

# **PROCEDURES FOR IMPLEMENTING NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMITS IN NEW MEXICO**

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ABBREVIATIONS

In the document that follows, various abbreviations are used.

4Q3 - Minimum flow over 4 consecutive days once in 3-years	NPDES - National Pollutant Discharge Elimination System
BAT - best available technology economically achievable	MQL - minimum quantification level
BMP - best management plan	POTWs - Publically Owned Treatment Works
BOD <sub>5</sub> - five-day biochemical oxygen demand	Qa - Quality assurance
BPJ - best professional judgment	Qa/Qc - Quality assurance/Quality control
CD - critical dilution	RP - reasonable potential
CFR - Code of Federal Regulations	SWQB - Surface Water Quality Bureau
cfs - cubic feet per second	TDS - total dissolved solids
COD - chemical oxygen demand	TIE - Toxicity identification evaluation
COE - United States Corp of Engineers	TMDL - total maximum daily load
CS - Chemical specific	TRC - total residual chlorine
CV - Coefficient of variation	TRE - Toxicity reduction evaluation
CWA - Clean Water Act	TSS - total suspended solids
DMR - discharge monitoring report	TSD - Technical Support Document for Water Quality-Based Toxics Control
EPA - United States Environmental Protection Agency	TU - Toxicity unit
ESA - Endangered Species Act	UAA - use attainability analysis
FR - Federal Register	USFWS - United States Fish and Wildlife Service
MCL - Maximum contaminant level	USGS - United States Geological Service
MGD - million gallons per day	WET - whole effluent toxicity
MQL - Minimum quantification level	WLE – Waste load evaluation
NMAC - New Mexico Administrative Code	WQCC – New Mexico Water Quality Control Commission
NMED - New Mexico Environment Department	WQBELs – Water Quality-Based effluent limits
NMWQS - New Mexico State Standards for Interstate and Intrastate Surface Waters	WQMP – Water Quality Management Plan
	WWTP – wastewater treatment plant



## **I. OVERVIEW**

### **A. INTRODUCTION**

Pursuant to Section 303 of the CWA, and Section 74-6-4 of the New Mexico Water Quality Act (NMWQA), the New Mexico Water Quality Control Commission (WQCC) has adopted the State of New Mexico "Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC" (hereinafter referred to as the New Mexico Water Quality Standards or NMWQS) for all surface waters of the State. These standards apply to all surface waters not on Tribal land. EPA has the responsibility to administer the CWA on Tribal lands, who may at their discretion draft NPDES permits using the NMWQS as guidance for those dischargers located in Indian country without EPA approved Tribal standards. EPA will work closely with tribal governments and environmental officials.

This document, "Procedures for Implementation NPDES Permits in New Mexico" establishes procedures to effectively incorporate the NMWQS into NPDES permits. Application of the NMWQS is based on the designated uses and applicable criteria for the receiving water. The document will also be used to implement TMDLs in the state water quality management plan. This document is for the permit writer, certifying agent, and public to fully follow the logic behind permitting decisions. In addition to addressing the NMWQS, this document meets federal regulatory requirements for NPDES permits.

The document is based on: the New Mexico Interim Guidance for Implementation of Water Quality Standards through NPDES Permits dated May 5, 1995; documented conversations between NMED and EPA Region 6 staff; the Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2 90 001); and the EPA Region 6 Post Third Round NPDES Permit Implementation Strategy adopted October 1, 1992, or the most current revisions thereof.

### **B. LEGAL AUTHORITY**

Pursuant to Section 301(b)(1) and (2), 306 and 307 of the CWA, EPA Region 6 has produced this document in consultation with NMED for development of effluent limitations and schedules of compliance for NPDES permits that are necessary to protect applicable water quality standards in effect under authority of Section 303 of the CWA and the NMWQA.

### **C. REVISIONS OF THE DOCUMENT**

The document will be reviewed on a periodic basis and revisions made to establish and assure adequate implementation of existing, new or revised water quality standards, including schedules of compliance, in accordance with Section 303(c) of the CWA. Reviews may also include changes as a result of new or modified State/Federal statutes, regulations, policy statements or guidance.

## II. SEGMENT DESCRIPTORS AND BASIN PLAN

### A. DESIGNATED USES

#### 1. Objective and List

Pursuant to the objectives of the NMWQS, the standards provide for: protection of public health and welfare; protection and propagation of fish, shellfish, and wildlife; and provide for recreation in and on the water. Specific designated uses are listed for most surface waters of the State. These uses include fish culture, water supply and storage; domestic water supply; irrigation and irrigation storage; primary contact; secondary contact; livestock watering; wildlife habitat; aquatic life; high quality coldwater; coldwater; marginal coldwater; warmwater; marginal warmwater; and limited aquatic life.

#### 2. Designated and Default Uses

Implementation of the NMWQS to obtain the objectives are directed at specific designated uses listed by surface water segments also are protective of State narrative standards.

Lacking a site specific UAA, all discharges shall meet livestock, wildlife habitat, aquatic life; either coldwater or warmwater, and primary contact uses. For purposes of the primary body contact uses, the limitations for E. coli bacteria shall be a monthly geometric mean of 126 cfu/100ml and a single sample not to exceed 410 cfu/100ml. The effluent pH shall be within the range 6.6 to 9.0 su's. Site specific criteria will specify minimum conditions and may be less protective than the default ones specified above.

### B. BASIN STATEWIDE MANAGEMENT APPROACH TO PERMITTING IN NEW MEXICO

#### 1. GOAL

In an effort to better serve the communities and industries of New Mexico with prompt NPDES permit issuance, and to streamline the permitting and Federal permit certification processes through better resource management, the permitting authority has adopted a Five Year River Basin Statewide Management Approach to permitting, as demonstrated in other States of Region 6. This program is a comprehensive framework to better coordinate and integrate water resource management activities geographically by river basin. Regulations found at 40 CFR 122.46(c) allow the Permitting authority to issue any permit for a duration that is less than the full allowable 5 year term.

#### 2. SCHEDULE FOR NM PERMITS/EXPIRATION DATES

After the initial permitting round as described above, the basins will fall into the 5 year basin approach to permitting according to the following expiration dates:

**TABLE 1. Basin Permitting Schedule**

BASIN	Target Dates	Target Dates
San Juan River Basin, Southwestern Closed Basin, Lower Rio Grande River Basin	2009	2014
Middle Rio Grande River Basin	2010	2015
Upper Rio Grande River Basin	2011	2016
Pecos River Basin, Central Closed River Basin, Southern High Plains Basin, Arkansas River Basin	2012	2017
White-Red River Basin, Western Closed Basins, Lower Colorado River Basin	2013	2018

The permitting authority may make exceptions to this permitting schedule on a case by case basis. The largest growth in new permits is in the Middle Rio Grande Basin. The permitting authority may make adjustments to the schedule to help maintain a year-to-year permit staff workload. Permits issued prior to the basin approach to permitting, or those exceptions to the permitting schedule granted by the permitting authority, will adhere to the basin approach, as reflected above, during the next permit issuance.

### **III. ANTIDegradation Implementation Between Federal AND State Policies**

#### **A. GENERAL**

The Antidegradation Policy and Implementation Plan section of the NMWQS sets forth the requirements to protect designated uses through implementation of the State water quality standards. Furthermore, the policy sets forth the intent to protect the existing quality of those waters, whose quality exceeds their designated use. The limitations and monitoring requirements set forth in a proposed permit must be protective of the State water quality standards and designated uses. Permit requirements must be protective of the assimilative capacity of the receiving waters, which are protective of the designated uses of that water.

#### **B. ANTIDegradation Review For Permits**

New permits and reissued permits that will increase wasteload limits, incorporate new wasteload limits (either through new WQBEL's or from TMDLs), or new permits that institute wasteload limits are required to go through an antidegradation review process, in accordance with the procedures outlined in Appendix A of the State of New Mexico Statewide Water Quality Management Plan. The process will be instituted by NMED when the application has been received, and the wasteload addition to the receiving water has been determined during review of the application.

The permit writer should contact the SWQB as early as possible to provide as much time as possible for the States antidegradation review for all new permits and renewing permits that may increase pollutant loadings.

#### **IV. ESTABLISHING WATER QUALITY - BASED TOXIC EFFLUENT LIMITATIONS**

##### **A. EVALUATION OF WATER QUALITY IMPACT**

Once the applicable designated uses and associated water quality criteria for a receiving water body have been determined, the effluent must be characterized and the need for permit limits to control the discharge must be assessed [Technical Support Document for Water Quality based Toxics Control (EPA/505/2 90 001), page 47]. All new permit applications permit renewals and applicable permit modification requests will be reviewed to insure that permitted effluent limits will protect instream criteria for the NMWQS.

##### **B. NUMERIC STANDARDS IMPLEMENTATION**

This section will present methodology used to establish water quality based limits to protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the NMWQA and the CWA. This section describes in detail how the permitting authority determines applicable water quality-based permit limits to achieve these goals. This section will be supportive of numerical criteria, and narrative criteria will be discussed in Section V, NARRATIVE TOXICS IMPLEMENTATION - WHOLE EFFLUENT TOXICITY (WET) below.

New permit applications, permit renewals and permit modifications are evaluated to ensure that the permitted effluent limits will maintain instream numerical criteria and general criteria for all listed substances such as bacteria, phosphorus, nitrogen, turbidity, dissolved solids, temperature, pH, and toxic pollutants. In order to determine impacts of pollutants, the permitting authority staff will review all available information from sources that may include, but not be limited to the permit application, the complete permit file, including DMR history, stream surveys, inspection reports, waste load evaluations (WLEs), TMDLs, and routine monitoring information.

State numeric standards for the protection of designated uses are established in 20.6.4.97; 20.6.4.98; 20.6.4.99; and 20.6.4.101 through 900 NMAC. Subsections in that document list the various specific chemicals, and the criteria that the State has established needed to protect for the designated use.

C. APPLICATION – GENERAL REQUIREMENTS

Although all applications for wastewater discharge permits are considered on a case by case basis, a consistent approach to application review is important.

1. APPLICATION DATA SOURCE AND AGE

Data for applicable EPA NPDES application forms each have instructions unique for that form and they specify the allowable age of data to be used in filling out the application forms. All test data must be representative of the discharge and all test data must be to at least the current MQL level in effect at the time of application. The age of data differs for each form. For EPA Form 2A, effluent data shall be no more than four and one-half years. For EPA Form 2C, sampling shall be done no more than three years before submission. Effluent data from, but not limited to, the following sources could be used that would also meet the above requirements:

EPA approved application forms;

Supplemental data provided by the applicant

Data reported in the most recent five years of DMRs, or;

Inspection sampling data that meets 40 CFR Part 136 requirements. This would be, including, but not limited to, sample collection, preserving, analytical tests and chain of custody protocol procedures.

Where DMR's or facility records are used to characterize effluent, in general, the permitting authority will use the most recent two year period of record. The permit writer may, based on his professional judgment, use a different period of time, or may develop permit conditions on planned future activities if those situations are sound and representative of the facts.

2. ANALYTICAL DATA REQUIREMENTS

All effluent concentration monitoring must be conducted according to test procedures contained in 40 CFR Part 136, unless other test procedures have been specified in the permit and approved by the Regional Administrator. Effluent monitoring data must be defensible analytical data, must be representative of the discharge, and must account for any seasonality or other variability in effluent quality.

Single data point effluent concentrations can be used to characterize the effluent to determine if there is a reasonable potential for the presence of a substance. Permit applicants must retain all analytical laboratory reports used for effluent characterization in a permit application, and provide copies to the permitting authority upon request.

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments, at intervals frequent enough to insure accuracy of measurements, and

shall maintain appropriate records of such activities. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results, shall be maintained by the permittee or designated commercial laboratory.

3. MINIMUM QUANTIFICATION LEVELS (MQL)

All pollutant concentration data must be sampled and analyzed to the most current MQLs in effect at the time of the application. See **Appendix D** of this document for the current list. Analytical data not submitted to the current MQL will require additional retesting and analysis if the method detection limit (MDL) is not low enough to demonstrate RP.

4. FACILITY EFFLUENT FLOW DATA

Appropriate flow measurement devices and methods, consistent with accepted scientific practices, shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes. The permitting authority may allow measurement of flow that is based on estimates. The estimates shall be based on sound analytical techniques, and these estimates will not be subject to the same level of accuracy as measured flow rate devices. In general, this type of flow is used when the limiting pollutant cannot appropriately be expressed by mass or on a case-by-case basis where mass limits are not directly related to a measure of operation.

D. APPLICATION – SPECIFIC REQUIREMENTS

1. PUBLICLY OWNED TREATMENT WORKS (POTWs)

All applicable POTWs are required to fill out appropriate sections of the Form 2A and 2S to apply for an NPDES permit or reissuance of an NPDES permit. The new form is applicable not only to POTWs, but also to facilities that are similar to POTWs but do not meet the regulatory definition of "publicly owned treatment works" (like private domestics, or similar facilities on Federal property). The forms were designed and promulgated to "make it easier for permit applicants to provide the necessary information with their applications and minimize the need for additional follow up requests from permitting authorities," per the summary statement in the preamble to the Rule. These forms became effective December 1, 1999, after publication of the final rule on August 4, 1999, Volume 64, Number 149, pages 42433 through 42527 of the Federal Register.

The amount of information required on each form is based on the design flow rate of the facility, the potential for toxicity, and the final disposal of the sludge generated from the facility. In general, major POTWs are defined as those that produce greater than or equal to

one (1) MGD of effluent, and minor POTWs are defined as those that produce less than one (1) MGD. The permitting authority however, has the authority to designate on a case-by case basis discretionary major permit status of facilities that do not meet the one (1) MGD threshold, based on other considerations.

2. INDUSTRIAL FACILITIES AND FEDERAL FACILITIES

Industrial facilities are required to fill out one or a combination of a number of different applications, depending on the type of activity they are engaged in and the type of discharge they produce. The permitting authority will designate status for industrial facilities based on the NPDES permit rating work sheet. The Federal applications are as listed:

**TABLE 2. Industrial NPDES Permit Applications**

EPA FORM	DESCRIPTION
Form 1	General administrative information about the business (used in conjunction with a number of other forms)
Form 2B	Concentrated Animal Feeding Operations and Aquatic Animal Production Facilities
Form 2C	Consolidated Permits information Industrial activities, including manufacturing, commercial, mining, and silvicultural operations
Form 2D	New Sources and New Discharges
Form 2E	Facilities which do not discharge process wastewater
Form 2F	Storm water discharges associated with industrial activity or by operators of storm water discharges that EPA is evaluating for designation as a significant contributor of pollutants to waters of the U.S.

3. FLOW DATA

a) POTWs

The design flow rate shall be used for both municipal wastewater treatment plants and domestic wastewater treatment plants.

b) Industrial Facilities

In general, the highest of 30 day average flow from the most recent two-year flow data reported in DMRs or the long-term average flow reported in the application shall be used for industrial discharges, unless other factors indicate a different effluent flow rate is required.

An estimated flow (based on pump rate, batch volume, or other analytical estimates) reported in the application could be used on a case by case basis for:

- (1) A facility that has not discharged for the past two years;
- (2) Discharge (overflow) that is caused by storm event; or
- (3) Infrequent discharge, such as hydrostatic tests, blow down, etc.

There is not a limit to the age of the data that can be used for effluent flow rate as long as it can be justified that the data are representative.

Both POTWs and industrial facilities can have more than one flow rate condition, with conditions allowing for changes, increases or decreases, based on planned future activities. Trigger points would be used that would allow current conditions to remain in force in the event that the planned changes are not made.

#### 4. MINIMUM APPLICATION COMPLETENESS REVIEW REQUIREMENTS

The determination of completeness of an NPDES application specified in 40 CFR 124.3, will be based on satisfactorily completing the appropriate EPA NPDES application form. Additional technical information beyond that specifically required in the application may be required to complete the permit, but since this is information not required on the specific application it will be considered additional information.

#### 5. ADDITIONAL REQUIRED INFORMATION

The permitting authority may request additional information as may reasonably be required to assess the discharges of the facility and to determine whether to issue an NPDES permit. The additional information may include quantitative data and bioassays to assess the relative toxicity of discharges to aquatic life and requirements to determine the cause of the toxicity. Even if a discharger is not required to sample a particular parameter, a sample that exists for that parameter may be considered by the permitting authority. If reasonable potential is established a limit for that parameter will be developed.

#### 6. HUMAN HEALTH DATA REQUIREMENTS

EPA established additional permit application pollutant data requirements for the protection of NM WQS for human health pollutants in December 2007. The elements of that policy are contained in this document. Data submitted for human health parameters shall analyze the applicable parameters, and not use “believed absent” in reporting results. The analytical results must be tested to the MQL listed in **Appendix D**, or below the applicable WQS and be defensible and represent periods of normal facility activity.

##### a) POTWs with Design Flow <1 MGD

For sanitary waste treatment plants which have a design flow less than 1 MGD (million gallons per day): Discharges are deemed to have no reasonable potential to cause or



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contribute to a violation of human health criteria. Therefore, no additional data are required.

b) ALL Industrial Dischargers and POTWs with Design Flow > 1 MGD

All industrial discharges, and all municipal discharges with a design flow greater than or equal to 1 MGD MUST test according to the following:

- (1) For discharges to an ephemeral or intermittent stream which will not enter into a perennial stream or a permanent water pool, except in direct response to precipitation or runoff, the following persistent pollutants MUST be analyzed and reported in the application.

**TABLE 3. Persistent Pollutant Which Will Not Enter Into A Perennial Stream**

POLLUTANT	POLLUTANT	POLLUTANT
Antimony, (dissolved (D))	Zinc, (D)	Dieldrin
Arsenic, (D)	Aldrin	2,3,7,8-TCDD dioxin
Nickel, (D)	Benzo (a) pyrene	Hexachlorobenzene
Selenium, (D)	Chlordane	PCBs
Thallium, (D)	4,4' -DDT and derivatives	Tetrachloroethylene

- (2) For all other discharges, all pollutants listed below MUST be analyzed and reported in the application:

**TABLE 4. Persistent Pollutant Which Will Enter Into A Perennial Stream**

POLLUTANT	POLLUTANT	POLLUTANT
Antimony (D)	2-Chlorophenol	Fluoranthene
Arsenic (D)	2,4-Dichlorophenol	Fluorene
Nickel (D)	2,4-Dimethylphenol	Hexachlorobenzene
Selenium (D)	2-Methyl-4, 6-Dinitrophenol	Hexachlorobutadiene
Thallium (D)	2,4-Dinitrophenol	Hexachlorocyclopentadiene
Zinc (D)	Pentachlorophenol	Hexachloroethane
Cyanide, weak acid dissociable	Phenol	Indeno (1,2,3-cd)Pyrene
2,3,7,8-TCDD (Dioxin)	2,4,6-Trichlorophenol	Isophorone
Acrolein	Acenaphthene	Nitrobenzene
Acrylonitrile	Anthracene,	n-Nitrodimethylamine
Benzene	Benzidine,	n-Nitrosodi-n-Propylamine
Bromoform	Benzo(a)anthracene	n-Nitrosodiphenylamine
Carbon Tetrachloride	Benzo(a)pyrene	Pyrene
Chlorobenzene	Benzo(b)fluoranthene	1,2,4-Trichlorobenzene
Clorodibromomethane	Benzo(k)fluoranthene	Aldrin
Chloroform	Bis (2-chloroethyl) Ether	Alpha-BHC
Dichlorobromomethane	Bis (2-chloroisopropyl) Ether	Beta-BHC
1,2-Dichloroethane	Bis (2-ethylhexyl) Phthalate	Gamma-BHC
1,1-Dichloroethylene	Butyl Benzyl Phthalate	Chlordane
1,2-Dichloropropane	2-Chloronapthalene	4, 4'-DDT and derivatives

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1,3-Dichloropropene	Chrysene	Dieldrin
Ethylbenzene	Dibenzo(a,h)anthracene	Alpha-Endosulfan
Methyl Bromide	1,2-Dichlorobenzene	Beta-Endosulfan
Methylene Chloride	1,3-Dichlorobenzene	Endosulfan sulfate
1,1,2,2-Tetrachloroethane	1,4-Dichlorobenzene	Endrin
Tetrachloroethylene	3,3-Dichlorobenzidine	Endrin Aldehyde
Toluene	Diethyl Phthalate	Heptachlor 90
1,2--trans-Dichloroethylene	Dimethyl Phthalate	Heptachlor Epoxide
1,1,2-Trichloroethane	Dibutyl Phthalate	PCBs
Trichloroethylene	2,4-Dinitrotoluene	Toxaphene
Vinyl Chloride	1,2-Diphenylhydrazine	

c) Exceptions

Facilities that have previously performed and submitted effluent sample analyses for dioxins, pesticides and polychlorinated biphenyls (PCB) are not required to re-analyze for these parameters provided:

- (1) the permittee submits a signed, certified statement attesting that the facility's processes and/or
- (2) feedstock chemicals have not changed and
- (3) the MQL used previously is at least as low as the current MQL or below the applicable WQS (See **Appendix D**).

7. EFFLUENT DATA USED FOR WATER QUALITY BASED REASONABLE POTENTIAL SCREENING

a) Samples Reported At Detection Levels Greater or Less Than MQL

- (1) Analytical detection levels (DL) used by the testing laboratory, for effluent and background data should be less than or equal to EPA established MQLs (**Appendix D**).
- (2) If the value is reported as less than a detection level (< DL) and the DL is less than the MQL, "0" is used for the water quality based reasonable potential screening purposes;
- (3) If the value is reported as less than a detection level (< DL) and the DL is greater than the MQL, the permit writer may allow the permit applicant to provide additional data analyzed at an appropriate detection level. If the applicant does not provide new data, then the permit writer may use the value of the "DL" for screening purposes;

- (4) If the permittee reports two (2) or more data points for a pollutant and at least one data point is detected above the DL and the rest of the data points are reported as < DL, then all the data reported as < DL will be counted as 1/2 DL. A calculated geometric mean value will be used for screening purposes;
- (5) If a measurable, verifiable data point is reported, that value may be used for screening purposes, even if the value is less than the EPA MQL;
- (6) If a metal is reported as total concentration and there is no partition coefficient for that metal, then the dissolved concentration would be assumed to be equal to the total concentration. However, during the permit drafting process, the permit writer may allow the applicant to resubmit data that reports the metal in dissolved form. That data will be used for the screening process. The applicant would be required to submit four (4) additional dissolved data samples, taken over a minimum of 2 weeks, but no longer than four (4) weeks, with any single sampling event to be no closer than 3 days from another sampling event.
- (7) For discharges to an ephemeral stream, the hardness and TSS of the discharge may be used to calculate the reasonable potential.

#### E. MIXING ZONES

The Compliance with Water Quality Standards section of the NMWQS state that a limited mixing zone, contiguous to point source wastewater discharge may be allowed in any stream receiving such a discharge. "Mixing zones serve as regions of initial dilution that allow the application of a dilution factor in calculations of effluent limitations." These zones are a limited area or volume of water where the discharge plume is progressively diluted by the receiving water. A mixing zone is a defined area or volume of the receiving water surrounding or adjacent to a wastewater discharge where the receiving water, as a result of the discharge, may not meet all applicable water quality criteria or standards. It is considered a place where wastewater mixes with receiving water and not as a place where effluents are treated.

##### 1. NMWQS PROVISIONS

Wastewater mixing zones in which numeric standards may be exceeded are subject to a number of provisions in the NMWQS. They include the following:

- a) Mixing zones are not allowed for discharges to publicly owned lakes, reservoirs, or playas. The critical dilution for WET testing in these waters is 100%.
- b) Acute numeric standards shall be attained at the "point of discharge" (end-of-pipe) for any discharge to surface water with a designated aquatic life use.
- c) The general narrative standards are applicable in mixing zones.

- d) The shape and size of the mixing zones shall depend on site specific conditions including, but not limited to, wastewater flow, receiving water critical low flow, outfall design, channel characteristics and climatic conditions. Where stream morphology is not available, use 100% of the critical low flow for the mixing zone to determine compliance with the applicable NMWQS, with the exception of acute standards.
- e) All applicable water quality standards, except acute aquatic life criteria, pH, E. coli bacteria and acute ammonia criteria, are to be attained at the boundaries of the mixing zones.
- f) A continuous zone of passage, in which all applicable water quality standards are to be met, is to be maintained through and around a mixing zone. This zone shall allow the migration of aquatic life presently common in the area with no adverse effect to their populations.

## 2. MIXING ZONE DETERMINATIONS

After consideration of the requirements of the NMWQS requirements on a mixing zone for a particular discharge or discharges, further considerations must be given for determining an applicable standard mixing zone on a case-by-case basis in accordance with the NMWQS.

## F. EVALUATING RECEIVING WATER AMBIENT CONDITIONS

The permitting authority will issue NPDES permits containing effluent limits for pollutants which have an established numerical water quality standard, and where the discharge has a reasonable potential to cause an exceedance of a water quality standard. This determination was made using the stream's critical low flow as dilution. Consideration of background pollutant contribution in the receiving stream potentially results in a reduction in the mass and concentration limits for the discharge. (See formula in Section 8 of this part.)

In some cases, background concentrations determine the status of the receiving water as impaired, allowing no further assimilative capacity of the receiving water for calculations of mass in effluent limits, beyond those already allocated. Therefore, it is important to evaluate the ambient conditions of the receiving water to help make permitting decisions associated with effluent limitations development (see **Appendix C**, Permit Decision Flowchart), and it is important to have the receiving water ambient data for actual calculation of effluent limits (see section on WQ screening against criteria for designated uses).

## G. NATURAL BACKGROUND STRATEGY/PARTITIONING COEFFICIENTS

Wherever possible, background information will be used within the development of effluent limitations for facilities in New Mexico. The SWQB has and continues to compile and update a

series of intensive water quality studies throughout the State that characterize the health of specific sections of surface waters, including background water quality data. Other sources of data are compiled from the USGS yearly reports and the State 305(b) reports.

1. LOWFLOW - 4Q3

The critical low flow is defined in the NMWQS as the minimum average four consecutive day flow that occurs with a frequency of once in three years (i.e., 4Q3). Critical low flow values may be determined on an annual, seasonal, or monthly basis, as appropriate. The permitting authority will consider seasonal condition permits on a case-by-case basis. In general, this type of variable time permit would require the construction, operation, calibration and maintenance of an upstream flow monitoring station with reporting of the upstream flow as part of a permit condition and with approval by the State and the permitting authority.

The NMWQS make another provision for allowing the use of a contractually guaranteed minimum stream flow in lieu of a critical low flow. A contractually guaranteed minimum stream flow may be allowed on a case-by-case basis and upon consultation with the New Mexico Interstate Stream Commission. Should drought, litigation or other reasons interrupt or interfere with minimum flows under a minimum flow contract for a period of at least 30 consecutive days, such permission under that contract, at the sole discretion of the Commission, could be revoked, in which case the 4Q3 would be in effect for all permit limitations and conditions. A reopener clause needs to be placed in the permit to account for needed changes to the limitations and conditions, should the contract be revoked.

2. HARMONIC MEAN FOR HUMAN HEALTH SCREENING

The NM WQCC adopted human health criteria into the NMWQS effective October 11, 2002. As allowed in Section 20.6.4.11.B.(1), the harmonic mean used for screening treated wastewater against the human health criteria is defined as the number of daily flow measurements divided by the sum of the reciprocals of the flows. It is the reciprocal of the mean of the reciprocals. For ephemeral waters, the calculation is based on the nonzero flow intervals and modified by including a factor to adjust for the proportion of intervals with zero flow. It is calculated as follows:

$$\text{Harmonic Mean} = \frac{n}{\sum 1/Q}$$

where  $n$  = number of flow values  
and  $Q$  = flow value

Modified Harmonic Mean =

$$\left[ \frac{\sum_{i=1}^{Nt-N_0} \frac{1}{Q_i}}{Nt - N_0} \right]^{-1} \times \left[ \frac{Nt - N_0}{Nt} \right]$$

where:  $Q_i$  = nonzero flow

$Nt$  = total number of flow values

$N_0$  = number of zero flow values

### 3. BACKGROUND RETRIEVAL/SOURCES

The following ambient background data sources should be utilized as appropriate:

- a) STORET or NMED SWQB's database/files that meet QA requirements

NMED stream data, USGS stream data, effluent data and EPA data stored in a variety of databases and reports.

- b) 305(b) Reports

NMED source of basic information on ground and surface water quality and water pollution.

- c) Stream data submitted by the Permittee

This data is permissible only if the permittee has submitted Quality Assurance/Quality Control (QA/QC) documentation acceptable to the EPA and State, or has contracted with an impartial agency (e.g., USGS) with documented QA/QC; and

- d) USGS Yearly Water Resources Data

These annual reports are hydrologic data consisting of stream flow, ground water levels, and the quality of water to help develop and manage water resources.

- e) Other sources of verifiable data after consultation/approval of the State

The permit writer will include information in the permit fact sheet referencing the source of data used (e.g., permittee, USGS) and identify the point of collection (e.g., USGS gauge station identification number). If no data are available, then the permit writer will indicate so.

Available data should be assessed to determine which data are appropriate for utilization as follows:

- (1) Data prior to known significant changes (e.g., in point source discharges, nonpoint source discharges, hydrologic modifications of the stream, etc.) should generally not be utilized.
- (2) A minimum of two data points should be utilized for evaluations and a geometric mean calculated for the background concentration value.
- (3) When the concentration of any pollutant is reported as "less than" for all data points, the value for that pollutant should be assumed to be zero. When the actual concentration is reported in one or more data points, the value for other data points reported as "less than" shall be assumed to be one half the detection limit, or disregarded where the assumed value is considered unrepresentative.
- (4) In instances where the geometric mean or individual data points are not available, the arithmetic mean of the appropriate data will be utilized in determining the background level for that parameter.

Where background data exceeds water quality standards, the EPA Permits Branch will inform the EPA Water Quality Branch to contact the NMED to discuss development of a Total Maximum Daily Load (TMDL)/Waste Load Allocation (WLA) for the parameter in question. A WLA may not always be appropriate and the State may opt to develop a site specific water quality standard.

#### 4. PARTITIONING COEFFICIENTS FOR METALS

Metals criteria are based on dissolved metal concentrations and mean average hardness values obtained from STORET 1 for the applicable stream segment. Effluent limitations calculated from the dissolved metals criteria are converted to total metals using dissolved/total metal partitioning coefficients developed by the EPA.

The specific numerical criteria for metals are based on dissolved metal concentrations in ambient waters. 40 CFR Part 122.45 (c) requires that all permit effluent limitations for metals be expressed in terms of "total recoverable metal" as defined in 40 CFR Part 136 (exceptions are described under Part 122.45 (c)). TSS (footnote <sup>1</sup> below), are a function of the conversion from dissolved to total recoverable metal values. This conversion involves determining a linear partition coefficient for the metal of concern and using it to determine the fraction of metal dissolved so that the dissolved metal ambient criteria may be translated to a total effluent limit.

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The linear partition coefficient formula for streams and lakes is as follows:

$$K_p = K_{po} \times TSS^\alpha$$

where:

- $K_p$  = Linear partition coefficient
- $K_{po}$  = found in table below
- $\alpha$  = found in table below
- TSS = total suspended solids concentration found in receiving stream or approximation thereof, geometric mean, units in mg/l
- C/Cr = Fraction of metal dissolved
- Cr = Dissolved criteria value for metal in water quality standards

Given that:

$$K_p = K_{po} \times TSS^\alpha$$

then,

$$C/Cr = 1 / [1 + \{K_p \times TSS \times 10^{-10}\}]$$

$$\text{total metal limit} = Cr / C/Cr$$

In accordance with Section 20.6.4.12.H. NMAC, hardness dependent formulae for metals shall be valid only for hardness values of 0 - 400 mg/l. For values above 400 mg/l, the value of 400 mg/l shall apply.

**Table 5 Linear Partition Coefficients For Priority Metals In Streams And Lakes**

(Delos et. al, 1984) <sup>2</sup>

METALS	STREAMS		LAKES	
	$K_{po}$	$\alpha$	$K_{po}$	$\alpha$
Arsenic	$0.48 \times 10^{-6}$	- 0.73	$0.48 \times 10^{-6}$	- 0.73
Chromium	$3.36 \times 10^{-6}$	- 0.93	$2.17 \times 10^{-6}$	- 0.27
Copper	$1.04 \times 10^{-6}$	- 0.74	$2.85 \times 10^{-6}$	- 0.90
Lead <sup>3</sup>	$2.80 \times 10^{-6}$	- 0.80	$2.04 \times 10^{-6}$	- 0.53
Nickel	$0.49 \times 10^{-6}$	- 0.57	$2.21 \times 10^{-6}$	- 0.76
Silver	$2.39 \times 10^{-6}$	-1.03	$2.39 \times 10^{-6}$	-1.03
Zinc	$1.25 \times 10^{-6}$	- 0.70	$3.34 \times 10^{-6}$	- 0.68

Footnotes:

1. Hardness and TSS values will be obtained at the nearest upstream gauge station found in STORET.
2. Delos, C. G., W. D. Richardson, J. V. DePinto, R. B. Ambrose, P. W. Rogers, K Rygwelski, J. P. St. John, W. J. Shaughnessey, T. A. Faha, W. N. Christie. Technical Guidance for Performing Waste Load Allocations, Book II: Streams and Rivers, Chapter 3 Toxic Substances (EPA - 440/4 - 84 - 022). Note that the coefficients for cadmium and mercury have been removed from the table per Glenn Saums (NMED) instructions to Brian



Burgess (US EPA) during a meeting on September 12, 1994. Mercury and dissolved cadmium values are to be applied directly without use of a partition coefficient.

3. Contains revised values for stream applications in accordance with EPA memo dated March 3, 1992, page 18, from Margaret J. Staiskowski (WH-586) to the Water Management Division Directors, Regions I - IX.

a) Aluminum

NMED has not adopted a partitioning coefficient for total Aluminum in New Mexico, due to the variability of partitioning of this metal across the State. The NMWQS and ambient data are expressed in dissolved form. Partitioning between the forms can range up to ten times the permittee reportable concentration, which makes a direct comparison between effluent data, expressed in the total form, and the NMWQS, expressed in the dissolved form, not necessarily representative of actual impacts. Therefore, whenever possible, effluent data should be collected in the dissolved form and directly compared to the NMWQS through the screening processes described in Sections 3.4.

b) Dissolved/Total Evaluations

Monitoring requirements in permits can be expressed in the dissolved form, but limitations must be expressed in the total recoverable form, per the requirements of 40 CFR 122.45(c). When a limitation is required, or when the only effluent or ambient data available is in the total recoverable form, a 1:1 conversion to the dissolved form will be made for water quality screens. The reverse process will be made to obtain a limitation in the total recoverable form. During the permit development or the public participation process of the permit, the permittee shall be allowed the opportunity to submit data in the dissolved form for a water quality screening directly with numeric criteria in the proper form.

## H. REASONABLE POTENTIAL FOR TOXICS

The analyses developed by EPA Region 6 and utilized by NMED in determining potential exceedances of New Mexico's toxic criteria is developed from available data. This approach is in accordance with the Region 6 policy titled Determining the Need for Water Quality Based Permit Effluent Limitations, September 11, 1991 (see [Appendix F](#)). This policy requires that submitted data be analyzed to estimate the 95th percentile of an effluent data set, or the value that would be expected to exceed 95% of the effluent concentrations in a discharge. The policy estimates this to be:

Average pollutant concentration \* 2.13 = 95th percentile pollutant concentration

EPA and NMED recognize that effluent characteristics are normally distributed over time; therefore, the permitting authority's determination of the need for WQBEL considers the measured concentrations of priority pollutants in effluent, multiplied by 2.13, in order to estimate the upper limit of concentrations at a confidence level of 95 percent.

1. POST THIRD ROUND PERMITTING PRIORITIES

The regional policy will be implemented to the maximum extent possible given available EPA and state resources in accordance with the following priorities:

- a) Facilities with known or suspected toxicity problems.
- b) Other major industrial, municipal and Federal facilities.
- c) Other minor industrial and federal facilities.
- d) Other minor municipal facilities.
- e) Storm water only facilities

2. REASONABLE POTENTIAL FOR MINOR POTW's

The amount of information required for minor facilities was limited to specific sections of these forms, because they are unlikely to discharge toxic pollutants in amounts that would impact state water quality standards. Supporting information for this decision was published as "Evaluation of the Presence of Priority Pollutants in the Discharges of Minor POTW's," June 1996, and was sent to all state NPDES coordinators by EPA Headquarters. In this study, EPA collected and evaluated data on the types and quantities of toxic pollutants discharged by minor POTW's of varying sizes from less than 0.1 MGD to just under 1 MGD. The Study consisted of a query of the EPA Permit Compliance System (PCS) database from 1990 to 1996, an evaluation of minor POTW data provided by the State agencies, and on-site monitoring for selected toxics at 86 minor facilities across the nation. Findings of the study dictated the scope of testing for minor facilities into two different classes, based on their reasonable potential to contain toxic substances in their wastewater discharges. Facilities less than 0.1 MGD were not required to report any toxic substances, since studies indicated they had "no reasonable potential" to discharge toxic substances in amounts that would violate state WQS. Facilities greater than 0.1 MGD, but less than 1 MGD reported some toxic substances that were found to be present in facility discharges of that size.

Therefore, since the development of the application for these types of facility discharges has already evaluated general reasonable potential for toxicity issues, data entered on the application is generally sufficient to determine the need for effluent limits. Reasonable potential screens may be made on data provided, and in the cases of facilities under 0.1 MGD, these facilities have already been assessed as having no reasonable potential to discharge toxic substances in toxic amounts. Additional historical records may provide information to assess reasonable potential.

I. WATER QUALITY SCREENING AGAINST CRITERIA FOR DESIGNATED USES

1. DISCHARGE TO STREAMS

The permitting authority will use the following equation for calculating water quality based effluent limits for discharges to perennial streams:

$$C_e = C_s [(FQ_a + Q_e)/Q_e] - C_a (FQ_a/Q_e)$$

where:

$C_e$  = Allowable daily maximum effluent concentration. In the case of intermittent or ephemeral streams,  $C_e = 100\% C_s$ . Daily average effluent concentrations are calculated as  $C_e/1.5$ .

(Reference Section 5.4.2, page 104 of EPA's Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2 90 001, Second Printing Current as of July 26, 2002).)

$C_s$  = Applicable water quality standard. The most stringent of the applicable numerical NMWQS will apply.

$C_a$  = Ambient stream concentration upstream of discharge.

$Q_e$  = Wastewater treatment facility design flow in MGD for municipal facilities, and highest daily average flow for the past 24 months (or projected daily average flow in the case of new facilities) in MGD for industrial and Federal facilities.

$Q_a$  = Critical low flow (4Q3) of the receiving waters at discharge point in MGD for all applicable standards except acute, where  $C_e = C_s$ .

$F$  = fraction of stream allowed for mixing (as applicable).

The NMWQS state that a limited mixing zone, contiguous to point source wastewater discharge, may be allowed in any stream receiving such a discharge. Wastewater mixing zones in which numeric standards may be exceeded are subject to the following definition defining the shape and volume of mixing zones as "dependent on site specific conditions such as, but not limited to, wastewater flow, receiving water critical conditions, and, if needed, shall be determined on a case by case basis." (Where stream morphology is not available, use 100% of the critical low flow for the mixing zone.)

= site specific based on the wastewater flow, receiving water critical low flow, outfall design, channel characteristics, and climatic conditions, where stream morphology data is available, 1.0 when it is not available.

= 1.0 for intermittent or ephemeral streams.

= 1.0 for human health evaluations for screening against EPA human health standards.

Critical dilution in perennial streams shall be calculated as  $Q_e / (FQ_a + Q_e)$ . Critical dilution in intermittent or ephemeral streams shall be 100% effluent.

## 2. DISCHARGE TO LAKES AND RESERVOIRS

Effluent limitations shall be determined using the above calculations with the receiving water low flow being  $Q_a = 0.0$  MGD. Chronic or acute biomonitoring tests with a critical dilution of 100% will be used to determine whole effluent toxicity in accordance with the Applicability of Water Quality Standards section of the NMWQS.

## 3. ADDRESSING EFFLUENT LIMITS THAT ARE LESS THAN MINIMUM QUANTIFICATION LEVELS

Where a calculated effluent limit is less than the current EPA Region 6 Minimum Quantification Level (MQL), the permit writer must include the calculated effluent limit in the permit. Language in Part II of the permit under a section titled Minimum Quantification Level shall read:

"If any individual test result is less than the MQL value for that parameter, then a value of zero (0) may be used for Discharge Monitoring Report (DMR) calculations and reporting requirements.

## J. HUMAN HEALTH SCREENING

### 1. GENERAL CONDITIONS

Human health standards shall apply to those waters with a designated, existing or attainable fishery use.

The human health strategy is designed to be a one-time analysis to demonstrate that the facility, under current operations and flow, does not have the reasonable potential to exceed the criteria through screening of a minimum of one sample. Changes to the facility reflected by the addition of pollutants, a process change and/or addition, or the addition of pretreatment facilities would require an updated test at the next permit renewal cycle, or when the permitting authority directs the facility. At re-application, the applicant may provide a signed certificate that certifies that no changes in process, chemicals used or a change in the nature of the discharge has occurred since the last test requirements and that the MQL has not changed from the time of the previous test. This certification must be signed by the appropriate signatory as described in 40 CFR Part 122.22, also contained in Part III (Standard Conditions).

If the effluent data shows the concentration of any pollutant does not exceed the reasonable potential concentration (RPC) or the MQL, whichever is highest, that pollutant is not deemed to have the reasonable potential to exceed New Mexico's human health-based criteria. If the data however shows that reasonable potential does exist for any specific pollutant, then the permitting authority shall limit that pollutant in the permit with an appropriate compliance schedule.

## 2. APPLICATION

In Part D.6 above, human health permit application requirements were identified. All pollutants need to be analyzed, the applicant shall not use the "believed absent" notation and not analyze the pollutant. The type of additional data requirements are based on a combination of the nature of the discharger and the type of receiving waterbody. In general those requirements are:

### a) Minor POTWs

POTWs and private domestics which have a design flow less than 1 MGD are deemed to have no reasonable potential to cause or contribute to a violation of human health criteria. Therefore, no additional testing is required.

### b) Major POTWs and Industrial Dischargers

All industrial discharges and those municipal dischargers greater than or equal to 1 MGD shall test according to the nature of the receiving stream.

#### (1) Discharges To An Ephemeral Or Intermittent Stream

Which will not enter a perennial stream or a permanent water pool, except in direct response to precipitation or runoff, facilities must analyze and report the following persistent toxic pollutants: Antimony, dissolved (D); Arsenic, D; Methylmercury; Nickel, D; Selenium, D; Thallium, D; Zinc, D; Aldrin; Benzo(a)pyrene; Chlordane; 4,4' DDT and derivatives; Dieldrin; 2,3,7,8 TCDD Dioxin; Hexachlorobenzene; Tetrachloroethylene; and PCBs.

#### (2) Discharges To Perennial Streams

The following pollutants must be analyzed and reported: Antimony, D, Arsenic, D, Nickel, D, Selenium, D, Thallium, D, Zinc, D, Cyanide, weak acid D, 2,3,7,8-TCDD Dioxin, Acrolein, Acrylonitrile, Benzene, Bromoform, Carbon Tetrachloride, Chlorobenzene, Chlorodibromomethane, Chloroform, Dichlorobromomethane, 1,2-Dichloroethane, 1,1-Dichloroethylene, 1,2-Dichloropropane, 1,3-Dichloropropene, Ethylbenzene, Methyl Bromide, Methylene Chloride, 1,1,2,2-Tetrachloroethane, Tetrachloroethylene Toluene, 1,2--trans-Dichloroethylene, 1,1,2-Trichloroethane, Trichloroethylene, Vinyl Chloride, 2-Chlorophenol, 2,4-Dichlorophenol, 2,4-Dimethylphenol, 2-Methyl-4,6-Dinitrophenol, 2,4-Dinitrophenol, Pentachlorophenol,

Phenol, 2,4,6-Trichlorophenol, Acenaphthene, Anthracene, Benzdine, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-chloroethyl)Ether, Bis(2-chloroisopropyl)Ether, Bis(2-ethylhexyl)Phthalate, Butyl Benzyl Phthalate, 2-Chloronaphthalene, Chrysene, Dibenzo(a,h)anthracene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 3,3'-Dichlorobenzidine, Diethyl Phthalate, Dimethyl Phthalate, Dibutyl Phthalate, 2,4-Dinitrotoluene, 1,2-Diphenylhydrazine, Fluoranthene, Fluorene, Hexachlorobenzene, Hexachlorobutadiene, Hexachlorocyclopentadiene, Hexachloroethane, Indeno(1,2,3-cd)Pyrene, Isophorone, Nitrobenzene, n-Nitrosodimethylamine, n-Nitrosodi-n-Propylamine, n-Nitrosodiphenylamine, Pyrene, 1,2,4-Trichlorobenzene, Aldrin, Alpha-BHC, Beta-BHC, Gamma-BHC, Chlordane, 4,4'-DDT and derivatives, Dieldrin, Alpha-Endosulfan, Beta-Endosulfan, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs, and Toxaphene.

### 3. IMPLEMENTATION

Human health standards are long term in nature, and permit limits established for human health protection will be monthly (30 day) average limits only, there will be no daily maximum limits.

NMWQS establish that for human health permitting implementation, the harmonic mean flow and modified harmonic mean flow developed above shall be used as  $Q_a$ , the critical low flow. The same equation that was previously used for toxic evaluation in streams is used for human health. The calculations derived from this relationship are for the daily maximum. The appropriate daily average (30 day average) limits would be the calculated result divided by the daily maximum/monthly average factor 1.5, consistent with the reference cited above. (Reference Section 5.4.2, page 104 of EPA's Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2 90 001, Second Printing Current as of July 7, 2002).

$$C_e = C_{SHH} [(FQ_{aHM} + Q_e)/Q_e] - C_a (FQ_a/Q_e)$$

where:

$C_e$  = Allowable daily maximum effluent concentration. In the case of intermittent or ephemeral streams,  $C_e = C_s$ . Daily average effluent concentrations are calculated as  $C_e/1.5$ .

$C_{SHH}$  = Applicable human health standard.

$C_a$  = Ambient stream concentration upstream of discharge. (This should be a long term average)

Q<sub>e</sub> = Wastewater treatment facility design flow in MGD for municipal facilities, and highest daily average flow for the past 24 months (or projected daily average flow in the case of new facilities) in MGD for industrial and Federal facilities.

Q<sub>aHM</sub> = Harmonic mean, or modified harmonic mean flow shown above.

F = 1.0 for human health evaluations for screening against EPA human health standards.

## K. METHYLMERCURY STRATEGY

### [THIS POLICY IS STILL WAITING FINAL IMPLEMENTATION STATUS]

On January 8, 2001, EPA announced the availability of its recommended water quality criterion for methylmercury. EPA recommended the level of 0.3 mg/kg methylmercury fish tissue wet weight in freshwater and estuarine fish and shellfish that should not be exceeded to protect consumers of fish and shellfish among the general population. EPA recognized that the use of a fish tissue value instead of the traditional water column criteria posed implementation challenges. On June 28, 2007, EPA released the document “Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion (GMWQC)”, on how to implement these new standards.

Methylmercury is not unique to only industrial or sanitary dischargers, although in general, the occurrence of methylmercury in discharges is greater in POTWs, regardless of size. The monitoring for methylmercury shall be required for all industrial operations and POTWs with a design flow greater than 0.1 MGD.

Three steps are presented in the GMWQC for methylmercury assessment and protection. Step One is to determine if methylmercury is present in the discharge at a suitably sensitive method. Step Two is to determine that if methylmercury is present at detectable levels in the discharge, is it at a level such that methylmercury exceeds WQS in predator fish tissue at the vicinity of the discharge. Step Three is to address in terms of permit limitations if either methylmercury exists in the discharge only, or in both the discharge and fish tissue.

Regulations found in 40 CFR 122.44(d)(i) through (iii) require that in determining if a discharge has a reasonable potential to exceed an applicable WQS, limitations must be imposed in the permit for that pollutant. This requires reasonable potential analysis of and limitations for methylmercury. EPA Method 1630 measures methylmercury in water to a 0.02 ng/l detection limit. The GMWQC establishes a protocol using a translator to compute the methylmercury water column equivalent to the fish tissue methylmercury standard. The translator contained in the GMWQC is a national bioaccumulation factor (BAF) of 2,670,000 l/kg. Using the translator allows Steps One and Two to be combined and the reasonable potential analysis to be simplified.

Step One: Use the national screening BAF to establish the “screening” water equivalent level for methylmercury as follows:

$$\text{WQS } 0.3 \text{ mg/kg} \div 2,670,000 \text{ l/kg} = 0.112 \text{ ng/l}$$

Step Two: Using EPA Method 1630, determine if methylmercury in the discharge is at a reasonable potential to exceed WQS in both the water column and the fish tissue of the predator fish in the vicinity of the discharge. Since methylmercury is a human health standard, the procedures contained in Part J Section 3 above are based on a mixing zone using the stream harmonic flow and not the low flow. At a worse case test, with zero harmonic flow, the lowest concentration to exceed reasonable potential for methylmercury is 0.053 ng/l. This is greater than the 0.02 ng/l MQL for EPA Method 1630, but significantly less than the less sensitive EPA Method 245.7 that has a 5 ng/l MQL.

Step Three: The analysis of reasonable potential in Step Two will yield one of three possible outcomes. Outcome One is where the discharge does not exist at a level detectable by Method 1630. Outcome Two is when the discharge exists at a level greater than the MQL of EPA Method 1630, but is below the reasonable potential of the methylmercury WQS, and Outcome Three is where the discharge is at a level above detection limit and also appears to be greater than the reasonable potential to exceed fish tissue levels.

Outcome One: The permit shall have the standard reopener clause to allow additional monitoring for future needs on an as needed basis.

Outcome Two: The permit would have a “Report” requirement for methylmercury using EPA Method 1630. The standard reopener clause would allow additional limitations and requirements if required based on the “Report” results.

Outcome Three: The permit would institute a methylmercury minimization plan (MMP) in lieu of a traditional methylmercury water quality based effluent limitation (WQBEL). The MMP would be a part of a narrative WQBEL that would place emphasis on waste minimization and pollution prevention. The facility would continue monitoring methylmercury using Method 1630 and this would allow direct measurement of reduction in methylmercury discharges as the MMP continued. The MMP would have enforceable events with reduction goals and timelines.

At the facility’s discretion, they could, instead of Outcome Three, fund and complete a fish tissue study with consultation and approval of the permitting authority. This study would determine directly if the fish tissue in the receiving water exceeded the State WQS for methylmercury. Based on the results of that study the facility could demonstrate that the fish do not exceed the WQS, and may avoid the MMP, and instead follow the Outcome Two steps. However, if the fish tissues study demonstrated exceedance of the WQS, then the facility would, subject to the permitting authority be subject to a methylmercury WQBEL, an MMP or both.



L. SPECIAL STANDARDS/VARIANCES

1. COLORADO RIVER SALINITY CONTROL STANDARDS

The Colorado River Salinity Control Forum's Policy for Implementation of Colorado River Salinity Standards Through the NPDES Permit Program (Policy), was adopted February 28, 1977 by the State. The Policy has been reviewed and retained in each of the Forum's Clean Water Act Section 303 triennial reviews since 1977. The basinwide provision for the Colorado River Basin in the NMWQS incorporates adoption of the Colorado River Salinity Control Standards that were set up by the Forum. The last review was approved in 2008.

One of the components of the Policy consists of placing effluent limitations on salinity for river basins that drain to the Colorado River. In New Mexico these Basins include the San Juan, Upper Colorado River, and Gila River Basins. Within these Basins, the application of the salinity standards require limitations that assure no unreasonable increase, or in some cases no increase in salinity to the Lower Colorado River.

a) Municipal Dischargers

According to the Policy, a reasonable or incremental increase in salinity over the supply water will be established for municipal discharges to any portion of the Colorado River Basin system that have an impact on the lower main stem. An incremental increase in salinity will be 400 mg/l or less, which is considered to be a reasonable incremental increase above the flow weighted average salinity of the intake water supply.

The Policy provides for essentially 4 subcategories of municipal discharges:

- (1) The large salt discharge facilities, where monitoring data indicates the incremental salt load is greater than 1 ton per day or 350 tons per year, but the facility is able to meet the goal of an incremental increase of 400 mg/l or less and the facility has not applied for an exemption.
- (2) Large salt facilities, where monitoring data indicates the incremental salt load is greater than 1 ton per day or 350 tons per year, and the facility has 1) not met, 2) is not able to meet, or 3) in the future may not be able to meet the goal of an incremental increase of 400 mg/l or less and has pre applied for an exemption.
- (3) Small scale discharge facilities, where the incremental increase in salt load is less than 1 ton per day or 350 tons per year. The Policy states the requirements for effluent limitations may be waived on a case by case basis, which is generally dependent on their reasonable potential to provide any net increase in the salt load.
- (4) Facilities where, in the opinion of the permitting agency, there is insufficient salt loading data to make a decision. Again, effluent limitations may be waived on a

case by case basis, according to best professional judgment on the reasonable potential of the facility to provide any net increase in the salt load.

Regardless of which category the facility falls into, the policy universally requires that all new and reissued NPDES permits for all municipalities require monitoring of the salinity of the intake water supply and the wastewater treatment plant effluent. Incremental increases in salinity are measured by calculating the difference of samples collected at the drinking water system intake location and the wastewater discharge outfall.

Section II.A of the Policy allows the permitting authority to permit a discharge in excess of 400 mg/l only if the applicant has submitted, with their permit application, certain information detailed in the Policy. The permitting decision making process, in regard to the applicant, is directed through the Policy. In this instance the permit language would be identical to that of the category of dischargers that meet the 400 mg/l net increase, with the exception that the allotted value would be substituted for that "400 mg/l" value.

Waivers from effluent limits do not relieve dischargers from the need to monitor salinity or from their obligation to try and reduce salt loading. If a waiver is not allowed by the permitting authority, then the "400 mg/l" net increase effluent limit will be required in the permit.

In all cases, reopener clauses in permits would be appropriate, in cases where data collected during the term of the permit becomes sufficient to indicate the facility's permit should include a limitation. In all categories, the permit writer should also consider, as an option, including a requirement that the permittee employ Best Management Practices (BMPs) to ensure the minimization of salt loading to the river system. An annual report on the BMPs could also be required, if this option were selected.

Sampling analysis shall be by either the "calculation method" sum of constituents or the filterable residue method (total dissolved solids [TDS]) a See Section 20.6.4.13.(K) and Policy II.F.d.1 .

Monitoring frequency requirements are as follows:

**Table 6: Monitoring Frequency Requirements for Salinity in the Colorado River Basin**

Treatment Plant Design Capacity	Monitoring Frequency <sup>1</sup>	Monitoring Frequency <sup>2</sup>
< 1.0 MGD	Quarterly	Discrete (grab)
1.0 - 5.0 MGD	Monthly	Composite
> 5.0 MGD - 50 MGD	Weekly	Composite
> 50.0 MGD	Daily	Composite

Footnotes:

1. The Policy allows for the reduction of the monitoring frequency for the intake water supply, where the salinity of the water supply is demonstrated to be relatively uniform (Policy II.F.2).
2. Intake samples shall be flow weighted (ref. Policy II, Introductory Paragraph).

b) Industrial Dischargers

The basic objective for industrial dischargers is a "no salt return" discharge, whenever practicable. The policy generally requires submittal of information by the applicant on alternatives, water rights, quantity, quality, and costs to eliminate or minimize the salt discharge, should they seek something other than the "no salt return" (Ref. Water Quality Standards for Salinity Colorado River System for permittee requirements for all the type of reviews). Industrial dischargers are classified into two groups and 5 subgroups, which include:

(1) Groups

(i) Existing Facilities

The permit writer may permit the discharge of salt beyond the "no salt return" upon a satisfactory demonstration by the permittee that it is not practicable to prevent the discharge. The "no salt return" may be waived in cases where the discharge is less than one ton per day or 366 tons per year, or the permitting authority determines that a discharge qualifies for a "fresh water waiver," irrespective of the total daily or annual salt load.

(ii) New Construction

The permit writer may permit the discharge of salt for a new discharge from a new facility if a demonstration is made that it is not practicable to prevent the discharge of all salt, if it is less than one ton per day or 366 tons per year, or the discharge is of sufficient quality in terms of TDS concentrations that it can be considered "fresh water," and thus have no adverse effect on the system. The permit writer can consider a discharge to be fresh if the maximum TDS concentration is: 1) 500 mg/l for discharges into the Colorado River, upstream of Lees Ferry, AZ, or 2) 90% of the applicable in stream salinity standard at the appropriate benchmark monitoring state for discharges into the Colorado River downstream of Lees Ferry. In the latter case, discharges in NM do not apply.

c) Subgroups

(1) New Industrial Sources

Operations and associated discharges at multiple locations (Ref. Water Quality Standards for Salinity Colorado River System for specific definitions on these types of facilities)

The objective for new sources that have operations and associated discharges at multiple locations is generally to have no adverse effect on achieving the adopted numeric salinity standards. The permitting authority may authorize a discharge

beyond the objectives, based upon a satisfactory demonstration by the permittee it is not practical to attain that limit, and the permitting authority approves the new limit. This waiver would be the freshwater waiver described for new construction.

(2) Freshwater Industrial Discharges

These are discharges that do not cause or contribute to exceedances of the adopted numeric salinity standards for the Colorado River System. Different concentrations that define applicable standards are published in the Water Quality Standards for Salinity Colorado River System, but include concentrations based on areas on the far side of Arizona from New Mexico. Therefore, this section of the standards is not applicable to New Mexico's contribution to the River System.)

(3) Once Through Non-Contact Cooling Water

Non contact cooling water or blow down, defined in 40 CFR 401.11 (m) and (n), which has not commingled with any other waste stream, may be permitted for discharge under specific provisions. The permitting authority may authorize discharge of once through non contact cooling water, based on a finding that the returned water does not contribute to the loading or concentration of salts in the receiving waters in excess of de minimis amounts. Once through non contact cooling water must return only to the same stream from which the water was diverted, and the de minimis increase cannot be more than 25 mg/l, measured at the intake monitoring point of the cooling process or facility, subtracted from the effluent TDS immediately upstream of the discharge point to the receiving stream. The permitting authority may authorize a discharge in excess of the 25 mg/l increase, based upon a satisfactory demonstration by the permittee it is not practical to attain that limit, and the permitting authority approves the new limit.

(4) Fish Hatcheries

The basic policy for discharges from fish hatcheries will be an incremental increase in salinity of 100 mg/l or less above the flow weighted average salinity of the intake supply water. That increase may be waived if the discharged salt load reaching the Colorado River system is less than one ton per day, or 350 tons per year, whichever is less. Evaluation is made on a case by case basis.

The permitting authority may permit the discharge above the 100 mg/l limit if the permittee makes a satisfactory demonstration that it is not practical to attain that limit, and the permitting authority approves the new limit.

(5) Intercepted Groundwater

This type of discharge is classified by default as an industrial discharge, and it consists of intercepted groundwater from wells and mines within the Basin. The permitting authority may permit the discharge above the "no salt return" if the

permittee makes a satisfactory demonstration that it is not practical to attain that limit, and the permitting authority approves the new limit. In this particular case, consideration must be given to the possibility that the ground water, if not intercepted, would normally reach the Colorado River System in a reasonable time frame.

Additionally, the Standards have included a section to encourage new industrial sources to conduct or finance one or more salinity offset projects in cases where the permittee has demonstrated that it is not practicable to prevent the discharge of all salt from proposed new construction.

#### d) Permit Page Requirements

When the permit writer deems it appropriate for POTWs permits to allow for the TDS intake credit and a net increase permit limit of 400mg/l is limited, the permit table shall show the intake water TDS, the effluent TDS and the net difference TDS. The intake and effluent will be shown as “Report” and the 400 mg/l will be the limit.

### 2. TOTAL RESIDUAL CHLORINE (TRC) STRATEGY

In instances where a facility uses chlorine for disinfection of the wastewater, or is used as an emergency back-up to a system using another bacteria control technology such as ultraviolet light, or is used to remove filamentaceous algae, or when chlorine is used to disinfect process equipment used at the facility and the permit writer must limit TRC in the permit. The limits for TRC are based on acute and chronic chlorine limitations for the protection of aquatic life and the protection of wildlife uses in the Numeric Criteria table.

The limit is determined using the mixing zone model. The critical dilution used in conjunction with the chronic criteria, 11 ug/l and end-of-pipe used with the acute criteria, 19 ug/l, are calculated. The most limiting criteria is then used to determine the limit.

TRC is sampled using an instantaneous grab sample, and 40 CFR Part 136 defines instantaneous maximum as being measured within 15-minutes of sampling. Also, TRC cannot be averaged for reporting purposes. The Part I permit table shall have a footnote for TRC stating that:

“The effluent limitation for TRC is the instantaneous maximum grab sample taken during periods of chlorine use and can not be averaged for reporting purposes. Instantaneous maximum is defined in 40 CFR Part 136 as being measured within 15-minutes of sampling.”

### 3. TOTAL DISSOLVED SOLIDS STRATEGY

To address invertebrate freshwater aquatic toxicity caused by excessive total dissolved solids, the permitting authority will use the EPA Region 6 document titled Strategy for Evaluating and Addressing Impacts of Total Dissolved Solids in Freshwater Invertebrate Species

Toxicity Testing, dated January 19, 1994, or the most current revision thereof. See **Appendix E**.

4. PHOSPHORUS

There are segment specific criteria for Phosphorus in approximately eight segments in New Mexico. Phosphorus limitations in permits will be based on a case-by-case basis generally, but not limited to, the result of TMDLs.

5. pH

Compliance with the pH water quality standards for discharges to perennial streams is generally consistent with the WQMP, which in most cases will specify a pH range of 6.0-9.0 s.u. Segment specific pH values will be implemented in permits if they are more restrictive than the WQMP.

For permit purposes, the pollutant pH shall be limited at the end-of-pipe.

6. VARIANCES

The NMWQS makes no provisions for variances of WQS. Reopeners are allowed in permits for upcoming changes to the NMWQS to allow reopening and modifying an effective permit to reflect changes in the standards (see Section 4.4.4 on Reopeners). An existing permit will meet current NMWQS until changes in those standards have been adopted by the New Mexico WQCC.

M. TMDL STRATEGY

40 CFR 122.44(d)(1) requires the permitting authority to establish permit conditions which achieve water quality standards. In addition, 40 CFR 130.7(c) requires TMDLs to be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards. Lastly, 40 CFR 122.44(d)(1)(vii)(B) requires that NPDES permit conditions must be consistent with the assumptions and requirements of an available WLAs in a TMDL. These, approved loads are then incorporated into the State's WQMPs and NPDES permits.

In order to meet the Federal requirements and meet State water quality requirements, permits must meet those conditions of TMDLs that can be implemented in permits. Facilities that discharge the parameter of concern addressed in an approved or established TMDL generally fall into two groups, and will need to be permitted in specific ways. Where the approved or established TMDL assigns an individual waste load allocation (WLA) to a specific discharger, the permit writer will permit per the TMDL condition. Where the approved or established TMDL does not include a specific WLA for a discharger, the WQMP will need to be revised to include the facility with a specific WLA, or reference a specific WLA for that facility (which may require a revision of the TMDL). In either case, specific WLAs or conditions of the TMDL,

which can include target parameter concentrations, in lieu of specific WLAs, will need to be included in permits.

Pollutants with a specific numeric standard can be implemented at the point of discharge. Narrative or general water quality standards that cannot be implemented through a point of discharge limit will require additional modeling, as determined acceptable by EPA, to demonstrate compliance with the TMDL. Effluent trading, to allow new dischargers or allow expansion for existing discharges, will need to be verifiable and in all affected permits, consistent with EPA policy.

Incorporation of conditions of the TMDL may occur at reissuance of the permit, or the permit may be reopened to incorporate those conditions if they are of an immediate health and safety concern.

## N. DETERMINING COMPLIANCE WITH WATER QUALITY OBJECTIVES AND WATER QUALITY BASED EFFLUENT LIMITATIONS

### 1. WATER QUALITY MANAGEMENT PLAN COMPLIANCE

Federal regulations state that NPDES permit limitations must reflect water quality standards and State requirements per WQMP (40 CFR 122.44 (d)(6)). This regulation requires that permits be at least consistent with State WQMP, which means that permit writers must incorporate at least the requirements of WQMP, any WLAs or specified statewide or basin specific parameter concentration target, but may include more stringent water quality standards in permits.

### 2. COMPLIANCE SCHEDULES

The NMWQS allow the inclusion of compliance schedules in NPDES permits issued to existing facilities in order to provide sufficient time to comply with permit limits based upon new or revised provisions of the NMWQS. The compliance schedules may be included in permits at the time of renewals or modifications of the permit, and will be written to require compliance at the earliest practicable time. Compliance schedules will not be allowed in permits for "new dischargers" or existing facilities that would cause increases in effluent flow or changes in effluent characterization that adds new pollutants.

Compliance schedules will specify milestone dates and will include provisions for submitting quarterly progress reports and a final report detailing activities conducted toward meeting compliance schedule provisions. The schedules will include required actions, on the part of permittees, to achieve the effluent limitation. The schedule shall include 1) a schedule for completion that reflects a realistic assessment of the shortest practicable time required to perform each task; 2) a final compliance date, based on the shortest practicable time required to achieve compliance; and, 3) the deadlines to complete each action in the compliance schedule, including interim requirements.

### 3. INTERIM REQUIREMENTS/REPORTS

When compliance schedules exceed one year from the date of permit issuance, interim limitations, with specific compliance dates, will be included in the permit. Additionally, if a schedule is allowed in a permit to collect and provide data for a special report, prior to compliance with a NMWQS, then interim limitations, with specific compliance dates, will be included in the permit. A special report may be appropriate, where insufficient data are available to establish an effluent limitation in a permit, but the permitting authority decides to require a discharger to collect the data for evaluation, water quality screening, and effluent limitation development during the life of the permit.

Interim requirements can include both numeric limitations for the priority pollutant in the permit and may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures. Numeric interim limitations for the pollutant must be based on current treatment facility performance, or on existing permit limitations, whichever is more stringent. If the existing permit limitations are more stringent, and the discharger is not in compliance with those limitations, the noncompliance under the existing permit must be addressed through appropriate enforcement action before the permit can be reissued, unless antibacksliding provisions are met.

There will be no more than one year between interim dates. The interim requirements will state that the discharger must notify EPA and NMED, in writing, no later than 14 days following each interim date, of its compliance or noncompliance with the interim requirements.

If data are lacking to calculate a final effluent limitation in the permit, the permit writer may establish numeric interim limitations and other interim requirements, such as requiring the discharger to implement pollutant minimization and/or source control measures and participate in the activities necessary to develop final effluent limitations. Numeric interim limitations for the pollutant must be based on current treatment facility performance or on existing permit limitations, whichever is more stringent. If the existing permit limitations are more stringent, and the discharger is not in compliance with those limitations, the noncompliance under the existing permit must be addressed through appropriate enforcement action before the permit can be reissued, unless antibacksliding provisions are met.

### 4. MONITORING REQUIREMENTS

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample,



measurement, report or application. This period may be extended by request of the Director at any time.

a) Records Of Monitoring Information Shall Include:

- (1) The date, exact place, and time of sampling or measurements;
- (2) The individual(s) who performed the sampling or measurements;
- (3) The date(s) analyses were performed;
- (4) The individual(s) who performed the analyses;
- (5) The analytical techniques or methods used; and
- (6) The results of such analyses.

Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136, or methods specified in the permit and approved by the Regional Administrator. In the case of sludge use or disposal, methods must be approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

b) Recommended Monitoring Frequency

Regulations at 40 CFR 122.44(i)(2) establishes a floor, or minimum frequency for monitoring results of no less than once per year. This would generally be for monitoring only, where a pollutant was not limited due to exceeding reasonable potential to violate WQS, or was a pollutant regulated by technology based concerns. For pollutants for which water quality based limits are developed from chronic and/or acute toxicity, or human health criteria, initial reporting frequencies generally should be a minimum of two samples per month. The tables below establish monitoring frequency guidelines for both new and reissued permits.

(1) POTWs and Private Domestic

For municipal dischargers, frequency of testing for pollutants is based on the requirements listed in the following three tables.

**Table 7: Recommended Monitoring Frequencies for Municipal Wastewater Permits – Discharging Lagoons**

Parameter	Design Capacity, MGD				
	0 ≤ 0.1	0.1 ≤ 0.5	0.5 ≤ 1.0	1.0 ≤ 5.0	> 5.0
Flow	1/week – I	2/week - I	Daily - T	Daily - T	Daily - T
pH	1/week – I	2/week - I	2/week - I	2/week - I	2/week - I
BOD	1/month – G	2/month - G	1/week - 3C	2/week - 6C	5/week - 12C
TSS	1/month – G	2/month - G	1/week - 3C	2/week - 6C	5/week - 12C
TRC (*1)	1/week – I	2/week - I	2/week - I	2/week - I	2/week - I
Bacteria	1/month – G	2/month - G	1/week - G	2/week - G	2/week - G
Toxics & Metals	1/month – G	1/week - G	2/week - G	3/week - G	5/week - G

**Table 8: Recommended Monitoring Frequencies for Municipal Wastewater Permits – Trickling Filter Plants**

Parameter	Design Capacity, MGD					
	0 ≤ 0.1	0.1 ≤ 0.5	0.5 ≤ 1.0	1.0 ≤ 5.0	5.0 ≤ 10.0	> 10.0
Flow	5/week – I	5/week - T	Daily - T	Daily – T	Daily – T	Daily - T
pH	5/week – I	5/week – I	Daily - I	Daily – I	Daily – I	Daily – I
BOD	1/month – G	2/month - G	3/month - 3C	1/week - 6C	2/week - 12C	Daily – 12C
TSS	1/month – G	2/month - G	3/month - 3C	1/week - 6C	2/week - 12C	Daily – 12C
TRC (*1)	5/week – I	5/week - I	Daily - I	Daily – I	Daily – I	Daily – I
Bacteria	1/month – G	2/month - G	3/month - G	1/week - G	2/week – G	Daily – G
Toxics & Metals	2/month – G	1/week – G	2/week - G	3/week - G	5/week – G	Daily – G

**Table 9: Recommended Monitoring Frequencies for Municipal Wastewater Permits – Activated Sludge, Including Sequential Batch Reactors and Extended Aeration and Oxidation Systems**

Parameter	Design Capacity, MGD					
	0 ≤ 0.1	0.1 ≤ 0.5	0.5 ≤ 1.0	1.0 ≤ 5.0	5.0 ≤ 10.0	> 10.0
Flow	Daily – I	Daily – T	Daily - T	Daily – T	Daily – T	Daily - T
pH	Daily – I	Daily – I	Daily - I	Daily – I	Daily – I	Daily - I
BOD	1/month – G	2/month – G	3/month - 3C	1/week – 6C	5/week - 12C	Daily - 12C
TSS	1/month – G	2/month – G	3/month - 3C	1/week – 6C	5/week - 12C	Daily - 12C
TRC (*1)	Daily – I	Daily – I	Daily - I	Daily – I	Daily – I	Daily - I
Bacteria	1/month – G	2/month - G	3/month - G	1/week - G	5/week - G	Daily - G
Toxics & Metals	2/month – G	1/week - G	2/week - G	3/week - G	5/week - G	Daily - G

FOOTNOTES:

- (\*1) If necessary
- I Instantaneous grab (field measurement)
- T Totalized (meter required)
- G Grab
- 3C 3-hour composite
- 6C 6-hour composite
- 12C 12-hour composite

(2) Industrial Discharger’s

Industrial dischargers have more complexity and offer a wider range of conditions than POTWs. There is more latitude for the permit writer to use case-by-case basis in determining monitoring frequencies. The table below however offers a starting point to achieve a reference point for these types of facilities.

In cases where toxic pollutant limits are established in a permit for technology-based reasons, and those pollutants do not cause a reasonable potential to exceed water quality standards, the permit writer may use a less frequent monitoring schedule than that prescribed below with the rationale stated in the development document.

**Table 10: Recommended Monitoring Frequencies for Industrial Wastewater Permits**

Pollutant Type	Specific Pollutants	Normal Flow Frequency		
		Continuous *1, *2	1/ day *1, *2	1/ week or less *1, *2
Conventional Pollutants	BOD	1/ day	3/ week	1/ week
	TSS	1/ day	3/ week	1/ week
	Oil & Grease	1/ day	3/ week	1/ week
	pH	1/ day	1/ day	1/ day
Nonconventional Pollutants	Chemical Oxygen Demand, TRC, Total Organic Carbon, Ammonia – Nitrogen, Total Phosphorus, Total Dissolved Solids, Sulfate, Chloride, Dissolved Oxygen	1/ day	1/ week	1/ week
	Temperature	Continuous	1/ day	1/ week
Metals & Toxics		1/ day	3/ week	1/ week

FOOTNOTES:

- \*1 Totalizer (meter required)
- \*2 Sample type will generally be grab.

c) Case-By-Case Basis

While the intent of the tables above is to provide a uniform measure of monitoring between similar in nature and sized facilities, the permit writer may develop on a case-by-case basis a replacement schedule. A number of factors must be considered by the permit writer in establishing a case-by-case monitoring frequency that deviates from the tables above. These factors include:

- (1) The type of treatment process, including retention time.
- (2) Environmental significance and nature of the pollutant or pollutant parameter.
- (3) Cost of monitoring relative to the discharger's capabilities and benefit obtained.

- (4) Compliance history.
- (5) Number of monthly samples used in developing the permit limit.
- (6) Effluent variability.

The rationale for using any compliance schedule should be stated in the development document; fact sheet or statement of basis, and the reasons and methodology for such schedule.

## 5. REPORTING REQUIREMENTS

Reporting requirements are contained in 40 CFR 122.41(l). Monitoring results are to be reported on DMR forms, or forms specified by the Director. Pollutants measured more frequently than required by the permit using test procedures approved under 40 CFR 136 or, in the case of sludge use or disposal, approved under 40 CFR 136 unless otherwise specified in 40 CFR 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

Calculations for all limitations which require averaging of measurements shall utilize a geometric mean unless otherwise specified by the permitting authority.

$$\text{Geometric Mean} = [\Sigma \log x]/n$$

where:

- x = individual sample point concentrations
- n = number of samples

The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The following shall be included as information which must be reported within 24 hours under this paragraph.

- a) Any unanticipated bypass which exceeds any effluent limitation in the permit.
- b) Any upset which exceeds any effluent limitation in the permit.

- c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24 hours.

Pollutants for which the permittee must report violations of maximum daily discharge limitations under the above 24 hour reporting, shall be listed in the permit. This list shall include any toxic pollutant or hazardous substance, or any pollutant specifically identified as the method to control a toxic pollutant or hazardous substance.

The permittee shall report all instances of noncompliance not reported under the 24 hour reporting requirement at the time monitoring reports are submitted. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

All reports shall be sent concurrently to EPA and NMED. The addresses and phone numbers will be located in the permits.

## O. GENERAL CRITERIA IMPLEMENTATION

### 1. BOTTOM DEPOSITS, TURBIDITY

The general criteria for bottom deposits states: "Surface waters of the state shall be free of water contaminants including fine sediment particles (less than two millimeters in diameter), precipitates, or organic or inorganic solids from other than natural causes that have settled to form layers on or fill the interstices of the natural or dominant substrate in quantities that damage or impair the normal growth, function, or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom."

The general criteria for settleable solids states: "Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function, or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water."

### 2. FLOATING SOLIDS, OIL AND GREASE

The general criteria for floating solids, oil and grease states: "Surface waters of the state shall be free of oils, scum, grease and other floating materials resulting from other than natural causes that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life."

The implementation of this standard is a narrative provision to be placed in permits that have a reasonable potential to discharge these substances. "Surface waters shall be maintained so that oil, grease, or related residue will not produce a visible film of oil or globules of grease on the surface or coat the banks or bottoms of the watercourse; or cause toxicity to man, aquatic life, or terrestrial life."

### 3. PLANT NUTRIENTS (PHOSPHORUS AND NITROGEN)

The general criteria for plant nutrients states: "Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state."

Nutrient numeric standards do not generally exist at the national level or in State WQS, except as site specific standards. The Safe Drinking Water Act MCL of 10 mg/L nitrate nitrogen is often used to limit point source discharges to protect the drinking water designated use in surface waters. Dischargers that could enter sources of water used for drinking water could be limited on a site specific basis to 10 mg/L of NO<sub>3</sub> - N. This would also apply, as appropriate, for discharges directly into reservoirs. Site specific nutrient criteria, nutrient permit limitations, and/or separate rules to control nutrients in individual watersheds will be established where appropriate after notice and opportunity for public participation.

### 4. TOXICS

The general criteria for toxic pollutant states: "Surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, concentrations or combinations that affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms; wildlife using aquatic environments for habitation or aquatic organisms for food; or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms."

This standard is supported by direct chemical limitations for protection of fish, wildlife, livestock and human health. In instances where a specific chemical pollutant is not limited, and toxicity persists, WET testing is used to protect waters of the state.

### 5. TEMPERATURE

The general criteria for temperature states: "The introduction of heat by other than natural causes shall not increase the temperature, as measured from above the point of introduction, by more than 2.7°C (5°F) in a stream, or more than 1.7°C (3°F) in a lake or reservoir. In no case will the introduction of heat be permitted when the maximum temperature specified for the reach (generally 20°C (68°F) for coldwater fisheries and 32.2°C (90°F) for warmwater fisheries) would thereby be exceeded. These temperature standards shall not apply to

impoundments constructed off stream for the purpose of heat disposal. High water temperatures caused by unusually high ambient air temperatures are not violations of these standards.”

#### 6. SALINITY

Salinity numerical control for the Colorado River is discussed in a separate section of this guidance. For the rest of the State, concentrations and the relative ratios of dissolved minerals such as chlorides, sulfates, and total dissolved solids will be maintained such that existing, designated, and attainable uses will not be impaired. In addition to the Colorado River Salinity Control measure, the permit writer needs to determine if segment specific salinity standards exist that need protection.

#### 7. RADIOACTIVITY

The general criteria for radioactivity states: “The radioactivity of surface waters of the state shall be maintained at the lowest practical level and shall in no case exceed the standards set forth in the New Mexico Radiation Protection Regulations, 20.3.1 and 20.3.4 NMAC.”

### **V. NARRATIVE TOXICS IMPLEMENTATION - WHOLE EFFLUENT TOXICITY (WET)**

#### A. APPLICABILITY

Section 101 of the CWA states that “...it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited...” To insure that the CWA's prohibitions on toxic discharges are met, EPA has issued a “Policy for the Development of Water Quality Based Permit Limitations for Toxic Pollutants (49 FR 9016 9019, 3/9/84).” In support of the national policy, Region 6 adopted the "Policy for Post Third Round NPDES Permitting" and the "Post Third Round NPDES Permit Implementation Strategy" on October 1, 1992. The Regional policy and strategy are designed to insure that no source will be allowed to discharge any wastewater which (1) results in instream aquatic toxicity; (2) causes a violation of an applicable narrative or numerical State water quality standard resulting in nonconformance with the provisions of 40 CFR 122.44(d); (3) results in the endangerment of a drinking water supply; or (4) results in aquatic bioaccumulation which threatens human health.

WET testing, or biomonitoring, will be used as a biological assessment of the toxic impact of discharges on receiving waters located in the State. Biomonitoring requirements will be applied to all major dischargers and those minor dischargers with known or potential problems, which may cause or contribute to exceedances of applicable NMWQS numeric or narrative water quality criteria in waters with existing or designated fishery uses.

B. TEST TYPES

If biomonitoring or WET testing is determined necessary, and the discharge is to an intermittent or ephemeral stream, acute 48 hr. biomonitoring testing will be required. If the discharge is to a perennial stream, lake or reservoir, chronic 7-day biomonitoring testing will be required.

If it is determined that a facility is to receive chronic biomonitoring requirements at a critical dilution of 10% or less, then an acute to chronic ratio of 10:1 may be used in order to allow acute biomonitoring in lieu of chronic. This will result in a shorter test duration, and a higher critical dilution by decreasing the ratio between the amount of effluent and receiving water used as well as a reduction in the cost per biomonitoring test for the permittee.

The permit will specify that tests are conducted using the latest version of the appropriate EPA method. These methods can be found in the following publications (or their most recent versions):

1. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA 821 R 02 012, October 2002.
2. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA 821 R 02 013, October 2002.

The permittee may use a revised method if one becomes available during the term of the permit. Alternate test methods are subject to EPA review and approval.

C. TEST SPECIES

1. Freshwater Streams and Lakes:
  - a) CHRONIC 3 brood Ceriodaphnia dubia (water flea) survival and reproduction test and/or 7 day Pimephales promelas (fathead minnow) larval survival and growth test.
  - b) ACUTE 48 hour Daphnia pulex (water flea) survival test and/or 48 hour Pimephales promelas (fathead minnow) survival test.

If the segment criterion for TDS or the site specific TDS concentration in the receiving water is too high to support Ceriodaphnia dubia or Daphnia pulex, the Daphnia magna (water flea 48-hour acute or 21-day chronic tests) may be substituted as the invertebrate test organism after the need to make the substitution is demonstrated. The permittee may submit evidence (e.g. the confirmed results of a Toxicity Reduction Evaluation) substantiating the need for an alternative species before or during the application process. However, draft permits with alternate tests, alternate species, or testing requirements that exclude a species are subject to EPA review and approval.



For all the above tests except the 7-day Chronic test for *Ceriodaphnia dubia*, each test will use five replicates of each effluent concentration tested.

#### D. TEST ACCEPTABILITY CRITERIA

The permittee will have to repeat any toxicity test, including the control and all effluent dilutions, that fails to meet any one of the following criteria:

1. Chronic Freshwater
  - a) a mean survival of 80% or greater in the control;
  - b) a mean number of 15 or greater water flea neonates per surviving adult in the control;
  - c) a mean dry weight of 0.25 mg or greater for surviving fathead minnow larvae in the control;
  - d) a coefficient of variation percent (CV%) of 40 or less between replicates in the control and in the critical dilution for:
    - (1) the young of surviving females in the water flea reproduction and survival test; and
    - (2) the growth and survival endpoints in the fathead minnow growth and survival test.

However, if statistically significant lethal or sublethal effects are exhibited at any dilution, a CV% greater than 40 does not invalidate the test. A test population of < 40% males in a single concentration or < 40% males in a whole test for the water flea reproduction test.

#### 2. 48 hour Acute Freshwater

- a) a mean survival of 90% or greater in the control;
- b) a CV% of 40 or less in the control and in the critical dilution.

However, if significant lethality is demonstrated, a CV% greater than 40 does not invalidate the test. Also note that tests should be ended within a period of two hours before the appropriate test end time to two hours afterward.

#### E. DILUTION SERIES

For 7-day chronic and 48 hour acute tests that are based on the critical dilution in the receiving water, the critical dilution represents the percentage of effluent at the edge of the mixing zone

during critical lowflow (that is, the 4Q3) or critical mixing conditions. The test results at the critical dilution are statistically compared with the test results at the control dilution (0% effluent) to measure compliance. The permit specifies the critical dilution and the dilution series as well as the type of WET tests required. The dilution series consists of four effluent concentrations in addition to the critical dilution. For domestic dischargers, the average design flow or permitted flow is normally used to calculate the critical dilution. For industrial dischargers who are renewing permits, the highest monthly average flow from the preceding two years is normally used to calculate the critical dilution. For new or expanding industrial facilities, the anticipated process flow is used to calculate the critical dilution. For new industrial dischargers, the permit may have a requirement that adjusts the critical flow based on a shorter performance period during the initial permit term. An example would be for reporting of flow to be made as a separate submittal for a period of time such as two-years, defined by the permit, and using the standard reopener clause of the permit, adjusting the critical dilution if the actual flow performance deviated from the anticipated application flow rate.

All dilution WET testing is performed using a 0.75 dilution series. Dilution series that have a critical dilution of 75 % will be calculated with 1 concentration greater than the critical dilution and 3 lower. Dilution series that have a critical dilution of > 75 % will have 4 concentrations lower than the critical dilution and none greater. Critical dilutions which are not whole numbers will be rounded off to the nearest whole number.

When the permit writer is using the 10:1 acute to chronic ratio to determine the type of test, the permit writer shall apply the 10:1 ratio first and then round to the nearest whole percent for determining the correct CD for the dilution series.

See **Appendix A** for dilution series for critical dilutions from 1% - 100%.

#### F. TEST FREQUENCIES

The permitting authority and NMED have established the following WET testing requirements and frequencies based on the type and size of the facility and the characteristics of the receiving water.

**Table 11. WET Testing Requirements - Streams**

New Mexico NPDES Permit Baseline WET Testing Requirements <sup>1, 2, 3</sup>				
Type / Size	Streams Receiving Water Characteristic <sup>4</sup>			
	<i>Perennial</i> <sup>5</sup> (DU = AL)		<i>Intermittent</i> (DU = AL)	<i>Ephemeral</i> (DU = LAL)
	CD ≤ 10% <sup>6</sup>	CD > 10%	CD = 100%	CD = 100%
<b>MAJORS</b> (all)	<ul style="list-style-type: none"> <li>• Ac, Dp, Pp</li> <li>• F<sub>1</sub> = 1/3 mo for 1<sup>st</sup> year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Dp 1/6 mo</li> <li>* Pp 1/yr</li> </ul> </li> <li>‡ If fail any test, freq returns to Dp &amp; Pp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/3 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/3 mo for 1<sup>st</sup> year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Cd 1/6 mo</li> <li>* Pp 1/yr</li> </ul> </li> <li>‡ If fail any test, freq returns to Cd &amp; Pp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/3 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/3 mo for 1<sup>st</sup> year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Cd 1/6 mo</li> <li>* Pp 1/yr</li> </ul> </li> <li>‡ If fail any test, freq returns to Cd &amp; Pp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/3 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Ac, Dp</li> <li>• F<sub>1</sub> = 1/3 mo for 1st year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Dp 1/6 mo</li> </ul> </li> <li>‡ If fail any test, freq returns to Dp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/3 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>
<b>Minor</b> POTW / Private domestic (≥0.1 MGD)	<ul style="list-style-type: none"> <li>• Ac, Dp, Pp</li> <li>• F<sub>1</sub> = 1/12 mo</li> <li>• F<sub>2</sub> = 1/6 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/12 mo</li> <li>• F<sub>2</sub> = 1/6 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>‡ F<sub>1</sub> = 1/5 yr (in 1<sup>st</sup> year)</li> <li>‡ If Cr = pass, F<sub>1</sub> = 1/12 mo, Ac, Dp for remaining term of permit</li> <li>• F<sub>2</sub> = 1/6 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Ac, Dp</li> <li>• F<sub>1</sub> = 1/2 yrs</li> <li>‡ 1<sup>st</sup> sample in 1<sup>st</sup> year of permit</li> <li>‡ 2<sup>nd</sup> sample in 3<sup>rd</sup> year of permit</li> <li>• F<sub>2</sub> = 1/12 mo</li> </ul>
<b>Minor</b> POTW / private domestic (<0.1 MGD)	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Ac, Dp, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/2 yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Cr, Cd, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/2 yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Cr, Cd, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/2 yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Ac, Dp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/2 yr</li> </ul>
<b>Minor</b> <b>Industrial</b> <sup>7</sup> (mine, fish hatchery, power utility)	<ul style="list-style-type: none"> <li>• Ac, Dp, Pp</li> <li>• F<sub>1</sub> = 1/6 mo</li> <li>• F<sub>2</sub> = 1/6 mo</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/5 yrs</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/5 yrs</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ac, Dp</li> <li>• F<sub>1</sub> = 1/ yr</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>
<b>Minor</b> <b>Industrial</b> (aquifer remediation, drinking water treatment, other <sup>8</sup> )	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Ac, Dp, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Cr, Cd, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Cr, Cd, Pp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>	<ul style="list-style-type: none"> <li>• Ec</li> <li>• Ac, Dp</li> <li>• If no Ec, F<sub>1</sub> = 1/5 yrs collected ASAP w/reopener clause</li> <li>• F<sub>2</sub> = 1/ yr</li> </ul>

**Table 12. WET Testing Requirements – Lakes, Reservoirs and Playas**

Type / Size	Lakes, Reservoirs and Playas (CD=100%)
<b>ALL Majors (POTWs &amp; Industrials)</b>	<ul style="list-style-type: none"> <li>• Cr, Cd, Pp</li> <li>• F<sub>1</sub> = 1/3 mo for 1<sup>st</sup> year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Dp 1/6 mo</li> <li>* Pp 1/yr</li> </ul> </li> <li>‡ If fail any test, freq returns to Dp &amp; Pp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/3 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>
<b>ALL Minors (POTWs &amp; Industrials)</b>	<ul style="list-style-type: none"> <li>• Ac, Dp, Pp</li> <li>• F<sub>1</sub> = 1/6 mo for 1<sup>st</sup> year of permit</li> <li>‡ If all pass, reduce for years 2-5 to:                             <ul style="list-style-type: none"> <li>* Dp 1/6 mo</li> <li>* Pp 1/ yr</li> </ul> </li> <li>‡ If fail any test, freq returns to Dp &amp; Pp 1/3 mo for remainder of permit</li> <li>‡ F<sub>1</sub> reverts to 1/6 mo on last day of permit</li> <li>• F<sub>2</sub> = 1/3 mo</li> </ul>

<b>Definitions</b>	
AL = Aquatic Life (all subcategories except LAL) CD = Critical Dilution DU = Designated Use LAL = Limited Aquatic Life MGD = million gallons per day (design)	Ac = Acute test (48 hrs) Cr = Chronic test (7 day) Pp = <i>Pimephales promelas</i> (fathead minnow) Dp = <i>Daphnia pulex</i> Cd = <i>Ceriodaphnia dubia</i>
F1 = frequency of monitoring for WET monitoring (no limits) <sup>9</sup> F2 = frequency of monitoring for WET limitations <sup>10</sup>	Ec = Effluent Characterization single WET sample event, included with permit application. If Ec result indicates no “reasonable potential” to create a toxic condition in the receiving water, F1 = none. The permittee may also include the WET test with the next application if the following conditions are met: 1) the test is less than 10 years old and shows no toxicity or reasonable potential to cause toxicity in the receiving stream; and 2) there has been no change in the size or nature of facility/discharge; and 3) the permittee has submitted all DMR reports and required reports in the previous term; and 4) the permittee has not received from the permitting authority any written notice of significant noncompliance of a permit effluent limitation within the past 5 years.

Footnotes:

- 1 WET testing (or biomonitoring) requirements are necessary to assure protection of NM water quality standards adopted by the State pursuant to Clean Water Act §303 and the NM Water Quality Act.
- 2 Monitoring frequency can be increased or decreased for cause under best professional judgment. Generally, frequencies given in the table should be considered a minimum. Fact Sheet/Statement of Basis associated with a proposed permit must state considerations that support alternative(s) selected. Cause for modification may include: past test results, unique characteristics of a receiving water, unique characteristics of a wastestream. Possible reasons to increase frequency may include but are not limited to discharge to sensitive water containing an endangered species, past failure of previous tests, compliance history, existence of or need for a pretreatment program; or whether chemical specific water quality based effluent limits (WQBELs) for the protection of aquatic life are required. Prior test results may also warrant different schedules for different test species.
- 3 Requirements for municipal and industrial majors are a summary of the EPA Region 6 Post-Third Round Whole Effluent Toxicity Testing Frequencies Revised June 30, 2000.

- 4 The designated use of a classified segment will supercede the designated use specified for unclassified waters. Generally, most perennial streams are classified. Generally, most intermittent and ephemeral streams are not classified. The designated use descriptions given here are for general information and are not intended to (re)designate use(s) for a type of stream.
- 5 Includes lentic waters. Note: The NMWQS do not allow mixing zones for discharges to publicly owned lakes, reservoirs, or playas. Therefore CD in those waters will equal 100%.
- 6 **Test duration:** If it is determined that a facility is to receive chronic biomonitoring requirements at a critical dilution of 10% or less, then an acute-to-chronic ratio of 10:1 may be used in order to allow acute biomonitoring in lieu of chronic. This will result in a higher critical dilution by decreasing the ratio between the amounts of effluent and receiving water used as well as a reduction in the cost per biomonitoring test for the permittee. Reference pages 17-18 of EPA's Technical Support Document for Water Quality-based Toxics Controls (EPA/505/2-90-001) and personal communication from Phil Jennings EPA Region 6 Effluent Toxicity Coordinator dated October 7, 2005.
- 7 The distinction between the two classes of minor discharges in the federal/industrial category is based upon the Surface Water Quality Bureau's best professional judgment regarding the reasonable potential for these categories to cause a water quality standards impairment based upon past review of permit applications, compliance records and compliance inspections of these types of facilities. Discharges from coal mine classified as "reclamation area" operations will not be required to have WET testing.
- 8 Consult with State program on "other" facilities. Most "other" facilities are anticipated to be suited to this protocol, however due to the unpredictable nature of what may occur in the future, the State retains the right to adjust according to the nature of the facility.
- 9 If a test frequency is 1x/year or less, the test should occur in winter or springtime when most sensitive juvenile life forms are likely to be present in receiving water and colder ambient temperatures might adversely affect treatment processes. This will generally be defined as between November 1 and April 30.
- 10 Generally, WET limits may be established where past monitoring indicates failure of WET tests, a likelihood of failure or where test results indicate effluent toxicity varies significantly over time.

## G. TOXICITY REDUCTION EVALUATION (TRE)

### 1. When Is a TRE Performed?

If a permit does not contain WET limits and the effluent fails a WET test, the permittee will conduct three retests. Test failures, or significant toxic effects, are herein defined as a statistically significant difference at the 95% confidence level between the survival or growth or reproduction of the appropriate test organism in a specified effluent dilution and the control (0% effluent). A retest is another test performed on a sample(s) taken on a different day(s). The three retests are to be conducted monthly during the next three consecutive months. If persistent lethality is demonstrated by failure of one or more retests, the permittee will perform a TRE. If persistent sublethality is demonstrated by failure of two or more retests, the permittee will perform a TRE. (Note that all test data must be submitted for review regardless of whether the test was valid or invalid.)

### 2. TRE Purpose and Content

The purpose of the TRE is to determine those actions necessary to achieve compliance with water quality based effluent limits by reducing an effluent's toxicity to an acceptable level (i.e., no significant toxicity at the effluent critical dilution). A TRE is defined as a step wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE

Action Plan shall lead to the successful elimination of effluent toxicity at the critical dilution, and develop a schedule for taking corrective action. Persistent sublethal effects may also have to be addressed by a TRE. Components of a TRE may include, but are not limited to:

- a) Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA 600/6 91/003) and "Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I" (EPA 600/6 91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations (TIEs) and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/60-0/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.
- b) Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified;

Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis;

- c) Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.); and
- d) Project Organization (e.g., project staff, project manager, consulting services, etc.).

All test data must be submitted for review regardless of whether the test was valid or invalid. For more information on methods used in TREs, see the following documents (or their most recent versions):

Toxicity Identification Evaluation: Characterization of Chronically Toxic effluents, Phase I, EPA/600/6 91/005F

Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition, EPA/600/6 91/003

Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, EPA/600/R 92/080

Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, EPA/600/R 92/081.

Toxicity attributable to ammonia or Diazinon is discussed in the sections of this document entitled:

Ammonia Toxicity  
Diazinon Toxicity

### 3. Reports

As required by the permit, the permittee must submit quarterly reports to the permitting authority that describe TRE progress and results. The permit also requires the permittee to complete the TRE and submit a final report within 28-months of the retest that confirms lethality. Permittees may request an extension to the 28-month time limit. The extension, however, must be warranted, and approval by the Permitting authority is contingent upon permittees demonstrating (1) due diligence in pursuit of the TRE and (2) the existence of circumstances beyond their ability to control.

Upon the conclusion of either the TRE or the identification of a specific parameter or set of parameters, whichever occurs first, the TRE may be terminated. See Part f. below.

### 4. Toxicity Control Measures

Near the conclusion of the TRE and associated corrective measures, the permitting authority may amend the permit to specify toxicity control measures. These may include a chemical-specific (CS) limit or a WET limit, if appropriate.

#### a) CS Limit

When the permitting authority determines that a discharge causes, has the reasonable potential to cause, or contributes to an in stream excursion above a narrative criterion within the applicable WQS, the permit must contain effluent limits for WET. Limits on WET are not necessary where the permitting authority demonstrates in the fact sheet that CS limits for the effluent are sufficient to attain and maintain applicable numeric and narrative State water quality standards. The permitting authority may use the CS limit in lieu of a WET limit if the CS limit can adequately address toxicity. In order to be eligible

for a CS limit, the permittee has to demonstrate that one or more known toxicants caused the toxicity and must determine a specific concentration of the toxicant that does not cause toxicity.

b) WET Limit

Failures to identify the toxicant or toxicants, presence of multiple toxicants, or lack of a routine test method capable of detecting a pollutant at levels causing toxicity, are examples of cases where a CS limit may be inadequate to address toxicity. In such cases, where reasonable potential has been demonstrated to violate the general criteria regarding toxic pollutants and no other appropriate toxicity control measure has been identified, the permit will be amended to add a WET limit with a compliance period (if appropriate). Upon reaching the effective date of the WET limit, a testing frequency of once per quarter is required for the next five-years.

If the permittee does not comply with the WET limit (that is, fails a test), the permittee is considered in violation of the permit and receives a written Notice of Violation (NOV). The testing frequency for the species in question increases to monthly until compliance is demonstrated for a period of three consecutive months. After compliance is demonstrated, the permittee may resume quarterly testing. However, if the permittee fails a test during the increased monthly testing period, the permittee will be referred to the Permitting authority Enforcement Division for formal enforcement action.

H. AMMONIA STRATEGY

Ammonia, a common component of domestic wastewater, has been shown to be toxic to aquatic organisms. The Compliance With Water Quality Standards section of the NMWQS states “compliance with water quality standards for total ammonia shall be determined by performing the biomonitoring procedures set out in Subsections D and E of 20.6.4.14 NMAC, or by attainment of applicable ammonia criteria set out in Subsections K, L and M of 20.6.4.900 NMAC.”

The permitting authority may choose either a WET test or a chemical specific ammonia limit to address ammonia toxicity. WET testing is discussed in Section C above. Chemical specific ammonia limitations however, are based on tables presented in Subsections K, L, and M of 20.6.4.900 NMAC. For ammonia chemical specific limits, data for pH and temperature would be ambient stream data. When selecting ammonia limits from the chart contained in Subsection K, use the highest ambient pH and temperature that have been identified for the receiving water. If ambient stream data are not available, for pH, the permit writer should use either 9.0 standard units; or the highest segment specific water body limitation contained in 20.6.4.101 through 20.6.4.899 NMAC; and/or 20.6.4.900 NMAC; and/or TMDLs, whichever is less. For temperature guidelines, when ambient stream data are not available, then the permit writer should use either 32 degrees Celsius, or the segment specific water body limitation contained in 20.6.4.101 through 20.6.4.899 NMAC, and/or 20.6.4.900 NMAC, and/or TMDLs, whichever is less. The permit writer may also develop seasonal limits based on available stream data.



## I. DIAZINON STRATEGY

The NMWQS does not contain any provisions for those domestic wastewater facilities demonstrating diazinon as the primary cause of effluent toxicity. However, once the permittee demonstrates this, using standard toxicity identification evaluation (TIE) characterization tests and other analytical techniques, and also demonstrates that diazinon is ubiquitous within the wastewater collection system, the permitting authority will amend the permit. The amendment requires the permittee to address toxicity as follows:

### 1. Public Education Program (PEP)

The permittee will be required to implement a PEP, emphasizing education and awareness to prevent diazinon from entering the collection system. The PEP should include, but not be limited to, the following components:

#### a) Users Survey

The permittee should survey all suspected users of diazinon. The survey should be comprehensive, including individuals as well as businesses. The survey should identify those source groups and/or individuals that should receive the information described in the next sub-section.

#### b) Information Development

The permittee should develop information for dissemination to source groups and individuals. This information should include best management practices for use of diazinon and other pesticides and alternative methods of pest control besides the use of organophosphate pesticides.

#### c) Disseminating Information

The targeted audience should be assured of receiving the developed information through a number of means, including the media, mailings, and public presentations.

### 2. Diazinon Monitoring

The permittee will monitor wastewater influent and effluent (in all samples used for WET testing) for diazinon using EPA Method 614 while continuing to conduct biomonitoring using the most sensitive species. The results of the WET testing and the diazinon monitoring should be submitted in quarterly reports. Should diazinon not prove to be the primary cause of toxicity or not be ubiquitous within the wastewater collection system, the permittee will resume the TRE.

In addition, should the permittee not address diazinon toxicity as described above with due diligence, the TRE requirements remain in effect. In either case, the permitting authority

may amend the permit to specify appropriate toxicity control measures pursuant to the General Criteria of the NMWQS.

J. MONITORING/LIMITATIONS

1. WET Testing Trial

The minimum required WET testing frequency is typically once per quarter however facility-specific conditions may result in more or less frequent testing. The length of the WET testing trial period will be established by the permitting authority based on whether and to what degree a facility poses an increased toxicity risk due to the nature of its activities (e.g., accepting external waste streams, a history of WET test failures, or reported discharges of toxic compounds in toxic amounts). The minimum WET testing trial period is one year. The length of the WET testing trial period will be specified in the permit. If the permitting authority determines that an increased toxicity risk so warrants, quarterly or more frequent testing may be required for the life of the permit.

2. WET Testing Frequency Reductions

Permittees may request reduction of the WET testing frequency for the remaining term of the permit depending on the results of WET testing during the WET testing trial period. To qualify for a WET testing frequency reduction, the permittee must certify that no test failures have occurred during the trial, all tests submitted in fulfillment of its WET testing requirements during the WET testing trial period meet all test acceptability criteria set forth in the permit and that copies of the full report for all tests initiated are been submitted for agency review. In addition the following apply:

a) WET Limit Established in Permit

Reductions in WET testing frequency are not allowed during the first five years of applicability of a WET limit. The permitting authority may consider a reduced testing frequency after this period if no lethal or sub-lethal toxicity is demonstrated during the five year-period, and if all past tests have been performed timely.

b) No Test Failures During WET Testing Trial Period

The permitting authority may reduce the testing frequency for the more sensitive test species to not less than once per six months and may reduce the testing frequency for the less sensitive test species to once per year. If the monitoring frequency reduction is denied, the permittee must continue WET testing at a frequency of once per quarter for the affected species for the remaining life of the permit.

c) Eligibility

To be eligible for a WET test frequency reduction under this provision, the permittee must demonstrate no lethal or sublethal test failures during the WET testing trial period.

K. REASONABLE POTENTIAL

1. Reasonable Potential for WET

a) General

Section 301 (b) of the CWA requires that effluent limitations for point sources include any limitations necessary to meet water quality standards. Federal regulations found at 40 CFR 122.44 (d) state that if a discharge poses the reasonable potential to cause an in stream excursion above a water quality criterion, the permit must contain an effluent limit for that pollutant.

The General Criteria of the NMWQS state that "Surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, concentrations or combinations which affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms, wildlife using aquatic environments for habitation or aquatic organisms for food, or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms." To meet these requirements, a demonstration or assessment must be made on the discharges to surface waters to assure that toxicity is not an issue, and that all designated uses of the receiving water will continue to be met. As part of this assessment, the permitting authority must first determine if the discharge will result in instream concentrations of regulated pollutants that exceed the specific water quality regulated pollutants that exceed the specific water quality criteria at their point of application in the receiving water body. This assessment is the reasonable potential for a specific discharge to violate NMWQS.

b) Region 6 Policy

Reasonable potential for whole effluent toxicity is performed as established by the May, 2005 EPA Region WET Implementation Strategy, which updated the Region 6 Post-Third Round NPDES Permitting Policy and Strategy. (**See Appendix H.**)

When examining a permit, one should note from the previous permit, how many tests should have been conducted and how many tests were actually conducted for each species. If there is a discrepancy, it should be addressed and clarified. If there are more tests than expected, the facility may have had a test failure in which case they would have to perform retests. If there are fewer tests than expected, the facility may have misinterpreted their permit or gone to no-discharge.

After a test failure, the monitoring frequency will increase to monthly for three months. The reason for a retest after a test failure (lethal or sublethal for any species) is to determine whether toxicity is present at a level and frequency that will provide toxic samples to use in performing a TRE (Toxicity Reduction Evaluation). If any of the retest(s) fail, a TRE should follow. If a failure is followed by a series of passing tests, a monitoring frequency reduction is either not allowed or revoked for the affected species for the remainder of the permit term.

Facilities with WET limits should test for the affected species (vertebrate and/or invertebrate) once per quarter for the first 5 years after a WET limit goes into effect. All major dischargers should monitor quarterly for both species for at least the first year of the permit. At the end of the first year, a reduction in monitoring frequency may be granted to the facility based on the completion of one year with no toxicity failures for a species. If one or more failures have occurred during the last 2 years of the previous permit term, a WET limit is generally required and no monitoring frequency reduction should be granted for the affected species for the five-year period after the WET limit becomes effective.

If a facility has had no failures and has performed the expected number of tests for its permit term, a finding of no reasonable potential for toxicity is appropriate.

If a facility has failures and toxicity is confirmed by sporadic and/or a series of failures, a TRE may have been triggered by the permit. If there is reasonable potential at the time the permit is being written, a compliance schedule of no more than 3 years to meet WET limits should be included in the permit. If the toxicity issue is resolved prior to completing the compliance schedule, the WET limits may be replaced with limits on the identified toxicant. The minimum monitoring frequency of the affected species (vertebrate and/or invertebrate) should be quarterly.

c) Procedures

The specific procedure, as outlined below, is from Box 3-2 on page 53 of EPA's Technical Support Document for Water Quality-based Toxics Control (1991, 2<sup>nd</sup> printing):

**Box 3-2. Determining "Reasonable Potential" for Excursions Above Ambient Criteria Using Effluent Data Only**

EPA recommends finding that a permittee has "reasonable potential" to exceed a receiving water quality standard if it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentrations is below the receiving water criteria at specified low-flow conditions.

Step 1: Determine the number of total observations ("n") for a particular set of effluent data (concentrations or toxic units [TUs]), and determine the highest value from that data set.

Step 2: Determine the coefficient of variation for the data set. For a data set where  $n < 10$ , the CV is estimated to equal 0.6, or the CV is calculated from data obtained from a discharger. For a data set where  $n > 10$ , the CV is calculated as standard deviation/mean (see Figure 3-1). For less than 10 items of data, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence.

Step 3: Determine the appropriate ratio from Table 3-1 or 3-2.

Step 4: Multiply the highest value from a data set by the value from Table 3-1 or 3-2. Use this value with the appropriate dilution to project a maximum receiving water concentration (RWC).

Step 5: Compare the projected maximum RWC to the applicable standard (criteria maximum concentration, criteria continuous concentration [CCC], or reference ambient concentration). EPA recommends that permitting authorities find reasonable potential when the projected RWC is greater than an ambient criterion.

#### Example

Consider the following results of toxicity measurements of an effluent that is being characterized: 5 TUc, 2 TUc, 9 TUc, and 6 TUc. Assume that the effluent is diluted to 2 percent at the edge of the mixing zone. Further assume that the CV is 0.6, the upper bound of the effluent distribution is the 99th percentile, and the confidence level is 99 percent.

Step 1: There are four samples and the maximum value of the sample results is 9 TUc.

Step 2: The value of the CV is 0.6.

Step 3: The value of the ratio for four pieces of data and a CV of 0.6 is 4.7.

Step 4: The value that exceeds the 99th percentile of the distribution (ratio times  $x_{\max}$ ) after dilution is calculated as:

$$[9 \text{ TUc} \times 4.7 \times 0.02] = 0.85 \text{ TUc}$$

Step 5: 0.85 TUc is less than the ambient criteria concentration of 1.0 TUc. There is no reasonable potential for this effluent to cause an excursion above the CCC.

## **IV. SPECIAL PROVISIONS**

### **A. HISTORIC PRESERVATION COMPLIANCE**

Section 106 of the National Historic Preservation Act of 1966 requires that the head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having

authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking. 36 CFR 800 prescribes the Section 106 process that seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

EPA must complete the Section 106 process prior to the issuance of the NPDES permit. EPA will determine if the proposed permit has the potential to cause effects on historic properties. Should permit issuance have no potential to cause effects on historic properties, assuming such historic properties were present, the agency has no further obligations under Section 106. Where EPA determines that the permit issuance has potential to affect historic properties, EPA must contact the appropriate State Historical Preservation Officer or Tribal Historic Preservation Officer and initiate consultation with the appropriate officer or officers.

#### B. US FISH AND WILDLIFE SERVICES ENDANGERED SPECIES CONSULTATION REQUIREMENTS

Section 7(a)(2) of the Endangered Species Act requires every Federal agency, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to insure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or results in the destruction of adverse modification of critical habitat. 50 CFR 402 describes the process through which EPA ensures that its issuance of NPDES permits in New Mexico complies with Section 7(a)(2).

Prior to final issuance, EPA will consult with the USFWS Ecological Field Services in Albuquerque, NM, regarding the effects of the permit on listed species and, if any, designated critical habitat. That consultation will require some level of information exchange between USFWS and EPA, allowing the New Mexico Field Services Office to either concur with EPA's determination that the permit is unlikely to adversely affect a listed species or designated critical habitat or to proceed to formal consultation. Formal consultation will result in a biological opinion by the Service where terms and conditions may be prescribed for the permit to provide protection for the species and/or habitat. Where EPA determines that permit issuance will have "no effect" on the listed species and/or designated critical habitat, EPA may record the determination for its files and no consultation is required (USEPA, 2001).

The New Mexico Ecological Field Services Office may be contacted for species information, including a county by county listing of species and designated critical habitat, at:

U.S. Fish and Wildlife Service  
New Mexico Ecological Services Field Office  
2105 Osuna Road NE  
Albuquerque, NM 87113  
Phone (505) 346-2525 Fax (505) 346-2542

### C. STORM WATER CONTROLS

EPA has guidance for appropriate controls for storm water discharges associated with industrial activity regulated under an individual permit. In general, it is appropriate to utilize comprehensive storm water pollution prevention plans adapted from those in the storm water general permits as the control mechanism.

Many industrial facilities will have both wastewater and regulated storm water discharges. Prior to the NPDES Storm Water program established under CWA Section 402(p), a limited number of facilities had storm water-only discharges regulated by individual or general permits, typically as a result of national effluent limitation guidelines. Starting in 1992, general permits for storm water discharges associated with industrial activity became available and facilities were encouraged to take advantage of these permits even if their wastewater discharges were authorized under individual permits. In the 1990 storm water regulations (55 FR 48002), EPA put forth a tiered storm water permitting strategy: Tier I Baseline Permitting - general permits covering a majority of discharges, Tier II Watershed Permitting - individual or general permits for watersheds particularly affected by storm water discharges, Tier III Industry Specific Permitting - individual or industry-specific general permits for industrial categories of particular concern, and Tier IV Facility Specific Permitting - individual permits for facilities warranted by circumstances at a particular facility or in order to reduce administrative burdens (e.g., incorporating storm water discharges into a facility's wastewater permit at reissuance).

To date, EPA has continued to allow most facilities the choice of whether to cover storm water discharges under a general permit or under their individual wastewater permit. In either case, storm water discharges associated with industrial activity are subject to all the water quality and technology requirements of the CWA Section 402(p)(3)(A)). Where storm water discharges will be covered under an individual permit, a Storm Water Pollution Prevention Plan (SWPPP) incorporating applicable requirements of the current industrial storm water general permit would serve as the basis for assessing whether or not the BAT requirements of the CWA had been met (for discharges without a promulgated BAT effluent limitation guideline). The SWPPP, along with applicable water quality protection requirements, can also be assumed, absent information to the contrary, to satisfy the basic water-quality protection requirements of the Act (see EPA guidance on water quality-based permitting and TMDL requirements relative to storm water discharges - **Appendix G**). Note that continuance of old "standard" numeric limits (e.g., COD, TSS, O&G, etc.) typically applied to storm water discharges in the past are not considered to meet the technology and water-quality requirements of the Act.

There are situations where it may be appropriate for storm water discharges to be removed from an individual permit and covered instead under a general permit, at the discretion of the permitting authority. Regarding anti-backsliding requirements, EPA Region 6 takes the position that a comprehensive SWPPP, along with the water-quality and TMDL consistency requirements of current storm water general permits generally provides as good or better protection of water quality as “standard” numeric limitations in individual permits, provided the permittee is required to continue operation of any storm water treatment system used to meet those numeric limits as a BMP in the SWPPP. Note that storm water discharges for which a site-specific numeric water quality-based limitation had been calculated would not be eligible for general permit coverage due to backsliding concerns. Dischargers that had not been able to meet the numeric limitations in their individual permit should generally not be allowed to move from an individual permit to a general permit.

#### D. REOPENER CONDITIONS AND LANGUAGE

Permits are developed to incorporate the most recent information available, with relationship to water quality standards, ambient conditions, effluent characteristics, implementation procedures and the results of TMDLs. However, in the course of a permit's effective life, these conditions may change and may warrant other effluent limitations than those that are in the current permit. Therefore, permits are allowed reopener clauses to address possibilities of this nature. Several such conditions, but not limited to just these examples, are represented as either changes to WQS, imposition of conditions of TMDLs, or required pollutant specific studies in existing permit requirements that result in changed conditions to the permit:

"The permit may be reopened and modified during the life of the permit if relevant portions of New Mexico's Water Quality Standards for Interstate and Intrastate Streams are revised or remanded by the New Mexico Water Quality Control Commission. In addition, the permit may be reopened and modified during the life of the permit if relevant procedures implementing the Water Quality Standards are either revised or promulgated."

"The listing of the receiving stream on the State 303 (d) list of impaired waters categorizes the receiving water as water quality limited; however, no new requirements have yet been established for this facility. The State is presently reevaluating and updating the final effluent limitations necessary to protect water quality standards through the Total Maximum Daily Load (TMDL) process. When final effluent limitations are established in an approved TMDL and updated Water Quality Management Plan (WQMP) and if they are more stringent than those listed in this permit, or controls a pollutant not listed in this permit, then the permit may be modified or revoked and reissued to conform with the approved TMDL and WQMP final effluent limitations."

“In accordance with 40 CFR Part 122.62 (s) (2), the permit may be reopened and modified if new information is received that was not available at the time of permit issuance that would have justified the application of different permit conditions at the time of permit issuance. New information includes results obtained from the Pollutant Specific Study identified in Part I,



Section B. of this permit. Permit modifications shall reflect the results of any of these actions and shall follow regulations listed at 40 CFR Part 124.5.”

Other conditions may be appropriate to address in reopeners, upon approval from the Permitting authority. In addition, permit issuance may be delayed if a new or revised TMDL is imminent. In general, imminent would be when the TMDL has been presented to the New Mexico WQCC, and is waiting for final public notice comments and subsequent approval by EPA.

E. POLLUTION PREVENTION STRATEGY AND LANGUAGE

The Pollution Prevention Act of 1990 established pollution prevention as a preferred means of pollution control and presented a hierarchy of pollution control measures: “. . . *it is the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented shall be recycled in an environmentally safe manner whenever feasible; and disposal or release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.*” EPA Region 6 developed a policy to support that act in NPDES permit activities, and included specific elements into Part I of the permit language for municipal permits, as follows:

*SECTION C. POLLUTION PREVENTION REQUIREMENTS (Revised March 11, 1994)*

*1. The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:*

- a. The influent loadings, flow and design capacity;*
- b. The effluent quality and plant performance;*
- c. The age and expected life of the wastewater treatment facility's equipment;*
- d. Bypasses and overflows of the tributary sewerage system and treatment works;*
- e. New developments at the facility;*
- f. Operator certification and training plans and status;*
- g. The financial status of the facility;*
- h. Preventative maintenance programs and equipment conditions and;*
- i. An overall evaluation of conditions at the facility.*

*2. The permittee shall complete the following evaluation of the sewage sludge generated by the facility:*

- a. An annual quantitative tabulation of the ultimate disposition of all sewage sludge (including, but not limited to, the amount beneficially reused, landfilled, surface disposed, and incinerated).*

- b. An assessment of technological processes and an economic analysis evaluating the potential for beneficial reuse of all sewage sludge not currently beneficially reused, including a listing of any steps which would be required to achieve the sludge quality necessary to beneficially reuse the sludge.*
- c. A description of, including the expected results and the anticipated timing for, all projects in process, in planning and/or being considered which are directed towards additional beneficial reuse of sewage sludge.*
- d. A sludge sample analysis collected prior to ultimate re use or disposal shall be performed for the pollutants listed in Part IV, Element 1, Section III, Table 3 of the permit.*
- e. A listing of the specific steps (controls/changes) which would be necessary to achieve and sustain the quality of the sludge so that the pollutant concentrations in the sludge fall below the pollutant concentration criteria listed in Part IV, Element I, Section III, Table 3 of the permit.*
- f. A listing of, and the anticipated timing for, all projects in process, in planning, and/or being considered which are directed towards meeting the sludge quality referenced in (e) above."*

The permittee shall certify in writing, within three years of the effective date of the permit, that this information is available. This certification shall be submitted concurrently to: Environmental Protection Agency, 6EN WC, 1445 Ross Ave, Dallas, Texas 75202-2733 and State of New Mexico Environment Department, Surface Water Quality Bureau, 1190 St Francis Dr, PO Box 5469, Santa Fe, NM 87502-5469.

Additionally, as part of the Policy, Region 6 recommends that major industrial and selected minor industrial permits require the preparation of a facility pollution prevention plan for wastewater and storm water discharges. The storm water pollution prevention plans are covered under the discussion in Section 4.3.

#### F. DOWNSTREAM/SHARED TRIBAL WATERS

In 1987, Congress amended the CWA to allow qualified tribes to receive some of the regulatory authority otherwise delegated to the states. Section 518(e) of the CWA grants EPA the authority to grant qualified tribes "treatment as a state" (TAS) status for a variety of purposes, including establishing water quality standards and issuing NPDES permits. In order for a tribe to be TAS under this section, the tribe must meet four requirements. The tribe must (1) be federally recognized, (2) have a governing body carrying out substantial duties and powers, (3) have adequate jurisdiction over the water resources for which it seeks program approval, and (4) have the capability to carry out the functions for which the tribe seeks authorization. Recognition of this authority is program specific; a tribe may apply for TAS status for purposes of setting water quality standards, under Section 303 of the CWA, independent of its status in other CWA

programs, such as the NPDES permitting program; see 58 Fed. Reg. 67966 67985 (Dec. 22, 1993). To obtain TAS status under the CWA, a tribe must meet criteria reflecting its ability to effectively implement the program. Although the EPA may delegate CWA program authority only over waters "within the area of the Tribal Government's jurisdiction," approval of tribal water quality standards under CWA 303 can affect upstream, off reservation sources. The Permitting authority cannot issue NPDES permits when the imposition of conditions will not ensure compliance with the applicable water quality requirements of all affected States, 40 CFR 122.4 (d). The permit writer will evaluate the impact of the discharge on downstream and/or shared tribal waters to be consistent with these conditions.

The EPA shall be responsible to administer the CWA and draft NPDES permits on Tribal lands that do not have NPDES authority. In drafting these NPDES permits, EPA may at EPA's discretion use the NMWQS for those dischargers located on Tribal lands where there are no EPA approved Tribal WQS.

## V. APPENDICES

### APPENDIX A. WET DILUTION SERIES

After determining the Critical Dilution (CD), find that number in column 4. The dilution series for each CD is provided in the row that it appears in. For example, for a CD of 30 %, the series would be 13 %, 17 %, 23 %, 30 %, and 40 % plus the required 0 % control. For CD greater than 75 %, the CD is the highest dilution, as shown. In general, facilities that have CD less than or equal to 5 %, the permitting authority will use an acute-to-chronic ratio of 10:1 to allow acute WET testing in lieu of chronic.

CONTROL		CD				
0 %	1	2	3	4	5	
0.4	0.6	0.8	1.0	1.3		
0.8	1.1	1.5	2.0	2.7		
1.3	1.7	2.3	3.0	4.0		
1.7	2.3	3.0	4.0	5.3		
2.1	2.8	3.6	5.0	6.7		
2.5	3.4	4.5	6.0	8.0		
3	4	5	7	9		
3	5	6	8	11		
4	5	7	9	12		
4	6	8	10	13		
5	6	8	11	15		
5	7	9	12	16		
5	7	10	13	17		
6	8	11	14	19		
6	8	11	15	20		
7	9	12	16	21		
7	10	13	17	23		
8	10	14	18	24		
8	11	14	19	25		
8	11	15	20	27		
9	12	16	21	28		
9	12	17	21	29		
10	13	17	23	31		
10	14	18	24	32		
11	14	19	25	33		
11	15	20	26	35		
11	15	20	27	36		

PROCEDURES FOR IMPLEMENTING NPDES PERMITS IN NM

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CONTROL					
0 %	1	2	3	CD	5
	12	16	21	28	37
	12	16	22	29	39
	13	17	23	30	40
	13	17	23	31	41
	14	18	24	32	43
	14	19	25	33	44
	14	19	26	34	45
	15	20	26	35	47
	15	20	27	36	48
	16	21	28	37	49
	16	21	29	38	51
	16	22	29	39	52
	17	23	30	40	53
	17	23	31	41	55
	18	24	32	42	56
	18	24	32	43	57
	19	25	33	44	59
	19	25	34	45	60
	19	26	35	46	61
	20	26	35	47	63
	20	27	36	48	64
	21	28	37	49	65
	21	28	38	50	67
	22	29	38	51	68
	22	29	39	52	69
	22	30	40	53	71
	23	30	41	54	72
	23	31	41	55	73
	24	32	42	56	75
	24	32	43	57	76
	24	33	44	58	77
	25	33	44	59	79
	25	34	45	60	80
	26	34	46	61	81
	26	35	47	62	83
	27	35	47	63	84
	27	36	48	64	85
	27	37	49	65	87
	28	37	50	66	88
	28	38	50	67	89

PROCEDURES FOR IMPLEMENTING NPDES PERMITS IN NM

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CONTROL					
0 %	1	2	3	CD	5
	29	38	51	68	91
	29	39	52	60	92
	30	39	53	70	93
	30	40	53	71	95
	30	41	54	72	96
	31	41	55	73	97
	31	42	56	74	99
	32	42	56	75	100

CONTROL					
0%	1	2	3	4	CD
	24	32	43	57	76
	24	32	43	58	77
	25	33	44	59	78
	25	33	44	59	79
	25	34	45	60	80
	26	34	46	61	81
	26	35	46	62	82
	26	35	47	62	83
	27	35	47	63	84
	27	36	48	64	85
	27	36	48	65	86
	28	37	49	65	87
	28	37	50	66	88
	28	38	50	67	89
	28	38	51	68	90
	29	38	51	68	91
	29	39	52	69	92
	29	39	52	70	93
	30	40	53	71	94
	30	40	53	71	95
	30	41	54	72	96
	31	41	55	73	97
	31	41	55	74	98
	31	42	56	74	99
	32	42	56	75	100

## APPENDIX B. POST THIRD ROUND PERMITTING AND WHOLE EFFLUENT TOXICITY STRATEGY

### Assessment Requirements

Reasonable potential assessments require effluent data, which is normally taken from the permittee application, historical data, and any other source of data that is appropriate and approved by the permitting authority. The approved data is for use in development of water quality based effluent limitations (WQBELs), and as such must meet similar requirements for data, listed under Section 3.4.2 and 3.4.3 of this document.

### Post Third Round Permitting Strategy

Over the history of the NPDES permit program, the Environmental Protection Agency (EPA) has focused on two primary concepts to abate the discharge of pollutants. First, EPA has utilized a technology based control approach. This was reflected in permits originally issued with requirements for secondary treatment (municipalities) and Best Practicable Control Technology Currently Available (industries). More recently permits have required implementation of the Best Conventional Pollutant Control Technology, Best Available Technology Economically Achievable (industries) and pretreatment program development (municipalities).

Secondly, EPA has addressed water quality as impacted primarily by conventional (or oxygen demanding) parameters. This has occurred through the use of specific state water quality standards (and the resulting water quality management plans) for specific pollutants.

EPA Region 6 moved into the “third round” of NPDES permits in 1987. The focus of these “post BAT” permits was to move beyond our first two phases of control and insure that adequate controls are being implemented to confirm that human health and aquatic life are being adequately protected on a site specific receiving stream basis. Region 6 developed its third round policy on March 11, 1987, and adopted a strategy to implement this policy on April 1, 1987, revised October 31, 1989.

On October 1, 1992, and in support of the National Policy, EPA Region 6 adopted the “Policy for Post Third Round NPDES Permitting”. The goal of the regional policy is to assure that there are "no toxic materials in toxic amounts" in waters of the United States; this is stated in the WQA as the national policy. The specific areas of concern are human health protection and aquatic biota protection.

In support of the National Policy, EPA Region 6 set a priority to address toxicity in permits. The priority is set for those facilities, whose technology based permit limits do not protect water quality or the designated uses. In accordance with the priorities listed below, all potential significant contributors to toxicity will be evaluated at permit issuance or when modifications are requested for new processes or expansions. Also, the discharges in known areas of ambient toxicity will be evaluated. This evaluation will consist of a review of both specific chemical data and toxicity testing data representative of the facility's discharge into the receiving water. The

review will consist of a projection of ambient impacts at appropriate critical low river flow conditions or at the appropriate mixing zone conditions for lakes.

Routine biomonitoring and, where appropriate, chemical specific monitoring of discharges will be required for all major dischargers.

(1) Increased monitoring of discharges may be required in areas of suspected ambient toxicity problems to confirm the presence and causes of ambient toxicity. Suspected toxicity will be verified by toxicity testing, specific chemical evaluations and/or bioassessments.

(2) Appropriate controls will be established to correct identified problems at permit reissuance, or by reopening the permit, if necessary to prevent ambient toxicity.

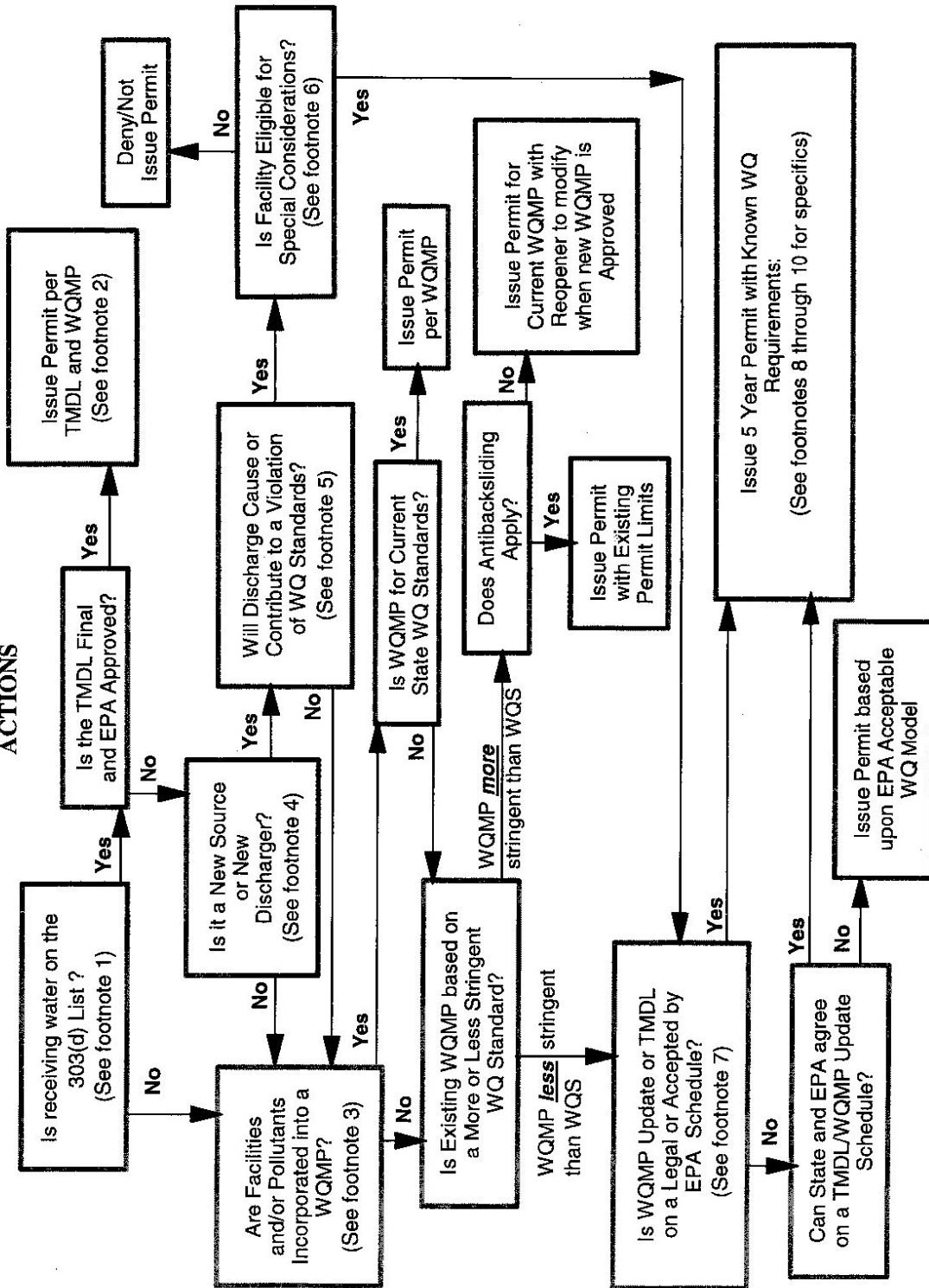


APPENDIX C. PERMIT DECISION MAKING FLOWCHART

Page 1 of 4

WATER QUALITY ASSESSMENT  
NPDES PERMIT ISSUANCE  
ACTIONS

September 29, 2003



FLOWCHART FOOTNOTES:

- 1) Is receiving water on the 303(d) list?
  - A) The receiving water has been determined by the State to be impaired, but it is not yet listed on the 303(d) list: Until the water is listed, EPA recommends limitations or monitoring, as appropriate. A reopener clause should be included in the permit to allow establishment of limitations for those parameter(s), if warranted, when the receiving water is listed.
  - B) Where the 303(d) list has a generic listing and does not identify the specific pollutant(s), [e.g., "metals" with no specific metal identified; "nutrients" with no specific indicator(s) identified; "priority organics" with no specific organic chemical(s) identified; "pesticides" with no specific pesticide(s) identified], EPA recommends limits or monitoring and reporting with a reopener clause as a condition of the permit. Where the 303(d) list has a listing for unknown toxicity, EPA recommends Whole Effluent Toxicity (WET) limitations or monitoring, in accordance with the State WQ Implementation Plan. The "generic listing" does not apply to pollutants that may be suites of pollutant mixtures, such as TDS or TSS.
  - C) When the 303(d) list identifies specific pollutant(s) for an identified receiving water [that part of the body of water or segment that is specified in the 303(d) list], then a limit must be developed in accordance with the WQMP, if the pollutant(s) is/are already incorporated into the WQMP. If the pollutant(s) is/are not incorporated into the WQMP, a limit will be developed in accordance with Footnote 10, unless the facility is a new source or new discharger and they are not eligible for the special considerations listed in Footnote 6.
- 2) For facilities that discharge the parameter of concern addressed in the final TMDL, the following conditions will apply:
  - A) Where the TMDL assigns an individual WLA to a specific discharger, permit per the TMDL condition.
  - B) Where the TMDL does not include a specific WLA for a discharger, the State must revise the WQMP to include the facility.

IN GENERAL:

Pollutants with a specific numeric standard can be implemented at the point of discharge (criteria end of pipe).

Narrative/general WQS that cannot be implemented through a point of discharge limit will require additional modeling, etc., as determined acceptable by EPA, to demonstrate compliance with the TMDL.

Effluent trading, to allow new dischargers or allow expansion of existing discharges, will need to be verifiable and in all affected permits, consistent with EPA policy.

States may choose to incorporate conditions of the TMDL at reissuance of the permit, or they may reopen the permit to incorporate them. EPA encourages the States to incorporate TMDL's into permits in a timely manner.

- 3) This could also include State elected TMDLs and WLAs. If the pollutant is not normally included in the WQMP, then issue the permit with an individual WQ screening per WQS Implementation Plan if the discharge is to an unimpaired water, or per Footnotes 9 or 10 if the discharge is to an impaired water.
- 4) For purposes of this flowchart only, "New Sources" covered under new source performance standards that are not new dischargers may be treated as existing facilities, provided there is no expansion or change in operation (e.g., significant production/discharge increase) from the previously permitted condition.
- 5) "Cause or contribute" will normally include all discharges of the pollutant of concern, unless the discharge does not exceed the WQS criteria at the point of discharge.
- 6) "Special considerations" include reallocation of the wasteload, effluent trading, WQS variances, or other options which are demonstrated not to cause or contribute to the violation of WQS.
- 7) "Legal or accepted by EPA" means court order or other schedule agreed upon by EPA.
- 8) For facilities (new or existing) not on a 303(d) listed water, conduct an individual WQ screening or waste load evaluation and incorporate the results into a WQMP, as appropriate. This action may be done concurrently with the permit process.
- 9) For facilities (new or existing) on a 303(d) listed water that do not discharge the pollutant of concern, conduct an individual WQ screening or wasteload evaluation for other reported parameters on the application, as necessary, and incorporate the results into a WQMP, as appropriate. Industrial facilities (new or existing), whose application for permit issuance/renewal indicates the permittee does not believe their effluent contains the pollutant of concern, may generally be treated the same as facilities with analytical data showing no discharge of the pollutant.
- 10) For facilities on 303(d) listed waters that discharge the pollutant of concern, Water Quality Based Effluent Limits will be developed, using "known WQ requirements" on identified 303(d) listed parameters, as follows, with a reopener clause in the permit:
  - A) For renewing permits, the permit limit must be no less stringent than the WQMP, and must be equal to or less than:

The facility's current discharge load or permitted level, or

The total assimilative capacity of the receiving water, whichever is more stringent.

B) Existing facilities that are expanding must have limits equal to or less than:

The facility's current discharge load or permitted level, plus WQ criteria at the point of discharge for the expanded flow, or

A limit, based on special considerations, such as reallocation of the wasteload, effluent trading, WQS variances, or other options which are demonstrated not to cause or contribute to the violation of WQS.

C) For new facilities or new sources, the limit must be either:

WQ criteria at the point of discharge, or

A limit, based on special considerations, such as reallocation of the wasteload, effluent trading, WQS variances, or other options which are demonstrated not to cause or contribute to the violation of WQS.

Note:

For facilities on a 303(d) listed water that is expected to be delisted, and protocols for data collection and EPA approval are demonstrated in the permit Fact Sheet, the permit writer will generally perform a WQ screening or wasteload evaluation, as necessary, and incorporate results into a WQMP.

PROCEDURES FOR IMPLEMENTING NPDES PERMITS IN NM

APPENDIX D. MINIMUM QUANTIFICATION LEVELS (MQLs)

**METALS, CYANIDE and CHLORINE**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l	Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
Aluminum (7429-90-5)	2.5	Lead (7439-92-1)	0.5
Antimony (7440-36-0)	60	Mercury <sup>2</sup> (7439-97-6)	0.0005
Arsenic (7440-38-2)	0.5	Mercury <sup>2</sup> (7439-97-6)	0.005
Barium (7440-39-3)	100	Molybdenum (7439-98-7)	10
Beryllium (7440-41-7)	0.5	Nickel (7440-02-0)	0.5
Boron (7440-42-8)	100	Selenium (7782-49-2)	5
Cadmium (7440-43-9)	1	Silver (7440-22-4)	0.5
Chromium (18540-29-9)	10	Thallium (7440-28-0)	0.5
Cobalt (7440-48-4)	50	Uranium (7440-61-1)	0.1
Copper (7440-50-8)	0.5	Vanadium (7440-62-2)	50
Cyanide (57-12-5)	10	Zinc (7440-66-6)	20
Cyanide, weak acid dissociable (57-12-5)	10	Chlorine (7782-50-5)	33

**VOLATILE COMPOUNDS**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l	Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
Acrolein (107-02-8)	50	1,3-Dichloropropylene (542-75-6)	10
Acrylonitrile (107-13-0)	20	Ethylbenzene (100-41-4)	10
Benzene (71-43-2)	10	Methyl Bromide (74-83-9)	50
Bromoform (75-25-2)	10	Methylene Chloride (75-09-2)	20
Carbon Tetrachloride (56-23-5)	2	1,1,2,2-Tetra-chloroethane (79-34-5)	10
Chlorobenzene (108-90-7)	10	Tetrachloroethylene (127-18-4)	10
Clorodibromomethane (124-48-1)	10	Toluene (108-88-3)	10
Chloroform (67-66-3)	50	1,2-trans-Dichloroethylene (156-60-5)	10
Dichlorobromomethane (75-27-4)	10	1,1,2-Trichloroethane (79-00-5)	10
1,2-Dichloroethane (107-06-2)	10	Trichloroethylene (79-01-6)	10
1,1-Dichloroethylene (75-35-4)	10	Vinyl Chloride (75-01-4)	10
1,2-Dichloropropane (78-87-5)	10		

**ACID COMPOUNDS**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l	Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
2-Chlorophenol (95-57-8)	10	2-4-Dinitrophenol (51-28-5)	50
2,4-Dichlorophenol (120-83-2)	10	Pentachlorophenol (87-86-5)	50
2,4-Dimethylphenol (105-67-9)	10	Phenol (108-95-2)	10
4,6-Dinitro-o-Cresol (534-52-1)	50	2,4,6-Trichlorophenol (88-06-2)	10

**PROCEDURES FOR IMPLEMENTING NPDES PERMITS IN NM**

**BASE/NEUTRAL COMPOUNDS**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l	Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
Acenaphthene (83-32-9)	10	Dimethyl Phthalate (131-11-3)	10
Anthracene (92-87-5)	10	Di-n-Butyl Phthalate (84-74-2)	10
Benzidine (92-87-5)	50	2,4-Dinitrotoluene (121-14-2)	10
Benzo(a)anthracene (56-55-3)	5	1,2-Diphenylhydrazine (122-66-7)	20
Benzo(a)pyrene (50-32-8)	5	Fluoranthene (206-44-0)	10
3,4-Benzofluoranthene (205-99-2)	10	Fluorene (86-73-7)	10
Benzo(k)fluoranthene (207-08-9)	5	Hexachlorobenzene (118-74-1)	5
Bis(2-chloroethyl)ether (111-44-4)	10	Hexachlorobutadiene (87-68-3)	10
Bis(2-chloroisopropyl)ether (108-60-1)	10	Hexachlorocyclopentadiene (77-47-4)	10
Bis(2-ethylhexyl)Phthalate (117-81-7)	10	Hexachloroethane (67-72-1)	20
Butyl Benzyl Phthalate (85-68-7)	10	Indeno (1,2,3-cd) pyrene (193-39-5)	5
2-Chloronaphthalene (91-58-7)	10	Isophorone (78-59-1)	10
Chrysene (218-01-9)	5	Nitrobenzene (98-95-3)	10
Dibenzo(a,h)anthracene (53-70-3)	5	N-Nitrosodimethylamine (62-75-9)	50
1,2-Dichlorobenzene (9+5-50-1)	10	N-nitrosodi-n-propylamine (621-64-7)	20
1,3-Dichlorobenzene (541-73-1)	10	N-nitrosodiphenylamine (86-30-6)	20
1,4-Dichlorobenzene (106-46-7)	10	Pyrene (129-00-0)	10
3,3-Dichlorobenzidine (91-94-1)	5	1,2,4-Trichlorobenzene (120-82-1)	10
Diethyl Phthalate (894-66-2)	10		

**PESTICIDES**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l	Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
Aldrin (309-00-2)	0.01	Beta-Endosulfan (33213-65-9)	0.02
Alpha-BHC (319-84-6)	0.05	Endosulfan sulfate (1031-7-8)	0.02
Beta-BHC (319-895-7)0.05	0.05	Endrin (72-20-8)	0.02
Gamma-BHC (58-89-9)	0.05	Endrin Aldehyde (7421-93-4)	0.1
Chlordane (57-74-9)	0.2	Heptachlor (76-44-8)	0.01
4,4' DDT and derivatives (50-29-3)	0.02	Heptachlor Epoxide (1024-57-3)	0.01
Dieldrin (60-57-1)	0.02	PCB's (1336-36-3)	0.2
Alpha-Endosulfan (959-98-8)	0.01	Toxaphene (8001-35-2)	0.3

**DIOXIN**

Pollutant (CAS <sup>1</sup> No.)	MQL ug/l
2,3,7,8-TCDD (1764-01-6)	0.00001

Footnotes:

- 1 Chemical Abstract Service Number
- 2 Applicant to use 0.005 ug/l for mercury unless permitting authority directs otherwise.

The permittee may develop an effluent specific method detection limit (MDL) in accordance with Appendix B to 40 CFR 136. For any pollutant for which the permittee determines an effluent specific MDL, the permittee shall send to the EPA Region 6 NPDES Permits Branch (6WQ P) a report containing QA/QC documentation, analytical results, and calculations necessary to demonstrate that the effluent specific MDL was correctly calculated. An effluent specific minimum quantification level (MQL) shall be determined in accordance with the following calculation:

$$\text{MQL} = 3.3 \times \text{MDL}$$

## APPENDIX E. STRATEGY FOR EVALUATING AND ADDRESSING IMPACTS OF TOTAL DISSOLVED SOLIDS IN FRESHWATER INVERTEBRATE SPECIES TOXICITY TESTING

The Strategy for Evaluating and Addressing Impacts of Total Dissolved Solids in Freshwater Invertebrate Species Toxicity Testing was presented in a letter dated January 20, 1994, from Jack Ferguson, Chief, Permits Branch, EPA to Maria L. Martinez, Stephen Bainter, and Phillip Jennings, EPA.

The policy developed is as follows:

**BACKGROUND:** Several permittees have proposed that high total dissolved solids concentrations (> 2000 mg/L TDS) are causing an adverse impact on freshwater invertebrate species toxicity testing; i.e., *Ceriodaphnia dubia* (Freshwater Chronic Testing) and *Daphnia pulex* (Freshwater Acute Testing). These permittees have performed various studies to substantiate their claim. It is their contention that the dissolved solids alone cause lethality to the invertebrate species. Requests received have included requests to allow an alternate invertebrate test species (i.e., *Daphnia magna*) or to cease the invertebrate species testing. The information received has been reviewed in order to devise a strategy to address this issue within Region 6 (see Attachment 1: CASE STUDIES).

**SCOPE:** The workgroup has developed a strategy to confirm and address TDS contribution to effluent toxicity. The strategy involves the characterization and confirmation of toxicity due to TDS within a Toxicity Reduction Evaluation, comparison toxicity testing using an alternate species, and where appropriate, invertebrate Rapid BioAssessment studies. This strategy will be applied to all municipal, industrial, and federal facilities within Region 6 that claim that TDS is the source of effluent toxicity unless otherwise directed by an approved State Implementation Plan via the Continuous Planning Process.

### TDS STRATEGY

#### INTRODUCTION:

Once lethal effects at the critical dilution have been confirmed a Toxicity Reduction Evaluation will be required through a Section 308 Order for Information or permit requirement (see Attachment 2: FLOWCHART). Established TRE guidance includes full effluent characterizations, identifications, and confirmations. Characterization procedures do not typically remove toxicity due to TDS. Therefore, a strategy was necessary to address situations where high concentrations of TDS exist. However, only effluents with high TDS concentrations at the critical dilution (i.e., >2,000 mg/L) and not economically or technologically controllable will be eligible for the implementation of this strategy.



### **IDENTIFICATION PROCEDURES:**

A minimum of 3 characterizations demonstrating that toxicity is not eliminated will be required. The failure to remove the toxicity in the Toxicity Identification Evaluation (Phase I) of the TRE will aid in deducing that the toxicity is possibly attributable to something other than nonpolar organics, surfactants, metals, ammonia, volatile organics, oxidative compounds, suspended solids or particle-bound toxicants. The source of the high TDS concentration will then be explored. If the source is not economically or technologically controllable, the permittee will proceed with analysis of the TDS and all major ions i.e. Ca<sup>++</sup>, Mg<sup>++</sup>, Na<sup>+</sup>, K<sup>+</sup>, HCO<sub>3</sub><sup>-</sup>, CO<sub>3</sub><sup>=</sup>, SO<sub>4</sub><sup>=</sup>, and Cl<sup>-</sup> in both the effluent and the receiving stream. The receiving stream sample will be collected upstream from the point of discharge and unaffected by the discharge. The TDS concentrations of the effluent at the critical dilution must be >2,000 mg/L in order to conclude TDS as the source of toxicity.

### **CONFIRMATION PROCEDURES:**

The confirmation phase of the TRE will consist of a minimum of one set of side-by-side lethality screening tests with both the permitted invertebrate species and *Daphnia magna*. The tests will be conducted with testing solutions made up of reconstituted lab water. The major ion concentrations measured in the effluent and the receiving stream from the previous identification phase of the TRE will be used for the testing solutions. The solutions will duplicate the major ionic constituent concentrations in the receiving water and the effluent at the critical dilution. A lab control replicate series of moderate hardness and alkalinity will also be run. *Daphnia magna* is the species recommended for the comparison test species for the side-by-side toxicity testing since it is an invertebrate species that is more tolerant to TDS effects than either *Ceriodaphnia dubia* or *Daphnia pulex*. The three invertebrate species are otherwise comparable in sensitivities to most toxicants<sup>1</sup>. In the case of a chronic biomonitoring permit requirement the lethality screening testing will involve a comparison of a 21-day *Daphnia magna* test and a 7-day *Ceriodaphnia dubia* test. The 21-day *Daphnia magna* test would be required due to the differing life cycles between the *D. magna* and the other freshwater chronic toxicity test invertebrate species used, *C. dubia*. A 48-hour lethality screening test would be required in the case of the acute testing permit requirement. Since *Daphnia magna* is more tolerant to TDS for all three invertebrate species it is expected that significant lethal effects will be demonstrated by *Ceriodaphnia dubia* or *Daphnia pulex* while *Daphnia magna* should yield no significant lethal effects.

### **EVALUATION PROCEDURES:**

In evaluating the side-by-side testing results the following criteria will be used. If *Daphnia magna* exhibits significant lethality in the receiving stream screening test, the invertebrate biomonitoring requirement will be dropped from the permit through a permit modification and replaced with the requirement to conduct invertebrate Rapid BioAssessment (iRBA) studies. An iRBA is defined as a replicable biological field assessment technique which integrates concepts of community structure and functional group relationship at major taxonomic levels into a relative assessment of impact to the benthic community. The toxicity of the receiving stream's ionic composition alone to *Daphnia magna* presents the support needed to prove *Daphnia magna*

unsuitable as the invertebrate test species. Since there are no other invertebrate freshwater species with established protocols the freshwater invertebrate toxicity testing will be replaced with an invertebrate monitoring tool, iRBAs. These iRBAs will be required on a quarterly basis to determine the extent, if any, that the receiving stream is impaired or its invertebrate populations adversely affected by the discharge. This demonstration will include a comparison of the invertebrate populations immediately downstream of the effluent's zone of initial dilution or mixing zone to an unaffected upstream site or representative site in the same watershed.

If the reconstituted receiving stream does not cause significant lethality to *Daphnia magna* and both test species for the reconstituted effluent at the critical dilution yield no significant lethal effects it is concluded that TDS is not the source of toxicity and the permittee must revisit the TIE procedures with the permitted species.

If the reconstituted receiving stream and the effluent at the critical dilution do not cause significant lethality to *Daphnia magna* but significant lethality is demonstrated to the permitted species, *Daphnia magna* will be recommended for the invertebrate biomonitoring species. The use of *Daphnia magna* as an alternate species will be granted through a modification of the NPDES permit as a whole effluent toxicity (WET) limit. Prior to the permit modification, the substitution of *Daphnia magna* will be granted through a Section 308 letter from the Director of the Water Management Division. It should be noted that the 21-day *Daphnia magna* chronic toxicity test averages \$3,500 in cost (1994 costs). Additionally the Water Quality Management Branch (6W-Q) will be notified that a use attainability analysis should be conducted for establishing site specific criteria. In cases where state water quality standards for TDS and/or its components exist the permit modification will also include these permit limits.

If the reconstituted receiving stream solution does not exhibit significant lethality to *Daphnia magna* but does exhibit significant lethality to both the permitted invertebrate and *Daphnia magna* in the effluent solution at the critical concentration it is concluded that a TRE to address *Daphnia magna* lethality is necessary. Furthermore, the Water Quality Management Branch (6W-Q) will be notified that a use attainability analysis should be conducted for establishing site specific criteria. In cases where state water quality standards for TDS and/or its components exist the permit modification will also include water quality based numerical permit limits.

In summary, toxicity impacts from high TDS are a concern. Region 6 acknowledges that high concentrations of TDS can cause toxicity. However, Region 6's position is in support of the federal standard of "no toxic materials in toxic amounts" and of the states' and pueblos' narrative water quality standards. Furthermore, the states and pueblos reserve the right to develop site specific criteria. Additionally, where states or pueblos have numerical standards for TDS and its ionic components those standards should be imposed. TRE coordination efforts between EPA and the states or pueblos will also aid in communicating this type of special consideration for toxic effects. Contentions of TDS toxicity will be evaluated on a case by case basis.

#### **TECHNICAL INFORMATION:**

The terms of salinity, conductivity, ionic composition and total dissolved solids are interrelated. Salinity is the chemical term for the ionic composition of waters and is expressed in mg/L or

meq/L (2). The ionic composition of fresh waters is dominated by dilute solutions of alkalis and alkaline earth compounds. The concentrations of four major cations,  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ , and four major anions,  $\text{HCO}_3^-$ ,  $\text{CO}_3^{=}$ ,  $\text{SO}_4^{=}$ , and  $\text{Cl}^-$ , usually constitute the total ionic salinity of the water for all practical purposes. Concentrations of ionized components of other elements such as nitrogen (N), phosphorus (P), and iron (Fe), and numerous minor elements are of immense biological importance, but are usually minor contributors to total salinity. The quantity of total dissolved solids is a measure of inorganic and organic materials dissolved in water after filtration and evaporation to dryness. The conductivity of fresh waters, in turn, is expressed as the resistance of a solution to electrical current. The resistance of an aqueous solution to electrical current or electron flow decreases with increasing ion content. The conductivity of freshwater is closely proportional to concentrations of the major ions. This relationship is not true, however, for minor constituents of freshwater (e.g. N, Fe, Mn, Sr, or P).

It is speculated that total dissolved solids inhibits the osmotic regulation of the invertebrate species<sup>1</sup>. More importantly, the suspected effect on the organism(s) is lethality.

The research community has explored a number of different techniques that can be used to evaluate whether TDS (or salinity) is a contributing factor to toxicity in freshwater testing (1). This research has resulted in the development of a Salinity/Toxicity Relationship (STR) model that can predict acute toxicity of saline waters to freshwater organisms based on major ion composition. Although validation studies are still forthcoming, these types of analyses coupled with a Toxicity Reduction Evaluation can aid in determining whether TDS is a cause of lethality in freshwater effluents.

The TNRCC considered the impact of total dissolved solids on the biomonitoring tests and included, in the definition of "toxicity" (found in the Texas Surface Water Quality Standards) a clause which states that "Adverse effects caused by conditions of temperature, dissolved oxygen, or nontoxic dissolved substances are excluded from the definition of toxicity". The draft document "Implementation of the Texas Natural Resource Conservation Commission Standards via Permitting" states, on Page 34, " If the TIE/TRE procedure documents to the satisfaction of the TNRCC staff that high levels of non-toxic dissolved substances caused the effluent lethality test failure, then the permittee will be required to continue effluent lethality testing with an approved alternate organism and/or demonstrate that attainable uses will be maintained in the receiving water. Nothing outlined here should be construed as excluding individual, potentially toxic chemical components of Total Dissolved Solids from the provisions of the lethality test." This procedure places the burden of proof on the permittee, and not the regulatory agency. Additionally, this demonstration requires a greater level of activity than those required during a typical TRE/TIE procedure, since the permittee must demonstrate the absence of individual potentially toxic chemical components. Although only addressed in the Texas Surface Water Quality Standards, it is reasonable to assume facilities in other Region 6 states may have similar difficulties with total dissolved solids, requiring the Region to adopt a position.

Information from the TNRCC<sup>1</sup>, the National Effluent Toxicity Assessment Center<sup>2</sup>, and the University of North Texas<sup>3</sup>, indicates there are no lethal effects to *Ceriodaphnia dubia* in effluents with conductivities of less than approximately 4,000  $\mu\text{mhos}$  (TDS of less than approximately 2,000 mg/l). The information collected also supports the contention that levels of

TDS greater than 2,000 mg/l may result in lethal effects, but that there is no discrete value for which TDS will cause an effect. The effects of TDS are in fact dynamic and dependent on other environmental factors, such as; individual concentrations of alkalinity components, hardness components, organic constituents, etc.

In cases where an impact is considered to be present, the TNRCC has amended the permit to include a permit provision that allows the consideration to biomonitor with an alternate testing species. After commencing a TRE the permittee is asked to demonstrate through data generation that an alternate species is warranted. The State language states, "if the TRE procedure documents to the satisfaction of the Executive Director that high levels of non-toxic dissolved substances caused the failure of the effluent lethality test, then the permittee may cease TRE activities and continue effluent lethality testing with an approved alternate test organism(s) at the frequency required (in item b). This section does not exclude individual, potentially toxic chemical components of total dissolved solids from the provisions of the lethality test."

Footnotes:

- 1 Personal correspondence between Maria Martinez and Theresa Norberg-King.
- 2 Personal correspondence between Maria Martinez and Vickie Reat.
- 3 Personal correspondence between Maria Martinez and David Hall.

## **ATTACHMENT 1 CASE STUDIES**

The City of El Paso has reported TDS values in the range of 800 ppm. This TDS concentration has been determined not to have a lethal effect to *Ceriodaphnia dubia*<sup>1</sup>.

Texas Eastman (Longview) (NPDES No. TX0000949), in data submitted to TNRCC, reports that their facility's effluent has a TDS that ranges from 3500 to 4000 ppm TDS. Texas Eastman has failed to meet TNRCC's 24 hour Acute testing (technology based limit). The facility discharges into Segment 0505 of the Sabine River, and must meet a water quality based chronic biomonitoring requirement at 55% effluent concentration. They have successfully completed four quarterly toxicity tests for Outfall 004's effluent. Chronic biomonitoring requirements for Outfall 004 required under their TNRCC permit have expired as of May 21, 1993. Texas Eastman is still biomonitoring using the 24-hour test for Outfall 004. Texas Eastman has submitted data necessary for the TNRCC to make a final decision on the question of TDS impacts. The data were collected from: 1) analysis of specific ion concentrations in the effluent, 2) toxicity tests on simulated effluent at the same ionic strength in Outfall 002 effluent, and 3) use of the salinity/toxicity relationship model to develop lethality curves for comparison to simulated effluent and Outfall 002 effluent (1). The State has granted Texas Eastman permission to substitute *Daphnia magna* for *Daphnia pulex* as their invertebrate test organism in all future 24-hour toxicity tests. A change in invertebrate species from *Daphnia pulex* to *Daphnia magna* may not represent a less stringent requirement, since the species are comparable in sensitivity<sup>1</sup>.

Shell Oil (Odessa) (NPDES No. TX0030449) has also submitted a request for the use of an alternate test species. The State required that the permittee conduct ion analyses on the effluent and side-by-side testing using the *Daphnia pulex* and *Daphnia magna*. The data demonstrated

that the processes in the refinery increased the TDS concentrations of the influent. However, the final effluent TDS values i.e. approximately 12,000 mg/L TDS were below the applicable TNRCC standard for Segment 1412 of the Colorado River i.e. 20,000 mg/L TDS. The effluent's TDS values are still within the toxic range for all three invertebrate species utilized for freshwater toxicity testing. Therefore, TNRCC has allowed Shell Oil (Odessa) to stop monitoring with *Daphnia pulex*. There is no invertebrate testing requirement for this facility under their State permit.

EPA Region 8 has had two cases involving TDS interference<sup>2</sup>. Region 8's final determination was that the data presented by the two permittees were inconclusive. Hence, no changes to the biomonitoring requirements were made. EPA Region 9 has reportedly not had any permittees reporting TDS interference<sup>3</sup>.

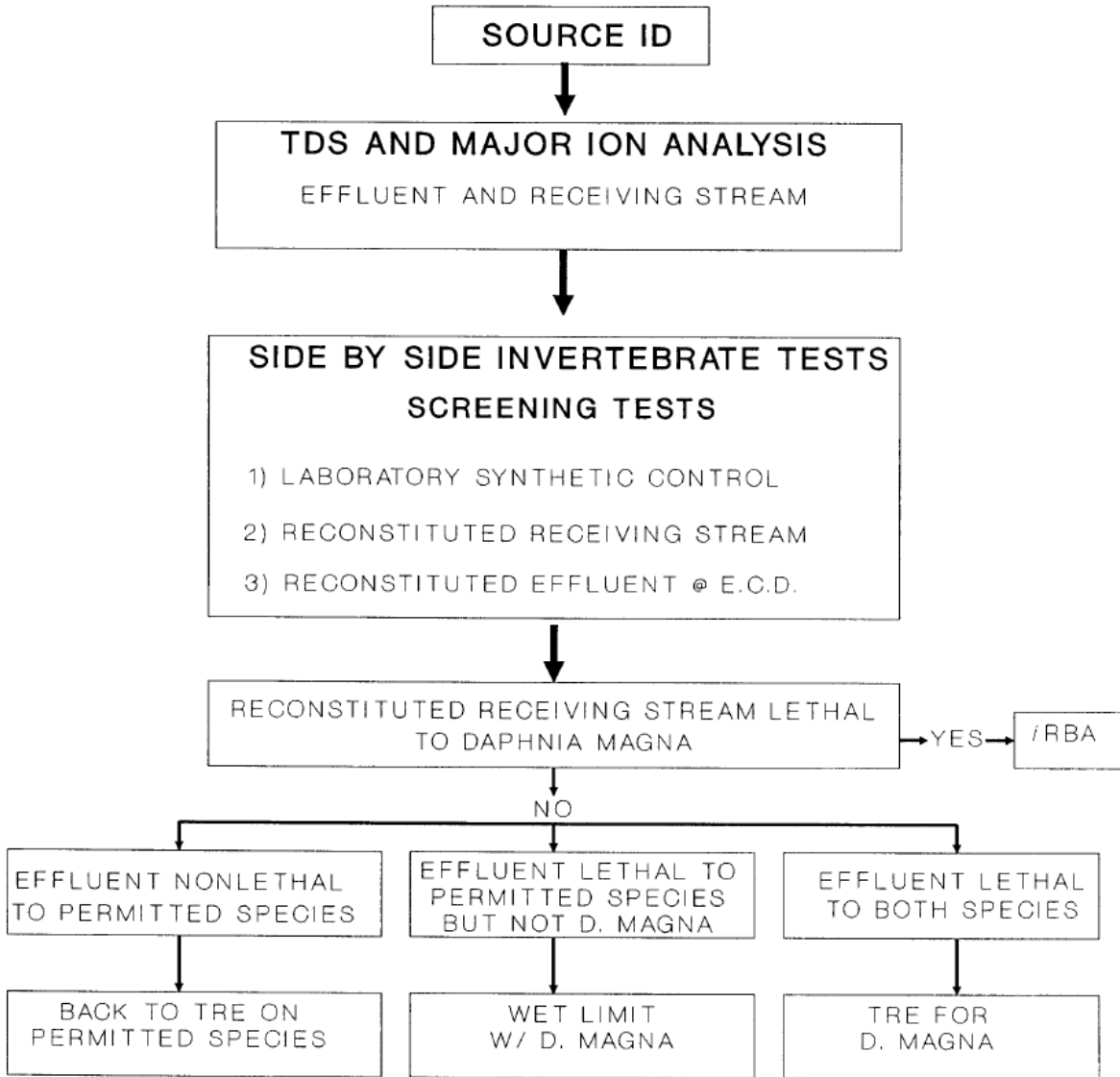
Footnotes:

- 1 Personal correspondence between Maria Martinez and Theresa Norberg-King.
- 2 Personal communication w/Glenn Rodriguez, EPA Region 8.
- 3 Personal communications w/Peter Husby, EPA Region 9.

ATTACHMENT 2.

# INVERTEBRATE TDS LETHALITY

Where TIE manipulations fail to remove toxicity and  
TDS > 2,000 mg/l @ Effluent Critical Dilution (E.C.D.)



REFERENCES

Mount, D.R. and D.D. Gulley. 1992. Development of a Salinity/Toxicity Relationship Predict Acute Toxicity of Saline Waters to Freshwater Organisms. Final Report.

Wetzel, R.G. 1983. Limnology. Second Edition. CBS College Publishing. New York, New York.

Plafkin, J.L., M.T. Barbour, K.D. Porter, and S.K. Gross. 1989. Rapid BioAssessment protocols for use in streams and rivers. Benthic macroinvertebrates and fish. EPA-444/4-89-001. U.S. Environmental Protection Agency, Washington, D.C.

American Society for Testing and Materials. Standard Guidance for Conditions for the Renewal Life Cycle Toxicity Test with *Daphnia magna*, E 1193. American Society for Testing and Materials, Philadelphia, PA.

APPENDIX F. REGION 6 POLICY FOR DETERMINING THE NEED FOR WATER QUALITY BASED PERMIT EFFLUENT LIMITATIONS

Date: 8/29/91

A. REGION 6 APPROACH DETERMINING REASONABLE POTENTIAL

Region 6 has developed a procedure to extrapolate limited datasets to better evaluate the potential for the higher effluent concentrations to exceed a State water quality standard. Our method yields an estimate of a selected upper percentile value. We believe that the most statistically valid estimate of an upper percentile value is a maximum likelihood estimator which is proportional to the population geometric mean. If one assumes the population of effluent concentrations to fit a lognormal distribution, this relationship is given by:

$$C_p = C_{\text{mean}} * \exp (Z_p * \sigma - 0.5 * \sigma^2)$$

where:  $Z_p$  = normal distribution factor at  $p^{\text{th}}$  percentile

$$\sigma^2 = \ln(\text{CV}^2 + 1)$$

To calculate the maximum likelihood estimator of the 95th percentile, the specific relationship becomes:

$$C_{95} = C_{\text{mean}} * \exp (1.645 * \sigma - 0.5 * \sigma^2)$$

if CV is assumed = 0.6,

$$\sigma^2 = .307$$

The ratio of the estimated 95th percentile value to the mean ( $C_{95}/C_{\text{mean}}$ ) is calculated:

$$C_{95}/C_{\text{mean}} = 2.13$$

A single effluent value or the geometric mean of a group of values is multiplied by the ratio to yield the estimate of the 95th percentile value.

The following table shows the ratio of the upper percentile to the mean for the 90th, 95th, and 99th percentiles

Ratio of Upper Percentiles to Geometric Mean

Percentile	Z	$C_p/C_{\text{mean}}$
90	1.283	1.74
95	1.645	2.13
99	2.386	3.11



EXAMPLE  
 DETERMINING REASONABLE POTENTIAL  
 REGION 6 PROTOCOL

The outcome of this approach is illustrated in the following example:

Assume a discharger has reported 3 effluent concentrations of cadmium [9 ug/l, 12 ug/l, 15 ug/l]. The discharge flow is 3 MGD, the receiving stream critical flow is 6.4 MGD. The ambient chronic standard for cadmium is 6 ug/l as total metal. Assume 100% mix at the point of discharge and that the upstream concentration of cadmium is nondetectable. Evaluate the potential of the discharge to exceed water quality standards by assessing the impact of the 95th percentile effluent cadmium concentration.

1. Estimation of 95th percentile (Regional Approach)

The geometric mean effluent concentration of 12 ug/l is used as a parameter to estimate the 95th percentile value, assuming a lognormal distribution and a coefficient of variation of 0.6.

$$C_{95} = C_{\text{mean}} * \exp(1.645 * \sigma - 0.5 * \sigma^2)$$

$$\sigma^2 = \ln(CV^2 + 1)$$

$$C_{95}/C_{\text{mean}} = 2.13$$

$$12 \text{ ug/l} * 2.13 = 25.6 \text{ ug/l}$$

The 95th percentile effluent value is used to calculate the Instream Waste Concentration:

2. Determination of Instream Waste Concentration

$$C_d = [(Q_a * C_a) + (Q_e * C_e)] / (Q_a + Q_e)$$

where

$C_d$  = ambient concentration of cadmium after mix (Instream Waste Concentration)

$Q_a$  = stream flow

$Q_e$  = effluent flow

$C_a$  = upstream concentration of cadmium

$C_e$  = maximum effluent concentration of cadmium

$$C_d = [(6.4 \times 0) + (3 \text{ MGD} * 26 \text{ ug/l})] / (6.4 \text{ MGD} + 3 \text{ MGD})$$

$$= 8.2 \text{ ug/l}$$

The IWC of 8.2 ug/l exceeds the ambient standard of 6.0 ug/l, a limit would be placed in the permit.

Use of other Upper Percentiles

The 90th percentile effluent value would be estimated as follows:

$$12 \text{ ug/l} * 1.74 = 21 \text{ ug/l cadmium}$$

The IWC would be calculated:

$$\begin{aligned} & [(6.4 \times 0) + (3 \text{ MGD} * 21 \text{ ug/l})] / (6.4 \text{ MGD} + 3 \text{ MGD}) \\ & = 6.6 \text{ ug/l cadmium} \end{aligned}$$

The 99th percentile effluent value would be estimated as follows:

$$12 \text{ ug/l} * 3.11 = 37 \text{ ug/l cadmium}$$

The IWC would be calculated

$$\begin{aligned} & [(6.4 \times 0) + (3 \text{ MGD} * 37 \text{ ug/l})] / (6.4 \text{ MGD} + 3 \text{ MGD}) \\ & = 12 \text{ ug/l cadmium} \end{aligned}$$

As one selects more extreme tail values at which to evaluate potential water quality exceedances, the reported effluent concentrations must decrease to conclude that the potential to exceed the standard is not present.

Dealing with Highly Variable Datasets

The example above assumes that the coefficient of variation, defined as the ratio of the standard deviation to the mean, is 0.6.

If multiple effluent concentrations are reported which exhibit a large range between the highest and lowest values, the statistical variance of this population of numbers may well be greater than 0.6.

One can calculate the geometric mean of a group of numbers as follows:

1. Take the logarithm of each pollutant value.
2. Sum the logarithmically transformed values.
3. Divide the sum of transformed data by the number of measurements.
4. Express the geometric mean pollutant value by determining the antilog of the average of the logarithmically transformed values.

Dealing with Large Datasets

When a larger dataset of pollutant measurements is available, one may not need to statistically estimate the upper range or 95th percentile as described above. It is suggested that the 95th percentile be determined from the data and compared to the statistical estimation, the larger of these values should be assumed as the reasonably potential concentration of the discharge.

**B. TECHNICAL SUPPORT DOCUMENT FOR WATER QUALITY-BASED TOXICS CONTROL DETERMINING REASONABLE POTENTIAL**

The procedure assumes that the concentrations of chemical parameters in wastewater fit a lognormal frequency distribution. Assuming some coefficient of variation (CV), the ratio between any two percentiles of the distribution may be calculated. An upper percentile of the distribution is selected, and a level of uncertainty in the confidence of estimation of the upper percentile is also selected. The procedure for estimating the extreme tail value consists of five steps.

1. The upper percentile for a sample is calculated given some level of confidence that the data set has captured the maximum discharge concentration.

$$p_n = (1 - \text{confidence level})^{1/n}$$

Where:

$p_n$  is the upper percentile for n samples  
n is the number of samples

If one selects a confidence level of 99% and is evaluating a dataset consisting of three effluent analyses of a given substance, the TSD states that one can predict that the maximum of the 3 values reported is greater than the 21.8th percentile of all potential samples from the same population with 99% confidence.

2. The normal distribution factor (Z) at the  $p^{\text{th}}$  percentile is determined from tabulated values of the areas of the normal curve. For example, if the  $p^{\text{th}}$  percentile is determined to be the 21.8<sup>th</sup> percentile, Z is equal to -0.823.
3. The ratio of the concentration at the  $p^{\text{th}}$  percentile to the average concentration is calculated based on the CV and the relationship between these statistics in a lognormal population.

$$C_p = C_{\text{mean}} * \exp (Z_p * \sigma - 0.5 * \sigma^2)$$

where:  $Z_p$  = normal distribution factor at  $p^{\text{th}}$  percentile

$$\sigma^2 = \ln(\text{CV}^2 + 1)$$

4. The ratio of the 99<sup>th</sup> percentile concentration to the average concentration is calculated assuming some CV and a lognormal distribution.

$$C_{99} = C_{\text{mean}} * \exp(2.326 * \sigma - 0.5 * \sigma^2)$$

5. The ratio of the 99<sup>th</sup> percentile concentration to the p<sup>th</sup> percentile concentration is calculated by dividing C<sub>99</sub> by C<sub>p</sub>. This ratio is the multiplication factor presented in the TSD by which the maximum data value reported is multiplied to calculate the estimate of the potential extreme effluent value.

The following table contains multipliers expressing the ratio of the 99<sup>th</sup> percentile to the p<sup>th</sup> percentile for a range of sample sizes, selecting a confidence level of 99% about the estimate of the p<sup>th</sup> percentile and assuming the population to be characterized by a coefficient of variation (CV) of 0.6. The TSD recommends the use of a CV of 0.6 where site specific data are not available to determine variance and estimation of the 99<sup>th</sup> percentile of effluent values to evaluate the potential to exceed water quality standards.

**Multipliers: 99% Confidence Level and 99<sup>th</sup> Percentile**

Number of Samples	Upper Percentile	Probability Factor	Ratio to Mean	Ratio 99 <sup>th</sup> to Upper Percentile
1	0.01	-2.326	0.236	13.2
2	0.100	-2.326	0.421	7.4
3	0.2154	-0.823	0.543	5.6
4	0.3162	-0.48	0.657	4.7
5	0.3981	-0.261	0.742	4.2
6	0.4641	-0.092	0.815	3.8
7	0.5179	0.045	0.879	3.6
8	0.5623	0.157	0.935	3.3
9	0.5994	0.253	0.987	3.2
10	0.6309	0.334	1.032	3.0
11	0.6579	0.406	1.074	2.9
12	0.6812	0.473	1.114	2.8

Column 2 is calculated from the equation  $p_n = (1 - 0.99)^{1/n}$ .

To illustrate, one may state that the maximum of 2 effluent concentrations reported is greater than 10% of all potential samples from the same population with 99% confidence. In using the TSD protocol, one assumes that in datasets of less than 7 samples, the maximum value reported will be less than the median effluent concentration.

Column 3 are tabulated values of Z corresponding to the p<sup>th</sup> percentile.

Column 4 is calculated by the equation  $C_p / C_{\text{mean}} = \exp(Z_p * \sigma - 0.5 * \sigma^2)$

Column 5 is calculated by the equation

$$C_{99}/C_p = \frac{\exp(2.326*\sigma - 0.5*\sigma^2)}{\exp(Z_p*\sigma - 0.5\sigma^2)}$$

**EXAMPLE  
DETERMINING REASONABLE POTENTIAL  
TSD PROTOCOL**

The scenario is the same as that described in Attachment 1. Assume a discharger has reported 3 effluent concentrations of cadmium [9 ug/l, 12 ug/l, 15 ug/l]. The discharge flow is 3 MGD, the receiving stream critical flow is 6.4 MGD. The ambient chronic standard for cadmium is 6 ug/l as total metal. Assume 100% mix at the point of discharge and that the upstream concentration of cadmium is nondetectable.

1. Federal regulations require that a permit limit be derived if a discharge causes or has the reasonable potential to cause an exceedance of water quality standards. One first would determine the ambient concentration of cadmium after mixing to assess if there is an exceedance of the water quality standard.

$$C_d = [(Q_a * C_a) + (Q_e * C_e)] / (Q_a + Q_e)$$

Where:

- C<sub>d</sub> = ambient concentration of cadmium after mix (Instream Waste Concentration)
- Q<sub>a</sub> = river flow
- Q<sub>e</sub> = effluent flow
- C<sub>a</sub> = upstream concentration of cadmium
- C<sub>e</sub> = maximum effluent concentration of cadmium

$$C_d = [(6.4 \times 0) + (3 \text{ MGD} * 15 \text{ ug/l})] / (6.4 \text{ MGD} + 3 \text{ MGD})$$

$$C_d = 4.8 \text{ ug/l}$$

The Instream Waste Concentration of 4.8 ug/l is less than the ambient standard of 6.0 ug/l, the discharge as described does not cause a violation of water quality standards. Does the reasonable potential exist to cause such an exceedance? Consistent with the TSD recommendations, assume that the coefficient of variation of cadmium in this effluent is 0.6, and evaluate the potential of the projected 99<sup>th</sup> percentile effluent value to exceed the standard. Attach a level of uncertainty about your estimate of the 99<sup>th</sup> percentile by constructing a 99% confidence level above the estimate.

2. Determine potential to exceed chronic standard.

Select highest effluent concentration reported:

15 ug/l cadmium  
 multiply by 5.6 - ratio of  $C_{99}/C_p$   $n = 3$   
 $15 * 5.6 = 84$  ug/l cadmium potentially discharged

Determine potential cadmium concentration after mix:

$(3 \text{ MGD} * 84 \text{ ug/l}) / (3 \text{ MGD} + 6.4 \text{ MGD}) = 26 \text{ ug/l}$   
 Since 26 ug/l exceeds the chronic standard of 6.0 ug/l, a limit must be placed in the permit.

3. A permit limit based on the chronic standard and the 90% percentile would be computed:

WLA = 18.7 ug/l  
 LTA =  $18.7 * .77 = 14.4$   
 Daily max =  $14.4 * 3.11 = 45$  ug/l  
 Daily avg =  $14.4 * 1.77 = 21$  ug/l

### C. COMPARISON OF TSD APPROACH AND REGIONAL APPROACH

In the Region 6 method described above, the mean value is used to estimate the 90<sup>th</sup> percentile effluent concentration. Considering the example presented, any single effluent value or the mean of multiple values greater than 11 ug/l would trigger an effluent limit, if the 99<sup>th</sup> percentile concentration is considered any single value or mean greater than 6.5ug/l would trigger an effluent limit. The decision to impose a permit limit becomes more likely as higher percentile values of the effluent concentration are evaluated.

Using the TSD protocol, the evaluation of reasonable potential is to some degree dependent on sample size. Using the same scenario, any single value greater than 1.3 ug/l would trigger a limit. If two effluent values were reported, any single value greater than 2.5 ug/l cadmium would trigger a permit limit. A daily maximum permit limit computed in accordance with the TSD would be 45 ug/l cadmium.

#### **Effluent Concentration Which Triggers Limit**

	n=1	n=2	n=3
TSD Protocol (maximum of values reported)	1.4 ug/l	2.5ug/l	3.3 ug/l
Region 6 Approach Assess IWC from 90th percentile value (single value or mean of n values)	11 ug/l	11 ug/l	11 ug/l
Assess IWC from 95th percentile value	9 ug/l	9 ug/l	9 ug/l
Assess IWC from 99th percentile value	6.5 ug/l	6.5 ug/l	6.5 ug/l

The Region 6 staff objects to the TSD reasonable potential protocol because it uses a highly biased statistical estimator of an extreme tail effluent value. In using the TSD method, one is at least 99% sure that the estimated value of the upper percentile is greater than the true population value of this statistic. There also seems to be some confusion in the relationship between the "confidence level" of the estimator and the percentile being estimated. The two numbers are unrelated. Indeed, if one is to proceed in this manner, it should be remembered that the confidence level indicates the confidence that one has in over-estimating the true percentile.

The Region has developed this alternative to the TSD approach because we have concluded that this method yields a less biased statistical estimate of the population upper percentile value. The upper percentile estimate is proportional to the mean; the mean may be estimated by calculating the arithmetic average of a group of values or assuming a single value to be equivalent to the mean. This introduces considerably less bias to the estimate of the upper percentile value than the TSD method of estimating the  $p^{\text{th}}$  percentile from the maximum of values reported. Since the more statistically valid estimate of an upper percentile value is proportional to the population mean, calculating a confidence interval for the population mean will yield a less biased confidence interval for the upper percentile.

**APPENDIX G. GENERAL GUIDANCE: INDUSTRIAL PERMITS FOR STORMWATER RUNOFF ASSOCIATED WITH INDUSTRIAL ACTIVITY**

Industrial storm water may be authorized under either a general permit (if eligible) or under an individual permit. Storm water discharges do not necessarily need to be identified in the permit to the outfall level, but individual applications do require EPA application Form 2F. Industrial storm water (as defined at 40 CFR 122.26)(b)(14)) are subject to all permit requirements of CWA Section 301 and Section 402(p) (i.e., all BPT/BCT/BAT and water quality requirements for NPDES permits). The permitting authority may terminate coverage under a general stormwater permit, and require the facility to submit a Form 2F, and have its stormwater discharges covered under the individual NPDES permit. In the alternative, the Permitting authority may notify the facility that has coverage under a general permit, a storm water pollution prevention plan (SWPPP), and require the facility to amend its SWPPP and/or include specific BMPs to address issues that the current SWPPP does not adequately address.

**Technology-based Requirements**

Starting with the baseline permits of 1992, EPA has considered the storm water pollution prevention plan (SWPPP) to be BAT-level technology for industrial storm water. A SWPPP tailored to a facility would form the basis for storm water controls in individual permits with storm water outfalls. Pre-stormwater program “generic” storm water limits, such as O&G, TSS, TOC, COD, pH, etc. would not be considered sufficient on their own, especially combined with need to also protect water quality, to meet minimum permit requirements.

As of August 2004, Effluent Limitation Guidelines apply to the storm water discharges in the table below:

<b>Storm Water Effluent Guidelines Effluent Guideline</b>	<b>New Source Performance Standards Included?</b>
Runoff from material storage piles at cement manufacturing facilities [40 CFR Part 411 Subpart C (established February 23, 1977)]	Yes
Contaminated runoff from phosphate fertilizer manufacturing facilities [40 CFR Part 418 Subpart A (established April 8, 1974)]	Yes
Coal pile runoff at steam electric generating facilities [40 CFR Part 423 (established November 19, 1982)]	Yes
Discharges resulting from spray down or intentional wetting of logs at wet deck storage areas [40 CFR Part 429, Subpart I (established January 26, 1981)]	Yes
Mine dewatering discharges at crushed stone mines [40 CFR part 436, Subpart B]	No
Mine dewatering discharges at construction sand and gravel mines [40 CFR part 436, Subpart C]	No
Mine dewatering discharges at industrial sand mines [40 CFR part 436, Subpart D]	No
Runoff from asphalt emulsion facilities [40 CFR Part 443 Subpart A (established July 24, 1975)].	Yes
Runoff from landfills, [40 CFR Part 445, Subpart A and B (established February 2, 2000.)]	Yes



### Water Quality-based Requirements

EPA has encouraged use of Best Management Practices emphasizing pollution prevention measures as the preferred approach to ensuring protection of water quality for storm water permits. A SWPPP, with its emphasis on pollution prevention, would also be better suited for protecting receiving waters from episodic events such as spills or poor housekeeping - which might not be caught in the single sample required for the 2F individual permit application. As with any other NPDES permit, storm water permits must be consistent with any applicable TMDL (40 CFR 122.44(d)(vii)). New sources and new discharges would also be subject to the prohibitions at 40 CFR 122.4(i).

EPA has two national policy/guidance documents that relate to water quality-based conditions for industrial storm water permits:

**Interim Permitting Approach for Water Quality-Based Effluent Limitations in Stormwater Permits (9/1/96)** <http://www.epa.gov/npdes/pubs/swpol.pdf>

Memorandum from Robert Wayland, Director of OWOW and James Hanlon, Director of OWM to Regional Water Division Directors: **Establishing Total Maximum Daily Load (TMDL)**

**Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit**

**Requirements Based on Those WLAs (11/22/02)**

<http://www.epa.gov/pdes/pubs/final-wwtmdl.pdf>

APPENDIX H: EPA REGION 6 WET PERMITTING STRATEGY

EPA Region 6 WET Permitting Strategy  
May, 2005

This strategy is designed to implement regulatory requirements established in 1989 and guidance developed since that time. The Clean Water Act and federal regulations at 40 CFR § 122.44(d)(1) establish the basis for whole effluent toxicity (WET), or biomonitoring, requirements for wastewater discharge permits issued under the NPDES permitting program. The applicable federal regulations require that the permitting authority determine, during the permit development period, whether the reasonable potential exists for an effluent to cause or contribute to an excursion above a State's narrative or numeric criterion for the protection of aquatic life. If reasonable potential is found to exist, WET limits must be included in the permit. A chemical-specific limit may be established in lieu of a WET limit where the permitting authority demonstrates, in the fact sheet, that the chemical limit will preclude toxicity at unacceptable levels. All available, valid and relevant information will be used in making permitting decisions. EPA Region 6 WET permitting practices follow the current agency policy on independent applicability.

References to sub-lethal effects in this document apply only to chronic testing. Where the permit establishes 7-Day Chronic test requirements, the reasonable potential analysis will be performed for both lethal and sub-lethal effects. Where the permit establishes 48-Hour Acute test requirements, the reasonable potential analysis will be performed on lethal effects.

Applicability

WET requirements are established for all Region 6 discharges classified as majors (e.g., POTW > 1.0 MGD design flow) with the exception of once-through, non-contact cooling water discharges to which no chemical treatment is added. WET requirements will also be applied on a case-by-case basis to minor discharges with known or suspected toxic potential, or which are designed to discharge > 0.5 MGD with a chlorine residual. As an option in such cases, WET testing may not be required if the permittee agrees to a compliance schedule to install dechlorination to meet a non-detect total residual chlorine limit.

Reasonable Potential

As applicable, reasonable potential to cause or contribute to an exceedance of State narrative criteria for the protection of aquatic life will be determined by the method established in EPA's Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, second printing (see Box 3-2, page 53). This approach is also provided in federal regulations pertaining to wastewater discharges into the Great Lakes, at 40 CFR § 132, Appendix F, Procedure 6. Where a facility does not intend to significantly alter the effluent quality or quantity during the permit term, has a critical dilution of 90% or greater, has performed quarterly

testing and has demonstrated no significant lethal or sub-lethal effects during the previous five-year period, a finding of no reasonable potential may be made.

### WET Limits

A WET limit is a permit control required where the reasonable potential exists for an exceedance of the State water quality criteria for protection of aquatic life and a specific toxicant has not been identified and controlled via a toxicity reduction evaluation (TRE). If, during permit development, reasonable potential is found to exist for lethal and/or sub-lethal effects, WET limits will be included in the permit. A compliance schedule of up to three years duration can be included. The minimum monitoring frequency for species under a WET limit is once per quarter for the life of the permit. WET limits may be removed from a permit after the first five years in effect, based on a demonstration of no lethal or sub-lethal affects during that period.

### Monitoring Frequencies

#### Facilities with WET Limits

Normally, the minimum monitoring frequency for species under a WET limit is once per quarter for the first five years after a WET limit goes into effect.

#### Major Dischargers

For major dischargers, the minimum monitoring frequency for WET is once per quarter for the invertebrate and vertebrate test species, with a potential reduction in testing frequency after completing one year of testing with no lethal or sub-lethal effects (see Region 6 WET Monitoring Frequency Guidance, 06/30/00). Some facilities pose a more significant concern (e.g., POTWs > 20 MGD and petroleum/chemical refineries) and have historically been required to perform WET monitoring on a quarterly basis, for at least one test species, for the life of the permit. The minimum WET monitoring frequency reduction option does not apply to these discharges.

#### Minor Dischargers

Testing frequencies for minor dischargers and dischargers with a critical dilution of <1.0% will be established on a case-by-case basis.

#### All Dischargers

When a test failure occurs, the monitoring frequency will automatically increase to once per month for the next three months. The purpose of this testing is to determine whether toxicity is present at a level and frequency that will provide toxic samples to use in performing a toxicity reduction evaluation (TRE). The additional tests are not performed for the purpose of confirming whether the original test failure was 'real.' If no additional test failures occur during the three-month period, the testing frequency will return to once per quarter for the life of the

permit or until another test failure occurs. If multiple intermittent test failures occur, a TRE may be required, and the testing frequency may be increased for the affected test species.

#### Toxicity Reduction Evaluations / Toxicant Identification Evaluations (TREs/TIEs)

Where reasonable potential is not demonstrated and the permit is issued with WET monitoring requirements only, the permit will contain trigger language to require a TRE. A TRE is a 28-month study to identify sources and controls for toxicants in effluents. A TIE is a set of effluent manipulations that is used to identify specific toxic compounds in a sample known to be toxic. EPA does require TREs but does not typically require TIEs. Generally, permittees are allowed latitude in choosing how they proceed through a TRE and come into compliance. A TRE will usually result in either WET limits (if a specific toxicant is not identified, confirmed and controlled), or chemical limits. In some cases a best management practice (BMP) may be included as a permit control. If additional testing indicates that a chemical-specific limit or a BMP does not result in controlling toxicity, and reasonable potential exists; the permit then will be revised to include WET limits.

#### Lethal Effects

Region 6 will implement TREs and limits for lethal effects as it has historically. A TRE for lethal effects is triggered by failure in a scheduled test followed by failure in one or more tests performed during the following period of increased frequency.

#### Sub-Lethal Effects

Due to the potential difficulty of resolving toxicity related, in some cases, to identifying toxicants responsible for sub-lethal effects, EPA Region 6 will take a graduated approach to TREs and implementation of WET limits where significant sub-lethal effects are demonstrated only in effluent concentrations greater than 75% effluent. Where significant effects are demonstrated at effluent concentrations of 75% or less, aggressive TREs have demonstrated a high degree of success. While TREs may still be required, Region 6 will implement limits for sub-lethal limits at the 80% effluent level at this time. A TRE for sub-lethal effects is triggered by failure in a scheduled test followed by sub-lethal failures in two or more tests performed during the following period of increased frequency.

#### IN ADDITION:

1. Where WET testing has demonstrated a significant toxic effect within two years of the RP determination made during permit development, and the facility has not completed significant relevant improvements, a WET limit will be incorporated into the permit because that data would still be valid and representative, and would indicate that reasonable potential continues to exist.
2. Where there are < 10 test results per species at the time of permitting, and RP is found to exist based solely on the paucity of data, the Agency and permittee may agree to include a permit condition to allow up to twelve months to develop the additional test data necessary to

perform another RP determination, using all the data, to determine whether a WET limit is necessary or not.

3. State agencies authorized to administer the NPDES permitting program will decide whether to change results reporting from NOECs to Toxic Units (TUs). EPA Region 6 recommends the use of TUs to simplify the reasonable potential calculation.
4. EPA will consider an alternative WET reasonable potential determination procedure should an agency authorized to administer the NPDES permitting program formally submit one for review. EPA anticipates no basis to delay permitting decisions pending such reviews/revisions.