*Presented below are water quality standards that are in effect for Clean Water Act purposes.*

*EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.*

# State of Wisconsin

# Water Quality Rules Implementation Plan


Wisconsin Department of Natural Resources
Bureau of Watershed Management
P.O. Box 7921
Madison, Wisconsin 53707-7921

January 1998

# Table of Contents

# Glossary

To Be Provided ASAP

# Chapter 1. INTRODUCTION

In March 1989, the Wisconsin Department of Natural Resources (the Department) promulgated a comprehensive set of Administrative Rules which laid the framework for the regulation of toxic pollutants discharged from point sources. In doing so, Wisconsin was one of the first states in the nation to formally adopt toxic criteria and associated permitting procedures to address water quality concerns of individual receiving waters. Historically, all regulation of toxic pollutants had been done categorically, an approach which set treatment-based standards for all dischargers belonging to a particular type of industrial or municipal category (i.e., pulp, paper, and paperboard manufacturing, electroplating, leather tanning and finishing, etc.). With the 1989 revisions of ch. NR 102 and the promulgation of new chs. NR 105, NR 106, and NR 207 (Wis. Adm. Code), the Department formally began the era of addressing the discharge of toxic pollutants on a facility-specific basis with the clear intent of protecting receiving water quality.

In that same year (1989), A cooperative agreement was reached between three U.S. EPA Regions (Regions 2, 3, and 5) and eight Great Lakes states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) to assemble the most up-to-date scientific information on persistent toxic chemicals in the Great Lakes Basin. The goal of this agreement, known as the Great Lakes Water Quality Initiative (GLI) was to develop a consistent set of water quality standards for the entire basin. In 1990, the United States Congress amended the Clean Water Act (22 USC s.1268) which formalized the process for developing the GLI Guidance and requiring the participated states to adopt provisions consistent with and as protective as the final GLI Guidance within two years of its final publication in the Federal Register. After several years of work, that final guidance was published on March 23, 1995 (40 CFR Parts 9, 122, 123, 131, and 132) which necessitated final promulgation of state-specific rules by March 23, 1997 that were as protective as the Federal GLI Guidance.

At its March 1997 meeting, the Natural Resources Board of the Department approved the revisions to the Administrative Rules, thereby forwarding the rules package to the Wisconsin Legislature for final adoption. As a result of the Legislative review process, the revised rules were officially published and became effective on September 1, 1997. *Note to the reader: this revised set of rules is unofficially known as the "Water Quality Rules."*

The revised water quality rules have resulted in several changes which affect the procedures used since 1989 to issue WPDES permits with water quality-based effluent limitations. This ***Water Quality Rules Implementation Plan*** was drafted with those changes in mind and is an attempt to minimize problems associated with the transition to the new procedures. It should be noted that this plan is intended to be used jointly with existing guidance, especially the Department's Permit Drafter's Handbook, the Effluent Limits Calculation Guide for Discharges to Wisconsin Surface Waters (December 1994 -

revisions pending) and the Whole Effluent Toxicity Program Guidance Document (June 1997).

**At this time, this Plan is being released as a working document for Department staff and other interested parties. It must be clearly noted that this Plan is simply "guidance" and is not a legally binding document. In all cases, WPDES permit requirements must adhere to the conditions set forth in chs. NR 102, 105, 106, 207 (Wis. Adm. Code), and any other applicable state or federal law.**

The original DRAFT of this document was distributed to selected Department staff and WPDES permittees, GLI Advisory Committee members, and U.S. EPA - Region 5 for review and comment in September 1997. Several revisions have been made as a result of those comments. A full response to those comments is available upon request.

If additional information is needed, the following Department staff can be contacted:

Bob Masnado
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# Chapter 2.
# PERMIT PROCESS GUIDANCE

**Author:** Bob Weber

**Overview:** It is the intent of the Department to implement the recently promulgated changes to chs. NR 102, 105, 106, and 207 (Wis. Adm. Code) with minimal disruption to the existing permit process. This chapter provides suggestions on how this may be accomplished by using a team approach to review the status of a permittee prior to developing an application package. This chapter encourages communication among the different sub-programs which have a responsibility to manage the various aspects of the State's surface waters. The approach recommended below is consistent with the Department's desire to utilize "teams" of staff to ensure program integration and to ensure consistency among and between Regions.

One significant change to the permit process is the introduction of "preliminary limits." A group of other Department staff are currently developing procedures and guidance on the use of "preliminary limits" which may be used to assist dischargers and their consultants in determining when the collection of additional effluent and/or receiving water data may be beneficial. The Department believes that providing this information to permittees with their WPDES permit application will encourage a cooperative effort that yields a more robust data analysis and fewer unnecessary monitoring requirements and effluent limitations.

Preliminary limits will be based on rudimentary data (i.e., effluent flow and hardness, stream flow, and water quality criteria) and sent to permittees along with the WPDES permit application. As mentioned above, preliminary limits are to be used as flag values for the discharger to determine if additional monitoring or other data gathering will be beneficial to the development of more accurate effluent limits. In addition, preliminary limits may be provided to the laboratory (by the permittee) to aid in the selection of the analytical methods with the appropriate limits of detection (LOD).

After preliminary effluent limits are prepared, the permit drafter and/or the area engineer can meet with the permittee to explain the application package and the monitoring impact of the preliminary effluent limits. This will alert the permittee of important aspects of the application package and establish a communication link to answer questions and resolve issues during the process. Once the permit application package is returned, the permit drafter and the effluent calculator can review the monitoring data prior to calculating the final effluent limits. The permit drafter and the area engineer may meet with the permittee to discuss the draft permit prior to the public notice process.

What follows is an outline of a *recommended* process for issuing a WPDES permit from start to finish. It should be clearly noted that this recommendation may be modified to fit the needs of the Region and the individual permittee.

**Recommended Process:**

1. Pre-application Coordination: This is an in-house scoping process that could be held on a quarterly basis to review the permit applications scheduled to be mailed to permittees. An effort should be made at this stage to raise any issues related to the discharge that may impact the receiving water and the surrounding community in which the discharge is located.

   A. Staff who may have input:

      1) Engineer
      2) Permit Drafter
      3) Sludge Coordinator
      4) Effluent Limits Calculator
      5) Water Quality Basin Planner
      6) Biomonitoring Coordinator (as needed)
      7) Fisheries Managers
      8) Others

   B. Areas/Topics that may be evaluated:

      1) Assessment of Stream Flows
      2) Significant Contributing Industries
      3) Pollutants of Concern
      4) TMDL and Non-point Source Issues
      5) Known Environmental Problems
      6) Biomonitoring Results and Concerns (see list of permittees with "problems" P:\FLEMIK\FAILURE.TAB
      7) Review of Existing Studies

2. Application Meetings: These are meetings that could be scheduled with permittees to discuss the permit application package.

   A. Staff to attend:

      1) Permit Drafter
      2) Engineer
      3) Effluent Limits Calculator (as needed)

   B. Areas/Topics to be evaluated:

      1) Explanation of the application
      2) Projected Timeline & Need for Communication
      3) Review of Preliminary Effluent Limits and flag values if appropriate (including discussion on the need for Mass and Concentration Limits)
      4) Review of Monitoring Requirements
      5) Need to Ensure Sufficient Data with the Appropriate QA/QC
      6) Review of Secondary Values Guidance (if necessary)
      7) Discussion of Metals Options (i.e., Total Recoverable vs. Dissolved)

8) Review Effluent Flows Used for Calculation Purposes
9) Status of Compliance with Existing Permit Requirements

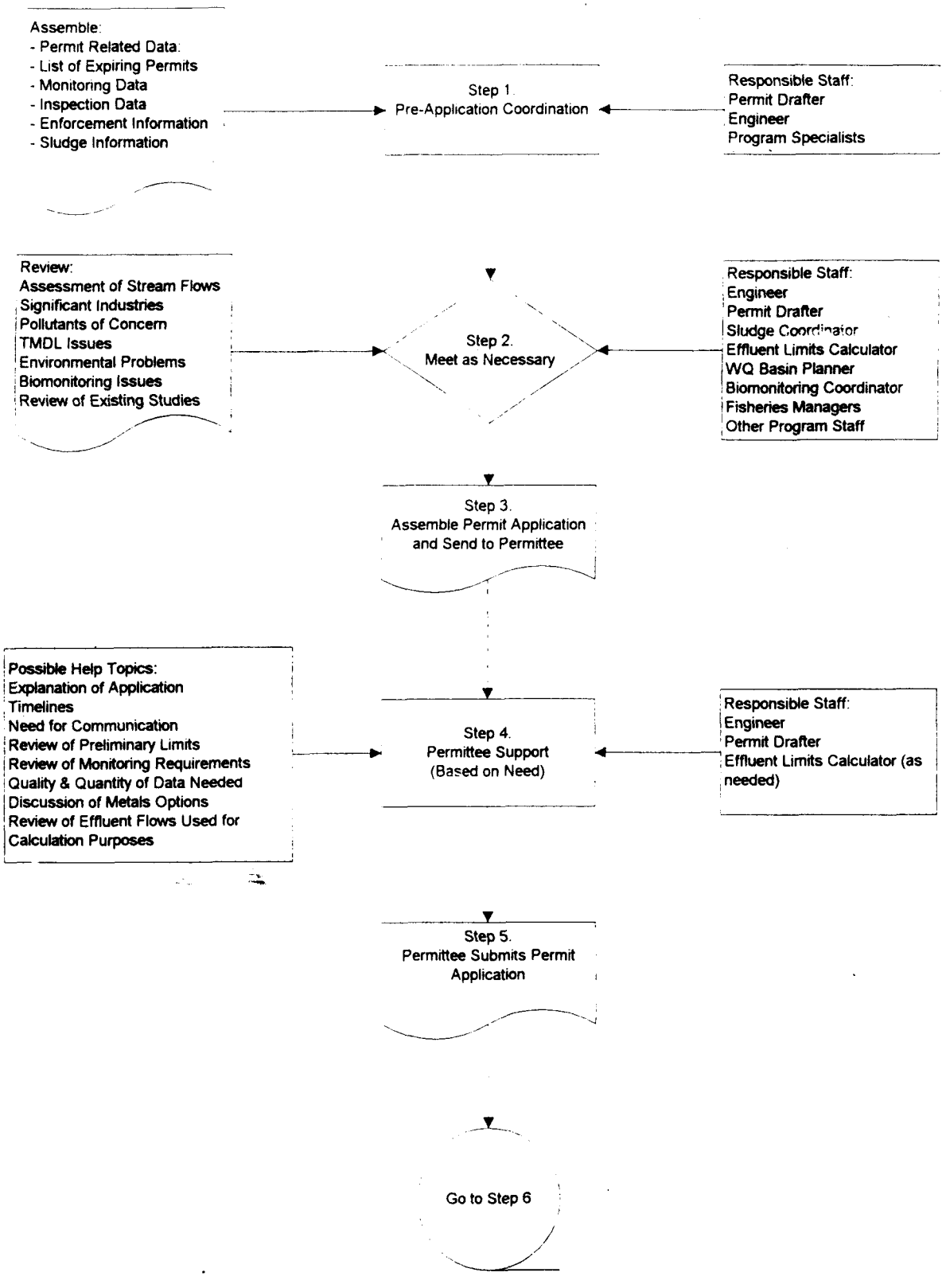
3. Post Application Meetings: These are meetings that may need to take place following receipt of a completed permit application.

A. In-house meetings: once the permit drafter compiles all of the data, a meeting should take place with the effluent limits calculator to ensure that representative data are being used to determine effluent limitations. If there are data anomalies and/or other data quality concerns, the permit drafter should initiate discussions with the permittee and any appropriate contract laboratory or consultant representing the permittee. It is the Department's goal that ***representative data*** should be used for the calculation of all effluent limitations. Once the permit drafter and effluent limits calculator agree that data in hand are representative of the discharge, effluent limits and corresponding monitoring requirements should be prepared.

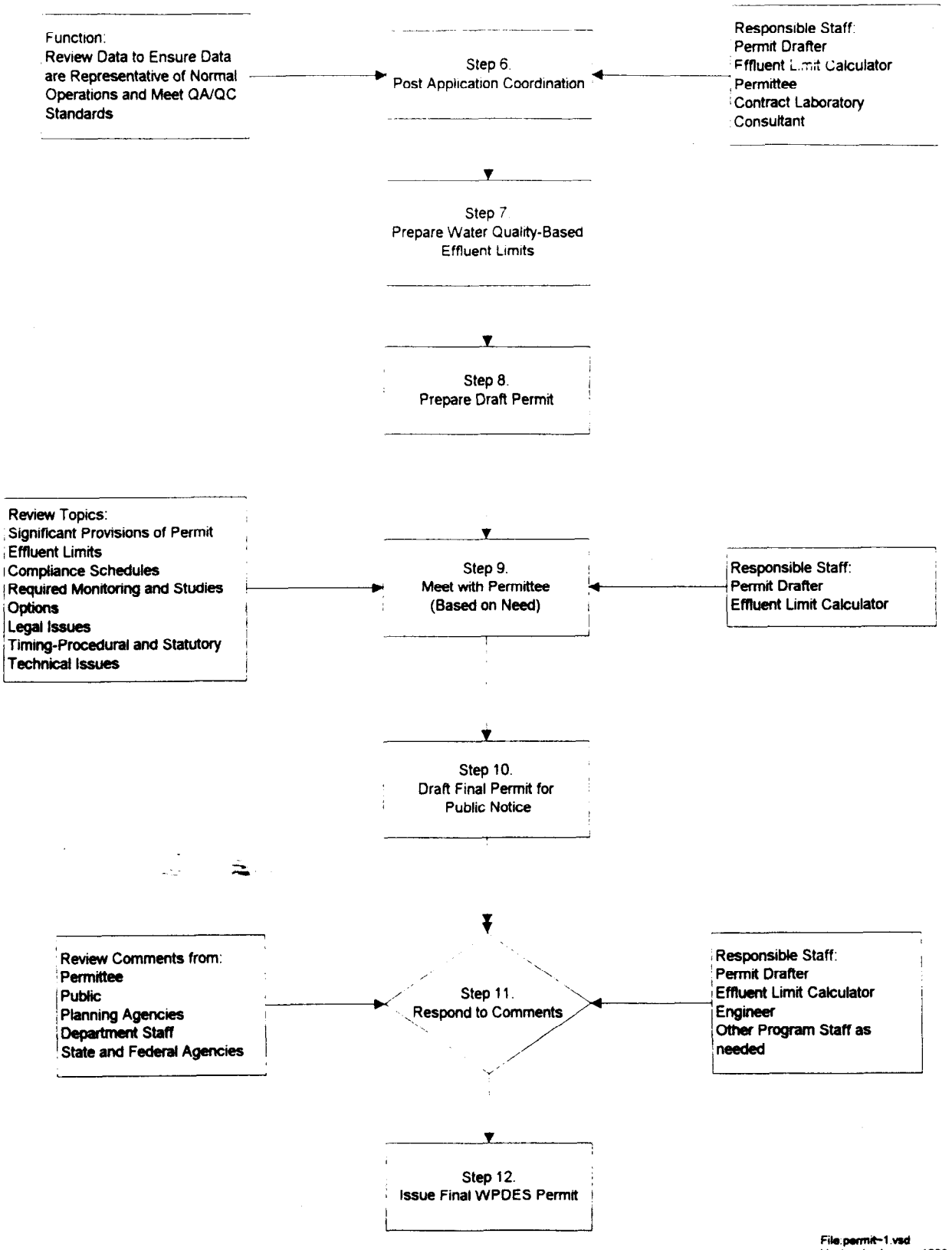
B. Meetings w/ Permittee: meetings could be scheduled as necessary to discuss any aspect of the permit, especially the topics listed below. It is recommended that these discussions occur prior to public-noticing the permit.

1) Significant Provisions of the Permit
2) Review Effluent Limits
3) Compliance Schedules
4) Required Monitoring/Studies
5) Options (i.e., pollution minimization plans, total recoverable vs. dissolved metals limits, etc.)
6) Legal Issues
7) Timing - Procedural and Statutory
8) Technical

# Flow Diagram 2-1
# Permit Process



# Flow Diagram 2-1
# Permit Process
## (Continued)

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# Chapter 3A. CALCULATION OF SECONDARY VALUES

**Authors:** Bob Masnado, Jim Schmidt, and Beth Goodman

**Overview:** Section NR 105.02 (3) states that a secondary value may be calculated for a discharge which contains a toxic substance if there are insufficient data to calculate a water quality criterion for that substance. Secondary values may be calculated for substances which cause or have the potential to cause acute or chronic toxicity to fish and aquatic life, or impairments to wildlife and human health. This chapter contains guidance on how and when a secondary value will be calculated to be consistent with the language contained within ch. NR 105. The Department will maintain a list of substances that have secondary values. That list will be updated periodically as new toxicological data become available or as secondary values are calculated for additional substances. The list of secondary values may be posted on the Department's WEB Page if resources allow it. In the meantime, it will be available through the Water Quality Standards Section of the Bureau of Watershed Management.

## Where do secondary values come from?

As mentioned above, secondary values may be derived for substances for which NR 105 criteria cannot be calculated at a particular time. The reasons that criteria are not available include the following:

**Acute toxicity criteria:** S. NR 105.05 (1)(a) contains a list of database requirements which must be met in order to enable criteria to be established. That requirement is for data on species in at least eight different families, with the subdivisions under par. (a) listing the types of species which must be present among those eight. If eight species are not available, or if the species types in subds. 1 through 8 of sub. (1)(a) are not all satisfied, secondary values may be calculated. The word "may" is used because secondary values cannot be calculated if the species that are tested do not include results from either the genus *Ceriodaphnia, Daphnia*, or *Simiocephalus*, even if eight (or more) species are available in the database (reference: page 15400, March 23, 1995 Federal Register).

**Chronic toxicity criteria:** S. NR 105.06(1)(a) contains the same database requirements as listed above relating to acute criteria but adds the ability to calculate chronic criteria or secondary values based on acute-chronic ratios. If data are available on the eight families listed in par. (a), then a chronic toxicity criterion may be calculated. Criteria may also be calculated if there are acute data available on at least three species. Of those three species, one must be a fish, one must be an invertebrate, and one must be for an acutely sensitive freshwater species. When both acute and chronic data exist for three species, acute-chronic

ratios can be calculated. If chronic data are not available, default acute-chronic ratios may be used to calculate secondary chronic values instead of criteria.

Secondary chronic values may be calculated if any of the following exist, according to s. NR 105.06 (6):

- An acute criterion is available, but the chronic database lacks the eight families of data and lacks the three comparable acute-chronic ratios,

- A secondary acute value is available and the chronic database lacks the eight families of data, but the chronic database contains the three comparable acute-chronic ratios, or

- A secondary acute values is available, but the chronic database lacks the eight families of data and lacks the three comparable acute-chronic ratios.

If none of those secondary chronic value triggers are satisfied for a particular substance, a secondary chronic value cannot be calculated for that substance.

**Wildlife criteria, human threshold criteria, and human cancer criteria:** Toxicity data requirements for wildlife and human health secondary value calculations are the same as those for the calculation of true criteria (i.e., no less stringent). The difference between criteria and secondary values lies in the data available to calculate a bioaccumulation factor (BAF). Chapter NR 105.10 describes a more rigorous process than in the past to determine a BAF. A BAF must now be determined by a "baseline BAF" process as summarized in NR 105.10 and described in detail in Appendix B to 40 CFR part 132 (the GLI). Chapter NR 105 summarizes four methods to calculate a baseline BAF. It also describes when use of certain data automatically generate secondary values rather than criteria. For example, if a bioaccumulation factor is greater than 1000 and is determined using the methods referred to in sub. (2)(c) or (2)(d), the resulting calculation generates a number that must be expressed as a secondary value. Baseline BAFs derived using sub. (2)(c) are predicted based on a BCF measured in a laboratory study and a food-chain multiplier, while those using sub. (2)(d) are predicted based on a $K_{ow}$ and a food-chain multiplier. The use of a food-chain multiplier is a new tool. Not allowing a criterion to be based entirely on lab data (such as $K_{ow}$) is a more stringent change.

## When should secondary values be calculated or updated?

This guidance is based on the assumption that effluent data are available for the substance in question. Another Department team is involved with recommending monitoring requirements for substances, based on the listing of those substances in ch. NR 105, NR 219 and/or the priority pollutant list (see Chapter 8). So as not to contradict that team's efforts, it should suffice to say that the proposed procedure for secondary value development discussed here applies to substances that were already tested and detected in discharges. The phrase "and detected" is included here because the process for determining the need to propose limits and/or monitoring requirements in permits is triggered upon a finding of "reasonable potential," or the potential for the discharge of a substance to result in exceedences of a water quality

standard. To trigger this showing of reasonable potential, a substance must be detected at a particular level in comparison to an effluent limit (greater than 1/5 of a limit if fewer than eleven detected results, or a 99th percentile exceeding a limit if there are eleven or more detected results), so reasonable potential cannot be demonstrated if a substance is not detected. Therefore, if a substance is not detected in a discharge (assuming the use of appropriate test methods), there is no need to even search for or calculate a secondary value for that substance. Instead, the availability of secondary values need only be examined for substances that are detected and for which no specific criteria are available in ch. NR 105.

Until now, the decision process for application monitoring requirements was based on the priority pollutant list and the list of non-priority pollutants with water quality criteria in ch. NR 105. Primary industries and major municipalities were required to test for all substances on the priority pollutant list, regardless of whether or not those substances had water quality criteria. For some industrial categories, monitoring was not required for certain groups of substances on the priority pollutant list, but that decision only went to the level of groups of substances, such as saying there's no need to test pesticides at metal finishers, foundries, power plants, and some paper mills (see Form 2C requirements). There is currently no provision for subdividing the list of pesticides at these facilities, such as saying some have to do only BHCs or PCBs, etc.

For minor municipalities and secondary industries, there is more flexibility in the decision process. The Department has the authority to look at potential sources and uses to determine which substances are believed present. Alternatively, the permittee has the opportunity to make the same type of assessment for priority pollutants. Part of that process may also include comparison to the list of substances with available water quality criteria. This process is available for all discharges in the area of non-priority pollutants. In those cases, there are no Federal testing mandates, so there is flexibility in determining when a non-priority pollutant needs to be tested.

This process becomes complicated when the issue of secondary values arises because theoretically, the sky is the limit when it comes to the potential for the availability of secondary values. There is not enough time available for every permittee and permit drafter to examine the universe of potential pollutants to determine what is believed present or absent in a discharge. As a result, the Monitoring Workgroup (See Chapter 8) is focusing on three sources of information to determine possible options for setting up monitoring requirements in permit applications, or possibly in permits themselves. Those sources include the following:

- Priority Pollutant List: It is the Department's understanding that no changes are being made to U.S. EPA's priority pollutant list or the categorical monitoring requirements in Form 2C (primary industries), but the other two sources may be used to suggest future modifications to this list.

- List of substances with water quality criteria: If a substance doesn't have water quality criteria, there may not be a monitoring priority. As noted above, though, this list should not stand alone simply because of the potential for secondary values.

- List of substances with approved test methods, such as those in ch. NR 219: If an approved test method is unavailable, effluent data are not expected to be generated.

**Process:** Environmental Toxicologists in the Water Quality Standards Section will be responsible for the actual derivation of secondary values (See Flow Charts in this chapter). Those staff will routinely review data from Department files, permit applications, and published scientific literature to determine which substances have been detected in effluents making them candidates for secondary values. If necessary, Environmental Toxicologists may propose the derivation of a secondary value for any substance that is believed to pose a significant environmental risk to fish, aquatic life, wildlife, or human health. Effluent Limits Calculators and/or Permit Drafters may also initiate the derivation of a secondary value by completing the "Secondary Value Worksheet" (Attachment 3A-1). New secondary values will not be calculated for substances that have not been associated with the potential for detrimental ecological or environmental impacts.

In order to determine if a substance may pose an environmental threat, Department staff (environmental toxicologists, permit drafters, regional water experts, etc.) will consider the following questions and complete a "Secondary Value Worksheet":

1. Are there whole effluent toxicity data or other biological data which suggest the potential for toxicity to fish and aquatic life that is related to the substance in question (positive toxicity test results)?

2. Are there any surface waters listed on the 303(d) list of impaired surface waters because of the substance in question?

3. Is there information that suggests the substance in question may be discharged from any industrial or municipal discharger (is the industry or industrial contributor to the municipality either a source or a user of the substance)?

4. Is the substance in question found in fish flesh at concentrations which have resulted in a fish consumption advisory for any Wisconsin surface water?

5. Has the substance in question been determined to be the cause for any historical fish kill or other surface water use impairment (i.e., detectable instream sediment concentration)?

6. Are there any significant health concerns associated with the substance in question which are related to the ingestion or dermal contact by humans?

7. Is the substance in question removed or reduced as a result of the facility's treatment process?

8. Has the substance been associated with ecological problems at other facilities that have manufacturing processes similar to that being evaluated here?

9. Has the substance been detected in the flesh of fish (also see #4), mussels, crayfish, turtles, or other aquatic organisms in the receiving water?

"Yes" answers to any of the above questions warrant the need to calculate secondary values. This information should be documented on the "Secondary Value Worksheet" by the Effluent Limits Calculator and/or the Permit Drafter, preferably as a result of a team process working within Regions or GMUs in the permit reissuance process. All Secondary Value Worksheets must be submitted to the Water Quality Standards Section Chief who will assign the derivation of a secondary value to a staff toxicologist. That staff member will be responsible for searching for available toxicological data using national database queries as well as the U.S. EPA Information Clearinghouse.

**What is the U.S. EPA Clearinghouse?** In general terms, it is a national repository for toxicological data which is designed to help meet one of the major goals of the Great Lakes Water Quality Initiative, that being the establishment of consistent approaches and bases for criteria development among the states surrounding the Great Lakes. To that end, U.S. EPA is establishing an information Clearinghouse to serve as a receptacle for data on aquatic life toxicity, bioaccumulation studies, and exposure studies on human health and wildlife that states could use to develop or update criteria or secondary values.

In the March 23, 1995 Federal Register, U.S. EPA published a list which reflects the approaches for calculating criteria based on the information available at the time. When one considers potential differences between states in receiving water uses and exposure routes, numerical criteria or secondary values may differ from state to state as well as for waters within each state, but the information used to develop those criteria or values, and the approach for calculating the criteria and values, should be consistent across the Great Lakes basin. The calculation approach is what the various states must incorporate into their water quality standards and rules, while the list of the data is what comprises the Clearinghouse. It is foreseen that Wisconsin will be able to access the contents of the Clearinghouse, presumably either by telephone or via a Web site on the Internet, such that at any given time, a database for a substance can be examined to determine if criteria or secondary values may be calculated or revised.

It is anticipated that results and dates of these searches will be kept in an electronic summary for future reference. The list is kept in a table which may be found in the WRMSRV file service at \SCHMIJ\106LIMIT\SECVALUE.TBL. After reviewing the data to determine their applicability to protection of Wisconsin freshwater species, a toxicologist will derive the value(s) according to Chapter 3B and the following sections of ch. NR 105 :

| | |
|---|---|
| Acute: | s. NR 105.05(4) |
| Chronic: | s. NR 105.06(6) |
| Wildlife: | s. NR 105.07 |
| Human Threshold: | s. NR 105.08 |
| Human Cancer: | s. NR 105.09 |

Department toxicologists may propose derivation of a new secondary value or modification of an existing secondary value at any time. However, the Water Quality Standards Section Chief

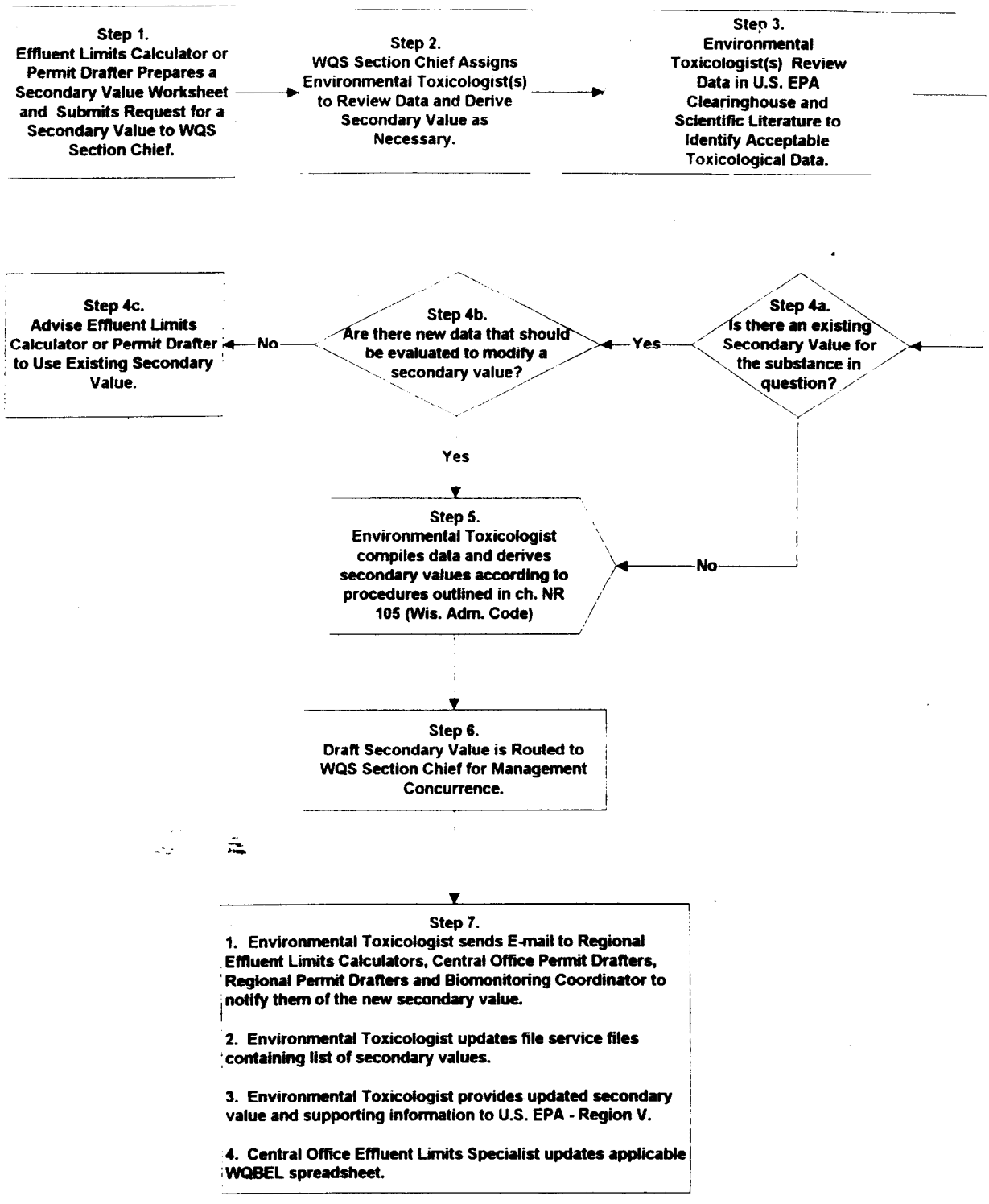
will utilize all information available to decide when to proceed while keeping in mind that it is the expressed intent of this guidance to prevent inappropriate delays in the issuance of a WPDES permit.

Over time, it is inevitable that the minimum database requirements will be met for some of the substances with secondary values. In those cases, the Water Quality Standards Section Chief shall be consulted, as described above, to obtain approval to calculate a water quality criterion. Any formal modification or adoption of a water quality criterion must be promulgated according to the formal rulemaking process.

**Communication:** Once a secondary value is derived for a substance, it will be forwarded to the Water Quality Standards Section Chief for concurrence. At that point in time, an E-mail message will be sent to all Department staff responsible for drafting WPDES permits (i.e., Regional Effluent Limits Calculators, Central Office and Regional Permit Drafters, and Biomonitoring Coordinator) which notifies them of the availability of the new value. In addition to the E-mail message, any centralized listing of secondary values will be updated to denote any new values. Lastly, revised values will be shared with U.S. EPA - Region 5.

Since the use of secondary values is intended to be local or site-specific, it will be the responsibility of the effluent limits calculator to modify the effluent limit calculation spreadsheet for that site to incorporate any authorized secondary values. To avoid conflicts with the use of secondary values in the preliminary limits process, the template spreadsheets should not contain secondary values. They should be limited to the use of criteria only, with secondary values added only on a local basis.

# Secondary Values Derivation Process

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# Attachment 3A-1
# Secondary Value Worksheet
# Instructions

*NOTE: Please fill out a separate worksheet for each substance which needs consideration of a secondary value.*

When you are reviewing permit application data to determine the need for water quality-based effluent limitations, you must consider the applicability of secondary values for toxic substances which do not have criteria listed in Ch. NR 105. This may be for a substance that has no criteria at all or one that has only particular type(s) of criteria (i.e., acute and chronic toxicity criteria, but no wildlife or human health criteria).

The intent of this worksheet is to allow you to quickly and efficiently document why you believe the derivation of a secondary value is appropriate for a substance. In order to ensure the secondary values are being calculated for substances that have a potential to impact a given receiving water, this worksheet is required for any and all requests for calculation of or modifications to a secondary value.

When you have completed the worksheet for each substance to be considered for a secondary value, please mail it or FAX it to:

Duane Schuettpelz, Chief
Water Quality Standards Section
Bureau of Watershed Management

FAX Number: (608) 267-2800

**Instructions:**
Header Information: Please fill out the requested information (name, date, telephone, etc...). If you are requesting secondary values for more than one substance, please staple all worksheets together.

1. Check "Yes" or "No" as appropriate.
2. Check "Yes" or "No" as appropriate.
3. Check "Yes" or "No" as appropriate.
4. Check for each type of criterion which is currently listed in NR 105. If none, check the last option "No Criteria Exist in NR 105."
5. Sequentially follow Steps 8 & 9 in the Flow Diagram and then check all appropriate boxes.
6. Sequentially follow Steps 10 & 11 in the Flow Diagram and then check all appropriate boxes.
7. Sequentially follow Steps 12 & 13 in the Flow Diagram and then check all appropriate boxes.
8. Sequentially follow Steps 12 & 13 in the Flow Diagram and then check all appropriate boxes.

If there is other information available which supports the calculation of a secondary value, please attach a summary to the worksheet and send it to the address noted above.

If you have any questions, please contact Bob Masnado (608) 267-7662 or Jim Schmidt (608) 267-7658.

# Attachment 3A-1
# Secondary Value Worksheet

Prepared by: _____ Date: _____/_____/_____

Telephone No. - (_____) _____ - _____ Substance Considered: _____

Facility Name: _____ WPDES Permit No. WI- _____

Receiving Water Name and Location: _____

1. Are effluent data representative of normal operating conditions? ____ Yes ____ No
2. Were data generated using appropriate analytical methods and an appropriate Limit of Detection? ____ Yes ____ No
3. Is there information available to indicate that the type of facility represented above (or, in the case of a municipality, industrial contributors to the treatment facility) is an expected source or user of this substance? ____ Yes ____ No
4. Which type of NR 105 water quality criteria exist for this substance? (Check (✓) all that apply.)

___ Acute Toxicity ___ Chronic Toxicity ___ Wildlife

___ Human Threshold ___ Human Cancer ___ No Criteria Exist in NR 105

5. **Acute Fish and Aquatic Life Toxicity (Check (✓) all that apply):**

☐ a) Fish kills or other ecological impairments are related to the discharge of the substance.

☐ b) Positive acute whole effluent toxicity has been demonstrated.

☐ c) The receiving water is on the 303(d) list due to the discharge of the substance.

☐ d) The substance has been associated with ecological problems at other facilities with similar manufacturing and/or treatment processes.

☐ e) The substance will not be adequately removed or reduced by the existing type of treatment.

6. **Chronic Fish and Aquatic Life Toxicity (Check (✓) all that apply):**

☐ a) Fish kills or other ecological impairments are related to the discharge of the substance.

☐ b) Positive chronic whole effluent toxicity has been demonstrated.

☐ c) The receiving water is on the 303(d) list due to the discharge of the substance.

☐ d) The substance has been associated with ecological problems at other facilities with similar manufacturing and/or treatment processes.

☐ e) The substance will not be adequately removed or reduced by the existing type of treatment.

7. **Wildlife Toxicity (Check (✓) all that apply):**

☐ a) The receiving water is on the 303(d) list due to the discharge of the substance.

☐ b) There is a fish consumption advisory for the receiving water due to the substance.

☐ c) Fish kills or other ecological impairments are related to the discharge of the substance.

☐ d) The substance has been detected in the flesh of fish, mussels, crayfish, turtles, or other aquatic organisms in the receiving water.

☐ e) The substance will not be adequately removed or reduced by the existing type of treatment.

8. Human Threshold and Human Cancer Toxicity (Check (✓) all that apply):

☐ a) The receiving water is on the 303(d) list due to the discharge of the substance.

☐ b) There is a fish consumption advisory for the receiving water due to the substance.

☐ c) Fish kills or other ecological impairments are related to the discharge of the substance.

☐ d) The substance has been detected in the flesh of fish, mussels, crayfish, turtles, or other aquatic organisms in the receiving water.

☐ e) The substance poses health concerns related to ingestion or dermal contact by humans.

☐ f) There are data that indicate the substance has accumulated in sediments below the discharge at concentrations which are detectable using appropriate analytical methods.

☐ g) The substance will not be adequately removed or reduced by the existing type of treatment.

**When complete, please route or FAX this summary to:**

**Duane Schuettpelz, Chief**
**Water Quality Standards Section**
**Bureau of Watershed Management**

**FAX Number: (608) 267-2800**

Upon receipt, Duane will assign the responsibility of updating or calculating a secondary value to a staff toxicologist. That staff member will contact you directly with the secondary value and any other associated information.

# Chapter 3B.
# ASSESSING EFFLUENT DATA FOR SUBSTANCES WITH SECONDARY VALUES

**Author:** Jim Schmidt, Bob Masnado

**Overview:** The preceding discussion (Chapter 3A) covered background information on secondary value calculations. Next, it is necessary to discuss when limits are calculated and when a determination should be made of when limits or monitoring are needed in WPDES permits.

Where water quality criteria are available, the procedure for evaluating permit needs is straightforward since the limit calculation procedures are codified in ch. NR 106. The only determination to make is whether the discharge of a substance warrants inclusion of limits in permits based on the reasonable potential for the discharge of that substance to exceed the criteria after mixing (where applicable). The reasonable potential determination is based on comparison of a 99th upper percentile (P99) value to a limit or, if fewer than 11 detected results are available in the effluent, a comparison of the mean effluent concentration to 1/5 of the limit. Ch. NR 106 mandates the imposition of a water quality-based effluent limitation if either the 99th upper percentile exceeds the calculated limit or if the mean effluent concentration (when less than 11 detects are available) exceeds 1/5 of the calculated limit..

Where secondary values are available, though, several additional comparisons enter into the evaluation. Since aquatic life secondary values are based on smaller toxicity or exposure databases, or adverse impacts are more of a relative estimate because of minimal data, the relative impacts associated with the values are not as certain or as well-defined as those based on promulgated criteria. Given that knowledge, the Department will be more cautious about including limits in permits unless there is more qualitative evidence available that suggests limits are needed. For that reason, the new language in s. NR 106.05 (1)(b) was developed. In general, a limitation based on a secondary value shall only be imposed in a WPDES permit when one or more of the six conditions contained in s. NR 106.05(1)(b) are satisfied and the reasonable potential determinations are made based on the effluent data (P99 vs. limit or mean vs. 1/5 of limit). These six conditions are as follows:

1. **Whole effluent toxicity or other biomonitoring or bioassay test results indicate toxicity to test or other species.** If biomonitoring data are available on a discharge, it is possible to make this assessment with respect to acute or chronic toxicity to aquatic life. If there are toxicity test failures, a secondary value should be calculated for a substance if the permittee has identified that substance as being the cause for toxicity (via the TIE process) and if aquatic life criteria are not already available for that substance.

2. **The use designation of the receiving water is or may be impaired.** This relates to the presence of a water body on the 303(d) list because of the substance in question, a process which would theoretically warrant initiation of the TMDL process.

3. **There is other information that the industrial category or subcategory of the point source or other sources discharging to a publicly-owned treatment works discharges the substance.** This information may be available from the same sources as those used to establish permit monitoring recommendations as discussed in Chapter 8 of this document. Essentially, this is a showing that a substance is believed present in a particular discharge in addition to, or in place of, the availabi ity of representative effluent data.

4. **The substance in the wastewater will not be adequately removed or reduced by the type of wastewater treatment provided.** This demonstration follows closely to condition 3 in that a substance may be believed present in a type of wastewater, and if no operations or appurtenances are available for removal or reduction of the substance within the collection/treatment system, the substance will also be believed present in the discharge to surface waters. In reality, though, this is more of a "representative data" step than a showing of risk or toxicity. If limited data are available to show a substance is present after treatment, more information may be needed to show if that substance can truly be associated with a demonstrated adverse impact.

5. **The ecological or environmental risk from the substance may be significant when discharged to surface waters.** The significance of risk as applied to aquatic life, wildlife and human health situations is explained within ch. NR 105. Risk from exposure to a substance can be evaluated based on the available scientific data base. Ecological risk suggesting a need for secondary value calculation may be implied based on a combination of toxicity data, bioaccumulation in the food web and the likelihood of exposure. Situations that are covered by this condition include ecological impairments of a more subtle nature than fish kills, such as a fish consumption advisories, wildlife or human health concerns related to the ingestion of fish, or dermal contact by humans.

6. **Other relevant factors which may cause an adverse effect on surface waters as specified in s. NR 105.04 (1).** This is seen as somewhat of a last resort in terms of demonstrating adverse impacts. S. NR 105.04 (1) states that "substances may not be present in surface waters at concentrations which adversely affect public health or welfare, present or prospective uses of surface waters for public or private water supplies, or the protection or propagation of fish or other aquatic life or wild or domestic animal life." It is similar to the narrative language in s. NR 102.04 (1)(d). Examples of findings relating to this condition include information showing that the substance accumulates in sediments at detectable concentrations (meaning a potential to be re-released back into the water column), detection of a substance in the flesh of fish, mussels, crayfish, turtles, or other aquatic organisms in the receiving water, or information on other surface waters (even outside of Wisconsin) where adverse impacts can be associated with a particular type of discharger and/or a substance being discharged.

In this process, it is possible is to have a list of secondary values available when preliminary effluent limits are calculated (or at least a list of substances which have secondary values). It is also possible to calculate secondary value-based limits available as part of the preliminary limit process. **However, since there are other factors driving the need to impose secondary value-based limits in permits (the six conditions listed above), Department staff will not provide preliminary limits based on secondary values**.

It is strongly recommended that the need for secondary values be evaluated when permit applications are submitted to the Department. When the application data are submitted, the first thing the limits calculator should do is to determine if any of the six conditions even warrant evaluation of secondary values. It is expected that other Department staff can be consulted to determine if any of the above six conditions exist at a given site. If there is no information on hand which indicates any of the six conditions are triggered, then there should be **no calculation of secondary values nor of limits based on secondary values.**

As noted above, information should be made available to the limits calculator to make the above assessment. Significant time expenditures in acquiring this information may cause unnecessary delays in the permit reissuance process. Depending on where the limits calculator is located, it may be necessary to contact regional or GMU staff to answer some of the questions, but it is possible to do this as part of the regular review process. An example may be that when the limit calculator routes a draft review to the GMU, s/he could note the areas for which input is needed, such as soliciting comments on fish advisories, 303(d) listings, fish kills, or any other issues of concern which may be worthy of consideration. Information must also be made available to the limit calculator on sources and uses of different substances (see Attachment 7 of this document).

In order to facilitate the review of the need to calculate secondary value-based limits and compare them to effluent data, it is necessary to do some re-arranging of the six conditions in s. NR 106.05 (1)(b). Although only one of the six conditions needs to be satisfied in order to warrant limit calculations, there is a sequence to reviewing those conditions such that all of them can be answered without having to collect a lot of unneeded data or spend a lot of unnecessary time in the process. The narrative flow chart which begins on the next page is intended to provide a step-by-step process for evaluating the need to calculate limits based on secondary values.

# NARRATIVE FLOW CHART FOR EVALUATION OF NEED FOR SECONDARY VALUE-BASED LIMITS IN PERMITS (subdivisons of s. NR 106.05 (1)(b) are noted in brackets where applicable)

1. **Are data available on a discharge that are representative of normal operating conditions?**

   If **yes**, continue to step 2 (analytical methods and levels of detection).

   If **no**, effluent monitoring should be requested as needed, pursuant to Chapter 8 of this document.

2. **Was a substance tested in a discharge using appropriate and approved test methods?**

   If **yes**, continue to step 3 (detected results).

   If **no**, additional monitoring should be requested using appropriate analytical methods and/or levels of detection as per Chapter 8 of this document. After this information is received, return to step 1(do NOT provide limits subject to removal in this case because of other factors which may affect review of the need for a permit limit).

3. **Was a substance detected?**

   If **yes**, continue to step 4 (availability of criteria).

   If **no**, STOP. No further action on secondary values (or even limits based on criteria) is needed because there does not exist the reasonable potential to exceed a standard. Since appropriate analytical methods and levels of detection were used (yes answer to step 2), permit limits are not needed pursuant to s. NR 106.05 (3) through (6).

4. Where **water quality criteria are available** for a substance in chs. NR 102 or 105, calculate effluent limitations using s. NR 106.06 and determine the need to recommend permit limits for that substance using s. NR 106.05.. All available criteria should be examined in this step, including acute toxicity (ATC), chronic toxicity (CTC), wildlife (WC), human threshold (HTC), human cancer (HCC), or taste and odor criteria (TOC). For example, the August, 1997 revisions to chs. NR 102 and 105 include ATC, CTC and TOC for copper. At that time, there were no WC, HTC or HCC for copper, so potentially there could have been secondary wildlife, threshold, and/or cancer values for copper. The need to calculate those values is determined using the remaining steps of the flow chart. After calculating the criteria-based limits and determining the need to include limits in permits based on those available criteria, go to step 5.

5. Step 5 is merely the **compilation of the criteria that are <u>not</u> available** for a substance. In the copper example of step 4, WC, HTC and HCC are not available. Go to step 6.

6. **Is information available to indicate the discharger may be a source or user of the detected substance?**

If **yes**, go to steps 7a through 7c (parallel reviews).

If **no**, a secondary value should not be calculated for that substance. If there are water quality concerns in the receiving water, they should not be associated with this discharger. However, the fact that the substance was detected (a "yes" answer to Step 3) is still an issue here. It is recommended that the discharger investigate why the substance was detected, which may involve additional monitoring of the substance as well as some source investigation work. The following sentences discuss possible results of such an investigation:

- If the substance is related to the use of an additive, secondary values may be warranted, or else s. NR 106.10 limits may be warranted.
- If the substance is present in the effluent because it was present at similar levels in the intake water, limits are not necessary because the substance is not "added" to the receiving water as a result of the facility's processes or operations (see s. NR 205.03 (13) in the context of use in chs. NR 200 to 298).
- If the substance is found to be discharged as a result of the facility's processes or operations, it may be necessary to revise the source/use documentation in chapter 8 of this document. Step 6 of this flowchart should then be answered "yes."
- Other actions may be necessary as a result of this investigation. Some flexibility is available as to the next step in the process if none of the above results describe a particular situation.

**7a-c.** **Determine which criteria are not available for a particular substance.** The next step in the flowchart depends on which criteria are missing. Steps 7a, 7b, and 7c are intended to be answered in all cases.

**7a.** If the **only missing criteria are ATC and/or CTC**, go to step 8a (review of whole effluent toxicity results).

**7b.** If the **only missing criteria are WC, HTC or HCC**, go to steps 12a through 12c (parallel reviews relating to wildlife and human health impacts).

**7c.** If there are **no NR 105 criteria available** for a substance, go to **both** steps 8a (and the subsequent steps in the flowchart) and the parallel steps 12a through 12c.

NOTES: 1) The availability of TOC does not affect this review. No secondary values are applicable to taste and odor at this time, so if the only criterion that is available is TOC, step 7c is applicable (that is why step 7c specified "NR 105" criteria).
2) If every criterion is available for a substance, the reviewer should have never gotten past step 5. Limits would be calculated based on all criteria and no secondary values are needed. When NR 105 was revised in August of 1997, there were no substances that had all of the NR 105 criteria (ATC, CTC, WC, HTC and HCC). The most criteria available for any given substance was four (mercury only lacked HCC).

**8a. Does the substance have an ATC in s. NR 105.05 (Tables 1 or 2 of NR 105)?**

If **yes**, go to step 10a (review of chronic criteria and whole effluent test results). Several substances in NR 105 have ATC but no CTC, for those there may need to be secondary chronic values calculated. Limits will already be calculated based on ATC (in step 4) and the need for ATC-based limits will be evaluated by the limits calculator.

If **no**, go to step 8b (process to evaluate the need to calculate secondary acute values).

**8b. Is there any reason to believe that fish kills or other ecological impairments to the receiving stream are related to the discharge of the substance (see s. NR 105.05 (1)(b)5)?**

If **yes**, go to step 8f (authorization to calculate a secondary acute value).

If **no**, go to step 8c (availability of acute whole effluent toxicity test results).

**8c. Are there acute whole effluent toxicity test data that are representative of normal operating conditions?**

If **yes**, go to step 8e (review of acute whole effluent toxicity test results).

If **no**, go to step 8d (additional monitoring).

**8d. Additional data are needed** on the substance in question as well as on acute whole effluent toxicity. The following recommendations should be made:

- At least two annual acute whole effluent toxicity tests should be performed. If the WET checklist specifies more frequent testing than this, that frequency should be used in place of the two annual tests (that's why the recommendation says "at least").

- Perform chemical-specific tests on the substances in question from the same samples taken for the acute WET tests (so the frequency will be the same). This is done in order to more easily determine if any positive toxicity test results can be associated with the discharge of the substance(s) lacking ATC.

**8e. Has the discharge demonstrated positive acute whole effluent toxicity?**

If **yes**, go to step 8f (authorization to calculate a secondary acute value).

If **no**, go to step 9a (evaluation of use impairments).

**8f. A secondary acute value should be calculated** by the environmental toxicologist. Prepare the Secondary Value Worksheet to document the need for calculation of a secondary value and submit a request to the Section Chief that such a value be calculated. Go to step 15 (limit calculation and reasonable potential review).

**9a. Is the receiving water on the 303(d) list due to the substance that was detected (see s. NR 106.05 (1)(b)2)?**

If **yes**, go to step 8f (authorization to calculate a secondary acute value).

If **no**, go to step 9b.

**9b. Has the substance been associated with ecological problems at other facilities that have similar manufacturing processes (see s. NR 106.05 (1)(b)5)?** Hopefully, this type of information will be maintained for future reference to avoid any major, time-consuming literature searches at this step in the process. If possible, this information will be documented in the same subdirectory as secondary value calculations and the justifications for the secondary value requests.

If **yes**, go to step 8f (authorization to calculate a secondary acute value).

If **no**, go to step 9c (removal or reduction in the treatment process).

**9c. Is there information to show that the substance is adequately removed or reduced by the existing type of wastewater treatment (see s. NR 106.05 (1)(b)4)?** This determination may involve not only the availability of representative in-plant and effluent data from the particular facility being reviewed for limits, but also information on other similar treatment systems.

If **yes**, recommend monitoring of the substance in the permit **(step 9d)**. No secondary acute value-based limit is necessary at this time. Monitoring is needed to better categorize the amount of the substance discharged in the treatment system effluent. Given the lack of other acute toxicity-related concerns (steps 8b, 8c, 9a, and 9b), this monitoring should take place during the fourth year of the permit in order to insure the availability of representative data at the time the next permit reissuance application is submitted. One test during the fourth year is sufficient, but Chapter 8 may be consulted at that time to determine the need for additional data, especially if an ATC is available then.

If **no**, go to step 8f (authorization to calculate a secondary acute value). A "no" answer to step 9c is most likely the result of information to indicate that the treatment system does not remove or reduce concentrations of the substance in question. If no data were available on the treatment system effluent, additional monitoring would already have been recommended because of a "no" answer to step 1.

**10a. Does the substance have a CTC in s. NR 105.06 (Tables 3, 4, 5 or 6 of NR 105)?**

If **yes**, go to steps 12a through 12c (parallel reviews relating to wildlife and human health impacts). Limits will already be calculated based on CTC (in step 4) and the need for CTC-based limits will be evaluated by the limits calculator.
NOTE: IF WC, HTC AND HCC ARE ALREADY AVAILABLE (via steps 4 and 7a), THEN LIMITS CAN BE CALCULATED BASED ON ALL FIVE NR 105 CRITERIA. WHEN NR 105 WAS REVISED IN AUGUST OF 1997, THIS SITUATION DID NOT OCCUR (see step 4), SO IT IS LIKELY THAT A "yes" ANSWER WILL WARRANT PROCEEDING TO STEPS 12a - 12c.

If **no**, go to step 10b (process to evaluate the need to calculate secondary chronic values).

**10b. Is there any reason to believe that fish kills or other ecological impairments to the receiving stream are related to the discharge of the substance (see s. NR 105.05 (1)(b)5)?**

If **yes**, go to step 10f (authorization to calculate a secondary chronic value).

If **no**, go to step 10c (availability of chronic whole effluent toxicity test results).

**10c. Are there chronic whole effluent toxicity test data that are representative of normal operating conditions?**

If **yes**, go to step 10e (review of chronic whole effluent toxicity test results).

If **no**, go to step 10d (additional monitoring).

**10d. Additional data are needed** on the substance in question as well as on chronic whole effluent toxicity. The following recommendations should be made:

- At least two annual chronic whole effluent toxicity tests should be performed. If the WET checklist specifies more frequent testing than this, that frequency should be used in place of the two annual tests (that's why the recommendation says "at least").

- Perform chemical-specific tests on the substances in question from the same samples taken for the chronic WET tests (so the frequency will be the same). This is done in order to more easily determine if any positive toxicity test results can be associated with the discharge of the substance(s) lacking CTC.

**10e. Has the discharge demonstrated positive chronic whole effluent toxicity?**

If **yes**, go to step 10f (authorization to calculate a secondary chronic value).

If **no**, go to step 11a (evaluation of use impairments).

**10f. A secondary chronic value should be calculated** by the environmental toxicologist. Prepare the Secondary Value Worksheet to document the need for calculation of a secondary value and submit a request to the Section Chief that such a value be calculated. Go to step 15 (limit calculation and reasonable potential review).

**11a. Is the receiving water on the 303(d) list due to the substance that was detected (see s. NR 106.05 (1)(b)2)?** Note that this review may be the same as that done in step 9a if the need for a secondary value was also evaluated for this substance, the results from step 9a may be used here.

If **yes**, go to step 10f (authorization to calculate a secondary chronic value).

If **no**, go to step 11b.

**11b. Has the substance been associated with ecological problems at other facilities that have similar manufacturing processes (see s. NR 106.05 (1)(b)5)?** Hopefully, this type of information will be maintained for future reference to avoid any major, time-consuming literature searches at this step in the process. If possible, this information will be documented in the same subdirectory as secondary value calculations and the justifications for the secondary value requests. Note that this review may be the same as that done in step 9b if the need for a secondary value was also evaluated for this substance, the results from step 9b may be used here.

If **yes**, go to step 10f (authorization to calculate a secondary chronic value).

If **no**, go to step 11c (removal or reduction in the treatment process).

**11c. Is there information to show that the substance is adequately removed or reduced by the existing type of wastewater treatment (see s. NR 106.05 (1)(b)4)?** This determination may involve not only the availability of representative in-plant and effluent data from the particular facility being reviewed for limits, but also information on other similar treatment systems. Note that this review may be the same as that done in step 9c if the need for a secondary value was also evaluated for this substance, the results from step 9c may be used here.

If **yes**, recommend monitoring of the substance in the permit **(step 11d)**. No secondary chronic value-based limit is necessary at this time. Monitoring is needed to better categorize the amount of the substance discharged in the treatment system effluent. Given the lack of other chronic toxicity-related concerns (steps 10b, 10c, 11a, and 11b), this monitoring should take place during the fourth year of the permit in order to insure the availability of representative data at the time the next permit reissuance application is submitted. One test during the fourth year is sufficient, but Chapter 8 may be consulted at that time to determine the need for additional data, especially if an CTC is available then.

If **no**, go to step 10f (authorization to calculate a secondary chronic value). A "no" answer to step 11c is most likely the result of information to indicate that the treatment system does not remove or reduce concentrations of the substance in question. If no data were available on the treatment system effluent, additional monitoring would already have been recommended because of a "no" answer to step 1.

**12a-c. Does the substance have the following:**
**12a. A WC in s. NR 105.07 (Table 7 of NR 105)?**
**12b. An HTC in s. NR 105.08 (Table 8 of NR 105)?**
**12c. An HCC in s. NR 105.09 (Table 9 of NR 105)?**

Where any of these answers are **yes**, limits based on those criteria will already be calculated (in step 4) and the need for criteria-based limits will be evaluated by the limits calculator.

Where any of these answers are **no**, go to step 13a (evaluation of use impairments).

**13a. Is the receiving water on the 303(d) list due to the substance that was detected (see s. NR 106.05 (1)(b)2)?** Note that this review may be the same as that done in steps 9a or 11a if the need for a secondary value was also evaluated for this substance, the results from steps 9a or 11a may be used here.

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13b.

**13b. Is there a fish consumption advisory in the receiving water due to the substance that was detected (see s. NR 106.05 (1)(b)6)?**

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13c (potential for ecological impairment).

13c. **Is there reason to believe that fish kills or other ecological impairments to the receiving stream are related to the discharge of the substance (see s. 106.05 (1)(b)5)?**

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13d (detection in flesh of aquatic organisms).

13d. **Has the substance been detected in the flesh of fish, mussels, crayfish, turtles, or other aquatic organisms in the receiving water (see s. NR 106.05 (1)(b) 5 or 6)?**

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13d (human health concerns).

13e. **Are there any health concerns associated with the substance which are related to the ingestion of, or dermal contact, by humans (see s. NR 106.05 (1)(b)5)?**

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13e (accumulation in sediment).

13f. **Are there any data to show the substance accumulated in sediments that are below the discharge in detectable concentrations (see s. NR 106.05 (1)(b)6)?** This information may be obtained by accessing the "Fish/Sediment Contaminant Database." This is an Oracle database which can be accessed using the instructions in Attachment 3B-1. (Linda Talbot (WT/2) or Steve DeVoe (ET/8) may be able to provide assistance.)

If **yes**, go to step 14 (authorization to calculate a secondary value).

If **no**, go to step 13f (removal or reduction in the treatment process).

13g. **Is there information to show that the substance is adequately removed or reduced by the existing type of wastewater treatment (see s. NR 106.05 (1)(b)4)?** This determination may involve not only the availability of representative in-plant and effluent data from the particular facility being reviewed for limits, but also information on other similar treatment systems. Note that this review may be the same as that done in step 9c or 11c if the need for a secondary value was also evaluated for this substance, the results from steps 9c or 11c may be used here.

If **yes**, recommend monitoring of the substance in the permit **(Step 13h)**. No secondary value-based limit is necessary at this time based on wildlife or human health as appropriate. Monitoring is needed to better categorize the amount of the substance discharged in the treatment system effluent. Given the lack of other wildlife and/or human health-related concerns (steps 13a through 13e), this monitoring should take place during the fourth year of the permit in order to insure the availability of representative data at the time the next permit reissuance application is submitted. One test during the fourth year is sufficient, but Chapter 8 may be consulted at that time to determine the need for additional data, especially if WC, HTC, and/or HCC (where appropriate) are available then.

If **no**, go to step 14 (authorization to calculate a secondary value). A "no" answer to step 13f is most likely the result of information to indicate that the treatment system does not remove or reduce concentrations of the substance in question. If no data were available on the treatment system effluent, additional monitoring would already have been recommended because of a "no" answer to step 1.

14. **A secondary wildlife, threshold, or cancer value (as appropriate based on the missing criteria) should be calculated** by the environmental toxicologist. Prepare the Secondary Value Worksheet to document the need for calculation of a secondary value and submit a request to the Section Chief that such a value be calculated. Go to step 15.

15. **Calculate effluent limits** based on the secondary values (using s. NR 106.06 (3) and/or (4)) **and determine the need to include those limits in permits** based on the reasonable potential procedures which comprise s. NR 106.05 (3) through (9). If permit limits are not needed because of s. NR 106.05, periodic monitoring of the substance in question should be required as part of the permit (either once per month or once per quarter is suggested).

# Secondary Values and Associated Effluent Limitations

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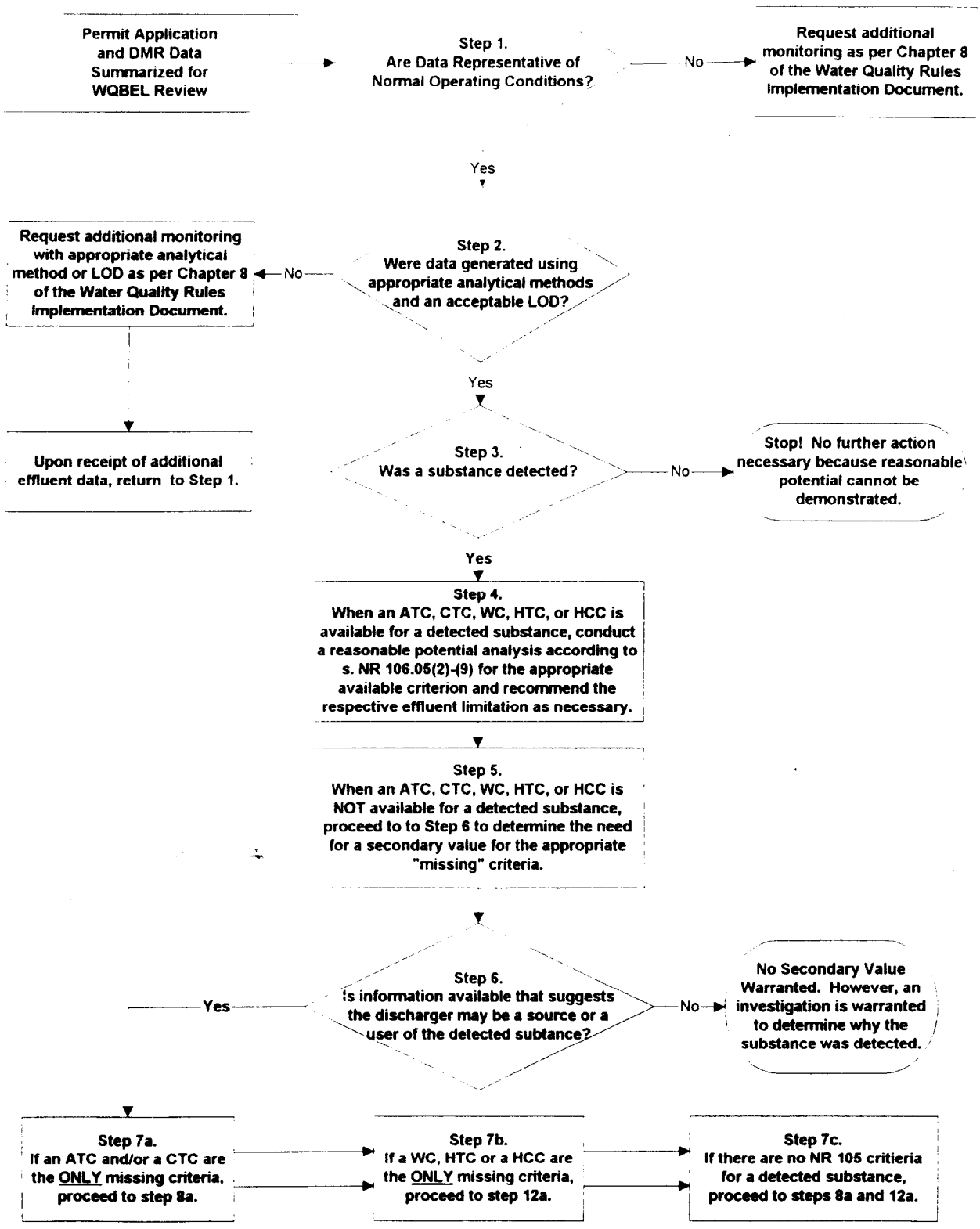
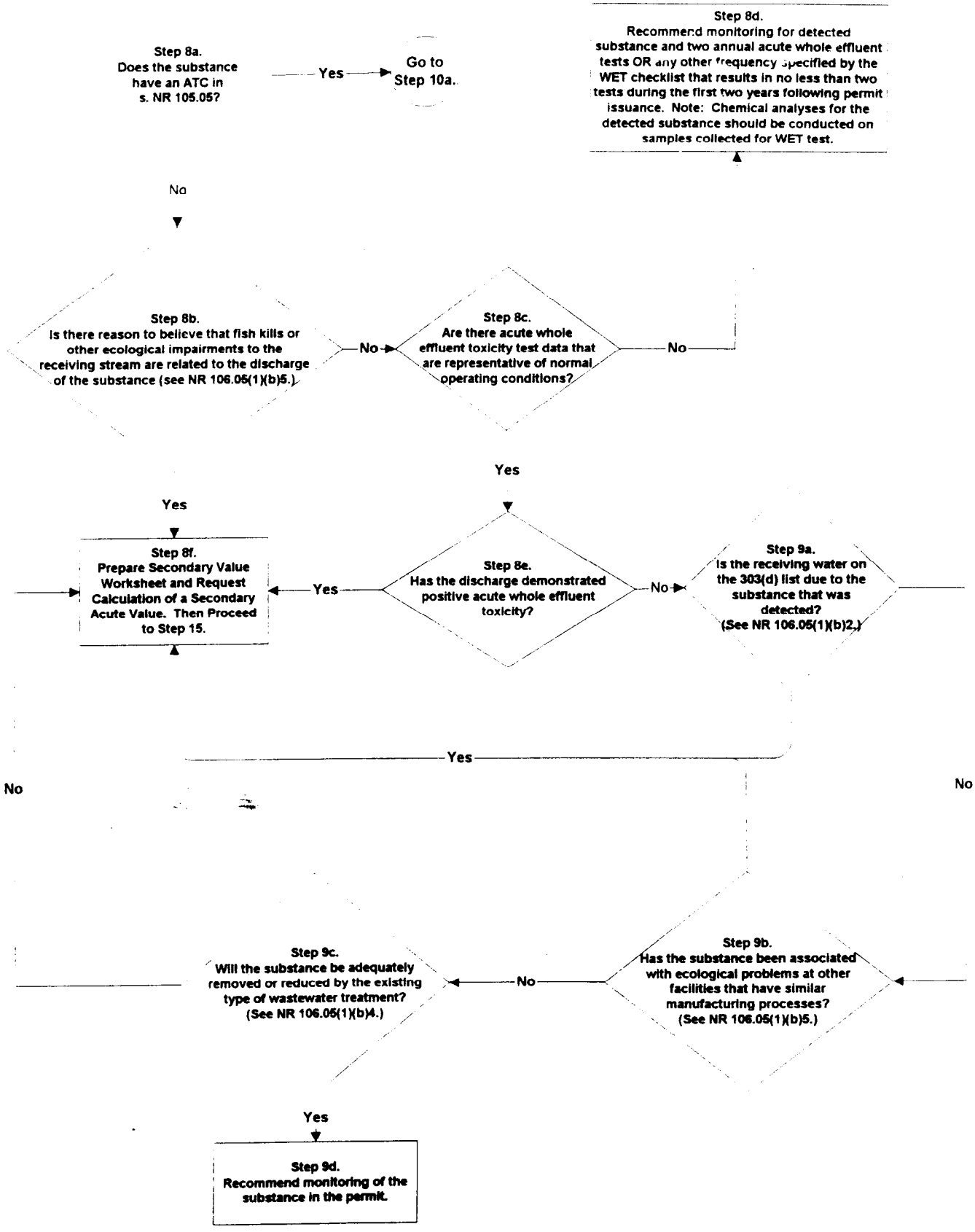
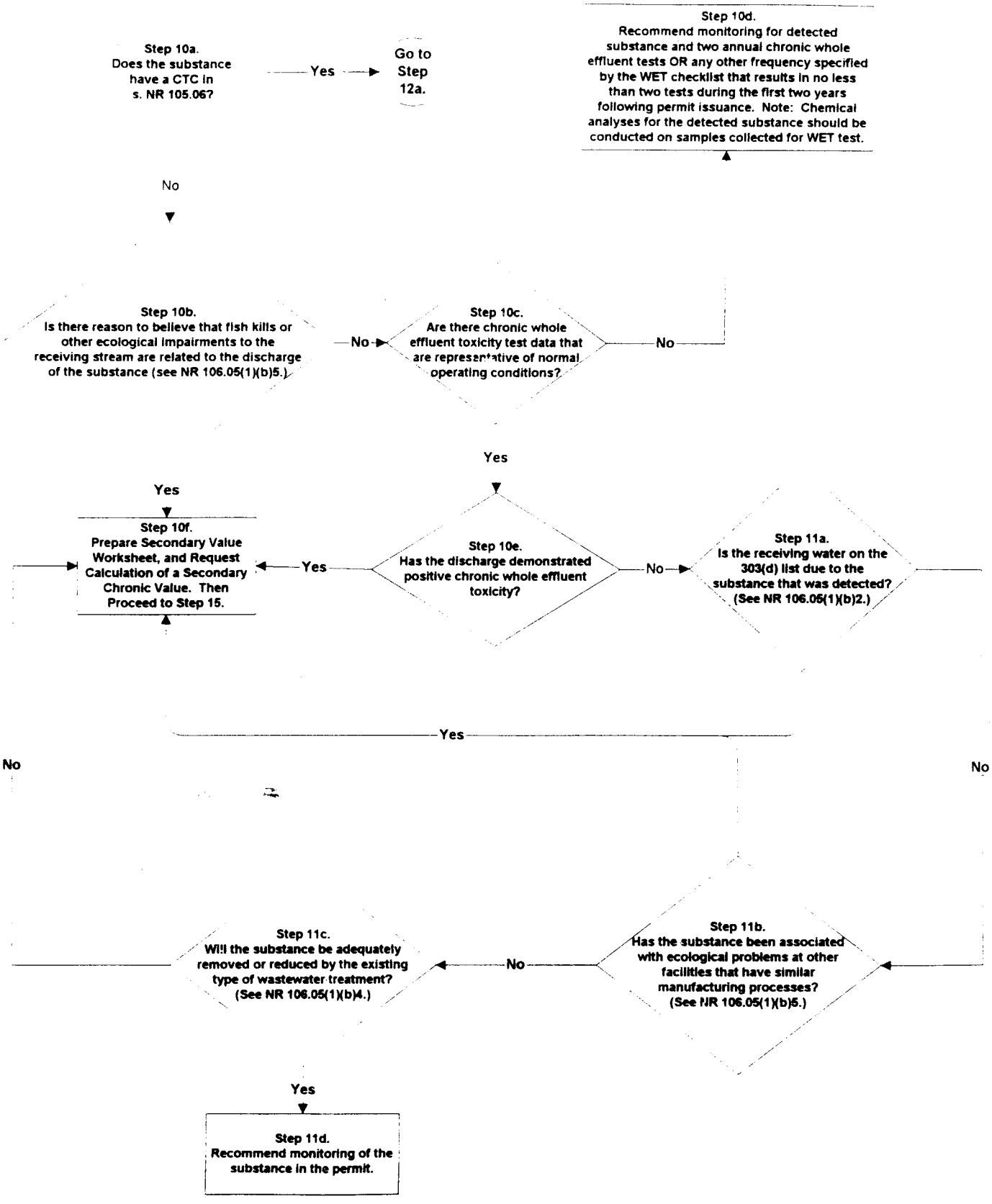


# Secondary Values and Associated Effluent Limitations (Continued)

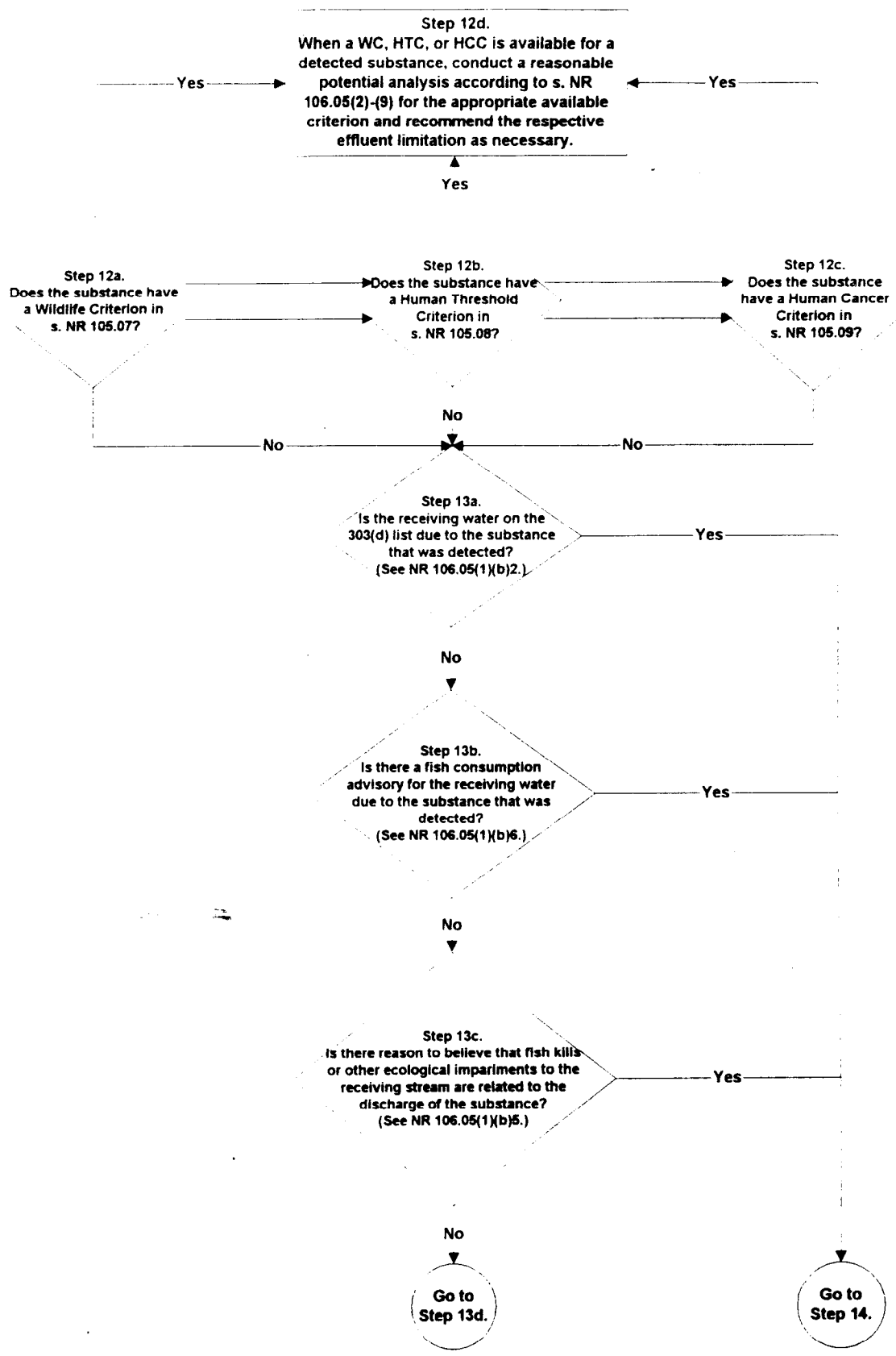


# Secondary Values and Associated Effluent Limitations (Continued)

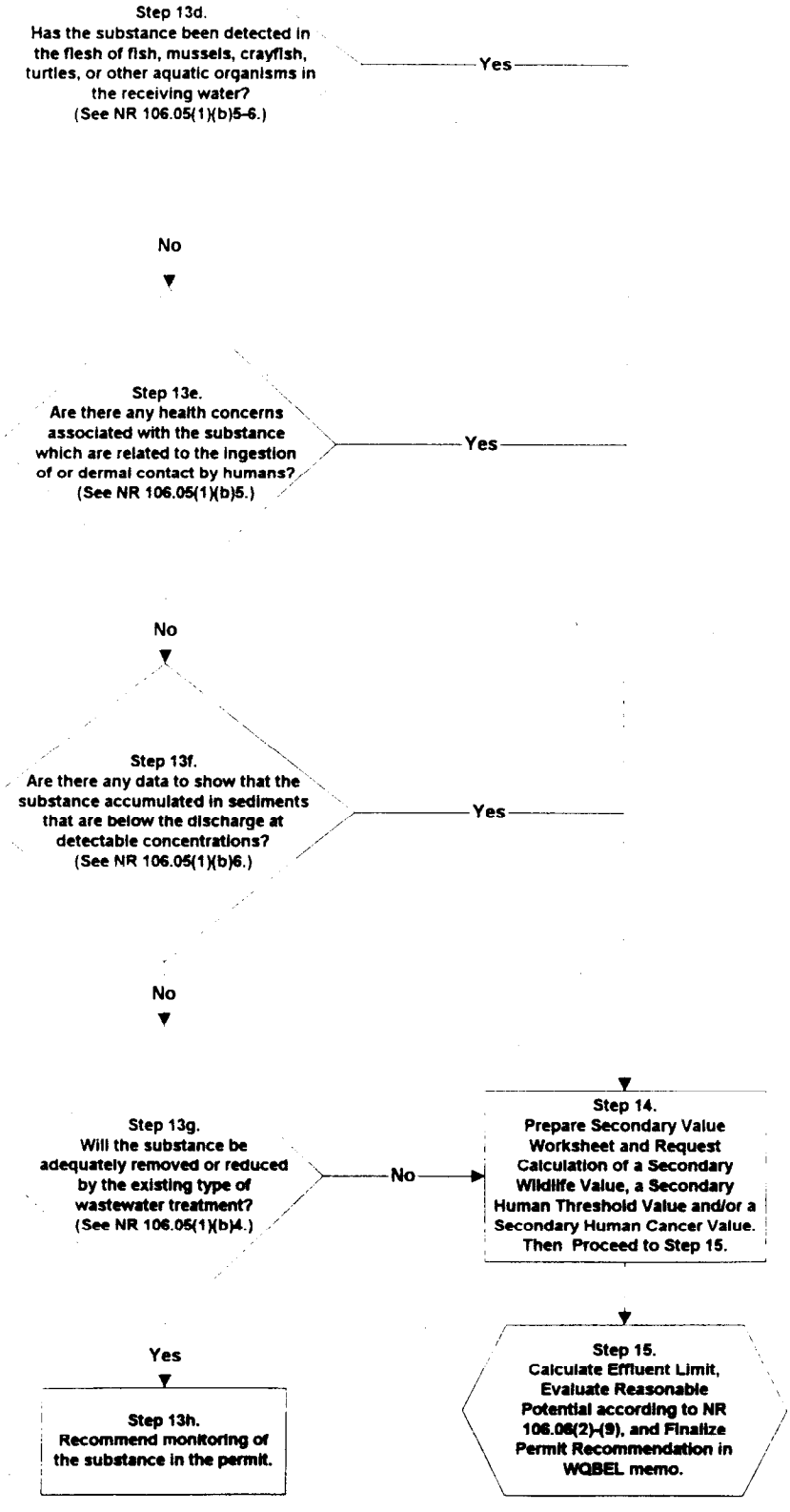


# Secondary Values and Associated Effluent Limitations (Continued)





# Secondary Values and Associated Effluent Limitations (Continued)



# Attachment 3B-1
# Instructions for Access to the
# Fish/Sediment Contaminants Database

At C:> type: **SETHOST ORACL1** or from Windows, access ORACLE from the Network. An ORACLE icon can be placed in that window if you do not have one already. Please contact your Data Coordinator for assistance in setting up an ORACLE icon.

At the $ prompt, type: **@runsys.wr_contam_read_pc**

This is followed by a series of menu selectsions. You pick which you want.

Common ORACLE keys:

| Command Name | Keyboard Key |
|---|---|
| Commit (Save) | F12 |
| Exit | - |
| Next Block | Page Down |
| Insert | Home |
| Delete | Page Up |
| List of Values | Insert |
| List of Values Find | Tab (this puts the cursor in the FIND box) |
| ORACLE Menu | F10 |
| Scroll Down | Num Lock, Down Arrow |
| Scroll Up | Num Lock, Up Arrow |
| Previous Field | Num Lock, Enter (or Tab) |

# Chapter 3C. Development of Site-Specific Water Quality Criteria and Modification of Secondary Values.

**Author:** Bob Masnado

**Overview:** Chapter NR 105.02(1) authorizes both the development of site-specific water quality criteria and the modification of secondary values used to establish numeric water quality-based effluent limitations. A discharger may choose to exercise options allowed by this section of the rule as follows:

## Acute and Chronic Aquatic Life Criteria:

- **Site-Specific Criteria:** Water quality criteria are established when toxicological data representing a broad array of fish and aquatic life species are available. There are minimum database requirements as outlined in s. NR 105.05(1)(a) and s. NR 105.06(1)(a). Those data are compiled in a fashion that allows the calculation of numeric criteria that apply to surface waters with a specific designated use (i.e., warmwater community, coldwater community, etc..). Once promulgated, those criteria are applied statewide to protect all surface waters with the appropriate designated use.

  When a site-specific criterion is calculated, it applies only after promulgation to a very specific surface water segment. The development of a site-specific criterion may result in a criterion that is less stringent than the statewide criterion for that substance. However, there are times when a criterion may become more stringent than the statewide criterion in order to protect the organisms that inhabit the receiving stream. U.S. EPA's *Water Quality Standards Handbook*[1] recognizes three procedures for modifying a water quality criterion on a site-specific basis:

  (1) **Recalculation Procedure:** This procedure involves reviewing existing toxicological data for species that are known to inhabit the stream segment in question. If adequate toxicological and stream survey data are available, this procedure can be accomplished rather quickly without significant field work.

  (2) **Water-Effect Ratio Procedure:** This procedure involves conducting toxicity tests in site water and laboratory water to determine the effect of the receiving water on the bioavailability of the pollutant. This procedure may be very time intensive in order to evaluate the effects of seasonal water quality differences on the toxicity of a substance. This procedure also requires a moderate amount of analytical chemistry to complement the toxicological data generated.

  (3) **Resident Species Procedure:** This procedure involves generating toxicity data on resident species using site water. While this procedure may lead to the development of a very accurate criterion, it may be compromised by the lack of success in testing wild organisms in a laboratory setting. Similar to the Water-Effect Ratio Procedure, this procedure may be very time intensive in order to evaluate seasonality and will

involve a significant amount of analytical chemistry to complement the toxicological data generated.

- **Modification of Secondary Values:** The development of secondary values is authorized under s. NR 105.02(3). Secondary values differ from water quality criteria in that toxicological data exist for the substance, but the minimum database requirements have not been satisfied to allow promulgation of a criterion. Due to the added uncertainty associated with a smaller database, a variable adjustment factor is used to ensure protection of fish and aquatic life. The magnitude of the adjustment factor is indirectly proportional to the number of minimum database requirements that are satisfied. For this reason, a discharger may attempt to modify a secondary value by supplementing the toxicological database for a substance.

  Supplementing a database involves the generation of acceptable toxicological data for appropriate species. A discharger wanting to generate supplemental data would need to contact the Department to determine which species were included in the database used to derive the secondary value. Toxicity tests in laboratory water would then need to be conducted using accepted methodology and those data would need to be reported to the Department in a written report. All data will be reviewed for acceptability using method-specific requirements and all pertinent criteria contained in U.S. EPA's *Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*[2] (Summarized in Appendix H of the Water Quality Standards Handbook.).

  Upon receiving acceptable toxicological data which represent a species not included in the database for the secondary value in question, the Department will recalculate that value using a new adjustment factor if appropriate. That value will then be used until additional data are provided to the Department to further modify the secondary value.

## Wildlife and Human Health Criteria:

The Final Water Quality Guidance for the Great Lakes System (Federal Register Vol. 60, No. 56, March 23, 1995, pg. 15414-15415) is the only existing guidance on site-specific modifications to criteria and secondary values for the protection of wildlife and human health. The Department does not have additional guidance.

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**References:**

1 U.S. Environmental Protection Agency. August 1994. *Water Quality Standards Handbook - Second Edition* (EPA/823/B-94/005a)

2 U.S. Environmental Protection Agency. 1985. *Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses.* Authors: Charles E. Stephan, Donald I. Mount, David J. Hansen, John H. Gentile, Gary A. Chapman, and William A. Brungs. Available from National Technical Information Service - Document No. PB85-227049

# Chapter 4.
# "DISSOLVED" WATER QUALITY CRITERIA FOR HEAVY METALS

Author: David Webb

**Overview:** Accurate regulation of heavy metals in surface waters for the protection of aquatic life is predicated upon knowledge of the bioavailability of discharged metal. Standard/historic implementation of water quality criteria for metals assumes that 100 percent of discharged metal is bioavailable (i.e., toxic). A number of regional and national guidance documents and reports have promoted the implementation of water quality criteria for metals which are expressed as dissolved concentrations. These guidance documents are based upon the assumption that it is only the dissolved fraction of metals in surface waters which are bioavailable. However, for legal and programmatic reasons, the water quality based effluent limitation must necessarily be expressed as a total recoverable concentration. Federal Statute (40 CFR 122.45(c)) dictates that water quality based effluent limitations be expressed as a total recoverable concentration. In addition, regardless of how a water quality based effluent limitation is expressed, an assessment must be made to determine the total recoverable concentration in effluent which corresponds to the fraction of discharged metal that will be "dissolved" under ambient chemical conditions. It must be noted that "dissolved" is defined as filtrable (filtrable at 0.4 to 0.45 µm pore size) and in many instances only a relatively small portion of the filtrable metal is actually dissolved in solution. The process that follows is a mechanism by which existing "total recoverable criteria" can be converted as necessary to water quality criteria expressed as a dissolved concentration ("dissolved criteria"), and adjusted to account for the degree to which the ambient water chemistry will render a portion of the discharged metal to be less bioavailable. Water quality based effluent limitations can then be generated which are based upon dissolved criteria, but would be established and enforced as an effluent limitation expressed as total recoverable metal.

This guidance document acknowledges and is consistent with the following federal guidance document: *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion* (EPA 823-B-96-007). The federal guidance recommends generating a translator using one of the following three methods: "(1) It may be assumed to be equivalent to the criteria conversion factors. (2) It may be developed directly as the ratio of dissolved to total recoverable metal. (3) Or it may be developed through the use of a partition coefficient that is functionally related to the number of metal biding sites on the adsorbent in the water column (i.e., concentrations of TSS, TOC, or humic substances)". Wisconsin's guidance document for calculating a total recoverable permit limit from a dissolved criterion contains a method which is functionally equivalent to option number (2) above. Implementation of option number (1) results in no numerical difference between application of total recoverable criterion and dissolved criterion, and is not founded in science. Implementation of option number (3) is perhaps more scientifically accurate, but, is data intensive and difficult to implement on a large (statewide) scale.

An approach is needed which requires minimal data collection/interpretation, but at the same time, provides adequate knowledge necessary to accurately determine an effluent limitation which is based upon a dissolved criterion. However, the transport, fate, bioavailability, and resulting toxicity of heavy metals in surface waters is extremely site-specific and difficult to quantitatively determine. In order to achieve the highest accuracy for implementation of dissolved criteria, a particular receiving water would need to be modelled to determine the local partitioning characteristics of heavy metals. Modelling each surface water which receives a point source discharge is not feasible.

**Water Quality Criteria:**

To implement water quality criteria expressed as dissolved concentrations adjustments to the water quality criteria in ch. NR 105 must be made before calculating a water quality based effluent limit. Water quality criteria can be expressed as dissolved concentrations for acute and chronic effluent limit determination. In general, assumptions must be made to determine a receiving water's ability to render a portion of discharged metal non-toxic (non-bioavailable). Because of this, many of the parameters of concern and applicable assumptions are related to the receiving water characteristics reflective of the mix of receiving water and effluent. Because the purpose of this process is to account for site-specific characteristics which render a portion of the discharged pollutant less bioavailable, the parameters used to translate the criteria to account for the lesser bioavailability of heavy metals in the water column should be representative of the receiving water. There is no difference in the way in which the conversion and translation should occur for acute and chronic criteria.

**Conversion and Translation:**

If a water quality criterion is to be adjusted to account for a degree of decreased bioavailability in the water column, two adjustments to the water quality criterion expressed as total recoverable must be made to generate a water quality criterion expressed as a dissolved concentration. First, the total recoverable criterion must be converted to a dissolved criterion according to the ch. NR 105. The conversion factor simply represents that percentage of metal which was dissolved in the laboratory water to conduct the toxicity test for purposes of criteria generation. Since the solids concentration is very low in laboratory water, the conversion factors are less than but very close to 1.0. Second, the dissolved criterion (converted from total recoverable) needs to be "translated". The magnitude of the translator reflects the ability of the receiving water to render a portion of the discharged metal non-bioavailable and the portion of discharged metal that remains non-bioavailable in the receiving water. The translation involves multiplying the criterion resulting from the first step by a translator which will account for site-specific conditions. The translator consists of a ratio indicating how much discharged metal will be less bioavailable after discharge to a surface water. The procedure for generating the translator is included in ch. NR 105. In order to generate the translator, the following data are needed:

1. Total Suspended Solids - TSS (site-specific receiving water or appropriate surrogate) in grams per liter (see discussion on TSS). Note: TSS data are often reported as milligrams per liter, however, the equation for generating a translator requires that TSS data be expressed as grams per liter.

2. Particle bound concentration of metal, expressed as micrograms of metal per gram of particulate matter (µg metal/gram solids). The particle-bound concentration of metal must either be site-specifically determined or an appropriate default used. If site-specifically determined, annual or semi-annual (minimally) monitoring of total recoverable metal, dissolved metal, and TSS is needed. Experiments have indicated that directly measuring the metal on particles (by analyzing the material left on a filter) compares well with determining the particulate bound metal concentration by using the following equation: [total recoverable concentration (µg/L) - filtrable concentration (µg/L)] / TSS (g/L). Table 1 contains acceptable default data which may be used.

3. Filtrable (dissolved) concentration of the applicable metal in the receiving water, expressed as micrograms of metal per liter of water (µg metal/liter water). Table 2 contains acceptable default data which may be used. If site-specifically determined, annual or semi-annual (minimally) monitoring of the dissolved (filtrable) metal is needed to accurately characterize the filtrable metal in the surface water. However, this number has much less significant impact on the magnitude of the translator, so it probably does not warrant specific determination. Table 2 contains acceptable default data which may be used.

If it is unclear as to which data should be used for translation (TSS, $M_p$, and $M_d$), persons with local/stream expertise should be consulted, such as a regional biologist.

**Use of Total Suspended Solids (TSS) Data in Translator Development:**

The concentration of TSS in the receiving water is a critical component of the generation of the translator. Generally, the magnitude of the translator is a function of the TSS concentration. As TSS increases, the number of "binding sites" increases for discharged heavy metals. Caution must be taken when selecting a TSS value so the receiving water is not placed in jeopardy of violating standards for a portion of the year. If an inaccurately high TSS value is used and the receiving water TSS may actually be at much lower concentrations for a significant portion of the year then more metal than expected will be bioavailable (a translator may be developed that is not representative). It is possible that the solids concentration in ambient water can be measured as Suspended Particulate Matter (SPM), or by another method. These results may be acceptable for use in translator development with review and understanding of the data origin, validity, etc. Typically, TSS has been measured for many streams and lakes. Much data exists in STORET, USGS data files, and other similar databases. These data are acceptable for use in translator development, however, caution should be taken to insure that the data were not collected as part of a "runoff" study, in which case the data will be quite high and not be representative of the typical solids concentration in the receiving water. It is also possible that a facility has collected TSS or solids data for the receiving water to which they discharge. These data are also acceptable, and in some cases, preferable since they may not be "event-samples".

A seasonal pattern or trend may be apparent if sufficient data are available. Once data are collected and tabulated, obtaining the geometric mean of all the sample results is an acceptable means to arriving at a number to use for the translator. If all of the available data were collected as part of a runoff study and the concentrations are elevated, other data should be sought, and/or the facility may need to collect some representative data. In some cases, a subset of existing data may suffice for translator development. Since collection of TSS data is not necessarily expensive, a facility may actually wish to collect some data in support of a more accurate and representative translator. If a strong seasonal pattern is observed, a TSS number which represents the time when TSS are low may be appropriate to protect the surface water when available "binding sites" for metals are minimal. In addition, the common limit of detection for TSS is commonly in the range of 2 mg/L. If a stream is sampled in at a "low solids" time such as baseflow, winter, etc., TSS should be measured using a method capable of quantifying a lower concentration of TSS. Typically, achieving a lower level of detection simply mean filtering a larger sample (volume) of water.

**Monitoring Requirements:**

If a facility undergoes review for the applicability of a dissolved-based water quality based effluent limit (i.e. a total recoverable effluent limit was calculated from a dissolved criterion), the following scenarios may provide guidance on possible types and frequency of monitoring which may result from the review.

Types of potential monitoring:

1. Effluent: Analysis of the applicable metal in effluent in total recoverable and filtrable ("total dissolved") form may be required. Composite samples may be collected, but, most likely grab samples would be preferred since "low-level metals" sampling and analysis may be required to accurately characterize the metal in the effluent. Monitoring frequency should be determined case specifically but generally will not exceed quarterly sampling/analysis. Effluent sampling will not duplicate permit compliance sampling, and reconciliation between compliance sampling and this monitoring must occur. However, if 24 hour composite sampling is required for compliance, and strict "low level" grab sampling is required for the purpose of translator generation, it is possible that some sampling duplication would result. Grab sampling is preferred due to the inherent problems associated with obtaining contaminant-free samples using compositing techniques.

2. Receiving Water: Analysis of the applicable metal in the receiving water in total recoverable and filtrable ("total dissolved") form may be required. Grab samples are preferred. Low-level metals sampling and analysis should generally be required to accurately characterize the metal in the receiving water. There are draft EPA methods which characterize low-level methods (sampling and analysis). Many labs use this, or an equivalent method, and can be noted. Sampling should occur in an area which is representative of the mixed receiving water and effluent (at whatever point chemical equilibrium has been reached). If site-specific data for a conservative (non degradable) substance/parameter such as conductivity are available, these data could be used to quantitatively determine the point of chemical equilibrium. However, a

qualitative determination may be required (by the Department or the permittee) to determine the point of complete mixing. If total recoverable, filtrable, and total suspended solids data are collected, the translator which was used for calculation of the effluent limit can be verified. Obtaining total suspended solids information will provide a means to check the validity of the translator which was used to generate the effluent limit. The exact location will depend upon the hydrologic characteristics (mainly flow) of the effluent and receiving water. Frequency should be determined case-specifically but generally will not exceed quarterly sampling/analysis.

3. Sediment: Analysis of downstream sediments for the applicable metal in total or total recoverable form (may depend on the metal) may be required. It is critical to realize that sediment monitoring provisions cannot be placed in a "one size fits all" approach. There are too many variables, and the sites too different from each other to prescribe a uniform approach. The permit drafter must use their local expertise and knowledge, while working with appropriate Department staff such as sediment monitoring experts to determine prudent sediment monitoring provisions.

   The sampling location should be in an area which represents the closest depositional area downstream of the outfall. The sample(s) should be collected from the "top" section of the sediment to represent recently deposited material. If grab sampling is performed, recently deposited material will automatically be collected. If coring is done, the top 10 cm will generally represent recently deposited material. Frequency should be determined case specifically but generally will not exceed semi-annual sampling/analysis. Applicability of sediment sampling is a function of $Q_s$:$Q_e$ ratio and the presence and/or proximity of a depositional area. Depositional areas are common in many areas of receiving waters. In order for sediment monitoring to be justified, an area receiving a load of particles which has been "contaminated" with metals from the discharge needs to be in reasonably close proximity to the discharge location. If it is thought that there is an area susceptible to accumulation of sediments laden with metals from a certain discharge, sediment monitoring should be required.

   Sediment monitoring data will used to insure that an area of a receiving water is not being loaded with metal-laden particles which will lead to heavy metal contamination. If it is found that a depositional zone is being loaded with heavy metals, corrective action(s) may be required which could include altering the applicable translator or re-examining the effluent limitation at the facility which received the less stringent limitation. Due to the complexities of deposition, a trend in deposition and loading to an area would need to be established to link the deposition to the applicable discharger. Additionally, depending on the characteristics of the site, it may be useful for the discharger to obtain upstream sediment data. For example, if there are many other dischargers in the area, the facility may need to collect information immediately upstream of their facility to allow a judgement about the source of deposited metal.

4. Whole Effluent Toxicity Testing (WET): Analysis of the effluent for WET may be required. Specifics of WET sampling and analysis are contained in the Wisconsin DNR guidance document; Whole Effluent Toxicity Program Guidance Document. Applicability of whole effluent toxicity testing is primarily a function of the $Q_s$:$Q_e$ ratio, i.e. dilution. Whole effluent toxicity testing requirements which result from the review of dissolved-metals limits should not duplicate whole effluent toxicity testing requirements

which result from routine application of the WPDES program. If a facility is required to conduct whole effluent toxicity testing at least annually, due to standard application of the WPDES program, no additional whole effluent toxicity testing will be required. However, since the legally allowed discharge amount would increase with a dissolved-based limit, annual acute whole effluent toxicity testing should be required for any facility which receives a less stringent effluent limit based upon a dissolved water quality criterion. Chronic whole effluent toxicity testing should generally only be applied for low $Q_s$:$Q_e$ ratios, as defined in the Whole Effluent Toxicity Program Guidance Document. If whole effluent toxicity testing is required, it should generally be applied on an annual basis (for each year in which a dissolved-based effluent limit is in effect). If a facility is generally required to conduct whole effluent toxicity testing at a frequency of less than annually or there is not a requirement for whole effluent toxicity testing, there should be an annual requirement based on the following factors:

a. If $Q_s$:$Q_e$ is less than 100:1, acute and chronic whole effluent toxicity testing should be required annually (not to duplicate "standard" whole effluent toxicity testing).

b. If $Q_s$:$Q_e$ is greater than (or equal to) 100:1, but less than 1,000:1, acute whole effluent toxicity testing should be required annually (not to duplicate "standard" whole effluent toxicity testing). The necessity of requiring chronic whole effluent toxicity testing should be reviewed according to the Whole Effluent Toxicity Program Guidance Document.

c. If $Q_s$:$Q_e$ is greater than 1,000:1, only acute whole effluent toxicity testing should be required.

Many factors may be involved in determining whole effluent toxicity testing requirements. Along with the Whole Effluent Toxicity Program Guidance, best professional judgement may be exercised to determine monitoring applicability.

The following is a list (not all inclusive) of possible discharge situations with concomitant monitoring recommendations:

Generally applicable monitoring: In all cases where a facility's WPDES permit contains an effluent limit which was based upon implementation of a water quality criteria expressed as a dissolved concentration, receiving water monitoring should occur for total recoverable and filtrable metal, and total suspended solids at least semi-annually with increased frequency as described below, or otherwise deemed necessary due to seasonal or effluent variability or other site-specific circumstances. Also, effluent monitoring should occur for total recoverable and dissolved metal at least annually with increased frequency as described below, or otherwise deemed necessary due to variability, etc.

$Q_s$:$Q_e$ ratio as applied to effluent and receiving water monitoring: For high $Q_s$:$Q_e$ ratio situations, or obvious stream-dominated flow regimes, annual or semi-annual monitoring should suffice for assessing significant changes in receiving water or effluent quality. For low $Q_s$:$Q_e$ ratio situations, or obvious effluent dominated flow regimes, quarterly monitoring may be necessary to characterize the concentrations or other important aspects of the site. If the $Q_s$:$Q_e$ ratio does not allow a clear determination of the effluent and receiving

water characteristics, the determination for monitoring frequency should be based on other factors such as surface water classification, magnitude of the translator, or other objective criteria. If the applicable translator is above a value of approximately three to five, the calculated effluent limit may be quite elevated with respect to the limit as calculated from a total recoverable water quality criteria.

In-stream total suspended solids (TSS) concentration: If in-stream TSS is high, a large translator may have been applied in the generation of the effluent limit. If TSS is elevated during some portion of the year (approximately greater than 50-100 mg/L) quarterly monitoring for effluent and/or receiving water may be appropriate. If TSS is low or moderate (approximately 10-50 mg/L), annual, semi-annual, or tri-annual monitoring may be warranted. For sediments, as the concentration of TSS increases, the potential for deposition may also increase, especially if an impoundment is near downstream. Therefore, sediment monitoring may be warranted. If TSS is low, and an impoundment or depositional area is near, sediment monitoring may be required on an annual basis, or, if TSS is elevated in the receiving water and an impoundment is near, semi-annual monitoring should be required. If it is apparent that sediment deposition will not occur to a significant extent either due to low TSS, high Qs:Qe ratio, or other factors which indicate that insufficient solids are present to deposit, no sediment monitoring should be required.

Presence/location of impoundment or apparent depositional zone: If a facility receives an effluent limit based upon a dissolved water quality criterion, and the outfall is in reasonable close proximity to an impoundment or apparent depositional area, an increased probability of particulate-phase metals deposition increases. If a depositional area is near, annual sediment monitoring for the applicable metal is warranted. Only if the receiving water is "low" in TSS, and the facility does not contribute significant solids to the receiving water, would sediment monitoring in a depositional area not be warranted.

Due to uncertainty of quantifying fate, transport, and bioavailability of heavy metals in receiving waters, monitoring is justified. The behavior of metals in surface waters is very complex and dynamic. While the default procedure is useful in determining the probable fate of a discharged metal, site-specific monitoring will produce very useful data for use in verifying the applicable translator. Depending upon circumstances such as the calculated effluent limitation, magnitude of the translator, specificity of the data which produced the translator (or lack thereof), and local site conditions, a translator (and resulting effluent limitation) could be modified during a permit or at reissuance. The results of monitoring, as specified in a permit, can be used for a number of purposes which include checking the magnitude of the translator which was applied to a water quality criterion, to ensure that by regulating less metal in an effluent, the effluent is not toxic, and to confirm that sediments are not subject to increased deposition of metal-laden particles.

Summary of monitoring provisions - minimum required monitoring If a facility is triggered using "reasonable potential" determinations to receive a limit (based upon either total recoverable of dissolved criteria), the following minimum monitoring conditions should be imposed in the permit (the preceding text explains some detail):

Effluent: At least semi-annual grab samples taken at least four months apart; total recoverable (unfiltered) metal using low-level methods if it is likely that routine analysis will result in un-reliable data or "less than" detection results.

Receiving water: At least semi-annual grab samples obtained during summer and winter months (or at least low flow) using low-level sampling and analysis techniques. Commercial laboratories are available for this work. As discussed above, samples should be taken from an area which is representative of effluent and receiving water. Total recoverable and dissolved (filtered and unfiltered) metal should be measured. Effluent to receiving water ratios may also be factor in frequency, as discussed above. TSS results should also be obtained from the same time periods at the same location. TSS data are important for translator development/confirmation.

Whole Effluent Toxicity Testing: See discussion above for details. Acute whole effluent toxicity testing should be required for any facility that receives a limit based upon a dissolved criteria. Chronic whole effluent toxicity testing inclusion is a function of $Q_s$:$Q_e$ ratio. Any imposed whole effluent toxicity testing will not duplicate whole effluent toxicity testing occurring due to other provisions of code.

Sediment: Sediment monitoring should only be imposed if there is a concern about deposition of metal-laden particles in a zone downstream of a discharge. As a matter of course, sediment monitoring should not be imposed. However, as the above discussion indicates, impoundments and other obvious depositional areas can be efficient collectors of particles. See the above text for further discussion of sediment monitoring.

**Source Reduction Requirements to Accompany a Dissolved-based Effluent Limit:**

The intent of a facility performing source reduction measures is to minimize unnecessary heavy metals discharge. If a facility receives an effluent limit based upon the dissolved water quality criterion, then the facility should insure that they will only discharge that portion that they cannot reasonably treat. Source reduction efforts are not principally different between municipal and industrial facilities, therefore, discussion of source reduction requirements is not separated. For example, typical waste minimization techniques for point-source dischargers include[1]:

- Equipment or technological improvements
- Process or procedural improvements
- Reformulation or redesign of products
- Changing raw materials used in production
- Improvements in housekeeping, maintenance training
- Inventory/inflow control

Documents which focus on pollution prevention for mercury can be a good starting point for identifying generally applicable waste minimization efforts. Mercury is unique in terms of sources, fate, and transport in surface waters. However, many of the tools used in minimization may be applicable. Many federal and state efforts have occurred for minimizing and/or eliminating mercury from influent and effluent[2,4]. Typical waste minimization techniques for municipalities can be as apparent as assessing waste water being discharged into sewers by contributor groups, promoting water conservation, conducting waste minimization at selected industrial sites, establishing local limits, and providing information/education to citizens and industries[3]. Waste minimization for more complex municipal or industrial situations (for mercury or non-mercury) can be as

comprehensive as the "seven basic steps" for developing a mercury minimization plan [4], which include the following:

1. Identify your mission
   - o Develop a mission statement
   - o Identify scope of the program
2. Select a reduction team and form partnerships
   - o Assigned staff & volunteers
   - o Pick a facilitator
   - o Focus on partnerships
3. Develop baseline and set objectives
   - o Mercury history profile
   - o Set a baseline year
   - o Establish program for assessing concentrations
   - o Set objectives
4. Identify sources of mercury
   - o Potential sectors
   - o Identify sources
   - o Measure or estimate relative contributions
5. Evaluate tools and options
   - o Identify appropriate tools to reduce mercury
   - o Evaluate your options
   - o Make a list of highlighted sectors and identify tools
6. Set goals and implement
   - o Set specific goals
   - o Develop performance measures
   - o Provide incentives
   - o Implement your reduction plan
7. Measure and promote your success
   - o Measuring success
   - o Develop a system to process results
   - o Enforce your policy
   - o Promote your success

It is also important to distinguish between a pollution minimization program (PMP) -- which may be a requirement resulting from application of other administrative codes -- and a source reduction requirement. Fundamentally, there are no major differences between a PMP and a source reduction requirement. However, the following discussion informally defines each, and illustrates the differences:

PMP: A program which minimizes discharged pollutants through active promotion of pollution prevention and recycling. The primary trigger for a PMP is a need for imposition of a calculated water quality based effluent limitation which is less than either the limit of detection and/or limit of quantitation. A PMP may take the place of said numerical effluent limitation in a WPDES permit if the need is unclear.

Source Reduction requirement: A source reduction requirement is invoked when/if the ch. NR 105/106 language for water quality criteria expressed as dissolved concentrations for metals is applicable. If a permittee receives a water quality based effluent limitation which

is based upon implementing converted and translated water quality criteria for metals as specified in ch. NR 105, a source reduction requirement will be specified in the permit.

Language to be included in a WPDES permit could consist of the following:

1. At a time not later than six months after permit issuance, the permittee shall develop and submit to the Department a cost-effective source reduction program with the goal of reducing all applicable potential sources of the pollutant for the purpose of minimizing uncertainty associated with not regulating that portion of discharged pollutant which is particulate-bound in the receiving water. In developing this program, the permittee shall consider pre-treatment/source reduction activities, pollutant inventory, and related efforts. In addition, various treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques. Department staff and publications may be consulted to tailor the source reduction program. Past documented efforts may satisfy the requirements of this section.

2. At a time not later than _____, the permittee shall implement the source reduction program as submitted or as amended by agreement of the permittee and the Department.

Some primary and fundamental differences between a source reduction requirement and a PMP are:

1. A source reduction requirement may be less prescribed and is less formal in terms of administrative review,
2. A source reduction requirement may often be satisfied by a past/ongoing pollution prevention strategy,
3. A source reduction requirement will not take the place of a limit in a permit,
4. The goal of the PMP is to meet the calculated effluent limitation. The goal of the source reduction program is minimize the amount of heavy metals discharged, especially those measured in the total recoverable form.
5. Generally, the endpoint of a source reduction requirement are analytically measurable in the effluent. For a PMP, endpoint measurements are less direct since the effluent limitation is below limits of quantitation and might be based upon upstream determinations with mass balance calculations or some other indirect measurements.

Source reduction measures are intended to be specified in the permit. According to s. NR 106.06(7)(c)(2.), past activities or other documented efforts which have taken place (or are currently taking place) can satisfy the source reduction requirement. Municipalities may have a pretreatment program in place, which may include source reduction requirements. If a municipality has implemented a pretreatment program, it is possible that the source reduction requirement would be satisfied. Copies of the final provisions of the source reduction requirements should be sent to the central office effluents specialist for logging, and consistency check. If a municipality is encountering problems with a particular metal, implementation of a pretreatment program, or other initiatives which are fundamentally similar to those listed in[5], may be required. An additional useful document is a list of all publications/order forms for documents which pertain to industrial waste reduction[6]. This

list of publications includes citations under each of the following headings, which may be useful for Department staff, or, can be ordered and reviewed by effected parties:

- Wisconsin Programs
- Waste Reduction Successes
- Information Clearinghouse
- Wisconsin Management Reports
- Setting Up a Company Program
- Equipment Manufacturers & Consultants
- Material Exchanges & Recycling Markets
- Solid Waste Reduction & Recycling
- Industrial Hazardous Waste Management Requirements
- Medical Waste Requirements
- Special Waste Guidance
- Used Oil Management Requirements
- Hazardous Waste Management Information/Services
- Household Hazardous Waste
- Other Environmental Regulations
- Industry specific guidance:
  - Coating & Painting
  - Machining and Cooling
  - Food Products
  - Paper & Allied Products
  - Petroleum & Coal Products
  - Industrial Machinery & Equipment
  - Dry Cleaning Industry
  - Vehicle Maintenance Industry
  - Electrical, Gas & Sewer Services
  - Health Services Industry
  - Electroplating
  - Parts Cleaning & Solvent Reduction
  - Furniture
  - Printing and Publishing
  - Fabricating Metal Products
  - Transportation Equipment & Repair
  - Building Materials & Garden Suppliers
  - Educational Institutions
  - Local Government
  - Electronics & Other Electronic Equipment

Source reduction documents cited

(1) WDNR Publication; The Bottom Line Solution, Increasing Business Productivity and Efficiency, A Summary of Eleven Case Studies. PUBL-TS-009 REV 95.
(2) WDNR memorandum; Wisconsin Strategy for Regulating Mercury in Wastewater, May 9, 1996
(3) U.S. EPA Publication; Pollution Prevention at POTWs - Case Studies. 742-F-94-001. Winter 1994.
(4) WDNR document; Draft Wisconsin Mercury Sourcebook - A Guide to Help Your Community Identify & Reduce Releases of Elemental Mercury.
(5) U.S.EPA Publication; Guides to Pollution Prevention, Municipal Pretreatment Programs. EPA/625/R-93/006, October, 1993.
(6) WDNR Publication; Industrial Waste Reduction Information Clearinghouse, Publications Order Form 9/96, PUBL-SW-199. 1996.

## TABLE 1 - Particulate-Bound Metal Concentrations.

The following table contains particulate-bound concentrations (µg/g) of metals in Wisconsin streams. All data are from cooperative studies between WDNR and the University of Wisconsin. In most cases, the data represent single grab samples collected in 1992 or 1993. Other (unpublished) data indicate that the particulate-bound concentration does not vary to a significant extent with a hydrograph of a stream. Site locations can be determined by using information in Table 2 and the attached map.

| Site | As | Cd | Cr | Cu | Ni | Pb | Hg | Zn |
|---|---|---|---|---|---|---|---|---|
| Big Eau Pleine @ Cherokee | | | | | | | 0.24 | |
| Big Rib @ Goodrich | | | | | | | 0.14 | |
| Black (E. Fork) | | | | | | | 0.088 | |
| Black @ Hemlock | | | | | | | 0.14 | |
| Black @ Medford | | 0.60 | | 45 | | 40 | | 146 |
| Bois Brule (Lake Superior) | | | | | | | 0.051 | |
| Chaffee Creek @ Dakota | 9.2 | | 64 | | 10 | 20 | 1.12 | |
| Chippewa @ Durand | | 0.56 | | 4.0 | | 43 | 0.048 | 104 |
| Chippewa @ Winter | | 0.16 | | 3.9 | 41 | | 80 | |
| Duck Creek @ Oneida | 1.3 | | 12 | | 7.2 | 7.7 | 0.131 | |
| Fish Creek | | | | | | | 0.019 | |
| Flambeau @ Park Falls | | 0.88 | | 31 | | 32 | | 108 |
| Fox @ Wrightstown | | 0.70 | | 12 | | 49 | 0.46 | 112 |
| Grand (S. Fork) @ Kingston | | | | | | | 0.053 | |
| Kickapoo @ Oil City | | | | | | | 0.09 | |
| Kinnickinnic @ Chase Avenue | | | | | | | 0.24 | |
| Lake Superior | | | | | | | | |
| Lake Michigan | 93 | 3.7 | 50 | 59 | 108 | 49 | | 144 |
| Lincoln Crk. @ 47th St. Park | | | | | | | 0.56 | |
| Milwaukee (N. Branch) @ Batav. | 2.7 | | 22 | | 14 | 13.2 | 0.19 | |
| Milwaukee @ Estebrook Park | | 1.65 | | 41 | | 67 | 0.11 | 248 |
| Mississippi @ Alma | | 1.86 | | 8.2 | | 67 | | 165 |
| Mississippi @ Diamond B. | | 1.23 | | 16 | | 40 | | 137 |

**TABLE 1 - Particulate-Bound Metal Concentrations. (Continued)**

| Site | As | Cd | Cr | Cu | Ni | Pb | Hg | Zn |
|---|---|---|---|---|---|---|---|---|
| Mississippi @ Trenton | | | | | | | 0.17 | |
| Moose @ Moose Lake | 4.6 | | 11 | | 6.8 | 8.5 | 0.23 | |
| Nemadji River | | | | | | | 0.057 | |
| Otter Creek @ Darlington | | | | | | | 0.045 | |
| Pecatonica (E. Branch) @ Hollandale | | | | | | | 0.044 | |
| Pensaukee (S. Branch) @ Krakow | | | | | | | 0.21 | |
| Pigeon Creek @ York | | | | | | | 0.061 | |
| Popple River | 3.2 | | 3 | | 2.7 | 12 | 0.97 | |
| Rattlesnake Crk. @ Beetown | 6.1 | | 21 | | 18 | 37 | 0.11 | |
| Rock @ Waupun | | 0.41 | | 28 | | 49 | | 213 |
| Rush @ Martell | | | | | | | 0.14 | |
| Sand River | | | | | | | 0.031 | |
| Sheboygan @ Sheboygan Marsh | | | | | | | 0.045 | |
| Sheboygan @ Dotyville | | 0.76 | | 36 | | 35 | 0.056 | 1280 |
| Ten Mile Creek @ Nekoosa | | | | | | | 0.52 | |
| Thornapple @ Dairy Center | | | | | | | 0.24 | |
| Tomorrow @ Nelsonville | | | | | | | 0.13 | |
| Upper Eau Claire @ Gordon | | | | | | | 0.27 | |
| Upper Tamarack (MN) | | | | | | | 0.29 | |
| Wisconsin @ Biron | | 0.53 | | 3.7 | | 21 | | 64 |
| Wisconsin @ Conover | | 0.60 | | 73 | | 45 | .024 | 108 |
| Wisconsin @ Plover | | | | | | | 0.18 | |
| Wolf @ Lily | | 0.60 | | 0.82 | | 22 | 0.17 | 112 |
| Wolf @ Shiocton | | | | | | | 0.18 | |

## TABLE 2 - Background Surface Water Data.

The following data represent the "total recoverable" and "dissolved" concentrations in monitored surface waters. For each site, the top number is the total recoverable and the bottom number is dissolved (at 0.45 µm pore size). For example, for the Big Eau Pleine @ Cherokee, the total recoverable concentration for aluminum is 137.79 µg/L and the dissolved concentration is 28.52 µg/L. All data are represented as µg/L, except mercury, which is ng/L. Site locations can be determined by identifying the site location on the attached map. These data are the same as those found in the WDNR memorandum from David Webb, March 14, 1995. Most values are geometric means of two to three data points.

| LOCATION ---Site No. | Al | Cd | Cr | Cu | Pb | Hg | Zn |
|---|---|---|---|---|---|---|---|
| Big Eau Pleine 1 | 137.79 | 0.0251 | 0.337 | 1.266 | 0.2832 | 5.531 | 2.011 |
| @ Cherokee | 28.52 | 0.0155 | 0.256 | 1.102 | 0.0956 | 4.436 | 1.215 |
| Big Rib R. 2 | 114.39 | 0.0115 | 0.391 | 0.795 | 0.1404 | 4.350 | 1.831 |
| @ Goodrich | 45.32 | 0.0218 | 0.326 | 0.765 | 0.0791 | 3.945 | 1.409 |
| Black Earth Creek 2a | 1153.0 | 0.0787 | 2.430 | 3.840 | 2.6460 | NA | 12.710 |
| @ Black Earth | 13.20 | 0.0120 | 0.479 | 1.590 | 0.0570 | NA | 1.500 |
| Black R. 3 | 100.38 | 0.0090 | 0.622 | 1.265 | 0.1784 | 4.469 | 1.710 |
| @ Hemlock | 27.52 | 0.0098 | 0.239 | 1.181 | 0.0724 | 3.934 | 1.303 |
| Black R. 4 | 490.00 | 0.0149 | NA | 0.938 | 0.3550 | 4.684 | 1.900 |
| @ Medford | 19.30 | 0.0102 | NA | 0.588 | 0.0500 | NA | 0.775 |
| Black R. (E.Fork) 5 | 463.55 | 0.0469 | 0.995 | 1.237 | 0.6471 | 7.188 | 8.012 |
| @ Hatfield | 157.31 | 0.0243 | 0.659 | 0.975 | 0.1253 | 5.984 | 7.052 |
| Black R. (MI) 6 | 137.00 | 0.0198 | 0.679 | 2.098 | 0.2788 | 6.436 | 2.031 |
| @ mouth | 16.98 | 0.0138 | 0.544 | 1.866 | 0.1091 | 4.396 | 1.362 |
| Bois Brule 7 | 206.72 | 0.0111 | 1.173 | 1.039 | 0.2827 | 2.393 | 1.720 |
| @ mouth (Riv. vw dr.) | 38.30 | 0.0075 | 0.522 | 0.492 | 0.0475 | 1.953 | 0.433 |
| Chaffee Creek 8 | 36.34 | 0.0035 | 0.694 | 0.251 | 0.1451 | 6.879 | 0.966 |
| @ Dakota | 8.94 | 0.0039 | 0.624 | 0.190 | 0.0473 | 2.388 | 0.473 |
| Chippewa 9 | 138.93 | 0.0103 | 0.500 | 1.210 | 0.3384 | 4.376 | 1.413 |
| @ Durand | 24.80 | 0.0082 | 0.384 | 1.099 | 0.1041 | 4.323 | 0.606 |
| Chippewa 10 | 98.60 | 0.0108 | NA | 0.753 | 0.3920 | 4.253 | 1.200 |
| @ Winter | 50.50 | 0.0101 | NA | 0.735 | 0.1980 | NA | 0.825 |
| Duck Creek 11 | 85.72 | 0.0170 | 0.324 | 1.992 | 0.1391 | 2.757 | 1.806 |
| @ Oneida | 8.30 | 0.0152 | 0.267 | 1.964 | 0.0441 | 1.637 | 1.474 |
| Eau Claire R. 12 | 13.43 | 0.0075 | 0.266 | 0.312 | 0.0379 | 1.552 | 0.220 |
| @ Gordon | 2.80 | 0.0069 | 0.211 | 0.264 | 0.0136 | 0.837 | 0.198 |
| Fish Creek (N) 13 | NA | 0.0090 | 2.370 | 1.420 | 0.2910 | 4.683 | 2.180 |
| @ highway 2 | NA | 0.0035 | 1.180 | 0.821 | 0.0099 | 2.763 | 0.344 |
| Flambeau R. 14 | 103.00 | 0.0108 | NA | 0.681 | 0.2760 | 3.345 | 0.865 |
| @ Park Falls | 20.30 | 0.0069 | NA | 0.542 | 0.1300 | NA | 0.371 |
| Fox R. 15 | 91.00 | 0.0156 | 0.264 | 1.247 | 0.6098 | 5.654 | 3.453 |
| @ Wrightstown | 14.09 | 0.0140 | 0.331 | 0.874 | 0.1210 | 1.782 | 1.792 |
| Fox R. 16 | 289.00 | 0.0224 | NA | 0.669 | 0.9490 | 4.339 | 1.680 |
| @ Princeton | 2.62 | 0.0070 | NA | 0.238 | 0.0660 | NA | 0.163 |
| Fox R. (lower) 17 | 309.00 | 0.0246 | NA | 1.340 | 1.4500 | 6.610 | 3.470 |
| @ N. LLBDMorts | 20.70 | 0.0057 | NA | 1.000 | 0.1170 | NA | 0.438 |

(Continued on Next Page)

**TABLE 2 - Background Surface Water Data. (Continued)**

| LOCATION ---Site No. | Al | Cd | Cr | Cu | Pb | Hg | Zn |
|---|---|---|---|---|---|---|---|
| Grand R. (S. Fork) 18 | 183.51 | 0.0278 | 0.668 | 1.454 | 0.3239 | 5.347 | 4.214 |
| @ Kingston | 5.46 | 0.0078 | 0.341 | 0.821 | 0.0312 | 3.445 | 1.109 |
| Kickapoo R. 19 | 379.14 | 0.0253 | 0.836 | 1.093 | 0.9501 | 3.656 | 2.935 |
| @ Oil City | 6.93 | 0.0042 | 0.233 | 0.511 | 0.0326 | 0.709 | 1.228 |
| Kinnickinnic R. 20 | 152.67 | 0.1565 | 7.092 | 9.156 | 5.8440 | 6.664 | 82.837 |
| @ Chase Ave. | 7.55 | 0.0710 | 2.244 | 5.202 | 0.3514 | 4.390 | ND |
| Lincoln Creek 21 | 129.84 | 0.0616 | 0.848 | 5.478 | 1.8502 | 4.823 | 16.120 |
| @ 47 St. Park | 16.31 | 0.0425 | 0.560 | 3.977 | 0.2522 | 1.570 | 10.606 |
| Milwaukee R. 22 | 300.04 | 0.0206 | 0.496 | 1.263 | 0.6464 | 4.107 | 2.607 |
| @ Batavia | 3.97 | 0.0063 | 0.191 | 0.779 | 0.0745 | 2.520 | 0.406 |
| Milwaukee R. 23 | 322.00 | 0.0442 | 0.933 | 1.771 | 1.9210 | 3.409 | 5.707 |
| @ Estebrook Park | 5.51 | 0.0071 | 0.253 | 1.285 | 0.2283 | 2.122 | 2.115 |
| Mississippi R. 24 | 515.00 | 0.0331 | NA | 1.860 | 0.8410 | 4.694 | 2.350 |
| @ Alma | 6.18 | 0.0125 | NA | 1.770 | 0.0910 | NA | 0.515 |
| Mississippi R. 25 | 1620.0 | 0.0790 | NA | 2.510 | 1.8800 | 7.083 | 6.990 |
| @ Diamond Bluff | 3.85 | 0.0247 | NA | 1.800 | 0.0970 | NA | 0.925 |
| Mississippi R. 26 | 373.99 | 0.0510 | 0.908 | 2.069 | 1.0482 | 6.338 | 4.950 |
| @ Trenton | 4.30 | 0.0224 | 0.194 | 1.064 | 0.0711 | 0.656 | 1.168 |
| Moose R. 27 | 158.09 | 0.0202 | 0.702 | 0.632 | 0.4622 | 8.724 | 3.335 |
| @ Moose Lake | 112.88 | 0.0202 | 0.557 | 0.520 | 0.1970 | 7.830 | 2.929 |
| Nemadji R. (MN) 28 | 641.17 | 0.0265 | 1.861 | 2.539 | 0.6623 | 5.362 | 4.335 |
| @ Pleasant Valley | 13.85 | 0.0159 | 0.432 | 1.218 | 0.0450 | 3.794 | 0.496 |
| Otter Creek 29 | 485.73 | 0.0307 | 0.768 | 1.409 | 1.7325 | 3.174 | 5.801 |
| @ Darlington | 5.67 | 0.0065 | 0.132 | 0.729 | 0.0363 | NA | 0.731 |
| Pecatonica R. (S.B.)30 | 614.41 | 0.0356 | 0.958 | 1.557 | 1.9702 | 3.799 | 5.065 |
| @ Hollandale | 4.58 | 0.0044 | 0.175 | 0.658 | 0.0369 | 1.370 | 0.466 |
| Pensaukee R. (S.B.) 31 | 61.83 | 0.0117 | 0.388 | 1.193 | 0.1138 | 2.460 | 1.383 |
| @ Krakow | 5.91 | 0.0070 | 0.293 | 0.918 | 0.0350 | 1.818 | 0.898 |
| Pigeon Creek 32 | 413.00 | 0.0384 | 0.678 | 1.130 | 0.5261 | 3.773 | 19.689 |
| @ York | 7.59 | 0.0104 | 0.163 | 0.640 | 0.0143 | 1.841 | 13.008 |
| Popple R. 33 | 113.12 | 0.0214 | 0.462 | 0.455 | 0.4040 | 7.446 | 3.003 |
| @ Popple River | 94.97 | 0.0153 | 0.422 | 0.506 | 0.2804 | 5.673 | 2.705 |
| Rattlesnake Creek 34 | 300.26 | 0.0174 | 0.784 | 0.960 | 0.8144 | 4.244 | 3.152 |
| @ Beetown | 3.50 | 0.0103 | 0.160 | 0.554 | 0.0430 | NA | 0.830 |
| Rock R. 35 | 304.00 | 0.0165 | NA | 1.230 | 0.3720 | 4.741 | 1.900 |
| @ Waupun | 4.52 | 0.0140 | NA | 1.061 | 0.0790 | NA | 0.616 |
| Rush R. 36 | 53.06 | 0.0115 | 0.295 | 0.598 | 0.0993 | 1.602 | 0.981 |
| @ Martell | 4.64 | 0.0081 | 0.252 | 0.466 | 0.0176 | 1.241 | 0.584 |
| Sand R. 37 | 807.77 | 0.0253 | 4.226 | 2.928 | 0.8476 | 4.654 | 4.313 |
| @ mouth (Hwy 13) | 26.56 | 0.0084 | 1.294 | 1.071 | 0.0174 | 2.831 | 0.335 |
| Sheboygan R. 38 | 116.00 | 0.0056 | 0.310 | 0.827 | 0.3170 | 1.240 | 1.180 |
| @ Dotyville | 3.31 | 0.0048 | 0.127 | 0.573 | 0.0391 | 0.750 | 0.411 |
| Sheboygan 39 | 19.32 | 0.0084 | 0.818 | 0.344 | 0.1183 | 2.166 | 0.555 |
| @ Sheboygan Marsh | 2.51 | 0.0053 | 0.185 | 0.108 | 0.0520 | 1.927 | 0.339 |
| Tamarack R. (MN) 40 | 101.05 | 0.0105 | 0.511 | 0.958 | 0.1730 | 5.544 | 1.976 |
| @ Cloverton | 54.10 | 0.0078 | 0.458 | 0.872 | 0.1080 | 4.669 | 1.587 |

(Continued on Next Page)

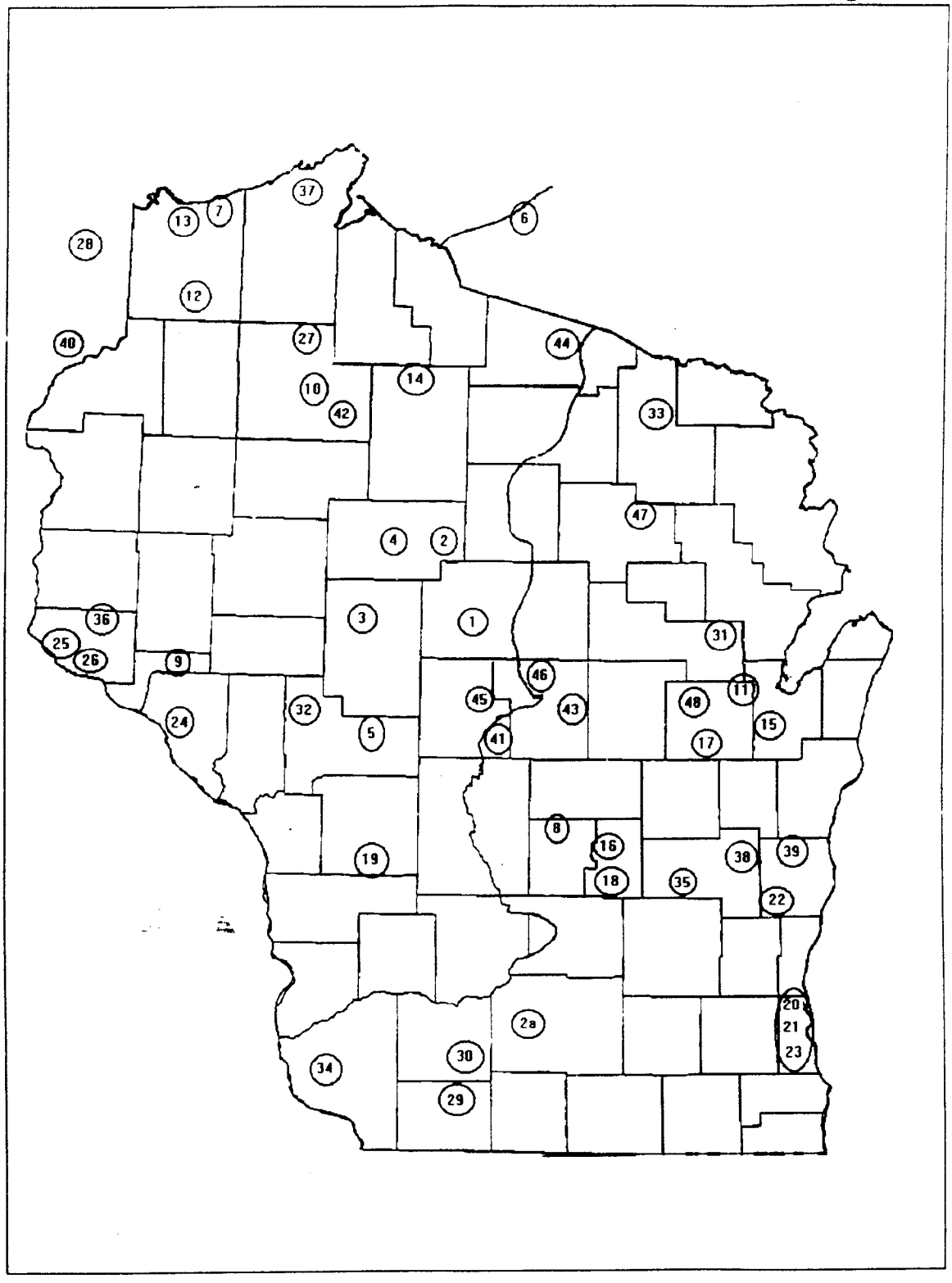
## TABLE 2 - Background Surface Water Data. (Continued)

| LOCATION ---Site No. | Al | Cd | Cr | Cu | Pb | Hg | Zn |
|---|---|---|---|---|---|---|---|
| Ten Mile Creek 41 | 126.94 | 0.0122 | 1.190 | 1.069 | 0.1145 | 5.862 | 0.954 |
| @ Nekoosa | 6.54 | 0.0098 | 0.752 | 0.747 | 0.0098 | 2.111 | 0.302 |
| Thornapple R. 42 | 145.98 | 0.0190 | 0.552 | 0.773 | 0.1735 | 5.841 | 2.167 |
| @ Dairy Center | 59.14 | 0.0123 | 0.436 | 0.682 | 0.1056 | 5.187 | 1.801 |
| Tomorrow R. 43 | 39.48 | 0.0064 | 0.573 | 0.339 | 0.0934 | 2.573 | 1.001 |
| @ Nelsonville | 17.55 | 0.0061 | 0.550 | 0.268 | 0.0428 | 2.260 | 0.722 |
| Wisconsin 44 | 23.54 | 0.0056 | 0.265 | 0.268 | 0.1681 | 1.731 | 0.603 |
| @ Conover | 8.43 | 0.0047 | 0.215 | 0.179 | 0.0808 | 1.165 | 0.395 |
| Wisconsin R. 45 | 228.00 | 0.0183 | NA | 1.230 | 0.6260 | 4.718 | 2.060 |
| @ Biron | 18.30 | 0.0085 | NA | 1.160 | 0.2460 | NA | 0.892 |
| Wisconsin R. 46 | 204.33 | 0.0248 | 0.569 | 1.338 | 0.4654 | 5.207 | 3.120 |
| @ Plover | 41.04 | 0.0097 | 0.381 | 0.906 | 0.1194 | 3.725 | 1.651 |
| Wolf 47 | 46.34 | 0.0094 | 0.603 | 0.376 | 0.2020 | 2.481 | 0.959 |
| @ Lily | 11.02 | 0.0054 | 0.315 | 0.313 | 0.1040 | 1.724 | 0.371 |
| Wolf R. | NA | 0.0108 | NA | 0.460 | NA | 2.400 | 1.050 |
| @ Shiocton | 6.59 | 0.0060 | 0.459 | 0.358 | 0.0635 | 1.550 | 0.510 |
| Lake Michigan | 5.95 | 0.0085 | 0.49 | 0.44 | 0.052 | na | 0.39 |
| @7 mi. off Milw. | 0.73 | 0.0053 | 0.47 | 0.38 | 0.0078 | na | 0.26 |

The following information summarizes the detection criteria:

| Element | Detection Limit (ng/L) | Sample Precision[1] (ng/L) |
|---|---|---|
| Aluminum | 170 | 104 |
| Cadmium | 4.4 | 1.5 |
| Copper | 39 | 17 |
| Chromium | 1 | 0.4 |
| Lead | 48 | 21 |
| Mercury | 0.5 | 0.1 |
| Zinc | 28 | 15 |

[1]Mean precision (+/- 1 standard deviation) of samples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## NARRATIVE FLOW CHART FOR EVALUATION OF NEED FOR WATER QUALITY BASED EFFLUENT LIMITATIONS USING DISSOLVED-METAL WATER QUALITY CRITERIA

The following steps outline those in the attached graphical flow chart, and the language found in s. NR 106.(06)(7):

**Step 1.** Calculate water quality-based effluent limitations (expressed as total recoverable) using total recoverable water quality criteria according to the procedures defined in s. NR 106.06.

Proceed to step 2.

**Step 2.** Perform a reasonable potential determination according to the procedures defined in s. NR 106.05 using total recoverable water quality criteria and applicable total recoverable effluent limitations.

Proceed to step 3.

**Step 3.** Is an effluent limitation necessary (using total recoverable-based limits) as determined by reasonable potential determination?

If **yes**, continue to step 4.

If **no**, stop. No effluent limtitation is warranted, which terminates the process - no effluent limit established. No limit, no monitoring, or other provisions, should be established in the permit.

**Step 4.** Calculate water quality-based effluent limitations (expressed as total recoverable) using dissolved water quality criteria. The dissolved water quality criteria are simply the converted total recoverable criteria. The translation step, as outlined in s. NR 105.06(5) [acute] and s. NR 105.06(8) [chronic], involves "translating" the dissolved water quality criteria in to a number from which a total recoverable effluent limit may be calculated. The translator represents the physical speciation of metal downstream of a discharge and represents that portion of metal in the receiving water which is assumed to be less bioavailable. In addition, determine minimum monitoring and source reduction requirements to accompany potential dissolved-based limitations.

Proceed to step 5.

**Step 5.** Prepare the water quality-based effluent limits report for appropriate review and approval. If total recoverable limits are warranted, they should be included in the report and the recommendation summary. A brief reference to dissolved metal-based limit(s) may also be included within the body of the WQBEL report. However, a desription of any corresponding "tentative" dissolved-based limits must be included in an attached Appendix to the WQBEL report.

Proceed to step 6.

**Step 6.** Prepare an Appendix to the water quality memo which contains the following elements:

1) Effluent Limitations (expressed as total recoverable concentration) calculated from dissolved water quality criteria.
2) An evaluation of reasonable potential to exceed the dissolved based limitation.
3) A description of the bare minimum monitoring requirements. This description should include any required effluent and receivinge water monitoring requirements (i.e., effluent - total recoverable metal, TSS, and hardness; receiving water - total recoverable and dissolved metal, TSS, and hardness).
4) A minimum set of source-reduction requirements.
5) A notification that additional site-specific monitoring and source-reduction requirements may by included in WPDES permit.

Proceed to step 7.

**Step 7.** Provide the permittee with the anticipated date of public notice for the permit and also a copy of the WQBEL recommendations (including the appendix).

Proceed to step 8.

**Step 8.** Does the permittee request dissolved-based limits prior to public notice of WPDES permit?

If **Yes**, Proceed to step 9.

If **No**, prepare the permit for public notice with total recoverable-based WQBELs. No further consideration of dissolved-based effluent limits is warranted.

**Step 9.** Determine if a dissolved-based effleunt limitaiton is necessary based upon the reasonable potential determination in the appendix to the water quality-based effluent limits report.

If **Yes** (a limit s necessary), proceed to step 10a.

If **No** (a limit is <u>not</u> necessary), proceed to step 10b.

**Step 10a.** Public-Notice the WPDES Permit with the following:

1) WQBELs based upon dissolved water quality criteria.
2) Minimum requirements for effluent and receiving water monitoring.
3) Minimum requirements for source reduction activities.

Proceed to step 11.

**Step 10b**. Public-Notice the WPDES Permit with the following:

1) No WQBEL.
2) Minimum requirement for effluent and receiving water monitoring.

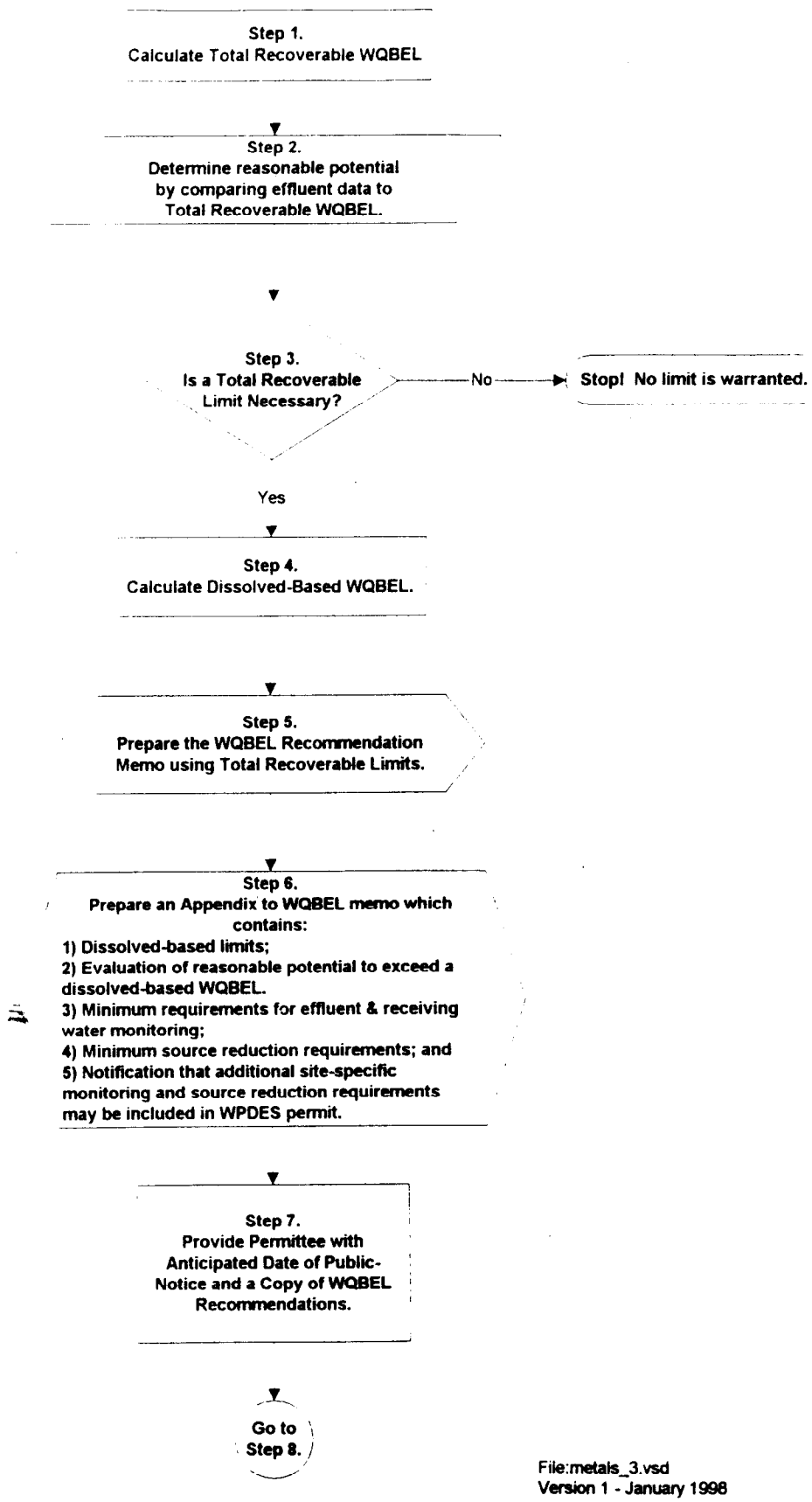
Proceed to step 11.

**Step 11**. Discuss the need for additional effluent and/or receiving water monitoring or source reduction requirements with Regional Biologist and/or other Department staff as necessary.

**Proceed to step 12**.

**Step 12**. Issue permit with minimum requirements specified in Steps 10a. or 10b. and any additional requirements determined in Step 11.

# Dissolved Metals Implementation Flow Diagram 4-1

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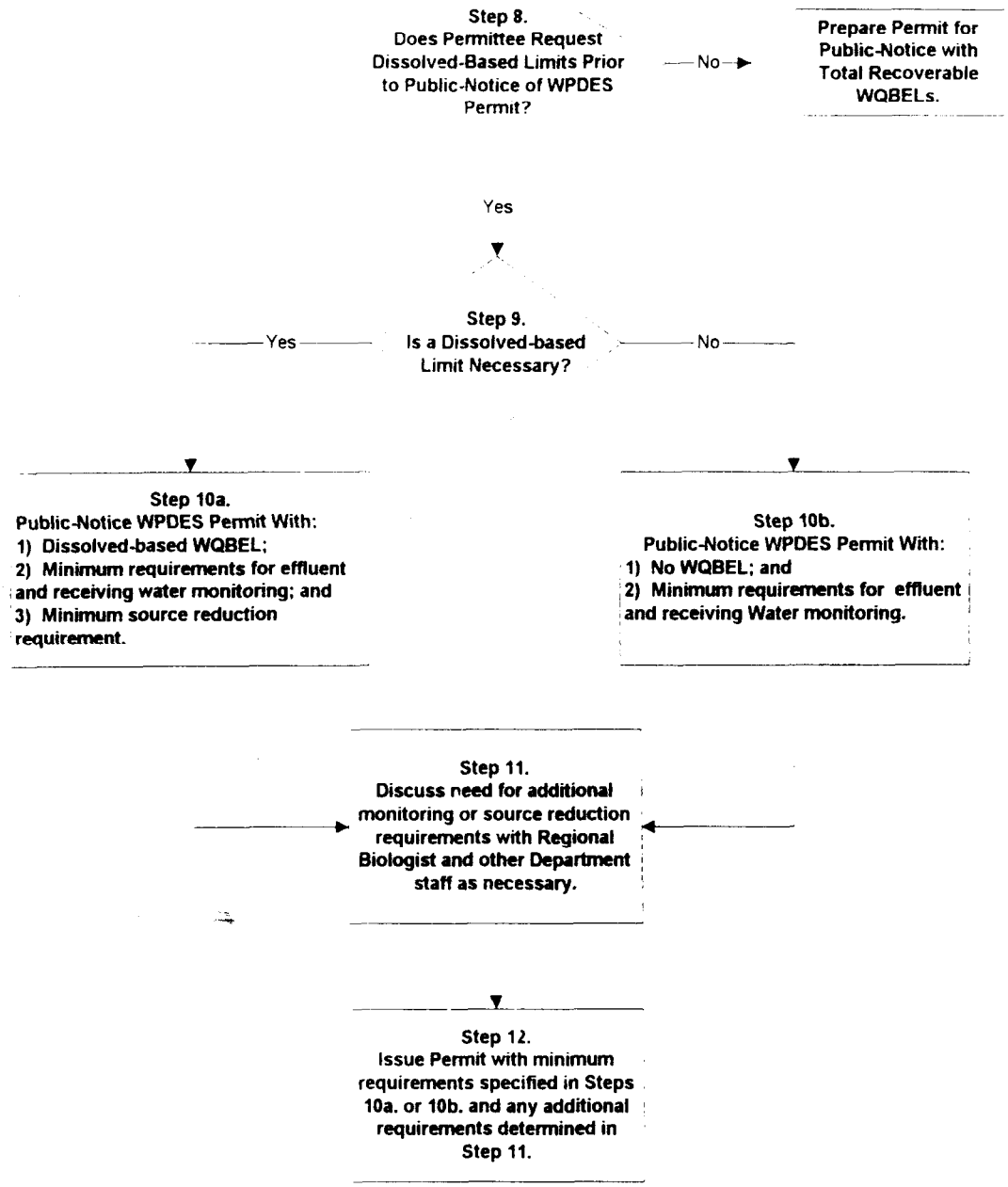
# Dissolved Metals Implementation
# Flow Diagram 4-1
## (Continued)



# Chapter 5. RECEIVING STREAM FLOW CALCULATIONS

**Authors:** Eric Rortvedt, Steve Jaeger

**Overview: Section NR 106.06(4)(c)** specifies the receiving stream flows to be used to calculate effluent limits based on fish and aquatic life, wildlife, and human cancer criteria, human threshold, taste and odor criteria and associated secondary values. The significant rule changes resulting from the revisions to ch. NR 106 are described below:

**Fish and Aquatic Life:** No significant changes have been made to the streamflow values to be used for calculation of FAL limits. Additional language has been included which limits the dilution for situations where an effluent may pose a risk to endangered or threatened species.

**Wildlife:** Under the previous rule, limitations were calculated for wild and domestic animal criteria based on the 30-$Q_5$ or 85% of the 7-$Q_2$ if the 30-$Q_5$ was unavailable. Changes in the criteria are described in Chapter 3. However, additional changes have been made regarding the preferred streamflow value and they are described as follows.

The revised rules specify the use of a 90-$Q_{10}$ flow for wildlife criteria. If a 90-$Q_{10}$ is unavailable, a 30-$Q_5$ or 85% of the 7-$Q_2$ should be used to calculate limitations. Further, *the rules now specify that limitations shall be calculated based on 25% of the selected flow value* unless a permittee makes a demonstration that an adequate zone of free passage exists in the receiving stream or that the dilution is accomplished rapidly such that the extent of the mixing zone is minimized.

To date, the Department has not calculated 90-$Q_{10}$ values for receiving streams. Accordingly, ¼ of the 30-$Q_5$ or ¼ of 85% of the 7-$Q_2$ will be used to calculated effluent limitations based on wildlife criteria or secondary values. Additional language has been included which limits the dilution for situations where an effluent may pose a risk to endangered or threatened species.

**Human Health and Taste & Odor:** Under the previous rule, limitations were calculated for human threshold, human cancer, and taste & odor criteria using the mean annual flow or annual average ($Q_{ave}$) of a receiving stream for dilution. The new rules now require the use of a harmonic mean (HM) flow value. The annual average flow will only continue to be used to calculate limits based on taste and odor criteria and associated secondary values. Further, *the rules now specify that limitations based on human threshold or human cancer criteria and secondary values shall be calculated based on 25% of the selected flow value* unless a permittee makes a demonstration that an adequate zone of free passage exists in the receiving stream or that the dilution is accomplished rapidly such that the extent of the mixing zone is minimized.

Harmonic mean flows are easy to calculate for sites with continuous flow data, but since they have not been previously used for calculating effluent limitations, no work had been done on how to estimate them at sites where continuous flow data are not available. In order to determine an appropriate correlation between harmonic mean and another variable, staff evaluated sites where continuous flow data are available. As described below, data were reviewed at approximately 70 continuous flow monitoring stations with adequate data to estimate a simple relationship between harmonic mean flow and: (1) drainage area, (2) annual average flow, and (3) 7-$Q_{10}$. The desired relationship would be as good as possible but error on the conservative side (protective side).

At this time, harmonic mean flows at approximately 70 stations have been calculated and can be accessed within the WWPERMITS and WRMSRV file services within SCHMIJ\FLOWINFO\HARMONIC.WB2 and annual average flows by water basin within SCHMIJ\FLOWINFO\. If a site-specific harmonic mean or annual average flow is not available at the location of interest, then a default flow estimate should be used. If effluent limits are triggered, the permittee has the opportunity to gather more data and perform more detailed analysis to refine the estimate of harmonic mean flow, subject to Department review.

DEFAULT FLOW ESTIMATE

**Harmonic Mean:** Site-specific harmonic means were calculated at approximately 70 United States Geological Survey (USGS) continuous flow monitoring stations throughout the state which had 10 or more years of data including the low-flow water year of 1988. A maximum of 20 years of data were used to calculate harmonic means at these stations due to file size limitations in importing the data into Quattro Pro. Additionally, U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89) (commonly referred to as the "TSD") referenced a multiplier of "3" (multiplied by the 7-$Q_{10}$) to estimate the harmonic mean for a stream. The TSD also referenced an alternative equation where the estimated harmonic mean was approximately equal to $1.2(Q_{ave})^{0.5}(7\text{-}Q_{10})^{0.5}$.

Based on the data recorded at the USGS stations, harmonic means were estimated graphically to determine which alternative was best suited for using as a default estimate. The U.S. EPA equations based on 7-$Q_{10}$ relationships were graphed as seen in Attachments 5-1 and 5-2. Graphical comparisons were also considered for drainage area and average flow relationships (Attachments 5-3 and 5-4). The graphical data supported the following equation as a reasonably good estimate of harmonice mean flows in Wisconsin streams.

$$\text{Harmonic Mean Flow} = 1.2(Q_{ave})^{0.5}(7\text{-}Q_{10})^{0.5}$$

RECOMMENDATION: A default harmonic mean flow equal to $1.2(Q_{ave})^{0.5}(7\text{-}Q_{10})^{0.5}$ is recommended when a site-specific harmonic mean has not already been calculated. If a limit is triggered by using the default, an effort should be made to calculate a site-specific harmonic mean flow estimate if possible. Alternatively, the permittee may contact the USGS to calculate the flow estimate at their own cost. The appropriate contact at the USGS is Barry Holmstrom at (608) 276-3831.

**Annual Average Recommendation:** A default annual average flow (in cfs) of 0.7 times the drainage area (in square miles) is recommended (Example: 0.7 x 50 squ. mi. = 35 cfs).

This relationship is presented graphically in Attachment 5-5. The annual average flow default has not changed from that previously used.

SITE-SPECIFIC FLOW ESTIMATE

In most cases, substances with either human threshold, human cancer or taste and odor criteria are not detected or will be detected below the level of concern using a default flow estimate. However, if a limitation is triggered by the use of a default estimate, it may be suggested to the permit drafter and/or permittee that extra effort to try to calculate a site-specific harmonic mean or annual average flow may be warranted. Limits can still be recommended based on default harmonic mean flows, but the permittee has the option to request a site-specific flow estimate from USGS.

The USGS has a web site through which a user can access various station data throughout the United States. To calculate a harmonic mean or annual average flow from the USGS web site, the following instructions are provided using Quattro Pro 6.0 applications and assuming ability to access the Internet:

1. Go to the Wisconsin Surface-Water Data Retrieval page at http://water.usgs.gov/swr/WI/.
2. Enter the station number for the site of concern in the box indicated. If you do not know the station number of which you are interested, locate the station of interest using the indicated links to search using station information, by map of Wisconsin or by county.
3. Once you have entered a station number or clicked a station name using the search options, a page describing station information will appear. You will want to click on the "Historical Streamflow Daily Values Data" link under Data Types Available.
4. The next page which comes up will give additional station information including the period of record. You will then need to enter the time period for which you would like to retrieve daily streamflow data. Then you need to click on the "Tab-delimited text data file" circle to get the numeric data. It does not matter which date format you choose (YYYY.MM.DD or MM/DD/YYYY). Then click on the "Retrieve Data" button.
5. After a few seconds, a screen displaying station information and daily flow data will appear. Scroll down the page to see the individual daily average flows and dates.
6. Now you need to create a text file of what you are looking at in order to import it into a spreadsheet. This is done by clicking the File menu and then clicking on the "Save as Text" command. You need to assign a file name with a .txt extension such as C:\STRMFLO.TXT which will save the text file to your hard-drive. Note: a maximum of about 20 years of data can be imported into Quattro Pro. Twenty years of data takes approximately 4 minutes on a 486 machine to create the text file.
7. Now switch applications and enter Quattro Pro 6.0.
8. Once in Quattro Pro 6.0, click the Notebook menu and then click on the Text Import command. You then need to specify the filename of the text file you saved from the USGS database (C:\STREAMFLO.TXT or whatever you have saved it as). Also, within the options box you need to specify "comma and delimited file". Then hit "OK" and after a few seconds the file should be imported.
9. The imported file only shows numerical data and about the 42nd line down or so the daily average flow values begin. What you want to do is to use the @HARMEAN(B4..B34) and/or @AVG(F2..F120) functions to calculate the harmonic mean and/or arithmetic average of the daily flow values. Use the Help menu in Quattro Pro for an explanation and example of how each @function operates.

NOTE: Other WEB browsers can be used although certain commands may be different. when saving text files.

POTENTIAL PROBLEMS/ISSUES

**Seiche Effects:** A one-day occurrence of zero flow or reverse flow (negative flow) will result in a harmonic mean flow of zero or an error. Since the harmonic mean is being used to protect against long-term human health effects, short-term seiche conditions should not be used in calculating a harmonic mean. This means that individual daily flows affected by seiches can be removed from the list of daily flows used to calculate the harmonic mean flow.

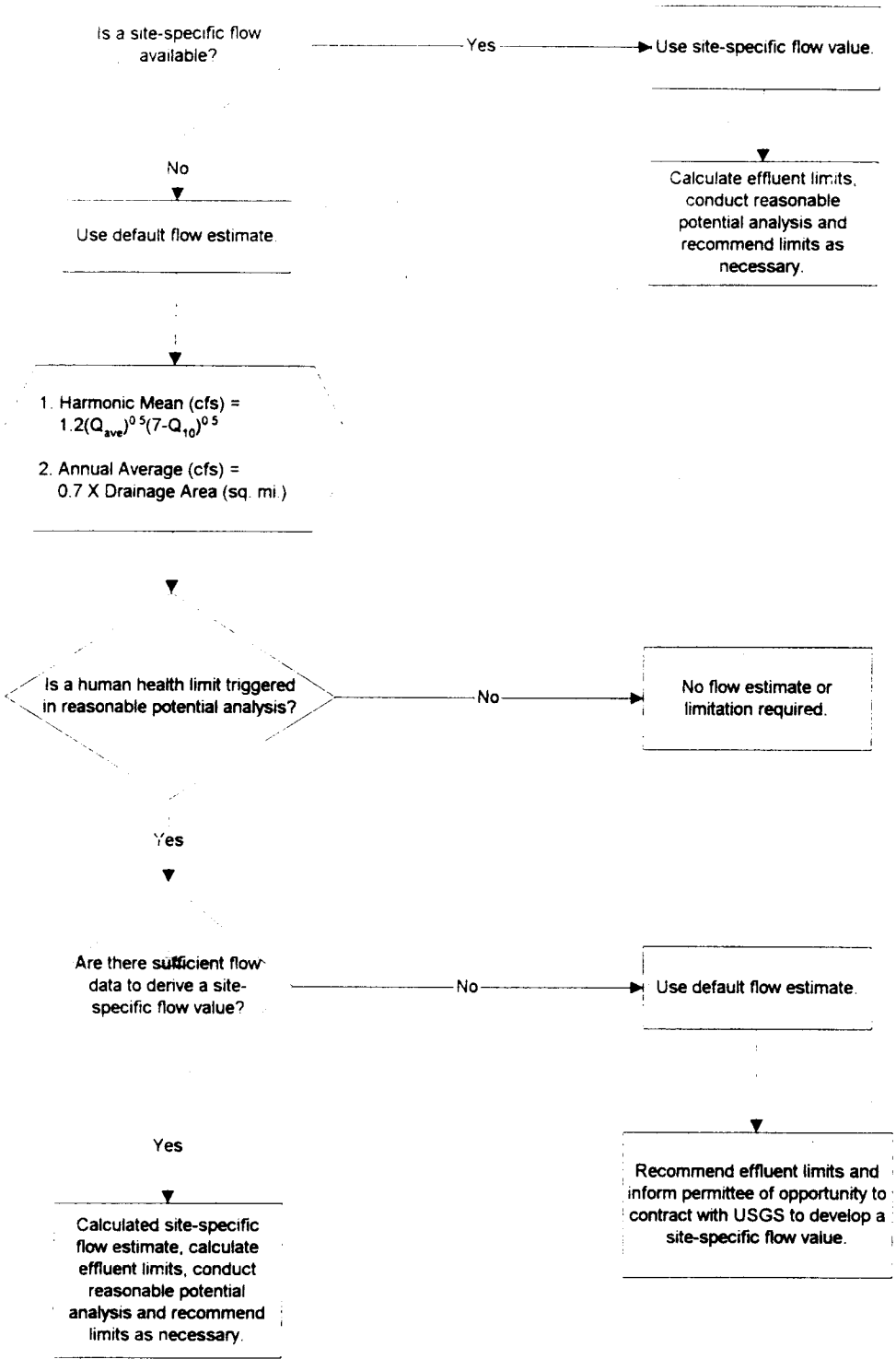
**Upstream Dam Regulations:** Similarly, unusual operations of dams upstream of a site may cause zero (or near zero) streamflow during short periods for dam maintenance. These flows should be screened out before calculation of harmonic mean flow.

HELP

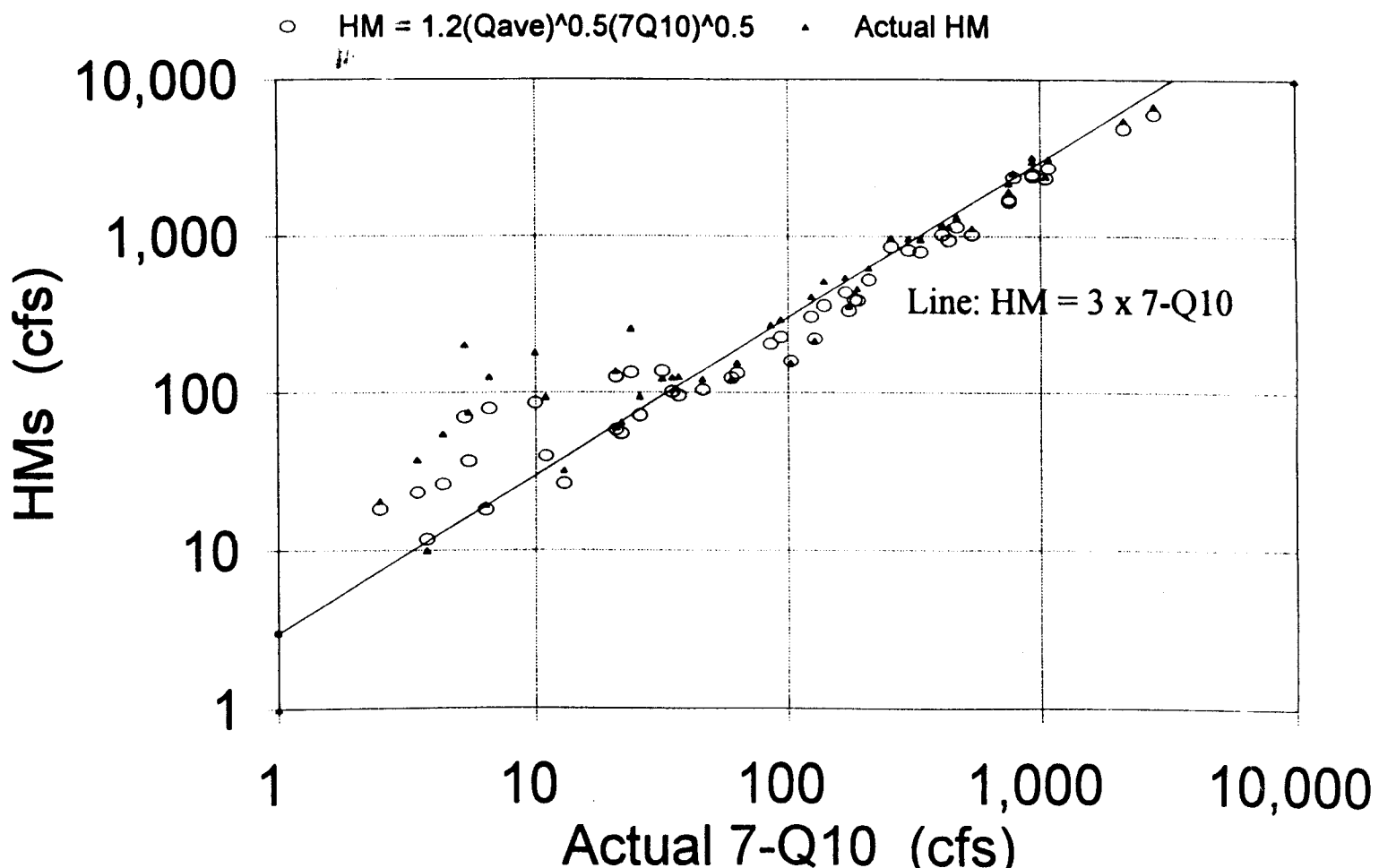
For help in calculating stream flows or general questions, please contact your Regional Effluent Limit Calculator or Jim Schmidt in the Central Office. Current assignments are:

| | | |
|---|---|---|
| Northeast Region | Nile Ostenso | (608) 266-9239 |
| Northern Region | Mike Goettel | (715) 392-4764 |
| South Central Region | Nasrin Mohajerani | (608) 275-3239 |
| Southeast Region | Diane Figiel | (608) 264-6274 |
| West Central Region | Eric Rortvedt | (608) 264-6273 |

# Harmonic Mean and Annual Average Flow Estimates

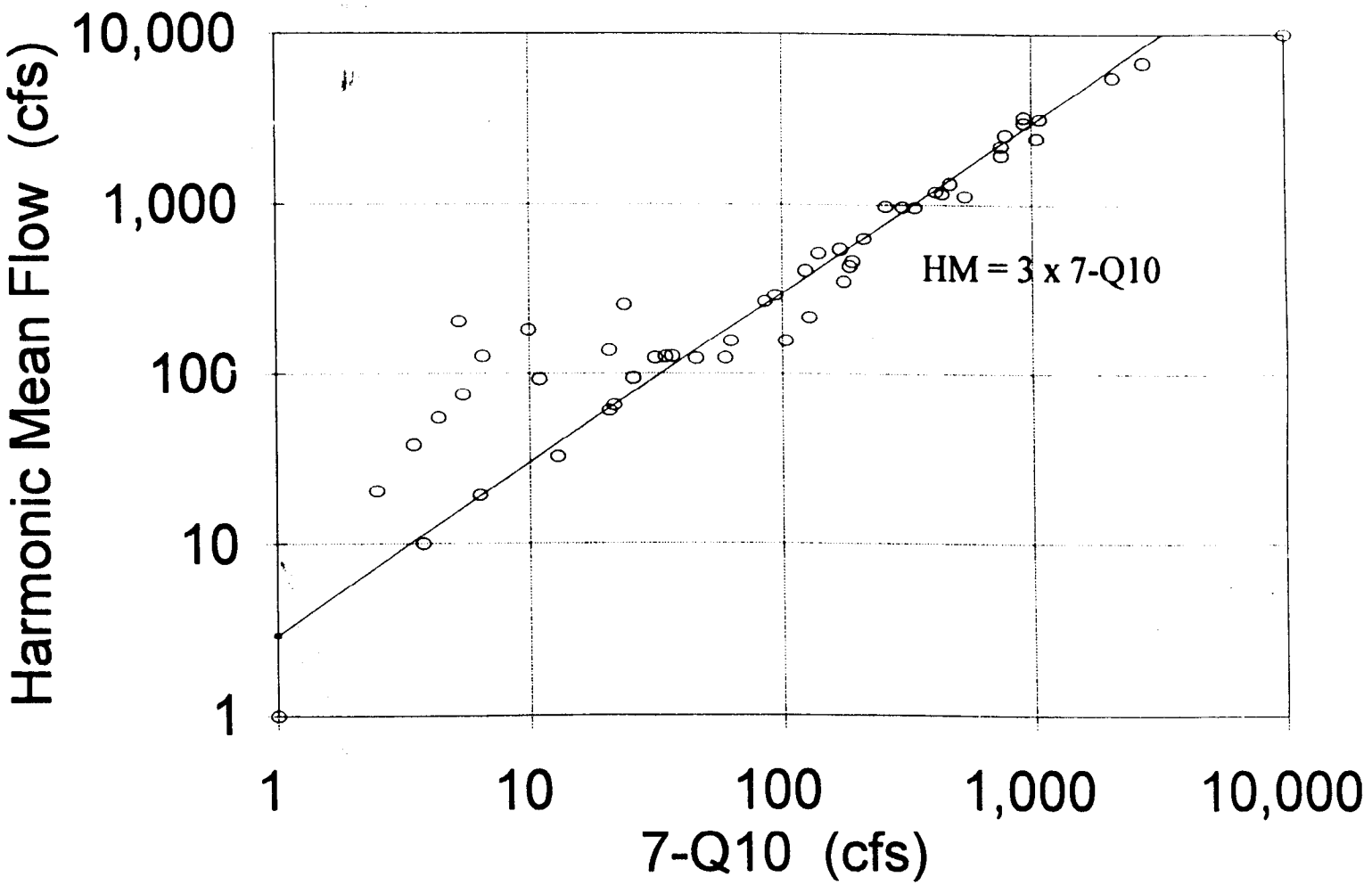


# Attachment 5-1
## Estimated Harmonic Mean



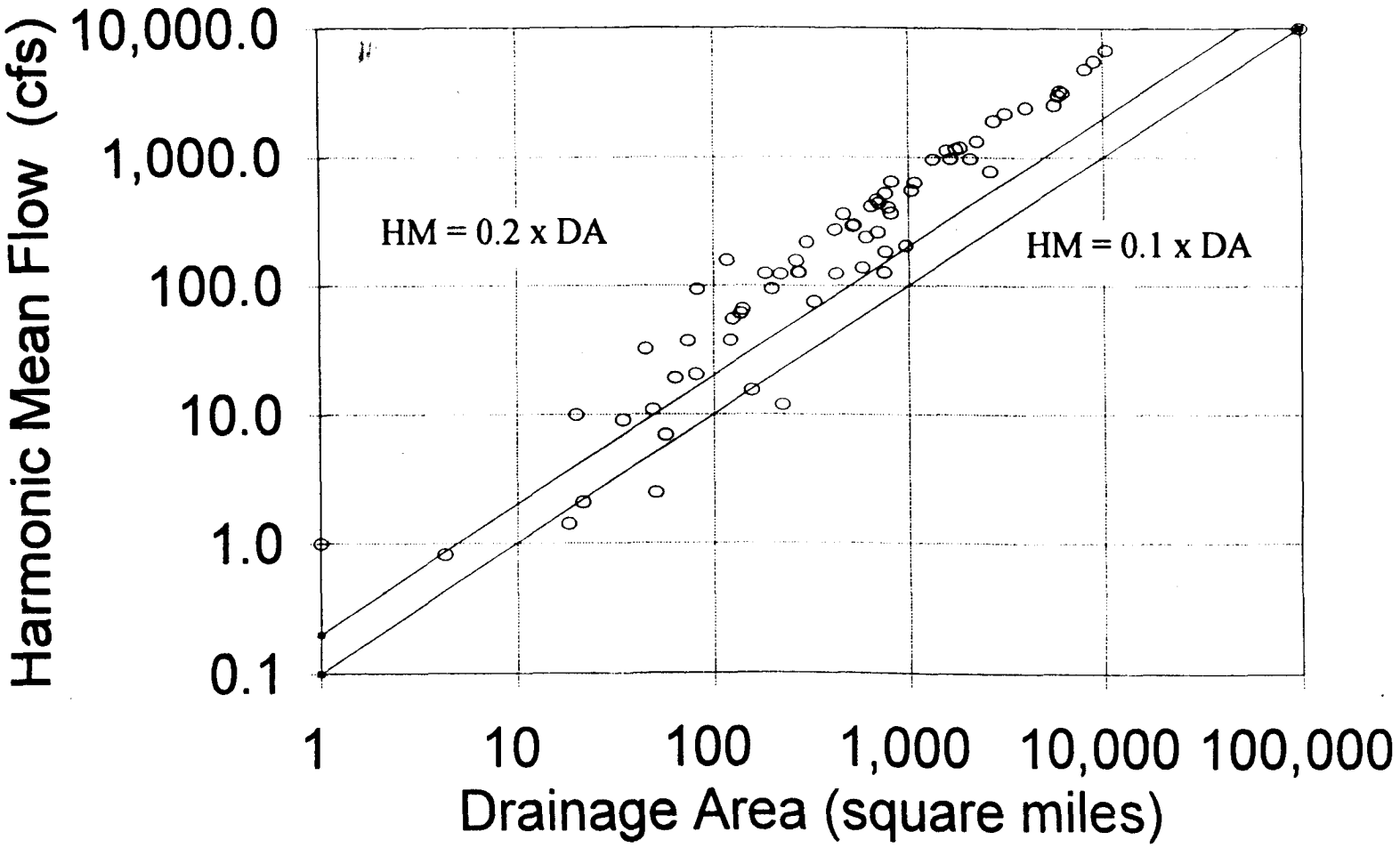
# Attachment 5-2

## 7-Q10 vs. Harmonic Mean



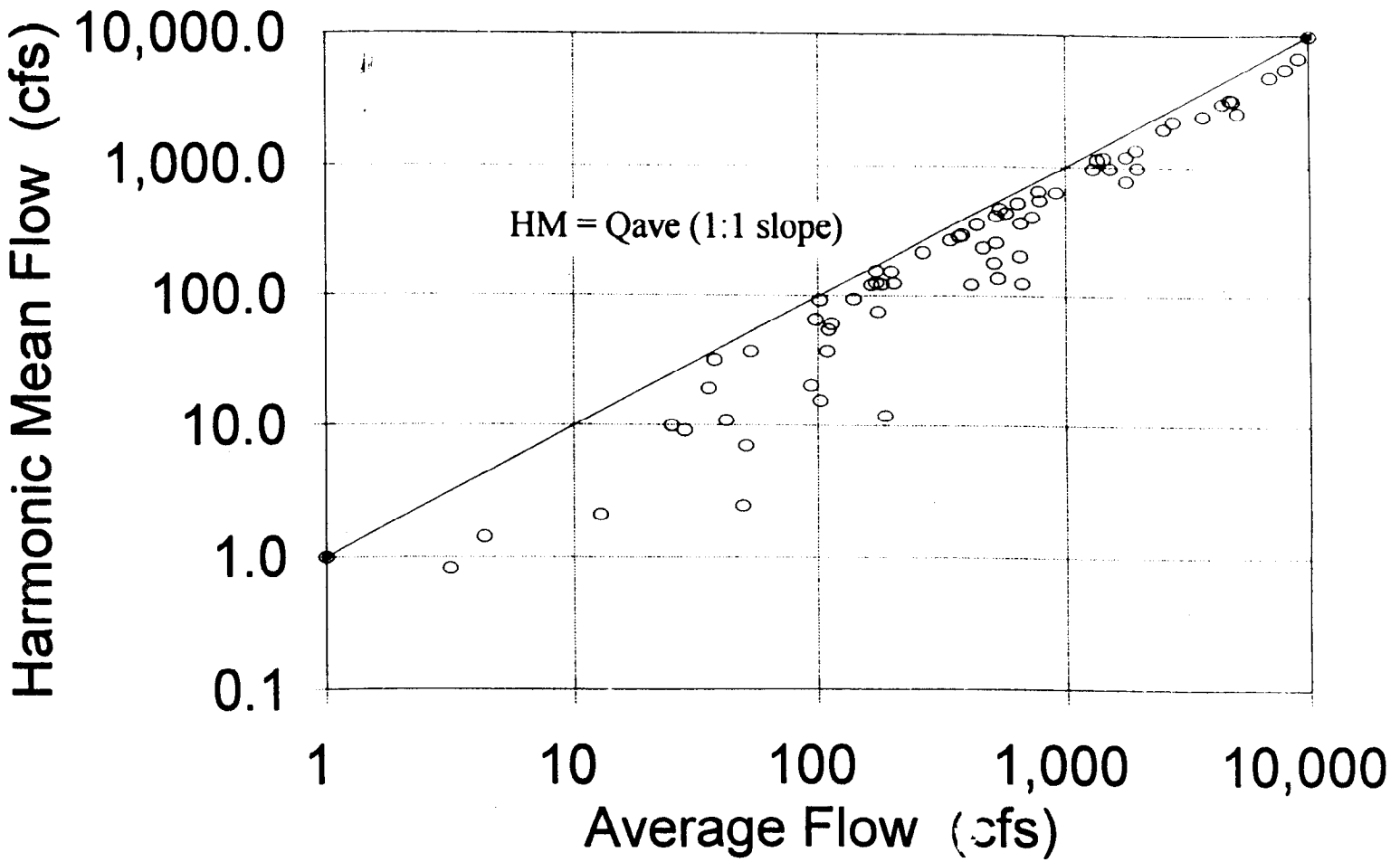
# Attachment 5-3

## Drainage Area vs. Harmonic Mean



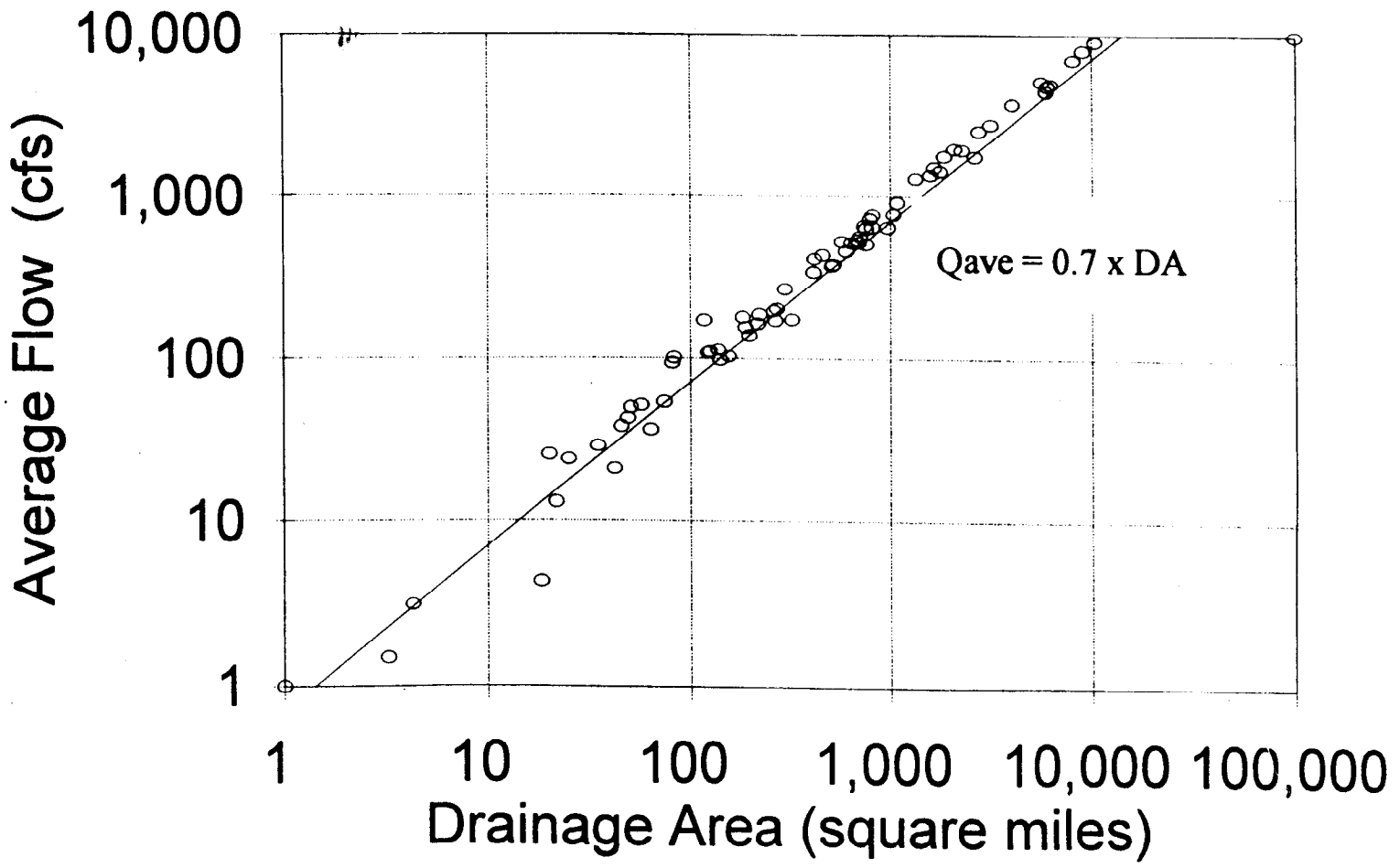
# Attachment 5-4

## Average Flow vs. Harmonic Mean



# Attachment 5-5

## Drainage Area vs. Average Flow



# Chapter 6.
# EFFLUENT DESIGN FLOWS FOR MASS AND CONCENTRATION LIMITS

**Authors:** Tom Gilbert, Mike Hammers, Jackie Shuda

**Overview**: Chapter NR 106 has been revised to explicitly require both concentration and mass limits for regulated toxicants. Additions to the rule specifically define flows to be used in the calculation of limits, and in the use of those limits to determine compliance.

**MUNICIPAL**

**1) Summary of NR 106 Approach**

ACUTE LIMITS: NR 106 identifies an acute water quality based concentration limit as a final acute value or a secondary acute value as determined in NR 105.05(4). The mass limit is determined by multiplying the concentration limit X the daily maximum design flow X appropriate conversion factor(s).

CHRONIC LIMITS: NR 106 identifies a mass balance calculation which is similar to the procedure in the original rule. However, NR 106.06(4)(d)1. indicates that, for dischargers subject to NR 210 which discharge for 24 hours per day on a year-round basis (most municipal dischargers), $Q_e$ equals the 'maximum design flow, expressed as a daily average, that is anticipated to occur for 12 continuous months during the design life of the treatment facility'. This is equivalent to the 'Average Design Flow' as given in the proposed changes to NR 110. This design flow is used to calculate both a concentration and a mass limit.

In addition to the mass limit based on the facility's average design flow, an 'alternative wet weather mass limitation' is also included in the permit. This mass limit is determined by multiplying the concentration limit as identified above X the maximum design flow corresponding to the criterion frequency X appropriate conversion factor(s). For limits based on aquatic life chronic toxicity criterion, a maximum week design flow is used. For limits based on wildlife, human threshold, human cancer, or taste and odor criteria, the maximum monthly design flow is used.

WET: Average design flow is used to determine the Instream Waste Concentration for chronic WET monitoring and limits.

**2) Determination of Design Flows Used for Calculation of Limits**

The limit determination process may depend on the availability of as many as four POTW design flows - Average Design Flow (also called average annual design flow); Maximum Day Design Flow; Maximum Week Design Flow; and Maximum Month Design Flow (also called sustained wet weather flow). Although all these flows may not be necessary to determine limits for every facility, the limit determination process is well under way before the limits calculator and permit drafter will know what flows are

needed. Therefore, it is necessary to solicit all design flows from the permittee as part of the permit application.

It is preferable for the permittee to use design information to provide the flow information. Unfortunately, many permittees will not have a supportable source, such as an approved facility plan, for all the design flows. Typically, the annual average flow is available to permittees. Therefore, this guidance proposes some methods for estimating design flows (see Worksheet). These estimates are based on determining daily, weekly, and monthly peaking factors from available discharge monitoring report data, and multiplying the Average Design Flow by the appropriate peaking factors to estimate daily, weekly, and monthly maximum flows. Other methods of estimating the flow values may be appropriate and any circumstances peculiar to a given permittee should be accounted for.

**3) Determination of a Need for a Limit**

The applicability of a limit (reasonable potential) is determined by comparing the average of <11 data points to the level of concern (1/5 of the concentration limit), or comparing the $P_{99}$ to the calculated concentration limit. Average Design flow is used as $Q_e$ to calculate the CTC, Wildlife, HTC, HCC and TOC limits.

**4) Determination of Compliance with Limits**

***Note: this section is not intended to provide definitions of significant noncompliance.***

Whenever a municipal permit includes a limit based on CTC, Wildlife, HTC, or HCC criteria, the permit will include two mass limits. One limit is based on the average design flow for the facility, and the other - the Alternative Wet Weather Mass Limit - is based on a peak design flow consistent with the duration of the criterion. NR 106.07(9) indicates, 'for the purposes of compliance, the alternative wet weather mass limit shall apply when the mass discharge level exceeds the mass limitation [based on average design flow] and when the permittee demonstrates to the satisfaction of the Department that the discharge exceedance is caused by and occurs during a wet weather event. ...a wet weather event occurs during or immediately following periods of precipitation or snowmelt, ...during which water...enters the sewerage system during infiltration or inflow, or both'.

The objective here is to provide guidance for determining if a permittee is still in compliance if the mass limit based on average design flow is exceeded, but the alternative wet weather mass limit is met. For the purposes of determining the applicable mass limit under NR 106, the definition of a 'wet weather event' is not the same as A 5-year frequency wet weather event associated with Category 2 bypasses in NR 110.05(2)(c). Use of the alternative wet weather mass limit needs to be considered whenever the flow of the plant exceeds the average design flow and when wet weather conditions are present.

***Note: The existence of the wet weather alternative limit underscores the importance of getting a representative average design flow for a facility. The description of what we are calling 'Average Design Flow' in NR 106 assumes a certain amount of I/I. Care***

***must be taken to not use a base design flow to determine the concentration and 'average design' mass limits.***

To determine compliance when an alternative wet weather mass limit exists: The permittee needs to determine the mass of the discharge as indicated in Item (17) of the Permit Standard Requirements; then proceed to through the following steps (See Flow Diagram 6-1):

a) Is the permittee in compliance with the average design flow mass limit? If **yes**, compliance is demonstrated.

b) If the permittee has exceeded the average design flow mass limit and also exceeded the alternative wet weather mass limit, the mass limit provision is being violated.

c) If the permittee has exceeded the average design flow mass limit, but has not exceeded the alternative wet weather mass limit and the flow on the sampling day is in excess of the average design flow because of rain, snowmelt, etc., the alternative wet weather limit applies. In cases where more than one sample is taken during the duration of averaging, and the flow of at least one of the sampling days is in excess of the average design flow because of rain, snowmelt, etc., the alternative wet weather limit applies.

**5) Permittee's Demonstration that an Exceedance Was Caused by an Event**

NR 106.07(9) states that the alternative limit applies "...when the permitte demonstrates to the satisfaction of the Department that the exceedance is caused by and occurs during a wet weather event." This demonstration should include a discussion of normal flow rates, the effluent flow rates that resulted in the exceedance and identification of the event that caused the high flow reates, including intensity and duration information. Some permittees may also want to present a graph of flow over time.

**Example: Cadmium limits for Facility 'Ourtown' - MUNICIPALITY**

Receiving stream information: WWSF, non-Public Water Supply, $Q_{7,10}$ = 15 cfs, harmonic mean flow = 50 cfs, 25% of streamflow used for mixing, stream hardness = 135 PPM, no background Cd concentration

'Ourtown' information: 1.0 MGD Average Design Flow, 2.0 MGD Maximum Daily Design Flow, 1.7 MGD Maximum Weekly Design Flow, 1.6 MGD Maximum Monthly Design Flow, Effluent Hardness = 200 PPM

NOTE: Assume effluent cadmium concentrations are high enough to trigger the inclusion of limits in permits.

Acute Toxicity Criterion = 22.83 ug/L
Daily Maximum Limit = 45.66 ug/L
Daily Maximum Mass Limit = 2.0 MGD X 8.34 X 0.04566 mg/L = 0.7616 lbs/day

Chronic Toxicity Criterion = 3.12 ug/L
Weekly Avg. Limit = 10.68 ug/L
Weekly Avg. Mass Limit = 1.0 MGD X 8.34 X 0.01068 mg/L = 0.08907 lbs/day
Alt. Wet Weather Weekly Avg. Mass Limit = 1.7 MGD X 8.34 X 0.01068 mg/L = 0.1514 lbs/day

Human Threshold Criterion = 1200 ug/L
Monthly Average Limit = $1.09 \times 10^4$ ug/L > 10.68 weekly average

Under these flow scenarios, a monthly average limit wouldn't be needed because the weekly (and daily) concentration limits are much lower, meaning the acute- and chronic-based limits are protective of human threshold concerns as well. If a monthly average limit was needed, the mass limit would be based on 1.0 MGD and the alternative wet weather mass limit would be based on 1.6 MGD of flow.

PERMIT RECOMMENDATIONS FOR THIS EXAMPLE (based on rounding of limits to two significant digits as per current Department policy) FOR TOTAL RECOVERABLE CADMIUM:

| | |
|---|---|
| Daily Maximum: | 46 ug/L, 0.76 lbs/day |
| Weekly Average: | 11 ug/L, 0.089 lbs/day |
| Alternative Wet Weather Limit: | 0.15 lbs/day weekly average |

NOTE: Dissolved-based limits are not addressed here, those will only be calculated if the permittee requests (see Chapter 4 and s. NR 106.06 (7)).

## INDUSTRIAL

### 1) Summary of NR 106 Approach

ACUTE LIMITS: NR 106 identifies an acute water quality based concentration limit as a final acute value or a secondary acute value as determined in NR 105.05(4). The mass limit is determined by multiplying the concentration limit X the daily maximum flow that represents normal operation X appropriate conversion factor(s).

CHRONIC LIMITS: NR 106 identifies a mass balance calculation which is similar to the procedure in the original rule. However, NR 106.06(4)(d)2. indicates that, for dischargers not subject to NR 210, $Q_e$ can either equal the 'maximum effluent flow, expressed as a daily average, that is anticipated to occur for 12 continuous months and represents normal operations', or $Q_e$ can equal the maximum flow consistent with the duration of the criterion. The same flow needs to be used for concentration and mass limit; ie, the permit drafter cannot use annual flow for a concentration limit based on CTC criteria, and then use a weekly maximum flow to convert this concentration limit to a mass limit.

In order to request calculation of limits based on peak flows, the permittee will need to provide documentation of peak weekly and monthly flows. Permittees discharging to the Great Lakes or to an effluent dominated stream are likeliest to benefit from use of peak flows to determine limits based on chronic, WC, HTC, HCC or TOC criteria.

The rule also allows the Department to consider a projected increase in effluent flow that will occur when production is increased or modified, or another wastewater source, including stormwater, is added to an existing wastewater facility. Any increases in existing limits would be subject to an NR 207 determination.

WET: Annual average flow is used to determine the Instream Waste Concentration for chronic WET monitoring and limits.

**2) Determination of Flows Used for Calculation of Limits**

The determination of all concentration limits require the use of annual average flow at a minimum. In order to determine a mass limit for acute criteria, a daily maximum flow is also needed.

As part of the permit application process, the permittee can provide an average annual flow, expressed as a daily average, by taking the highest of the annual mean flows from mean of DMR monthly average flows from at least 3 years of recent data. The permittee can also indicate in the application any anticipated increase in the annual average flow. The peak daily flow is the highest flow value in the data base.

If continuous or at least weekly flow monitoring data are available, the permittee can also determine peak flow data. Peak daily flow and peak monthly flow values are determined by data review. The permittee can estimate peak weekly flow by one of two methods. One method is to select the four highest peak daily flows, and calculate the average of seven consecutive days of data that includes the peak daily flows. The highest of these averages is then chosen as the peak weekly flow. A second method is to average the peak daily and peak monthly flow. This method is not as accurate as the first method described, if the industrial discharge includes a component of flow that varies with the weather, such as stormwater.

If at least weekly flow data are not available, the permittee can still provide the annual mean and peak daily flows as indicated above. These two flows are sufficient to calculate all limits.

***Note: other methods for estimating weekly and monthly peak flows are still possible with infrequent flow monitoring, such as use of the $P_{99}$ calculation. NR 106 does not require the use of peak weekly and monthly flows for industries. The use of peak weekly flows will primarily benefit industries that discharge to effluent-dominated streams or to the Great Lakes. Any circumstances peculiar to a given permittee should be accounted for.***

**3) Determination of a Need for a Limit**

The applicability of a limit is determined by comparing the average of <11 data points to the level of concern (1/5 of the concentration limit), or comparing the $P_{99}$ of 11 data points or more to the concentration limit that is calculated using the annual average flow.

If, however, a limit is justified using the average annual flow, the rule provides for the use of the corresponding peak flow to calculate the limit to include in the permit.

***Note: NR 106 does not specify who is to choose whether to use the annual average or peak flow - the Department or the permittee? Since the rule is silent on this, we have proposed consistent use of annual average flow to determine the need for a limit. If a limit is necessary when an annual average flow is used, it will also be necessary when a peak flow is used. As noted earlier, however, permittees with a Great Lakes or effluent dominated stream discharge will receive a somewhat larger mass limit if a peak flow is used to determine the limit.***

***A general item of note: if a permit already has an existing limit for a toxicant, and subsequent recalculations using the alterative flows allowed in this rule revision indicate a relaxation of the limit, the increase is still subject to the requirements in NR 207.***

**Example: Cadmium limits for 'Our Company, Inc.' - INDUSTRY**

Receiving stream information: WWSF, non-Public Water Supply, $Q_{7,10}$ = 15 cfs, harmonic mean flow = 50 cfs, 25% of streamflow used for mixing, stream hardness = 135 PPM, no background Cd concentration

'Our Company' information: 1.0 MGD Annual Average Flow, 2.0 MGD Maximum Daily Flow, 1.7 MGD Maximum Weekly Flow, 1.6 MGD Maximum Monthly Flow, Effluent Hardness = 200 PPM

NOTE: Assume effluent cadmium concentrations are high enough to trigger the inclusion of limits in permits.

Acute Toxicity Criterion = 22.83 ug/L
Daily Maximum Limit = 45.66 ug/L
Daily Maximum Mass Limit = 2.0 MGD X 8.34 X 0.04566 mg/L = 0.7616 lbs/day

Chronic Toxicity Criterion = 3.12 ug/L
Weekly Avg. Limit BASED ON LONG-TERM AVERAGE FLOW = 10.68 ug/L
Weekly Avg. Mass Limit BASED ON LONG-TERM AVG. FLOW = 1.0 MGD X 8.34 X 0.01068 mg/L = 0.08907 lbs/day
Weekly Avg. Limit BASED ON PEAK WEEKLY FLOW = 7.57 ug/L
Weekly Avg. Mass Limit BASED ON PEAK WEEKLY FLOW = 1.7 MGD X 8.34 X 0.00757 mg/L = 0.1073 lbs/day

Human Threshold Criterion = 1200 ug/L
Monthly Average Limit = 1.09 X $10^4$ ug/L > 10.68 weekly average
No monthly average limits are needed because the limit (as well as the criterion) is far above any acute- or chronic-based limit, so no mass limits need to be calculated.

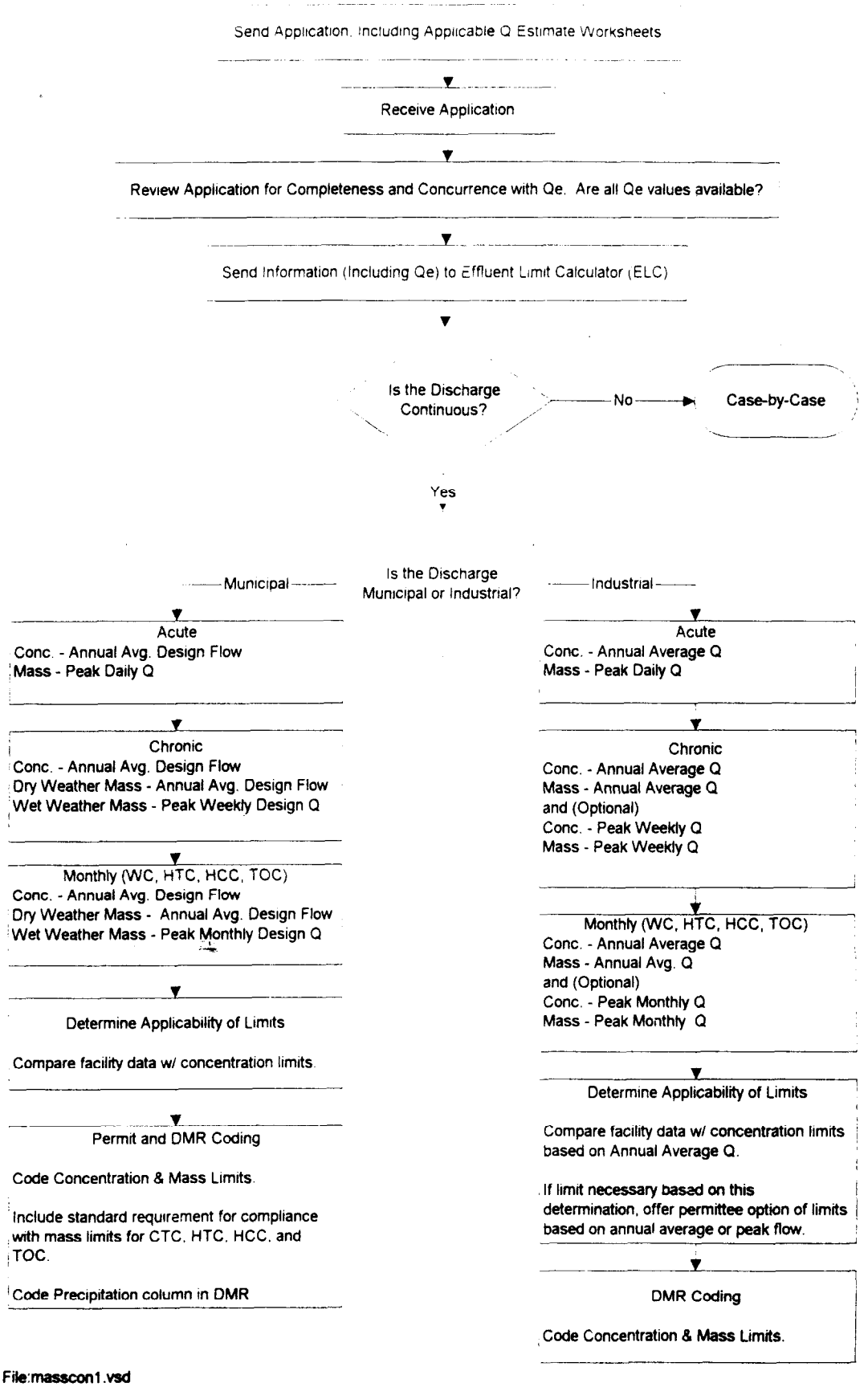
NOTE: Because the effluent-to-streamflow ratio is at a "borderline" condition between being effluent-dominated or stream-dominated, both the weekly abverage concentration and mass limits vary from average to peak flows. The wording in s. NR 106.06 (4)(d)2 indicates that the combination of concentration and mass limits should be offered to the permittee as choices (by the use of the words "either" and "or" in subpar. b). Presumably, the choice should be made during the public notice period or before the permit is (re)issued. If either the concentration or the mass limit remained fairly constant between average and peak flows, it is possible to assume the permittee will

choose the option that has the higher limit for the "other" parameter (the one which varied more). This choice would be acceptable to the Department because the limit which remained fairly constant is the one which "really" is protective of water quality (mass where dilution is high, concentration where dilution is fairly low, the river-dominated vs. effluent-dominated concept). In this example, though, going from average to peak flows, the concentration limit decreased by 29% and the mass limit increased by 20.5%. There's no clear procedure in an example like this to assume which option the permittee will accept, so both must be offered in draft form.

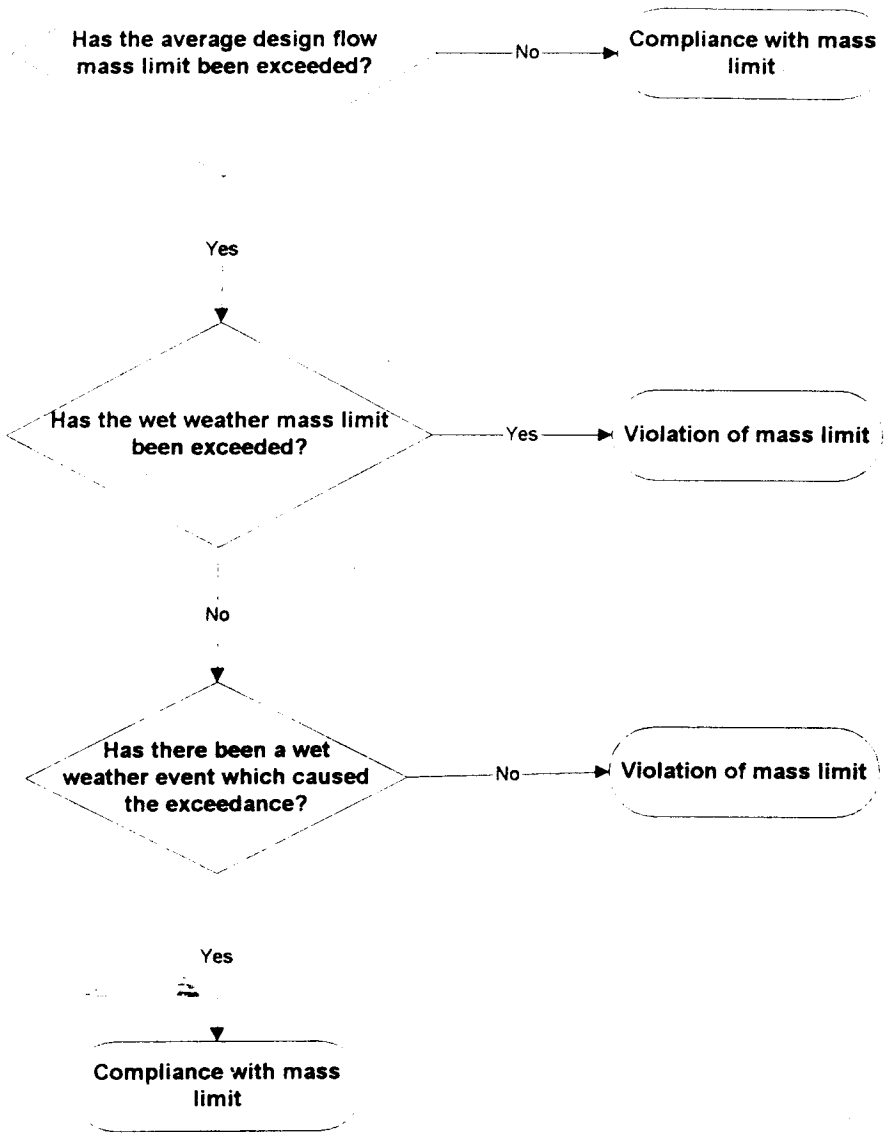
PERMIT RECOMMENDATIONS FOR THIS EXAMPLE (based on rounding of limits to two significant digits as per current Department policy) FOR TOTAL RECOVERABLE CADMIUM:

| | |
|---|---|
| Daily Maximum: | 46 ug/L, 0.76 lbs/day |
| Weekly Average: | 11 ug/L, 0.089 lbs/day |
| OR | |
| Weekly Average: | 7.6 ug/L, 0.11 lbs/day |

# Flow Diagram 6-1
# Mass Limits and
# Associated Flow Values



# Flow Diagram 6-2
# Compliance with Mass Limits (Municipal)
# Applies to CTC, WC, HTC, HCC, and TOC.



# Attachment 6-1
## Effluent and Receiving Water Flows Needed for Limit Calculations

| NR 105 CRITERION | STREAMFLOW (if applicable) | MUNICIPAL | INDUSTRIAL |
|---|---|---|---|
| ATC | Not Applicable | Average Design Flow AND Peak Daily Flow | Annual Average Flow AND Peak Daily Flow |
| CTC | 4-Q3 OR 7-Q10 | Average Design Flow AND Peak Weekly Flow | Annual Average Flow OR Peak Weekly Flow |
| WC | 90-Q10 OR 30-Q5 OR 85% of 7-Q2 | Average Design Flow AND Peak Monthly Flow | Annual Average Flow OR Peak Monthly Flow |
| HTC | Harmonic Mean | Average Design Flow AND Peak Monthly Flow | Annual Average Flow OR Peak Monthly Flow |
| HCC | Harmonic Mean | Average Design Flow AND Peak Monthly Flow | Annual Average Flow OR Peak Monthly Flow |
| TOC | Arithmetic Mean | Average Design Flow AND Peak Monthly Flow | Annual Average Flow OR Peak Monthly Flow |
| WET | 4-Q3 OR 7-Q10 | Average Design Flow | Annual Average Flow |

# Attachment 6-2
# WORK SHEET FOR ESTIMATING MAXIMUM DESIGN FLOWS FOR MUNICIPAL WWTPs

INSTRUCTIONS: This worksheet should be used to estimate your maximum daily, maximum weekly and maximum monthly design flows given your average design flow. Where an approved facilities plan has evaluated the peak design flows, those values should be used.

The person filling out this form will need the average design flow value for the facility (usually from a facility plan), records on continuous flow monitoring (copies of your Discharge Monitoring Reports) for at least 3 years of record and a calculator.

When selecting data from flow records to enter onto the form, exercise some judgement. You may want to exclude certain extreme values from consideration. An example might be data from an extremely unusual event or circumstance which would not be expected to be duplicated during the design life of the treatment plant.

This work sheet should be completed for EACH of a minimum of three years of data used. The corresponding peak design flows should then be averaged. Start by making at least two more copies of this form. Complete one of the forms for the most recent 12 month period. Then take a second copy for the 12 months before that. And so on. Then average each of the maximum design flows for the number of 12 month periods you analyzed to obtain final values for your maximum daily, maximum weekly and maximum monthly design flows.

# Attachment 6-2
# WORK SHEET FOR ESTIMATING MAXIMUM DESIGN FLOWS FOR MUNICIPAL WWTPs

12 MONTH RECORD from _____/_____ (Month/Year) through _____/_____ (Month/Year)

A. Enter Average Design Flow (may also be called Average Daily Design Flow or Average Annual Design Flow) _____ A.

B. Calculate CURRENT AVERAGE FLOW by determining an annual average of the DMR Monthly Average Effluent Flows.

Average of Monthly Average Flows = _____ B.

Data Used from: ____/____ - ____/____
(Enter Month/Year Info)

**For Estimate of Daily Maximum Design Flow:**

C. Within this reporting period, what is the Daily Maximum Flow recorded in the DMRs?

Date of Daily Maximum Flow: ____/____/____ _____ C.

D. To estimate a DAILY MAXIMUM PEAKING FACTOR, divide C by B.

(C ÷ B) = _____ D.

E. To estimate a DAILY MAXIMUM DESIGN FLOW, multiply A by D.

(A X D) = _____ E.

**For Estimate of Weekly Maximum Design Flow:**

F. Within this reporting period, what are the FOUR HIGHEST Daily Maximum Flow Values recorded on the DMRs?

_____ MGD ____/____/____ (Date)
_____ MGD ____/____/____ (Date)
_____ MGD ____/____/____ (Date)
_____ MGD ____/____/____ (Date)

G. For <u>each</u> of the four highest Daily flow values, calculate a weekly average flow value using seven consecutive days from the DMRs and including the daily maximum value

_____ MGD From ____/____/____ to ____/____/____ (Date)
_____ MGD From ____/____/____ to ____/____/____ (Date)
_____ MGD From ____/____/____ to ____/____/____ (Date)
_____ MGD From ____/____/____ to ____/____/____ (Date)

H. To estimate a WEEKLY MAXIMUM PEAKING FACTOR, divide the HIGHEST average in G by B.

(G ÷ B) = _____ H.

I. To estimate a WEEKLY MAXIMUM DESIGN FLOW, multiply A by H.

(A X H) = _____ I.

**For Estimate of Monthly Maximum Design Flow:**

J. Within this reporting period, what is the highest Monthly Average Flow recorded on the DMRs?

Date of Highest Monthyl Average Flow: ____/____ (Month/Year) _____ J.

K. To estimate a MONTHLY MAXIMUM PEAKING FACTOR, divide J by B.

(J ÷ B) = _____ K.

L. To estimate a MONTHLY MAXIMUM DESIGN FLOW, multiply A by K.

(A X K) = _____ L.

Notes to Reviewers:

The worksheet is based on the assumption that the permittee has continuous flow monitoring; that an average daily design flow is available from another source; and that the various peak flows are NOT available through another source like an approved facilities plan. Where an approved facilities plan has evaluated the peak design flows, these values should be used.

We have been careful to note the peak flows as ESTIMATES of design flows, since the use of the work sheet assumes that information relating to plant design and these flows does not exist.

The worksheet largely uses information that is coded into the DMRS system, and will allow the engineer/permit drafter to verify information through HFRC Access. We recommend that the permittee include the dates of the peak flows for ease in review. The hard copies of the DMRS will be needed to verify the peak weekly average flows, but the engineer/drafter can at least verify the highest peak flows through the DMRS system.

For estimating the weekly maximum flows, we have recommended that the permittee review the data associated with the four highest daily maximum flows for the data review, because the DMRS system doesn't capture weekly maximum data. A single daily maximum flow may not be associated with a peak weekly flow, but one of the four highest Daily Max flows is likely to lead the permittee to highest weekly flow.

*This is one of any number of ways to estimate the peak design flows. We have suggested this as a default because even a permittee who is dependent on the DMR forms and a calculator should be able to estimate peak design flows. However, permittees with more sophisticated data management systems may want to determine the current weekly and monthly maximum plant flows through rolling averages. The permittee may also want to determine the current average annual flow by averaging the totalized flow over the record review period by the number of days, which may be more accurate than the proposed grand average of monthly average flows.*

***We have recommended the use of three years of data because we recognize that use of a small data base may not enable the permittee to use data associated with peak wet weather events. We have limited the data to three years because the permittee is legally obligated to keep only three years of data. The permittee can use more data if they wish.***

# Chapter 7.
# MIXING ZONES

**Authors:** Steve Jaeger and Jim Schmidt

**Overview:** This chapter addresses two specific issues:

1) Changes in ch. NR 106 now allow for an alternative mixing zone demonstration for dischargers to get more than the default mixing for human health and wildlife limits, and

2) Comments received from the members of the advisory committee and during the public comment period stated that the Department should re-examine the 10 ft/sec velocity requirement for Zone of Initial Dilution (ZIDs) in light of U.S. EPA's most recent guidance.

This section proposes changes to the Department's mixing zone guidance document (Mixing Zone Guidance for Chronic Toxicity and Zones of Initial Dilution, May 1992) to deal with the above two issues. However, that document should still be consulted for questions regarding issues not covered in this chapter.

Other issues related to mixing zones that are covered by other groups include:

- Different default stream design flows for human health and wildlife calculations. (See Chapter 5)
- New code language protecting endangered species when evaluating mixing zones. (Guidance to be developed.)
- Phase-out of mixing zones for BCCs. (Guidance to be developed.)

Results from these other efforts (especially the endangered species issue) could also result in additional changes to the mixing zone guidance document.

**Requirements for Alternative Mixing Zone Demonstration for Meeting Human Health and Wildlife Criteria.**

The changes to NR 106 specify new default stream flows for the calculation of human health and wildlife limits of 25% of the harmonic mean flow and 25% of the 90-day $Q_{10}$, respectively. Allowances for fractions greater than 25% are made for those dischargers performing an acceptable alternative mixing zone demonstration. This is very similar to the existing procedure for the calculation of chronic aquatic life limits and much of the language for the new sections of code dealing with human health and wildlife design flows was taken from the old sections for chronic aquatic life.

Comments received during the public comment period suggested limiting the default to the 25% value was not scientifically defensible. The Department's response was that adoption of the defaults was necessary to be consistent with the GLI and to have uniform application of criteria throughout the Great Lake states.

Based on the recent history of effluent test data submitted by permittees, it is expected that the number of facilities receiving limits based on human health and wildlife will be relatively small. The possible exception may be groundwater remediation efforts that are not near streams of at least moderate size since limits in those cases are used to determine treatment needs and alternatives rather than as responses to available discharge data. Chemicals of concern for human health and wildlife generally have criteria well below levels of detection that are achievable by current technology. Detection of a chemical in an effluent will often result in a wildlife or human health-based limit below the level of detection regardless of whether the default or alternative stream design flow is used. NOTE: In those cases, though, the detected results should still be examined under the representative data guidance as part of an evaluation of whether or not the detected results are "real" and/or representative of the discharge.

Recommendation:

The most straight forward approach to using a streamflow other than the default of 25% is to tie the fraction of available dilution to the fraction used for chronic fish and aquatic life limits. In this case, the fraction of available dilution could be anywhere between 25% and 100% of the critical stream design flow pending the results of a mixing zone study conducted by the discharger. This would result in the following situations getting more than the default 25%:

a) Discharges using instream diffusers get the portion of the streamflow that mixes rapidly with the effluent. The length of instream diffusers is generally limited to 50% of the stream width to allow for zones of free passage. Well designed diffusers can mix the effluent rapidly with the fraction of the stream flow that is flowing over the length of the diffuser. Therefore, instream diffusers that use the full allowable width can receive up to 50% to 70% of the appropriate low flow value.

b) Dischargers to turbine inlets get the portion of the flow that flows through the appropriate turbine during low flow conditions.

**Review of 10 ft/sec Minimum Velocity Requirement for Zones of Initial Dilution (ZIDs):**

Existing DNR guidance justifies the 10 ft/sec discharge requirement in order to minimize the extent of the receiving water that exceeds the criteria for acute aquatic life and to prevent fish from staying in regions of high concentrations due to preferences for the effluent at certain times of the year. Exceptions to the 10 ft/s requirement are only given when other circumstances prevent fish from residing in areas of high concentrations. These are limited to dam tailraces which have stream velocities of at least 5 ft/sec or to discharges directly into turbine inlets. For practical purposes, there have been no requests based on stream velocities of at least 5 ft/sec: it appears these velocities are not sustained, even in dam tailraces.

Comments received during advisory committee meetings and during the public comment period stated that our current policy does not conform to current U.S. EPA guidance (*Technical Support Document for Water Quality-based Toxics Control*, March 1991, EPA/505/2-90-001) (aka TSD). The specific written comment suggested changing language in s. NR 106.06(3)(c) to "limits exposure time to less than one hour".

The Department's written response indicated that the TSD provides general guidance for free swimming and drifting organisms and the 1-hour exposure time was one method that could be used, but the TSD states other considerations may be necessary. The Department felt the existing language in the code allowed for the flexibility that was needed so no changes were made to the administrative code.

What follows is a review of the current TSD to determine if changes should be made to our 10 ft/sec discharge velocity requirement for ZIDs in our mixing zone guidance document based on the comments received. The key section in the TSD on this issue begins on the last column of page 33 and continues to the first couple paragraphs of page 34. The last full paragraph of page 33 of the TSD states:

> *"If a full analysis of concentrations and hydraulic residence times within the mixing zone indicates that organisms drifting through the plume along the path of maximum exposure would not be exposed to concentrations exceeding the acute criteria when averaged over the 1-hour (or appropriate site-specific) averaging period for acute criteria, then lethality to swimming or drifting organisms ordinarily should not be expected, even for fast-acting toxicants. In many situations, travel time through the acute mixing zone must be less than roughly 15 minutes if a 1-hour averaging exposure is not to exceed the acute criterion."*

This appears to be the basis for the comments received. The key point stated in the above excerpt is that the calculation protecting drifting organisms should also protect swimming organisms. If this is accepted, the calculation of average exposure over a one-hour period along the path of maximum exposure would be a straightforward calculation the consultants for the discharger could perform based on model scenarios that are already required by the Department. Based on the TSD, an exemption from the 10 ft/sec minimum velocity requirement could be granted if a discharger could show that a lower discharge velocity satisfied the 1-hour exposure criterion along with the other existing requirements in our mixing zone guidance document.

However, the first full paragraph on page 34 of the TSD states:

> *"The above recommendations assume that the effluent is repulsive, such that free-swimming organisms would avoid the mixing zones. While most toxic effluent are repulsive, caution is necessary in evaluating attractive mixing zones of known effluent toxicity, and denial of such mixing zones may well be appropriate. ..."*

This is the crux of the question: are toxic effluents repulsive? Temperature differences between discharges and receiving water can cause some fish to be attracted to discharge plumes at certain times of the year. If the effluent is toxic, is there a repulsive effect large enough to counter this?

Pages 69 through 78 of the TSD offers more discussion on mixing zones but little additional clarification on this issue. Pages 71 and 72 present four alternatives for preventing lethality to passing organisms, but the only reference in these pages to discharges that may attract aquatic life is on page 71 stating:

> ***"Requirements for wastewater plumes that tend to attract aquatic life should incorporate measures to reduce the toxicity (e.g. via pretreatment, dilution) to minimize lethality or any irreversible toxic effects on aquatic life."***

Recommendation:

The Department believes at this time, we do not have the evidence to assume that toxic effluents are repulsive for all discharges for the wide variety of toxic chemicals that can be found in effluents. However, changes to the mixing zone guidance document should be made to allow the discharger to demonstrate that for the chemicals of concern in their effluent, fish avoidance, even in the presence of attractive temperature differences, occurs at concentrations lower than the acute criteria.

Demonstration of fish avoidance can be made by either citing previous studies in the literature for the chemical(s) of concern or by conducting new studies. Study designs for new studies should be submitted to the Department for comments before initiation of a study. Any evaluation of fish avoidance should account for mixtures of substances that may be discharged. Be advised that any decisions made by the Department on mixing allowances will consider the potential for certain pollutants to be attractive (i.e., heat) while others may be repulsive.

If the Department is satisfied with the demonstration, the discharger may be exempted from the 10 ft/sec requirement and allowed to perform a 1-hour exposure calculation for drifting organisms instead. The remaining ZID criteria in the Department's mixing zone guidance document limiting size and location of the ZID would still need to be satisfied. The discharger would be required to maintain the discharge velocity used for their 1-hour exposure calculation.

**Flow Diagrams**

**Alternative Mixing Zone Demonstration for Meeting Human Health and Wildlife Criteria.**

No flow diagram is needed. When the mixing zone request is reviewed in the Modeling Section, the percentage for wildlife and human health is tied to the existing procedures for chronic aquatic life. The absolute upper limit would be 100% of the appropriate low flow value with a practical limit of 50% to 70% for instream diffusers depending on the fraction of stream flow passing over the center 50% of stream width.

**Alternative to 10 ft/sec Minimum Velocity Requirement for ZIDs:**

Flow Diagram 7-1 should be used in addition to the existing process for evaluating an alternative mixing zone request for a ZID.

Step 1. A discharger formally requests an exemption from the minimum velocity requirement of 10 ft/sec.

Sep 2. The permit drafter notifies the permittee that, at a minimum, the following additional information is necessary:

a) The proposed minimum discharge velocity.

b) A demonstration which shows that the effluent will be *repulsive* to aquatic life found in the receiving water if concentrations of the toxic pollutants are greater than the Acute Toxicity Critieria (ATC) for those pollutants. This may be borne out by citing published, scientifically valid studies which indicate that the same

pollutant induces a repulsing effect on appropriate fish and aquatic life species. If a discharger proposes to conduct field studies for this purpose, a study plan should be submitted to the Department for review prior to initiating the study. For this demonstration to be successful, the permittee must demonstrate that the effluent is repulsive to all fish and aquatic life that may pass through the effluent plume. Lastly, this conclusion must be reached for all pollutants discharged, individually and collectively, including heat.

c) A demonstration that the 1-hour average exposure concentration will be less than the ATC at the proposed discharge velocity. This demonstration must account for all mixtures of chemical substances as well as heat.

Step 3. Permittee submits information to permit drafter.

Step 4. Permit drafter provides information to Effluent Limits Speciallist (Currently: Jim Schmidt - WT/2) and Water Quality Modeilling Section Chief (Currently: Dale Patterson - WT/2). Collectively, two questions must be answered:

a) Does the demonstration show that the effluent is repulsive to fish and aquatic life if the effluent concentrations of the pollutant(s) in question exceed the appropriate ATC?

If **yes**, go to Step 4B.

If **no**, the request for an exemption from the 10 ft/sec. requirement must be denied.

b) Is the 1-hour average exposure concentration clearly less than the ATC at the proposed discharge velocity?

If **yes**, the request for an exemption from the 10 ft/sec. requirement is approved and the discharger must meet the alternative discharge velocity.

If **no**, the request for an exemption from the 10 ft/sec. requirement must be denied.

**Permit Language, Policy Guidance Documents, Strategies, Etc**

When a discharger receives an exemption from the 10 ft/sec minimum velocity requirement, the permit language related to a ZID would not change. The amount of dilution used to calculate associated permit limitations would be different and would affect only the numerical calculation of any limitations imposed within the WPDES permit.

Similarly, changes in the permit language for a discharge requesting greater than the default 25% for human health and wildlife limits would be minor. Upon approval of a new dilution value and calculation of associated limitations, the permit conditions would be dependent upon proper operation of a diffuser or discharge into a turbine that is operating to ensure adequate receiving stream protection.

**The mixing zone guidance document will be revised to include the changes mentioned here as well as changes needed to address endangered species.**

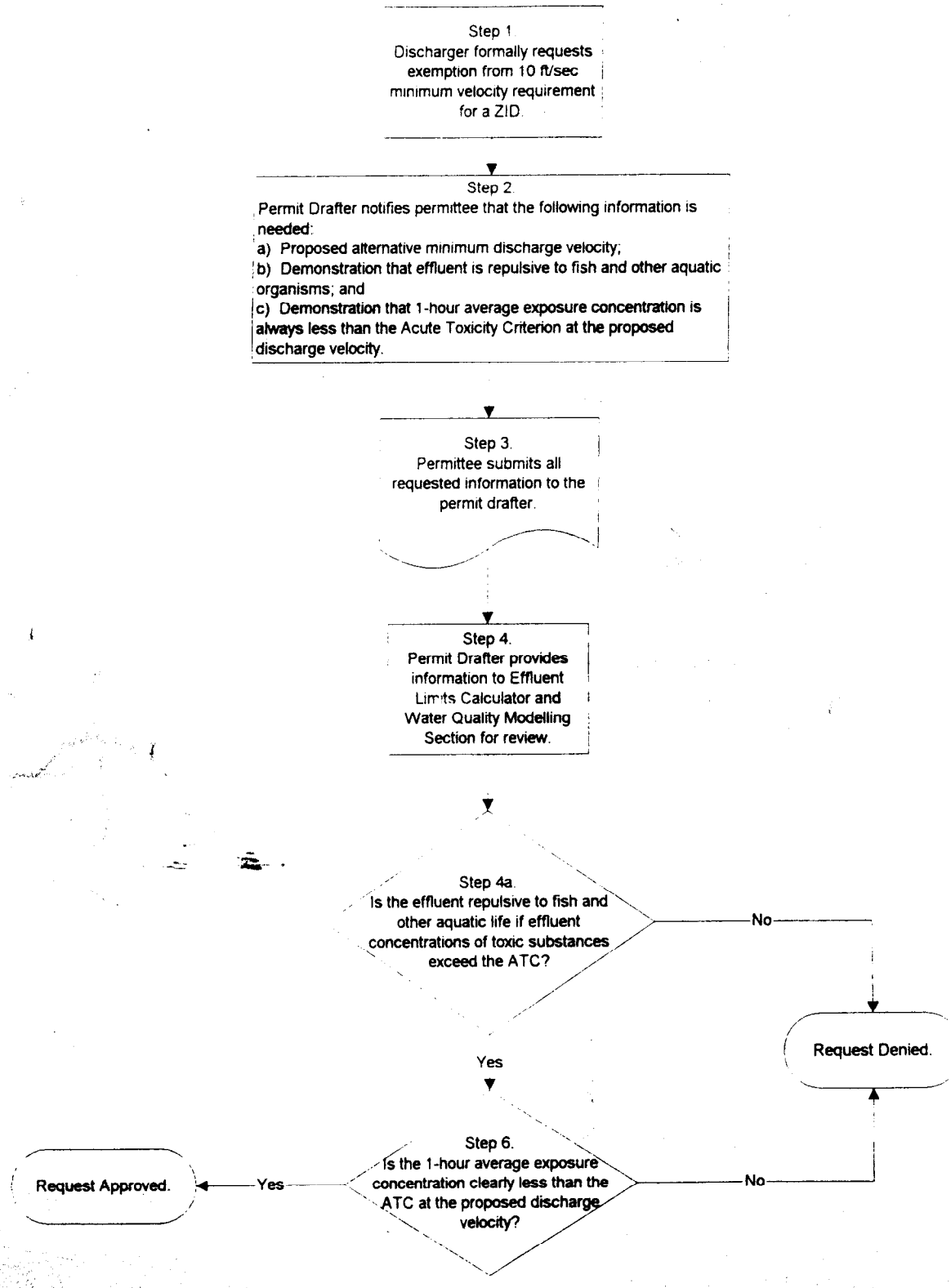
**Training Needs**

Alternative mixing zone requests are currently reviewed by the Modeling Section in the Bureau of Watershed Management. Review by Central Office staff was deemed appropriate due to the low number of request (usually <5 per year) and the need for consistency. Review is divided between two staff to allow for times when one is busy on another project or on vacation. There is generally no time when both are busy with mixing zone reviews. The two staff performing the reviews have participated in developing these procedures so no additional training is needed for the reviewers. Consistency will be maintained by continued tracking of alternative mixing zone requests and resulting decisions with continued discussions with and review by the Modeling Section supervisor.

Training, however, would be needed for staff outside the Modeling Section who deal directly with the permitted dischargers. They will need an understanding of the revised procedures, type of data and analysis needed for an alternative mixing zone request and expected range of results in order to best assist dischargers in determining cost effective ways to meet the water quality standards. Questions can always be referred to the Modeling Section as needed.

Training will begin with a short memo distributed with a the revised mixing zone guidance document outlining the changes made along with the expected implications. Face-to-face training will also occur in the coming months when select staff visit the Regions to work through examples of drafting WPDES permit conditions using the revised water quality rules.

# Determination of Exemption from 10 ft/sec Minimum Velocity Requirement for Zone of Initial Dilution Flow Diagram 7-1



# Attachment 7-1
## Bioconcentratable Chemicals of Concern (BCCs)
## (All listed substances have a Bioaccumulation Factor ≥ 1000.)

1. $\alpha$ - BHC (alpha-Benzene hexachloride)
2. $\beta$ - BHC (beta-Benzene hexachloride)
3. $\gamma$ - BHC (gamma-Benzene hexachloride) (a.k.a. Lindane)
4. $\Delta$ - BHC (delta-Benzene hexachloride)
5. Chlordane
6. DDD
7. DDE
8. DDT
9. Dieldrin
10. Hexachlorobenzene
11. Hexachlorobutadiene
12. Mercury
13. Mirex
14. Octachlorostyrene
15. Polychlorinated Biphenyls (PCB)
16. Pentachlorobenzene
17. Photomirex
18. Dioxin
19. 1,2,3,4-Tetrachlorobenzene
20. 1,2,4,5-Tetrachlorobenzene
21. Toxaphene

# Chapter 8.
# MONITORING

**Authors:** Toni Glymph, Jim Schmidt, Linda Vogen, Bernie Robertson, Kari Fleming, Tom Mugan

**Overview:** Recent discussions have occurred among Department staff with respect to monitoring needs for different types of wastewater. These discussions characterize the need for one group to evaluate the need for monitoring several types of pollutants and, in an attempt to eliminate inconsistencies around the state, to consolidate the recommendations in one place.

The Monitoring/Representative Data Workgroup was formed to accomplish the following tasks:

1) To develop guidance which describes which substances we need to investigate and to determine the appropriate monitoring needed to make defendable, data-driven decisions regarding imposition of effluent limitations in permits.

2) To provide "generic" monitoring for the pollutants of initial focus in the Great Lakes Initiative.

3) To provide clarity to the representative data guidance of August, 1995 in establishing roles and responsibilities of Department staff which ensure consistent application of the guidance.

**Process:** The Workgroup did an initial comparison of the substances listed as "Pollutants of Initial Focus in the Great Lakes Water Quality Initiative" (GLI-Table 6, see page 15393 of the March 23, 1995 Federal Register), substances in our current list of priority pollutants, substances with criteria listed in the old and the new NR 105 and with substances which have test methods available in NR 219, although subsequent meetings with EPA staff caused us to drop references to GLI Table 6 as one of the reference sources. Eventually, the substances were placed in one of the following categories (also see Attachment 8-1):

Category 1 - Substances that are included in EPA's list of priority pollutants. Many of these substances currently have criteria available in NR 105 and/or NR 102, most (if not all) have test methods listed in NR 219.

Category 2 - Substances that are <u>not</u> on EPA's list of priority pollutants. These substances currently have criteria available in NR 105 and/or NR 102, and have test methods listed in NR 219 (with the exception of Chlorpyrifos for which we currently require EPA Method SW-846 8141A; no method is specifically approved for it).

Category 3 - Substances that are <u>not</u> on EPA's list of priority pollutants. These substances have criteria available in NR 105 and/or NR 102, but have <u>no</u> test method available in NR 219.

Category 4 - Substances that are not on EPA's list of priority pollutants. These substances have test methods available in NR 219 but have no criterion available in NR 105 and/or NR 102. A secondary value needs to be calculated for substances in Category 4 based on s. NR 106.05 (1)(b).

Category 5 - Same as Category 4, except secondary values do not need to be calculated using s. NR 106.05 (1)(b).

Category 6 - Substances that are not on EPA's list of priority pollutants. These substances do not have criteria available in NR 105 and/or NR 102 and do not have test methods available in NR 219.

**Decisions and Recommendations:** The recommendations are that monitoring be required for substances in Categories 1,2 and 4. Major Municipal facilities and Primary Industries should monitor for the substances listed in Category 1. Monitoring for Primary Industries should be based on industrial category (see attached table - Testing Requirements for Organic Toxic Pollutants Industry Category). Secondary industries and minor municipal facilities will be required to monitor for these substances on an as needed basis and/or as required by current policy. Attachment 8-1 includes information on sources and uses of the indicated compounds, that should be consulted in the decision-making process on determining possible presence in discharges. In addition, sources such as EPA Development Documents for particular industrial use categories should also be consulted for information on the presence of certain compounds.

Substances in Category 2 should be monitored if the approved test method is the same as one already used for substances on the priority pollutant list. An example of this would be the GC/MS method (EPA #625) for the volatile organic compounds in Category 2, specifically 1,1- and 2,3-dichloropropene as well as 1,2-cisdichloroethylene. Facilities required to test for volatile compounds on the priority pollutant list will most likely use method 625 anyway, so these compounds could be tested as well at costs which are not significantly more than that needed for the priority pollutants. If a facility is not required to test the priority pollutants, the information on potential sources in Attachment 8-1 should be consulted to determine if the substance is believed present in that particular discharge.

There are five substances of note listed in Category 2: chlorpyrifos, chromium (+6), parathion, chlorine and chlorides. Monitoring for chromium (+6) should be required for all primary industries monitoring for metals. Municipal facilities which have metal plating, and/or leather tanning industries discharging process wastewater to the WWTP should also monitor for chromium (+6). Monitoring for parathion should be required for industry categories currently requiring monitoring for pesticides and for major municipalities located within the cranberry, cherry, and potato growing regions of the state. Monitoring for chlorpyrifos should be required only if there is reason to believe it is present in the discharge, namely if there is significant pesticide use at the facility which may result in contribution to the discharge. Chlorine and chlorides should be monitored based on strategies previously established for these substances.

Substances in Category 4 should be monitored where needed to compare to secondary value-based limits. Attachment 8-1 contains a list of substances which would comprise either Category 4 or 5, depending on the need to evaluate secondary values (Category 5 includes substances where secondary values do not need to be calculated). That need to

evaluate secondary values is an on-going process and substances may fall into either category as more information becomes available.

Monitoring should not be required at this time for the substances listed in Categories 3,5, and 6. Currently, substances in Categories 3 and 6 do not have approved test methods available. In order to determine the need to include a limit in a permit, there must be both effluent data available using approved test methods, and water quality-based effluent limitations. Lacking either one makes the requirement to collect data inappropriate. Category 3 lacks the test method, Category 5 lacks both criteria and the need to calculate secondary values and related limits, and Category 6 lacks both test methods and criteria.

Process

Monitoring and representative data decisions are a subset of the work being done by the Application Process Redesign Team. In Step 1 of the process the application package is prepared along with preliminary limits calculated for those pollutants of concern for a particular facility (see Attachment 8-2: Testing Requirements for GC/MS Fractions for Primary Industries). These pollutants are determined based on six categories of dischargers; municipal majors with pretreatment control authority, majors without pretreatment, municipal minors, primary industrial facilities, secondary industrial facilities (including NCCW discharges with additives) and NCCW dischargers without additives. The effluent monitoring requirements will be customized for each category of discharger (see Attachment 8-3: Effluent Monitoring Summary).

After the Department receives the completed application, the data is reviewed for quality. The representative data guidance (See Attachment 8-5: "Regulating Toxics Using Representative Data") provides a list of considerations for selecting representative data. In the past, the information required to make data quality decisions was not readily available. The Workgroup has designed a QA/QC checklist to be included with the application that contains data quality and sampling information from the contract labs and the permittees (see Attachment 8-4: Data Quality Checklist). This checklist, along with providing preliminary limits as part of the permit application form, is designed to insure high quality, consistent decision making regarding representative data. A joint discussion should be scheduled between field staff (i.e., those most familiar with the facility such as permit drafters and area engineers who will be able to make the best decisions based on changes in effluent quality, WWTP upgrades/changes, whether samples were taken during normal events etc.), and limits calculators who can assist in making data quality decisions based on their experience with reviewing data sets for toxic substances.

Training

Training on the Pollutant of Concern Process, the new Application Process, and the Preliminary Limits Process will be required for Department staff. Permittees and contract labs will require training/updating on the new application requirements (checklist information) and monitoring requirements.

**ATTACHMENT 8-1: Pollutant Monitoring Categories and Source Information**

| CATEGORY: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Is substance a "Priority Pollutant"? | YES | NO | NO | NO | NO | NO |
| Is an approved test method available for this substance (such as in NR 219)? | YES or NO | YES | NO | YES | YES | NO |
| Does substance have criterion in NR 105 (or in NR 102 re: taste and odor)? | YES or NO | YES | YES | NO | NO | No |
| Does a secondary value need to be calculated using s. NR 106.05 (1)(b)? | YES or NO | YES or NO | YES or NO | YES | NO | YES or NO |

**CATEGORY 1 - Priority Pollutant Substances**

This category includes compounds that appear on the priority pollutant list, regardless of other available information. Information given in other columns on the attached table are ignored, since requirements already exist which state that permittees must test for part or all of this list (based on discharge category) in the permit application. Since similar type compounds on this list (e.g., "volatiles", "base-neutral compounds", etc ) are analyzed via GCMS, it would not be beneficial to eliminate individual compounds within similar groups (e.g., if labs are already analyzing for "volatiles" it would not significantly decrease cost or effort to eliminate 1 or a few "volatile" compounds). NOTE: The "secondary value" column is left blank since the determination of the need for calculation of a secondary value is site-specific and discharger-specific.

Major Municipal: 1-time testing for priority pollutants in permit application (exception for 2,3,7,8,- TCDD (dioxin) - see note in comments column on page 6)

Minor Municipal: Testing for a subset of these compounds (mostly metals) is required for these dischargers. The application team is making decisions regarding these facilities and will include them in their new application process.

Primary Industrial: 1-time testing for priority pollutants in permit application, based on discharge category

Secondary Industrial: Testing for a subset of these compounds (mostly metals) is required for these dischargers. The application team is making decisions regarding these facilities and will include them in their new application process.

**ATTACHMENT 8-1: Pollutant Monitoring Categories and Source Information** (Continued)

SUBSTANCES THAT FIT INTO CATEGORY 1:

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2*VAL | NR 102 | | | |
| **SORTED BY PRIORITY POLLUTANT CATEGORY:**<br>**Metals and Cyanide:** | | | | | | | | |
| Antimony | Y | t | t | | | Y | Mining; flame retardant (added to many products); textiles; paints & pigments; pewter; metal coating; batteries; bearings; ammunition; foil sheet & pipe; pyrotechnics; rubber | |
| Arsenic | Y | acx | acx | | | Y | (arsenic trioxide) turf, termite & non-crop insecticide; glass mfg ; automotive mfg ; mining; certain types of wood preserving | |
| Beryllium | Y | x | x | | | Y | alloys in electrical & other equipment; cathode ray tubes | |
| Cadmium | Y | act | act | | | Y | engraving, photoelectric cells, electroplating, batteries, pigments, plastics, used as a catalyst; rubber & plastic products; fungicides; photography & lithography; flashlights and calculators; | |
| Chromium (+3) | Y | act | act | | | Y | chrome-steel, stainless steel, metal plating; textile drying; fur dressing & drying; car wash; pigments; leather tanning; meat processing; breweries, soft drinks & flavoring | Chromium +3 and +6 are not listed separately on Table 6 |
| Copper | Y | ac | ac | | y | Y | plumbing, heating, roofing, & construction | |
| Lead | Y | act | act | | | Y | pipe,ceramics, electronic devices, plastics, paint, pigments, alloys in metallurgy, & batteries; electroplating | |
| *Mercury* | Y | awt | acwt | | | Y | thermometers, barometers, vapor lamps, mirror coatings, chem. mfg & electrical equipment | |
| Nickel | Y | act | act | | | Y | electroplating, coins, batteries, catalysts, stainless steel and other metal alloys | |
| Selenium | Y | act | at | | | Y | electrodes, glass, paints, dyes, photocopying, insecticides, veterinary medicine, pigment in paper, leather and printing industries | |
| Silver | Y | act | t | | | Y | jewelry, tableware, & mirrors; photography, solders, electroplating, anti-infectives, coins, cloud-seeding; paint | |
| Thallium | Y | t | | | | Y | mining, rodenticides, semi-conductors, photoelectric equipment, lens, & thermometers | |
| Zinc | Y | ac | ac | | y | Y | galvanizing & coating iron & steel; brass metal alloys, paint, rubber & dyestuffs | |
| Cyanide | Y | act | act | | | Y | electroplating; pesticide mfg.; silver & metal polishes; photography solutions; steel, petroleum, & plastics industries; synthetic fibers; metal plating; mining, chemical mfg.; automotive mfg. | |

| COMPOUND | PP | CRITERIA | | | | NR-219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| **Volatile Organic Compounds:** | | | | | | | | |
| Acrolein | Y | t | t | | | Y | Aquatic herbicide commonly known as "Aqualin" or "Magnacide-H" used to control weeds in irrigation canals, WWTP lagoons. Intermediate in chemical industry; polyurethane & polyester resins; biocide for algae, weed, & mollusc control and in recirculating process water systems; used for slime control in the paper industry, leather/tanning; dishwater detergent; oil recovery operations; chlorination of organic compounds (e.g., during disinfection of wastewater) | |
| Acrylonitrile | Y | x | x | | | Y | used to make acrylic fibers, plastics, surface coatings, & adhesives. Chemical intermediate in the synthesis of antioxidants, pharmaceuticals, & dyes Pesticide fumigant for stored grains. | |
| Benzene | Y | x | tx | | | Y | Used in mfg. of medicinal chemicals, dyes, plastics, textiles, detergents, artificial leather, varnishes, paints, lacquers, waxes. Solvent for pesticides, inks, paints, rubbers, adhesives, coatings, & detergents. Found in petroleum napthalates & gasoline. Wood preserving at plants which treat with pentachlorophenol and creosote preservatives only. | |
| Bromoform | Y | x | x | | | Y | used to make pharmaceuticals; as an ingredient in fire-resistant chemicals and gauge fluid; as a solvent for waxes, greases, & oils; in separating mixtures of minerals | |
| Carbon Tetrachloride | Y | x | x | | | Y | fire extinguisher, solvent, insecticide, dry cleaning, aerosols; paints & plastics | |
| Chlorobenzene | Y | t | t | | y | Y | manufactured chemical; used to create nitrochlorobenzenes, phenols, DDT, and aniline; as a solvent for paints; heat transfer medium; weed control; dyes; drugs, insecticides; rubber; textiles; grease removers | |
| Chlorodibromomethane | Y | | | | | Y | fire extinguishers, grain fumigant | |
| Chloroethane | Y | | | | | Y | resins, plastics, rubber; paper; glass, and automotive industries; flame retardant | |
| 2-Chloroethyl vinyl ether | Y | | | | | Y | | Not stable in water, therefore will not be detected in wastewater |
| Chloroform | Y | x | x | | | Y | refrigerant & aerosol propellant; drugs, cosmetics, dyes, & pesticide mfg., a byproduct of heating chlorinated water; floor polish; dry cleaning; cough syrup, toothpaste, liniments, & antiseptics | |
| Dichlorobromomethane | Y | x | x | | | Y | chemical intermediate, solvent, fire extinguisher fluid ingredient | |
| 1,1-Dichloroethane | Y | | | | | Y | solvent; fumigant | |
| 1,2-Dichloroethane | Y | x | x | | | Y | used to make vinyl chloride, other chlorinated solvents, acetyl cellulose, and tetraethyl lead; as a solvent for rubber, fats, oils, waxes, gums, & resins; a fumigant; nylon; plastics; PVC; photography; paint; upholstery & carpet cleaners | |
| 1,1-Dichloroethylene (vinylidene chloride) | Y | x | | | | Y | mfg. of plastics (esp. food packaging such as sandwich wraps); polymers used in interior coatings of ship tanks, railroad cars, fuel storage tanks, pipes, & other structures. | |
| 1,2-Transdichloroethylene | Y | t | t | | | Y | cleaning solvent; intermediate in chemical mfg.; solvent for waxes & resins | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| 1,2-Dichloropropane | Y | | | | | Y | oil & fat solvent; dry cleaning fluids, degreaser; insecticidal fumigant mixtures | |
| 1,3-Dichloropropene | Y | t | t | | | Y | crop fumigant used to kill soil nematodes; fat & oil solvents; dry cleaning | Labs report both cis & trans isomers, but NR 105 doesn't |
| Ethylbenzene | Y | t | t | | | Y | resin solvent; conversion to styrene monomer; petroleum refining; organic chemicals mfg.; asphalt component; diluent in paint industry; insecticide, gasoline blends; aluminum electroplating | |
| Methyl Bromide | Y | x | | | | Y | oil extractant; fire extinguishers; soil fumigant; insecticides; dye & drug mfg | |
| Methyl Chloride | Y | x | x | | | Y | refrigerant; methylating agent; dewaxing agent; synthetic rubber mfg | |
| Methylene Chloride | Y | x | tx | | | Y | used in food, furniture, 7 plastics processing; paint removers, degreasing & cleaning fluids | |
| 1,1,2,2-Tetrachloroethane | Y | x | x | | | Y | solvent; paints & varnishes; chemical mfg.; plastics & agricultural industry; photographic chemicals; dry cleaning | |
| Tetrachloroethylene | Y | x | x | | | Y | dry cleaning agent; degreasing solvent, heat exchange fluid; textile mfg.; paint removers; solvent for oils, resins & tars | |
| Toluene | Y | t | t | | | Y | used to make chemicals, explosives, dyes; Solvent for inks, paints, lacquers, resins, cleaners, glues, & adhesives; found in gasolines & aviation fuel. Wood preserving at plants which treat with pentachlorophenol and creosote preservatives only. | |
| 1,1,1-Trichloroethane | Y | t | t | | | Y | polymer mfg.; adhesives; shoe polishes; stain repellent; hair spray, mace, resins, aerosol propellent; metal degreasing; pesticides; textile processing; solvent, photographic film; inks; lubricants | |
| 1,1,2-Trichloroethane | Y | x | x | | | Y | organic chemical mfg.; solvent for alkaloids, fats, resins, and waxes | |
| Trichloroethylene | Y | x | x | | | Y | solvent for degreasing, fats, waxes, resins, ores, rubber, lacquers, varnishes, & adhesives; dry cleaning, organic chemical mfg.; printing inks & paints | |
| Vinyl Chloride | Y | x | x | | | Y | PVC mfg.; plastics & vinyl chloride copolymers | |
| **Acid-Extractable Compounds:** | | | | | | | | |
| 4-Chloro-3-Methylphenol | Y | | | | y | Y | Chemical mfg.; disinfectants & deodorizers; insecticides; wood preservatives | |
| 2-Chlorophenol | Y | | | | y | Y | dyes | |
| 2,4-Dichlorophenol | Y | t | t | | y | Y | wastewater disinfection; degradation of herbicides & pesticides; organic chemical mfg.; timber & paper industries | |
| 2,4-Dimethylphenol | Y | | t | | y | Y | petroleum & coal tars; lubricants; gasolines | |
| 4,6-Dinitro-O-Cresol | Y | t | t | | | Y | insecticide; fungicide; herbicide; & defoliant, Dyestuff industry | |
| 2,4-Dinitrophenol | Y | t | t | | | Y | dyes, photo chemicals, pest control agents, wood preservatives, & explosives | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| 2-Nitrophenol | Y | | | | | Y | synthesis of dyes & pigments; mfg. of pharmaceuticals, rubber chemicals, lumber preservatives, photographic chemicals, & pesticides | |
| 4-Nitrophenol | Y | | | | | Y | primarily used to produce insecticides (ethyl & methyl parathion); also used to make dyes & leather treatments | |
| Pentachlorophenol | Y | act | ac | | y | Y | wood preservatives; herbicide; organic chemical & pesticide mfg.; leather mfg., paper mills; wall & roofing materials; fungicide & bactericide in cooling towers; rayon & textile processing; tanning, glues & petroleum industries | |
| Phenol | Y | t | | | y | Y | plywood, pharmaceutical, & rubber mfg.; oil refinery wastes; paints; dyes; slimicide; biocides; explosives; fertilizers; paint remover; wood preservative; resins; textiles | |
| 2,4,6-Trichlorophenol | Y | x | x | | y | Y | fungicide, bactericide, & preservative agent; Used to produce more highly chlorinated phenols; tanning; defoliant | |
| **Base-Neutral Compounds:** | | | | | | | | |
| Acenaphthene | Y | | | | y | Y | | |
| Acenaphthylene | Y | | | | | Y | | |
| Anthracene | Y | | | | | Y | PAH; found in coal tar & combustion of organic compounds; Mostly used in dye industries | |
| Benzidine | Y | x | x | | | Y | dyes, plastics, rubber; pigments; laboratory chemical<br>Dibutyl phthalate - insect repellent for the impregnation of clothing, plasticizer in mfg. of flexible plastics; lacquer solvent | |
| Benzo(a)anthracene | Y | x | | | | Y | | |
| Benzo(a)pyrene | Y | x | | | | Y | cancer research; tobacco; petroleum refining; electrodes; wood preservatives; roofing | |
| 3,4-Benzofluoranthene | Y | x | | | | Y | | |
| Benzo(ghi)perylene | Y | x | | | | Y | | |
| Benzo(k)fluoranthene | Y | x | | | | Y | | |
| Bis(2-chloroethoxy)methane | Y | | | | | Y | | |
| Bis(2-chloroethyl)ether | Y | x | x | | | Y | used to make glycol products, rubber & insecticides; as a solvent for fats, waxes, & greases; as a scouring agent for textiles; possibly from chlorination of water; mfg. of finish removers, lacquers, paints, soaps and varnish; dry cleaning | |
| Bis(2-chlorisopropyl)ether | Y | t | t | | | Y | textiles; ion exchange resins; pesticide mfg.; chemical mfg.; rubber; insecticides; chlorination of drinking water; solvent for fats, metals, greases & paint/varnish removers | |
| Di(2-ethylhexyl)phthalate (DEHP) | Y | t | | | | Y | plasticizer; plastics, automobile, medical, & packaging industries; inks, pesticides, cosmetics, vacuum pump oils | |
| 4-Bromophenyl Phenyl Ether | Y | | | | | Y | | |
| Butyl benzyl phthalate | Y | | | | | Y | | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| 2-Chloronaphthalene | Y | | | | | Y | | |
| 4-Chlorophenyl Phenyl Ether | Y | | | | | Y | | |
| Chrysene | Y | x | | | | Y | organic synthesis; crude oils; creosote & other wood preservatives | |
| Dibenzo(a,h)anthracene | Y | x | | | | Y | | |
| 1,2-Dichlorobenzene | Y | t | | | | Y | solvent for asphalt; insecticide; degreaser; metal polishes; dyes; fumigant; industrial odor control; electrical & pharmaceutical industries; adhesives & sealants; auto & other laundries; printing & publishing; pesticides; nonferrous metals | |
| 1,3-Dichlorobenzene | Y | t | t | | | Y | insecticidal fumigant; usually in technical grade of o-dichlorobenzene, dye & textile mfg. | |
| 1,4-Dichlorobenzene | Y | x | x | | | Y | insecticide in moth balls; disinfectant in toilet blocks, often present in landfill leachates; dyes | |
| 3,3'-Dichlorobenzidine | Y | x | x | | | Y | industrial dyes; pigments; polyurethane; crayons, plastics, printing inks & textile mfg. | |
| Diethyl Phthalate | Y | t | t | | | Y | solvent for cellulose acetate; used to make varnishes; fixative for perfumes & denaturing alcohol; vehicle for pesticide sprays; plasticizing agent, adhesives, PVC, resins; rubber; lacquers | |
| Dimethyl Phthalate | Y | t | t | | | Y | solvent and plasticizer; insect repellent (for personal use); chemical, textile, pulp & paper, oil refining industries; landfill leachates | |
| Di-n-butyl Phthalate | Y | t | | | | Y | plasticizer; insect repellent, lacquer solvent; textile & plastics mfg. | |
| 2,4-Dinitrotoluene | Y | x | tx | | | Y | Polyurethane foams mfg.; polymers; explosives mfg.; organic chem mfg., dyes; mfg. of smokeless powder | |
| 2,6-Dinitrotoluene | Y | | | | | Y | | |
| Di-n-octyl Phthalate | Y | | | | | Y | plastics mfg. | |
| 1,2-Diphenylhydrazine | Y | x | x | | | Y | intermediate in the production of dyes; chemical mfg.; pharmaceutical industry | |
| Fluoranthene | Y | t | t | | | Y | oil refining; plastic & dyestuff mfg.; wood preservatives; gasoline & motor oil | |
| Fluorene | Y | | | | | Y | rocket fuels; glass, enamel & bricks mfg. | |
| ***Hexachlorobenzene*** | Y | x | tx | | | Y | Organic chem. mfg.; fungicide; wood preservative; used in production of aromatic fluorocarbons; impregnation of paper; present in herbicide DCPA, pesticide PCNB, & Tetrachlor; found in the production of: HCB, chlorinated solvents, pesticides, dyes, electrolytic chlorine, electrodes, ordnance & pyrotechnics, sodium chlorate, aluminum, seed treatment chem., PCP, electrodes, vinyl chloride monomers, & synthetic rubber; herbicide, insecticide, fumigant, bactericide; used for aquatic control of algae; lab chemical | |
| ***Hexachlorobutadiene*** | Y | x | x | | | Y | by-product of chlorinated chemical mfg.; solvent for organic chemicals, intermediate in rubber mfg. & chlorine production | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| Hexachlorocyclopentadiene | Y | t | t | | y | Y | pesticides, flame retardants; resins; dyes; insecticides; pesticides, fungicides, pharmaceuticals; plastics, polyester | |
| Hexachloroethane | Y | x | tx | | | Y | animal medicines; insecticides; smoke-making devices; explosives; chlorination at WWTPs; solvent; rubber mfg.; dye mfg.; fire extinguishers; lab chemical | |
| Indeno(1,2,3-cd)pyrene | Y | x | | | | Y | fossil fuels; oils | |
| Isophorone | Y | t | | | | Y | latex & chemical mfg.; resins; pesticides; solvent for lacquers, resins, pesticides, herbicides, fats, oils, & gums | |
| Naphthalene | Y | | | | | Y | inks & paints; petroleum & gasoline | |
| Nitrobenzene | Y | t | | | y | Y | explosives, dyes, shoe & floor polishes, paint, solvent, metal polishes, perfume, dyes, propellants; TNT production; photographic chemicals, rubber, medicinals | |
| N-Nitrosodimethylamine | Y | x | x | | | Y | antioxidant; lubricants, polymers, intermediate in chemical mfg.; pesticides | |
| N-Nitrosodiphenylamine | Y | x | x | | | Y | rubber mfg.; pesticides; petroleum; polymers | |
| N-Nitrosodipropylamine | Y | | | | | Y | chemical mfg. intermediate and solvent | |
| Phenanthrene | Y | x | | | | Y | coal tar; gasoline; dyestuffs; drugs; perfumes; leather, paper soap, toy, tanning, dye and agricultural industries | |
| Pyrene | Y | x | | | | Y | coal tar; biomedical research; wood preservatives | |
| 1,2,4-Trichlorobenzene | Y | | | | | Y | termite insecticide, solvent in chem. mfg., dyes & intermediates | |
| **Pesticides:** | | | | | | | | |
| Aldrin | Y | ax | | | | Y | termite control; insecticide | |
| ***Alpha-BHC*** | Y | x | x | | | Y | insecticide; agricultural industry | |
| ***Beta-BHC*** | Y | x | | | | Y | insecticide; agricultural industry | |
| ***Delta-BHC*** | Y | | | | | Y | insecticide; agricultural industry | |
| ***Gamma-BHC (Lindane)*** | Y | acx | atx | | | Y | insecticide-based seed dressing; treatment for hair lice | |
| ***Chlordane*** | Y | acx | tx | | | Y | home, lawn, & garden insecticide; pest control - corn, turf, potatoes, shrubs, strawberries & termites. | |
| ***4,4'-DDD*** | Y | w | w | | | Y | pesticide/insecticide and its by-products | |
| **4,4'-DDE** | Y | w | w | | | Y | | |
| **4,4'-DDT** | Y | awx | wtx | | | Y | | |
| **Dieldrin** | Y | ax | actx | | | Y | insecticide for use on buildings, poles, & food crops | |
| Endosulfan (thiodan)<br>alpha<br>beta | Y | act | t | | | Y | non-systemic insecticide used in food/non-food crops & ornamentals; wood preservative | |
| Endosulfan Sulfate | Y | | | | | Y | | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| Endrin | Y | at | ac | | | Y | pesticide used on cotton, tobacco, rice, sugar cane & fruit trees; rodenticide | |
| Endrin Aldehyde | Y | | | | | Y | | |
| Heptachlor | Y | ax | | | | Y | used in buildings and soil to control termites | |
| Heptachlor Epoxide | Y | | | | | Y | break down product of heptachlor | |
| *PCBs* | Y | wx | wx | | | Y | insulation of electrical systems; electrical capacitors & transformers | |
| *Toxephene* | Y | acx | [illegible] | | | Y | insecticide; pesticide used with food crops | |
| Dioxin: | | | | | | | | |
| *2,3,7,8-TCDD (dioxin)* | Y | x | wtx | | | Y | defoliant | present policy requires it to be monitored only at facilities involved in pulp and/or paper producing, leather tanning, petroleum refining, chemical manufacturing, or POTWs which accept wastewaters from these facilities |

**CATEGORY 2 - Not a priority pollutant, an approved test method is available, and a criterion is available (secondary values do or do not need to be calculated)**

Since these substances are not priority pollutants and have limited uses, it is recommended that they be monitored only when there is the thought to be potential for them to be present based on the sources listed below. Since criteria are available, the need to calculate secondary values based on s. NR 106.05 (1)(b) does NOT affect the assessment of monitoring in Category 2, it only affects the need to calculate effluent limits based on those secondary values.

For example, parathion (which has criteria in NR 105) should be monitored only by POTWs in areas of the state where parathion is thought to be used (e.g., in areas where cherries, potatoes and/or cranberries are grown). The application team will discuss and determine how to incorporate this decision into the application (merge) process.

The amount of monitoring which is performed depends on the test methods available. If the approved test method is one that would normally be used for other substances when performing the priority pollutant scan, at least one test should be performed (additional testing as needed based on preliminary limit calculations). An example of this is EPA method 608 for the pesticides (GC method). If the method is not one normally used as part of the priority pollutant scan process, look at the sources and uses listed below to see if the substance is expected to be present in the effluent. If the substance is not expected to be present in the effluent, no monitoring is necessary (meaning any environmental concerns that might trigger the potential need for secondary values are not expected to be associated with this discharge).

**SUBSTANCES THAT MAY FIT INTO CATEGORY 2:**

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| **Volatile Organic Compounds:** | | | | | | | | |
| 1,1-Dichloropropene | | t | t | | | | | |
| 1,2-Cisdichloroethylene | | t | t | | | | solvent for organic materials | |
| 2,3-Dichloropropene | | t | t | | | | | |
| Bis(chloromethyl)ether | | x | x | | | | | unstable in moist air and decomposes into formaldehyde and hydrochloric acid , no longer on the priority pollutant list - **DO NOT TEST** |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| Dichlorodifluoromethane | | x | x | | | | refrigerant gas and aerosol propellant | no longer on the priority pollutant list - **DO NOT TEST** |
| Trichlorofluoromethane | | x | | | | | | no longer on the priority pollutant list - **DO NOT TEST** |
| **Base Neutral Compounds:** | | | | | | | | |
| N-Nitrosodiethylamine | | x | x | | | Y | research chemical; antioxidant; stabilizer; gasoline & lubricant additives | |
| N-Nitrosodi-n-butylamine | | x | x | | | Y | research chemical; synthetic intermediate and solvent in chemical mfg | |
| N-Nitrosopyrrolidine | | x | x | | | Y | food products; tobacco smoke | |
| ***Pentachlorobenzene*** | | t | t | | | Y | Pesticides; flame retardant | |
| ***1,2,4,5-Tetrachlorobenzene*** | | t | t | | | Y | | |
| **Pesticides:** | | | | | | | | |
| Chlorpyrifos | | | a | | | * | broad spectrum insecticide used in variety of crops, domestic gardens, indoor pest control, termites, & pet products | * We currently require EPA Method SW-846 8141A for this substance, but no method is approved specifically for it |
| ***Parathion*** | | ac | ac | | | Y | *Fruit & vegetable insecticide, used mostly on food crops such as cherries, potatoes, and cranberries* | Labs report methyl & ethyl parathion, but NR 105 contains only parathion |
| **Acid-Extractable Compounds:** | | | | | | | | |
| 4-Chlorophenol | | | | | y | Y | chemical mfg.; topical antiseptic | |
| 2-Methyl-4-Chlorophenol | | | | | y | Y | | |
| 2,3-Dichlorophenol | | | | | y | Y | | |
| 2,3,4,6-Tetrachlorophenol | | | | | y | Y | | |
| 2,5-Dichlorophenol | | | | | y | Y | | |
| 2,6-Dichlorophenol | | | | | y | Y | | |
| 3-Chlorophenol | | | | | y | Y | chemical mfg. | |
| 3-Methyl-6-Chlorophenol | | | | | y | Y | | |
| 3,4-Dichlorophenol | | | | | y | Y | | |
| 2,4,5-Trichlorophenol | | t | t | | y | Y | | |
| 1,3-Dichloropropane | | | | | | Y | | |

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| 2,3-Dinitrophenol | | t | t | | | Y | dyes, wood preservatives, explosives | |
| 2,5-Dinitrophenol | | t | t | | y | Y | | |
| **Other Non-Priority Pollutants:** | | | | | | | | |
| Chlorine | | ac | ac | | | Y | solvents; chemical, plastics & synthetic rubber mfg.; disinfectants, bleach; food & paper industries | |
| Chlorides | | | | | | Y | | *being developed |
| Chromium (+6) | | act | act | | | Y | chrome-steel, stainless steel, metal plating; textile drying; fur dressing & drying, car wash; pigments; leather tanning; meat processing; breweries; soft drinks & flavoring | |

**CATEGORY 3 - Not a priority pollutant, no approved test method available, criterion available, secondary values do or do not need to be calculated using s. NR 106.05 (1)(b)**

No testing is recommended at this time for these substances, since no approved test methods exist. It is recommended that monitoring begin for these substances when approved test methods are developed which have levels of detection low enough to determine whether these substances may be present at levels of concern (i.e., current methods have not detected these substances, but this may be because current test methods are not sensitive enough). The need to calculate a secondary value is not relevant to this category since the lack of an approved test method would make it impossible to determine whether or not the discharger is contributing to any environmental concerns that trigger the calculation of the value (no data to support a reasonable potential evaluation). **NOTE: Where criteria are available, and especially where secondary values need to be calculated based on demonstrated environmental concerns, priority should be established either in the Department or in the scientific community to generating approved test methods.**

**SUBSTANCES THAT FIT INTO CATEGORY 3:**

No substances currently fit into this category

**CATEGORY 4 - Not a priority pollutant, an approved test method is available, no criterion available, but a secondary value needs to be calculated based on s. NR 106.05 (1)(b)**

No criteria have been developed for these substances, but a secondary value needs to be calculated using s. NR 106.05 (1)(b) because of on-site environmental concerns, potential discharger-specific environmental concerns, or potential sources in the discharge (see Chapter 3 of Implementation Plan). Where secondary values need to be calculated for a particular substance, effluent monitoring is recommended.

**CATEGORY 5 - Not a priority pollutant, an approved test method is available, no criterion available, secondary values do NOT need to be calculated based on s. NR 106.05 (1)(b)**

Although a test method is available, the lack of water quality criteria and the lack of the need to calculate secondary values using s. NR 106.05 (1)(b) would not allow the Department to calculate effluent limits for a substance. Since limits would not be calculated, there is no need to perform monitoring.

**SUBSTANCES THAT MAY FIT INTO EITHER CATEGORY 4 or 5, DEPENDENT UPON THE NEED TO CALCULATE 2° VALUES AT A GIVEN SITE:**

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| **Pesticides:** | | | | | | | | |
| Diazinon | | | | | | Y | broad spectrum insecticide used on livestock & as an ant killer | |
| 2,4-Dichlorophenoxyacetic acid | | | | | | Y | herbicide; used to promote latex production in rubber trees | |
| Malathion | | | | | | Y | insecticide for food crops, ornamentals, & pet care | |
| Methoxychlor | | | | | | Y | insecticide for fruit & shade trees, vegetables, dairy & beef cattle, home gardens, & around farm buildings; animal medicines | |
| **Other Non-Priority Pollutants:** | | | | | | | | |
| ***Mirex*** | | | | | | Y | | |
| Fluoride | | | | | | Y | used in etching glass; water supplies, toothpaste, mouthwash, steel, chemical, ceramics, lubricants, dyes, plastics, & pesticides and associated industries | |
| Aluminum | | | | | | Y | paper & printing mfg.; dental fillings, baking powder, fireproofing chemicals, water purification, catalysts, dyes, medicinals, electronics, packaging & paints | |
| Iron | | | | | | Y | metal cleaners; photographic chemicals; general disinfectant used in toilets, cess pools, floors, and drains | |

**CATEGORY 6 - Not a priority pollutant, no approved test method available, no criterion available, secondary values do or do not need to be calculated using s. NR 106.05 (1)(b)**

No testing is recommended at this time for these substances, since no approved test methods exist. If a secondary value needs to be calculated for a substance based on s. NR 106.05 (1)(b), then it is recommended that monitoring begin for that substance when approved test methods are developed which have levels of detection low enough to determine whether these substances may be present at levels of concern. If a secondary value does not need to be calculated, monitoring is not required because effluent limits would not be calculated to which any test results would be compared. **NOTE: Where secondary values need to be calculated based on demonstrated environmental concerns, priority should be established either in the Department or in the scientific community to generating approved test methods in order to make it possible to document the contribution of individual sources (or lack there of) to those concerns.**

**SUBSTANCES THAT FIT INTO CATEGORY 6:**

| COMPOUND | PP | CRITERIA | | | | NR 219 | SOURCES | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| | | OLD 105 | NEW 105 | 2°VAL | NR 102 | | | |
| **Base-Neutral Compounds:** | | | | | | | | |
| ***Octachlorostyrene*** | | | | | | | | |
| ***1,2,3,4-Tetrachlorobenzene*** | | | | | | | | |
| **Pesticides:** | | | | | | | | |
| **Guthion** | | | | | | | insecticide; used to kill parasites | |
| **Other Non-Priority Pollutants:** | | | | | | | | |
| ***Photomirex*** | | | | | | | | |
| **Asbestos** | | | | | | | fireproofing & insulating agent; brake linings, paper products, roofing products | |

## KEY:

***Italicized, bold*** substances are Bioaccumulative Chemicals of Concern (BCC's)

PP: A "Y" indicates that the compound is found on the "Priority Pollutant" list

CRITERIA:

OLD 105 NR 105, Wis. Adm. Code, prior to revisions in August 1997
a = Acute, c=Chronic, w = Wildlife, t = Human Threshold, x = Human Cancer

NEW 105 NR 105, Wis. Adm. Code, subsequent to revisions in August 1997
a = Acute, c=Chronic, w = Wildlife, t = Human Threshold, x = Human Cancer

2ºVAL Indicates secondary values have been calculated using NR 105 under the authority of s. NR 106.05 (1)(b). Note that these values, where available, may only bapplicable at certain locations or to certain types of dischargers.
a = Acute, c=Chronic, w = Wildlife, t = Human Threshold, x = Human Cancer

NR 102 indicates whether NR 102 taste and odor criterion are available for this substance
y = NR 102 taste and odor criterion available (not affected by GLI-related revisions)

NR 219 Indicates whether test methods are available for the substance in NR 219, Wis. Adm. Code

## REFERENCES: INFORMATION IN THESE TABLES WAS COLLECTED FROM THE FOLLOWING SOURCES:


1 Merck Index
2 Handbook of Environmental Data on Organic Chemicals, 2nd Edition
3 Data on Priority Toxic Pollutants Listed in Chapter NR 105 of the Wisconsin Administrative Code (Anders and Kassulke, 1989)
4 Toxic Chemical Factsheets - http:\\mail.odsnet.com/TRIFacts
5 New Jersey Hazardous Substance Factsheets - http://www.alternatives.com/libs/envchemh.htm
6 ChemFinder Search - http://www.chemfinder.camsoft.com
7 EPA Toxics List - gopher://ecosys.drdr.virginia.edu/11/library/gen/toxics
8 ToxFAQs - http://atsdrl.atsdr.cdc.gov
9 Great Lakes Water Quality Initiative, Table 6 - Pollutants of Initial Focus in the GLWQI, Federal Register, March 1995
10 NR 105, NR 102, and NR 219, Wis. Adm. Code

**ATTACHMENT 8-2: TESTING REQUIREMENTS FOR GC/MS FRACTIONS FOR PRIMARY INDUSTRIES**

| INDUSTRIAL CATEGORY | GC/MS FRACTION | | | |
|---|---|---|---|---|
| | Volatile | Acid-Extractable | Base/Neutral | Pesticide |
| Adhesives and sealants | X | X | X | |
| Aluminum forming | X | X | X | |
| Auto and other laundries | X | X | X | X |
| Battery manufacturing | X | | X | |
| Coal mining | X | X | X | X |
| Coil coating | X | X | X | |
| Copper forming | X | X | X | |
| Electric and electronic compounds | X | X | X | X |
| Electroplating | X | X | X | |
| Explosives manufacturing | X | X | X | |
| Foundries | X | X | X | |
| Gum and wood chemicals<br>All Except Subparts D & F | X | X | | |
| Subpart D | X | X | X | |
| Subpart F | X | X | X | |
| Inorganic chemicals manufacturing | X | X | X | |
| Iron and steel manufacturing | X | X | X | |
| Leather tanning and finishing | X | X | X | |
| Mechanical products manufacturing | X | X | X | |
| Nonferrous metals manufacturing | X | X | X | X |
| Ore mining (applies to Subpart B) | | X | | |
| Organic chemicals manufacturing | X | X | X | X |
| Paint and ink forming | X | X | X | |
| Pesticides | X | X | X | X |
| Petroleum refining | X | | | |
| Pharmaceutical preparations | X | X | X | |
| Photographic equipment and supplies | X | X | X | |
| Plastic and synthetic materials manufacturing | X | X | X | X |
| Plastic processing | X | | | |

**ATTACHMENT 8-2: TESTING REQUIREMENTS FOR GC/MS FRACTIONS FOR PRIMARY INDUSTRIES (Continued)**

| INDUSTRIAL CATEGORY | GC/MS FRACTION | | | |
|---|---|---|---|---|
| | Volatile | Acid-Extractable | Base/Neutral | Pesticide |
| Porcelain enameling | | | | |
| Printing and publishing | X | X | X | X |
| Pulp and paperboard mills | | | | |
| Subpart A - Unbleached Kraft | | X | | X |
| Subpart B - Semi-chemical | | X | | |
| Subpart C - [Reserved] | | X | | |
| Subpart D - Unbleached Kraft-Neutral Sulfite Semi Chemical (Cross Recovery) | | X | | |
| Subpart E - Paperboard from Wastepaper | X | X | | X |
| Subpart F - Dissolving Kraft | X | X | | |
| Subpart G - Market Bleached Kraft | X | X | | |
| Subpart H - BCT Bleached Kraft | X | X | | |
| Subpart I - Fine Bleached Kraft | X | X | | |
| Subpart J - Paper Grade Sulfite (Blow Pit Wash) | X | X | X | |
| Subpart K - Dissolving Sulfite Pulp | X | X | | |
| Subpart L - Groundwood-Chem-Mechanical | X | X | | |
| Subpart M - Groundwood-Thermo-Mechanical | X | X | | |
| Subpart N - Groundwood-CMN | X | X | | |
| Subpart O - Groundwood-Fine | X | X | | |
| Subpart P - Soda | X | X | | |
| Subpart Q - Deink | X | X | | X |
| Subpart R - Nonintegrated-Fine | | X | | |
| Subpart S - Nonintegrated-Tissue | X | X | | X |
| Subpart T - Tissue from Wastepaper | X | X | | X |

**ATTACHMENT 8-2: TESTING REQUIREMENTS FOR GC/MS FRACTIONS FOR PRIMARY INDUSTRIES (Continued)**

| INDUSTRIAL CATEGORY | GC/MS FRACTION | | | |
|---|---|---|---|---|
| | Volatile | Acid-Extractable | Base/Neutral | Pesticide |
| Subpart U - Papergrade Sulfite (Drum Wash) | X | X | X | |
| Subpart V - Combined Unbleached Kraft and Semi-Chemical | | X | | X |
| Subpart W - Wastepaper Molded Products | X | X | | X |
| Subpart X - Nonintegrated-Lightweight | X | X | | X |
| Subpart Y - Nonintegrated Filter and Nonwoven Papers | X | X | | X |
| Subpart Z - Nonintegrated Paperboard | X | X | | X |
| Rubber processing | X | X | X | |
| Soap and detergent manufacturing | X | X | X | |
| Steam electric power plants | X | X | | |
| Textile mills (excluding Subpart C) | X | X | X | |
| Timber products processing | X | X | X | X |

## ATTACHMENT 8-3: EFFLUENT MONITORING SUMMARY

***Applications for Municipal Majors with Pretreatment Control Authority***

| Substance | Minimum # of analyses |
|---|---|
| Ammonia Nitrogen | 4 Monthly analyses |
| Total Chlorides | 1 |
| Hardness | 4 |
| Category 1,2,6 Pollutants | 1 |

(Category 2 pollutants will be monitored based on the probability of their presence in the discharge. Category 6 pollutants will be monitored based on current policies for these substances).

***Applications for Municipal Majors (not pretreatment)***

| Substance | Minimum # of analyses |
|---|---|
| Ammonia Nitrogen | 4 monthly analyses |
| Total Chlorides | 1 |
| Hardness | 4 |
| Total Copper | 4 |
| Total Zinc | 4 |
| Category 1,2,6 Pollutants | 1 |

(Category 2 pollutants will be monitored based on the probability of their presence in the discharge. Category 6 pollutants will be monitored based on current policies for these substances)

***Applications for Municipal Minors***

| Substance | Minimum # of analyses |
|---|---|
| Ammonia Nitrogen | 4 monthly analyses |
| Total Phosphorus[1] | 4 monthly analyses |
| Total Chlorides | 1 |
| Hardness | 4 |
| Total Copper | 4 |
| Total Zinc | 4 |
| Total Cadmium | 1 |
| Total Chromium | 1 |
| Total Lead | 1 |
| Total Nickel | 1 |
| Total Silver | 1 |

[1] Monitoring for phosphorus will be required in accordance with current policy

**ATTACHMENT 8-3: EFFLUENT MONITORING SUMMARY (Continued)**

*Applications for Primary Industries*

| Substance | Minimum # of analyses |
|---|---|
| $BOD_5$ (Biochemical Oxygen Demand - 5 day) | 1 |
| COD (Chemical Oxygen Demand) | 1 |
| Oil and Grease | 1 |
| Total Suspended Solids | 1 |
| Ammonia Nitrogen | 4 monthly analyses |
| Total Chlorides | 1 |
| Total Phosphorus | 4 monthly analyses |
| pH | 1 |
| Temperature (winter) | 1 |
| Temperature (summer) | 1 |
| Total Copper | 4 |
| Total Zinc | 4 |
| Total Mercury | 3 |
| Total Hardness (as $CaCO_3$) | 4 |
| Category 1,2,6 Pollutants | 1 |

Industrial facilities will monitor for the organic fractions specified for the industry category (see attached Industry Category table)

(Category 2 pollutants will be monitored based on the probability of their presence in the discharge. Category 6 pollutants will be monitored based on current policies for these substances)

***Application for Secondary Industries (including NCCW dischargers with additives)***

| Substance | Minimum # of analyses |
|---|---|
| $BOD_5$ (Biochemical Oxygen Demand) | 1 |
| COD (Chemical Oxygen Demand) | 1 |
| Oil and Grease | 1 |
| Total Suspended Solids | 1 |
| Ammonia Nitrogen | 4 monthly analyses |
| Total Chlorides | 1 |
| Total Phosphorus | 4 monthly analyses |
| Temperature (winter) | 1 |
| Temperature (summer) | 1 |
| pH | 1 |
| Total Copper | 4 |
| Total Zinc | 4 |
| Arsenic | 1 |
| Total Cadmium | 1 |
| Total Chromium | 1 |
| Total Lead | 1 |
| Total Mercury | 1 |
| Total Nickel | 1 |
| Total Selenium | 1 |
| Total Hardness (as $CaCO_3$) | 4 |
| Category 1,2,6 Pollutants (only for substances believed present) | 1 |

## ATTACHMENT 8-3: EFFLUENT MONITORING SUMMARY (Continued)

***Applications for Industrial Non-contact Cooling Water Dischargers(without additives)***

| Substance | Minimum # of analyses |
|---|---|
| $BOD_5$ (Biochemical Oxygen Demand) | 1 |
| Oil and Grease | 1 |
| Total Suspended Solids | 1 |
| Ammonia Nitrogen | 1 |
| Total Chlorides | 1 |
| Total Phosphorus | 1 |
| Temperature (winter) | 1 |
| Temperature (summer) | 1 |
| pH | 1 |

**ATTACHMENT 8-4: DATA QUALITY CHECKLIST**

Permittees should use this form to summarize and report sampling information, general quality control deviations or other qualifying information on samples collected for the permit application. Use the attached sample reporting form to report specific sample data including, collection dates of individual samples, numerical results and units, detection limits (LODs), and analytical methods used. *We recommend that permittees supply this form to their contract laboratories and request assistance in completing this form.* **For explanations, attach additional sheets as necessary.**

Sampling Period: _____

Sample Location(s) _____

Sample Type(s) Used: (Check all that apply)

___ GRAB (Use for pH, temperature, oil and grease, chlorine residual, cyanide, hexavalent chromium, and volatile organics; also recommended for effluent mercury)

___ 24 HR COMPOSITE (Recommended for most other substances)

___ OTHER (describe)_____

Were samples representative of normal operating conditions? If no, explain. ____Yes ____No

Were samples properly preserved at time of collection? If no, explain. ____Yes ____No

Method of shipment to the laboratory.

Were all holding times met? If not, explain. ____Yes ____No

Were there any conspicuous conditions of any of the samples noted by the laboratory which might have affected results? ____Yes ____No

List all laboratories who performed analyses, their WI lab certification no., and the test(s), or test categories they performed.

Have all detected results for organics been confirmed? Please explain. ____Yes ____No

Describe all QA/QC qualifiers associated with the data being submitted by parameter.

Other qualifying information which might serve as an indication of data reliability (for example, results of field blanks for mercury).

Has your laboratory made any recommendations regarding use of any qualified data? Explain.

**ATTACHMENT 8-5: REGULATING TOXICS IN PERMITS USING REPRESENTATIVE DATA**
**August 1995**

(Guidance from the Permit Streamlining Team on Lab QA and Toxics )

**NOTE: IN ORDER TO SAVE PAPER AND REDUCE THE SIZE OF THE DRAFT DOCUMENT, THE REPRESENTATIVE DATA GUIDANCE FROM AUGUST 1995 HAS NOT BEEN RE-COPIED FOR THE COMMENT PERIOD. IF THE READER WOULD LIKE TO REVIEW THIS GUIDANCE DOCUMENT, PLEASE CONTACT BOB MASNADO @ (608) 267-7662.**

# Chapter 9.
# POLLUTANT MINIMIZATION PROGRAMS

**Authors:** Tom Mugan, Randy Case, Greg Searle, Bernie Robertson

Overview: As a definition of a PMP, NR 106.04(5) says *"...a cost-effective pollutant minimization program is an activity which has as its goal the reduction of all potential sources of the pollutant for the purpose of maintaining the effluent at or below the water quality based effluent limitation. The pollutant minimization programs specified ss NR 106.05(8), 106.06(6)(d) and 106.07(6)(f) shall include investigation of treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques that are appropriate for that facility, taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. Past documented pollution prevention or treatment efforts may be used to satisfy all or part of a pollution minimization program requirement. The permittee shall submit to the Department an annual status report on the progress of a pollutant minimization program."* PMPs were not required in the original version of our toxics codes. To successfully implement them, staff need to understand what PMPs are, when and how to apply them and who has responsibility for them.

PMPs will be used in 3 circumstances:

a) A PMP may be imposed if the Department establishes an alternative effluent limitation (because the concentration of a substance in the water supply and the background surface water exceeds the water quality standard and the discharger's relative contribution to the mass of the substance is negligible.

b) A PMP will be required in all cases when an effluent limitation, which is below the LOD or LOQ, is imposed in a permit.

c) A PMP may be imposed, if requested by the permittee, in lieu of an effluent limitation, if the Department is unable to get representative discharge data for a substance because of sensitivity limitations of the most sensitive, approved analytical test. (See Mercury Strategy for an example of this circumstance)

Three flow diagrams are attached. Flow Diagram 9-1 covers situation a) above. Flow Diagram 9-2 covers situations b) and c) above. Flow Diagram 9-3 shows the implementation of a PMP after it becomes a permit requirement.

**When to Impose PMPs:**
Flow Diagram 9-1 covers the situation where the background concentration of a substance is above the water quality criterion. This situation is covered in s. NR 106.06(6). Flow Diagram 9-1 lays out the code language step-by-step and is pretty self explanatory. At the bottom of Flow Diagram 9-1, a decision must be made regarding what the alternative permit limitation or other requirement will be. According to the code, this could include one or more of the following: 1) a numerical limitation for the substance; 2) a monitoring requirement for the substance; or 3) a cost-effective pollutant minimization program for the

substance. Additional criteria for how to decide which of these is appropriate is contained in s. NR 106.06(6)(d).

Flow Diagram 9-2 covers situations where limits or potential limits are below the limit of quantitation (LOQ) of the best available test method. The top half of flow diagram 9-2 is aimed mainly at making sure the proper QA is followed and the Department applies the Representative Data Guidance to help screen out false detects as much as possible before effluent levels are compared to potential limits. After considering reasonable potential (i.e., Use of the 1/5 rule or $P_{99}$ comparison [more likely the 1/5 rule because, in these situations, there will rarely be 11 detects]), it must be decided if there is "clear and sufficient evidence" of an impact to water quality.

The question of clear and sufficient evidence will be subject to much case-specific judgement. In order for a concentration of a pollutant to provide sufficient evidence of the need for a numerical limit, the pollutant should be detectable and quantifiable and should preferably be based on multiple results. The following examples provide a framework for determining sufficient evidence of the need for a numerical limit.

Example 1:

The average concentration of the pollutant of concern is 20 µg/L (this concentration is based on the average of four data points; 36 µg/L, 14 µg/L, 12µg/L and 18 µg/L).

The limit for the pollutant is 2 µg/L. The concentration of the pollutant is therefore greater than $^1/_5$ of the limit.

The LOD for the pollutant is 5 µg/L; the LOQ for the pollutant is 16 µg/L.

**This example provides sufficient evidence of the need for a numerical limit, since there is a quantifiable concentration of the pollutant based on multiple test results. If it can be verified that the substance is used at the facility or at a contributing industry, there would be even stronger evidence of the need for a limit. (Note: There is considerable uncertainty in quantifying particularly the two lowest results, since they fall between the LOD and LOQ.**

Example 2:

The concentration of the pollutant of concern is 7 µg/L (this concentration is based on one data point).

The limit for the pollutant is 2 µg/L. The concentration of the pollutant is therefore greater than $^1/_5$ of the limit.

The LOD for the pollutant is 5 µg/L; the LOQ for the pollutant is 16 µg/L.

**This example does not provide sufficient evidence of the need for a numerical limit, because, even though the effluent level is above $^1/_5$ of the limit, that determination is based on only one data point and that data point is below the LOQ.**

Example 3:

The concentration of the pollutant of concern is 20 µg/L (this concentration was based on one data point).

The limit for the pollutant is 2 µg/L. The concentration of the pollutant is therefore greater than $^1/_5$ of the limit.

The LOD for the pollutant is 5 µg/L; the LOQ for the pollutant is 16 µg/L.

**This example does not provide sufficient evidence of the need for a numerical limit, because, even though the 20 µg/L effluent level is in the quantifiable range, there is only 1 test result. It frequently occurs, for whatever reason, that the initial test result is biased high. The Permit Application Redesign Team is formulating a procedure to make sure that, in the future, multiple test results are available for reasonable potential determinations. This will be accomplished through the use of preliminary limits and instructions to the permittees on how to appropriately use them.**

Example 4:

The average concentration of the pollutant of concern is 4 µg/L (this concentration is based on the average of four data points; 11 µg/L, < 5 µg/L, 5 µg/L and < 5 µg/L, substituting zeros for the <5 values).

The limit for the pollutant is 2 µg/L. The concentration of the pollutant is therefore greater than $^1/_5$ of the limit.

The LOD (based on the method detection limit {MDL} in lab-pure water) for the pollutant is 5 µg/L; the LOQ for the pollutant is 16 µg/L.

**This example does not provide sufficient evidence of the need for a numerical limit for these reasons: (a) although there are multiple test results, there are several no detects; (b) those samples with detectable concentrations have concentrations that are lower than the LOQ; and (c) the LOD is based on an ideal MDL determination. Until such time as that occurs, additional data should be obtained before making a decision on the need for permit requirements.**

If it is decided that there is no clear and sufficient evidence, things are still fuzzy. This is where it may be decided to conduct additional monitoring or special laboratory work to decide if a particular substance is really in an effluent or not. For example, as in example 4 above, it might be appropriate to have the permittee, either prior to reissuance or as a condition of the permit, hire their lab to do a matrix-specific MDL. The idea here being that if the matrix MDL turns out to be higher than the detected value(s), it can be argued that the substance is not present at levels previously thought (what was thought to be a detect is actually a no detect). Again, use of preliminary limits may allow resolution of some of the uncertainty prior to permit reissuance. An alternative is to go directly to a PMP, whose first step might be to do the additional laboratory work to confirm or disprove the presence of a substance before embarking on a source identification project.

A permittee may opt to verify pollutant levels by sampling internal waste streams where pollutant concentrations may be higher, or to collect data to allow a statistical evaluation.

If it is decided that a PMP is needed in a permit, that attached permit language should be used (Attachment 9-1).

When PMPs are imposed in permits (and when dischargers undertake voluntary PMPs), guidance needs to be provided to the discharger to help them understand how to do a PMP. (See Attachment 9-2 - Pollutant Minimization Program (PMP) Development and Review Guidance).

**The PMP Plan:**
Flow Diagram 9-3 outlines the steps necessary to review, provide comments, and determine the acceptability of a PMP plan submittal and subsequent annual status reports. Permit required submittals are normally received at the Regional offices or by a permittee's primary Department contact person. That person should keep track that a submittal was received for purposes of determining compliance with permit required submittal dates and then forward the PMP submittal directly to the central office PMP coordinator (Currently Randy Case - WT/2). The PMP Coordinator will take care of reviewing and notifying the permittee of a plan's acceptability or of improvements that are needed. This centralized function is needed for consistency sake at least until Department staff become more experienced with PMPs. However, care should be taken not to create a formal "approval" process similar to the facility plan or plan and specification approval process.

It should be noted that a PMP is very facility-specific. Once the plan is determined to be in general conformance with the above-mentioned guidance and the permittee is notified as such, the permittee must implement the PMP at its facility.

**Annual Status Reports:**
What annual reports should address is as specific as the PMP itself and common sense should be the guide. For a difficult pollutant, the report should state what actions have been taken, how successful they were, what future actions are planned or being considered, what difficulties are being encountered, etc.

If a source of contamination is eliminated, that's about all the annual report needs to say. Presumably the effluent monitoring requirement will remain in the permit and the results may provide some indication of success. If some other indicator triggered the original water quality concern (and the permit requirement), changes in the indicator might be valuable to report.

Regional staff will need to be responsible for monitoring the programs and insuring that annual status reports are received as required. The central office PMP coordinator will be available for consultation on the appropriateness of annual reports.

The PMP should be considered to be an enforceable provision of the permit. Unless all cost-effective options have been evaluated and exhausted, if acceptable progress is not made, the Department should enforce PMP conditions through normal stepped enforcement procedures.

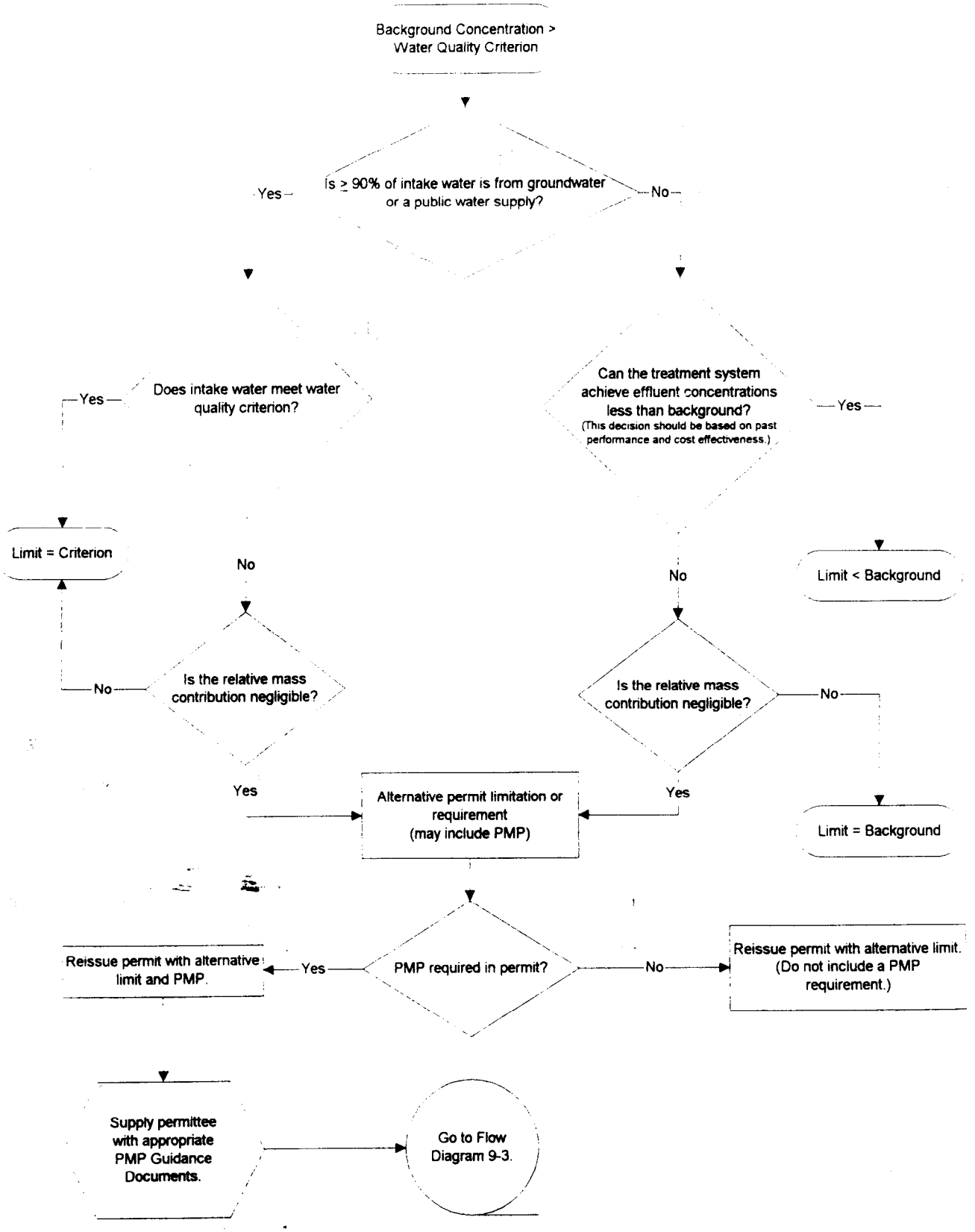
**Relevant Documents:**

- Attachment 9-1: Suggested Permit Language
- Attachment 9-2: *Pollutant Minimization Program (PMP) Development and Review Guidance*
- Regulating Toxics in Permits Using Representative Data (aka Representative Data Guidance) - WDNR August 1995
- Wisconsin Strategy for Regulating Mercury - WDNR May 1996
- *Data on Priority Toxic Pollutants Listed in Chapter NR 105* - WDNR August 1989 (Authors: Krista Anders and Natasha Kassulke)
- Summary of Success Stories (future)

**Implementation Training:**

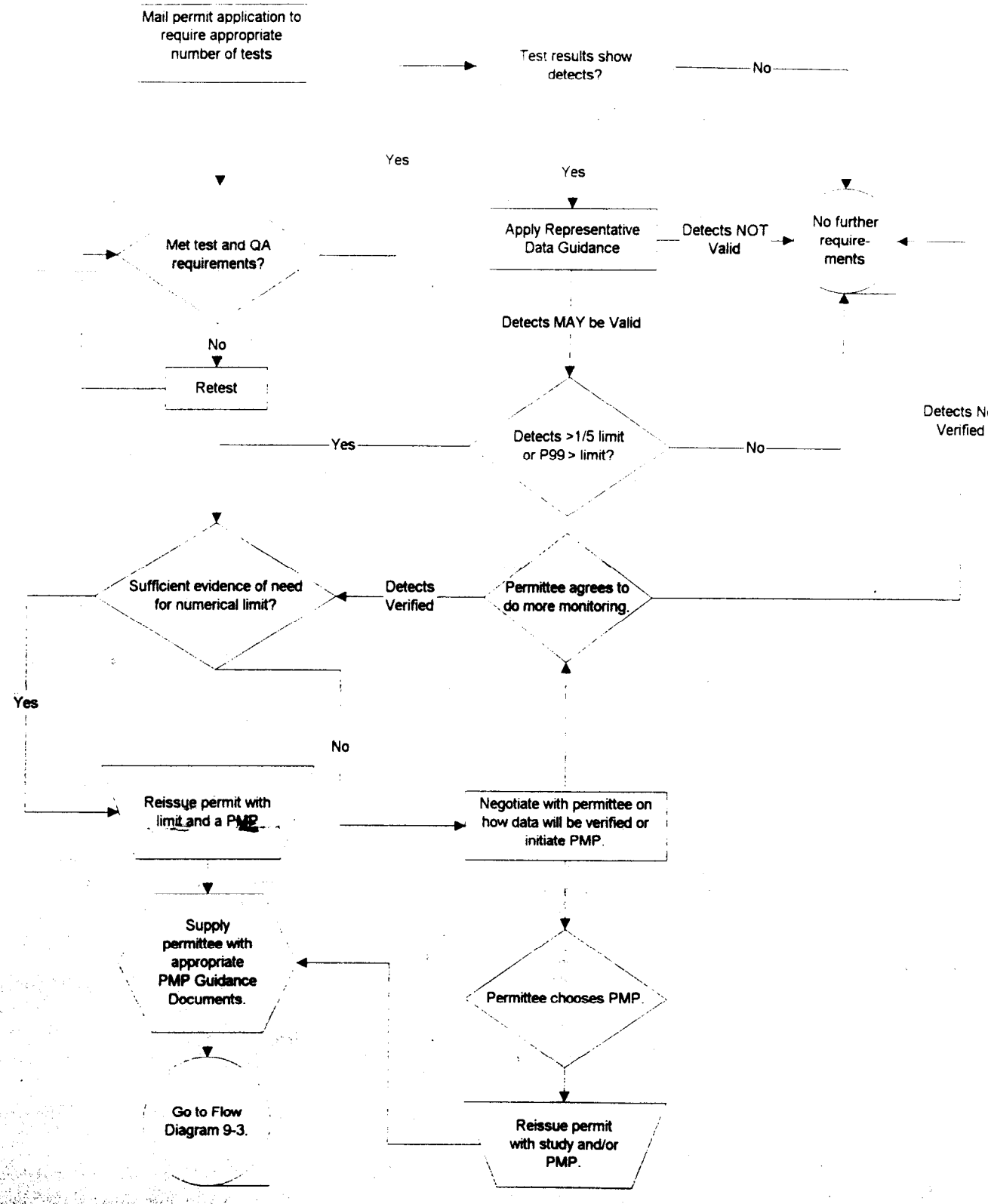
Some staff training will be needed. This can be handled by a "GLI Implementation Workshop." Also, the central office PMP coordinator will be available as a point of contact for those who have questions on how to implement this part of the program.

# PMP Permitting Flow Diagram 9-1
## (Background Above Water Quality Criterion)

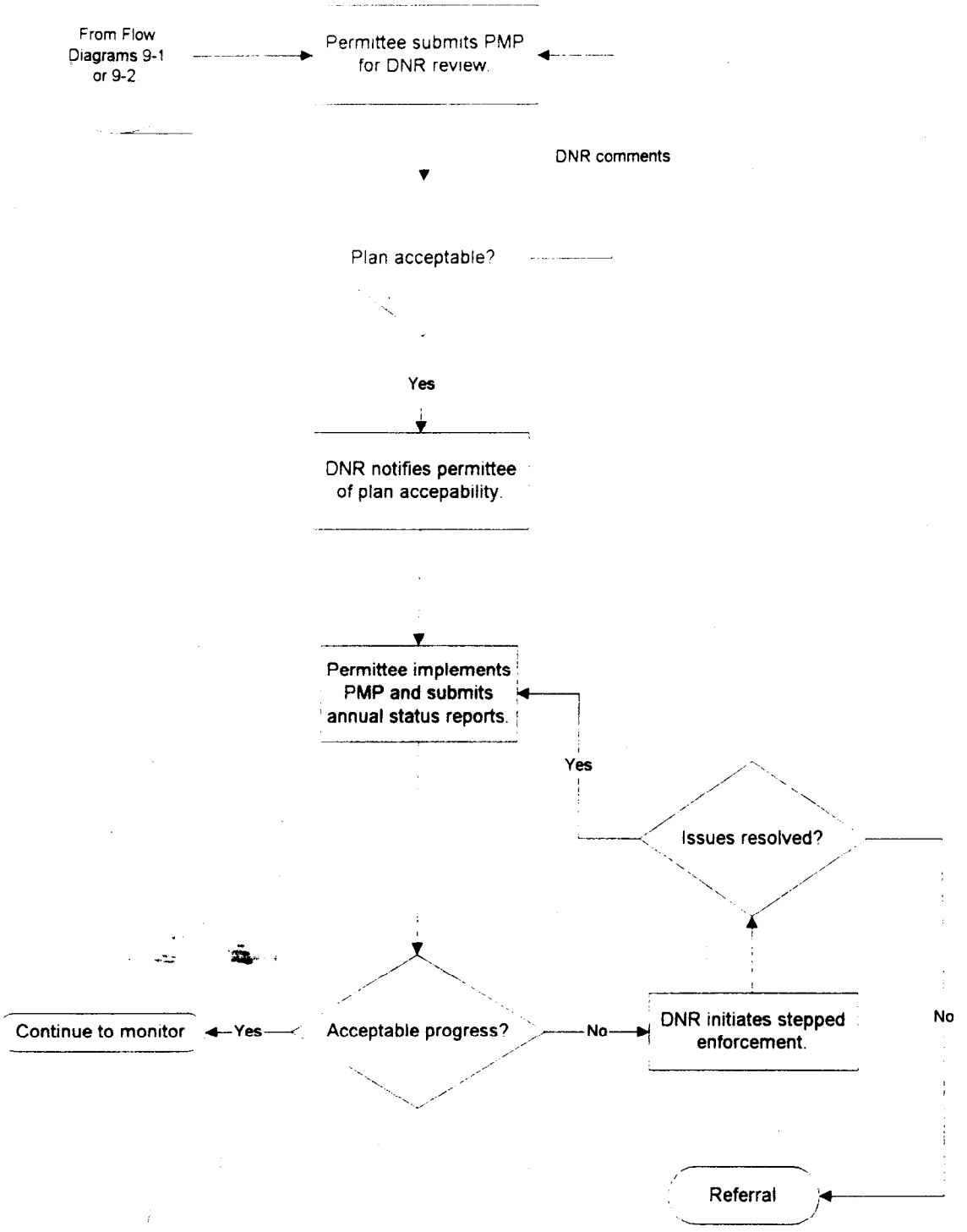



File:pmp_fich.vsd

# PMP Permittting Flow Diagram 9-2
## (For Limits or Potential Limits Below the LOD/LOQ)



# PMP Implementation Flow Diagram 9-3



# Attachment 9-1
# Pollutant Minimization Program Permit Language

1. By _____, the permittee shall develop and submit to the Department a plan for a cost-effective pollutant minimization program (PMP) which has as its goal the reduction of the pollutant, _____ for the purpose of maintaining the effluent at or below the water quality based effluent limitation or potential limitation. The pollutant minimization program shall include investigation of treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques that are appropriate for that facility, taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. Past documented pollution prevention or treatment efforts may be used to satisfy all or part of this PMP requirement.

   *NOTE: The Department will notify the permittee of acceptance of or comments on the proposed PMP. The permittee and the Department will then agree on what changes, if any, will be made to the PMP. If the Department has not notified the permittee within 90 days of the Department's acceptance of the PMP, the permittee may assume the PMP has been accepted.*

2. By _____, the permittee shall implement the pollutant minimization program as submitted or as amended by agreement of the permittee and the Department.

3. The permittee shall submit to the Department an annual status report on the progress of the pollutant minimization program. The first annual report shall be due on _____.

**NOTES TO DEPARTMENT PERMIT DRAFTER:**

**When to use this language:** This permit language is used for three situations:

1. This language may be used as an alternative to an effluent limit when there is some reason to suspect that a discharge may cause water quality standards to be exceeded, but the collection of representative discharge data is not possible due to the inability of the most sensitive approved method to quantify discharge levels and application of numeric effluent limitations is infeasible or impractical. Prior to insertion of this language into the permit, the permittee should be consulted regarding their preference for a PMP or a permit limit. A monitoring requirement should also normally accompany the language in this situation.

2. This language must be used in a permit which contains a numeric water quality based effluent limitation which is less than the limit detection or less than the limit of quantitation. The permit should also be specific as to what analytical method the permittee is required to use to test for the substance in the effluent or what level of detection must be achieved.

3. This language may be used if the Department establishes an alternative effluent limitation because the concentration of the substance in the water supply exceeds the water quality standard and the discharger's relative contribution to the mass of a substance, for which the water quality standard has already been exceeded in the background surface water, is negligible.

**How to use this language:**

1. Times between steps in the process may vary, depending on individual circumstances. Generally, six months to one year should suffice as a reasonable time for submission of the first document. If the program plan is submitted within a year of permit reissuance, this may serve as the first status report. The first annual report would then be due no later than one year after the plan is due.

2. The date for implementation should take into account some time for review and discussions between the permittee and the Department.

# Attachment 9-2
# Pollutant Minimization Program (PMP)
# Development and Review Guidance

Permittees should use the following stepped sequence when planning their PMP. Many PMPs will be highly site-specific and certain steps can be more or less important, depending on the individual situation. However, this guidance has been drafted to help permittees develop a PMP systematically. Ongoing and historical pollutant minimization activities should be folded into the PMP at the appropriate steps. Department staff reviewing PMPs submitted by permittees may also use this guidance for ideas about what activities might be included in a PMP and for the logical order of the activities.

Step 1: Development and Adoption of PMP Mission Statement

Objective: Obtain management support for a comprehensive pollutant minimization (source reduction or pollution prevention) program.

Tools: Mission statement signed and promoted by management.

Step 2: Formation of PMP Reduction Team and Partnerships

Objective: Internal source reduction program organization (important in both municipal and industrial source reduction programs): selection of leader or facilitator, steering team, technical staff assignments, and volunteers.

Identify external source reduction resources and partnerships and form a PMP team. Team members might include consultants, similarly situated facilities, industrial and commercial trade associations, professional organizations, educational institutions, environmental organizations, tribal leaders, etc.

Tools: Internal organization management and staff; external partner or resources representatives.

Step 3: Establishment of Pollutant Baseline and Setting Reduction Goals

Objective: Verify proper sampling and analytical quality control. Quantify, as much as possible, historical and current releases of the pollutant to the environment (to all media) by the community or industry; document past efforts to limit release of the pollutant; identify a baseline year (or period).

Set community or industrial facility release reduction goals and methods for measuring progress towards goals.

Tools: Sampling and analytical monitoring of releases by community or industry (internal or external to the facility), literature search, parallel work by others.

Step 4: Identification and Evaluation of Source Sectors for Pollutant

Objective: Quantify uses of pollutant (intentional and unintentional) and releases of pollutant (actual and potential) by sector or area within the community or industrial facility.

Prioritize sector or area use/release reduction for effectiveness and efficiency (based on relative sector contributions, sector ability to respond to source reduction, availability of outreach resources, and other criteria); list users.

Set sector use/release reduction goals within the community or industrial facility and methods for measuring progress towards goals.

Tools: Literature search, parallel work by others, survey or inventory, sampling and analytical monitoring of releases by users.

Step 5: Implementation of Appropriate Sector Source Reduction Tools

Objective: Identify most appropriate education outreach (to promote alternatives to using pollutant), process changes, reduction incentives, pollutant collection, recycling, or waste treatment tools for targeted sectors or area within community or industry...emphasize alternative products and process changes, recycling, and waste treatment in that order.

Implement source reduction tools with internal and external partners identified in Step 2.

Tools: Education literature, professional technical assistance, workshops, reduction incentive programs, product or equipment substitution, worker training and procedures, collection and recycling programs, treatment technology.

Note: In a municipal PMP, while much of the source reduction activity may rely on voluntary sector participation, it may be necessary to use standard regulatory tools (via municipal pretreatment programs) to ensure participation by some users of the targeted pollutant, e.g., permit issuance, outfall monitoring and reporting, sewer use ordinance enforcement applied to point source dischargers to publicly owned treatment works).

Step 6: Measurement of Sector Performance vs. Sector Goals

Objective: Measure community sector or industrial area pollutant use/release reduction against goals established in Step 4.

Measure total community or industrial facility releases to the environment (to all media) against baseline and goals established in Step 3.

Tools: Subjective Tools: measures of alternative product use, process changes, participation in incentive programs, increased pollutant collection and recycling, installation and maintenance of treatment technology, sector participation rates; and

Objective Tools: inspections, sampling and analytical monitoring of releases by users, by community, or by industry.

Step 7: Promote Success, Adjust for Failures

Objective: Promote source reduction accomplishments meeting goals as measured in Step 6.

Adjust and repeat Steps 4-6 for source reduction accomplishments not meeting goals as measured in Step 6.

Tools: Press release, individual or collective recognition programs, export of case studies to similar communities or industries for use in other PMP programs.

**********

Schedules for PMP Development and Implementation

A description of how a community or industry proposes to carry out the above steps can be submitted in a short period of time (six months), but implementation of these stepped procedures will take substantially longer:

Industrial: 1-3 years with a shorter time spent on PMP development and evaluation (Steps 1-4 and 6-7), but with potentially longer time spent on PMP implementation if the targeted pollutant is deeply imbedded in manufacturing operations or raw materials.

Municipal: 3-5 years because of the complexity of PMP development and evaluation (mission statement adoption, partnership formation, total community pollutant source identification, and multiple-facility sector scale of project). However, individual sector implementation activities may be less difficult than industrial implementation activities.

Note: for a community, in particular, the PMP development and implementation time frames may be even longer for pollutants widely used by the industrial, commercial, institutional, and general public sectors of a community. Large population centers may require longer PMP schedules for these types of pollutants than smaller communities.

# Chapter 10.
# COMPLIANCE SCHEDULE GUIDANCE

**Authors:** Susan Watson, Mike Hammers, Bernie Robertson, Bob Weber

**Overview:** This section provides guidance for the consistent implementation of s. NR 106.17, "Schedules for Compliance." Compliance schedules for water quality-based effluent limitations (WQBELs) are being addressed for the first time in our rules. Although the new code revisions stipulate compliance schedules should be as short as possible, extended compliance schedules are possible as described in the following paragraphs.

Keep in mind that what follows is guidance only. In specific applications, when it is appropriate, modifications may be made to the default compliance schedules that are provided in this guidance. Remember, however, that compliance schedules must conform to the following requirements as specified by s. NR 106.17:

1. Unless the permittee performs a toxicity study to alter a secondary value, the duration of the compliance schedule may not exceed 5 years.

2. If the permittee elects to perform toxicity studies to alter a secondary value, the duration of the compliance schedule may not exceed 7 years. Additional time beyond the maximum of 5 years may not be granted for toxicity studies that are needed to develop site-specific criteria, however.

3. An interim limit must be included in the permit when the duration of the compliance schedule exceeds the term of the permit.

   *Note: If a limit greater than the interim limit is later justified, the interim limit is subject to the provisions of ch. NR 207 (antidegradation) of the Wis. Adm. Code. However, note the provisions which are allowed pursuant to s. NR 207.03(1).*

4. Interim compliance dates may not be more than 1 year apart.

To use this guidance, simply refer to Flow Diagram 10-1 and the accompanying instructions. The guidance is applicable to those chemical-specific and whole effluent toxicity limits that are derived from chs. NR 105 & 106. This guidance does not supersede the "Whole Effluent Toxicity (WET) Program Guidance Document" and its recommended compliance schedule, but does augment it in on the topics of extended schedules and interim limits.

**Additional Points of Interest:**

- If a permittee adjudicates their WQBEL and compliance schedule, the compliance schedule may be restarted once the adjudication has been resolved. However, keep in mind that an interim limit is needed if the compliance schedule extends beyond the term of the permit.

- Always try to put a specific date in the compliance schedule rather than using a narrative such as, "6 months beyond permit issuance."

- Remember that this guidance applies to limitations derived from the NR 105 and NR 106 process. There may be different requirements for compliance schedules for other pollutants (i.e., phosphorus - NR 217).

## Instructions for Flow Diagram 10-1

1.0 When in doubt, check the Water Quality-based Effluent Limitations (WQBELs) recommendations memo to see if an effluent limitation is water quality-based. This compliance schedule guidance is applicable only to limits that are derived from chs. NR 105 and 106 (Wis. Adm. Code) (i.e., WQBELs for toxic substances and whole effluent toxicity).

2.0 If an effluent limitation is not water quality-based, follow past guidance for compliance schedules. That is, use a compliance schedule that is as short as reasonably possible. In most cases, a 3-year compliance schedule is adequate to accommodate construction of wastewater treatment units that are necessary to comply with the WQBEL. The compliance schedule may not extend beyond the term of the permit.

3.0 As soon as WQBELs recommendations are available, send a copy to the permittee.

4.0 The WQBELs recommendations memo will identify those WQBELs that are based on a water quality criterion or a secondary value.

5.0 Send a copy of the toxicity study guidance to the permittee along with the WQBELs recommendations memo from step 2.0.

6.0 The discussion with the permittee should reveal whether or not the permittee will perform a toxicity study to modify the secondary value upon which the WQBEL is based, and provide an indication of the time necessary to meet the limit. The permittee should indicate in writing their desire to perform a toxicity study and their reasons for requesting a compliance schedule that extends beyond 3 years, or beyond 5 years if a toxicity study is being performed.

7.0 Proceed based on the information collected in step 6.0.

8.0 Acceptable reasons for extending the compliance schedule beyond 3 years are provided below.

Extensive Construction The default 3-year compliance schedule is usually adequate to accommodate the design and construction of treatment units that are necessary to meet a WQBEL. If in the judgement of the permit drafter more time is necessary, however, the compliance schedule may be extended.

Source Reduction If the permittee wishes to commit to a source reduction effort, which for municipalities can include identifying and regulating contributors to a POTW, the interim compliance schedule requirements provided in Attachment 5 may be added to the default 3-year compliance schedule. The permittee should provide a rough plan and schedule to demonstrate their commitment to a source reduction effort as part of step 6.0.

Production Process Modification If an industrial permittee wishes to pursue modification of its production process to meet its WQBEL, the interim compliance schedule requirements provided in Attachment 10-7 may be added to the default 3-year compliance schedule. The permittee should provide a rough overview and

schedule for production line modifications to demonstrate their commitment as part of step 6.0.

WET/TRE Extended Compliance Schedule

As specified in the "Whole Effluent Toxicity (WET) Program Guidance Document," most whole effluent toxicity (WET) and toxicity reduction evaluation (TRE) compliance schedules are written for 3 years or less. However, it may be necessary to allow a longer schedule in some circumstances. Construction of a whole new treatment system or some other major action are possible justifications.

The Biomonitoring Team usually recommends going no longer than 4 years because a year's worth of testing after a TRE is needed to show that the problem has been solved before the next reissuance. A WET schedule may not extend longer than 5 years since it cannot be based on a secondary value.

Other reasons for extending the compliance schedule may be considered on a case-by-case basis. If you have any questions, contact the Discharge Permit Coordination Section Chief (Bob Weber @ (608) 266-7721).

9.0 If the permittee fails to provide acceptable reasons for extending the compliance schedule, use the default 3-year compliance schedule that is provided in Attachment 10-1.

10.0 If the permittee provides acceptable reasons for extending the compliance schedule, use the default 5-year compliance schedule that is provided in Attachment 10-4.

11.0 Compare the final date of the compliance schedule (i.e., the effective date of the WQBEL) to the expiration date of the permit.

12.0 Chemical-Specific Interim Limit An interim limit that is equal to the permittee's current effluent quality may be used and is derived as follows. If 11 or more detectable sample results are available for the substance for which a WQBEL has been recommended, use the one-day $P_{99}$ value of the sample results as the interim limit. Check to see if a $P_{99}$ value is provided in the WQBELs recommendation memo. Otherwise, you may calculate the value by using the $P_{99}$ spreadsheet at q:\toolbox\effcalc\P99_cal.wb2.

If less than 11 detectable sample results are available, assume a coefficient of variation of 0.6 and use Table F6-1 from the "Final Water Quality Guidance for the Great Lakes System" (March 23, 1995, 60 FR 154240), which has been reproduced in Table F6-1.

To calculate the interim limit, multiply the maximum effluent value by the appropriate multiplier from Table F6-1.

TABLE F6-1. REASONABLE POTENTIAL MULTIPLYING FACTORS

| Number of Samples | Multiplying Factor (@ CV = 0.6) |
|---|---|
| 1 | 6.2 |
| 2 | 3.8 |
| 3 | 3.0 |
| 4 | 2.6 |
| 5 | 2.3 |
| 6 | 2.1 |
| 7 | 2.0 |
| 8 | 1.9 |
| 9 | 1.8 |
| 10 | 1.7 |

The interim limit is most correctly imposed as a daily maximum mass. You may select any monitoring frequency that you believe is appropriate.

WET If a less-than-5 year permit is issued, a WET limit compliance schedule could possibly extend beyond the term of the permit. In this case, an interim limit is required.

Interim WET limits may be derived in a manner similar to that used above for chemical-specific limits with $LC_{50}$'s and $IC_{25}$'s representing current effluent quality. Be careful, however, you must first convert the $LC_{50}$'s and/or $IC_{25}$'s to toxicity units. It is strongly suggested that you contact the Bureau of Watershed Management Biomonitoring Coordinator (Currently: Kari Fleming (608) 267-7663) any time there is a need to derive a WET interim limit.

Other methods for deriving an interim limit may be used on a case-by-case basis. Section NR 106.17 allows non-numeric interim limits such as requiring implementation of source reduction activities and start-up of a component of a wastewater treatment system. The intent of an interim limit is to not allow the discharge of the substance with a WQBEL limitation to increase over the duration of the compliance schedule.

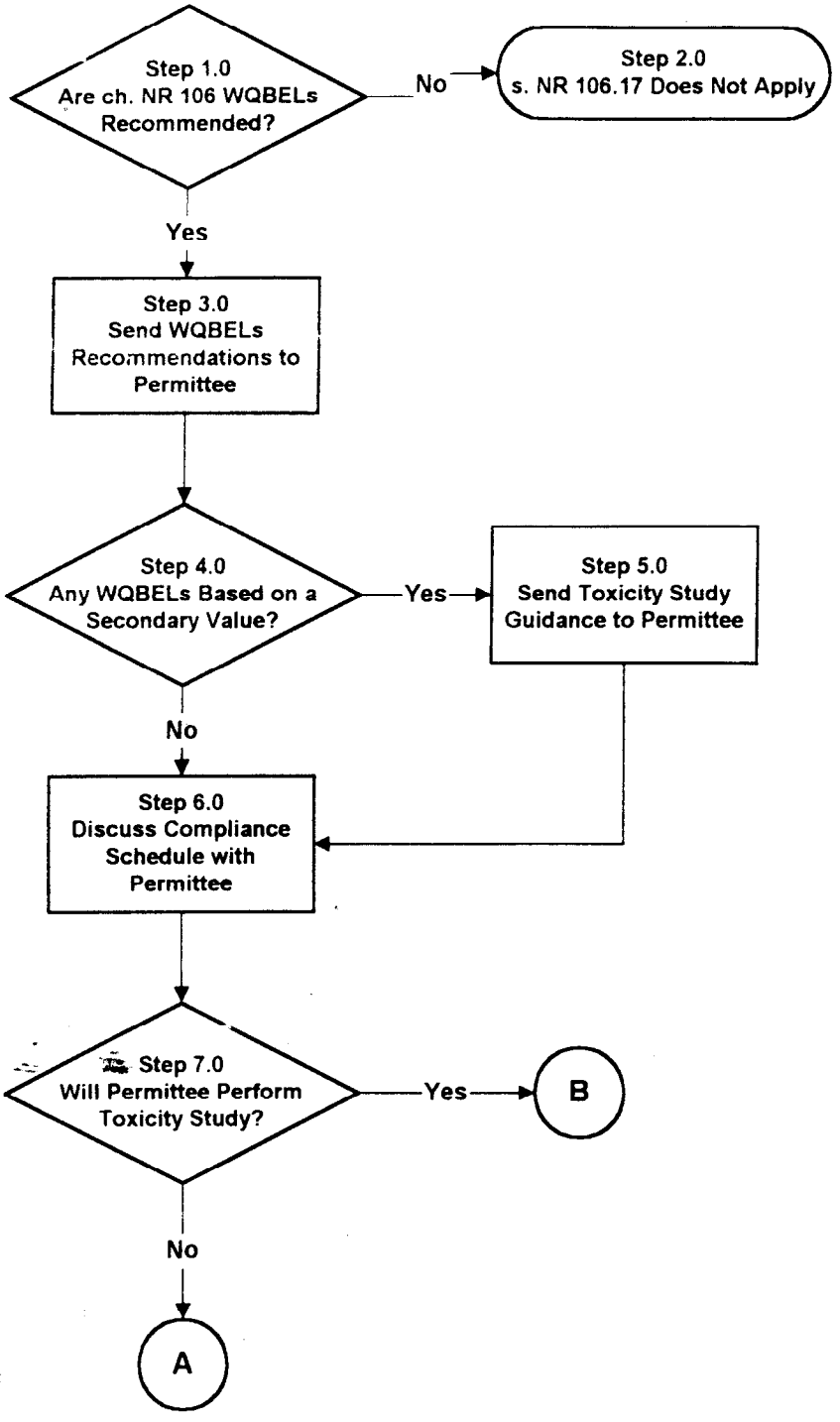
13.0 Public notice the permit.

14.0 Note that the toxicity study adds approximately 2 years to the compliance schedule, which combined with the default 3-year compliance schedule would provide a total of 5 years. The information gathered in step 6.0 should be used to determine if more than a 5-year compliance schedule is necessary.

15.0 If the permittee fails to provide acceptable reasons for extending the compliance schedule, use the default 3-year plus toxicity study compliance schedule in Attachment 10-3. (See the instructions for step 8.0 for a brief discussion of acceptable reasons for extending a compliance schedule.)

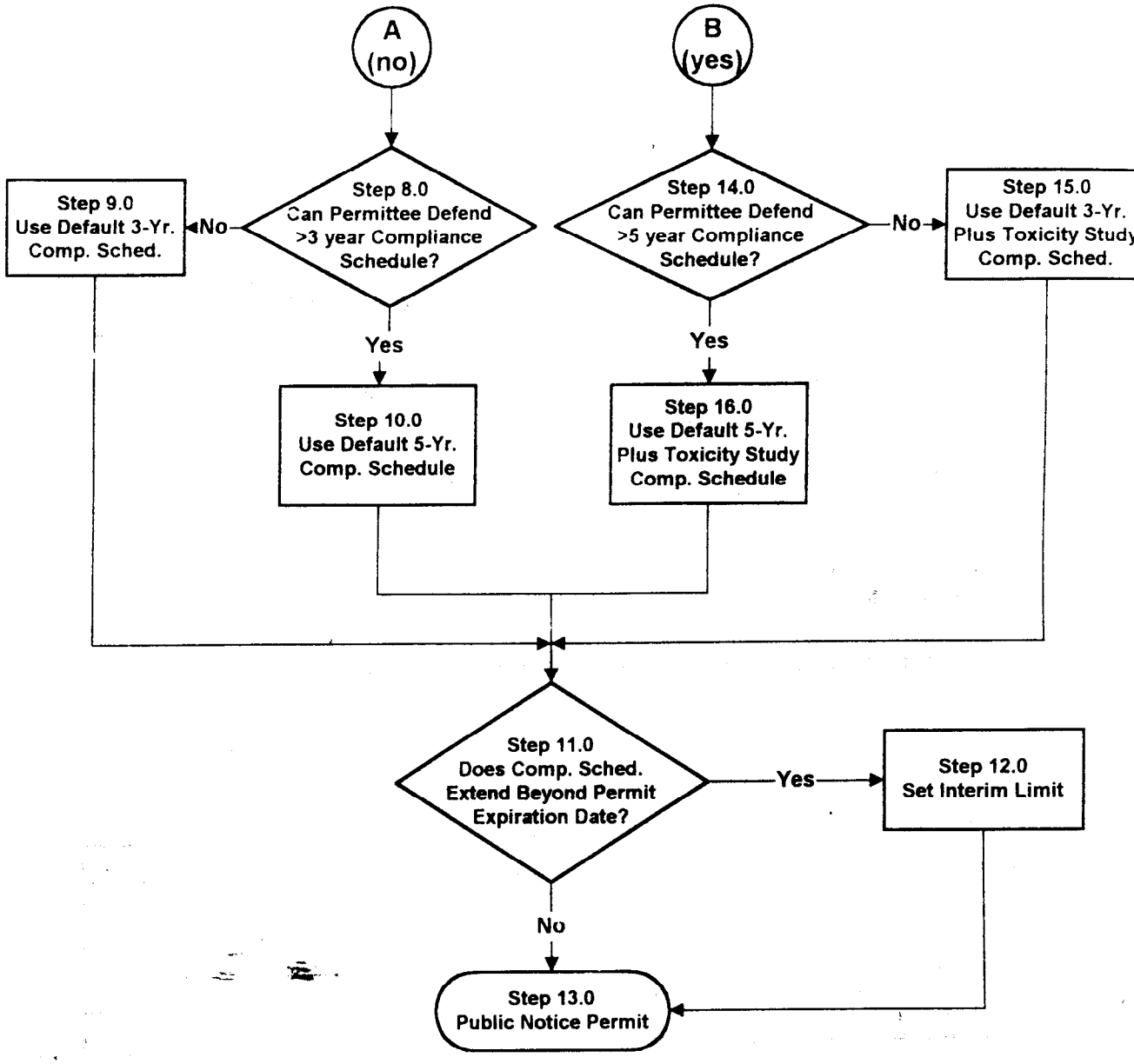
16.0 If the permittee provides acceptable reasons for extending the compliance schedule, use the default 5-year plus toxicity study compliance schedule in Attachment 10-5. (See the instructions for step 8.0 for a brief discussion of acceptable reasons for extending a compliance schedule.)

# Compliance Schedule
# Flow Diagram 10-1




File:cmpschd3.vsd
Version 1 - January 1998

# Compliance Schedule
# Flow Diagram 10-1
(Continued)




File:cmpschd3.vsd
Version 1 - January 1998

# Attachment 10-1
# Default 3-Year Compliance Schedule

## A. Chemical Specific

By (6 months past permit issuance), submit an action plan for complying with the effluent limitations for (list substance). If construction is required, include plans and specifications with the submittal.

By (1 year past permit issuance), initiate activities identified in the approved action plan including the commencement of construction if construction is necessary.

By (2 years past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (3 years past permit issuance), complete all actions necessary to achieve compliance with the effluent limitations for (list substance).

## B. Whole Effluent Toxicity

The following compliance schedule was taken from Chapter 2.2 of the "Whole Effluent Toxicity (WET) Program Guidance Document."

**Whole Effluent Toxicity Limit Compliance Schedule**

| Required Action | Date Due |
|---|---|
| Submit part one of a Toxicity Reduction Evaluation (TRE) plan describing procedures to be used to identify the source(s) responsible for the effluent toxicity. | 1-3 months should be sufficient for plan development |
| Implement part one of the TRE plan, make a reasonable attempt to identify the source(s) of the toxicity, and submit a report to the Department presenting the results of the evaluation. | 1-1.5 yrs should be sufficient |
| Submit part two of the TRE Plan describing actions to be taken to reduce or eliminate the toxicity identified in part one of the TRE and the dates by which those actions will be implemented. | 1-3 months should be sufficient for plan development |
| Submit a progress report identifying the actions taken to date to implement part two of the TRE plan. | about 1/2 way through part 2 |
| Complete all actions identified in the TRE plan and achieve compliance with the effluent toxicity limitation. | 1-1.5 yrs should be sufficient |

# Attachment 10-2
# Default 3-Year Compliance Schedule
# Modified for Facility Plan Submittal

**Chemical Specific**

By (6 months past permit issuance), submit an action plan for complying with the effluent limitations for (list substance) and include a facility plans amendment.

By (1 year and three months past permit issuance), submit plans and specifications.

By (1 year and three months past permit issuance), initiate activities identified in the approved action plan including the commencement of construction if construction is necessary.

By (2 years past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (3 years past permit issuance), complete all actions necessary to achieve compliance with the effluent limitations for (list substance).

# Attachment 10-3
# Default 3-Year Plus Toxicity
# Study Compliance Schedule

By (3 months past permit issuance), submit a plan for conducting studies that are needed to revise the secondary value upon which the effluent limitations for (list substance) are based.

*NOTE: We assume the Department will require a maximum of 3 months to review and approve the study plan.*

By (6 months past permit issuance), initiate the studies.

By (1 year and 6 months past permit issuance), complete the studies and submit the results to the Department.

*NOTE: We assume the Department will require a maximum of 6 months to accept the study results, recalculate the secondary value and modify the permit if necessary.*

By (2 years and 6 months past permit issuance), submit an action plan for complying with the effluent limitations for (list substance). If construction is required, include plans and specifications with the submittal.

By (3 years and 6 months past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (4 years and 6 months past permit issuance), complete all actions necessary to achieve compliance with the effluent limitations for (list substance).

# Attachment 10-4
## Default 5-Year Compliance Schedule

By (6 months past permit issuance), submit an action plan for complying with the effluent limitations for (list substance). If construction is required, include plans and specifications with the submittal.

By (1 year past permit issuance), initiate activities identified in the approved action plan including the commencement of construction if construction is necessary.

By (2 years past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (3 years past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (4 years past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (4 years and 6 months past permit issuance), complete all actions necessary to achieve compliance with the effluent limitations for (list substance).

# Attachment 10-5
# Default 5-Year Plus Toxicity
# Study Compliance Schedule

By (3 months past permit issuance), submit a plan for conducting studies that are needed to revise the secondary value upon which the effluent limitations for (list substance) are based.

*NOTE: We assume the Department will require a maximum of 3 months to review and approve the study plan.*

By (6 months past permit issuance), initiate the studies.

By (1 year and 6 months past permit issuance), complete the studies and submit the results to the Department.

*NOTE: We assume the Department will require a maximum of 6 months to accept the study results, recalculate the secondary value and modify the permit if necessary.*

By (2 years and 6 months past permit issuance), submit an action plan for complying with the effluent limitations for (list substance). If construction is required, include plans and specifications with the submittal.

By (3 years and 6 months past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (4 years and 6 months past permit issuance), comply with the interim effluent limitations of (list interim limitations) for (list substance).

*MORE: The interim limitations should be included in the effluent limitations table of the permit.*

The remaining portion of the compliance schedule is provided for informational purposes only.

By (5 years and 6 months past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (6 years and 6 months past permit issuance), submit a progress report on the completion of activities identified in the action plan.

By (7 years past permit issuance), complete all actions necessary to achieve compliance with the final effluent limitations for (list substance).

*NOTE: The entire compliance schedule should be included in the permit information form.*

## Attachment 10-6
## Source Reduction Interim Steps

By (6 months past permit issuance), submit a source reduction plan for (list substance).

By (9 months past permit issuance), initiate activities identified in the source reduction plan.

By (X months past permit issuance), submit a progress report on the completion of source reduction activities.

By (Y months permit issuance), complete all activities identified in the source reduction plan.

X = Any number of months necessary to ensure no more than 1 year between interim compliance schedule requirements. This interim compliance schedule requirement may be repeated as many times as necessary.

Y = Any number of months up to a total of 5 years when source reduction is the only activity necessary to meet the WQBEL. If additional activities, such as construction of wastewater treatment units, are necessary, the complete compliance schedule may not extend beyond 5 years.

# Attachment 10-7
# Production Modification Interim Steps

By _(6 months past permit issuance)_, submit an overview of production process modifications that will be undertaken to comply with the effluent limitation for _(list substance)_.

By _(1 year past permit issuance)_, initiate modification of the production process as identified in the overview.

By _(X months past permit issuance)_, submit a progress report on the completion of source reduction activities.

By _(Y months permit issuance)_, complete all modifications identified in the overview.

X = Any number of months necessary to ensure no more than 1 year between interim compliance schedule requirements. This interim compliance schedule requirement may be repeated as many times as necessary.

Y = Any number of months up to a total of 5 years when production process modifications are the only activities necessary to meet the WQBEL. If additional activities, such as construction of wastewater treatment units, are necessary, the complete compliance schedule may not extend beyond 5 years.

# Chapter 2 - Permit Process
# Response to Comments
# 1/21/98

1a. This chapter starts out with a statement of "implementation with minimum disruption." It then goes on to suggest major changes in the way we do things. Before this is implemented we should check to see if we have the resources to do this. *(See Response following Comment 1j.)*

1b. Application meetings aren't going to happen!! We may be better off training the consultants and holding joint meetings with the permittees. *(See Response following Comment 1j.)*

1c. I don't think it is necessary to meet with every permittee to go over the reissuance package. It is my opinion that the permit drafter could/should include potential problem areas in the cover letter for the reissuance package. The cover letter should include an invitation to meet to discuss reissuance and, if appropriate, the engineer and limits calculator should attend such a meeting. *(See Response following Comment 1j.)*

1d. All of the meetings proposed here are nice if you are going hire 5 additional drafters for us. For municipal, I would be spending all of my time setting up meetings or attending meetings rather than drafting permits - doesn't look very streamlined to me. We just don't have the time to do this many meetings. *(See Response following Comment 1j.)*

1e. Meeting with the permittee on the application package appears to be new if applied across the board. Will we have the resources for this? *(See Response following Comment 1j.)*

1f. Pre-application Meetings - Some form of this has been going on quarterly but with all those listed in subsection "A" would be new. Is this justified-for what purpose? Would it not be better to define purpose and let those attend who have an interest or stake? Or maybe these should take place at the project level during the review or permit writing? *(See Response following Comment 1j.)*

1g. Application meetings are now rarely done and a distinction needs to be made on type of application. Is this step needed in every case (i.e. efficiency)? *(See Response following Comment 1j.)*

1h. The Post Application section is the only part in this chapter that represents what we are doing now. This section has the purpose of using representative data and does not suggest large meetings. At this point in the review process we would have the most complete and accurate assessment of what the permit issues. A collective effort may be needed at this point. *(See Response following Comment 1j.)*

1i. I know it was not Bob Weber's intention to indicate a mandatory procedure that every permit application and issuance needs to go through. I'm not concerned at all about

Bob's intentions here, but do have concerns that at a later date someone might want to make the guidance more mandatory in fleshing out procedures for Department consistency. *(See Response following Comment 1j.)*

1j. In Oshkosh, I heard a number of comments relating to the number of meetings that would result and the time these meetings would take. I believe that these issues could be addressed by judicious organization of the pre-application meetings to discuss a group of applications on a quarterly or semi-annual frequency. I don't think every permit will merit an application meeting or meeting with the permittee. For example, if there is no anticipated need for limits, the meetings will not be necessary.

*Response to Comments 1a - 1j: This chapter has been provided as "guidance" which may result in a process that will ensure successful implementation of the changes that have been made to cbs. NR 102, 105, 106, and 207. It is simply guidance and not a mandate.*

*The authors of Chapter 2 recognize the workload and other time constraints on permit program staff. However, as the Department implements it reorganization, all staff must recognize the goals of consistency, improved customer service, and improved program integration. Staff shortage and time constraints on existing staff are issues that will affect our ability to meet those goals. As such, our work force must learn to "work smarter" and this often warrants changes in how we do business.*

*This is the idea behind Chapter 2. A process has been outlined which may result in a better permit which has fewer challenges by permittees and/or the public during and after the public-notice period. Further, by suggesting the involvement of programs that aren't typically involved in permit issuance (i.e., fisheries, basin planners), the process may also result in more holistic protection of our water resources. There is no question that the outlined process may be different than what staff currently do when issuing a WPDES permit. However, that does not make it "wrong" or a "bad idea."*

2. The verbs "can" and "may" are used in a way that questions if this really sets up a process that will be uniformly applied. Very vague.

*Response: As mentioned in the response to Comment 1, the process that has been outlined is guidance only. While it would be ideal if all staff had the time to follow the recommendations fully, the authors recognized the fact that this will not happen and that each Region needs flexibility.*

3. The team (assumption that this a different team from what we already have) review of permittee status before developing the application package is all new. The use of the large number of staff identified seems inefficient.

*Response: Please see the response to Comments 1a - 1j. The recommended approach is an opportunity to review the permittee's impacts to a watershed in a more holistic manner and to allow for more integration between programs. While different, this recommendation is consistent with the goals of a reorganized Water Division.*

4. I doubt anyone could oppose the concepts of working as a team at the time of permit application as well as when a permit is drafted. This chapter does not, however, address the amount of time this approach will take. Currently in NE, only one area engineer routinely meets with the permittee when a draft permit is ready. It has been my "dream" that this meeting would become a requirement for all permit reissuance but to date that has not happened, partly because of workload issues. I doubt that any of the field staff could find the time to participate in more than one "meeting" during permit reissuance nor do I believe that our effluent limit calculator, who is in Madison, could travel to the district for both an in-house and an external meeting on the 20 or 30 municipal permits reissued every year, much less for the surface water industrial permits. In talking with Charlie Verhoeven, we came up with 3 possible alternatives to the Plan's approach for a pre-application meeting. They are:

1) Develop a checklist that addresses the topics needing input. For each GMU and topic a specific person would be assigned to address that topic. These could be routed electronically. (To the list of persons to involve should be added the pretreatment coordinator).

2 and 3) On a quarterly basis these "meetings" could be held in conjunction with a GMU meeting or wastewater functional team meeting. This would require inviting those staff involved that are not part of the GMU or WW staff.

*Response: These suggestions are very well thought out. Other options include conducting group meetings with permittees in somewhat of an open house setting. Specific responses to each suggestion made the commented follow:*

*1) The outline provided in Chapter 2 may serve as the "checklist" that could be used. However, each GMU leader would have to decide if the single point of contact is a feasible option.*

*2) and 3) Anytime the key staff are meeting for a common cause, it would seem prudent to make the most efficient use of that time. That may very well include a discussion on pending permit applications. It would be up to each Region to determine meeting frequencies.*

5. On the subject of Application Meetings held with the permittee, again, having time to do this is the issue. One-on-one meetings are not feasible with existing staff. Two possible alternatives appear to be development of a guidance document for the permittee filing out the application and/or training sessions for groups of permittees whose permits are expiring. It may work to do this every 6 months and invite permittees whose expiration date is 9 -18 months away.

*Response: See response to Comment 4.*

6. The Post Application meeting is a great idea but only if the effluent limits calculator is located in the Region. This can be handled in a memo or phone conversation also.

*Response: It is the goal of the Department to eventually place an effluent limits calculator in each Region. Until such time, other means of communication (i.e., telephone, E-mail, snail-mail, etc...) must be used whenever possible. It should be noted, however, that those effluent limits calculators who are based in Madison are expected to be available for necessary face-to-face meetings in the Region to which they are assigned.*

7. The meeting with the permittee when the draft is ready, or during public notice, is extremely important and is the ONE meeting that should be built into work planning for permit reissuance.

*Response: This is an extremely important and valid comment. It will be forwarded to Bureau managers for consideration when preparing future workplans.*

8. Develop what appears to be highly individualized application packages also is new. Is this really needed?

*Response: The decision to develop a new application package was made some time ago as a result of the Permit Streamlining efforts. The changes to the application process will compliment the changes resulting from the revisions to the water rules.*

9. One area that is not included here. I have spent a fair amount of time communicating with permittees after they receive the application requests, but before they complete them. To some degree, the successful completion of tools like the application, the representative data guidance, draft limits, and other information can minimize the time we need to spend on this in the long run. In the short run, though, we are going to need to work with permittees to work with unfamiliar applications, concepts, etc.

*Response: This is the whole point of the recommended process. While it takes time to sit down with permittees to communicate data needs, it may pay significant dividends in time saved and result in fewer limits that are deemed unnecessary at a later date.*

10. One specific comment on the pre-application meetings: some of the topics to be evaluated seem out of place here, specifically the pollutants of concern and the compliance and upgrades issues. These items really can't be discussed until the completed application is received.

*Response: The discussion of pollutants of concern is appropriate for pre-application meetings because this is the time to identify the substances which should be monitored as part of the application package. The language suggesting discussion of compliance and upgrade issues has been removed.*

11. There should be mention in this section of the need to review design flows with the permittee early in the process. I remember several districts commenting that they had problems with design flows. They had proceeded with limits calculations and later

found that the work was wasted because the permittee questioned the design flow that was used.

*Response: Excellent comment. Language has been added as recommended.*

12. Screening the data before calculating the limits is not the way we currently operate. We presently check to see if the proper representative information is submitted before calculating the limits. We check on the quality of the data and double check the representativeness of the data after it appears a limit is needed. Screening is a term that is seldom used but if it is, this process is ongoing through the review.

*Response: The term "screening" has been removed from the guidance. However, the determination of representative data should be made **prior to** the calculation of effluent limits. In the past, there were many staff who would only determine whether or not data were representative after it was determined that a limit was necessary. However, that approach assumes that data are automatically representative if a limit is not triggered. This may not be the case since limits decision could be made with unrepresentative data and they may not be protective of the receiving stream. For this reason, the application data should be reviewed by the permit drafter and the effluent limits calculator before effluent limits are calculated to evaluate if there are any obvious anomalies.*

*Following this guidance will also prevent doubling up on the limits calculation which wastes a significant amount of staff time. This is often the case when limits are recommended and a discharger submits "new" data while arguing that the previous submittals were not representative. The result is a second and sometimes a third round of effluent limits calculations. To prevent this, staff are advised to calculate limits only after representative data have been made available with a complete permit application.*

13. Subsection B., is quite detailed for a quarterly meeting. Would a preliminary review of limits requirements -- something we do not do now -- be useful? A discussion of data without the limits is only partially useful. Why be concerned or spend time on data concerns if limit recommendations are not likely based on the information provided?

*Response: Please see the response to Comment 12. Also see the discussion on preliminary limits, below.*

14. If a permittee is facing the possibility of conventional limits being calculated for their particular facility, I would encourage that the Department be proactive and as part of the pre-limits package, provide those conventional limits and suggest/request ambient monitoring take place at the discharge site. Also, the permittee should be aware that the Department no longer has money available to contract with U.S.G.S. for stream flow information and that they may contract for this service themselves. The goal being that when the permit application is sent to the Department, all relevant information has been collected prior to effluent limit calculation(s).

Response: At this time, the Department is not prepared to calculate preliminary limits for conventional pollutants. One of the working principles behind the calculation of preliminary limits for toxic substance is that a spreadsheet can be updated quickly by entering a few variables found in the previous water quality-based effluent limits recommendation. To go beyond this level of effort will result in too much time spent on the part of the staff calculating preliminary limits.

Other reasons for calculating preliminary limits for toxic pollutants, but not conventional pollutants, include:

- Preliminary limits may help a discharger and/or consultant choose an analytical method best suited toward obtaining an appropriate limit of detection.
- Categorical limits are often more stringent than water quality-based effluent limits for conventional substances and it is possible that a discharger may be confused over which limits may be imposed in a permit.

It is possible that future efforts to calculate preliminary limits may include conventional substance, but this guidance does not recommend that they be included at this time.

The final comment suggested the need to notify dischargers that the Department cannot fund the calculation of stream flow any longer. The Department has attempted to relay this message to the discharge community in a roundabout way (i.e., individual meetings with permittees, conferences, and other mass communication efforts). However, there are still dischargers that do not seem to know this fact or understand its implications. The Department will continue to try to inform the discharge community of this dilemma.

15. Para. 2 - last sentence: I agree with the statement, but suggest that the focus be altered slightly to highlight the opportunity to avoid unnecessary additional monitoring by prudent selection of a laboratory and analytical methodology. Communication has been a problem throughout the system. I would also emphasize that the preliminary limits should be supplied to the laboratory as a tool for verifying analytical results and quality control so we get "good" data at the outset of the process.
*Response: Excellent suggestion. Language has been added to the guidance to emphasize this fact.*

16. The implementation of "preliminary limits" is new. This was a good idea and almost justifiable when there were 8 effluent calculators in the central office. Now there are 5 effluent calculator positions and these are decentralized. The decreased numbers and the less efficient operation resulting from decentralization question practicality. Times have also changed. Most facilities have received toxic limits and know what to expect in terms of limits, and commercial labs are now certified. One must really weigh closely the benefits of a "preliminary limits" approach.

*Response: As part of the Permit Streamlining Study, many of the Department's "customers" were asked if preliminary limits would be of benefit. All of them, large permittees, small permittees and analytical labs believed there use was warranted.*

*Therefore, they are going to be used. Granted, it will require some additional time to generate the preliminary limits, but it is believed that the time spent on the "front end" will result in less time on the "back end" of the permit process.*

17. Explaining "preliminary limits" to the permittee would be new. This step could result in lost time since the permittee situation may change in the year or two preceding the actual application submittal. This proposed step stretches out the "fine tuning of the application from several months to several years. This would be fine if we have the resources.

*Response: Please see the response to comment 16. Further, it should be noted that all application packages which contain preliminary limits will also include a listing of the variables that were considered when calculating the preliminary limits. This will enable a permittee and/or consultant to discern if there are significant differences between past and current information regarding the operating or the receiving water. Regardless of differences, it is still believed that the time spent generating and communicating preliminary limits will be time well spent.*

18a. We continue to support the DNR goal of implementing the GLWQI in an manner which minimizes the disruption of the existing permit process. This is certainly consistent with the DNR's position throughout the GLWQI rulemaking process, and we hope it continues throughout the implementation of these rule changes.

Chapter 2 does introduce a new concept referred to as "preliminary limits." As we understand it, the preliminary limits would be based on rough DNR calculations and would be sent to the permittee along with the permit application. The apparent purpose of providing the preliminary limits would be to allow the permittee to determine if additional monitoring or other data gathering may be beneficial in the development of the draft permit. In concept, we support his approach, but are somewhat troubled by the use of the word "limits." As an alternative and to clarify the intent of these values, we would suggest referring to them as "flag values" or some similar term which avoids the use of the word "limits."

With respect to the remainder of this Chapter, we are encouraged by what appears to be greater opportunity for communication between DNR and the permittee early in the permit process. This will hopefully minimize last minute exchanges of information and debates regarding proposed permit terms. (Wisconsin Manufactures and Commerce) *(See response to Comment 18b.)*

18b. I don't have a problem with the concept of the Department calculating tentative numbers for purposes of focusing the permit application. The term "preliminary limits" may give these numbers slightly more standing than is warranted. The term "flag values" is used in the description of what they "preliminary limits" are intended to be; why not use "flag values" as the name for these numbers? "Tentative values" might also be preferable. I am concerned about the implications of a discharger operating while something called "preliminary limits" have been issued. (Walter Kuhlman - Municipal Environmental Group)

*Response: The Department is cognizant with the concern which may be associated with the term "limit." However, introducing yet another term such as "flag value" would be inconsistent with the use of the term "limits" in other aspects of the WPDES program. For instance, it would be inconsistent to label the resulting numbers as "flag values" when the Department uses terms like "advisory limits" for ammonia. It should be noted that all permit applications which contain preliminary limits will contain a clause which clearly indicates that the preliminary limits are NOT LEGALLY BINDING and that a permittee is not obligated to comply with those "limits" until they are formally included in an issues WPDES permit.*

19. Page 1 - Paragraphs 2 & 3: Are WET limits to be included in the preliminary limits package? It would be helpful to the permittee to know whether a future permit will require that they perform a TRE and/or meet a WET limit.

*Response: Preliminary limits are not going to be provided for WET testing due primarily to the linkage in the WET Checklist between WET data and chemical-specific data. Specifically, the WET Checklist factors in which substances are detected as well as limited prior to concluding if limits are warranted or what frequency of testing is recommended. This suggestion may be reconsidered at at later date, but for now, WET information will not be included with preliminary limits.*

20. Page 1 - This process suggests that the biomonitoring coordinator be involved "as needed" in quarterly meetings with Region staff to discuss permit applications. I do not disagree with this, but there is only one biomonitoring coordinator, which would make too many of these meetings difficult. One suggestion: I have created a list of permittees with WET problems who have the highest potential to receive WET limit. This list is found at P:\FLEMIK\FAILURES.TAB. It is updated quarterly and shared with permits and area staff, which may be useful as an indicator of which facilities may have WET issues to be discussed at these meetings. This list typically consists of 50-60 facilities (although they are not all up for reissuance at the same time). I also currently participate ("as needed") in "Post Application Meetings" when a facility or staff have questions about a permittee's WET situation, representative data, or to explain new WET permit requirements.

*Response: The suggestion has been incorporated in the guidance.*

21. This is another case in point to support a data management system which keeps daily data.

*Response: There is no disagreement with this comment and it will be considered as the Department upgrades its WPDES program data management capabilities.*

22. I realize that the GLI Implementation Plan is focused on toxics. However, I would like to see the material in Chapter 2 integrated with overall watershed planning, facility planning, and nonpoint issues. The Plan is the only place I am aware of regarding the nature of pre-application and post-application meetings. Some time ago, the Department talked about having an advisory committee meet to talk about integrating

facility planning and permit writing. Many of the conflicts I have seen in permit issuance arise because the permit schedule (an arbitrary 5 year period) is not adequate integrated with upcoming facility planning changes. Also what about the impact of basin teams, and their assessment of nonpoint issues?

Although you may wish to get this Plan finalized before all those items can be addressed, perhaps you might put some placeholders in this outline so that the questions of nonpoint issues in the watershed, basin team priorities, the status of facility planning and impacts of that on the permit are part of the outline of items to be discussed at each of the meetings. The consequences of those discussions may not be an appropriate subject for this Implementation Plan, but I would prefer that staff working on permit applications see that these items are important and need to be integrated. (Walter Kuhlman - Municipal Environmental Group)

Response: It must be pointed out that the Implementation Plan, as drafted, is specific to the revisions to chs. NR 102, 105, 106, and 207 (Wis. Adm. Code) that addressed the discharge of toxic substances from point sources. However, the Department is attempting to encourage integration between point and nonpoint interests in the recommended permit process. Specifically, as part of the recommended process, the water quality basin planner has been identified as being a participant in the pre-application meeting. When consulted, the appropriate basin planner should be able to provide linkage with issues related to TMDLs and nonpoint pollution. While this level of effort may not seem satisfactory to the commenter, it is a recommended step toward program integration which encourages consideration of these nonpoint-related matters.

23. It would be useful to include some discussion of QA/QC in this chapter as it related to data collection. Although it is not an issue related to the Guidance, QA/QC is important in ensuring that the data generated are useful for purposes of the Guidance. (U.S. EPA - Region 5)

*Response: This suggestion has been included as a topic to be considered and discussed with permittees regarding the WPDES permit application.*

## Chapter 3 - Secondary Values - General
## Response to Comments
## 1/6/97

1. What about silver?

   *Response: U.S. EPA is currently in the process of calculating secondary acute and chronic values for silver. Please note that human threshold criteria for silver are part of the revised NR 105. For acute and chronic, the toxicological databases have not been updated since 1980. Due in part to the changes in U.S. EPA's aquatic life criteria calculation procedures that have occurred since 1980, it is necessary for EPA to re-examine the existing database. By deleting and/or adding new data, it will be possible to determine if the resulting database meets the minimum database requirements for calculating criteria or if enough data are available to calculate secondary values. Until that process is completed, and because of the long period of time since criteria were last calculated, the entire database is up for review, and no aquatic life criteria or values are available at the present time. At this time, limits should only be calculated and evaluated based on the human threshold criteria.*

2. What about selenium?

   *Response: Because of a lawsuit filed against U.S. EPA, the acute and chronic criteria have been withdrawn. Presumably, a re-evaluation process similar to that for silver is taking place at the Federal level for selenium. This lawsuit does not affect the human threshold criterion for selenium which is part of the revised NR 105. At this time, limits should only be calculated and evaluated based on the human threshold criteria.*

3. What about iron?

   *Response: U.S. EPA is in the process of calculating criteria and/or secondary values for iron. The only U.S. EPA criteria available for iron were developed back in 1976 and were not developed using the current approach for aquatic life. At this time, no usable criteria or secondary values are availab'e for iron, so no limits should be calculated or recommended.*

4. What about chlorides?

   *Response: Until U.S. EPA (or the Department) formally updates criteria, the Department's interim approach should be used for chlorides, pursuant to the July 15, 1997 strategy memo from Bruce Baker.*

5. What about PAHs?

   *Response: Secondary cancer values have been calculated by the Department, so they should be used to calculate limits if allowed under s. NR 106.05 (1)(b). PAHs were raised as a concern because of groundwater remediation activities that may involve PAHs. If PAHs are present in the groundwater, a responsible party may need limits for*

*PAHs to address treatment options, so there was a concern that secondary value-based limits for PAHs could not be calculated unless the responsible parties or the Department could show environmental impacts in the receiving water due to PAHs. One of the triggers in s. NR 106.05 (1)(b) involves information on a substance being discharged by a particular source while another trigger involves significant ecological or environmental risk when a substance is discharged to surface waters. These triggers are relevant for PAHs in groundwater remediation activities because the remediation may involve a discharge to surface water, and there may be human health risks due to PAHs if that discharge occurs just because there are human health-based groundwater or drinking water standards for PAHs (benzo(a)pyrene specifically) in chs. NR 140 and/or 809. The fact that PAHs result from operations that caused the groundwater contamination in the first place satisfies s. NR 106.05(1)(b)3., meaning the calculation of a secondary value and the resulting limit is justified. In other words, nothing changes for how we address PAHs as long as the source of PAHs can be identified and associated with that class of compounds.*
*NOTE: A similar argument may also be used to justify the calculation of secondary values for compounds such as agricultural pesticides that currently have no surface water criteria in ch. NR 105, but may have criteria in chs. NR 140 and/or 809.*

6. Regarding cooling water additives (specifically sodium bromide), we apparently cannot regulate them even if we have a secondary value because none of the conditions of s. NR 106.05(1)(b) are triggered. This is similar to the argument regarding secondary values for new discharges, where none of the existing water quality concerns could be demonstrated because there is no discharge into which to tie those impacts.

   *Response: This kind of situation (namely cooling water additives) is the reason why the language in s. NR 106.10 (1)(a) is still in the code. To a certain degree, the NR 106.10 approach is similar to the secondary value approach where there is uncertainty. In the NR 106.10 approach, limited toxicological data are divided by 5 or 10 depending on the species represented. There were questions as to why that language was still in the code, given the secondary value approach, when it was realized that this would still apply to NCCW additives. Following the corresponding code language, additves can be regulated regardless of the conditions of s. NR 106.05(1)(b). For additional guidance, please consult Chapter 1.7 of the Department's Whole Effluent Toxicity Program Guidance Document.*

7. At the time a secondary value is established, guidance should be written that explains to staff as well as permittees the implications of this value and the options available to a discharger faced with a limit based on a secondary value.

   *Response: This explanation shall be provided where possible as part of the permit recommendation package supplied by the limits calculator.*

8. Is a limit based on a secondary value scientifically sound?

   Response: A limit based on a secondary value is imposed in a permit because the substance was detected in an effluent and there were reasons to believe it posed a

threat to the environment. Only scientific data that have been generated using acceptable testing protocolsIto determine the concentration of a substance that is believed to be protective of the receiving water. Those data are typically found in published literature and are screened to ensure that they meet they meet minimum data quality requirements before they are used. Those data quality requirements are consistent with the requirements associated with the derivation of formal water quality criteria. The use of an uncertainty factor which yields a more conservative level of protection is also warranted because data are available which show that there is an increased risk associated with limited data. For these reasons, the secondary value process as defined in ch. NR 106 is considered to be scientifically sound and is consistent with the Federal guidelines referenced in s. NR 105.04.

9. This is an extremely well written section that has set my mind at ease about the fear of a great proliferation of this type of limit. Most of my remaining confusion relates to how we are going to interconnect monitoring for parameters subject to secondary values with representative data monitoring. For example, in order to determine whether a secondary value needs to be determined for chloroform, we need to know the level of concern that will serve as a "flag" to trigger more monitoring to get a representative data base. This information is not available in the implementation draft; perhaps it will be in the forthcoming limits calculation to be sent to the permittee as part of the application.

   *Response: The text and flowcharts for Chapter 3 as well as the monitoring language in Chapter 8 have been modified to clarify this process.*

10. The guidance refers to a number of other documents or lists at several places (i.e., page 20 - step 3 refers to a Federal Register table). Will these tables be available/distributed to appropriate staff? I do not currently have a copy of this table.

    *Response: The table mentioned above is no longer a part of the decision making process on secondary values. Mention of it has been deleted from the text. If a Department staff member needs access to any other referenced documents, they should contact a Regional effluent limits calculator or a member of the Water Quality Standards Section.*

11. Appendix - Page 27 - Include Dave Webb's pesticide memo for pesticides with secondary values.

    *Response: Appendix A has been deleted from the text.*

12. General Comment: I think the main points of this chapter get lost in the presentation. Consider changing the order of the sections. It only becomes clear at the end that the Environmental Toxicologists are responsible for deriving secondary values. If the section on Process were at the beginning, other readers would understand that they do not have to be as concerned about understanding all the details. If the section on "When to calculate" following the "Process" section, it could be focused on considerations in answering the six questions posed in the "Process" section.

*Response: The comment was considered, but the chapter has not reordered. However, the text has been substantially rewritten to provide clarification.*

# Chapter 3A - Calculation of Secondary Values
## Response to Comments
## 1/6/98

1. Page 2 - 5th Para. - Last Sentence: Define BCF and $K_{ow}$.

   *Response: Glossary added to document.*

2. Page 3: Define NOAEL and LOAEL 3rd Para.

   *Response: Glossary added to document.*

3. Page 3: Define DEQ

   *Response: Glossary added to document.*

4. Pages 5 & 6: This chapter states that WET info may be used when determining whether a substance has been "associated with the potential for detrimental ecological or environmental impacts" and that toxicologists in the Standards section will "routinely review data" to determine which substances are candidates for secondary values. I keep and update information regarding completed and ongoing toxicity reduction evaluations which would show data regarding which substances are known to be causing toxicity problems. How should I (or future biomonitoring coordinators) share this information (e.g., process, contact person, etc.)?

   *Response: The Water Quality Standards Environmental Toxicologist assigned to the project should be notified that a particular substance has been identified as a causative agent in effluent toxicity. That person will be responsible for the calculation of aquatic life criteria or secondary values which would be affected by any whole effluent toxicity test results.*

5. Page 7: The last paragraph indicates that "upon approval [of a secondary value], an E-mail message will be sent....." Please include the biomonitoring coordinator on the list of recipients of the E-mail message.

   *Response: Changes made as suggested.*

6. The chapter is well written up to the section on "when should secondary values be calculated or updated."

   *Response: With no details on how the wording can be improved, no response is possible.*

7. Based on the interpretation of when (*Responder's comment: Presumably this means the word "when" in the text of s. NR 106.05 (1)(b)*), seldom will secondary values be calculated according to the draft plan. It would be more efficient to calculate the secondary values as well as the other priority pollutant limit values at least once in a five year permit cycle and provide them to the permittee. Doing this during permit reissuance is the most practical time. A check should be made to see if acute and chronic secondary values are lower than for the other criteria. If not we do not need to

get as involved with addressing secondary values since other criteria would be controlling.

*Response: The original calculation of a secondary value will be initiated by reviewing a specific permit where a substance of concern has been detected and either a water quality concern exists due to that substance or the substance is believed to be present in that type of discharge. Once a value is calculated, it will be available for staff to review for future permitting decisions. It is likely that a link to a secondary value library will be available through either the Internet or the Department's network. As new data are generated and available to the Department, modifications to a secondary value will be completed and it will be the responsibility of staff working on permits to review the library of secondary values to ensure they use the correct value.*

8A. This same section seems confusing. Reasonable potential is established in part when facilities are required to test for substances in NR 105 (i.e., majors vs. minors). If a permittee must test for a particular substance, isn't s. NR 106.05(1)(b)3. satisfied?

*Response: When the priority pollutant list was first created, many dischargers were requried to test for the entire list of pollutants because there were no baseline data available to determine if the pollutants may be present. Many of these requirements were carried over into categorical requirements for primary industries and many major municipal dischargers. However, after many years of testing, the Department believes that not all pollutants may be discharged even though they may be requested with an application due to categorical testing requriements. For this reason, the mere requirement to test is not reason enough to satisfy s. NR 106.05(1)(b)3. Instead, the Department has summarized information which will allow a more informed decision to be made about whether or not a substance may be present for a particular type of discharger (See Attachment 8-1). The information contained in that attachment may be used to satisfy the requirements of s. NR 106.05(1)(b)3. which may warrant the calculation of a secondary value.*

8B. If a toxic substance is found in the effluent, the reasonable potential is further defined based on concentration and ch. NR 106 procedures. One interpretation would be that the secondary value substances would be treated up to this point like other toxic substances in defining "reasonable potential." By doing so, doesn't this suggest that an ecological or environmental risk may be significant and satisfy s. NR 106.05(b)5?

*Response: Reasonable potential is normally defined as the determination of whether a discharge will cause or has a reasonable potential to cause an exceedance of a water quality standard. Because of more limited information for secondary value substances, the calculation of a toxicologically harmful number carries with it a greater degree of uncertainty (or risk) than does the determination of a criterion, thus the use of certain "safety factors" in the secondary value process. These safety and uncertainty factors, while scientifically-based, create the need to assure greater certainty as to the presence or significance of a substance in a discharge. The conditions in s. NR 106.05(1)(b) provide that added cross-check.*

8C. The code suggests some discretion in requiring a secondary value as a limit, but it is explicit when a limit must be required. The code does not explicitly prohibit the calculation of secondary values.

*Response: The commenter appears to be suggesting that the code states that secondary values shall be calculated if the factors in s. NR 106.05(1)(b)1-6 are satisfied. By that, the commenter suggests that if the factors are not satisfied, the Department has some flexibility or discretion in that secondary values may still be calculated. It is true there is nothing to prevent the independent determination of secondary values regardless of a need for theire use in establishing permit limitations. Given the workload needed in doing a literature search for data needed to support secondary values (be it toxicity data, bioaccumulation data, wildlife study data, or human health-related study data), and the anticipation that the database for secondary values should be more dynamic (i.e.. new data leading to changing values), staff resources allocated to the derivation of secondary values should be spent only where needed. The purpose of the six factors in par. (b) is to associate a priority with these efforts, namely a priority to establish a secondary value and eventually a criterion. That way, Department staff time can be dedicated to these types of efforts where needed, rather than towards unnecessary literature searches.*

8D. It seems more expeditious to calculate secondary values and then evaluate the need for a limits after seeing how the effluent concentrations compare. If these toxic substances are present and a limit would be warranted based on s. NR 106.05(1)(c), then s. NR 106.05(1)(b) may be considered. As complicated as this is, we need to document our recommendation.

*Response: It appears the commenter may be confused by the intent of par. (c) as it is related to the ability of the permittee to request an alternative whole effluent toxicity limit as a substitute to a chemical-specific limit based on a secondary value. Regardless, the operational order of the rule was intentional and requires par. (b) to be applied prior to calculation of any water quality-based effluent limit from a secondary value. In other words, the factors of subds. 1 through 6 must be satisfied before secondary values and limits can be calculated. Only then can the requirement of par. (c) be applied.*

9. The first paragraph of the "Process" section is clear but the purpose of following the 6 points are not. Consider the following: 1) Based on the way the application process is setup, only substances that have a "reasonable potential" are tested for; 2) It will be rare that we will see effluent test results for substances that have criteria, secondary values, or categorical limits. We would have to change our reporting requirements to find other substances since organic substance scan results (entire scan) are not typically reported. Many of the 6 points are really chicken and egg situations and it suggests, if you have one, it is not sufficient to prove the other so the evaluation stops.

*Response: The first consideration was addressed in comment 8A above. The second consideration is accurate, the average numbers of substances detected per permittee is relatively small. At the time this response was prepared (December 1997), the average number of substances detected per permittee was approximately five for industries and six for municipalities. For those substances, the simple fact that the substance is detected does not always warrant the calculation of a secondary value and consideration of a limit. It is the expressed intent of the Department to impose secondary value-based limits in permits only if there is a potential for an advesre impact to water quality. Thus, the need to utilize the process outlined in Flow Diagram 8B-1. Lastly, the Department has the authority to request monitoring for any pollutant*

*thought to be toxic. even those substance that are not included on the priority pollutant or categorical monitoring lists. Accordingly. monitoring for those substances and associated detects may result in the calculation of secondary values and effluent limitations. For additional information, please see Flow Diagram 3B-1 since it has been revised to indicate where evaluations stop or where more or different information is needed before proceeding.*

10. It appears that the process of adding or evaluating secondary values does not take place at the project review level although a project could initiate such an activity. For implementing these new procedures, a practical distinction on who does what and when for the 6 points should be made. This chapter is valuable but it takes a while and some understanding to grasp its applicability. A direct summary of applicability in the overview would be useful.

*Response follows comment 11 due to similar comments.*

11. The flow chart is very useful and would be further enhanced if individuals or positions were identified with the specific responsibilities or actions outlined.

*Response to comments 10 and 11: The need to calculate secondary values should be established as a team effort between limit calculators, permit drafters, regional biologists, regional engineers, and other interested staff. This is a necessary offshoot of the Department's reorganization, applied to a specific situation such as this. In order to provide consistency in the searches for data needed to actually calculate the secondary values, certain staff need to be assigned to this effort. This assignment will be made to toxicologists in the Water Quality Standards Section since one of the products of this effort will be the tracking of secondary value calculations as a statewide reference source. All of this assignment process may very well change in the future as the reorganized Department proceeds, but this is the process that will be Implemented at this time.*

12. Para. 2 - Reference to Appendix A. It would be helpful to indicate where it is. ( I went to end of the entire document.)

*Response: Appendix A has been removed from the document. This was done because secondary values have not been formally calculated for any substances to date. As secondary values are calculated, a "library" will be kept and made available to staff and other interested parties.*

14. Para. 3 - Acute toxicity criteria - last sentence

For readability, I suggest reversing the "if" "then" statement as follows: The word "may" is used because secondary values cannot be calculated if species from the genus *Ceriodaphnia, Daphnia,* or *Simocephalus* are not included in the species tested, even if eight or more species are available in the database.

*Response: The sentence was rearranged.*

15. Paragraph 4, Chronic toxicity criteria

I don't follow the discussion about the intermediate step and the three examples. After talking with Jim Schmidt, I understand that the problem is that the discussion doesn't include anything about the EPA default ratios. I have suggested language changes based on the explanation Jim gave me. (If it's not quite right, it may be reveal a common misunderstanding.)

*Response: see response to Comment 16.*

16. s. NR 105.06(1)(a) contains the same database requirements as listed above relating to acute criteria but adds the ability to calculate secondary values based on acute-chronic ratios. If data are available on the eight families listed in par. (a), then a chronic toxicity criterion may be calculated. Criteria may also be calculated if there are acute data available on at least three species. When both acute and chronic data exist for three species, acute-chronic ratios can be calculated. If chronic data is not available, default acute-chronic ratios may be used. In either case, one species must be a fish, one must be an invertebrate, and the third must be for an acutely sensitive freshwater species.

*Response: The text was revised to clarify the language as suggested.*

17. It would be helpful to decode the acronyms: BCF and NOAEL. BAF is used before it its defined in the text.

*Response: Glossary added to document.*

18. Page 5 - Paragraph 3 (beginning with "It may be concluded...") I follow the discussion about secondary limits for gold, but I'm not sure what the message is in the following sentences: *" Other substances may be on any or all of the three lists mentioned above. However, they may be looked at differently in the permit process, whether permittee-specific, category-specific, or basin-specific (or any other type of specific procedure*).

*Response: This topic is addressed in Chapter 8 on monitoring. Since the paragraph in question deals with monitoring requirements, the subject is better served in Chapter 8 than in Chapter 3. The entire paragraph was deleted from the Chapter 3 text.*

19. As you may be aware, serious questions regarding the lawfulness of the "secondary value" concept were raised through the rule development process. While we will not restate all of our arguments in this regard, we continue to believe that Wisconsin law requires secondary values to be promulgated as administrative rules (in compliance with the Ch. 227 Wis. Stats. hearing and comment requirements) before they are used in a permitting context.

Our concern in this regard is not a mere "technicality," but reflects an honest concern regarding the publics' ability to comment on data before it is used to derive a secondary value. For example, in deriving secondary values, the DNR would use data in the EPA clearinghouse which has not been subject to public scrutiny. The regulated community deserves, and we believe Wisconsin law requires, the opportunity to critically analyze or comment on this data before it is used to derive secondary values.

Putting aside what we continue to believe is a legal infirmity, our concern with secondary values was that they not be used in the absence of some demonstrated human health or environmental impact. Throughout the advisory committee process, DNR staff assured the regulated community that this would not be the case and that DNR intended to limit the use of secondary values to address situations where there is a demonstrated threat to the environment or human health. We are encouraged that the Implementation Plan continues to reflect that approach. (Wisconsin Manufacturers and Commerce)

*Response: The Department will calculate secondary values using scientifically valid toxicological data. In most cases, a calculated secondary value can be used to protect receiving stream communities that are representative of the species used to calculate the value. This may allow for some statewide application of the value itself. However, when considering the need for limits based on secondary values, s. NR 106.05(1)(b) requires the Department's to apply them locally by considering the factors in the noted paragraph. If it is determined that a demonstrated or potential environmental impact exists using the criteria enumerated in par. (b), a limitation based on a secondary value may be included in a public-noticed permit. At that time, any interested party may comment on the data used to derive a secondary value. Further, additional data may be supplied to the Department which may result in an alternative secondary value or even a site-specific secondary value which may affect the final effluent limit placed in the permit. The language in Chapter 3 of the Implementation Plan was written to reflect this intent.*

20. We do, however, have several substantive comments on this Chapter. First, during the development of the GLWQI rule package, concerns were raised regarding the possible use of scientifically flawed data in developing secondary values. In response, the DNR indicated that the "credible scientific evidence" and "appropriate statistical techniques" concepts would apply to the derivation of secondary values. Consequently, there should be some discussion in Chapter 3A requiring DNR staff to use these concepts in reviewing the data used to derive secondary values to ensure that the data is scientifically and statistically valid. (Wisconsin Manufacturers and Commerce)

*Response: The Department agrees with the commenter as there would be no merit to using flawed data. As such, all literature and toxicological data considered for secondary value derivation will be reviewed for acceptability using the applicable criteria described in the U.S. EPA's 1985 Guidelines for Deriving Numerical Water Quality Criteria for the Protection of Aquatic Organisms and their Uses* or any subsequent U.S. EPA guidance related to this matter.

21. We are also concerned regarding what appears to be the ability to derive secondary values for the protection of wildlife. As drafted, Chapter 3A of the Implementation Plan suggest that secondary values can be calculated for the protection of wildlife. Our understanding of the federal Great Lakes Guidance is that it does not require the use of secondary values for the protection of wildlife. Furthermore, there are no specific procedures for the calculation of wildlife secondary values in NR 105.07. There should be some clarification of this issue in Chapter 3A. (Wisconsin Manufacturers and Commerce)

*Response: Secondary values may be based upon bioconcentration data. Since those data may also be used in terms of wildlife studies, it follows that secondary values could be developed for wildlife. The text has been clarified in terms of the basis for secondary values related to human health or wildlife.*

22. Our remaining substantive comment on this Chapter relates to a statement on Page 5 of Chapter 3A. In the section entitled "Process," a sentence begins ... **"With few exceptions, new secondary values will not be calculated for substances that have not been associated with the potential for detrimental ecological or environmental impacts."** We question what these "few exceptions" may be and would suggest that in the absence of any demonstrated detrimental ecological or environmental impacts there should be no need to calculate secondary values. The phrase "with few exceptions" should be deleted. (Wisconsin Manufacturers and Commerce)

*Response: The phrase in question has been deleted.*

23. We also have one editorial comment on page 1 of Chapter 3A. The reference to NR 105.03 in the first sentence in the "Overview" section should be changed to NR 105.02(3). (Wisconsin Manufacturers and Commerce)

*Response: The change has been made.*

24. The second paragraph relating to acute criteria states that a secondary value cannot be calculated without toxicity data for a Daphnid. This is accurate, if the pollutant is one of the 138 pollutants of original focus, the Guidance requires use of available data to derive a screening value which is then used to determine if the permittee must be required to generate the data necessary to derive a secondary value. (U.S. EPA - Region 5)

*Response: Section XII of Appendix A to Part 132 in the March 23, 1995 Federal Register (page 15400) does not associate the Daphnidae data requirement with the list of pollutants of initial focus. Also, U.S. EPA representatives have indicated to Department staff that the realm of secondary values is not limited only to the list of pollutants of initial focus and it is the Department's view that there is no reason that the "Daphnidae qualifier" should apply only to that limited list. The Department has drafted NR 105 to be consistent with that requirement [See s. NR 105.05(4)(a) which states very clearly that a secondary acute value may only be derived if data are available from one of three specified genera in the family Daphnidae.]. If the appropriate Daphnidae data are available, the Department will derive a secondary value based on available and acceptable toxicological data.*

25. This chapter states that prior approval of DNR management is required before a secondary value can be derived. This implies that DNR management can disapprove of developing a value where the procedures in Wisconsin's rules require that one be derived. The Guidance specifies the conditions under which a secondary value is required. Wisconsin's procedures create ambiguity about whether secondary values would be calculated in all circumstances where one would be required under the Guidance. (U.S. EPA - Region 5)

*Response: The approval process has been re-examined and has been changed to an assignment of work and "concurrence" approach by management. This simply means that management will have an opportunity to review the information which indicates a need for a secondary value to be considered for any given WPDES permittee. Specifically, management can review the "Secondary Value Worksheet" to determine if the six factors associated with s. NR 106.05(1)(b) are satisfied. This is an important step in ensuring consistency in the use of secondary values and related limits.*

26. The material in Chapter 3, and particularly on pages 4 and 5 thereof, is unclear on whether assessments of the need for secondary values will be made on a site-specific basis. At the top of page 4, the text indicates that a secondary value will not be considered if there is no evidence of the analyte in the effluent of the discharger. In other places, though, such as the list of questions at the top of page 6, it seems that staff will consider whether ***any*** surface waters are affected by a particular substance (e.g., causing a waterbody to be placed on the 303(d) list). If a substance has shown up as a concern in one part of the state, perhaps a particularly industrialized portion, should it be a candidate for secondary values in other parts of the state where it has not appeared? I don't think so, but the text is unclear on this, in my view. (Walter Kuhlman - Municipal Environmental Group)

*Response: The Chapter 3 text and flowcharts have been modified to clarify the Department's approach to using secondary values. As mentioned in the response to Comment 19, secondary values are calculated using available data. However the application of those secondary values will be done on a local basis considering the conditions of s. NR 106.05(1)(b)1-6. While a secondary value may be available for a particular substance, a permittee will not receive a limit for that substance if none of those six conditions are met or if the substance is not detected in the effluent.*

## Chapter 3B - Assessing Effluent Data For Substances With Aquatic Life Secondary Values Response to Comments 1/6/98

1. Page 11 - Point 5: The 303(d) list is an evolving list that is scheduled for updates every two years. It is possible that the permitting process generates data or analyses that were not available during the previous update. The 303(d) list should not be used as proof or supporting evidence that there is no risk at a site.

   *Response: The 303(d) list should be used as one of the demonstrations regarding environmental risk, but we agree that it should not be the only reference.*

2. The six-steps in NR 106 seem to be a lot of trouble to avoid a limit.

   *Response: The six steps were not included in the code as a means of "avoiding a limit." On the contrary, they were included to ensure that a limit is included when it is deemed environmentally necessary. In recent times, regulators have been chastised by the public for unnecessary regulation. The procedures outlined in s. NR 106.05(1) are an attempt by the Department to be environmentally conservative while still recognizing the uncertainty surrounding the secondary value itself.*

3. Page 16: Number 7 - Redlined Question: Human Cancer risk difficult to quantify.

   ***Response: Cumulative cancer risk is no longer a trigger to calculate secondary cancer values. The process for calculating cumulative cancer risk in s. NR 106.06 (8) is specifically (by rule) restricted to limits based on human cancer criteria (see definition for the variable "Limit$_{i,n}$." Secondary values do not enter into this process at all.***

4. Page 16: Number 7 - "If no, ....." ~~go to step 8 (availability of secondary values.....~~ use BAT and Pollution Minimization for EPA A & B plus pesticides.
   - Potential cancer compounds on EPA Database A & B list minimize to as much as possible.
   - Use BAT requirements to minimize discharge to the environment.
   - No numerical secondary limit.

   *Response: This section of the guidance has been clarified based on revisions to the flowchart.*

5. Pages 20,21,22: The flow chart on pages 20-22 indicates a separate evaluation for significant ecological or environmental risk even after it's decided that the receiving water is not on the 303(d) list. So maybe I am reading too much in the statement on page 11. I would prefer the paragraph on page 11 to state that if Department staff calculating effluent limits believed there is the potential for significant risk, re-evaluation of inclusion on the 303(d) list may be warranted and if significant risk is found, the site will be scheduled for addition to the 303(d) list and limits based on secondary values may be established.

*Response: The flow chart has been edited for clarity. Regarding the inclusion on the 303(d) list, any information Department staff obtain which suggests that a surface water is not meeting water quality standards should be forwarded to the Chief of the Water Quality Standards Section (WT/2).*

6. The interpretation of the code language on how to review secondary limits is inefficient. It also seems to be anti-environment since it goes to great lengths to require proof of the need for a secondary limit when a high concentration of a substance with secondary values should be reason enough for concern.

*Response: The high concentration of a substance with secondary values is not reason enough for concern. Since insufficient information is available for the calculation of water quality criteria for that substance, the secondary value process may be thought of as a priority-setting procedure. This is similar in concept to the types of priority setting which must have taken place in the past to decide whether or not to perform any additional testing of a substance to calculate criteria that are now existing. If there is no (or insufficient) environmental concern to justify the calculation of secondary values for a particular substance, there will probably be no priorities placed upon generation of additional toxicity or bioaccumulation data for that substance. The environmental concern is used to establish those priorities, so sources such as s. NR 106.05 (1)(b) may be used as a guide to establish those priorities as well. If no environmental concerns exist, the lack of calculation of secondary values is not "anti-environment." In reality, this is more appropriately a "common sense" approach.*

7. The code, ch. NR 106, procedures for secondary values as stated are effectively law. But there is room for interpretation and implementation of the rules. Implementation is altogether different from the rules themselves. So how the procedures are implemented is a function of practical implementation procedures.

*Response: This is one of the reasons an implementation plan is being prepared, to assist staff in making correct decisions. In this case, part of that includes making correct decisions under the law, so caution should be used to avoid making interpretations contrary to the rule language..*

8. The second sentence in second paragraph appears to be incorrect since it states "after mixing" and this would not apply to acute secondary limits. Also the way this sentence is worded is awkward since it refers to "only determination to make.....based on reasonable potential.....to exceed the criteria..." It seems that we do make many other determinations as indicated above and as required in the code.

*Response: It should be noted that mixing is used in the context of acute toxicity-based limits. Where criteria are available, limits equal the final acute value (two times the acute criterion) because it is assumed that a discharge at the final acute value meets the acute criterion after mixing within a short distance of the outfall. A secondary acute value is applied in the same context as the final acute value. In addition, where zones of initial dilution are applicable, dilution is considered even in the calculation of acute-based limits. The text was corrected to add the phrase "where applicable."*

9. It is also interesting to see that "reasonable potential" is correctly defined in the next sentence and then "reasonable potential" is defined to be just the opposite in the following sections for secondary values.

*Response: In terms of secondary values, the phrase "reasonable potential" goes beyond just a simple comparison of numbers. The evaluation of environmental concerns or potential presence in a discharge is used to establish the "reasonableness" of the calculation of secondary values and/or limits. This is not a "just the opposite" type of review, it is an additional process which must (by law) take place prior to any numerical comparisons. This subject is also addressed or considered in the discussion of chapter 8 on monitoring requirements.*

10. The third paragraph explains that secondary values are based on less justification or a lesser database and suggests that one of six other criteria on a qualitative basis must be met before a limit is recommended. The exact wording is "shall be imposed in a WPDES permit when one or more of six." see comments 3, 4, 6 and 7 in the previous section.

*Response: This interpretation is correct, but the referenced numbers may be changed because of re-arrangement or combination of comments and responses. The main point, namely use of the word "shall," is correct.*

11. It seems that many of these secondary values could be put in much better perspective if we compare them to other criteria. If the other criteria are more restrictive, do we really need to get this drawn out on how we handle the secondary values?

*Response: Unfortunately, one does not know how restrictive (or lenient) the secondary values are compared to criteria. Once they are calculated, it may be fairly clear or easy to say that existing criteria may or may not control over any secondary values depending on the resulting limits. Where criteria are more restrictive and the result is attainment of secondary values, we agree that the pursuit of additional data to modify secondary values may not be much of a priority.*

12. The discussion somewhat glosses over "representative data" issues. Based on reviews that I participate in, it is a significant decision that affects the remainder of your process. On the narrative flow chart, I suggest that consideration of Representative Data and NR 106.05(1)(b) between steps 1 and 2. Then the bolded note can be included in the text for the decision and the discussions in time 5 "Yes" then is one of obtaining sufficient data to proceed to step 6.

*Response: The flow charts have been modified to clarify the representative data issue and where it fits into the process. Obviously, if no representative data exist on a discharge, there may exist priorities that are different than the immediate evaluation of the need for secondary value-based limits. Where required (using chapter 8 of the Implementation Plan as an example), new or better effluent data need to be collected before environmental concerns can be related to a particular discharge.*

13. Item 4: I suspect that the discussion about representative data in this item is a bit of a red herring. In the determination of "reasonable potential," the permit drafter should

consider whether the data is of adequate quantity and quality. If it is not, then they should not evaluate the six conditions because there is too much uncertainty.

*Response: We are in agreement with the comment. the flowcharts have been revised tc better define the order of review.*

14. Again, aside from a questionable legal basis. we are encouraged by the DNR's approach to use of secondary values as set forth in this Chapter. We certainly concur that the DNR should be cautious about imposing limits based on secondary values unless there are demonstrated ecological or environmental impacts.

We do, however, object to a statement made in paragraph 1 on the bottom of page 10 and top of page 11. As drafted, this section provides that "if there are toxicity test failures, a secondary value-based permit limit is justified, especially if the permittee has identified a substance having a secondary value as being the cause for the toxicity." We believe the word "especially" should be deleted so that a limitation based on a secondary value is justified *only* if the substance has been identified as the cause of toxicity. This is not to suggest, however, that the DNR could not require some type of toxicity evaluation to identify the cause of the toxicity. However, this evaluation should be performed and the cause of the toxicity identified before a chemical specific limitation is imposed. (Wisconsin Manufacturers and Commerce)

*Response: The text has been revised in agreement with this comment.*

15. Along these same lines, the phrase "if the substance of concern has been identified as the source of toxicity" should be inserted at the end of the first sentence in the second paragraph on the top of page 13. (Wisconsin Manufacturers and Commerce)

*Response: The text has been revised in agreement with this comment.*

16. Another concern relates to notifying the permitee that it may be subject to a limit based on a secondary value. As proposed, the Implementation Plan would not provide "preliminary limits" based on secondary values. While we understand the difficulties in providing notice at this stage of the process, we would request that the permittees be provided with an indication as whether secondary value based limits may be included in the permit at some point prior to receipt of a draft WPDES permit. This would provide more time for the DNR and the permittee to discuss the basis and need for a limitation based on a secondary value. (Wisconsin Manufacturers and Commerce)

*Response: The calculation of "preliminary limits" is intended to be a quick-screen process using effluent and receiving stream data from the most recent water quality-based effluent limits recommendation. While there will be exceptions, those data may typically be 3-5 years old and may not account for current effluent or receiving water conditions. The purpose for these "preliminary limits" is to provide the permittee and/or a consultant with information which may be considered in determining if additional pre-permit monitoring may be advantageous. In order to send application materials in a timely manner, the Department staff will not be evaluating the requirements of s. NR 106.05(1)(b) to determine if substances need secondary values or if secondary value-based limits are warranted until a completed application package has been received.*

*Only then can decisions be made using contemporary receiving water and effluent data. For these reasons, it is the Department's intention to notify the permittee of the potential for secondary value-based limits at the time a draft permit is distributed for review. Adequate time should be available for discussions related to proposed secondary value-based limits prior to and during the public-notice period.*

17. The statement that "the Department will be more cautious about including limits in permits unless there are more qualitative demonstrations available that suggest limits are truly needed" is positive. The procedures outlined in Chapters 3A, 3B, and 3C generally reflect a cautious approach. However, we do have some questions and comments on specific provisions. (Wisconsin Paper Council)

On pages 10-11, in the discussion relating to the use of whole effluent toxicity (WET) test results, it is stated that "If there are toxicity test failures, a secondary value-based permit limit is justified, especially if the permittee has identified a substance having a secondary value as being the cause for toxicity (via the TIE process)." On page 13, it is stated that "If there is a failure in a whole effluent toxicity test (and confirmed by retesting), effluent limits may be calculated based on secondary values." (Emphasis added.)

The two quoted statements are inconsistent to the extent that the first statement appears to say that a WET test failure will result in a secondary value-based limit, while the second statement says that a limit may be imposed. Within the broader context of the chapter, it appears that "may" is the proper interpretation. The statement on pages 10-11 should be made consistent with the statement on page 13. (Wisconsin Paper Council)

*Response: The text and flow diagrams have been revised to provide clarification on this matter. It is the Department's interpretation of s. NR 106.05(1)(b)1. that positive whole effluent toxicity data necessitates the derivation of secondary values and consideration of the potential for an effluent to exceed those values. It should be pointed out however, that a limit may not be necessary if there is no reasonable potential for that limit to be exceeded.*

18. The "Narrative Flow Chart For Evaluation of Need For Secondary Value-based Limits In Permits" on pages 14-19 makes it clear that an evaluation of WET data does not occur until several other steps have taken place. Most importantly, the substance must have been detected in the discharge using appropriate and approved test methods. The statements earlier in the chapter indicate that a WET test failure alone, considering no other information, is sufficient to trigger a secondary value-based limit. These statements should be modified to make clear that consideration of WET test results takes place within the context of other information and that a WET test failure alone, with no other information relating to a specific substance, is not sufficient to trigger a limit. Specifically, language should be added indicating that a secondary value-based limit may be required only if the permittee has identified a substance having a secondary value as being the cause of whole effluent toxicity. (Wisconsin Paper Council)

*Response: The text and flowchart have been revised in agreement with this comment.*

19. The discussion regarding WET test results on pages 17-18, as well as the previously referenced statements, offers little guidance regarding the use of old WET test results. There were many problems associated with WET testing procedures that resulted in failures in the past that were unrelated to effluent toxicity. There may still be test failures unrelated to toxicity. The discussion of test data that is representative of normal operating conditions should establish some parameters for the use of WET test data to insure the use of recent and reliable information. (Wisconsin Paper Council)

*Response: We agree that this should be part of the "representative data" compilation.*

20. Discussion on pages 11 and 15 refer to the consideration of "other information" which indicates that the industrial category or subcategory discharges the substance. Consistent with a previous comment, the language on page 11 should be modified to make it clear that the consideration of "other information" takes place within the context of other decisions and that "other information" alone is not sufficient to trigger a limit. Further, additional guidance should be provided regarding the type of information that is acceptable or unacceptable. (Wisconsin Paper Council)

*Response: The text and flow diagrams have been revised to show that this is just one step in the process of determining if there is an environmental problem to address with secondary values. Step 6. of the the flow diagram beginning on Page 3B-12 is a sequential step which feeds into other review steps. Step 6 does not independently lead to the calculation of a secondary value or an associated limit.*

21. I'm a little confused about the role WET plays here. One error -- the decision point in Step 10 of the flow chart (sec_val3.vsd) indicates two "no's" so this might be part of my problem. The other point is, for the WET failures to be significant, there would also need to be information that a specific substance with a secondary value is the likely cause of the WET failure, right? This seems to be indicated in the first section, but not in the narrative flow chart. Also, in the narrative flow chart, the issue of WET monitoring frequency seems to relate to the likelihood of a substance with a secondary value being in the discharge as determined by information other than existing WET tests.

*Response: The text and flowchart have been revised in agreement with this comment.*

22. This chapter describes "assessing effluent data for toxic substances with aquatic life secondary values (acute and chronic toxicity)." It does not mention secondary values based on human health, wildlife, or taste and odor. Will there be secondary values based on human health, etc..? I see that it does mention that we should consider if the cumulative cancer risk is being exceeded to determine if a limit should be included based on acute or chronic toxicity - I'm a little confused by this.

*Response: Secondary values may be available based on wildlife or human health, but not based on taste and odor since the latter does not represent toxicity as defined in the context of NR 105. The flowchart has been revised to reflect the impacts that need*

*to be evaluated and when for consideration of wildlife and/or human health secondary values.*

23. NR 106.05(1)(b) addresses determination of the need for limitations based on secondary values. Implementation of this portion of Wisconsin's rules is discussed in Chapter 3B of the proposed Implementation Plan. U.S. EPA commented on NR 106.05(1)(b) that use of the six conditions contained in this part of Wisconsin's rules would not be consistent with the Guidance if they were used as an alternative reasonable potential procedure. In its response to U.S. EPA's comments, the DNR indicated that some changes were made to the rule language and that implementation would be conducted in a manner consistent with the Guidance. However, the procedures contained in the proposed Implementation Plan are not consistent with the Guidance. The proposed Implementation Plan uses the six conditions as and additional reasonable potential procedure. In essence, under the proposed procedures, in order for a limit to be imposed, it would have to be demonstrated that: 1) one of the conditions applied, and 2) that the reasonable potential procedures indicate the need for a limit. Under the Guidance, if a pollutant is present and there is acceptable toxicity data for a daphnid, a Tier 2 value must be generated and the Tier 2 value used to determine reasonable potential based on the established procedure. There are no provisions in the Guidance for "justifying" a limit based on a Tier 2 value using some other line of evidence. Consequently, as proposed, the procedures in Chapter 3B are neither consistent with nor as protective as the Guidance. In general, the six conditions, as they are used in the draft Implementation Plan appear to be inconsistent with Federal regulations at 122.44(d)(1)(vi). (U.S. EPA - Region 5)

*Response: The flow diagrams and corresponding text has changed since the first draft of the Implementation Plan to clarify the Department's intentions with respect to establishing limits based on secondary values. However, the general nature of Wisconsin's approach remains the same in that limits based on secondary values will be imposed when there are local environmental concerns related to the discharge of a given pollutant along with a reasonable potential for that substance to be discharged at a concentration which may cause adverse impacts to fish, aquatic life, wildlife, and/or humans inhabiting or utilizing the receiving water. The language contained within s. NR 106.05(1) is consistent with that philosophy and is the basis for the language and associated flow diagrams contained within Chapter 3 of the Implementation Plan.*

24. With respect to the narrative flow chart, step 3 conflicts with the Guidance, Appendix F, Procedure 5, Reasonable Potential. The procedures in the Guidance are not restricted to only the pollutants of initial focus in Table 6. If a pollutant is detected and there are toxicity data for a daphnid, the procedures for developing a Tier 2 value apply and the Tier 2 value should be used to determine if reasonable potential exists.

*Response: The flowchart and text have been revised to "de-emphasize" U.S. EPA's list of pollutants of initial focus (Table 6 in the March 23, 1995 Federal Register).*

25. Similarly, step 4 implies that if a secondary value is not currently available for a pollutant, then no further action is necessary to determine if a secondary value is needed (a permit may request development of a secondary value at their discretion).

This is not consistent with the Guidance (Appendix F, Procedure 5, Reasonable Potential - 5.C.1) A similar comment applies to step 8. (U.S. EPA - Region 5)

*Response: The text and flowchart have been revised in agreement with this comment.*

26. As written, step 5 could be used to discount data generated by a facility indicating the presence of a pollutant if the pollutant is not expected. This is inconsistent with the reasonable potential procedures in the Guidance. (U.S. EPA - Region 5).

*Response: (NOTE: Step 5 of the flow diagram in the previous draft of the Implementation Plan has been renumbered to Step 6.) The Department strongly believes in the need for representative data to make decisions on effluent limits. When considering whether or not data are representative, it is necessary to know if a substance is expected to be present or not. In those cases where a substance is detected, but NOT expected to be present, it is necessary to conduct additional monitoring to minimize the risk of imposing limits based upon anomalous data The flow diagram and associated text provide that latitude to Department staff reviewing effluent data. Any additional monitoring conducted by the permittee and/or the Department will be used to further evaluate the available data to determine if they are representative of normal operating conditions.*

27. In general, the narrative flow chart seems to rely on a number of considerations that are not normally part of a reasonable potential determination and are not included in the procedures contained in the Guidance. (U.S. EPA - Region 5)

*Response: The comment is correct. The new approach for calculating and implementing either criteria or secondary values warrants a re-definition of the way things are "normally" done.*

## Chapter 3C - Development of Site-Specific Water Quality Criteria and Modification of Secondary Values
## Response to Comments
## 1/9/97

1. In our comments on the original rule package (letter to Beth Goodman; October 30, 1996) we asked that the Department provide guidance on how it will implement the site-specific modification provisions. Of particular interest was the level of effort required to demonstrate that, for BAF modifications, the fraction of the total chemical that is freely dissolved in the ambient water is different than that used to derive the system-wide BAF.

   This issue has not been addressed in Chapter 3C and we again request guidance on this issue. We understand that there may be a question regarding whether this guidance should be provided by U.S. EPA or by the Department. In the absence of U.S. EPA guidance, the state should provide its own guidance, subject to future change. (Wisconsin Paper Council)

   *Response: With regard to further guidance on site-specific modifications, the Department believes that the two references noted in s. NR 105.02(1) (See 40 CFR Part 132, Appendix F, Procedure 1 and U.S. EPA Water Quality Standards Handbook - Second Edition [August 1994 -EPA/823/B-94/005a]) provide the spectrum of available guidance on this topic. Furthermore, U.S. EPA has advised the Department that site-specific modification language was included in the Great Lakes Water Quality Initiative (Federal Register Vol. 60, No. 56, March 23, 1995) because it is* ***theoretically possible*** *to change a BAF and a corresponding criterion on a site-specific basis. However, U.S. EPA and the Department believe that such an effort is extremely difficult because wildlife and human health criteria must offer adequate levels of protection for organisms using an entire watershed, not just the locale in which a discharge point exists. Factors that complicate the analysis, but must be addressed, include site characteristics, protection of downstream uses, and the mobility of wildlife and their prey organisms. With that in mind, the Department does not believe that many permittees will seek such a modification and has not attempted to prepare any standard guidance on the development of site-specific modification to BAFs. At this time, the available guidance is limited to the citations listed above.*

2. As a general comment, this section spends a great deal of time comparing the alleged costs of the different site-specific criteria methodologies. This discussion does not add any useful information to the document since it is speculative. Such a discussion is also misleading because it implies that costs should direct the choice of method in deriving a site-specific criterion. Each of the methods is intended to account for a particular situation, they are not interchangeable. Which method is appropriate for use is a scientific question dictated by the circumstances. (U.S. EPA - Region 5)

   *Response: All references to the potential cost of the various procedures have been removed.*

# Chapter 4 - Metals
# Response to Comments
# 1/30/98

To Be Provided ASAP

## Chapter 5 - Receiving Stream Flow
## Response to Comments
## 12/23/97

1. Comment: Why is a harmonic mean streamflow used to calculate human health criteria-based limits? The criteria are based upon long-term exposures, so why should a harmonic mean streamflow be used since it is considered (in the way it's calculated) to be representative of daily flow variability? Daily flow variability doesn't really matter when looking at long-term criteria.

*Response: The issue of design streamflow for human health criteria implementation was first addressed in EPA's 1991 Technical Support Document (p. 88), but the document didn't go into much detail on why the harmonic mean flow was appropriate. Fortunately, the GLI Supplementary Information Document (SID) goes into more of the needed detail (pp. 282 - 5).*

*According to the SID, an arithmetic mean streamflow is not appropriate because streamflows are not normally distributed. If they were normally distributed, meaning the frequency of flows would fall into a typical bell curve, the arithmetic mean flow would be applicable. In reality, though, it is the logarithms of flows which form the bell curve, meaning flows are typically log-normally distributed. The most frequent flows are between the minimum and maximum, but closer to the minimum, meaning the curve "tails off" on the upper end. This is actually the same way concentrations of substances generally vary as well.*

*With a log-normal distribution, the appropriate "mean" would usually be the geometric mean (or, in some cases, the median). However, in the limit calculation process, there are actually two variables to consider. Not only does streamflow factor into the calculations, but effluent flow (or effluent loading) does as well. The problem with using a geometric mean is that the river flows and effluent flows/loadings do not vary at the same time, or it can be more accurately stated that the problem occurs if the two do not vary similarly.*

*Certainly for industries, this common variation does not occur. Industrial discharges are generally not greater during high flow periods, except where the discharge rate can be "artificially" controlled, such as in a fill-and-draw discharge. Normally, though, the industrial influent flow does not increase during rainfall / runoff periods. Instead, flows may vary based on other factors such as production (seasonally or even daily) or external economic conditions. The GLI concern is that high effluent loadings may not occur when streamflows are high, even for a long period of time. Since the effluent and stream parameters do not vary similarly, EPA/GLI has determined that the harmonic mean approach is more appropriate.*

*For municipalities, though, there could be some similarities in the effluent and stream flow variability patterns. One of the issues faced by the Department in past years was the implementation of mass limits based on average flow conditions, and the concerns of some municipal permittees that mass limits cannot be met during wet weather periods. It can be concluded that many municipalities have effluent flow/loading increases during rainfall/runoff periods, but as municipalities do a better job of controlling infiltration and inflow, those variations will be reduced. After all, industrial*

*contributions to municipal sewer systems should vary similar to direct industrial discharges to surface waters, and there is no real reason to believe that residential flow contributions vary with wet weather either.*

*Given all of this, the differences in flow variability between effluents and streams support the use of harmonic mean flows, even for long-term criteria, the argument made by EPA/GLI in the SID.*

2. Please describe how the 7-$Q_{10}$ compares to the Harmonic Mean.

*Response: Normally, one would expect that the two parameters aren't really related at all. The 7-$Q_{10}$ is a flow exceeded a certain percentage of the time based on a statistical evaluation of return periods, while the harmonic mean is related to average flows (both arithmetic and geometric, another way to estimate harmonic mean is as the square of the geometric mean divided by the arithmetic mean). EPA's formula that estimates harmonic mean based on a function of both drainage area and 7-$Q_{10}$ is as much a coincidence as anything. In reality, one can picture a relationship between mean flow and drainage area because of the concept of average runoff over an area of land (drainage area). On a long-term average basis, the runoff from a large area of land will be greater than over a small area and typically this is proportional. Usually the relationship is not always exactly the same because of differences in soil characteristics and land use, but the drainage area - to - mean flow ratio holds up fairly well across the state. Building in a factor such as 7-$Q_{10}$ to the harmonic mean estimate is more likely a product of the comparison of various factors to see which one fits a relationship estimate best.*

*A similar exercise took place in the process of comparing 7-$Q_2$, 30-$Q_5$, and now 90-$Q_{10}$ in the determination of flows used for calculating limits based on wildlife criteria. The real intent of the exercise was to see if there was a parameter for which information was already available (such as 7-$Q_{10}$ and drainage area) that could be used to estimate an unknown quantity such as harmonic mean. Since the relationship holds up over large and small streams and/or drainage areas, the parameters were reasonable for estimating harmonic mean flows.*

3. After viewing the graphs of the relationship between Harmonic Mean and 7-$Q_{10}$, it appears that the estimate is less reliable when the 7-$Q_{10}$ is less than about 50 cfs. It may be reasonable to consider this in your decisions about when to pursue site-specific harmonic mean values.

*Response: This is a reasonable suggestion. Actually, it isn't that the estimate is "less reliable," it's that there may be more of a standard error in the estimate that would warrant being more conservative in the estimate of a harmonic mean and especially in its application to the recommendations for a particular permit.*

4. Can you place the harmonic mean formula in the document?

*Response: The formula can be found in Chapter 5, in the last sentence of the discussion of Harmonic Mean as well as the first sentence of the RECOMMENDATION on the same page.*

5. SITE-SPECIFIC FLOW ESTIMATE (page 3): If a limit is triggered, verify that the data is representative before putting effort into calculating the site-specific harmonic mean.

*Response: This is a valid point, when the term "data" refers to effluent concentration or quality data. If a harmonic mean is estimated using drainage area and 7-$Q_{10}$, the extra work in deriving a better site-specific estimate of harmonic mean with an entity such as USGS is only warranted if the effluent data are high enough to trigger permit limits based on the estimate. If the substance being evaluated wasn't detected in the effluent, or was detected at concentrations far below limits based on the default flow, it is a foregone conclusion that the need for a more precise streamflow estimate is lacking. However, any decision on streamflow estimation needs should also be considered in terms of the reliability or "representativeness" of the effluent data as well, so we are in agreement with the comment.*

6. Please include a list of the 70 sites with harmonic means in the Imp. Plan. Also, add this information to the low-flow database.

*Response: This information will likely be added to the Department's ongoing summary of streamflow information. In the past, this was used mainly for low flows, but it can easily be adapted to accommodate mean flows as well. Since these flows would be updated over time, it makes more sense to include harmonic flows with the other low flows rather than in the implementation plan.*

7. Calculation of a specific harmonic mean at Waukesha is a lot of work because of nearly 8,000 data points. Who will be responsible for this?

*Response: Since Waukesha has a continuous record gaging station, this flow has already been calculated from the available (current) database. Current data is certainly an issue at Waukesha given changes in upstream discharge conditions related to growth in communities such as Brookfield and Sussex. In any event, the calculations have already been performed.*

8. The GLWQI rule package made a number of significant changes in the receiving stream design flows used in calculating water quality-based effluent limitations and this Chapter generally does a good job of summarizing those changes.

One concern in this regard relates to the harmonic mean used in calculating human health and taste and odor based effluent limitations. As noted in the Implementation Plan, there is a limited amount of harmonic mean data available. We are continuing to evaluate the proposed calculation of "default values" and will respond shortly if we have additional concerns in this regard. Also, we would like to explore an alternative to requiring the permittee to develop the site-specific flow value if published data is unavailable. (Wisconsin Manufacturers and Commerce)

*Response: The comment is duly noted. If and when and specific suggestions or comments are received, we shall consider them along with those already received and answered.*

9. Permittees currently have limited understanding of the stream flows used to calculate toxics limits. With the changes resulting from the adoption of GLI-related rules, they

have the option of using a default harmonic mean flow value or they can develop a site-specific flow estimate. We ought to have guidance available for permittees who receive monitoring or a limit for substances using the default harmonic mean flow value.

*Response: The guidance has been revised to reflect this comment.*

10. Will we hold up a permit while a permittee contracts to have site-specific work done or do we plan to modify a permit when new data are available? Might a permittee adjudicate these limits to buy time to do site-specific work?

*Response: It is not our intent to encourage procedures that delay permit reissuance or other related activities. The permittee has the ability to do site-specific work at anytime, be it streamflow estimation or verification, mixing zone studies, or collection of additional effluent data. The permittee has the ability to request permit modifications at any time where it suspects or can demonstrate that any revisions in these parameters significantly affect permit conditions. Whether it is necessary for the permittee to pursue this via adjudication is questionable since the same result may be achievable through a modification request (without adjudication), but that is for the permittee(s) to decide. Our intent should not be to invite delays in permit processing through this, rather our charge should be to respond to questions or requests as they arise, hopefully while meeting the permit reissuance schedules assigned to us.*

11. Under the "Wildlife" section, the first sentence does not make sense as written. I think that the second "or" should be "if" to read as follows: ... *85% of the 7-$Q_2$ if 30-$Q_5$ is unavailable.*

*Response: This change was made in the guidance.*

12A. Do we have any situations with effluent dominated streams where the full stream flow is used? We should have guidance on when we will use full Qs versus 25%.

12B. Page 1 "fish and aquatic life" section - previously we would base the chronic dilution of 25% or 100% on effluent dominance. In a conversation with Eric Rortvedt, he has indicated that this will no longer be the case and it should be based on a demonstration of adequate mixing. This should be included in this part of the implementation plan. Also, the code indicated that the permittee needs to make a demonstration to get greater than the 25%. Will the permittee have to make this demonstration in an effluent dominated situation? Can this be a call by field staff or do we strictly have to follow the code language? And do we have guidance to give the permittees if they wish to make such a demonstration?

NOTE: Comment 5 in chapter 6 is basically the same question, and shall also be answered here: Do we use 25% of the 7-$Q_{10}$ for Qs unless we justify a higher number >25%?

*Response to Comments 12A and 12B [Chapter 5] and Comment 5 [Chapter 6]: Unless an actual mixing zone study is done, the only case where some kind of assumption of greater than 25% of the streamflow should be used in calculating limits is where there is an obvious case of the effluent plume's velocity and area mixing immediately with the*

*entire stream. This is something that could be obtained visually, but preferably by a regional biologist (or someone knowledgeable about mixing zone studies). This is more a qualitative judgment than one that is scientifically obtained.*

*The visual concept of complete mixing is important because just because a stream's flow is small doesn't mean that the stream itself is small in terms of area or volume. There are examples of streams in southeastern Wisconsin (Des Plaines basin), central Wisconsin (Eau Pleine basin), the Upper Rock basin (South Branch Rock River at the millpond in Waupun), and in the Lower Fox (WI) basin (Duck Creek, East River) where the receiving water flows are very low but the streams themselves are fairly wide and/or deep. An effluent discharge plume might not immediately mix with the entire stream, even by eye. On the other hand, large discharges to narrow streams such as at Lake Mills warrant use of greater than 25% of the streamflow because the streams are small enough that immediate and complete mixing is obvious to the trained eye.*

*Therefore, 25% of the streamflow should be used in **all** cases except where either a mixing zone study was performed or where a formal determination was made that rapid and complete mixing takes place immediately below the outfall.*

*It should be noted, however, that where effluent flows are much higher than streamflows, a situation that is normally indicative of an "effluent-dominated" condition, there shouldn't be much difference in the effluent limits whether 25% of the streamflow, 100%, or any percentage in between is used. Given that water quality-based limits are rounded to two significant digits (current Department policy), the effort in evaluating appropriate percentages should be considered in conjunction with the impact that percentage has on the limits one calculates. If the impact is small or non-existent, the extra workload in the evaluation process is difficult to justify, that goes for not only the Department efforts to evaluate discharge plume behavior, but also any efforts on the permittee's part to perform a mixing zone study.*

13. To determine acute and chronic WET testing based on Qs:Qe (100:1, 1000:1, etc) do we still use the full 7-$Q_{10}$? Please clarify in the document.

*Response: Full 7-$Q_{10}$ is still used to determine the need for WET testing, as per the June 30, 1997 WET guidance document (Revision #1). This term has nothing to do with the percentage of flow used to calculate chemical-specific limits. This did not change with the most recent revisions to the codes.*

# Chapter 6 - Effluent Design Flows for Mass & Concentration Limits
# Response to Comments
# 1/30/98

To Be Provided ASAP

## Chapter 7 - Mixing Zones
## Response to Comments
## 1/15/98

1. There needs to be list of the 22 BCCs included in this section.

   *Response: A list has been provided at the end of Chapter 7 (See Attachment 7-1.).*

2. How much time does it take a Great Lakes discharger to complete a mixing zone study?

   *Response: Mixing zone studies are very site-specific and there is no easy way to predetermine how much time it takes to comple one In the Department's mixing zone guidance document, there are several factors that must be considered when determining what level of effort is need for such a study. Some of the questions that must be evaluated when designing a study include:*

   - *Is a diffuser needed to ensure rapid and complete mixing?*
   - *Is the discharge to a flowing stream or a non-unidirectional lake?*
   - *Is the discharge to a flowing stream which drains into a lake prior to complete mixing?*
   - *Is a simple model adequate or is there a need to conduct dye studies, other field dispersion studies or extensive modelling (i.e., CORMIX)?*
   - *Can correlations be drawn between study results and low-flow years?*
   - *Is the discharge into the turbines or tailraces of a dam?*

   *If a discharger chooses to conduct mixing zone studies in order to seek modification to the critical stream design flow used to establish effluent limits, they are encouraged to submit a study plan to the Department for review prior to initiating such a study. Such plans should be directed to:*

   *Water Quality Monitoring Section*
   *Bureau of Watershed Management*
   *P.O. Box 7921*
   *Madison, Wisconsin 53707-7921*

   *Review of the draft study plan and all subsequent reviews will be conducted by a member of that Section who shall provide a final determination of any changes to the critical stream design flow to be used.*

3. I'm not sure that this comment/issue should be addressed in this document, but it must be addressed. Changes to NR 105/106 included revisions to the way the WET compliance is determined when a ZID had been given. I don't think these revisions were made because of the GLI, so maybe this document is not the right place to share this information. However, permit drafters, area staff, and WQBEL calculators should be made aware of these changes. Also, I believe permit merge language needs to be updated to reflect these changes. Permit merge language may also need to be made to reflect other WET, GLI-related changes to NR 105/106 (e.g., LC50s/IC25s and TUa/TUc).

   *Response: Please refer to the Whole Effluent Toxicity Program Guidance Document dated June 30, 1997. Copies are available from the Bureau of Watershed Management Biomonitoring Coordinator (Currently: Kari Fleming).*

4. On page 2, the discussion in the first paragraph makes seemingly conflicting statements about the likelihood that facilities will get a limit based on human health and wildlife criteria. The points about criteria and limits below the level of detection that may go too far. If the chemicals of concern for human health and wildlife are metals, the limits may be achievable but involve 'clean" sampling techniques. The organics present more of a problem. I suggest modifying the statements by inserting "achievable by currently technology" after "level of detection". The last sentence about any detection of a substance resulting in a limit is a problem. A detection may exceed the trigger, but the permit drafter still needs to evaluate whether that detection is "real" and representative. If it isn't, the permit should not have a limit.

   *Response: The guidance document was revised as needed to add the additional phrase relating to levels of detection, and to clarify the representative data evaluation.*

5. The discussion of alternative mixing zone demonstrations on pages 1-2 recommends that for human health and wildlife criteria, the only way for a discharger to obtain a stream flow greater than the 25% default would be for the discharger to use an in-stream diffuser or to discharge directly to turbine inlets. While this level of effort may be appropriate for fish and aquatic life criteria where the 25% default has some scientific basis, it is totally inappropriate for human health and wildlife criteria where the 25% default has no scientific basis and is simply another margin of safety.

   For existing dischargers with existing limits based on human health or wildlife criteria, the alternative mixing zone demonstration should be minimal. In this situation, 100% of the allowable flow would already have been determined to be protective and the additional margin of safety provided by a 25% restriction would be unnecessary.

   In other discharge situations, the guidance should allow alternate flows above the 25% default without installation of a diffuser or discharge to a turbine inlet. We would like to work with the Department to explore options for alternative mixing zone demonstrations.

   *Response: The question of scientific defensibility of the critical stream design flow used to establish wildlife and human health limits was addressed in detail during the Advisory Committee meetings. Yet, the rule changes were promulgated and became effective on September 1, 1997 to be consistent with the Federal Guidance. Accordingly, this response to comments and the Implementation Plan itself will not be the vehicle to debate the merits of the rule language. However, the Department believes that any request for additional flow for wildlife and human health limits should be linked to any acceptable demonstration which supports a higher fraction (>25%) of the streamflow available for the protection of aquatic life from chronic effects.*

6. The discussion on pages 2-4 regarding the 10 ft/sec minimum velocity requirement for zones of initial dilution is generally positive and attempts to respond to a comment that we submitted on the rule package. However, we disagree somewhat with the discussion about repulsive effluents on pages 3-4.

   On page 3, it is indicated that the key question is "Are toxic effluents repulsive?" We disagree. The key question should be "Will there be any adverse impacts to aquatic life if exposure is limited to less than one hour?" Simply evaluating the attraction/repulsion of an effluent will not address the impacts question. Specifically, the presence of aquatic life in an effluent does not mean that the aquatic life is adversely impacted.

A discharger should be allowed to demonstrate that there is no adverse impact on aquatic life if exposure time is limited to less than one hour. In the case of existing dischargers with ZIDs this should be a straight-forward demonstration that there are no acute impacts.

In our October 30, 1996, comments we requested guidance on new code language relating to endangered species protection when evaluating mixing zones. This chapter indicates that guidance on this issue will be developed in the future. Please send us a copy of draft guidance on this issue when it is available. (Wisconsin Paper Council)

*Response: The Department maintains its concern that certain discharges may result in attraction of fish or other aquatic life species into the effluent plume. In fact, it is possible that the attraction stimulus is stronger than a repulsive stimulus which poses an even greater risk to the fish and aquatic life community. For this reason, the Department believes that a minimum discharge velocity of 10 ft/sec is justified to prevent any such organism from being exposed to lethal concentrations of a pollutant. The minimum discharge velocity of 10 ft/sec. will induce rapid mixing which minimizes exposure through dilution and it will also preclude organisms from inhabiting that area due to the inability to remain stationary at that velocity.*

*With that said, however, the Department may consider an alternative minimum discharge velocity if a discharger can demonstrate that all organisms will not spend more than one hour in the effluent plume and that the maximum discharge of a pollutant or mixture of pollutants from that facility will not cause adverse impacts to aquatic life.*

7. In the course of the Advisory Committee meetings, there was considerable debate on the phase-out of the mixing zones for BCCs. Some members of the Committee questioned whether DNR should take any action on this matter as it was an issue in the then pending federal court litigation. In response , the DNR stated that it would not await the outcome of the litigation before promulgating its own rules, but stated many times that it would revise its rules to reflect the decision of the federal court. As you may know, the phase-out of the mixing zone was struck down by the federal court. American Iron and Steel v. EPA, 1997 WL 297251 (D.C. Cir. 1997) We take this opportunity to request that the DNR amend its rules to eliminate the phase-out of mixing zones for BCCs in accordance with the decision of the federal court. (Wisconsin Manufacturers and Commerce)

*Response: In response to the D.C. Circuit Court of Appeals ruling in American Iron and Steel v. U.S. EPA, the U.S. EPA intends to issue a notice to withdraw Procedure 3.C of the Great Lakes Water Quality Initiative (Federal Register - March 23, 1995) which contains the provision to eliminate mixing zones for bioconcentratable chemicals of concern for new dischargers and to phase them out over the next ten years for existing discharges. However, U.S. EPA also intends to repropose those provisions for incorporation into the final federal guidance and to promulgate those requirements by the end of 1998. Accordingly, the Department does not propose to change the language in s. NR 106.06(2) (Wis. Adm. Code) which was promulgated on September 1, 1997.*

## Chapter 8 - Monitoring
## Response to Comments
## 12/29/87

1. How can you have a criterion if there is no test method to analyze for the substance.

   *Response: Criteria are based on risk to the environment which in turn is often based on dose experiments, not on whether we can measure environmentally significant levels. In many cases, dosages are quantified stoichiometrically and do not involve actual chemical concentration analysis.*

2. This Chapter seems to rely heavily on the application team's efforts. Is the application team's product ready to use?

   *Response: A draft of the new application is currently out for comment in draft form.*

3. What do the Regions use in the interim to determine monitoring?

   *Response: Until, we have the new documents ready for use, we can continue to use what we have used in the past without violating any of the new code provisions.*

4A. Can we ask for receiving water monitoring for those substances which need water quality based limitations?

4B. We should be striving for quality receiving stream data and we should encourage permittees to provide these data.

4C. Can permittees supplement water quality data to refine WQ-limits? This may be appealing for some permittees who are not comfortable with the information used to calculate preliminary limits?

4D. Please include details for receiving stream parameters in Attachment 8-3. If we want hardness data in effluent, why don't we ask for it for the receiving water also?

4E. Do we have guidance for collecting appropriate background information for those permittees who want to do so?

*Response to Comments 4A - 4E: The instructions for the calculation and implementation of preliminary limits (or "flag values," as suggested in Comments to Chapter 2), which are currently available in draft form for review and comment, indicate that the preliminary limit calculations should note what background values are used, if any were used at all. If the permittee doesn't think those background values are representative of current conditions in the receiving water, regardless of the parameter, it is free to go and do whatever background sampling is needed to justify the use of some other background value. Preferably, that sampling should be done over such a time period that any seasonal variations in the background parameters are represented, and should be done at locations that are not within the direct influence of*

*other upstream dischargers. Beyond that, any guidance in collecting the information is, for the most part, site-specific and a regional Water Quality Biologist should be consulted to obtain advice for collecting representative field data.*

The limit calculation document for the regulated discharger should routinely indicate where any background data are considered "deficient," meaning the lack of available data warrants the use of assumed default values. That way, the permittee may want to consider doing background testing to supplement (or, in some cases, create) the database.

5. Do we drop iron limits from permits?

*Response: U.S. EPA is in the process of calculating criteria and/or secondary values for iron. The only U.S. EPA criteria available for iron were developed back in 1976 and were not developed using the current approach for aquatic life. At this time, no usable criteria or secondary values are available for iron, so no limits should be calculated or recommended. Further, any previously calculated water quality-based effluent limitation for iron my be dropped from a permit upon reissuance unless there is a need to include categorical limitations.*

6. We should develop a policy for how to modify a permit which may be affected by a change in the water quality criteria.

*Response: How to modify a permit was not affected by the changes in GLI. Perhaps a better question is; Which permit modification requests should we give a priority too? The answer to that question will have to be case-specific.*

7. Has EPA approved our application requirements?

*Response: EPA is reviewing our draft application along with internal staff. We have not heard any formal comments yet. It should be noted that EPA is currently working on separate new applications for municipal and industrial permittees.*

8. Page 21: Is there a seasonal concern for some substance like chlorine?

*Response: When dealing with substances that may be discharged seasonally (i.e., chlorine used for seasonal disinfection requirements) a permit drafter must use discretion and common sense in recommending monitoring. Ideally, all monitoring will be done during normal operating conditions when the substance would most likely be present in the effluent.*

9. Do preliminary limits apply to conventional substances as well as toxics? If we don't do this, how is a discharger going to know what background information to collect to modify conventional limits?

*Response: The question of the applicability of preliminary limits to conventional pollutants was forwarded to Bob Weber for review by another standing team, since the*

*August, 1997 code revisions do not involve conventional pollutants and their limitations.*

10. The point (of Comment 9) being that the background information needed to modify toxic limits is not always the same as the information needed to address conventional limits.

*Response: It is acknowledged that the background parameters for conventional and toxic pollutants are not necessarily the same. As for the issue of sampling protocols, please refer to the response to comments 4 - 8 in this chapter.*

11. Should we mail the data quality checklist to the labs to they can provide the necessary information to the permittee?

*Response: The draft application instructions suggest that this checklist be sent to the lab performing the work. However, the permit application redesign team also plans to keep certified commercial labs informed about the content of the application, including the checklist.*

12. Are we going to have a complete list of secondary industries? Can we request this by SIC codes? Further, if a new industry starts up, how do we know if it is a primary or secondary industry?

*Response: Attachment 8-2 contains a list of the primary industries. Any industry that is not a primary industry is considered a secondary industry. Since the list of types of secondary industries could, as a result, be almost infinite, it is easier and just as accurate to categorize the list of secondary industries as "anything that isn't primary."*

13A. Some of us have had numerous discussions with various staff on monitoring requirements for municipal minors required as part of the application. South Central Region has screened the minors for metals and have generally not found a problem due to the fact that this area of the state has predominantly hard water. Even with the majors, once representative data are available, they generally test out of the need for metals limits. Recently, the majors that were reissued for the second time around have "no" metals limits in them. The only municipal minor facilities that will be required to monitor for metals in the application are ones that have small receiving water flow, industrial contributors, or elevated sludge metal values.

13B. I continue to question the need for across-the-board monitoring for metals. In SCR and NER we have demonstrated that with hard water the limits are sufficiently high that we have not seen a need for metals limits except in cases like Brillion and Chilton where metal finishing industries are significant sources. There is no mention in this chapter of case-by-case decisions on the need for monitoring and the factors that should play a part in those decisions.

*Response to Comments 13A and 13B: This was a discussion that was held when Tom Mugan was circulating drafts of the POC (pollutants of concern) guidance. We*

*agreed on criteria that could be used to exempt facilities in hard water parts of the state from metals testing. However, removal of these substances from the "test list" will need to be done manually, after the application merge is done. The POC guidance will be formally prepared in the near future.*

14. Why require monitoring for silver when there are no criteria in NR 105 for acute or chronic?

*Response: Silver monitoring is required for two reasons. First, silver is still on the priority pollutant list regardless of the status of any water quality criteria to protect aquatic life. Second, ch. NR 105 still contains human threshold criteria (HTC) for silver. It should also be noted that once U.S. EPA resolves the outstanding questions about the silver database (also see comments to Chapter 3 - General), it is anticipated that acute and chronic toxicity criteria will eventually be re-developed for silver. Once those new criteria are promulgated in ch. NR 105, a decision will need to be made whether or not any available effluent data on silver are still representative of the discharge since the HTC is unlikely to trigger permit limits.*

15. Unless the labs have gotten a better test method for Hex-Chromium, I see no need to monitor for it. We have had several facilities get limits for Hex-Chromium that had no sources of Chromium. During the permit term, we had them do both a Hex-Chromium test and a total Chromium test, resulting in reasonable total Chromium values but totally off-the-wall Hex-Chromium values. We will continue to only ask for Total Chromium unless there are assurances that labs have greatly improved testing for Hex-Chromium. What a waste of time and money by the permittees to do 5 years of monitoring when a limitation wasn't applicable in the first place.

*Response: Yes, hexavalent chromium testing has been a problem. We should only require testing in cases where we really suspect it is a problem. Our experience shows that, in most of the other cases, total chromium levels are low enough that assuming all of the chromium exists in the hexavalent state results in a negative reasonable potential determination.*

16. Historically, monitoring for hexavalent chromium has been a problem because the commonly-available methodology is subject to false positives at the level of concern. Rather than simply requiring monitoring for this substance, I believe that we need address the analytical constraints and laboratory availability issues or suggest an alternative approach. Otherwise, the data we obtain is not reliable and this is an exercise in frustration for staff and facilities.

*Response: In our draft permit application instructions, we recommend use of EPA Method 218.6 (ion chromatography). We believe that this method, which a few labs now are capable of, will help eliminate the problem.*

17. We have already tested for chlorides at a large number of municipal facilities. Normally we need 11 sample results to be able to do a P99 since there are a lot of water softeners in the Region. The only facilities where limitations have been

applicable to date, are ones that have industrial sources of chlorides (i.e., pickle factories, sauerkraut factories, etc.). We will only monitor municipal facilities that have industrial sources or are close to the acute-chronic limitation based previous monitoring.

*Response: Here is another case where testing requirements in the application can be modified by a DNR staff person having the knowledge about specific permittees. We will add chloride to the discussion on what exemptions may be made to the standard testing called for by the application merge. An alternative approach here would be to test for chloride only enough times to verify that levels are similar to what they were the last go-round and combine the new with the old data before performing the P99. In addition, we currently have somewhat more flexibility in our reasonable potential determinations for chloride because of the fact that the strategy for dealing with it is interim.*

18. All of our minor municipals have tested for phosphorus or are currently doing so. Until limitations based on water quality criteria need to be put in the permit, the only facilities we will require monitoring for all the ones that have added a significant contributor of phosphorus or average above 100 lbs/month based on the testing they did as part of the last permit reissuance.

*Response: Again, if testing has been done in the past and Department staff responsible for preparing the application have the necessary information to confidently know when they can reduce or eliminate testing for certain substances for individual permittees, they may do so.*

19. Why isn't phosphorus in the recommended monitoring for majors?

*Response: With major municipal dischargers having design flows of 1 MGD or more, it is assumed that they will exceed the 150 pounds per month threshold for including the 1 mg/L limit in the permit according to chapter NR 217. Since it is assumed the limit is warranted, the additional monitoring isn't necessary except to justify removing the limit from the permit. It is assumed to be more likely than not that the limit will be included in those facilities' permits. Therefore, monitoring as part of the application is unlikely to change the permit recommendations.*

20A I would suggest that ammonia monitoring be required as needed also, based on preliminary limits, and our ability to impose those limits. If a limit is high so no limit would go into the permit, or we are unable to impose a limit in the upcoming permit, I don't think the monitoring should be required. We should have definite reasons for generating data (e.g., to determine the need for a limit or PMP, etc.), not just because it's easiest to have a standard application for everyone.

*Response: See response to Comment 20B.*

20B. Why are we asking for ammonia-nitrogen monitoring? You calculate the numbers and you either get ammonia-nitrogen limits or you don't. Are you asking for data at facilities that discharge to LAL streams also? If you want to generate data for a specific treatment process or project, ask for it as a separate letter, not as part of the permitting process. I thought we were supposed to be streamlining the permitting process not making it more time consuming. Just because we have taken many of these requirements out of the permit and put them in the application package, doesn't mean that it takes less time to do. In fact, much of what you are asking for is going to take a lot more additional time than what it did in the past. We are a regulatory agency, not a data base clearinghouse. We don't have the time to handle extraneous data as part of the permitting process that sits in the file and no one looks at other than the permit drafters.

*Response: The December 18, 1995 ammonia policy implementation memo from Bruce Baker and Mary Jo Kopecky sets forth the conditions at which monitoring will normally be required until new water quality criteria and implementation procedures are promulgated in the Administrative Code. This memo also includes the stream-to-effluent flow ratios above which monitoring will not be needed in the interim. Regions have the discretion to use that policy to amend the sampling protocols in Attachment 8-3. Since the Department anticipates promulgating new ammonia criteria and implementation procedures within the next year or two, we do not want to invite any additional controversy because of the perception of rigid monitoring requirements in Attachment 8-3. One of the reasons ammonia monitoring was requested within the past few months or years at other facilities was to provide some information to the ammonia advisory committee on achievable levels of effluent ammonia in different types of treatment plants, both municipal and industrial. The committee now feels such information is available from facilities that have already tested for ammonia, so much more latitude is now available to the remaining permittees who have not already monitored ammonia in their effluents and to the Regions responsible for discharge permits at those facilities. The information that is already available is being looked at by the advisory committee members responsible for recommending such issues as the highest and lowest limits to be given to permittees and any possible categorical or treatment technology-based limitations. Therefore, there may not be a pressing need for ammonia data to be collected at facilities that have not already done so unless they wish their situations to be considered uniquely within the scope of the ammonia advisory committee.*

21. Of all of the data that we have generated in this Region for toxics, no one outside of the Region has ever asked to see the data until Tom Mugan asked Linda and I to compile some of the data to show that metals in hard water areas of the state are not a problem. Did anyone else even attempt to use this information to make a meaningful decision? How can you make generic monitoring decisions when you haven't even looked at any of the data that already exist? In this time period of doing more with less, we need to work smarter and base our decisions on what we already know. Our time is better spent on real environmental issues rather than chasing butterflies. All we have done to this point is verify the fact that "pretreatment" has done an outstanding job in getting toxics out of the waste stream. They have already done the work for us -

we're 10 years too late. generally, all that remains are the plumbing metals or a specific substance(s) from an individual industrial source.

*Response: A year or so ago, we asked what process should be used to do screening for determining what testing we should require with the permit application. Some persons responded that they could not devote staff to the screening effort. What resulted is an approach which requests default monitoring based on certain discharger categories (Primary Industrial, Secondary Industrial, Pre-treatment Major Municipal, Major Municipal, Minor Municipal). As already stated in several ways, individual staff may choose to perform some of the steps which will more accurately target our monitoring data requests.*

*We did investigate the possibility of eliminating testing for certain substances based on composite testing to date. Unfortunately, much of the information was in hard copy form (not easy to dig out) and was of limited value for making the types of generalizations we wanted to make due to lack of quality control information. In the end, we opted to continue to require one-time testing for the "long list" (priority pollutants and a few others) until we are better able to make scientifically-based conclusions. We will continue to consider, on a gut-level basis, past history of monitoring results to shape our policy decisions. We hope that the preliminary limits process will help us as we strive to make better, data-driven decisions.*

22. The tables in this chapter are very helpful, particularly the information on sources of pollutants. Attachment 8-3 should also list the receiving water monitoring needed for each type of application.

***Response: The issue of background sampling was addressed in comments 4 - 8 in this chapter. Since background monitoring is optional on the part of the permittee, it is not included in Attachment 8-3 which contains minimum monitoring requirements or recommendations.***

23 The basis for determining which substance call for mandatory monitoring versus those not required is right on target. This further bears out WDNR's readiness to recognize the analytical constraints (e.g., substances lacking approved test methods) faced by the regulated community.

*Response: No response necessary.*

24. I'm not sure that the 9 categories gives the full picture as it relates to analytical methods. The latest change to NR 219(3/96) lists methods by class of compound and then identifies specific compounds within that class. Using the decision scheme in this chapter, if the compound isn't listed in NR 219, then the assumption is that there is no approved method. Another way of looking at NR 219 is that we have approved SW-846 methods 8081, 8141, 8260 and 8270 for wastewater monitoring. If the compound of concern is within the scope of those methods, we have an approved method. If you want to call highlight this in separate categories, the description becomes: method approved in NR219; however, specific compound not listed.

Response: See the response to Comment #25.

25. Chapter 2 in SW-846 lists specific compounds and appropriate analytical methodology. Using these tables and the substances in categories 3, 5, 7, and 9, I have produced a list of substances with available methodology.

**Category 3**

| Substance | Compound Class | Method(s) |
|---|---|---|
| Pentachlorobenzene | Chlorinated Hydrocarbon | 8121, |
| 82701,2,4,5-Tetrachlorobenzene | Chlorinated Hydrocarbon | 8121, 8270 |

**Category 5**

NO METHODS AVAILABLE

**Category 7**

| Substance | Compound Class | Method(s) |
|---|---|---|
| 1,1-Dichloropropene | Volatiles | 8021, 8260 |
| cis-1,2-Dichloroethene | Volatiles | 8021, 8260 |
| 2,3-Dichloropropene | Volatiles | 8021, 8260 |
| 1,3-Dichloropropane | Volatiles | 8021, 8260 |
| Dichlorodifluoromethane | Volatiles | 8021, 8260 |
| N-Nitrosodiethylamine | Nitrosamine | 8270 |
| N-Nitrosobutylamine | Nitrosamine | 8270, 8260 |
| N-Nitrosopyrrolidine | Nitrosamine | 8270 |
| 2-Methyl-4-chlorophenol | Phenols | 8270 (8040)[1] |
| 3 - Methyl-6-chlorophenol | Phenols | 8270 (8040)[1] |
| 3 - Chlorophenol | Phenols | 8270 (8040)[1] |
| 2,3 - Dichlorophenol | Phenols | 8270 (8040)[1] |
| 2,5 - Dichlorophenol | Phenols | 8270 (8040)[1] |
| 2,6 - Dichlorophenol | Phenols | 8270 (8040)[1] |
| 3,4 - Dichlorophenol | Phenols | 8270 (8040)[1] |
| 2,3,4,6-Tetrachlorophenol | Phenols | 8270 (8040)[1] |
| 2,4,5 - Trichlorophenol | Phenols | 8270 (8040)[1] |
| 2,3 - Dinitrophenol | Phenols | 8270 (8040)[1] |

Technical Grade BHC is a mixture of the various isomers, so this belongs in category 1 with a note to the sum of BHC isomers.

Check Bis(2-chloromethyl)ether - Should it be bis(2-chloroethyl)ether? If not, then the appropriate compound name should be bis(chloromethyl)ether.

[1]Method 8040 has been withdrawn from SW-846 and replaced with 8041, a capillary column method.

The Merck index indicates that N-Nitrosopyrrolidine occurs in food products and tobacco smoke.

**Category 9***

| Substance | Compound Class | Method(s) |
|---|---|---|
| 4-Chlorophenol | Phenols | 8270 (8040)[1] |
| Trichlorofluoromethane | Volatiles | 8021, 8260 |

* Availability of methods may move these substances into Category 8.

*Response: Based on Comments #28 and 29, we have made revisions to the tables. A number of the substances which we previously concluded have no analytical method indeed do have methods. We have eliminated technical grade BHC from our monitoring list as it cannot be monitored for, but is obtained by addition of isomers. The appropriate compound name for the chemical referred to is bis(chloromethyl)ether We have made appropriate corrections in this area as well as a few others.*

26. The discussion of monitoring and methodology doesn't really address whether approved methods are appropriate selections or sampling issues. The most obvious problem is inadequate sensitivity; however, it is not the only consideration. Approved methodology may be so inadequate that we should't be monitoring for some substances at all. As an example, ambient stream (background) monitoring for metals by traditional methods yields results far above "true" values because of contamination during the sampling and analysis process.

*Response: We agree with the comment and conclude that the problems identified need continued attention as we perform our program activities as they are beyond the scope of this implementation document.*

27. This Chapter of the Implementation Plan provides a useful discussion of the parameters for which DNR may require monitoring. Although it may be implicit, we would suggest that this Chapter expressly provide that the permitting staff has the discretion, on a case-by-case basis, to delete parameters from the "typical list." This would allow the permit writer the opportunity to take into account the availability of historical data or other circumstances peculiar to a discharger. (Wisconsin Manufacturers and Commerce)

*Response: This flexibility will be built into the POC process and is reflected in the responses to several of the comments addressed in this document..*

28. I know this group has been working on this information for a long time, and think the section is, for the most part, excellent. Two concerns - the data quality checklist is a good idea, as was the last checklist. However, the various contract labs generally have their own data bases and report forms, and we had a hard time getting them to fill out the checklist in the past. I think the checklist works well as a toll to make sure the submitted information is complete.

Relating to data quality: in the last few years, most of my discussions with the limits calculator relating to data quality have been related to the levels of detection of substances that have not been detected - usually organic substances. The situation is

much improved from when toxics monitoring began, but still can eat up a lot of the time involved in permitting. I know it is easier to automatically triggered retesting in the event of a detect, but we don't really have any means to trigger retesting in the event of a high LOD. I don't think this issue is amenable to a nice, neat "cookbook" method, but we need to continue to address this problem.

*Response: We agree with the comments. We would like to try use of the checklist as a means to get the correct information which may allow us to more easily qualify data and as a final check for the permittee on data quality. On the issue of no detects at unacceptably high LODs, we have not thought of a neat way to head off these problems ahead of time. However, we hope the preliminary limits process will help reduce the number of these situations we need to deal with on a case-by-case basis.*

29. General Comment: There seems to be too much emphasis on pollutants being either priority pollutants or on the list of pollutants of initial concern. EPA's intent was for Tier 2 to provide a mechanism to address previously unforeseen threats to water quality. Wisconsin should include monitoring for pollutants in category 4 since these are precisely the types of pollutants for which the Tier 2 procedures are intended. (U.S. EPA - Region 5)

*Response: The categories were revised such that monitoring can be accommodated for those substances with available test methods, regardless of whether or not they are part of EPA's list of pollutants of initial focus.*

30. Attachment 8-3 should include WET monitoring under application requirements for both classes of major municipal dischargers consistent with 40 CFR 122.21(j). (U.S. EPA - Region 5)

*Response: At this time, all major municipal dischargers have requirements in their permits to perform at least one acute and chronic test toward the end of the permit term for use in evaluating the need appropriate conditions in the upcoming permit. Monitoring is not included here for the same reason we have not listed monitoring for BOD and suspended solids - data will have been submitted as part of conditions of the previous permit.*

## Chapter 9 - Pollution Minimization Plans
## Response to Comments
## 12/29/97

1. Page 1: PMPs should be used in 4 circumstances, not 3. Add a section d) to read: "High cancer potential using EPA Database "A & B" and Dave Webb's pesticide memo."

*Response: It is agreed that source reduction is probably the solution to controlling the substances discussed in the Webb memo. However, the Department must be careful to limit the use of the term PMP to those things authorized by Chapter NR 106. The suggested "4th" circumstance should probably be handled through the secondary value procedures described in Chapter 3 of this document.*

2a. Are we going to place a discharger into a PMP with only 1 effluent sample?

*Response: No. The preliminary limits process is envisioned to work in such a way that the Department will have more than one data point for situations where a PMP is considered. Until such time that preliminary limits are communicated to permittees, the permit drafter should request additional information from a permittee for any substance which may trigger a PMP requirement. Often times, this additional information can be gathered quickly and can be used to provide a more definitive recommendation on the need for a PMP.*

2b. The conclusion reached in Example 3 on page 3 is not consistent with the Guidance. Reasonable potential determinations should be made based on the data in hand. In this case, there is only a single data point. Unless there is reason to believe that the data point is not representative (due to a plant upset or other identifiable problem) it should be used and a limit imposed (especially given the fact that the observed value is more than an order of magnitude greater than the limit. (U.S. EPA - Region 5)

*Response: The Department's experience of administering NR 105 and NR 106 since 1989 has led to the conclusion that it is not wise from a regulatory perspective to base effluent limits decisions on a single data point if at all possible. Ideally, additional information can be obtained before a final decision is reached. A note has been added to the text of Example 3 which suggests that additional information should be collected before deciding what to do. The Department believes that the use of preliminary limits should facilitate the collection of additional data whenever a PMP or effluent limit may be imposed in a permit. Accordingly, the need to make decisions based on one data point should be minimized.*

2c. How will we address the effluent concentration if there is more than one sample per month? Do we use an average of the samples collected or do we use discrete samples?

*Response: It is assumed that his question is dealing with determining compliance. In that light, s. NR 106.07(6) provides the necessary detail. Basically, if the effluent*

*limitation is an average limit, we would average any values corresponding to that averaging period, substituting zero for any result less than LOD [there is an "except" clause in (6)3.(e)] and using a numerical result if it is greater than LOD.*

3. Who will make the decision to require a PMP in lieu of a limit? If it is the Region, will there be guidance or training to ensure this is done consistently state wide? Who will review the Plan and annual submittals?

*Response: Flow Diagram 9-2 provides a schematic plan for deciding if a PMP is necessary in lieu of an effluent limitation. Also, there are examples provided in the text of Chapter 9 which are designed to help a decision maker know when there is "clear and sufficient evidence" of the potential for exceeding a water quality standard. It is understood that these may be difficult, subjective decisions which further justify clear documentation of how specific decisions are reached.*

*Regarding plan review; the PMP plans will be reviewed by Randy Case or others based on expertise for industrial segments. Regional staff will be reviewing the annual status reports. A short section describing expectations of Annual Reports has been added to Chapter 9. As is currently the case for making these types of decisions, central office staff will be available to assist.*

4a. Regarding the "Plan acceptance steps," the central office does not have a good track record of responding to permittees. This is critical.

4b. If the review of the PMP is going to be centralized, there is going to need to be prompt action to review and bring about approval of the PMP, consistent with the compliance schedule in the permit. Also, the communication between Randy (Case) and the Regional contact will need to be very good. If a PMP is going to be needed in a permit, Randy should probably be contacted by the drafter to ascertain if the compliance schedule is consistent with his workload, time needed for review, etc..

4c. I am concerned about only 1 person approving PMPs. There should be others involved to avoid the phenomenon of dealing with the easy ones first (i.e,. picking low fruit vs. high fruit).

4d. I don't think we actually talked about who would be reviewing the status reports. Even if Randy Case reviews these, I think that GMU staff need to be involved as well.

*Response to Comments 4a-4d: As we begin dealing with PMPs, it is necessary to have someone with directly related experience reviewing the submittals in order to ensure consistency AND a timely review. It is not expected that a large number of PMP submittals will need review in the near future which should enable that one individual to respond relatively quickly to any submittal. Randy Case has been identified as the individual who will be reviewing these documents and he has indicated that this cannot be done without strong communication between himself and the Regional staff involved. The annual reports would need to be reviewed by Regional staff.*

*Lastly, be advised that there are plans for a "Source Reduction Team" to be formed soon. This team will be charged with defining the roles and responsibilities of Department staff who deal with PMPs from various facility types in the future.*

5a. The draft language has to CLEARLY state that a formal approval of a PMP is needed or not.

5b. We need to clarify whether or not a PMP submittal MUST be approved by DNR.

*Response: Contrary to a formal approval required for such things as construction projects (NR 110), the Department does not believe it is necessary to formally "approve" a PMP. However, the Department will encourage a permittee to investigate all opportunities to identify sources and reduce loadings of pollutants.*

6. Regional staff need to be apprised of the details of a PMP in order to be able to deal with it.

*Response: A copy of the initial submittal of the PMP will be forwarded to the Regional staff for comment. Further, a copy of the final PMP will also be provided to the Regions for any permit-required review and follow-through. Please also see the response to Comments 4a-4c.*

7. Is there going to be a SOURCEBOOK? Where is it and is it available for distribution.

*Response: The SOURCEBOOK will be available upon request as a work in progress in early 1998. However, it should be noted that some of the concepts on how to do a PMP are widely applicable even though the SOURCEBOOK is specific to mercury. We have removed the reference in the flow diagrams to the SOURCEBOOK and referred more generally to guidance. Further, for permittees with a PMP requirement, the Department proposes to routinely provide information found in Attachment 9-2 at the time of permit reissuance.*

8. Can we get additional copies of the Anders/Kassulke report of the late 1980's?

*Response: Each of the Regional Effluent Limits Calculators have a copy of this document. Due to the size of the document and associated copying costs, there is not a surplus of this document. If one is critically needed, please contact Bob Masnado of the Water Quality Standards Section.*

9a. Are we going to provide basic training for PMPs? Can we publicize success stories Can we utilize CAER to help us publicize the success stories?

9b. Training is need for field staff. Could "success" stories be used to help staff understand and relate to the types of techniques which would be useful in identifying and reducing toxicants?

*Response to Comments 9a-9b: There is no question that training will be needed in this area. As the Department gains experience in the nature of PMPs, specific training*

*beyond that required to write permits will be provided. In the meantime, we must work within the constraints of NR 106 to issue permits with PMP requirements when necessary. For answers to questions regarding permit requirements, please contact Tom Mugan or Randy Case in Madison. Lastly, the idea of sharing success stories is an excellent suggestion. Contact will be made with staff from CAER to determine the best method for communicating that information when it becomes available.*

10. What constitutes a reasonable and effective PMP?

*Response: This is new ground for everyone. NR 106.04(5) says "...a cost-effective pollutant minimization program is an activity which has as its goal the reduction of all potential sources of the pollutant for the purpose of maintaining the effluent at or below the water quality based effluent limitation. The pollutant minimization programs specified ss NR 106.05(8), 106.06(6)(d) and 106.07(6)(f) shall include investigation of treatment technologies and efficiencies, process changes, wastewater reuse or other pollution prevention techniques that are appropriate for that facility, taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. Past documented pollution prevention or treatment efforts may be used to satisfy all or part of a pollution minimization program requirement. The permittee shall submit to the Department an annual status report on the progress of a pollutant minimization program." As you can see, it is very facility specific and as the Department gains experience dealing with PMPs, it will be easier to define the boundaries of a reasonable and effective PMP.*

11. A number of questions were raised during the development of the GLWQI rule package regarding the DNR's authority to require pollutant minimization programs. We continue to question the DNR's authority in this regard. Notwithstanding that concern, we believe that the draft "Pollutant Minimization Program Permit Language" set forth in Attachment 1 needs to be revised to more accurately reflect the requirements of NR 106. Specifically, Paragraph 1 of Attachment 1 should be revised to set forth verbatim the definition of "cost effective pollutant minimization program" in NR 106.04(5). (Wisconsin Manufacturers and Commerce)

*Response: The permit language has been revised as suggested.*

12. We are more concerned with Attachment 2 which purports to outline a stepped program for a PMP. The breadth and scope of this Attachment stands in stark contrast to what was represented to the GLI Advisory Committee in terms DNR's concept of a PMP. From an industrial perspective, the Attachment goes well beyond what may reasonably be required or necessary in developing a PMP. For example, organizing PMP committees involving external partners was never discussed in the context of the Advisory Committee and in many cases may be unnecessary or burdensome. Furthermore, it is arguable that Step 3 (Setting Reduction Goals) could amount to the establishment of effluent limitations on internal plant waste streams, which would clearly violate the American Iron and Steel decision. Id at p. 18. In short, we believe that this Attachment should be deleted pending further discussions with the regulated community with respect to the development of PMPs. (Wisconsin Manufacturers and Commerce)

*Response: The Department believes that many entities will need guidance on steps to develop a PMP and continue to believe that Attachment 2 is a necessary part of the guidance at this time. The text has been modified to clarify that this is guidance only. The Department recognizes that PMPs, particularly for industries, will be very site-specific.*

*The Department does not agree that setting goals is the same as establishing limitations on internal waste streams. A permittee may choose to monitor internal waste streams to see if effluent limitations could be met when future analytical improvements allow quantification down to that level. Alternatively, a permittee may also choose not to monitor internal waste streams if there are cost-effective ways to reduce the overall use of a substance (i.e., changes in raw material usage) or to eliminate the unwanted environmental effects which resulted in the imposition of the PMP in the first place.*

13. For circumstance a), the parenthetical statement is confusing as written. Perhaps it should read:

*(because the concentration of the substance in the water supply and background surface water exceeds the water quality standard and the discharger's relative contribution to the mass of a substance is negligible.)*

*Response: This wording change has been made.*

14. In the examples, I understand that the 1/5 rule is based on an average concentration, but I believe that the present wording may perpetuate misconceptions about data analysis. It does not encourage using other statistical tools that may be appropriate, such as looking at the median or checking for outliers. I suggest rewording the introductory sentences of the examples as follows: *Four analyses for the pollutant of concern yielded concentrations of 36µg/L, 14µg/L, 12 µg/L and 18 µg/L whose average is 20 µg/L.*

*Response: The text has been modified slightly in response to the comment.*

15. In the first example, the two concentrations between the LOD and LOQ are simply included in the average with no caution about the uncertainty associated with those concentrations and its effect on the average.

*Response: A cautionary note to the conclusion statement that speaks to the quantification uncertainty has been added to the text.*

16. In the third example, I agree that it is not a good idea to base your decision on a single data point, but the wastewater permit application process has been designed to do just this. As I follow the flow diagram, the permittee will be given two options, verify the concentration before the permit is issued or get a PMP in the permit with monitoring. Is it legitimate to discount issuing the permit with a limit and a PMP? I suspect that there will be times that this will be the right decision.

*Response: Experience in dealing with permit limits based on small datasets suggest that additional data will help bolster a decision. In light of this, the new application process currently being piloted will include a preliminary limits process that will ensure that more than one data point is available for PMP and limits decisions.*

17. It may be instructive to include an example in which multiple determinations all yield results between the LOD and LOQ. In this instance, the pollutant is consistently present but its concentration is more uncertain. For this example, you may want to adjust the permit limit to illustrate that there are times when you can make a decision with sufficient data between LOD and LOQ. There may be multiple "correct" decisions about whether we have sufficient data to make a decision or we are convinced that there is a problem and what are viable options for dealing with the situation.

*Response: There are any number of possible combinations of data points which will affect results. The examples were given to provide a range of possibilities without trying to imagine every scenario. The concepts of using statistics, refining the [illegible] doing source stream monitoring and using considerations spelled out in the Representative Data Guidance have all been discussed in the narrative portions of the guidance as possibilities for options for dealing with the situation.*

18. Consider simplifying the wording of the sentence at the top of page 4 something like this: *A permittee may opt to verify pollutant levels by sampling internal waste streams where concentrations may be higher or to collect more data to allow a statistical evaluation.*

*Response: The text has been modified to incorporate the suggested changes.*

19. On page 8 note 2, I believe that we need to move away from specifying the analytical method in the permit and toward more objective-based requirements (e.g. specifying the needed sensitivity). This shift should allow flexibility for method selection where it is warranted and still accomplish the goals for the monitoring. Consider using language on method selection that is similar to that in NR 140 or NR 149:

NR 140 (modified)
The analytical methodology selected shall:

(a) be approved in NR 219 or otherwise approved by the Department
(b) be appropriate for the matrix and concentration of the sample
(c) meet one of the following:
    (1) Has a limit of detection below _____ (specify the concentration)
    (2) Has a limit of quantification below the permit limit
    (3) Produces the lowest available limit of detection and limit of quantification (if the limit of detection or limit of quantification is above the permit limit).

NR 149
The analytical methodology used shall enable the laboratory to quantitate at levels required by the Department. If the required level cannot be met by the methods available in NR 219, then the method with the lowest limits of detection shall be selected.

*Response: The Standard Requirements in the permits merge have been modified to read as follows: (Retain the following)* ***WATER QUALITY SAMPLING AND TESTING PROCEDURES****: Unless specifically directed elsewhere in this permit, sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified in accordance with the requirements of ch. 149, except for groundwater samples analyzed for pH, conductivity and temperature. (Add the following) The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by methods available in NR 219, then the method with the lowest limits of detection shall be selected.*

20. Source reduction requirements are discussed in the dissolved metals section, at Chapter 4, page 7, and then on page 8 of that chapter, the material discusses the differences between a PMP and source reduction requirement.

I think it is important to give staff the code language on these matters first, and then follow that with any needed expansion, examples, etc.. Section NR 106.04(5), Wis. Adm. Code, defines a "cost-effective pollutant minimization program" and NR 106.06(7), Wis. Adm. Code, addresses the specific issues related to reducing metals mass in a dissolved limits context. First, I don't find this code language all that confusing. Second, when discussing a toxics problem with staff, we inevitably get back to the code, and sometimes potential inconsistencies with the code crop up and staff cling to guidance.

This problem can be minimized if the sections dealing with these problems are first set out in code. This is not necessary in all parts of the Plan, but where lengthy subjective terms which already have common sense meaning are involved, I would prefer that the code definition comes first and that staff be reminded that the coed definition is control. (Walter Kuhlmann - Municipal Environmental Group)

***Response:*** *In the overview segment of the guidance, the entire definition of a PMP has been included rather than a paraphrased version.*

21. The draft permit language on Page 8 of Chapter 9 bears comment. The first paragraph of the set of provisions in Attachment 1 truncates the code language. After listing examples of measure to minimize pollutants, the code continues to state:

> *"....taking account of the permittee's overall treatment strategies, facilities plans and operational circumstances. Past documented pollution prevention or treatment efforts may be used to satisfy all or part of a pollution minimization program requirement."*

This language should be included in the draft permit language. The current language does not take note of "the permittee's overall treatment strategies, facilities plans and operational circumstances," and the current language says past documented efforts "should be considered" when the code says that such efforts "may be used to satisfy all or part of" a PMP requirement. I think this is a material difference, and can attest to the fact that the quoted language above was an important inclusion in the GLI package

in order to develop the broad consensus that arose to support the final package. It detracts from those consensus efforts to seemingly sweep aside certain provisions that stake holders (POTWs) thought important at the time. (Walter Kuhlmann - Municipal Environmental Group)

*Response: The permit language contained in the draft implementation plan was written prior to the code language being finalized and it was an oversight that the proposed permit language was not rewritten. The permit language has now been updated to reflect essentially verbatim the code language.*

22. The "Pollutant Minimization Program (PMP) Development and Review Guidance" (Attachment #2) calls for the formation of external source reduction partnerships (primarily in municipal source reduction programs). The formation of an external source reduction group as part of an industrial PMP is totally inappropriate. In the case of an industry that treats and discharges effluent only from its own manufacturing operations, it is solely the responsibility of the industrial facility to evaluate pollutant minimization options. Other groups have no valid role to play. Language relating to external source reduction partnerships should be changed to apply only to municipal source reduction programs. (Wisconsin Paper Council)

*Response: The language in the instructions has been modified to clarify that this section is only guidance and that certain steps in the process can be more or less important, depending on the individual circumstances. The language in Step #2 has also been modified to indicate that external entities may be partners or resources and have listed who might be on the team. The Department generally agrees with the comment, but hopes that industrial permittees will make use of external resources in developing and implementing their PMPs.*

23. Regarding external source reduction partnerships for municipal source reduction programs, these external groups should have a role only in the municipal source reduction efforts. Source reduction efforts conducted by dischargers to the municipal treatment system should be solely the responsibility of the individual discharger and should not be subject to review by the external group. Further, the external group should only include representatives from dischargers to the municipal treatment system that are potentially affected by a PMP. (Wisconsin Paper Council)

*Response: The Department appreciates this view, as it follows the logic of the previous comment. However, it seems as though all dischargers to a municipality would have an interest in making sure that the municipality set up its PMP to implement source reduction activities equitably and in such a way as to minimize costs to ALL of its customers. For example, if some of the pollutant comes from diffuse sources throughout the system and some comes from "point source" contributors, wouldn't the external group want to know as much as possible about each segment so as to make good decisions about where to expend effort? How would the external group resolve what to do if two substantially similar contributors come to very different conclusions as to their ability to reduce discharge levels? Again, the comments are appreciated because they promote some philosophical discussion on these points early in the process. As the Department gains experience in the area of permit-required*

*PMPs, it is hoped that staff will be able to provide better advice, based on historical knowledge of how other entities have resolved these types of competing interests.*

24. On a broader level, Attachment #2 appears to envision a situation for implementing a PMP that is not consistent with our experience or with our expectations. Attachment #2 envisions a tidy, stepped process of identifying sources, setting reduction goals, and taking pollution prevention steps. We expect that most PMPs will involve a very untidy process with substances being discharged at extremely low levels and where the source of the discharge may be unknown or uncontrollable. In these situations, a PMP will be a search for a needle in a haystack. The adequacy of a PMP should be determined on a site-specific basis, not by comparison to an ideal and, perhaps, unrealistic check list. (Wisconsin Paper Council)

*Response: See responses to Comments 22 and 23. The Department believes the changes made to Attachment 2 clarify the need for flexibility when reviewing PMPs.*

25. We also expect that many PMPs will be one-time events -- the source can be identified and reduced/eliminated, and it is, or the source can't be identified and/or reduced/eliminated. It is unclear what would be included in annual reports in these situations. Annual reporting requirements should be minimal in these situations. (Wisconsin Paper Council)

*Response: What annual reports should address is as site-specific as the PMP itself. It is agreed that if a source is eliminated, the annual report should provide such a conclusion. However, if the source is only reduced, and evidence suggests that the effluent limit could still be exceeded (but it just can't be measured in the effluent), some sort of continued effort is needed to evaluate what actions could be taken to further reduce release of the subject pollutant. A short section has been added to this section of the implementation guidance, entitled Annual Reports, which discusses these points.*

26. Source Reduction (NOTE: THIS COMMENT WAS ALSO PROVIDED TO THE GROUP WORKING ON CHAPTER 4 - METALs.) I know a PMP proposal will be reviewed by Randy Case. Is this also true for source reduction efforts required with dissolved-based limits?

The Mercury Example: I know that this is just included as and example, but I don't think I could rattle the "seven basic steps" process off to a permittee with a straight face. Not everyone on the planet swallowed the CQI handbook whole. If I were working with a municipality, I'd be talking about monitoring, local limits, and so forth, not mission statements and tools.

We may also have an interesting conundrum relating to pretreatment program requirements. A control authority may want or need to change its local limits as part of the source reduction process. I believe, however, that such changes are contingent on Department approval (i.e., formal approval), and in addition, Central Office staff may no longer be doing this task. So the permittee may be left with the obligation to seek a Department approval that is not forthcoming.

The situation is no better for non-control authorities. These communities often have not devoted the formal resources to local regulation that control authorities are required to do. However, I don't think we gain as much as we think by trying to generate control authorities. There is a lot of formality associated with the program that may not have a direct impact on the end result. In general, I think we need to think more about the issue of source reduction for municipalities, because we can't seem to do it without creating an edifice called the pretreatment program, and we have less time formally delegated to pretreatment.

Last thing on source reduction - the way I read this, a permittee does not have to implement such an effort if there is no limit. However, if the permittee would get a total recoverable limit in the absence of the availability of the dissolved-based limit, they do need to do monitoring. Is source reduction also included in the activities of these permittees with no limit?

*Response: While there are some references to PMPs in this comment, this is primarily related to dissolved metals source reduction efforts. Regarding the issue of needing program staff time to review local limit changes, these initiatives really do not impose additional requirements. In fact, they provide some flexibility in that limits that would previously be determined based on mass balance calculations, now have phrases like "cost-effective" and "reasonable steps ... to minimize or eliminate" attached. While roles and responsibilities remain unclear in this area, it should be noted that Central Office staff may be available to provide review of local limit changes if necessary.*

27. The last paragraph indicates that large population centers will require longer PMP schedules (for pollutants widely used by the industrial, commercial, institutional, and general public sectors) than smaller communities. I disagree. While larger communities may have multiple sources of a pollutant, or more users to evaluate, they also tend to have an existing organizational structure, staffing and funding (like a permanent pretreatment program) that small communities may lack.

*Response: This statement seems to be based on the perception that the potential sources in a small community are more obvious and therefore easier to find, thus making the identification phase shorter. The implementation phase may be a different story, however. The text has been modified from the word "will" to "may".*

28. Chapter 9 lists three circumstances under which PMPs will be imposed. One of these is when the background concentration of a pollutant exceeds the criteria and DNR determines that the loading from a particular source is negligible. Discussions between the Department and U.S. EPA indicated that this provision would only be applied within the context of a TMDL. This agreement should be reflected here. (U.S. EPA - Region 5)

Response: The response to this comment will be addressed in future discussions between the Department and U.S. EPA - Region 5

## Chapter 10 - Compliance Schedules
## Response to Comments
## 1/20/98

1. Who determines if a permittee really needs the extra time to comply with a limit, or identify a source of pollutant, etc...?

   *Response: No one individual can be identified as the person to make this determination. That determination may lie with the area engineer, permit drafter, biomonitoring coordinator or others.*

2. Are we obligated to give a full 3-year or 5-yr compliance schedule? We must have the flexibility to go less than 3 or 5 years if it is warranted.

   *Response: As long as you comply with the restrictions of s. NR 106.17, you may modify the default compliance schedules that are provided in this guidance including shortening the default 3-year and 5-yr compliance schedules.*

3. Starting with 3-years suggests that we'll never go less than 3-years.

   *Response: See the response to Comment 2.*

4. How can we determine whether or not a permittee is in substantial compliance with a limit that becomes effective just prior to permit expiration in accordance with the 5-year compliance schedule?

   *Response: All default compliance schedules that are included in this guidance provide a period of at least 6 months between the effective date of the effluent limitation, or interim limit, and the expiration date of the permit. This should allow adequate time to determine substantial compliance with the effluent limitation.*

5. Does the merge require monitoring to determine the issue of substantial compliance WITH the compliance schedule or AFTER?

   *Response: See the response to Comment 4.*

6. Can WET limits be extended beyond the end of the permit term?

   *Response: While s. NR 106.17 is applicable to WET limits, this guidance does not modify the compliance schedule that appears in the "Whole Effluent Toxicity (WET) Program Guidance Document." It is unlikely that the WET compliance schedule will extend beyond the term if the permit since the WET guidance recommends compliance schedules of less than 4 years. Should a short-term permit contain a WET compliance schedule, however, this guidance provides suggestions on how to establish the required interim limit.*

implement the plan, so that Department review doesn't become a rubber stamp and the whole process a meaningless exercise.

*Response: While the compliance schedule may be extended on a case-by -case basis, the three months allowed for Department review does not appear to be inappropriate. Note that s. 281.41(1), Wis. Stats., require plan submittals to be reviewed by the Department within 90 days from the time of receipt of complete plans.*