TECHNICAL GUIDANCE MANUAL

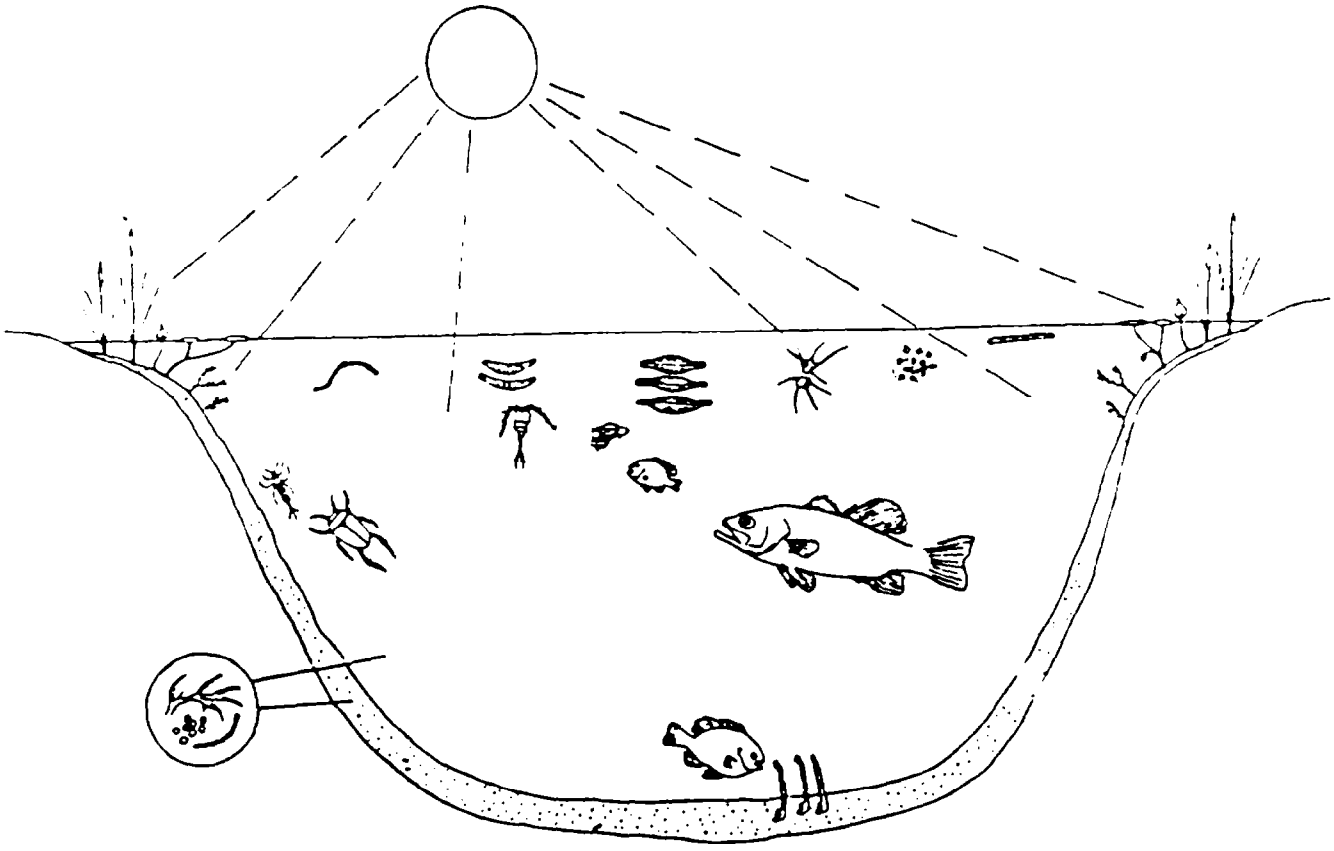
FOR THE REGULATIONS PROMULGATED

PURSUANT TO SECTION 301(g)

OF THE

CLEAN WATER ACT OF 1977

40 CFR PART 125 (SUBPART F)



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Front cover illustration taken from Fundamentals of Ecology, Eugene P. Odum, 1971 (Third Edition)

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IMPORTANT EPA CONTACTS

DIVISION	PHONE #	301(g) RELATED ACTIVITY
PERMITS (Office of Water Enforcement and Permits)	(202) 426-7035	overall review and coordination; use of biomonitoring
CRITERIA & STANDARDS (Office of Water Regulations and Standards)	(202) 245-3042	updates on EPA criteria; review of alternative criteria derivation methods
MONITORING AND DATA SUPPORT (Office of Water Regulations and Standards)	(202) 382-7056	fate models/wasteload allocations/design conditions
CARCINOGEN ASSESSMENT GROUP (CAG) (Office of Research and Development)	(202) 382-7343	carcinogenicity determinations; updates of CAG list
RESEARCH AND DEVELOPMENT (Environmental Criteria and Assessment Office, ECAO-Cin.)	(513) 684-7531	human health risk analyses; criteria updates and Multi-Media documents, and ADI derivations
(Industrial Environmental Research Lab, IERL-Cin.)	(513) 684-4402	bench scale treatment studies

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I. Introduction

A. Purpose of this Manual

The purpose of this manual is to assist applicants, States, and EPA Regions in developing section 301(g) variance requests and reviewing completed section 301(g) requests. This manual outlines the roles for each of the parties involved in the variance process and identifies techniques and methods of use in the section 301(g) process. If any of the methodologies or conditions recommended in this manual seem inappropriate to an applicant's situation, the applicant may use alternative methods but must first get approval from EPA (the Director of OWRS and Regional Administrator have separate responsibilities) during the early consultation suggested in the regulations addressing 40 CFR Part 125, Subpart F.*

B. Statutory Background

The Clean Water Act requires achievement of best available technology economically achievable (BAT) effluent limitations for all nonconventional pollutants by July 1, 1984 or not more than three years after EPA establishes the limitations, up to July 1, 1987, whichever is later. Section 301(b)(2)(F).

Section 301(g) of the Clean Water Act (P.L. 95-217) establishes a mechanism whereby a discharger may obtain a modification of the requirements of section 301(b)(2)(F). The discharger can be granted a section 301(g) variance by showing that the modified requirements will meet certain environmental criteria. These

* The regulation referred to is the proposed regulation which appeared at 49 FR 31462, (8-7-84). If changes are made when the regulation is promulgated, this manual will be modified accordingly.

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criteria were specified in the 1977 amendments to the Clean Water Act:

- o the variance is not available for pollutants designated as toxic, conventional, or as a thermal component of a discharge.
- o the new limitation will not be less than required by best practicable control technology currently available (BPT).
- o the new limitation will comply with applicable water quality standards specific to the nonconventional pollutant.
- o the modification will not result in any additional requirements on any other point or nonpoint source.
- o the modification will not interfere with water quality which assures protection of public drinking water supplies and the protection and propagation of a balanced population of fish, shellfish, and wildlife, and allows recreational activities in and on the water.
- o the modification will not result in a discharge of pollutants in quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment due to acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity or teratogenicity), bioaccumulation, persistency, or synergistic propensities.

The legislative history of the 1977 Amendments to section 301 of the Clean Water Act (CWA) makes it clear that Congress intended relief from promulgated BAT effluent limitations guide-

lines where warranted. Congress determined that it was possible that the BAT requirements might result in the application of excessive controls to certain kinds of pollutants. Where sufficient information could be generated on these pollutants to make a judgment concerning their effects on receiving water, appropriate relief from unnecessarily stringent limitations should be provided. Congress envisioned that the Administrator would develop a pollutant-specific waiver without affecting necessary BAT limitations on the remainder of the pollutants in the discharge. The enactment of section 301(g) was the result of an effort to eliminate "treatment for treatment's sake" for nonconventional pollutants.

The legislative history also contains Congress's recognition of the delays encountered with section 316(a) thermal variances and its expectation that the section 301(g) process be as expeditious as possible.

C. Summary of Section 301(g) Variance Process

To make the variance process as efficient and expeditious as possible, EPA recommends relying primarily upon State water quality standards or EPA section 304(a) water quality criteria, together with the methodologies for developing the criteria.

At a minimum, the proposed modified effluent limitation (PMEL) must meet applicable State water quality standards. In those cases where State standards do not individually address a nonconventional pollutant, EPA recommends that a specific criterion number be identified or developed for the pollutant or pollutant parameter in question and that number be met at the

edge of the State mixing zone. (See Figure I)

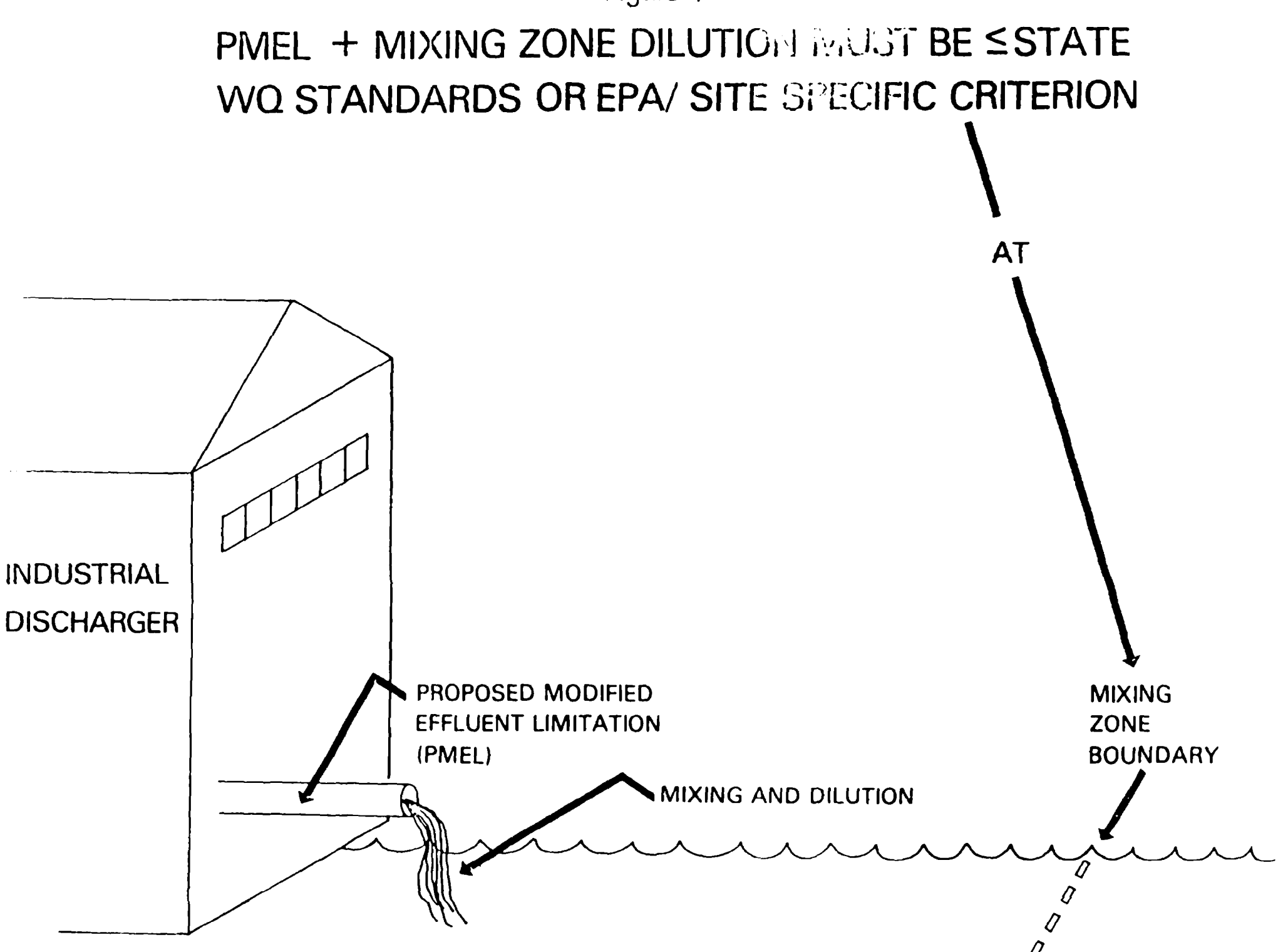
To avoid lengthy studies (i.e., site-specific environmental impact assessments which require extensive resources and time), EPA recommends use of section 304(a) water quality criteria unless relevant criteria do not exist or the EPA Director of the Office of Water Regulations and Standards consents to the development of other criteria, notwithstanding the existence of relevant 304(a) criteria. Therefore, the criteria or applicable water quality standards should be the usual basis of 301(g) variance determinations. Essentially the variance hinges on the applicant's ability to meet State standards or EPA (or other site-specific) water quality criteria for nonconventional pollutants, at the edge of an authorized mixing zone. Compliance with water quality standards or criteria at the edge of the mixing zone would provide EPA with a strong basis for concluding that aquatic life and human health will be protected from acute and chronic toxicity. Additionally, however, all other statutory factors will have to be addressed on a case-by-case basis such as synergism, persistency, etc.

Steps to Gaining a Variance

The following is a summary of the steps required to gain a section 301(g) variance. These steps are discussed in more detail in section II.

1. Identify pollutant as nonconventional.
2. Ensure compliance with BPT or BPJ/BPT.
3. Demonstrate no impact on other point and nonpoint sources.
4. Ensure compliance with applicable State water quality standards, or EPA water quality criteria at edge of State mixing zone if there is no State standard.
5. Demonstrate no impact on water supplies.
6. Demonstrate no impact on recreational activities.

Figure 1



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7. Ensure no impact on human health.
8. Demonstrate no synergism/persistency causing adverse impact.

D. Applicant Responsibilities

The primary responsibility of the applicant is to file a completed request which adequately addresses each of the statutory factors. The applicant will be responsible for conducting all tests and making all demonstrations of compliance with the section 301(g) requirements. The burden of proof is on the applicant.

The applicant should work as closely as possible with the State and Regional permitting authority in order to determine an acceptable plan for developing a completed request. The applicant is encouraged to conduct an early consultation with the State and Region to outline the studies and data that will be contained in its completed request. This will help to avoid denial of an application based on incompleteness or misinterpretation of the section 301(g) requirements.

Appendix G is a 301(g) checklist which is designed to help the applicant file an adequate, completed request. The checklist includes all the topics and informational needs which must be addressed by an applicant in order to be considered for a section 301(g) variance. Failure to address these topics adequately will most likely lead to a denial.

E. State Role

A number of aspects will involve the State where the variance request originates. They are:

- o State concurrence required.
- o State water quality standards must be met.
- o State mixing zones must be used.

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o State Agency responsible for wasteload allocations (other point sources) must make determination about impact of PMEL on other sources.

Section 301(g) authorizes the EPA Administrator to approve section 301(g) variance requests. The Administrator has delegated the final approval authority to the Director of the Office of Water Enforcement and Permits, formerly referred to as the Deputy Assistant Administrator; see 40 CFR 124.62(d). A strong State role in the section 301(g) variance process is nonetheless assured because the statute requires that no modified effluent limitation may be granted unless the State concurs. If a State waives its right to approve or deny the variance, the request will be denied. 40 CFR 124.62 specifies the way in which the State is involved in a section 301(g) determination.

The State Director of an NPDES-approved State may deny or forward to the Regional Administrator with a written concurrence, or submit to the EPA Regional Administrator without recommendation, a completed request for a section 301(g) variance (40 CFR 124.62(b)). In non-NPDES States, the State Director may provide certification of a permit containing a section 301(g) variance and such certification of the permit shall constitute the State's concurrence in the variance. Thus, States may exercise a veto over a proposed modified effluent limitation.

Applicants must meet relevant State water quality standards. If a mixing zone or zone of initial dilution (in marine waters) is defined in the State water quality standards, it will be used in the section 301(g) analysis when comparing concentrations of the discharged nonconventional pollutant to the water quality standard or water quality criteria, (whichever is more appropriate).

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The State's mixing zone (defined by its water quality standards) will be used to review water quality effects even when an independent criterion number, not a State water quality standard, is used to define acceptable concentrations of the nonconventional pollutants. If the State has no mixing zone, the State should work with the applicant to derive a site-specific mixing zone for section 301(g) purposes, unless the State prohibits a mixing zone. In that case the proposed modified effluent limitation must be met at the point of discharge (end of pipe).

In addition to the above responsibilities, the section 301(g) regulation requires a State to determine whether the applicant's modified effluent will result in any additional requirements on other point or nonpoint sources. The State must determine whether there are any wasteload allocation/total maximum daily load requirements for the nonconventional pollutant in the area of the discharge and whether the applicant's discharge will prevent compliance with these requirements.

F. EPA Regional Role

Section 301(g) requires the Regional Administrator to deny or approve each 301(g) variance request which is forwarded to the Region by the State. Approved requests will be forwarded to EPA Headquarters for final approval or denial. The Regional Administrator will also be responsible for approving or denying the use of substitute (local) test species in site-specific criteria development. It is recommended that the Regional Administrator consult the State permitting authority before making a decision on a species substitution. It is anticipated that Region and State representatives will work closely together on making a section 301(g)

variance decision.

G. Early Consultation

EPA recommends that all applicants hold an early consultation with Federal and State permitting authorities. The applicant can discuss the tentative plan for developing the contents of its completed request either in person, by phone, or correspondence. The early consultation will allow EPA, the State and the applicant to determine what is required to prepare a section 301(g) completed request. The early consultation should help the applicant avoid unnecessary or inadequate testing and could lead to a redirection of the applicant's proposed study.

During the early consultation, the applicant should discuss a plan of study describing the proposed modified effluent limitation, a general description of the data, studies, experiments and other information to be submitted, including any other data and information necessary to assist the Regional Administrator and State Director in determining whether the applicant's plan of study is adequate.

Early consultation is particularly recommended if: (1) the proposed modified effluent limitation is for a pollutant or pollutant parameter for which the State has not adopted a numerical standard and the applicant does not plan to use a published EPA numerical criterion or none is available; (2) the proposed modified effluent limitation is for a pollutant or pollutant parameter which is suspected of being a carcinogen (Applicants may determine whether the nonconventional pollutant has been evaluated by the Carcinogen Assessment Group (CAG) of EPA, and whether it is suspected of

being a carcinogen, by calling CAG at (202) 382-7315); (3) the applicant has reason to believe that the pollutant or pollutant parameter for which the variance is requested will contribute to synergistic or additive effects in the effluent or receiving water; and/or, (4) the applicant plans to request an extension for filing a completed request as provided in 40 CFR 122.21(n)(2).

II. Determining Factors in a Section 301(g) Variance

The following paragraphs discuss the factors that need to be addressed in order to be considered for a section 301(g) variance. Many of the sections provide EPA recommendations on how they should be addressed; however, an applicant may present its own methods and suggestions to the EPA Region and Headquarters. If an applicant believes there is a better way of addressing an issue under section 301(g), the applicant should discuss the option with EPA during the early consultation period before proceeding. Section 125.53(b) discusses the recommended time periods when early consultations should be held.

A. Pollutant Check

The first step an applicant must take is to identify the nonconventional pollutant for which a variance is sought (See Figure II). Toxic pollutants found on the section 307(a) list of toxic pollutants and conventional pollutants listed under section 304(a)(4) are ineligible for a variance under section 301(g). See Appendix A or 40 CFR 401.15 and 401.16. However, delisted pollutants, those pollutants removed from the 307(a) list of toxic pollutants through EPA administrative action, are eligible for section 301(g) variances. (Official delistings will be publicly noticed in the Federal Register.)

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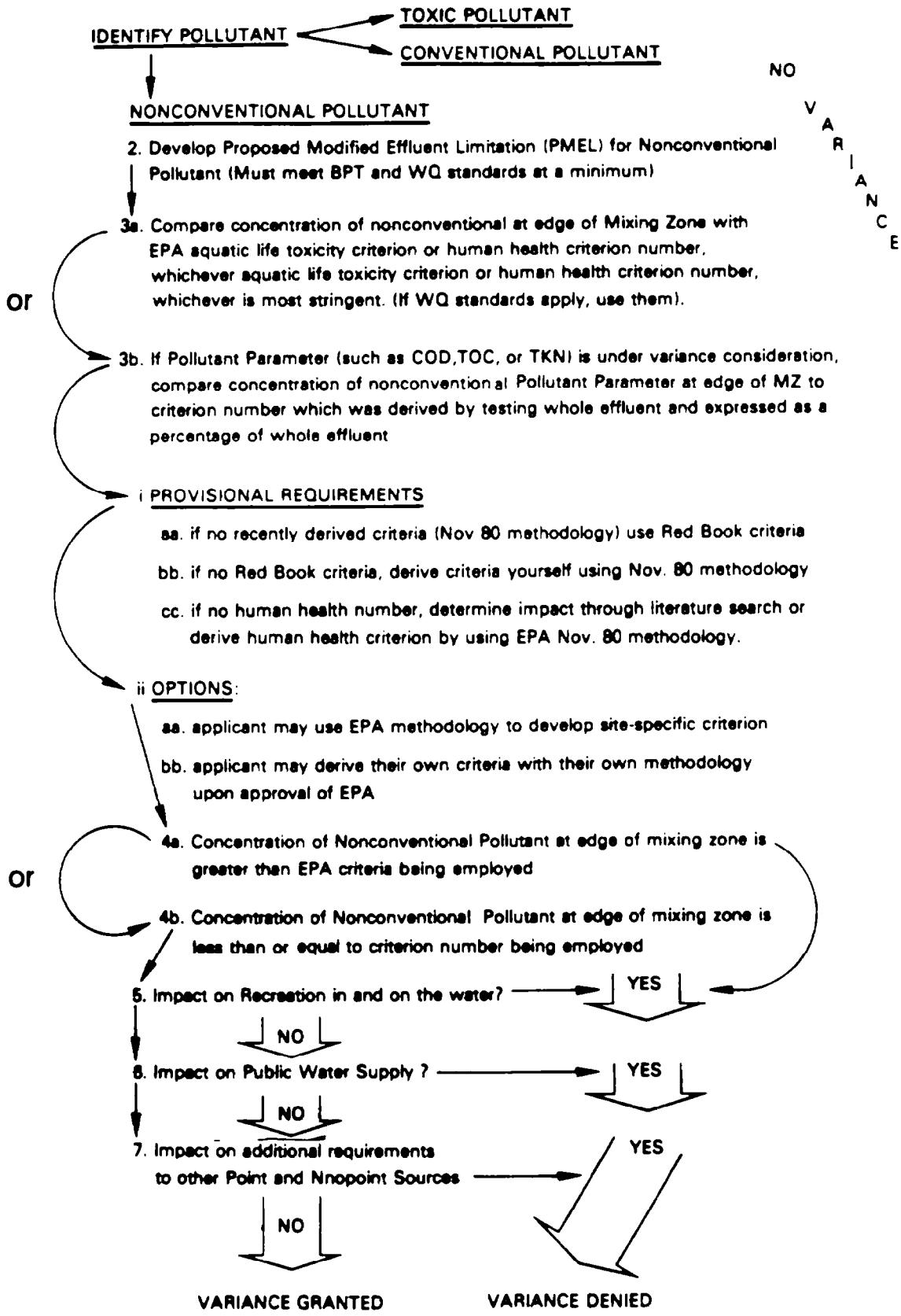
Figure II

301(g) DECISION LOGIC



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Pollutant parameters such as COD, surfactants, TOC, total phenols, etc. are also eligible for a section 301(g) variance as long as none of the constituents is found on the toxic or conventional pollutant lists (or if found on these lists, the pollutants must be properly limited by BAT or BCT). Analytical methods such as GC/MS are suggested to validate that no toxic pollutants make up the pollutant parameter.

B. Compliance with BPT Limitations

The owner/operator of a point source must demonstrate that the proposed modified effluent limitation (PMEL) will, at a minimum, be as stringent as BPT for the nonconventional pollutant in question. If an applicant requests a variance from a BAT guideline when there is no BPT guideline for that specific industrial subcategory, the permitting authority must determine a BPT/BPJ (best professional judgment) limit for that pollutant which will serve as a minimum requirement.

C. Compliance with State Water Quality Standards

At a minimum, the PMEL must meet the State water quality standard for the nonconventional pollutant. If an applicant does not know the State water quality standard which controls its nonconventional pollutant, it should contact its State permitting or water quality authority. EPA recommends that a section 301(g) applicant determine impact on aquatic life and human health by first reviewing water quality standards which address these concerns (i.e., fishable/swimmable, drinking water standards). If the State water quality standards for a nonconventional pollutant address aquatic life and human health concerns,

the applicant can determine whether the PMEL would violate those standards by measuring the nonconventional pollutant concentration at the edge of the mixing zone. A violation would mean an immediate denial of the variance.

D. Other Point and Nonpoint Sources

The owner/operator of a point source must demonstrate that the modified effluent limitation will not result in any additional requirements on any other point and nonpoint sources.

The section 301(g) regulation requires that a section 301(g) applicant obtain a determination from the State or other interstate agency(s) having authority to establish wasteload allocations (WLAs) and total maximum daily loads (TMDLs) indicating whether the applicant's discharge will result in any additional treatment, pollution control, or other requirements on any other point or nonpoint sources. The applicant should contact the State water quality or permitting authority and ask them to provide a written determination. The determination should be attached to the variance request if it is forwarded to the EPA Regional Office and/or EPA Headquarters. The State determination must include a rationale for its conclusion.

If wasteload allocations have not been established in the locale of the section 301(g) variance applicant, EPA recommends that the applicant identify other point sources in the vicinity of the modified effluent limitation and determine whether the increased nonconventional pollutant load expected in the receiving stream if a variance is granted would affect any other source's

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treatment requirements. The applicant may accomplish this by conferring with the State permitting agency or with the point sources most likely to be affected. If the modified effluent limitation under section 301(g) resulted in additional requirements on these dischargers, the 301(g) variance would be denied. Failure to show evidence of no effect on other point sources will result in a denial of the variance.

With regard to receiving waters where WLAs and TMDLs are absent, the section 301(g) regulation requires that once a section 301(g) variance has been granted, the State must establish numerical water quality standards for the nonconventional pollutant and WLAs and TMDLs for the section 301(g) source and the other dischargers in the vicinity. This must be done within the 5 year permit term for the section 301(g) permittee and before the permit containing the section 301(g) variance is reissued. The rationale for this requirement is that many of the factors considered in a section 301(g) review are also considered in the development of water quality standards (under section 303(c) of the Clean Water Act). Accordingly, it follows that the resulting data from a section 301(g) variance should be applied to the development of site-specific water quality standards and wasteload allocations and total maximum daily loads. Since States must by law review their water quality standards every 3 years, this requirement should not impose any undue extra administrative burden on them. EPA has a number of draft documents which may assist a State in developing WLAs and TMDLs. They are listed in Appendix H.

E. Maintenance of Water Quality

Section 301(g) requires an applicant to assure protection

of water quality which will protect the following:

1. Public water supply
2. Recreational Activities
3. Balanced Population of Shellfish, Fish, Wildlife
4. Human Health Considerations

1. Public Water Supply

The applicant must demonstrate that the modified effluent limitation will not adversely affect any public water supplies that are in the vicinity of the point of discharge. The modified effluent limitation must not prevent a planned or existing public water supply from being used, or from continuing to be used, as a public water supply, or have the effect of requiring any public water supply to provide additional treatment.

The applicant should contact the State permitting authority to determine whether there are or will be public water supplies in the area and then contact the public water supplies in the vicinity of the discharge to determine if the PMEL would affect their operation. If they are affected, a section 301(g) variance request would be denied. The applicant should also determine from the permitting authority whether State or local drinking water standards would be violated by the PMEL. If standards would be violated, the request would be denied.

2. Recreational Activities

The applicant must demonstrate that the PMEL will not adversely affect recreational activities beyond the mixing zone boundary. If a recreational use is affected, a section 301(g) variance request would be denied. The section 301(g) regulation requires that the PMEL not interfere with recreational activities

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beyond the mixing zone boundary (or zone of initial dilution, whichever is applicable), including without limitation swimming, diving, boating, fishing and picnicking and sports activities along shorelines, river banks, lake shores and beaches.

The section 301(g) regulation also requires that there are no Federal, State, or local restrictions on recreational activities within the vicinity of the applicant's outfall due to the PMEL, unless such restrictions are routinely imposed around industrial discharges.

The applicant should take an inventory of recreational activities in the area of the discharge and determine if the section 301(g) variance would affect these activities. For example, does the PMEL, after dilution in the mixing zone, exceed human health related standards or criteria? Human health criteria protect humans from both body contact and the consumption of water, fish or shellfish containing harmful levels of pollutants. An aquatic life criterion is a good measure of the potential impact to a fish population associated with a specific recreational use such as trout fishing.

3. Balanced Population of Shellfish, Fish and Wildlife

Section 301(g) requires the applicant to demonstrate that a section 301(g) variance will not interfere with the attainment or maintenance of water quality which shall assure protection and propagation of a balanced population of fish, shellfish and wildlife. At the same time, the statute requires that human health and the environment be protected from acute and chronic toxicity, persistency, bioaccumulation and synergistic propensities.

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(Chronic toxicity, according to section 301(g), includes carcinogenicity, teratogenicity, and mutagenicity.)

Applicants are urged to use State water quality standards in making a section 301(g) variance demonstration, if those standards address the required aquatic life and human health concerns with respect to the specific pollutant or pollutant parameter. Using these standards would considerably simplify the demonstration. Such standards are usually described as "fishable/swimmable," "drinking water," or "aquatic life" standards. State standards protecting designated uses such as "industrial" or "agricultural" are not acceptable to demonstrate compliance with section 301(g). If the State has water quality standards which protect aquatic life and human health on other water bodies in the State, these can be used in a section 301(g) assessment.

If State standards are inadequate to protect aquatic life and human health, or are not available with respect to the specific pollutant or pollutant parameter, EPA recommends use of the section 304(a) criteria to evaluate the environmental impact of the PMEL. These criteria address several of the objectives which underlie the section 301(g) statutory criteria (including acute and chronic toxicity and bioaccumulation). The criteria, designed to protect aquatic life and human health uses, consist of numerical concentrations of specific pollutants. They are based on data and scientific judgments on the relationships between pollutant concentrations and environmental and human health effects. When using a section 304(a) criterion number, the most recent EPA criterion document should be consulted and the most stringent criterion should be chosen (i.e., the latest criteria

for ammonia and chlorine are presented at 49 FR 4551, February 7, 1984). For latest updates on criteria development, please contact the Criteria and Standards Division at EPA (202) 245-3042.

Most State water quality standards and EPA water quality criteria do not cover persistence and synergistic propensities. The applicant must be address these factors separately. See Section IV (Special Considerations) for discussions of ways for applicants to address synergistic propensities, and persistence.

An applicant, with EPA approval, may develop modified criteria if it feels it is necessary to reflect site-specific water quality characteristics or if it thinks the EPA criteria are inappropriate. EPA's guidance document entitled "Water Quality Standards Handbook," December 1983, specifically outlines guidelines for deriving site-specific water quality criteria for the protection of aquatic life and its uses. For more information, refer to section III-C.

Use of Biomonitoring

Meeting a water quality standard or water quality criterion is a good indication that water quality is being maintained. However, the additional use of some kind of biological monitoring (whole effluent bioassays or instream surveys) can serve as a good tool to further verify that a balanced population of aquatic life is being maintained over time.

EPA recommends that permit writers (State and EPA) incorporate biomonitoring requirements into section 301(g) permits once a variance is granted to verify that the variance, once in place, will not result in an impact to the aquatic community in the receiving stream. Biomonitoring also will help to further account

for synergistic effects (and other combined impacts of effluent and receiving water) in and around the effluent. Refer to EPA's draft biomonitoring guidance manual (A Technical Support Document for Water Quality-Based Toxics Control, May 1984) to determine appropriate biomonitoring techniques for the 301(g) applicant.

4. Human Health Considerations

If State water quality standards or EPA water quality criteria do not include consideration of human health (such as a drinking water standard or a human health criterion), the applicant should use the most stringent aquatic life toxicity criterion number as a baseline requirement and also demonstrate that human health is not being affected. EPA does not expect every applicant to perform the scientific studies necessary to develop specific human health criteria numbers when those numbers are unavailable. Instead, the applicant should retrieve and analyze relevant literature and data to determine whether the nonconventional pollutant (at the discharge level) is known to be acutely or chronically toxic to humans. If the pollutant will cause acute or chronic toxicity at the discharge level, the variance will be denied.

With regard to chronic toxicity, the applicant should first determine whether the pollutant is a known or suspected carcinogen, teratogen, or mutagen. The applicant can do this a number of ways. First, EPA criteria or Multi-Media documents, while they may not have a human health number, usually contain some information on mutagenicity, teratogenicity, and carcinogenicity; applicants should review these documents for this information. (See section III-A.) The applicant should secondly determine whether an

acceptable daily intake (ADI) is available for a particular chemical. ADIs represent a level of intake of a particular chemical that is expected not to elicit any chronic toxicity. Applicants may call the Environmental Criteria and Assessment Office in Cincinnati (ECAO-Cin.) at (513) 684-7531 to determine whether an ADI for a certain nonconventional pollutant is available. If not, ECAO can provide guidelines for their determination.

To determine mutagenicity, an applicant may follow EPA's proposed guidelines for determining mutagenicity found at 47 FR 53200, Pesticides Registration: Proposed data requirements, November 24, 1982.

To examine carcinogenicity, besides reviewing the data in the criteria documents and other literature sources, the applicant is urged to see if the nonconventional pollutant is on EPA's Carcinogen Assessment Group (CAG) list of potential and known carcinogens. Call CAG at (202) 382-7343 to determine which pollutants are on the list and which ones have been added or deleted. If the pollutant is on the CAG list, the applicant should determine the level at which carcinogenic activity occurs and which route of exposure is prominent (oral, inhalation) and compare this to the section 301(g) variance conditions. If response data on carcinogenicity exists, then low risk concentrations (e.g., levels which give one in 100,000 excess risk) should be estimated.

The applicant also can use the November 28, 1980 criterion derivation methodology to determine human health criteria (see Appendix C at 45 FR 79347). This methodology, however, is very detailed and costly. It is a matter of discretion on the applicant's

part whether to use this methodology. If the methodology is used, there is greater assurance that an adequate assessment of potential human health impacts has been made for the nonconventional pollutant.

An approach to addressing one aspect of human health impact is to determine the bioconcentration factor (BCF) of the pollutant. A bioconcentration factor relates the concentration of a chemical in water to the concentration in aquatic organisms. Since accumulation of pollutants is generally assumed to be potentially hazardous it is desirable that a material show a low BCF. According to Stern and Walker, 1978, a BCF of a 100 may not indicate a substance is hazardous if clearance of the pollutant is rapid, but a BCF above 100 and certainly above 1000 indicates a great potential for danger. Accordingly, EPA recommends that if a nonconventional pollutant has a BCF greater than 100, more information should be obtained on this pollutant with regard to chronic toxicity and effects such as carcinogenicity, mutagenicity, teratogenicity. The November 1980 criterion derivation methodology (45 FR 79341) provides guidelines for deriving an acceptable bioconcentration factor. In addition, if no measured value of BCF is available, BCF may be estimated from the octanol-water partition coefficient, K_{ow} by use of the following regression equation (Veith et al., 1980): Log BCF = (0.76 Log K_{ow}) - 0.23. Since the bioconcentration factor alone is not conclusive evidence of an impact to human health, other significant data should be reviewed to make a complete human health risk assessment.

III. EPA Water Quality Criteria

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A. Existing EPA Water Quality Criteria for Nonconventional Pollutants

EPA recommends an applicant review the following sources to determine which water quality criteria to apply in a section 301(g) variance assessment:

1. The most recently published ambient water quality criterion document (or Federal Register notice) for the nonconventional pollutant;

2. The Red Book, Quality Criteria for Water, 1976, if no criterion document exists published since 1976.

3. A Multi-Media Document (If no criterion document or Red Book number exists for the nonconventional pollutant)

The following is a discussion of each of these sources of water quality information.

EPA Water Quality Documents

An EPA water quality criterion document is a publication which presents the most recent toxicological data on a pollutant and provides the derivation of aquatic life and human health criteria numbers based on those data and EPA approved methodologies. There are, presently, criteria documents for 65 toxic pollutants or pollutant classes.

Criteria documents for two important nonconventional pollutants, ammonia and chlorine, are presently being published for public comment. (Proposed criteria for ammonia and chlorine can be found

at 49 FR 4551, Feb. 7, 1984. See Appendix B.) These documents will present the aquatic life criteria as 3 different numerical criteria:

a. a 30 day average
b. a maximum concentration
c. a 96-hour range

There are, in addition, two human health criteria numbers. The more stringent of these numbers is designed to protect human health from the toxic properties of a pollutant if ingested from drinking water or contaminated aquatic organisms. The other criterion protects human health from the toxic properties of a pollutant if ingestion of contaminated organisms alone occurs. Each human health criterion number also incorporates data on mutagenicity, carcinogenicity and teratogenicity.

Red Book Criteria

When there are no recently published water quality criteria, EPA recommends the applicant review the Red Book for applicable water quality criteria. If the Red Book offers more than one criterion number for the nonconventional pollutant, the applicant should use the most stringent number.

Multi-Media Documents

If an applicable State water quality standard or EPA water quality criterion (including a Red Book criterion) has not been developed for a nonconventional pollutant, the applicant requesting a variance should generate a number or examine EPA's Multi-Media Documents for pertinent aquatic life and human health data. Multi-Media Documents address the aquatic life and human health toxicity of nonconventional pollutants in different environ-

mental media - air, water, soil. These documents will not include EPA recommended criteria numbers or safe exposure levels but will provide a great deal of scientific data which may be helpful in making a section 301(g) variance determination. These documents will offer results from studies, lowest effect levels, and no-effect levels for the following nonconventional pollutants:

1. Acetone
2. Dibenzofurans
3. Methoxychlor
4. Chlorophenoxy herbicides
5. Malathion
6. Parathion
7. Mirex
8. Kepone
9. Iron
10. Barium

EPA encourages section 301(g) applicants to refer to these documents and use data where applicable to address aquatic life and human health impacts of these nonconventional pollutants. These documents will be available from EPA during 1984. Information on the documents and the studies contained in the documents can be obtained by calling EPA's Environmental Criteria and Assessment Office in Cincinnati at (513) 684-7531.

B. Application of Criteria in Section 301(g) Determinations

In determining whether a variance request is justified, the instream water quality that would result from a discharge controlled by the PMEL (after dilution in a State mixing zone) should be compared with the most stringent water quality criterion (human health or aquatic life toxicity) for the pollutant. If the PMEL will not result in poorer water quality than that described by the State water quality standards, or water quality

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criterion and the results of any tests required for synergism or persistency (see Section IV-C), the PMEL is acceptable for the purposes of section 301(g) provided all other statutory requirements are met.

C. Procedures Where There Are No Existing Criteria/Standards or Applicant Wishes to Modify Criteria

When there are no existing water quality standards or water quality criteria available for the nonconventional pollutant, it is recommended that the applicant derive a water quality criterion on its own. In these cases the applicant is urged to use EPA's methodology for developing criteria numbers (45 FR 79341 Appendix B - Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Use, Nov. 1980), unless the Office of Water Regulations and Standards (OWRS) approves another method. (A summary of EPA's criterion derivation methodology is provided in Appendix B.) EPA has made revisions to the Nov. 1980 methodology. These can be found at 49 FR 4551 (See Appendix B).

In any case where an applicant does not agree with EPA's criteria or methodology, the applicant may generate its own criterion number, using its own methodology, provided that the alternative methodology for deriving criteria is scientifically valid and will generate criteria that protect fishable/swimmable uses. The Director of OWRS will make determinations. Where the applicant wishes to substitute local biota into the EPA methodology, the applicant should first have the selection of biota approved by the Regional Administrator. See Section I-G on early consultation. The Regional Administrator should consult the State to determine which species are accurate representatives of local biota before

approving the substituted selection. It should be noted that the applicant must protect against human health effects.

IV. Special Considerations

A. Pollutant Parameters (COD, TOC, TKN, Total phenols)

EPA recommends that section 301(g) applicants seeking a variance from a pollutant parameter such as COD, TOC, TKN or total phenols, use one of two procedures:

- o EPA's criterion derivation methodology, or
- o Bench scale treatments.

1. Criterion Derivation Methodology for Aquatic Life

To determine whether a pollutant parameter may qualify for a section 301(g) variance using the EPA criterion derivation methodology, the applicant must follow the acute and chronic toxicity tests requirements prescribed in the EPA methodology and conduct the tests with whole effluent. For example, if an applicant is deriving a criterion number for a nonconventional pollutant parameter such as chemical oxygen demand (COD), acute and chronic toxicity tests must be run on the whole effluent of which COD is a component. The toxicity tests are conducted with increasingly diluted samples of the whole effluent rather than diluted concentrations of a single pollutant. The resulting criterion number is expressed as a percent of the whole effluent - a diluted fraction of the 100% whole effluent. For example, if acute bioassays are conducted, the whole effluent should be assayed and the percentage of the whole effluent which caused 50% mortality (LC50) should be identified. After conducting several acute and chronic bioassays, the resulting criterion number might be, for example, 20% of the whole effluent. The applicant would

have to prove that there is sufficient dilution within the mixing zone to meet the 20% whole effluent concentration at the mixing zone edge or, if dilution is insufficient in the mixing zone, the applicant would have to reduce the level of the pollutant parameter in the effluent and re-measure the whole effluent toxicity. The permit writer must assure that any reduction of a pollutant parameter concentration in the applicant's effluent is achieved by treatment, not by increased in-plant flows. Given the new whole effluent criterion number, the applicant would re-evaluate the whole effluent concentration at the edge of the mixing zone. (See Figures III and IV.) See Appendix B, especially sections IV - VII. Where the EPA criterion derivation methodology calls for bioassay results such as LC50 or EC50 values, the applicant should use the percent effluent which resulted in the LC50 or EC50 when deriving final acute/chronic values.

Because toxic and conventional pollutants are ineligible for a variance, the section 301(g) regulation requires an applicant to identify those constituents of the whole effluent which are conventional or on the section 307(a)(1) toxic pollutant list. A GC/MS screen for toxics is recommended. If toxics are present, they must be controlled by BAT or discharged at levels equivalent to BAT treatment.

The applicant is also required to make a human health impact assessment to ensure that the nonconventional pollutant parameter and none of its constituents will cause human health impact. EPA recommends a literature search on the pollutant parameter or development of a human health criterion using the November 1980

CRITERION DERIVATION FOR AQUATIC LIFE

PMEL & DILUTION — Must Meet Criteria at Edge of Mixing Zone

Figure III

TO DERIVE CRITERION FOR SINGLE POLLUTANT (e.g. Iron)

8 ACUTE BIOASSAYS + 3 CHRONIC TESTS

8 LC 50s — 3 EC50's + RESIDUE + BIOACCUMULATION TESTS → EPA CRITERION NUMBER X mg/l IRON

TO DERIVE CRITERION FOR POLLUTANT PARAMETER (Such as COD)

8 BIOASSAYS WITH WHOLE EFFLUENTS LC50s EXPRESSED AS % EFFLUENT

e.g. 25% EFFLUENT CAUSES 50% MORTALITY

3 CHRONIC TESTS WITH WHOLE EFFLUENT EC50 EXPRESSED AS % EFFLUENT

e.g. 25% EFFLUENT CAUSES 50% MORTALITY

→ EPA CRITERION EXPRESSES AS PERCENT WHOLE EFFLUENT

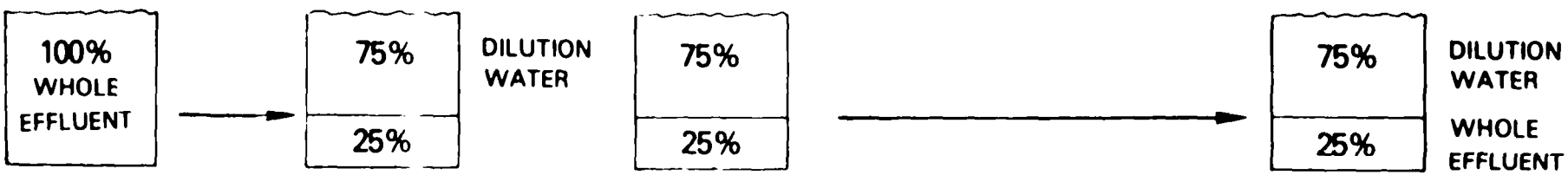

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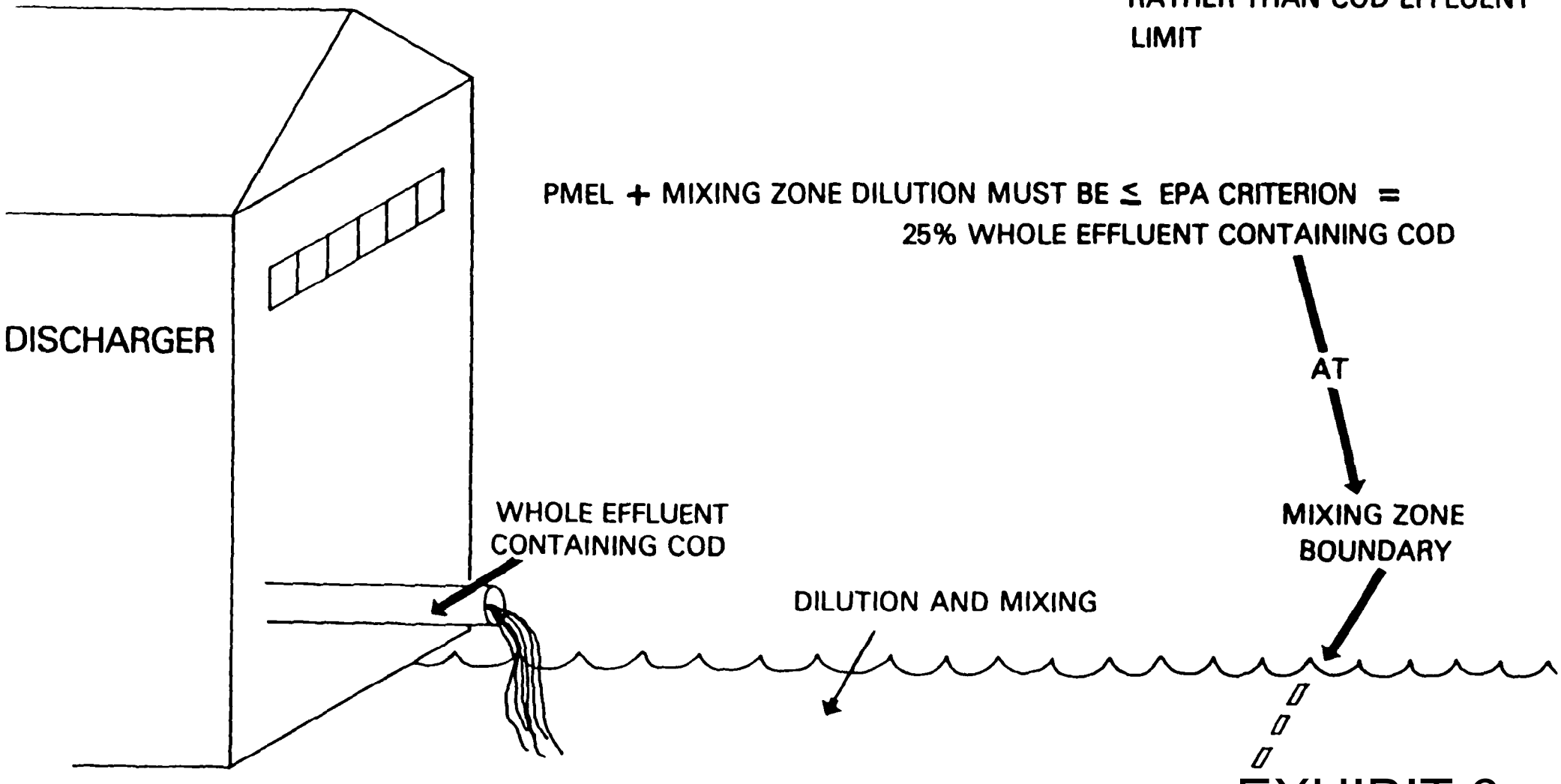
Figure IV

POLLUTANT PARAMETER

COD Chemical Oxygen Demand

ASSUMPTIONS

1. DIFFICULT TO SEPARATE COD FROM WHOLE EFFLUENT
2. EXAMINING WHOLE EFFLUENT RATHER THAN COD EFFLUENT LIMIT



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human health criterion derivation methodology (Appendix C at 45 FR 79347), if applicable. It is recommended that each component of the pollutant parameter be evaluated with regard to human health impact. See the section II - E(4) above on addressing human health impacts.

Note: In many cases a pollutant parameter such as COD will have variable constituents from day to day. Accordingly, the applicant must assess the variability of its COD or other pollutant parameters so that the section 301(g) variance request is based on COD representative of applicant's effluent. The applicant should list the pollutants that are in detectable quantities comprising the COD, the percentage of these pollutants in the COD, and the expected variability of these components.

2. Bench Scale Treatment Technologies

Bench Scale Treatment Technologies (Appendix C) are small (i.e., "bench") scale treatment strategies designed to simulate an effluent where only one pollutant or pollutant fraction is removed from the whole effluent by the proposed BAT and BPT treatment technologies. Using these methods, an applicant can compare the measured toxicity or effect attributed to a whole effluent with and without a pollutant parameter controlled at BPT and BAT levels. If an applicant can be demonstrate that the existence of the pollutant parameter treated to BPT in the whole effluent does not contribute to a significant increase in acute or chronic toxicity or synergistic effects, that no section 307(a) pollutants are present, and that all other section 301(g) factors are met, then the effect of the pollutant parameter at the

edge of the mixing zone and downstream can be disregarded and the section 301(g) variance may be granted.

Before using a bench scale treatment procedure, the applicant should outline, during the early consultation, the specific toxicity testing or biological effects testing which will be used to prove no significant impact due to the pollutant parameter. The applicant must also demonstrate that if a section 307(a) toxic pollutant is part of the whole effluent that the toxic pollutant does not affect the toxicity evaluation of the nonconventional pollutant at PMEL concentrations. If section 307(a) toxic pollutants are part of the whole effluent, toxicity associated with the toxic component must be isolated from any discussion or measurements of toxicity of the whole effluent containing the nonconventional component treated. The concern is for "masked effects" where the toxic treated at BAT will mask the toxicity effects of the nonconventional pollutant treated at BPT.

The applicant must also obtain approval of any toxicity test employed from the State permitting authority and the EPA Regional Office. The type and number of tests must be chosen carefully in order to protect a balanced population of shellfish, fish and wildlife. EPA recommends discussion of these tests during the early consultation.

Human health impact of the pollutant parameter must also be addressed by the applicant. If bench scale treatment procedures are employed, the applicant must specify which human health effect test methods will be used after the bench scale treatment simulates the appropriate effluent quality. Human health risk assessment

methods must be approved by EPA Cincinnati and Headquarters.

3. Downstream Effects

Because the nature of many pollutant parameters is not well understood, applicants should demonstrate that pollutant parameters such as nutrients and oxygen demanding materials will not cause downstream effects which violate State water quality standards. There is concern that many pollutant parameters may not cause impacts immediately beyond the mixing zone but further downstream, beyond the immediate vicinity of the discharge. Pollutants should be examined for latent fate and effects in all cases.

Mixing Zones/Dilution and Fate Models

1. Mixing Zone Determination

In most cases, the impact of a PMEL will be judged at the edge of the State mixing zone. If the State's mixing zone provision is not specific with regard to physical dimensions, a mixing zone may be determined on a case-by-case basis by the State permitting authority and the applicant. If the State forbids use of a mixing zone boundary as part of its water quality standards, the applicant will be required to meet the criterion number (or applicable State water quality standard) at the point of discharge. (Appendix D is a listing of mixing zone dimensions by State.)

In some cases a State may not have a mixing zone policy but may have other parameters in its water quality standards designed to determine water quality and the fate of pollutant discharges after initial mixing. For example, in Pennsylvania wasteload

allocations and other water quality analyses are conducted assuming complete mixing at the point of discharge. Dynamic models are also used to evaluate the behavior of non-conservative substances such as toxic organics and pesticides which may mix and recombine with other compounds and substrates in a number of ways. For the purposes of section 301(g) determinations, State water quality standard programs which rely upon predictive models and wasteload allocations in place of mixing zones should apply their models to the 301(g) determination. In some cases, a mixing zone will not serve as a purposeful boundary when the activity of a non-conventional pollutant takes place far beyond the mixing zone boundary. For example, acute toxicity may occur if an ammonia discharge enters a highly alkaline downstream area with increased temperature and reduced dissolved oxygen content.

If the State has no mixing zone policy or boundary but does have approved mixing and dilution predictive models, those should be used in the applicant's section 301(g) completed request. EPA guidance on mixing zones is available in the Water Quality Standards Handbook, November 1983. Copies of the Handbook can be obtained from EPA's Criteria and Standards Division. Call (202) 245-3042.

2. Marine Discharges

When an applicant applies for a section 301(g) variance for an ocean discharge containing nonconventional pollutants, the applicant should determine whether the State has an estuarine or marine mixing zone as part of its water quality standards. If there is none, the applicant should apply the zone of initial

dilution (ZID) referenced in the section 301(h) regulation and technical support document which was developed for marine municipal waste discharges. See Appendix E.

3. Water Quality Models

In order to demonstrate that a 301(g) waiver will result in compliance with water quality standards and will not impact other point and nonpoint source discharges, predictive water quality modeling should be performed using either dilution analysis or fate and transport models. Dilution analyses using mixing zone models are adequate for evaluating the impact of wastewater discharges only when the following conditions are met: (1) the pollutant of interest exerts its maximum effect immediately after discharge and (2) either the substance is conservative or an isolated discharge situation exists in which there is a single discharger or a discharger located beyond interaction with other dischargers. Pollutant kinetics and the travel time of the discharge will determine whether these conditions will occur. Fate and transport models are, therefore, required whenever: 1) a pollutant exerts delayed water quality impacts or 2) slow degradation rates relative to travel time and/or scour and resuspension of sorbed pollutants result in an upstream discharge affecting downstream dischargers.

When dilution analyses are appropriate, the 301(g) waiver applicant is encouraged to use an EPA-approved mixing zone model (Appendix F). These models predict the concentration of a pollutant at a specified distance after a specified time of

dispersal. If the applicant chooses an EPA model, the computer model must be identified and the printout containing the data and results must also be submitted with the completed request. All computations must be based on sampling data representative of critical conditions. The critical flow chosen for model predictions should be approved by the State and EPA Region before costly computer resources are expended.

The applicant may also use predictive mixing zone models but first must gain approval from the EPA Regional Administrator and State permitting authority. In any case, the applicant should provide a diagram showing the boundary of the mixing zone, the point of discharge, and the pollutant concentration isopleths generated in the mixing zone.

When fate and tranport modeling is required, the 301(g) waiver applicant is encouraged to use an EPA-approved farfield model. If phytoplankton effects on dissolved oxygen are significant in a receiving water and a 301(g) waiver would result in increased ammonia and phosphorus discharges, it is recommended that these pollutants be predicted with one of the following fate and transport models:

Model	Receiving Water Application
Qual II	rivers
Receiv II	rivers and estuaries
WASP	rivers, estuaries, lakes
CLEAN	lakes
LAKECO	lakes
WQRRS	lakes
DEM	estuaries
MIT-DNM	estuaries
EXPLORE-I	estuaries

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If a 301(g) waiver would result in increased discharge of nonconventional pesticides or metals which reach downstream discharges or exert delayed water-quality impacts, the following fate and transport models should be considered for use:

Model	Receiving Water Application
EXAMS, MEXAMS	rivers, estuaries, lakes
TOXIWASP	rivers, estuaries, lakes
CTAP	rivers, estuaries, lakes
WASTOX	rivers, estuaries, lakes
SERATRA	rivers
MICHRIV	rivers
HSPF	rivers
FETRA	rivers and estuaries
SLSA	rivers and lakes

These models are described in the guidance documents listed in Appendix H. For further information, contact the Wasteload Allocation Section of the Office of Water Regulations and Standards at (202) 382-7056.

C. Synergistic Propensities

The section 301(g) regulation requires an applicant to demonstrate that synergistic propensities will not cause an impact to human health or aquatic life. According to Casarett and Bruce, 1980, a synergistic effect is a situation in which the combined effect of two chemicals is much greater than the sum of the effect of each agent alone. For example, both tetrachloride and ethanol are hepatotoxic agents, but together they produce much more liver injury than the mathematical sum of their individual effects on the liver would suggest. For the purposes of section 301(g), EPA recommends a broad assessment under the heading of Synergistic Propensities. In addressing synergism, an applicant

should include an assessment of the combined effects of two or more pollutants, an assessment of effects produced by combining pollutants and different physical factors, and an assessment of the potential for pollutants to combine chemically and form a more toxic substance. To make such an assessment the applicant must identify the pollutants and the physical conditions in the effluent and the receiving waters which may combine to cause greater toxicity or impact than may be commonly suspected from the individual nonconventional pollutants alone.

To address this aspect a section 301(g) applicant should be review the literature to determine whether its effluent or the effluent and the receiving water will contain dangerous combinations of pollutants. An applicant could also conduct toxicity tests with each of the chemicals in its effluent and compare the sum of the toxicities with the toxicity of the whole effluent. To accomplish this, the applicant may apply biomonitoring techniques, where applicable, to determine whether synergism is occurring in an applicant's effluent. These techniques could include conducting acute and chronic bioassays on the whole effluent and separate fractions of the whole effluent to determine whether the nonconventional component of the effluent, when combined with the toxic or conventional fractions, exhibits synergistic qualities. (See Walsh and Garnas, 1983) In cases where effluents are highly complex, this may be impractical and the applicant may have to rely upon a literature search.

With regard to pollutants and physical parameters in the receiving stream, the applicant should be aware of combinations of varying temperature, pH, and dissolved oxygen levels which

could increase the toxicity of the effluent and the receiving stream. For example, the toxicity of ammonia is very much dependent upon pH and temperature. As alkalinity increases, the concentration of highly toxic un-ionized ammonia also increases.

Another area of concern is the possibility of two pollutants combining to form a more toxic substance. For example, when ammonia and chlorine are in the same effluent or receiving waters, they may combine to form more toxic and persistent chlorinated amines. Another dangerous combination of pollutants may be total phenols and chlorine. If the nonconventional portion of total phenols combines with chlorine, the result may be highly toxic chlorinated phenols.

EPA strongly urges applicants to describe their plan to determine whether synergism is occurring in their effluent during the early consultation.

D. Persistency

The section 301(g) regulation requires the applicant to demonstrate whether the nonconventional pollutant will impact human health or aquatic life due to persistency. The applicant should determine the fate of the nonconventional pollutant with regard to its chemical structure and concentration in the environment. The applicant should determine whether the pollutant or pollutant concentration will be altered (and to what degree) by such chemical or physical reactions as volatilization, photolysis, adsorption, absorption, oxidation, hydrolysis, etc. This can be accomplished through a review of the literature or direct measurements. Direct analytical methods must be cited if used. EPA has

prepared a draft document which outlines different methods for assessing the fate of a pollutant. The document entitled "Chemical Fate Test Guidelines" is available from NTIS at (703) 487-4650 or the EPA Office of Toxic Substances library at headquarters, referenced as USEPA 560/6-82-003.

Another way to assess persistency is to analyze the chemical structure and properties of the pollutant. The octanol-water partition coefficient, the degree of halogenation, the molecular weight of the compound can help correlate the biological activity of structurally related compounds to the physical parameters of the chemicals.

E. Indicator Pollutants

An applicant can receive consideration for a section 301(g) variance only under very specific conditions. 40 CFR 125.3(g) of the Environmental Permit Regulations states that if a pollutant is being used as an indicator for a toxic or conventional pollutant it cannot be considered for a section 301(g) variance. However, a nonconventional pollutant may be considered for a section 301(g) variance if its role as an indicator can be eliminated. To do so, either: (1) the nonconventional pollutant being used (or proposed for use) as an indicator must be replaced by another indicator or (2) individual permit limits must be placed on the toxic or conventional pollutants for which the indicator is being used.

F. Total Phenols

In keeping with the NPDES Litigation settlement of June 7,

1982, EPA recognizes that total phenols may be considered for section 301(g) variance requests as long as certain conditions are met. Because total phenols (as tested by 4AAP) is a pollutant parameter, it would be subject to the requirements of section 125.54(e)(2) of the section 301(g) regulations. Therefore, the applicant must demonstrate that the total phenols in its effluent do not include toxic phenolics, that those toxic phenolics present are at BAT concentrations or that the toxic phenolics are directly controlled by BAT effluent limitations.

G. Design Conditions

While EPA realizes it cannot impose standard design conditions on all tests and demonstrations provided as evidence for a variance, it is still important that 301(g) applicants strive toward a high degree of consistency in their approaches. The applicant should establish critical design conditions during early consultations with State and EPA officials. In some cases, State water quality standards will specify low flow conditions (e.g., 7Q10). Under such circumstances, the applicant must use the State-specified low flow conditions. Appendix H has a list of design condition documents prepared by the Wasteload Allocation Section of the Office of Water Regulations and Standards. These guidance documents outline procedures for determining the critical temperature, pH, and flow conditions that should be used in steady state mixing zone or fate and transport modeling of streams and rivers. Future documents will be prepared on appropriate design conditions for steady state lake and estuary modeling.

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In the absence of EPA guidance on lake and estuary design conditions, the applicant should consider water quality modeling in the waterbodies during periods of minimum dilution. The river inflow to lakes and estuaries could be set at the design conditions recommended for streams and rivers. Lake modeling could then be performed at periods of low water levels as well as spring and fall overturns. Estuarine modeling could be performed at slack tides during periods of maximum stratification and/or minimum dilution.

Mixing zone modeling of marine discharges should follow the guidelines developed for 301(h) waivers. The 301(h) program requires that the zone of initial dilution be determined for periods of critical minimum dilution. These periods are defined as a function of maximum vertical density stratification, minimum initial density differences, maximum waste flow rate, and minimum currents.

IV. EPA Section 301(g) Checklist

EPA has provided prospective section 301(g) applicants and State and Regional Officials with a checklist of factors EPA recommends the applicant and all reviewers (State, Regional officials) address when preparing or reviewing a section 301(g) completed request. This checklist (Appendix G) spans several areas that might affect the granting or denial of a variance. All of these subjects do not have to be addressed with an extraordinary amount of supporting data, but the more completely and

concisely they can be addressed, the greater the chance an application will not be rejected due to lack of information or incompleteness.

It is strongly recommended that both the applicant and the State and Regional representatives hold an early consultation and determine what is expected from each applicant before a completed request is filed. The checklist may serve as an agenda for an early consultation and may be used as an outline for preparation of the completed request.

References

Casarett, L.J. and Bruce, M.C., "Origin and Scope of Toxicology," Toxicology: The Basic Science of Poisons, John Doull, C.D. Klaasen, and M.O. Amdur, Eds., Macmillan Publishing Co., Inc., 1980, pp.3-10.

Stern, A.M. and Walker, C.R., "Hazard Assessment of Toxic Substances: Environmental Fate Testing of Organic Chemicals and Ecological Effects Testing," Estimating the Hazard of Chemical Substances to Aquatic Life, ASTM STP 657, John Cairns, Jr., K.L. Dickson, and A.W. Maki, Eds., American Society for Testing and Materials, 1978, pp. 81-131.

Veith, G.D., K.J. Macek, S.R. Petrocelli, and J. Carroll. 1980. An evaluation of using partition coefficients and water solubility to estimate bioconcetration factors for organic chemicals in fish. In: Aquatic Toxicology, ASTM STP 707, J.G. Eaton, P.R. Parrish and A.C. Hendricks, Ed. American Society for Testing and Materials, Philadelphia, PA, pp. 116-129.

Walsh, G.E. and Garnas, R.L., "Determination of Bioactivity of Chemical Fraction of Liquid Wastes Using Freshwater and Saltwater Algae and Crutaceans". Environmental Science and Technology. March 1983, pp. 180-183.

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Section 301(g) Checklist

State and Regional personnel should use this checklist when reviewing section 301(g) variance request. Section 301(g) applicants may also use this checklist to ensure their application addresses and documents all necessary items. The checklist covers all the factors EPA has identified as important in considering a section 301(g) request. As the importance of each item will vary from site to site, a careful review of the checklist by the permit writer and the applicant, during the early consultation period, can help the applicant determine the degree to which each of these factors must be addressed.

How To Use This Checklist

EPA recommends that Regional and State personnel use this checklist first to determine what the applicant should submit in its completed request and secondly, to review the submitted completed section 301(g) variance request.

The checklist consists of a series of questions addressing the statutory factors listed in section 301(g) of the CWA. State and Regional personnel will determine whether to grant a variance based upon the information furnished in response to the various factors outlined in the checklist.

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I. Preliminary Information

Did the applicant provide the following:

1. Legal name and mailing address?

2. Name and address of the point source for which the variance is being sought if it is different from Number 1?

3. Facility ID Number (EPA ID Number)?

4. Name, title, telephone number and address of person in the firm to contact about the section 301(g) completed request?

5. Identification of the nonconventional pollutant(s) or pollutant parameter for which a section 301(g) variance is sought?

6. The 40 CFR citation for the specific effluent guideline containing the limitation from which the section 301(g) variance is sought?

7. The date the initial request (in accordance with 40 CFR 122.21) for the section 301(g) variance was submitted to EPA? (Was a postcard submitted by September 1978, or was an initial request submitted 270 days after the promulgation of the applicable guideline?)

8. The date the applicable BAT effluent guideline(s) was promulgated? (If no BAT effluent guidelines were promulgated, the date the notice of preparation of the draft BPJ/BAT permit was published.)

9. The proposed modified effluent limitation (PMEL) for the nonconventional pollutant?

10. The promulgated BPT effluent guideline limitations? (If no BPT guideline exists, the limitation derived by the State/Region.)

11. The permit compliance schedule?

12. A list or description of State water quality standards applicable to the nonconventional pollutant(s)?

II. Environmental Quality Information

A. IMPACT TO POINT AND NONPOINT SOURCES

Did the applicant provide:

1. an analysis of the potential impact of the applicant's PMEL on other point and nonpoint sources in the vicinity of the point of discharge?

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SPECIFICALLY, DID THE APPLICANT:

a. Identify all the point and nonpoint sources in the vicinity of its discharge (with assistance of State permitting authority)?

b. obtain a determination from the State or interstate agency(s) having authority to establish wasteload allocations indicating whether the discharge of the PMEL would result in an additional treatment, pollution control, or other requirements on any point or nonpoint sources? (The State must include a discussion of the basis for its conclusion.)

If neither a or b were addressed:

c. Confer with nearby point sources to determine the possible impact on those sources if the PMEL were approved in a section 301(g) variance?

B. IMPACT TO RECREATIONAL ACTIVITIES

Did the applicant provide:

1. An analysis of the potential impact the PMEL would have on recreational activities in and on the water in the vicinity of the discharge?

SPECIFICALLY, DID THE APPLICANT:

a. Identify recreational activities in and on the water in the vicinity of its discharge?

b. Provide an analysis which determined whether the PMEL would interfere with recreational activities beyond the mixing zone including without limitation swimming, diving, boating, fishing and picnicking and sports activities along shorelines and beaches?

C. IMPACT TO PUBLIC WATER SUPPLIES

Did the applicant provide:

1. an analysis of the potential impact of the PMEL to public water supplies in the vicinity of its discharge?

SPECIFICALLY, DID THE APPLICANT:

a. Identify the public water supplies in the vicinity of its discharge?

b. Provide an analysis which demonstrated that the PMEL would not prevent a planned or existing public water supply from being used, or from continuing to be used as a public water supply, or have the effect of requiring any public water supply to provide additional treatment?

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D. IMPACT TO AQUATIC LIFE AND HUMAN HEALTH

Did the applicant provide:

1. a demonstration that the PMEL would still maintain water quality which protects the propogation of a balanced population of shellfish, fish, and wildlife and that the PMEL would not pose an unacceptable risk to human health and the environment because of bioaccumulation, persistency, acute toxicity, chronic toxicity (including carcinogenicity, teratogenicity, mutagenicity) or synergistic effects?

SPECIFICALLY, DID THE APPLICANT:

a. identify a State water quality standard or an EPA water quality criterion (most recently published or Red Book) for the nonconventional pollutant which protects both aquatic life and human health at the edge of the mixing zone?

or b. derive a site-specific criterion number for the nonconventional pollutant using an EPA-approved criterion derivation methodology, and if so, were local species used in the criterion derivation approved by the Regional Administrator?

or c. derive a criterion for the nonconventional pollutant using another method which was approved by OWRS?

or d. derive a safe concentration for the nonconventional pollutant by some other approved means such as field testing, literature search, biomonitoring?

e. demonstrate that the PMEL, after dilution in the mixing zone, would meet that water quality standard or criterion?

f. demonstrate that all other factors such as bioaccumulation, persistency, and synergistic propensities have been adequately addressed? (See questions on persistency and synergism in Section III of the checklist)

E. MODELLING AND FATE AS RELATED TO SECTION 301(g) VARIANCES

Did the applicant:

1. Provide an aerial-view map of the facility and the surrounding area illustrating the boundary of the State mixing zone and the concentration isopleth of the nonconventional pollutant from point of discharge to the mixing zone boundary?

2. Identify which model was used to determine the dilution pattern of the nonconventional pollutant and provide a basis for using that particular model?

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3. Provide any field data to calibrate and validate the model of choice?

4. State how the mixing zone was determined if it was not an approved State water quality standard mixing zone (case-by-case basis)?

5. Provide basis for the design flow used in making dilution calculations?

III. Special Considerations

A. POLLUTANT PARAMETERS (COD, TOC, TKN, Total phenols)

Did the applicant:

1. Identify the chemical constituents of the pollutant parameter and rule out the existence of toxics in the pollutant parameter? (Toxics may be found in trace amounts or at levels equivalent to BAT.)

2. Identify the means by which the constituents were identified? (e.g., GC/MS)

3. Derive a criterion number for the pollutant parameter by applying the EPA criterion derivation methodology of November 1980 to the whole effluent and expressing the resulting criterion in percent effluent?

4. Determine that the pollutant parameter was not a source of toxicity after conducting a bench scale treatment study?

5. Determine a safe level of the pollutant parameter by conducting a literature search?

6. Assess the potential for human health impact of the nonconventional pollutant parameter?

B. SYNERGISTIC PROPENSITIES

Did the applicant:

1. Identify potential synergistic propensities in the effluent and receiving water?

SPECIFICALLY, DID THE APPLICANT:

a. identify possible chemical reactions between compounds producing more toxic pollutants?

b. identify possible reactions dependent upon physical parameters such as increased toxicity related to increasing or decreasing temperature, pH, alkalinity, conductivity, flow (turbulence), or suspended solids.

c. identify possible joint effects where two compounds affect an

EXHIBIT 6

organism in two different ways simultaneously? (E.g. one pollutant affecting respiration, another the central nervous system.)

d. apply biomonitoring techniques to determine whether synergism is occurring in applicant's effluent. (Were toxicity tests conducted on separate toxic, conventional, or nonconventional fractions and then on the whole effluent to determine differences between the toxicity of the whole effluent and the different fractions?)

e. examine the potential for additivity in the effluent?

C. PERSISTENCY

Did the applicant:

1. Identify pollutants which could impact aquatic life or human health due to persistency?

SPECIFICALLY, DID THE APPLICANT:

a. examine chemical or physical reactions such as volatilization, photolysis, adsorption, absorption, oxidation and hydrolysis to determine the fate of the nonconventional pollutant?

b. apply direct analytical methods or conduct a literature search to determine the persistency of the nonconventional pollutant?

c. conduct structural analysis of the principal components in the effluent to determine whether the compounds are of a persistent nature?

EXHIBIT 6