollution Control might also have relevant information about the technical and regulatory status of oxidation ditches.

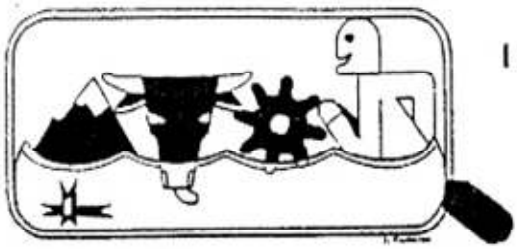
If I can be of further assistance, please call me at 228-6856.

Sincerely,

Howard Levenson

Howard Levenson
Senior Analyst
Oceans and Environment Program

Enclosure



INTERMOUNTAIN WATER ALLIANCE

Testimony for the Subcommittee on Water Resources

On

Wednesday, April 4, 1990

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TESTIMONY FOR THE SUBCOMMITTEE ON WATER RESOURCES

SUMMARY:

The Clean Water Act of 1972 is not being implemented by the EPA, as clearly was intended by the Congress, due to the fact that the federal regulatory program uses a pollution test incorrectly. The federal regulatory program ignores 35% of the water pollution caused by fecal waste and 100% of the water pollution caused by urine waste. It ignores 65% of the water pollution caused by sewage. The Congress promised the American public in 1972, that all water pollution would be eliminated by 1985. Now in 1990, eighteen years later, our open waters are still used as urinals for our cities. The Clean Water Act also authorized the EPA Administrator to achieve the goals of the Act by demanding "Best Available Technology." Best available technology in 1972 was 95% treatment, but the EPA Administrator currently only demands 35% treatment. The incorrect use of the test also made it impossible to enforce the federal program; treatment facilities could not meet their discharge permits simply because they were treating the sewage better than was required under their permits. In 1984 the EPA recognized this problem and modified the regulations by allowing a different test, the inhibited BOD test. This test simply does not measure the water pollution caused by urine waste. This test brought most of the facilities, earlier considered out of compliance, into compliance with their discharge permit. Prior to 1984, communities with facilities considered out of compliance with their NPDES discharge permit would be forced to modify or construct a new treatment facility, and were actually penalized for treating the sewage better than was required.

By changing the rule in 1984, the EPA at least would not penalize a sewage treatment facility for treating the sewage better than was required, but at the same time the EPA officially ignored 35% of the water pollution caused by fecal waste and 100% of the water pollution caused by urine waste. The lack of urine treatment has been disastrous for the federal program. Urine first is biochemically oxidized into nitrate, and exerts an oxygen demand on the open water. Then, as a nitrate, it becomes a fertilizer for algae growth, which not only contributes to the eutrophication of lakes, but also creates all types of problems in wetlands, bays and oceans.

The incorrect testing also caused major problems with the designs of sewage treatment facilities. Facilities were basically designed for the wrong type of waste. It is therefore not surprising that so many problems are experienced with the operation of sewage treatment facilities.

To add insult to injury: If the EPA had demanded "Best Available Technology," as so clearly directed by Congress, most sewage in this nation would by now have received 95% to 98% treatment at probably half the cost the public now pays for a meager 50% to

60% sewage treatment. There also would have been plenty of money to spend on treating certain forms of pollution in sewage, which now is completely ignored.

Utah State's Science Council evaluated this issue in 1983 and recommended in 1984 that the State should apply the BOD test properly. After a six month period the Council would evaluate the State's Water Pollution program with the new technical data. The Governor rejected the Council's recommendation, claiming that this would violate federal EPA policies.

As long as the EPA does not require correct testing, the water quality in our rivers, bays and oceans will only deteriorate further and the nation will continue to pay a very high price for treatment facilities that hardly provide sewage treatment. Achieving the interim goal of the Clean Water Act, swimmable and fishable waters, is possible. The only problem is that it does not require a specialized environmental-industrial complex, which presently has a monopoly on the knowledge needed to evaluate the projects it proposes and builds.

BIOCHEMICAL OXYGEN DEMAND (BOD) TEST:

The BOD test was developed in 1920 in England and enables scientists and engineers to predict if certain wastewaters are biodegradable and how much oxygen demand would be exerted if such wastewater would be discharged in open waters. A sample of the wastewater is put into a test bottle, which contains oxygen rich water, and oxygen consumption is measured until all the waste is oxidized.

Figure 1 represents a BOD test curve for municipal wastewater. There actually are two biochemical oxygen demands, one caused by heterotrophic organisms feeding on the carbonaceous compounds (fecal waste) called the C-BOD, and the biochemical oxygen demand caused by autotrophic organisms feeding on nitrogenous compounds (urine and proteins) called the N-BOD.

The reading of both BOD curves not only depends on the quality of feed compounds, but also on the presence and quantity of micro-organisms in the test bottle. Without the organisms, there would be no test reading at all. Autotrophic organisms are more complex than the heterotrophic organisms and take more time to grow and multiply. It takes a heterotrophic organism several minutes to multiply, while it takes an autotrophic organism several hours.

Since there was a distinct kink to the BOD test curve after 6 to 8 days, it was assumed that the activities of the autotrophic organisms only became significant after 6 to 8 days, and therefore the 5-day reading of the test only represented the C-BOD. Since the N-BOD could also be calculated with the result of the TKN (Total Kjeldahl Nitrogen) test, the 5-day BOD reading became a time saver. Instead of having to wait 30 days, one could calculate the BOD value of a wastewater with the 5-day BOD (BOD5) test value. If applied on sewage, as assumed in most literature, the 5-day BOD test value would

be 200 mg/l and the TKN reading would be 40 mg/l. Using the time correlation factors developed for this test, one can calculate the C-BOD by multiplying the 5-day reading of the test (BOD5) with 1.5. The C-BOD of sewage is 300 mg/l. The N-BOD can be calculated by multiplying the TKN test value with 4.6, which will result in a N-BOD value of 184 mg/l. The total BOD value of sewage is 484 mg/l.

The Clean Water Act directed the EPA to initiate a federal program demanding "Best Available Technology" (BAT) or at least secondary treatment. The only scientific definition for secondary treatment is the fact that it follows primary treatment. There is no scientific definition. However, if someone active in this field was asked, he would answer that secondary treatment is biological treatment, or more specifically he would say it is 85% BOD treatment.

BOD in the meantime became the 5-day reading of the test and the differentiation between C-BOD and N-BOD was ignored or forgotten. When the EPA set pollution limits for their NPDES permit program it used the 85% treatment definition of secondary treatment and the BOD5 pollution limit was consequently set for less than 30 mg/l BOD5. Figure 1 shows the BOD test curve on sewage. By addressing only the 5-day value of the test curve, 35% of the C-BOD and 100% of the N-BOD is clearly ignored.

The EPA demanded the same BOD test to be performed on the discharge of a treatment facility in order to meet the NPDES limit of less than 30 mg/l BOD. Since the sewage had been subject to the environment, which has an abundance of autotrophic micro-organisms, their activity was no longer delayed for 6 to 8 days. The N-BOD, therefore, is a significant part of the BOD5 test value. Figure 2 indicates a C-BOD5 value of 18 mg/l and a N-BOD5 value of 22 mg/l, making the BOD5 test value 40 mg/l. Until 1984, rule change would allow the inhibited BOD5 test, which would result in the BOD5 test, to be the same as the C-BOD5 test value, since there would be no N-BOD5.

As mentioned earlier, most research on this testing was performed between 1920 and 1930. Most testing was probably performed with very fresh sewage which probably was the reason that the activities of the autotrophic micro-organisms was 6 to 8 days delayed. Human discharge has an abundance of heterotrophic organisms in fecal waste, and therefore hardly has any autotrophic organisms since urine does not contain any micro-organisms. Autotrophic organisms have to come from the environment or from their own growth. This caused the delay of the N-BOD and not the compatitive environment. Since there are plenty of autotrophic organisms in our environment, their activity is nearly immediate especially if sewage is exposed to the environment. The assumption that the 5-day BOD test reading is carbonaceous for sewage has been proven to be incorrect. In several cities sewage has been properly tested and shown that 30% to 50% of the 5-day test readings were nitrogenous BOD. Most

process designs for sewage treatment facilities assume that the 5-day reading is only carbonaceous BOD and treatment processes and units are sized accordingly. Since this assumption is wrong, these treatment facilities are incorrectly designed. The treatment facilities are often over-designed for carbonaceous waste and not capable of handling nitrogenous waste, thus a large load of the facility will consist of nitrogenous BOD.

The sewage treatment facility for Salt Lake City was, according to the engineering study, overloaded. The correct testing showed that the plant only used 35% of its design capacity for carbonaceous BOD and did not provide any treatment for the nitrogenous BOD. The incoming sewage consisted of 40% N-BOD.

The following examples clearly show the problems caused by incorrect testing:

RAW SEWAGE: C-BOD5 = 200 mg/l
TKN = 40 mg/l
BOD = 1.5 x C-BOD5 + 4.6 x TKN = 484 mg/l

SECONDARY TREATMENT: BOD5 less than 30 mg/l.
No treatment requirement for N-BOD or TKN.

Plant A: Conventional Design
Effluent: BOD5 = 25 mg/l IN COMPLIANCE WITH NPDES PERMIT.
TKN = 40 mg/l
BOD = 1.5 x 25 + 4.6 x 40 = 221 mg/l (65% treatment)

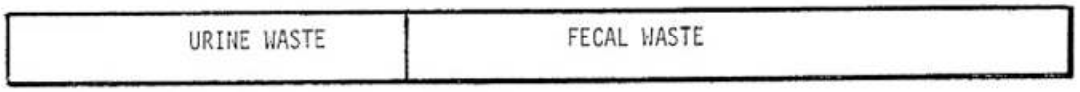
Plant B: Old Fashioned Design
Effluent: BOD5 = 40 mg/l NOT IN COMPLIANCE WITH NPDES PERMIT.
C-BOD5 = 20 mg/l
TKN = 10 mg/l
BOD = 1.5 x 20 + 4.6 x 10 = 81 mg/l (83% treatment)

Plant C: Best Available Technology
Effluent: BOD5 = 10 mg/l EXCEEDING ITS NPDES PERMIT.
C-BOD5 = 5 mg/l
TKN = 4 mg/l
BOD = 1.5 x 5 + 4.6 x 4 = 25 mg/l (95% Treatment)

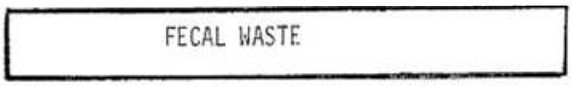
Plant C, according to EPA cost data, can be operated and built for half the cost one has to spend for Plants A or B. The superior treatment and the savings in cost does not appear significant for the EPA to demand this type of treatment in order to implement the Clean Water Act as clearly was intended.

BOD WATER POLLUTION CAUSED BY SEWAGE AND POSSIBLE TREATMENT.

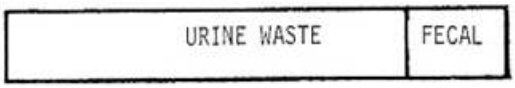
BOD POLLUTION CAUSED BY RAW SEWAGE



BOD REMOVAL REQUIRED FOR NPDES PERMIT



BOD POLLUTION STILL IN EFFLUENT



BOD POLLUTION STILL IN EFFLUENT AFTER "BEST AVAILABLE TECHNOLOGY"

* HAND-OUT DURING THE TESTIMONY ON APRIL 4, 1990.

Thanks to the Clean Water Act, this environmental-industrial complex has an open door to the federal treasury.

12-September 28, 1987 -- High Country News

With his attack on the BOD-5 test and the design of sewage plants, Maier broadened his critique from Salt Lake City to the national clean-water program.

Washington, D.C., water-lawyer Larry Silverman says that people at EPA headquarters tell him off the record that Maier is right, and that regulations and tests can and should be improved. But they also tell him change is impossible because, Silverman says, "It would require the re-education of an entire industry." He adds that it might also require the re-tooling of an industry that is happy with the status quo.

Salt Lake City illustrates the industry's ability to resist change. According to Silverman, "In Salt Lake City, as in most of the country, there is a sewer lobby. They have a product to sell and they sold it. There are equipment manufacturers, engineers who design it, construction companies that build it. They're all good citizens in the sense that they support the local politicians; they are well placed and highly organized."

Thanks to the huge sums allocated to sewage plant construction under the Clean Water Act, this environmental-industrial complex has an open door to the federal treasury. It also has a monopoly on the knowledge needed to evaluate the projects it proposes and builds.

PETITION FOR RULEMAKING BEFORE THE ENVIRONMENTAL PROTECTION AGENCY

To Amend the Secondary Treatment Regulations For Biochemical Oxygen Demand for Publicly-Owned Treatment Works, 40 C.F.R. Part 133

Petitioners: Peter Maier, P.E.; Sierra Club, Utah Chapter; Intermountain Water Alliance; Southern Utah Wilderness Alliance; Western Colorado Congress; Stone Fly Society Chapter of Trout Unlimited and the Federation of Fly Fishers; and the Utah Wilderness Association.

Submitted August 6, 1993.

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PETITION FOR RULEMAKING

INTRODUCTION:

Peter Maier, P.E.; Intermountain Water Alliance; Sierra Club, Utah Chapter; Southern Utah Wilderness Alliance; Western Colorado Congress; Stone Fly Society Chapter of Trout Unlimited and the Federation of Fly Fishers; and the Utah Wilderness Association ("petitioners") hereby petition the Environmental Protection Agency (EPA) to amend its Secondary Treatment Regulations for Publicly Owned Treatment Works (POTWs), 40 C.F.R. Part 133. Specifically, the purpose of this petition is to amend the regulations governing Biochemical Oxygen Demand (BOD). These amendments are necessary to implement the Clean Water Act's (CWA) requirements for the application of best practicable waste treatment technology for POTWs.

I. LEGAL BASIS FOR PETITION

A. Authority for This Petition and Availability of Judicial Review

The authority for this petition arises under both the CWA and the Administrative Procedures Act , 5 U.S.C. § 551 et. seq. (APA). Section 553(e) of the APA provides that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." The petitioners are "interested persons," being individuals and groups that have had a long-standing interest in the quality of this nation's navigable waters, and who are affected in the use of those waters for drinking, agriculture, fish consumption and recreation by the quality mandated by the EPA.

Authority for this petition also arises under CWA section 509(b), 33 U.S.C. § 1369(b). Under this section, an interested person may apply to review a CWA regulation in a federal Circuit Court of Appeals following the 120-day limitations period, provided that the petition is based on "new information." This petition is based on new information since the last revision of the regulations, which began in 1982 and which ended with the promulgation of final rules in 1984.[1] However, judicial

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[1]. 49 Fed. Reg. 37,006, Sept. 20, 1984; 49 Fed. Reg. 40,405, Oct. 16, 1984. The new information upon which this petition is based includes information contained in appendices I, III,

precedent indicates that before such a review can be had, a petition for rulemaking must first be presented to the EPA.[2] Notwithstanding this judicial precedent, the petitioners also believe that a petition before the EPA to amend the regulation is a more appropriate forum than federal court. However, in the event that this petition is denied, the petitioners intend to seek review of the denial in federal court under CWA section 509(b).[3]

As the Oljato court stated, "EPA should respond to the petition and, if it denies the petition, set forth its reasons." Likewise, section 553 of the APA requires the EPA to at least

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IV, V, VI, VIII, IX & XI.

[2]. Oljato Chapter of the Navajo Tribe v. Train, 515 F.2d 654 (D.C. Cir. 1975). The court in Oljato was hearing a challenge to a standard of performance under the Clean Air Act (CAA), pursuant to section 307 of that act. Like this petition, that case involved a challenge arising after the limitations period for challenging a rule, based upon new information. The court determined that the challenge could be heard, but only after a petition for rulemaking was first made to the EPA.

Although that case dealt with the CAA, the judicial review section of the CWA is the same in all applicable respects, and indeed CWA section 509 was based on section 307 of the CAA. Further, this petition provision was applied to the CWA (although not in the context of a petition based upon "new information") in Save the Bay v. Administrator of EPA, 556 F.2d 1282 (5th Cir. 1977).

[3]. The court in Oljato, *supra*, specifically stated that "[i]f the petition is denied, the petitioner may seek review of the denial in this court pursuant to [CAA] section 307." Likewise, review would be available here under CWA section 509(b).

Review in federal court would also be available under section 704 of the APA which provides that "final agency action for which there is no adequate remedy in a court [is] subject to judicial review."

provide "a brief statement of the grounds for denial," if in fact the petition is denied. The adequacy of this statement of reasons can also be reviewed in federal court.[4] The petitioners request the EPA to respond within 60 days, which we believe to be a reasonable time.[5] If the EPA cannot make a decision on the merits of the petition within 60 days, we request that the EPA notify the petitioners of its schedule of action within this time.

Petitioners also request public hearings on this matter, and full notice and comment opportunities. We believe that this is in the best interests of all involved, including those who might be opposed to the new regulations requested by the petitioners. We request that a least one hearing be held in Denver, as it is a central location in the West, where the petitioners reside.

B. Legal Inadequacy of the Present Regulations and Need for Revision

The CWA has a general mandate that the discharge of pollutants into the navigable waters of the United States be eliminated by 1985, and made swimmable and fishable by 1983. CWA § 101. Although this has clearly not occurred, it is still the duty of the EPA to work towards these goals. Further, the CWA contains specific provisions that require the EPA to amend its regulations governing secondary treatment of sewage from POTWs whenever it appears that better technology exists to treat waste better than that which is being utilized to meet current regulations. This is especially true when implementation of new regulations can be achieved at an equal or lesser cost than the ones now in place, as is the case with the petitioners' proposed amended regulations for BOD.

Specifically, CWA section 304(d)(2) requires that from time to time EPA shall promulgate information and guidelines to implement section 201. Section 201(b) requires waste treatment management plans and practices which shall apply the "best practicable waste

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[4]. See NRDC v. SEC, 389 F.Supp. 689, 702 (D.D.C. 1974) (remanding for lack of section 553(e) statement), 432 F.Supp. 1190, 1208 (D.D.C. 1977) (holding explanation in subsequent section 553(e) statement to be arbitrary and capricious), and 606 F.2d 1031, 1042-53 (D.C. Cir. 1979) (reversing district court on merits, but holding that review was available).

[5]. See Environmental Defense Fund v. Hardin, 428 F.2d 1093, 1099 (D.C. Cir. 1970), where the court required the EPA to respond to the petitioners within 30 days on an action relating to the registration of DDT.

treatment technology before any discharge into receiving waters."[6] This means that the EPA must set the most stringent effluent standards which are achievable at a reasonable cost- not just to set standards that existing POTWs can automatically meet. CWA requirements are intended to be technology-forcing, not technology-accommodating. This petition shows that the current regulations do not reflect the best practicable treatment technologies, and that the proposed regulations would go a long way towards achieving the best practicable technologies available.

The current regulations also violate CWA section 304(d)(4), which mandates that the EPA must set secondary treatment standards for treatment facilities by "assuring that water quality will not be adversely affected by deeming such facilities as the equivalent of secondary treatment." As fully explained in part II of this petition, the EPA is violating this mandate through its secondary treatment regulations, 40 C.F.R. Part 133, which allow up to 65% of the waste from POTWs to be ignored by the present regulations. The present regulations do not assure that water quality is not adversely affected, and must be changed. As also explained in part II, it should be emphasized that the proposed regulations would not increase construction costs for new POTWs, and in fact may be cheaper to build than current POTWs on line which are designed to meet the current regulations.

Amending the secondary treatment regulations for POTWs is also required to comply with section 304(d)(1), which states that "from time to time," the EPA shall publish information on the degree of effluent reduction attainable through the application of "secondary treatment." The regulations have not changed since 1984,[7] and it is about "time" that the EPA take a hard look at technologies that could increase the degree of effluent treatment attainable through "secondary treatment."

II. FACTUAL BASIS FOR PETITION

The main deficiency of the current BOD regulations is that they only address the oxygen depleting water pollution caused by C-BOD

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[6]. This includes the "confined disposal of pollutants so they will not migrate to cause water or other environmental pollution and shall provide for consideration of advanced waste treatment techniques." Section 201(d)(1) further requires "the recycling of potential sewage pollutants through the production of agriculture, silviculture, or aquaculture products."

[7]. Taking into account when those revisions were begun, it has been over 10 years.

(carbonaceous organic waste in raw sewage, comprised mostly of fecal waste), and they ignore oxygen depleting water pollution caused by N-BOD (nitrogenous water pollution sources and their end products, nitrates, comprised mostly of urine and protein wastes). Also, the current regulations only account for interim 5-day BOD values, and not the ultimate values. By implementing the proposed amendments, new and renovated POTWs can achieve much better results for N-BOD and C-BOD reduction, at a cost that is no more or below the cost of designing POTWs to meet the current regulations.

A. Historical Background of Secondary Treatment

The Clean Water Act established as its main goal to eliminate all water pollution by 1985. The Act authorized the EPA administrator to establish a national regulatory program, and in order to achieve the goals of the CWA this program had to be based on best practicable treatment technology for POTWs and should demand at least "secondary treatment."

Prior to this legislation, secondary treatment was defined by treatment process types that followed primary treatment, i.e., activated sludge, trickling filters, etc., and was not defined by effluent standards. To satisfy the requirements of the act, the EPA changed the definition of "secondary treatment" from a process type definition to an effluent standard definition, after the EPA established that the effluent of existing "secondary treatment" facilities could achieve an effluent containing less than 30 mg/l of BOD5 (Biochemical Oxygen Demand test after 5 days) and SS (Suspended Solids). Since BOD5 test values on raw sewage influent are generally assumed to be 200 mg/l,[8] it was concluded that the required effluent standard of 30 mg/l represented 85% treatment, an acceptable first step toward the ultimate goal of elimination of all water pollution, or 100% treatment.

Although biological oxidation of nitrogenous materials causes errors in the standard BOD5 test (often referred to as "nitrification interference"), and has been recognized in the technical literature for at least 50 years,[9] it was ignored when EPA

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[8]. 48 Fed. Reg. 52,275 (1983); American Society of Civil Engineers and the Water Pollution Control Federation Manual of Practice No.8- Wastewater Treatment Plant Design, 1977 (WPCF Manual), p.14.

[9]. See WPCF Manual at 14; see also Appendix II, "Inhibition of Nitrogenous BOD and Treatment Plant Performance Evaluation," Journal of the Water Pollution Control Federation (Journal WPCF), Vol. 53, # 12, December 1981, p.1.

established effluent standards for secondary treatment in 1973.[10] As a result, secondary treatment facilities often could not meet their NPDES permit requirements, so EPA amended its secondary treatment requirements in 1984 by adding section 133.102(a)(4).[11] This section provides that at the option of the NPDES permitting authority, the original 30 mg/l BOD5 effluent limit may be substituted with the lower 25 mg/l C-BOD5 effluent limit. Using the C-BOD5 alone solves the problem of nitrification interference, but as explained below, it allows a large portion of the BOD pollution in the waste stream to avoiding detection.

B. Deficiencies Caused by Incorrect BOD Testing

There are two main problems caused by BOD5 and C-BOD5 testing methods mandated by the current regulations: 1) they lead to ignoring N-BOD waste, often a substantial portion of the waste stream; and 2) they only represent a five-day value, and not the ultimate value.

1. Current BOD Testing Ignores N-BOD

The main problem with the BOD5 test is that it does not reveal how much of what pollutant (N-BOD or C-BOD) is present in the waste stream. Although the BOD5 test was originally used to measure C-BOD in order to avoid interference from nitrification as well as to save time, it was intended to be used in combination with the TKN (Total Kjeldahl Nitrogen) test, which is used to measure N-BOD. However, it became common engineering practice to use the BOD5 test by itself.

Many professionals erroneously believed that its value represented the whole amount of oxygen required to stabilize organic matter in raw sewage. The attached description of the BOD test[12] explains that the BOD5 test value is deficient in two respects: one, it does not indicate whether the BOD is carbonaceous or nitrogenous; and two, it only represents the BOD value at five days, rather than the ultimate value. By evaluating only BOD5 test data, the EPA in

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[10]. See Appendix VII, "Letter to the Editor from BOD Task Group (James C. Young, Iowa State University; Gerald N. McDermott, The Proctor & Gamble Company; and David Jenkins, University of California, Berkeley)," appearing in Journal WPCF, Vol. 54, #7, 1982.

[11]. 48 Fed. Reg. 52,259-60 (1983).

[12]. Appendix I: "BOD Test," Peter Maier, 1993.

fact addressed only 41% of the BOD pollution in raw sewage.[13] The anticipated 85% treatment consequently results in only a 35% treatment requirement (85% of 41%), which is clearly inadequate to meet any of the final or interim goals of the CWA.

The 1984 regulation changes which allowed the substitution of the C-BOD5 test is also faulty. It was estimated that 60% of the facilities violating the NPDES permit prior to 1984[14] got into compliance with the new C-BOD5 requirement by simply adding a chemical such as allythiourea. This process selectively kills autotrophic organisms in the test sample, which results in a lower BOD5 reading in the sample, but masks the N-BOD pollution still present in the waste stream. Also, it is questionable if such facilities would have met the 85% treatment requirement of even the C-BOD, which should be based on the C-BOD5 test value of the raw sewage influent entering the facility (but which was never required to be tested).

EPA justified the regulation change based on the test results of effluents only, and assumed that the nitrification interference of the BOD5 test was caused by autotrophic organisms growing in under-loaded sewage treatment facilities. However, recent testing shows that this assumption is not correct in many cases.

For instance, testing in Salt Lake City indicates that the nitrification interference in the BOD5 test on raw sewage influent, as well as on the effluent, is caused by autotrophic organisms originating from the sewer system, and not from the "under-loaded" treatment facility, since nitrification (TKN reduction) does not occur in the facility itself.[15] As a result, the facility receives much lower amounts of C-BOD than it was designed to treat, and instead receives N-BOD waste it is not able to handle.

C-BOD5 tests on raw sewage in Chicago and San Diego also

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[13]. See Appendix I, page 2, figure 1. Point A in that graph represents the BOD5 value assumed to be the C-BOD5 value by current regulations (200 mg/l). Point B represents the actual ultimate total BOD pollution value, or 485 mg/l. Since 200 is 41% of 485, EPA only addresses 41% of the total BOD pollution present in the waste stream.

[14]. See Appendix VI, "Nitrification in BOD5 Test Increases POTW Non-Compliance," Journal WPCF, Vol. 55, #12, December 1983, p.1

[15]. See Appendix III, "1984 Salt Lake City Water Reclamation Facility Test Results," especially table of test results on last page, comparing the TKN and Ammonia (NH3-N) values of influent and effluent. Because there is no significant change in the TKN value, and because the ammonia values actually increased, this indicates that no nitrification is occurring in the plant itself.

indicate that nitrification interference should be anticipated for all BOD5 testing.[16] Carbonaceous and nitrogenous biochemical oxygen demands must be considered separately. To do otherwise leads to technical data that is both meaningless and misleading, and can lead to the incorrect design of sewage treatment facilities.

2. Current BOD Testing Only Represents the 5-Day Value, Not the Ultimate Value

Not only must N-BOD and C-BOD be measured separately in order to accurately assess the makeup of a waste stream, but those values must be measured and quantified to reflect their ultimate value when the waste has fully stabilized in the waterway. The current C-BOD5 and BOD5 tests are faulty because they only represent the 5-day value, not the ultimate value.

This fact was recognized by EPA during the formulation of the 1984 revisions, although the regulations failed to implement the formula needed to adjust for the problem.[17] As explained below, there is no need to increase the time of the test- a simple formula extrapolates the ultimate value from the 5-day values.

C. Required Formula for Accurate Testing of BOD Values

In order to reflect the true measure of both the N-BOD and C-BOD components of BOD pollution, as well as to reflect the ultimate C-BOD and N-BOD values (not just the 5-day interim value), the following formula must be used:

BOD = 1.5 C-BOD5 + 4.6 TKN

In this formula, the C-BOD5 value is multiplied by 1.5 to give the ultimate C-BOD value.[18] The ultimate N-BOD value is determined by

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[16]. See Appendix IV- "Exertion of 5-Day Nitrogenous Oxygen Demand in Nitrifying Wastewaters," Journal WPCF Vol. 55, #9, Sept. 1983 (Chicago Results) and Appendix V- "San Diego Test Results on Raw Sewage, 1992." The Chicago data, Appendix IV, table III, shows N-BOD5 percentages of raw influent to be 24%, 28%, and 48% in three different plants. The San Diego data, Appendix V, shows an average N-BOD5 component in raw influent to be 15%, 12%, 16% and 20%. The maximums on a daily basis were as high as 57% N-BOD5 in raw influent.

[17]. 48 Fed. Reg. 52,274 (1983) (section II.A.).

[18]. Id.

multiplying the TKN test value by 4.6.[19] Testing for these separate components and using this formula yields the true ultimate makeup of the BOD, and eliminates problems related to nitrification interference (without ignoring N-BOD).

D. Best Practicable Waste Treatment Technology

It is the function of the secondary treatment regulations to define the best practicable waste treatment technology. This petition shows that waste treatment technology exists to build POTWs which cost no more or less than plants designed to meet current regulations, yet which reduce pollution to a much greater extent than those same plants designed to meet the current regulations.

Sewage is basically water carrying solids, and in order to treat sewage (remove solids), it is essential to know not only the composition of these solids, but even more importantly the physical condition of these solids (settleable, non-settleable, colloidal, or molecular dissolved). These conditions change with detention time and as sewage is transported from the source to the sewage treatment facility. Primary treatment mainly removes the settleable solids, while the non-settleable and dissolved solids only can be removed after they are adsorbed to a medium that can be removed by settling. Secondary treatment, historically defined as biological treatment, is using biomass (a medium of living organisms) to adsorb or directly utilize the non-settleable and dissolved solids in sewage, which in turn can be removed by settling processes.

This adsorption (or direct utilization) process can be achieved in fixed medium systems (trickling filters or bio-disks), or in suspended grown treatment systems (activated sludge, oxidation ditches). They all are called "secondary treatment," but their efficiency in removing the solids in the sewage are quite different, and mainly depend on the biomass that can be maintained in such systems. All biological treatment processes (removal of C-BOD, N-BOD, TKN, nitrates, phosphates) can be achieved as long as a suitable biomass can be contained in a controlled environment.

Oxidation ditches can provide such an environment, and the use of oxidation ditches results in excellent treatment of all the conventional water pollution elements in the waste stream.[20] These

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[19]. Id.

[20]. See Appendix IX, "Evaluation of Oxidation Ditches for Nutrient Removal," EPA 832-R-92-003, Sept. 1992; see also Appendix X, "A Comparison of Oxidation Ditch Plants to Competing

treatment results are contributed to the biomass contained in the system capable of adsorbing (or directly utilizing) all the above-mentioned water pollution elements from sewage.

Similar excellent treatment results (TKN, nitrate and phosphorous reduction) can be achieved in other containment systems. Not only in expensive multi-unit systems, but also in inexpensive Sequencing Batch Reactor (SBR) systems.[21]

Since these results are achieved in a containment system without primary treatment and without expensive sludge stabilization, it is not surprising that the initial construction and annual operating costs of oxidation ditches and SBRs are lower compared with complicated "conventional" systems which are only capable of adsorbing C-BOD, and which are unable of adsorbing or utilizing other water pollution elements in sewage such as N-BOD, nitrates and phosphates.[22]

E. Proposed Testing and Effluent Limitation Amendments

The petitioners recognize that it might not be economically feasible to apply the proposed regulations to existing POTWs, since many would be out of compliance and would need to make major renovations. Therefore, the petitioners propose that a new section be added to 40 C.F.R. Part 133 which would require *testing* of the below parameters for all existing and future POTWs,[23] but which would only apply as NPDES *effluent limitations* for those POTWs yet to be built or renovated. Based on the EPA reports and other technical papers cited in this petition, as well as numerous other technical

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Processes for Secondary and Advanced Treatment of Municipal Wastes," EPA 600/2-78-1051, March 1978.

[21]. See Appendix VIII, "Biological Phosphorous Removal in a Fed-Batch Reactor Without Anoxic Mixing Sequences," Research Journal WPCF, Vol. 63, #3, May/June 1991. This paper shows that the following effluent standards can be achieved using a SBR: less than 10 mg/l C-BOD; 10 mg/l TSS; 0.2 mg/l ammonia nitrogen; 5 mg/l total nitrogen; and 1 mg/l phosphorous.

See also Appendix XI- "EPA Summary Report on Sequencing Batch Reactors," EPA/625/8-86/011, August 1986, esp. pp. 9-13.

[22]. See Appendix XI pp. 16-22: these charts show the results of EPA's estimated costs for constructing SBRs of various sizes (1986). EPA's ultimate conclusion was that SBR and oxidation ditch systems can be built and operated at lower costs than conventional systems.

[23]. Testing on existing POTWs is necessary in order to evaluate treatment plant performance, since it is essential that proper technical data be available to determine future needs.

papers regarding secondary treatment and nutrient removal, the following effluent standards are proposed. The technical literature supports that these proposed effluent limitations are easily attainable by utilizing the proper biomass in a suitable containment facility, such as oxidation ditches and SBRs (as well as any other systems that EPA may wish to explore).

PROPOSED EFFLUENT LIMITATIONS:

C-BOD5	<	15 mg/l
TKN	<	5 mg/l
NH3-N	<	1 mg/l
NO3-N	<	5 mg/l
Total P	<	2 mg/l

All measured as 7-day averages.

CONCLUSION:

Treatment technologies are available to treat wastes more completely than the technologies which are now being employed to meet the current regulations, and at an equal or lesser cost. This being so, EPA has an obligation under the CWA to amend the secondary treatment standards to reflect this best practicable waste treatment technology.

The actual pollution components in the waste stream can only be identified by using correct testing procedures, as proposed in this petition. Correct testing of these parameters is the only way to ensure that the design of future POTWs will result in the treatment of all components of the waste stream, and to ensure that future expenditures of public funds will efficiently contribute to the interim 85% treatment goal of the CWA, as well as the ultimate goal of eliminating the discharge of pollutants into the Nation's waters.

SUBMITTED this Sixth Day of August, 1993.

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LUCERO, Circuit Judge, Concurring in part and dissenting in part

I join parts I, II, and IIIA of the majority's opinion, but must respectfully dissent from part IIIB. The majority concludes that the EPA's interpretation of the secondary treatment provisions is "permissible" and therefore valid under Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984). I cannot agree for two reasons. First, one "permissible" interpretation identified by the majority is not in fact advanced by the EPA. We cannot defer under Chevron to an agency construction when the agency has not construed the language at issue. Second, on this record, the EPA's construction of the term "secondary treatment" is not permissible. While the Clean Water Act ("CWA") gives the Administrator discretion to define secondary treatment pursuant to the statute, that discretion cannot be exercised in a manner inconsistent both with the structure and legislative history of the statute and with the Administrator's own prior interpretation of the term. In allowing the substitution of quality-based controls for generally-applicable, technology-based effluent limitations, the majority allows the EPA to return clean water regulation to the pre-1972 era.

The EPA does not itself argue that the language of 33 U.S.C. § 1311(b)(1)(B)—that "there shall be achieved . . . effluent limitations based upon secondary treatment"—gives it discretion to set effluent limitations lower than those deemed attainable through the application of secondary treatment. The majority's resolution, to the extent it finds discretion for the EPA's decision from

the term "based upon," see Maj. Op. at 27-28, is premised on its own construction of the statute, not the EPA's. That runs counter to the logic of Chevron deference and consequently to a core principle of judicial review of agency action. "If the basis stated by the agency for its decision is insufficient, we may not supply another that the agency itself has not chosen to rely on." American Meat Inst. v. EPA, 526 F.2d 442, 453 (7th Cir. 1975) (citing SEC v. Chenery Corp., 332 U.S. 194, 196 (1947) ("[T]he court is powerless to affirm the administrative action by substituting what it considers to be a more adequate or proper basis. To do so would propel the court into the domain which Congress has set aside exclusively for the administrative agency.")). If Congress has implicitly or explicitly left gaps in a statutory scheme, Chevron requires us to defer to reasonable efforts on the part of the agency to fill those gaps through policy and rule-making, see 467 U.S. at 843-44, and is explicitly concerned with the agency's construction of congressional language to fill those gaps, id. Such gap-filling can only be upheld if the agency's own rationale for its actions—including its construction of the statute—is proper.[1]

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[1]The majority argues that I fail to distinguish between "the *source of* agency discretion, which we must determine in the first instance under Chevron, and the *basis for* the agency's exercise of its discretion, for which . . . we may not supply our own rationale." Maj. Op. at 28 n.17. The majority's distinction is untenably semantic because an agency's exercise of discretion under Chevron must be based on its claimed statutory source of discretion. In reviewing the (continued...)

Reviewing the Agency's denial of Maier's petition, its briefs, as well as the material accompanying its earlier promulgation and amendment of secondary treatment regulations, I can find no suggestion from the Administrator that were she to find reductions of a particular pollutant attainable by means of secondary treatment, she would not need to promulgate a generally-applicable effluent limitation for that pollutant. Indeed, the Agency may hold a contrary view of its § 1311(b)(1)(B) discretion. In responding to Maier's petition, the Administrator states that were technologies to control NOD considered to be secondary treatment, "[a]ny such revised secondary treatment requirements would be universally applicable to all POTWs pursuant to section 301(b)(1)(B) [33 U.S.C. § 1311(b)(1)(B)]." A.R. at 123-24; see also EPA Br. at 26 ("Were NOD

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[1](...continued)
former, a court is bound to review the latter. The majority would have the reviewing court independently root through the statute on its own cognizance looking for gaps that the agency's policymaking might permissibly back-fill. What the majority has done is to identify an ambiguous portion of the statute, i.e. the "based upon" language of § 1311(b)(1)(B), and defended the agency's failure to promulgate generally-applicable NOD effluent limitations on the basis of the court's own construction of that ambiguous term. Quite aside from the fact that the EPA has implicitly disavowed this particular construction of the statute, Chevron contains absolutely no authorization for approving administrative constructions in this manner. The most that the majority can conceivably make of the "based upon" language of § 1311(b)(1)(B) is that the administrative construction of "secondary treatment" does not violate that particular statutory provision. This view is probably unsustainable in light of the EPA's previous interpretation of § 1311(b)(1)(B). But even assuming its validity, the majority's view fails to show that the administrative construction of "secondary treatment" does not fall afoul of some other provision of the CWA.

limitations to be made part of 'secondary treatment,' they would apply to all POTWs regardless of local conditions.").

Moreover, the relevant regulatory history strongly suggests that the Agency would not interpret the "based upon" language in § 1311(b)(1)(B) to give it discretion to depart from reductions attainable by the technology described in 33 U.S.C. § 1314(d)(1). Effluent limitations on POTWs are set pursuant to 40 C.F.R. § 133.102. This regulation, which the Agency refers to as the Secondary Treatment Information regulation, consistently cites both § 1311(b)(1)(B) and § 1314(d)(1) as its statutory authority, see, e.g., 41 Fed. Reg. 37222 (1976), and has never suggested that reductions deemed attainable via secondary treatment need not be translated directly into applicable effluent limitations. Rather, the Agency has implicitly viewed the Secondary Treatment Information regulation as simultaneously satisfying both its information publication obligations under § 1314(d)(1) and its limitation promulgation obligations under § 1311(b)(1)(B). See, e.g., 42 Fed. Reg. 54664 (1977) ("The Secondary Treatment Information regulation contains effluent limitations in terms of biological oxygen demand, suspended solids and pH which must be achieved by municipal wastewater treatment plants . . . in accordance with section 301(b)(1)(B) of the . . . FWPCA. The Secondary Treatment Information regulation was promulgated pursuant to section 304(d)(1) of the FWPCA.").

In fact, the Agency appears to regard the Secondary Treatment Information regulation as simultaneously defining secondary treatment and establishing the effluent limitations applicable to POTWs. See 41 Fed. Reg. 37222 (1976) ("Secondary treatment (as defined in 40 C.F.R. 133) is the minimum level of treatment required for all publicly-owned treatment works."); 49 Fed. Reg. 36987 (1984) ("The secondary treatment regulation defines 'secondary treatment' as attaining an average effluent quality for both biochemical oxygen demand, five-day (BOD 5) and SS of 30 mg/l in a period of 30 consecutive days, an average effluent quality of 45 mg/l for the same pollutants in a period of 7 consecutive days, and 85 percent removal of the same pollutants in a period of 30 consecutive days."). Agency practice has thus never recognized a disjunction between its obligation to publish attainable reductions under § 1314(d)(1) and to promulgate effluent limitations under § 1311(b)(1)(B). Yet the majority's "based upon" analysis would create this disjunction and effectively attribute it to the Agency's discretion.

The Agency claims "considerable discretion . . . to define 'secondary treatment.'" EPA Br. at 27. Exercising this definitional discretion, the Agency asserts that controls on NOD and nutrients "simply should not be required as part of 'secondary treatment.'" Id. at 25. Were the Administrator responding to Maier's petition in a regulatory vacuum, we might be required to defer to this

agency definition of secondary treatment. But that is not the case. The secondary treatment regulations have always set controls on biological oxygen demand (BOD), see 38 Fed. Reg. 10642 (1973) (defining minimum level of BOD reduction attainable through application of secondary treatment), and such "gap-filling" appears entirely consistent with the applicable legislative history.[2] Moreover, as noted above, BOD controls, in conjunction with those imposed on certain other pollutants such as suspended solids, have been administratively regarded as defining secondary treatment.

The Agency recognizes that NOD is one of two components of BOD, the other being carbonaceous BOD (or "CBOD"). See, e.g., 48 Fed. Reg. 52272, 52274 (1983). Maier's petition therefore requests the Agency to apply specific controls to a pollutant whose restriction falls broadly within the administrative and legislative understanding of secondary treatment. Of course, given the EPA's statutorily-conferred discretion to achieve "effluent limitations based upon secondary treatment," § 1311(b)(1)(B), the EPA may not be obliged to impose secondary treatment-based controls on NOD. But having included the control of oxygen-depleting compounds within the general definition of secondary

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[2]"Secondary treatment as considered in the context of a publicly-owned treatment works is generally concerned with suspended solids and biologically degradable, oxygen demanding materials (BOD)." H. Rep. No. 92-911, 92d Cong., 2d Sess., at 101 (1971), quoted in Proposed Rule, 48 Fed. Reg. 52272, 52273 (1983).

treatment, it is incumbent upon the EPA to explain its refusal to promulgate NOD and nutrient limitations.

In the past, the Administrator has principally explained the refusal to treat NOD controls as part of secondary treatment as proceeding from the impracticality of such controls. See, e.g., 49 Fed. Reg. 36986, 36988 (1984); 48 Fed. Reg. 52272, 52273 (1983) (citing supporting documentation for 1973 regulations). Such a decision, if adequately supported by the record, is well within the Administrator's rulemaking discretion. In denying Maier's petition, the EPA now points to two factors. First, the Agency reiterates that secondary treatment is concerned with the removal of carbonaceous organic material. This argument begs the question. If Maier's petition questions the EPA's earlier conclusion as to non-attainability, the Agency should explain its continued reliance on its previous explanation. The EPA has not done so, instead insisting that any new information on attainability submitted by Maier "does not establish (or even suggest) why control of nitrogen or phosphorus should be considered secondary treatment." A.R. at 125.

That error alone would not require us to remand to the Agency were the second factor relied on by the Administrator to deny Maier's petition more persuasive. It is not. The Agency's second defense of its secondary treatment regulations is to point to its policy preference for quality-based controls rather

than generally applicable limitations, at least for pollutants that do not have a uniform impact on receiving bodies of water. See A.R. at 113-14, 123; see also EPA Br. at 19-20. The EPA may yet have good reasons for refusing to regulate NOD via generally-applicable effluent limitations on POTWs, but a policy preference for quality-based measures over generally-applicable technology-based measures is not one of them. Such a preference improperly construes the CWA.

Before 1972, the stated purpose of the Federal Water Pollution Control Act ("FWPCA") was "to enhance the quality and value of our water resources and to establish a national policy for the prevention, control, and abatement of water pollution." 33 U.S.C. § 1151(a) (1970) (superseded by Pub. L. 92-500, § 2, 88 Stat. 816 (1972)). To this end, the pre-1972 legislation employed ambient water quality standards as the primary mechanism for water pollution control. See EPA v. California State Water Resources Control Bd., 426 U.S. 200, 202 (1976). The 1972 Amendments to the FWPCA, popularly known as the Clean Water Act, deliberately ended this approach. Prompted by the Senate Committee on Public Works' review of the FWPCA program, and its conclusion that "the national effort to abate and control water pollution has been inadequate in every vital respect," S. Rep. 92-414, at 7, reprinted in 1972 U.S.C.C.A.N. 3668, 3674, Congress declared as the new national goal of the program that "the discharge of pollutants into the navigable waters be eliminated," 33 U.S.C. § 1251(a)(1).

Consistent with this end, the CWA substituted technology-based, generally-applicable effluent limitations for water quality-based regulatory approaches. See State Water Resources Control Bd., 426 U.S. at 204 ("Such direct restrictions on discharges facilitate enforcement by making it unnecessary to work backward from an overpolluted body of water to determine which point sources are responsible and which must be abated."). The legislative history of the Act is replete with references to the need for this substitution.[3]

The EPA's denial of Maier's petition effects an entirely opposite substitution. In order for an administrative construction that runs counter to basic policies underlying the relevant statutory scheme to be reasonable under the second step of Chevron, the implementing agency must point to some language in the statute to justify its policy conclusion—here, that the POTW regulatory regime can legitimately depart from the core public policy of the CWA.[4] The

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[3]The Senate Report accompanying the CWA notes: "The application of Phase I technology to industrial point sources is based upon the control technologies for those sources and to publicly owned sewage treatment works is based upon secondary treatment. It is not based upon ambient water quality considerations." S. Rep. 92-414, at 43, reprinted in 1972 U.S.C.C.A.N. 3668, 3710 (emphasis added).

[4]Contrary to the majority's assertion, placing this obligation on the Administrator does not "turn[] the Chevron test on its head." Maj. Op. at 33. Chevron authorizes the Administrator to fill legislative gaps, but only when done in compliance with her statutory policymaking discretion. Chevron, 467 U.S. at 843-44. Here, the EPA has without justification chosen to fill a gap by means of (continued...)

Administrator has not done so. Her passing reliance on § 1311(b)(1)(C), which allows the Administrator to set "more stringent limitation[s]" to meet water quality standards, is misplaced. At most, that provision allows the Administrator to set quality-based limits for pollutants that cannot be attainably reduced by secondary treatment, or to set supplementary quality-based limits for pollutants already regulated by a floor of generally-applicable limitations based on secondary treatment. It cannot reasonably be read as general discretion to redefine secondary treatment to cover only those pollutants that are—in the view of the Administrator—more appropriately regulated via generally-applicable regulations rather than case-by-case quality-based limits. That interpretation makes a mockery of the primacy accorded technology-based regulation by the plain language and legislative history of the CWA.

In fact, Congress has itself confirmed that POTWs are not exempted from this core policy. In 1977, Congress enacted 33 U.S.C. § 1311(h), which permits the Administrator, on a case-by-case basis, to relax secondary treatment

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[4](...continued)
a policy that contravenes the most fundamental tenet of the CWA. See Maislin Indus., U.S. v. Primary Steel, 497 U.S. 111, 134-35 (1990) (agency "does not have the power to adopt a policy that directly conflicts with its governing statute"). Without some language suggesting that POTWs are exempt from the force of this basic statutory imperative, the EPA's regulatory inaction must be regarded as "manifestly contrary to the statute," and accordingly invalid under Chevron. 467 U.S. at 844.

requirements for POTWs releasing pollutants into marine waters. See 33 U.S.C. § 1311(h). If the EPA has the discretion relied on by the Administrator in the present case, this provision was (and is) entirely unnecessary. The Administrator could simply declare that the biological treatment of pollutants by POTWs that release into marine waters is not "secondary treatment" because she has made the policy choice to address such discharges solely through individual NPDES permit requirements. In passing § 1311(h), Congress effectively stated that such discretion was not open to the Administrator. Cf. Bridger Coal Co. v. Director, Office of Workers' Compensation Programs, 927 F.2d 1150, 1153 (10th Cir. 1991) (statute should be interpreted to give meaning and effect to each provision). It is not our place to offer discretion to the Agency where Congress has not.[5]

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[5]The majority states that it is not authorizing the EPA's exercise of general policy discretion to substitute quality-based restrictions for generally-applicable, technology-based effluent limitations, but is instead restricting the EPA's discretion to cases in which it advances a "reasoned explanation" for this substitution. See Maj. Op. at 32. I am not so sure. Nowhere does the CWA suggest that its clear technology-first imperative is subject to cancellation by the agency's "reasoned explanations." Nor does the majority explain why in the absence of statutory authorization, the EPA is free to ignore that imperative on the basis of its own "reasoned explanations." See Director, Office of Workers' Comp. v. Newport News, 115 S. Ct. 1278, 1288 (1995) ("Every statute proposes, not only to achieve certain ends, but also to achieve them by particular means . . . . The withholding of agency authority is as significant as the granting of it, and we have no right to play favorites between the two."). Finally, the majority fails to explain why the qualitative variability of pollutant discharges constitutes such a "reasoned explanation," or what other types of agency explanation would or would not allow for a similar departure from the basic public policy of the CWA.
(continued...)

On a number of occasions, the Agency has itself confirmed that "effluent limitations based upon secondary treatment" cannot be fixed by reference to quality-based considerations. See, e.g., 38 Fed. Reg. 22298 (1973) (POTW effluent limitation regulation "is to be based on the capabilities of secondary treatment technology and not ambient water quality"); 41 Fed. Reg. 30786, 30788 (1976) (same). In denying Maier's petition, the Administrator alludes to this constraint, see A.R. at 117 ("[T]he definition of secondary treatment is to be technology-based rather than water quality based"), then ignores it without explanation.

The denial of Maier's petition must be "based on a consideration of the relevant factors." Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971). Here, the EPA's denial is based on one factor that is illegitimate—its "reasoned" policy preference for quality-based over generally-applicable, technology-based restrictions—and another that is legitimate but unsubstantiated—the nonattainability of NOD reductions.[6] I would remand the

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[5](...continued)
Without some limiting principle, it is hard not to conclude that the majority is essentially deferring to the EPA's policy preference for quality-based standards.

[6]The majority states that I view technological feasibility as the "only criterion" that the EPA can use to define secondary treatment. Maj. Op. at 26. That is incorrect. Our review is appropriately confined to the reasons given by the EPA for its denial of Maier's petition. In my view, the only argument the
(continued...)

petition to the Agency for reconsideration in light of the correct legal principles. See American Horse Protection Ass'n v. Lyng, 812 F.2d 1, 7-8 (D.C. Cir. 1987).

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[6](...continued)
EPA offers that is not "manifestly contrary to the statute," is one based on unsubstantiated claims of technological feasibility. This should not be contorted to mean that the EPA's only possible basis for defining secondary treatment is technological feasibility.