OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Continuing Planning Process

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WITH CONTRIBUTION FROM
THE OKLAHOMA WATER RESOURCES BOARD

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CHAPTER 1

INTRODUCTION AND OVERVIEW

The Continuing Planning Process (CPP) is required by the Clean Water Act (CWA) § 303(e)(3)(A)-(H) and 40 CFR § 130.5. The document is required on an annual basis and describes the water quality programs implemented within the State. The document also describes present and planned water quality management programs and the strategy to be used by the State in conducting these programs.

PRIMARY AGENCIES

Corp. Comm.	Oklahoma Corporation Commission
OCC	Oklahoma Conservation Commission
DEQ	Oklahoma Department of Environmental Quality
ODM	Oklahoma Department of Mines
ODWC	Oklahoma Department of Wildlife Conservation
OSDA	Oklahoma State Department of Agriculture
OSE	Office of the Secretary of Environment
OWRB	Oklahoma Water Resources Board

OTHER AGENCIES

ACOG	*Association of Central Oklahoma Governments* One of three regional planning agencies designated by the Governor to provide planning for the State under the CWA. The current director of ACOG is Zach Taylor.
AG	*Attorney General* The Attorney General's Office provides legal counsel and representation for Oklahoma's state agencies.
ODOC	*Oklahoma Department of Commerce* This agency is responsible for conducting population projections used in the Water Quality Management Plan.
EPA	*Environmental Protection Agency* The primary federal agency responsible for administering various environmental programs. It is responsible for restoring and maintaining the physical, chemical, and biological integrity of the nation's environment.

INCOG — *Indian Nations Council of Governments* One of three designated regional planning agencies in Oklahoma. This agency is designated by the Governor to provide planning for the State under the CWA. The current director of INCOG is Jerry Lasker.

OGS — *Oklahoma Geological Survey* A state agency under the direction of the University of Oklahoma that does research on the geological, mineral, and water resources in the State and makes the information discovered available to the public.

USGS — *United States Geological Survey* The USGS is a federal agency that works closely with state agencies to gather water quality, geological, and geohydrological data.

PROGRAMMATIC TERMS

A-95 — A Congressionally mandated review system that establishes a network of state, metropolitan and regional planning and development clearinghouse. The system provides rules and regulations governing the formulation, evaluation and review of Federal programs and projects having a significant impact on area and community development.

104 — *Section 104 of the CWA* This section of the CWA provides federal grants for water quality management activities and other special projects.

106 — *Section 106 of the CWA* This section of the CWA provides annual grants to the states for use in controlling and abating water pollution control problems.

201 — *Section 201 of the CWA* This section of the CWA provided federal grants for construction of waste water treatment facilities. The construction grant process provided for direct federal matching grants of up to 75% (85% in some cases) of the cost of planning, improving, or building sewage treatment plants and their connecting sewers to local governments to help them meet their CWA responsibilities. NOTE: Funding for 201 Program was discontinued in Federal Fiscal Year 1990.

205 — *Section 205 of the CWA* This section, 205(j), of the CWA provides federal grants for water quality management activities.

208 — *Section 208 of the CWA* This section of the CWA provided federal grants for water quality management. In short, the purpose of the 208 program was to provide for sound decision making by state and local officials. The 208 process tied together several water pollution control programs and enabled the development of abatement requirements for municipal, industrial, residual waste, storm runoff, and ground water pollution control. NOTE: Funding for the 208 Program was discontinued in Federal Fiscal Year 82.

257 *Section 257 of the CWA* These rules were promulgated on September 19, 1979 and provided the first national guidance standards for sewage sludge use and disposal. These regulations set forth requirements for sludge treatment and sludge quality for the practices of land application and land filling. The State of Oklahoma rules for sludge management are modeled after the 257 requirements and are in some cases more stringent.

258 *Section 258 of the CWA* These rules were promulgated on October 9, 1991 and provide for non hazardous sludge disposal at landfills. These regulations set forth sludge quality requirements for landfills to accept and dispose of sewage sludge. Sewage sludge that is not land applied and is non-hazardous will be disposed of at landfills in Oklahoma.

301 *Section 301 of the CWA* This section of the CWA requires the achievement of EPA established effluent limitations for industrial and municipal point sources of pollution.

303 *Section 303 of the CWA* This section of the CWA requires states to review and, if necessary, revise their Water Quality Standards, at least once every three years, beginning in 1972.

303(d) *Section 303(d) of the CWA* This section requires states to identify waters that do not or are not expected to meet applicable Water Quality Standards with technology-based controls alone. States are required to establish a priority ranking for the waters, taking into account the pollution severity and designated uses of the waters. Once identification and priority ranking are completed, states are to develop Total Maximum Daily Loads at a level necessary to achieve the applicable state Water Quality Standards.

303(e) *Section 303(e) of the CWA* This section requires each state to prepare a Continuing Planning Process document.

304(l)

Section 304(l) of the CWA This section was enacted as part of the Water Quality Act of 1987 and requires the identification of those waters that fail to meet Water Quality Standards due to toxic pollutants and other sources of toxicity. It also requires the preparation of individual control strategies that will reduce point source discharges of toxic pollutants.

305(b) *Section 305(b) of the CWA* This section of the CWA established a process for preparing and submitting the Water Quality Assessment Report. This process was established as a means for the U.S. Environmental Protection Agency and the U.S. Congress to determine the status of the Nation's waters.

314 *Section 314 of the CWA* This section of the CWA established the Clean Lakes Program for the states. Section 314 provides federal funds for the State to submit a classification of lakes according to eutrophic condition, develop processes and methods to control sources of pollution and to work with other agencies in restoring the quality of these lakes.

319 *Section 319 of the CWA* This section requires the development of a State Assessment Report and a Management Program for Nonpoint Source (NPS) pollution problems. The Assessment Report is to describe the nature, extent, and effects of NPS pollution, the causes and sources of such pollution, and programs and methods used for controlling this pollution. The Management Program explains what the State intends to accomplish in the next four fiscal years to address NPS problems.

401 *Section 401 of the CWA* This section of the CWA requires any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, to provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate.

402 *Section 402 of the CWA* This section of the CWA established the National Pollutant Discharge Elimination System (NPDES).

404 *Section 404 of the CWA* This section of the CWA is intended to control discharges of dredge or fill materials. Section 404 required permits to be issued for discharging dredged or fill materials into navigable water at specific disposal sites. This process is currently administered by the U.S. Army Corps of Engineers in conjunction with the DEQ.

503 *Section 503 of the CWA* These rules were promulgated on February 19, 1993 and provide for disposal and reuse of sewage sludge that does not exceed the ceiling concentration as expressed in table 1 of the rule. The rule also requires that sewage sludge, based upon its proposed use be treated for pathogen and vector attraction reduction. Land application, incineration, and surface disposal practices are the required disposal alternatives. Domestic septage requirements are addressed in the rule in addition to the sludge requirements. Oklahoma rules for both sewage sludge and septage that meet the 503 requirements have been presented for approval.

604 *Section 604(b) of the CWA* Water quality management planning program. This section contains a provision that 40% of the total available funds be designated to regional public comprehensive planning organizations. These comprehensive planning organizations are designated by the Governor to receive funds under the 604(b) program. Currently, INCOG and ACOG are designated as comprehensive planning organizations. The designation of a comprehensive planning organization is at the discretion of the Governor.

$_7Q_2$ *Seven Day, two-year low flow* The design flow for determining allowable discharge load to a stream. The flow is calculated as a moving average of seven consecutive days for each year in a given record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of years of record (n), with a recurrence interval (R) of two years, as m=(n+1)/R, where R=two years. A value of flow corresponding to the m^{th} order is taken as the seven-day, two-year low flow for those historical data.

ACRONYMS AND DEFINITIONS

allotment — State Revolving Funds that are available for obligation. Allotments are made on a formula or other basis which Congress specifies for each fiscal year.

alternative technology — Proven wastewater treatment processes and techniques which provide for the reclaiming and reuse of water, productively recycle wastewater constituents or otherwise eliminate the discharge of pollutants, or recover energy. Specifically, alternative technology includes land application of effluent and sludge; aquifer recharge; aquaculture; direct reuse (non-potable); horticulture; revegetation of disturbed land; containment ponds; sludge composting and drying prior to land application; self-sustaining incineration; methane recovery; individual and on-site systems; and small diameter pressure and vacuum sewers and small diameter gravity sewers carrying partially or fully treated wastewater.

APA — *Administrative Procedures Act*

applicant — Any municipality, as defined for the State Revolving Fund, that submits a preapplication/application for financial assistance in accordance with these rules and regulations.

appropriation — Statutory authority that allows federal agencies to incur obligations and to make payments out of the Treasury for specific purposes.

architectural or engineering services — Consultation, investigations, reports, or services for design-type projects within the scope of the practice of architecture or professional engineering.

assimilative capacity — The greatest amount of loading a waterbody can receive and still maintain the water quality standards designated for that waterbody.

AST — *Advanced Secondary Treatment* Essentially the same as AWT.

authorization — Legislation which authorizes the appropriation of funds to implement program activities. It does not provide any money, only the appropriation act itself permits the withdrawal of funds from the Treasury.

AWT or AT — *Advanced Wastewater Treatment* Treatment of wastewater effluent at a higher level than secondary. This process usually involves the addition or removal of chemical components during treatment.

BAT	*Best Available Technology Economically Achievable.* A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best available technology economically achievable for such category or class. BAT effluent limitations guidelines, in general, represent the best existing performance in the category or subcategory for control of non-conventional and toxic pollutants.
BCT	*Best Conventional Pollutant Control Technology.* A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best conventional pollutant control technology for such category or class. BCT effluent limitations guidelines, in general, represent the best existing performance in the category or subcategory for control of conventional pollutants. BCT is not an additional limitation but replaces BAT for the control of conventional pollutants.
BPT	*Best Pollutant Control Technology Currently Available.* A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best pollutant control technology currently available for such category or class. BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants of various sizes, ages and unit processes within the category or subcategory for the control of familiar pollutants (i.e., conventional pollutants and some metals).
binding commitment	Legal obligations by the State to the local recipient that define the terms and the timing for assistance under the State Revolving Fund.
BMP	*Best Management Practice* A technique that is determined to be the most effective, practical means of preventing or reducing pollutants from Nonpoint sources in order to achieve water quality goals.
BOD_5	*Biochemical Oxygen Demand* The BOD_5 of a water is an amount of oxygen required by microorganisms while stabilizing decomposable organic matter under aerobic conditions. The test is important in the evaluation of purification capacity of a stream or other body of water. The test requires five days of laboratory time and results may vary when toxic substances are present which affect bacteria.
BPWTT	*Best Practical Waste Treatment Technology* A term derived from Section 201 of the CWA in which waste treatment management plans and practices shall provide for the application of the best practical waste treatment technology before any discharge into receiving waters.
building	The erection, acquisition, alteration, remodeling, improvement or extension of treatment works.

CAA — *Clean Air Act* Public Law 95-396, this includes 1970 amendments to the Clean Air Acts of 1963-67 which authorizes the setting of tough, uniform national ambient air quality standards to safeguard public health and welfare and upgrade the quality of American life.

capitalization grant — An agreement between EPA and the states whereby federal dollars are made available to partially fund a State Revolving Fund (SRF).

$CBOD_5$ — *Carbonaceous Biochemical Oxygen Demand* That portion of the BOD that is not due to oxidation of nitrogenous compounds.

CFR — *Code of Federal Regulations* A codification of the general and permanent rules published in the Federal Register by the Executive Departments and agencies of the Federal Government.

COD — *Chemical Oxygen Demand* The COD test is used extensively in the measurement of pollution strength of domestic and industrial wastes. The COD test measures the total amount of oxygen needed to completely oxidize the waste to carbon dioxide and water. The test employs a strong oxidizing agent to oxidize all organic compounds present in the waste. The test is more reliable than the BOD test and can be completed in about three hours.

collector sewer — The common lateral sewers, within a publicly owned treatment system which are primarily installed to receive wastewater directly from facilities which convey wastewater from individual systems, or from private property, and which include service "Y" connections designed for connection with those facilities including:

Crossover sewers connecting more than one property on one side of a major street, road, or highway to a lateral sewer on the other side when more cost effective than parallel sewers; and

Pumping units and pressurized lines serving individual structures or groups of structures when such units are cost effective and are owned and maintained by the recipient.

combined sewer — A sewer that is designed as a sanitary sewer and a storm sewer.

construction — Any one or more of the following: preliminary planning to determine the feasibility of treatment works, engineering, architectural, legal, fiscal, or economic investigations or studies, surveys, designs, plans, working drawings, specifications, procedures, or other necessary actions, erection, building, acquisition, alteration, remodeling, improvement, or extension of treatment works, or the inspection or supervision of any of the foregoing items.

contingency section — The planning portion of the priority list consisting of projects which may receive loans due to bypass provision or due to additional funds becoming available.

CPP	*Continuing Planning Process* A document which describes present and planned water quality management programs and the strategy to be used by the State in conducting these programs.
critical effluent flow	The point source effluent waste flow used in water quality modeling of a pollutant.
cross-cutting laws and orders	Federal laws and authorities that apply to all activities supported with funds "directly made available by" capitalization grants.
cfs	cubic foot per second.
CWA or "the Act"	*Clean Water Act* Public Law 92-500 enacted in 1972 provides for a comprehensive program of water pollution control. Two goals are proclaimed in this Act: 1) to achieve swimmable, fishable waters wherever attainable by July 1, 1983, and 2) by 1985 eliminate the discharge of pollutants into navigable waters.
daily discharge	The discharge of a loading measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.
DO	*Dissolved Oxygen* DO concentrations range from a few parts per million up to about 10 ppm for most Oklahoma streams. A level of DO around 7 ppm is essential to sustain desired species of game fish. If DO drops below 5 ppm the danger of a fish kill is present and malodorous conditions will result. The major factors determining DO levels in water are temperature, atmospheric pressure, plant photosynthesis, rate of aeration and the presence of oxygen demanding substances such as organic wastes. In addition to its effect on aquatic life, DO also prevents the chemical reduction and subsequent movement of iron and manganese from the sediments and thereby reduces the cost of water treatment.
DO target	*Dissolved Oxygen Target* The dissolved oxygen concentration to be met using a particular water quality model so to meet a DO criterion corresponding to the maintenance of a beneficial use.
dynamic (unsteady-state) simulation	Conditions at one or more points in a system being modeled change with time. Dynamic simulations approximate the response of a system to time-variable changes in the loads entering the system.
EIS	*Environmental Impact Statement* A mandatory statement process required for federal agencies. An EIS is required before a federal agency reaches a decision on a proposed major action which may significantly affect the environment. The statement must analyze in detail the likely environmental consequences of action and make the analysis available to the public.

enforceable requirements of the Act	Those conditions or limitations of NPDES permits which, if violated, could result in the issuance of a compliance order or initiation of a civil or criminal action. If a permit has not been issued, the term shall include any requirement which would be included in the permit when issued. Where no permit applies, the term shall include any requirement which is necessary to meet applicable criteria for best practicable wastewater treatment technology (BPWTT).
Equivalency projects	Projects, cited by the Board as being funded up to an amount equivalent to the capitalization grant and which meet the sixteen specific Title II requirements.
excessive infiltration/inflow	The quantities of infiltration/inflow which can be economically eliminated from a sewer system as determined in a cost-effectiveness analysis that compares the costs for correcting the infiltration/inflow conditions to the total costs for transportation and treatment of the infiltration/inflow.
FIFRA	*Federal Insecticide, Fungicide and Rodenticide Act* Public Law 94-140 which provides for broad government pre-market clearance and control of pesticides to ensure that they do not pose unreasonable adverse effects on humans or the environment.
fundable portion	That portion of the Project Priority List which includes projects scheduled for financial assistance during the funding year.
funding year	The first year of the planning period represented by a project priority list.
FY	*Fiscal Year* A twelve month period for which budgetary appropriations are allocated. The fiscal year for the Federal Government begins October 1 and ends on September 30. The State of Oklahoma's fiscal year begins July 1 and ends June 30.
Geometric Mean	The antilog of the mean of a set of log-transformed data. For the purposes of performing a reasonable potential evaluation in those cases where only one data value is available that single effluent data value will be considered the geometric mean.
Harmonic Mean	The reciprocal of the mean of the reciprocals of a set of data.
HQW	*High Quality Waters* Waterbodies that are prohibited from having any point source discharge(s) or alteration of any existing point source discharge(s) which would result in an increase in the concentration or an increase of pollutant loading of any constituent in the receiving water. The water quality exceeds that necessary to support propagation of fishes, shellfishes, wildlife, and recreation as described in Rule 200.3, Anti-Degradation Policy Statement.
HSWA	*Hazardous and Solid Waste Amendments* The 1984 Act (Public Law 98-616) that significantly expanded both the scope and coverage of RCRA.

I/A

Innovative and Alternative Innovative technology deals with wastewater treatment processes and techniques that are being developed which have not been fully proven to reclaim and reuse water. Alternative technology deals with proven wastewater treatment processes and techniques which provide for the reclaiming and reuse of water.

infiltration

Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include and is distinguished from inflow.

inflow

Water other than wastewater that enters a sewer system (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include and is distinguished from infiltration.

initiation of operation

The date specified by the recipient on which use of the project begins for the purposes that it was planned, designed, and built.

innovative technology

Developed wastewater treatment processes and techniques which have not been fully proven under the circumstances of their contemplated use and which represent a significant advancement over the state of the art in terms of significant reduction in life cycle cost or significant environmental benefits through the reclaiming and reuse of water, otherwise eliminating the discharge of pollutants, utilizing recycling techniques such as land treatment, more efficient use of energy and resources, improved or new methods of waste treatment management for combined municipal and industrial systems, or the confined disposal of pollutants so that they will not migrate to cause water or other environmental pollution.

Intended Use Plan

A document prepared each year by the State, which identifies the intended uses of the funds in the SRF and describes how those uses support the goals of the SRF.

interceptor sewer

A sewer which is designed for one or more of the following purposes:

To intercept wastewater from a final point in a collector sewer and convey such wastes directly to a treatment facility or another interceptor.

To replace an existing wastewater treatment facility and transport the wastes to an adjoining collector sewer or interceptor sewer for conveyance to a treatment plant.

To transport wastewater from one or more municipal collector sewers to another municipality or to a regional plant for treatment.

To intercept an existing major discharge of raw or inadequately treated wastewater for transport directly to another interceptor or to a treatment plant.

LA — *Load Allocation* The portion of a receiving water's loading capacity that is attributed either to one of its existing or future Nonpoint sources of pollution or to natural background sources.

LAB CERT — *Laboratory Certification* DEQ program which sets out the rules and regulations for the laboratory certification program. Its objective is to establish uniform methods of water and wastewater analysis.

LC — *Lethal Concentration* The concentration of certain chemicals or substances that can have lethal effects on living things.

LFD — Low Flow Dilution.

load or loading — The amount of matter or thermal energy that is introduced into a receiving water. A load may be caused by man (a pollutant) or by nature (natural background load). For oxygen demanding material, load may be expressed separately for separate components (e.g. CBOD, NBOD), or may be expressed as a total oxygen demand.

loan — An agreement between the State and the local recipient through which the SRF provides funds for eligible assistance and the recipient promises to repay the principal sum to the SRF over a period not to exceed 20 years at an interest rate established at or below market rates (may be interest free).

long-term average flow — An arithmetic average stream flow over a representative period of record.

Low flow dilution — The dilution that the effluent experiences at maximum concentration on the mixing zone boundary at low flow ($_7Q_2$ or 1 cfs).

maintenance — Preservation of functional integrity and efficiency of equipment and structures. This includes preventive or corrective maintenance and replacement of equipment.

Maximum likelihood estimator — For the purposes of performing reasonable potential evaluations the maximum likelihood estimator for a particular upper percentile is calculated assuming the population of values fit a log-normal distribution with a coefficient of variation of 0.6. This can be described as:

where:

$$C_p = C_{mean} * \exp(Z_p * s - 0.5 * s^2) \qquad (1)$$

Z_p = normal distribution factor at $_p$th percentile
ó^2 = ln(CV^2 + 1)
C_{mean} = geometric mean

For the 95th percentile the maximum likelihood estimator is typically calculated as:

$$C_{95} = 2.13 * C_{mean} \qquad (2)$$

If a large data set of effluent concentrations is available, C_{95} may not need to be estimated, the 95th percentile value can be calculated from the data.

mean annual average flow The annual mean flow found in "Statistical Summaries", USGS publication no. 87-4205, or most recent version thereof, or other annual mean flow as approved by the Oklahoma Water Resources Board or the permitting authority.

MBE/WBE participation The federal requirement for negotiation of a "fair share" objective for minority and women owned businesses (MBE/WBE) applies to assistance in an amount equal to the capitalization grant.

MGD *Million Gallons per Day* Measurement of average daily flow from municipal and industrial point sources.

MQL *Minimum Quantification Level* The lowest concentration at which a particular substance can be quantitatively measured with a defined precision level, using approved analytical methods.

mixing zone When a liquid of a different quality than the receiving water is discharged into the receiving water, a mixing zone is formed. Concentration of the liquid within the mixing zone decreases until it is completely mixed with the receiving water. In Oklahoma, the regulatory mixing zone is described as follows:

In streams, the mixing zone extends downstream a distance equivalent to thirteen (13) times the width of the water within the receiving stream at the point of effluent discharge and encompasses 25% of the total stream flow of the ${}_7Q_2$ or 1 cfs, whichever is larger, immediately downstream of the point of effluent discharge. Acute toxicity within the mixing zone is prohibited. The water quality in a portion of the mixing zone may be unsuitable for certain beneficial uses. Where overlapping mixing zones occur because of multiple outfalls, the total length of the mixing zone will extend thirteen (13) stream widths downstream from the downstream discharge point.

Mixing zones in lakes shall be designated on a case-by-case basis. However, for permitting purposes, the mixing zone is defined to extend a radius of 100 feet from the source.

NEPA *National Environmental Policy Act* The cornerstone of the environmental impact statement process. The Act requires each federal agency to issue regulations detailing the policies and procedures it will follow for the impact statement process.

NIPDWR *National Interim Primary Drinking Water Regulations* The EPA established the NIPDWR to provide minimum national drinking water standards for all public water.

non-excessive infiltration The quantity of flow which is less than 120 gallons per capita per day (domestic base flow and infiltration) or the quantity of infiltration which cannot be economically and effectively eliminated from a sewer system as determined in a cost-effectiveness analysis.

non-excessive inflow The rainfall induced peak inflow rate which does not result in chronic operational problems related to hydraulic overloading of the treatment works during storm events. These problems may include surcharging, backups, bypasses, and overflows.

NPDES *National Pollutant Discharge Elimination System* A permit program established by Section 402 of the CWA. This program regulated discharges into the Nation's waters from point sources, including municipal, industrial, commercial and certain agricultural sources.

NPS *Nonpoint source.* The contamination of the environment with a pollutant for which the specific point of origin may not be well defined and includes but is not limited to agricultural storm water runoff and return flows from irrigated agriculture.

NPS Mgmt. *Nonpoint Source Management* Section 319 of the CWA.

NSPS *New Source Performance Standards.* A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the new source performance standards for such category or class (applies to new industrial dischargers which are determined to be new sources). NSPS are based on the performance of the best available demonstrated control technology in the category or subcategory for all pollutants (conventional, non-conventional and toxic pollutants).

OAC *Oklahoma Administrative Code*

OPDES *Oklahoma Pollutant Discharge Elimination System* A permit program established by 27A O.S. 1993 Supp., § 2-6-201 et seq. (see also Section 402 of the CWA). This program regulated discharges into Oklahoma's waters from point sources, including municipal, industrial, commercial and certain agricultural sources.

operable treatment works A treatment works that, upon completion, will meet the enforceable requirements of the Act.

operation	Control of the unit processes and equipment which make up the treatment works. This includes financial and personnel management, records, laboratory control, process control, safety and emergency operation planning.
operation and maintenance	Activities required to assure the dependable and economical function of treatment works.
ORW	*Outstanding Resources Waters* These are waters which constitute outstanding resources or are of exceptional recreational and/or ecological significance as described in Rule 200.4, Anti-Degradation Policy Statement. They are prohibited from having any new point source discharge(s) or increased load from existing point source discharge(s).
O.S.	*Oklahoma Statutes*
PCBs	*Polychlorinated Biphenyls* Compounds that are produced by replacing hydrogen atoms in biphenyl with chlorine. They are poisonous environmental pollutants.
PCS	*Permit and Compliance System* A computerized management information system for tracking permit, compliance, and enforcement status for the NPDES program under the Clean Water Act. PCS is designed to support the individual NPDES administrative needs of the states and EPA Regional offices and provides a uniform means of communication between states, regions, and EPA Headquarters. The PCS database resides on a mainframe computer at EPA's National Computer Center in Research Triangle Park, North Carolina and is accessible through a network of user terminals across the country.
P.L.	*Public Law* Law concerned with regulating relations of individuals with the government and the organization and conduct of the government itself.
planning	The process of evaluating alternative solutions to water pollution problems, and through a systematic screening procedure, selecting the most cost effective environmentally sound alternative.
planning portion	The part of the Project Priority List containing all projects outside the fundable portion of the list that may, under anticipated allotment levels, receive funding during the five-year planning period represented by the list.
POTW	*Publicly Owned Treatment Works* A treatment facility owned and operated by a municipality, governmental organization, or Indian Tribe.
Project	The scope of work for which SRF assistance is provided. The scope of work is for construction and design, or construction of an operable treatment works or segment thereof. The project must be part of an operable treatment works. The principal purpose of both the project and the operable treatment works must be for the treatment of domestic users

	discharges of the jurisdiction, community, sewer service area, region, or the district concerned.
project completion	The date operations of the treatment works are initiated or are capable of being initiated, whichever is earlier.
project performance standards	The performance and operations requirements applicable to a project including the enforceable requirements of the Act and the specifications, including the quantity of excessive infiltration and inflow proposed to be eliminated, which the project is planned and designed to meet.
Project Priority List	A continuous list of projects in order of priority for which SRF assistance is expected during a five-year planning period.
project priority points	The total number of points assigned to a project by using the priority ranking formula.
PS	*Point Source* Any discernible, confined and discrete conveyance or outlet including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure container, rolling stock or vessel or other floating craft from which pollutants are or may be discharged into waters of the state. The term “point source” shall not include agricultural storm water runoff and return flows from irrigated agriculture.
quasi-dynamic (or quasi-steady state) simulation	One or more boundary conditions is constant, but other conditions vary with time. For example, QUAL2E can be used to compute the average response of a stream to specified constant flows and loads, but the user can also specify time varying meteorological conditions to simulate the effect of variable sunlight, air temperature, and wind speed on water quality conditions.
RCRA	*Resource Conservation and Recovery Act of 1976* This Act, also known as Public Law 94-580, amended the Solid Waste Disposal Act of 1965. The Act has two main objectives: 1) to broaden the national waste management program to better protect the public health and the environment, and 2) to conserve natural resources through waste reduction, materials and energy recovery.
reallotment	Allotment of previously allotted unused funds.
recipient	A municipality or other entity which receives assistance under the SRF program.
repayment	Principal and interest payments on loans which must be credited directly to the SRF.
replacement	Expenditures for obtaining and installing equipment, accessories, or appurtenances during the useful life of the treatment works necessary to

maintain the capacity and performance for which such works are designed and constructed.

responsible bidder A prospective contractor that currently meets the minimum standards of financial and technical ability to perform the tasks identified in the project specifications.

revenue program A formally documented determination of charges which is designed to provide revenues for operation and maintenance (including replacement), and local debt service for treatment works.

RRT *Regional Response Team* A regional group composed of federal agencies and states within the region which are called upon in the event of an emergency.

SDWA *Safe Drinking Water Act* Public Law 95-535 was passed in 1974 and amended in 1977. The Act mandates two major program initiatives- one aimed at ensuring the safety of the Nation's public water supplies and other designed to protect underground sources of drinking water from contamination through injection wells.

SEA *State/Environmental Protection Agency Agreement* An agreement negotiated between EPA and the State which defines State and EPA responsibilities and funding levels. The Agreement encourages program coordination, simplified paperwork and improved program accountability.

SIC *Standard Industrial Classification* The statistical classification standard developed by the Federal government for use in the classification of establishments by type of activity in which they are engaged. The Standard Industrial Classification covers the entire field of economic activities: agriculture, forestry, fishing, hunting and trapping; mining; construction; manufacturing; transportation, communications, electric, gas, and sanitary services; wholesale trade; retail trade; finance, insurance and real estate; personal, business, professional, repair, recreation and other services; and public administration. Under the SIC, establishments are assigned four-digit codes (SIC Codes) which identify the primary activity or activities in which they are engaged. SIC Codes can be found in the Standard Industrial Classification Manual 1987, published by the Executive Office of the President, Office of Management and Budget.

SIP *State Implementation Plan* A plan required by Section 110 of the Clean Air Act. The plan provides for the implementation, maintenance and enforcement of primary and secondary standards of air quality which are consistent with national standards.

SRF *State Revolving Fund* Funds for loans or providing other assistance for pollution control projects established through capitalization grants from EPA and State matching funds.

S.S.	*State Strategy* A document prepared and updated by the State. The document is a five year strategy for controlling water pollution problems.
SS	*Suspended Solids* The solid material that originates mostly from disintegrated rocks and is suspended in water. It includes biochemical and chemical precipitates and decomposed organic material.
SSES	*Sewer System Evaluation Survey* A study which shall identify the location, estimated flow rate, method of rehabilitation, and cost of rehabilitation versus the cost of transportation and treatment for each defined source of infiltration/inflow.
state match	Funds equaling at least 20% of the amount of the capitalization grant which the State must deposit into the SRF.
statutory requirements	The sixteen specific Title II requirements which are attached to Section 212 publicly-owned treatment works funded up to an amount equivalent to the capitalization grant.
steady-state simulation	Conditions at all points in a system being modeled are constant with time. Steady-state simulations use averaged loads and flows entering the system over specified periods of time to compute the average response in the system.
STORET	*Storage and Retrieval System* An EPA computerized management information system which allows the user to store and retrieve water quality information.
storm sewer	A sewer designed to carry only storm waters, surface runoff, street wash waters, and drainage.
STP	*Secondary Treatment Plant* A sewage treatment facility which utilizes oxidative activity of organisms to stabilize the organic components of sewage.
SWS	*Sensitive Public and Private Water Supplies* Waterbodies designated with this limitation are prohibited from having any new point source discharge(s) or increased load from existing point source discharge(s). These are waters which constitute sensitive public and private water supplies.
TMDL	*Total Maximum Daily Load* The sum of individual wasteload allocations (WLA) for point sources, safety, reserves; and loads from Nonpoint source and natural backgrounds.
TOC	*Total Organic Carbon* Measure of the organic matter contained in a sample based upon the amount of carbon it contains as measured by the complete oxidation of the matter to carbon dioxide.

transfer of reserves The optional transfer of specific set-asides from a State's Title II allotment into an established SRF.

treatment works Any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances.

In addition "treatment works" means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, including waste in combined storm water and sanitary sewer systems.

TSCA *Toxic Substance Control Act* Public Law 94-469 which authorizes EPA to obtain data from industry on selected chemical substances and mixtures and to regulate the substances when needed.

TSS *Total Suspended Solids* The complete amount of solid matter suspended or dissolved in water or wastewater.

TXC LST *Toxics List* Section 304(l) of the CWA.

UIC *Underground Injection Control* A program under the Safe Drinking Water Act intended to regulate injection activities to prevent contamination of underground sources of drinking water.

USDA *United States Department of Agriculture* A federal agency that ensures that fertilizers necessary for agricultural production are available and makes certain the fertilizers do not harm the environment.

user charge A charge levied on users of a treatment works for the proportionate share of the cost of operation and maintenance (including replacement) of such works.

Value Engineering A specialized cost control technique which uses a systematic and creative approach to identify and to focus on unnecessarily high costs in a project in order to arrive at cost savings without sacrificing the reliability or efficiency of the project.

WLA *Wasteload Allocation* "A wasteload allocation for a river segment is the assignment of target loads to point sources so as to achieve Water Quality Standards in the most efficient manner" (303 guidelines). The wasteload allocation is designed to allocate or allow certain quantities, rates or concentration of pollutants discharged from contributing point sources which empty their effluent into the same river segment. The purpose of the wasteload allocation is to eliminate an undue "wasteload burden" on a given stream segment.

WLE *Wasteload Evaluation* The process of assessment and estimation of pollutant loading to waterbodies from all sources; the prediction of resultant pollutant concentrations, and subsequent determination and allocation of the TMDL among the different pollutant sources in such a manner that water quality standards are maintained.

WQM — *Water Quality Management* A term associated with the various state programs found under the CWA. The various program elements under the CWA form the State and Area wide Quality Management Plans.

WQS — *Water Quality Standards* Standards established to serve as goals for the water quality management plans (Section 208) and as benchmark criteria for the NPDES (Section 402) permit process. State Water Quality Standards at a minimum consist of beneficial use classification for navigable water, water quality criteria to support those uses and a statement of policy which prevents the degradation of waters no matter what the beneficial use.

WQD — *Water Quality Division* The section of the DEQ which regulates the discharge of non-industrial waste from any sewer system and waste from any industrial system into any water of the State and handles permitting of changes made to public water supplies and industrial and municipal permitted discharges.

zone of impact — The portion of a stream between the most upstream pollutant source and a downstream limit located by the point at which water quality has recovered to the background quality at a point immediately upstream of the most upstream pollutant source.

zone of passage — A three-dimensional zone expressed as a volume in the receiving stream through which mobile aquatic organisms may traverse the stream past a discharge without being affected by it. In Oklahoma, the regulatory zone of passage is described as follows:

A zone of passage shall be maintained within the stream at the outfall and adjacent to the mixing zone that shall be no less than seventy-five percent (75%) of the volume of flow. Water quality standards shall be maintained throughout the zone of passage.

Zones of passage in lakes shall be designated on a case-by-case basis.

CHAPTER 2

PART I WATER QUALITY STANDARDS

INTRODUCTION AND PURPOSE

40 CFR (Code of Federal Regulations) § 131.2 states "A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States adopt water quality standards to protect public health or welfare, enhance the quality of the water and serve the purposes of the Clean Water Act.

Serve the purposes of the Act means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water, and agricultural, industrial, and other purposes including navigation.

Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water-quality based treatment controls and strategies beyond the technology-based levels of treatment required by ... the Act."

Water Quality Standards (WQS) are applicable to all water of the State and are designed to enhance the quality of waters, to protect their beneficial uses, and to aid in the prevention, control and abatement of water pollution in the State of Oklahoma. For standards to be enforceable, adoption by the Board pursuant to the State's Administrative Procedures Act (APA) is required. For the standards to be utilized in water pollution control programs, the standards must be implemented into discharge permits.

The 1994 Oklahoma WQS have been approved (7/27/1995) and are currently in effect. The 1996 and 1997 Oklahoma WQS have been approved at the state level, and are pending EPA approval.

Section 303 of the Clean Water Act requires each state to develop and prepare WQS. In addition, at least once every three years, each state is required to review and evaluate existing standards and determine if the current standards are appropriate or modifications are needed. Revised or new WQS shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses. In addition, standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the purpose of this act. Such standards shall be established taking into consideration their use and value for public water supply, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation.

WATER QUALITY STANDARDS AUTHORITY

STATE AUTHORITY

40 CFR § 131.4 states "States are responsible for reviewing, establishing and revising water quality standards. Under section 510 of the Act, States may develop water quality standards more stringent than required by this regulation."

Oklahoma law at Title 319 Section 15 empowers the Oklahoma Water Resources Board (OWRB) to "adopt, modify or repeal and promulgate standards of quality of the waters of the State, and to classify such waters according to their best uses in the interest of the public under such conditions as the OWRB may prescribe for the prevention, control and abatement of pollution. The standard of quality of water of the State adopted by the Board pursuant to the provisions of Section 321 of the act shall be utilized by all appropriate state environmental agencies in implementing their respective duties to abate and prevent pollution to the waters of the state."

Section 321 (C) further states "The standards of quality of the waters of the state, implementation documents and classification of such waters or any modification or change thereof shall be adopted and otherwise comply with the APA and shall be enforced by all state agencies within the scope of their jurisdiction."

FEDERAL AUTHORITY

40 CFR § 131.5 states "Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of: (a) Whether the State has adopted water uses which are consistent with the requirements of the Clean Water Act; (b) Whether the state has adopted criteria that protect the designated water uses; (c) Whether the State has followed its legal procedures for revising or adopting standards; (d) Whether the State standards which do not include the uses specified in Section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses, and (e) Whether the State submission meets the requirements included in [40 CFR] § 131.6 of this part. If EPA determines that State water quality standards are consistent with the factors listed in paragraphs (a) through (e) of this section, EPA approves the standards. EPA must disapprove the State water quality standards and promulgate Federal standards under section 303(c)(4) of the Act, if State adopted standards are not consistent with the factors listed in paragraphs (a) through (e) of this section. EPA may also promulgate a new or revised standard where necessary to meet the requirements or the Act."

WATER QUALITY STANDARDS COMPONENTS

Oklahoma's WQS are composed of three basic elements:

- **Beneficial uses**: a classification of the waters of the State according to their best uses in the interest of the public.
- **Criteria to protect those uses**: numerical or narrative guides on the physical, chemical, or biological aspects which will assure achievement of the designated use.
- **Antidegradation Policy**: a statement of the State's position on the use of waters which are protected at levels considered above that required for beneficial use maintenance.

Additionally, a forth and fifth component involves special requirements set forth within the Standards document. These include:

- **Compliance Schedules**: establish a reasonable time for new criteria to be implemented into permits
- **Variances**: allow for deviations from certain criteria for various reasons

All five of these components will be discussed more thoroughly in subsequent chapters.

BENEFICIAL USES

Oklahoma law in Section 319 (15) mandates that the OWRB is "To adopt, modify or repeal and promulgate standards of quality of the waters of the State and to classify such waters according to their best uses in the interest of the public under such conditions as the Board may prescribe for the prevention, control, and abatement of pollution."

Thus, state statutory language specifies that the OWRB is to designate beneficial uses and the Federal law (as manifest through the Code of Federal Regulations) establishes national guidelines for use designation.

Beneficial uses have been applied to Oklahoma streams and lakes since the initial (1968) WQS were adopted. These uses are revised periodically as more data is obtained. Oklahoma's 1994 WQS specifically list beneficial uses in Appendix A and 785:45-5-3 (a) for Oklahoma waters. Uses defined in the WQS include: Public and Private Water Supply, Emergency Water Supply, Fish and Wildlife Propagation, Agriculture, Hydroelectric Power, M & I Process and Cooling Water, Primary Recreation, Secondary Recreation, Navigation, and Aesthetics. Specific limitations may also apply to selected waters in order to provide them with additional protection.

Beneficial uses are assigned to Oklahoma Waters by three different methods. They are 1) Existing uses, 2) Assumed uses and 3) Designated uses.

EXISTING USES

40 CFR § 131.3 (e) states that "Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Generally, in Oklahoma, existing uses are evaluated through literature surveys of each water body. Ultimately, existing uses become designated uses when they are included in Appendix A of the WQS Document.

ASSUMED USES

Because it is not possible to determine the specific beneficial uses of all waterbodies through field surveys and list them in Appendix A, all waters of the State are assumed to be capable of certain beneficial uses. These uses vary according to their hydrological type such as stream or lake. A thorough evaluation of assumed uses is given in Chapter II.

DESIGNATED USES

The process of designating beneficial uses generally involves a three step process which at any point may include sufficient information to designate uses. These three elements include, a literature review, a "one-day" survey, and an intensive survey. A more in depth discussion of the methods required to designate uses may be found in Chapter II.

LITERATURE REVIEW

The literature review involves the review of historical chemical, physical and biological data. Although information of this type may be available, it is seldom comprehensive enough to allow the designation of a beneficial use. Consequently, most Use Attainability Analysis (UAA's) in Oklahoma, including the unlisted streams surveys, utilize a minimum of "one-day" surveys.

ONE-DAY SURVEYS

One-day UAA's utilize abbreviated field and laboratory analysis to designate uses. Generally, one-day surveys are sufficient to designate beneficial uses. In those rare instances when a one-day survey is inadequate to assign uses, a more intensive study may be required.

INTENSIVE SURVEY USE ATTAINABILITY ANALYSIS

In rare instances, it is not possible to designate uses to a waterbody based upon a one-day survey. In these instances, a more intensive survey is required.

These intensive studies generally involve more exhaustive chemical, physical and biological analysis. Continuous recording of physico-chemical parameters, and the deployment of periphytometers and benthic macroinvertebrate substrates are commonplace. Because of the time and manpower commitment required to perform intensive studies, they are undertaken only when one-day studies do not render uses or when a more detailed analyses is required to re-evaluate a stream which had previously received a UAA.

A more detailed description of intensive UAA methods may be found in a subsequent chapter.

CRITERIA TO PROTECT BENEFICIAL USES

Narrative and numerical criteria found within Oklahoma's WQS are scientifically derived to protect designated beneficial uses including human health, aquatic and terrestrial life, aesthetics, etc. These criteria also incorporate public policy through the public participation process. EPA also publishes guidance documents designed to facilitate the best available science into useful criteria.

In general, EPA guidance is helpful, but theoretical and broad based. Because it is developed from a national perspective, it is often of limited value in Oklahoma. Numerous items unique to Oklahoma water quality management (${}_{7}Q_{2}$, the 1 cfs minimum low flow, beneficial uses, etc.) require that criteria (and methods to implement these criteria into permits) be developed uniquely.

PUBLIC AND PRIVATE WATER SUPPLY

Synopsis of the various criteria to protect the Public and Private Water Supply beneficial use include:

- 24 raw water numerical criteria, most based upon drinking water MCL's
- radioactive materials numerical criteria
- maximum and geometric mean total coliform limits
- oil and grease limits
- general criteria
- 25 water column numerical criteria to protect human health for the consumption of fish flesh and water

The following excerpts of actual WQS language are provided here for reference. Please consult Oklahoma's WQS, 1997 for actual statutory language.

"785:45-5-10. Public and Private Water Supplies

The following criteria apply to surface waters of the State having the designated beneficial use of Public and Private Water Supplies:

(1) Raw Water Numerical Criteria.
For surface water designated as public and private water supplies, the numerical criteria for substances listed below shall not be exceeded.

TABLE 1: RAW WATER NUMERICAL CRITERIA

SUBSTANCES (Total)	NUMERICAL CRITERIA (mg/L)
Inorganic Elements:	
Arsenic	0.1000
Barium	1.0000
Cadmium	0.0200
Chromium	0.0500
Copper	1.0000
Cyanide	0.2000
Fluoride (at 90EF)	4.0000
Lead	0.1000
Mercury	0.0020
Nitrates (as N)	10.0000
Selenium	0.0100
Silver	0.0500
Zinc	5.0000
Organic Elements:	
Benzidine	0.0010
Detergents (total)	0.2000
Methylene blue active substances	0.5000
Phthalate esters (except butylbenzyl)	0.0030
Butylbenzyl	0.1500
2,4-D	0.1000
2,4,5-TP Silvex	0.0100
Endrin	0.0002
Lindane	0.0040
Methoxychlor	0.1000
Toxaphene	0.0050

(2) Radioactive Materials.

(A) There shall be no discharge of radioactive materials in excess of the criteria found in Oklahoma Radiation Protection Regulations, 1969, or its latest revision.

(B) The concentration of gross alpha particles shall not exceed the criteria specified in (i) through (iv) of this subparagraph, or the naturally occurring concentration, whichever is higher.

(i) The combined dissolved concentration of Radium-226 and Radium-228, and Strontium-90, shall not exceed 5 picocuries/liter, and 8 picocuries/liter, respectively.

(ii) Gross alpha particle concentrations, including Radium-226 but excluding radon and uranium, shall not exceed 15 picocuries/liter.

(iii) The gross beta concentration shall not exceed 50 picocuries/liter.

(iv) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in waters having the designated use of Public and Private Water supply shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year.

(3) Coliform Bacteria.

(A) The bacteria of the total coliform group shall not exceed a monthly geometric mean of 5,000/100 ml at a point of intake for public or private water supply.

(B) The geometric mean will be determined by multiple tube fermentation or membrane filter procedures based on a minimum of not less than five (5) samples taken over a period of not more than thirty (30) days.

(C) Further, in no more than 5% of the total samples during any thirty (30) day period shall the bacteria of the total coliform group exceed 20,000/100 ml.

(D) In cases where both public and private water supply and primary body contact recreation uses are designated, the primary body contact criteria will apply.

(4) Oil and Grease (Petroleum and Non-Petroleum Related).

For Public and Private Water Supplies, surface waters of the State shall be maintained free from oil and grease and taste and odors.

(5) General Criteria.

(A) The quality of the surface waters of the State which are designated as public and private water supplies shall be protected, maintained, and improved when feasible, so that the waters can be used as sources of public and private raw water supplies.

(B) These waters shall be maintained so that they will not be toxic, carcinogenic, mutagenic, or teratogenic to humans.

(6) Water Column criteria to protect for the consumption of fish flesh and water.

(A) Surface waters of the State with the designated beneficial use of Public and Private Water Supply shall be protected to allow for the consumption of fish, shellfish and water.

(B) The following water column numerical criteria to protect human health for the consumption of fish flesh and water shall apply to all surface waters designated with the beneficial use of Public and Private Water Supply. Water column criteria to protect human health for the consumption of fish flesh only may be found in 785:45-5-12(9).

TABLE 2: WATER COLUMN NUMERICAL CRITERIA TO PROTECT HUMAN HEALTH FOR THE CONSUMPTION OF FISH FLESH AND WATER

SUBSTANCES (Total Recoverable)	[NUMERICAL] CRITERIA (µg/L)
Acrylonitrile	0.59000000
Aldrin	0.00127300
Benzene	11.87000000
Chlordane	0.00575000
Dichlorobromomethane	1.90000000
Dieldrin	0.00135200
DDT	0.00587600
Gamma BHC (Lindane)	0.14580000
Heptachlor	0.00208000
Hexachlorobenzene	0.00902600
Carbon Tetrachloride	2.53800000
Chloroform	56.69000000
PCB	0.00079000
2,3,7,8-TCDD (Dioxin)	0.00000013
1-1-1 TCE	3094.00000000
Cadmium	14.49000000
Chromium (Total)	166.30000000
Endrin	0.75530000
Ethylbenzene	3120.00000000
Lead	5.00000000
Mercury	0.05000000
Nickel	607.20000000
Pentachlorophenol	1014.00000000
Phenol	20900.00000000
Silver	104.80000000
Tetrachloroethylene (PCE)	8.00000000
Thallium	1.70000000
Toluene	10150.00000000

EMERGENCY PUBLIC AND PRIVATE WATER SUPPLIES

(a) During emergencies, those waters designated Emergency Public and Private Water Supplies may be put to use.

(b) Each emergency will be handled on a case-by-case basis, and be thoroughly evaluated by the appropriate state agencies and/or local health authorities.

FISH AND WILDLIFE PROPAGATION

Four sub-categories of the Fish and Wildlife Propagation beneficial use have been designated: Warm Water Aquatic Community, Habitat Limited Aquatic Community, Cool Water Aquatic Community, and Trout Fishery. Certain criteria apply to all waters designated with any sub-category of Fish and Wildlife Propagation, while others are sub-category specific.

Synopsis criteria to protect the Fish and Wildlife Propagation beneficial use include:

- dissolved oxygen for each sub-category with an associated 1.0 mg/l diurnal excursion.
- temperature
- pH
- oil and grease
- biological criteria (an in-situ measure of biological community health)
- 32 numerical criteria for toxic substances
- 9 criteria which are alert and concern levels in fish tissue
- 25 water column numerical criteria to protect human health for the consumption of fish flesh
- turbidity"

The following excerpts of actual WQS language are provided here for reference. Please consult Oklahoma's WQS, 1997 for actual statutory language.

"785:45-5-12. Fish and wildlife propagation

(a) List of subcategories.
The narrative and numerical criteria in this section are designated to promote fish and wildlife propagation for the fishery classifications of Habitat Limited Aquatic Community, Warm Water Aquatic Community, Cool Water Aquatic Community (Excluding Lake Waters), and Trout Fishery (Put and Take).

(b) Habitat Limited Aquatic Community subcategory.

(1) Habitat limited aquatic community means a subcategory of the beneficial use "Fish and Wildlife Propagation" where the water chemistry and habitat are not adequate to support a "Warm Water Aquatic Community" because:

(A) Naturally occurring water chemistry prevents the attainment of the use; or

(B) Naturally occurring ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of a sufficient volume of effluent to enable uses to be met; or

(C) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(D) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(E) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of the "Warm Water Aquatic Community" beneficial use.

(2) Habitat Limited Aquatic Community may also be designated where controls more stringent than those required by sections 301(b) and 306 of the federal Clean Water Act as amended, which would be necessary to meet standards or criteria associated with the beneficial use subcategories or Cool Water Aquatic Community or Warm Water Aquatic Community, would result in substantial and widespread economic and social impact.

(c) Cool Water Aquatic Community subcategory.

Cool Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality, water temperature and habitat are adequate to support warm water intolerant climax fish communities and includes an environment suitable for the full range of cool water benthos. Typical species may include smallmouth bass, certain darters and stoneflies.

(d) Warm Water Aquatic Community subcategory.

Warm Water Aquatic Community means a subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality and habitat are adequate to support climax fish communities.

(e) Criteria used in protection of fish and wildlife propagation.

The narrative and numerical criteria shall include:

(1) Dissolved oxygen.

(A) Dissolved oxygen (DO) criteria are designed to protect the diverse aquatic communities of Oklahoma.

(B) Allowable loadings are designed to attain these disolved oxygen criteria are provided as follows:

(i) For streams with sufficient historical data, the allowable load shall be based on meeting the dissolved oxygen concentration standard at the seven-day, two-year low flow and the appropriate seasonal temperatures.

(ii) For streams lacking sufficient historical data, or when the appropriate flow is less than one (1) cubic foot per second (cfs), the allowable load shall be based on meeting the dissolved oxygen concentration standard at one (1) cfs and the appropriate seasonal temperature.

(iii) Provided for streams designated in OAC 785:45 Appendix A as HLAC or WWAC which have sufficient historical data as determined by the permitting authority, the allowable BOD load may be based upon meeting the dissolved oxygen concentration standard at the applicable seasonal temperature and corresponding seasonal seven-day, two-year low flow.

(C) Except for naturally occurring conditions, the dissolved oxygen criteria are set forth in the following table.

TABLE 3: DISSOLVED OXYGEN CRITERIA [1]

FISHERY CLASS	DATES APPLICABLE	DO (MINIMUM) (mg/L)	SEASONAL TEMP. (EC)
Habitat Limited Aquatic Community			
Early Life Stages	04/01 - 06/15	4.0	25[3]
Other Life Stages			
Summer Condition.	06/16 - 10/15	3.0	32
Winter Condition.	10/16 - 03/31	3.0	18
Warm Water Aquatic Community			
Early Life Stages	04/01 - 06/15	6.0[2]	25[3]
Other Life Stages			
Summer Condition.	06/16 - 10/15	5.0[2]	32
Winter Condition.	10/16 - 03/31	5.0	18
Cool Water Aquatic Community/Trout			
Early Life Stages	03/01 - 05/31	7.0[2]	22
Other Life Stages			
Summer Condition.	06/01 - 10/15	6.0[2]	29
Winter Condition.	10/16 - 02/28	6.0	18

1 For use in calculation of the allowable load.

2 Because of natural diurnal dissolved oxygen fluctuation, a 1.0 mg/l dissolved oxygen concentration deficit shall be allowed for not more than eight (8) hours during any twenty-four (24) hour period.

3 Discharge limits necessary to meet summer conditions will apply from June 1 of each year. However, where discharge limits based on Early Life Stage (spring) conditions are more restrictive, those limits may be extended to July 1.

(2) Temperature.

(A) At no time shall heat be added to any surface water in excess of the amount that will raise the temperature of the receiving water more than 2.8EC outside the mixing zone.

(B) The normal daily and seasonal variations that were present before the addition of heat from other than natural sources shall be maintained.

(C) In streams, temperature determinations shall be made by averaging representative temperature measurements of the cross sectional area of the stream at the end of the mixing zone.

(D) In lakes, the temperature of the water column and/or epilimnion, if thermal stratification exists, shall not be raised more than 1.7EC above that which existed before the addition of heat of artificial origin, based upon the average of temperatures taken from the surface to the bottom of the lake, or surface to the bottom of the epilimnion if the lake is stratified.

(E) No heat of artificial origin shall be added that causes the receiving stream water temperature to exceed the maximums specified below:

(i) The critical temperature plus 2.8EC in warm water and habitat limited aquatic community streams and lakes except in the segment of the Arkansas River from Red Rock Creek to the headwaters of Keystone Reservoir where the maximum temperature shall not exceed 34.4EC.

(ii) 28.9EC in streams designated cool water aquatic community.

(iii) 20EC in streams designated trout fishery (put and take).

(F) Water in privately-owned reservoirs used in the process of cooling water for industrial purposes is exempt from these temperature restrictions, provided the water released from any such lake or reservoir into a stream system shall meet the water quality standards of the receiving stream.

(3) pH (hydrogen ion activity).

The pH values shall be between 6.5 and 9.0 in waters designed for fish and wildlife propagation; unless pH values outside that range are due to natural conditions.

(4) Oil and grease (petroleum and non-petroleum related).

(A) All waters having the designated beneficial use of any subcategory of fish and wildlife propagation shall be maintained free of oil and grease to prevent a visible sheen of oil or globules of oil or grease on or in the water.

(B) Oil and grease shall not be present in quantities that adhere to stream banks and coat bottoms of water courses or which cause deleterious effects to the biota.

(5) Biological Criteria.

(A) Aquatic life in all waterbodies designated Fish and Wildlife Propagation (excluding waters designated "Trout, put-and-take") shall not exhibit degraded conditions as indicated by one or both of the following:

(i) comparative regional reference data from a station of reasonably similar watershed size or flow, habitat type and Fish and Wildlife beneficial use subcategory designation or

(ii) by comparison with historical data from the waterbody being evaluated.

(B) Compliance with this criterion shall be based upon, but not limited to such measures as diversity, similarity, community structure, species tolerance, trophic structure, dominant species, indices of biotic integrity (IBI's), indices of well being (IWB's), or other measures.

(6) Toxic substances (for protection of fish and wildlife).

(A) Surface waters of the State shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside the mixing zone. Acute test failure and chronic test failure shall be used to determine discharger compliance with these narrative aquatic life toxics criteria. The narrative criterion specified in this subparagraph (A) which prohibits acute toxicity shall be maintained at all times and shall apply to all surface waters of the state. The narrative criterion specified in this subparagraph (A) which prohibits chronic toxicity shall apply at all times outside the mixing zone of passage to all waters of the state except:

(i) When a discharge into surface waters designated with the Fish and Wildlife Propagation beneficial use complies with and meets the discharge permit limitations but the flow immediately upstream from the discharge is less than (1) cubic foot per second or the seven-day, two-year low flow; and

(ii) To streams listed as ephemeral in Appendix.

(B) Procedures to implement these narrative criteria are found in this document.

(C) Toxicants for which there are specific numerical criteria are listed after (G) of this paragraph.

(D) For toxicants not specified in the table following (G) of this paragraph, concentrations of toxic substances with bio-concentration factors of 5 or less shall not exceed 0.1 of published LC_{50} value(s) for sensitive representative species using standard testing methods, giving consideration to site specific water quality characteristics.

(E) Concentrations of toxic substances with bio-concentration factors greater than 5 shall not exceed 0.01 of published LC_{50} value(s) for sensitive representative species using standard testing methods, giving consideration to site specific water quality characteristics.

(F) Permit limits to prevent toxicity caused by discharge of chlorine and ammonia are determined pursuant to the narrative criteria contained within (A) and (B) of this paragraph.

(G) The acute and chronic numerical criteria listed in the following table apply to all waters of the State designated with any of the beneficial use sub-categories of Fish and Wildlife Propagation. The numerical criteria specified in this subparagraph (G) which prohibit acute and chronic toxicity shall apply at all times outside the mixing zone and within the zone of passage to all waters of the state except:

(i) When a discharge into surface waters designated with the Fish and Wildlife Propagation beneficial use complies with and meets the discharge permit limitations but the flow immediately upstream from the discharge is less than one (1) cubic foot per second or when the flow falls below the seven-day, two-year low-flow, whichever is larger. For purposes of the permitting process, the dilution factor shall be the larger of one (1) cubic foot per second or the seven-day, two-year low flow; and

(ii) To streams listed as ephemeral in Appendix A.

Equations are presented for those substances whose toxicity varies with water chemistry. Metals listed in the following table are measured as total metals in the water column.

TABLE 4: NUMERICAL CRITERIA FOR TOXIC SUBSTANCES (MICROGRAMS/L)

SUBSTANCE	ACUTE	CHRONIC
Acrylonitrile	7550.0000	
Aldrin	3.0000	--
Arsenic	360.0000	190.0000
Benzene	--	2,200.0000
Cadmium [1]	e (1.1280 [ln(hardness)]-1.6774)	e (0.7852 [ln(hardness)]-3.4900)
Chlordane	2.4000	0.1700
Chlorpyrifos (Dursban)	0.0830	0.0410
Chromium (Total)	--	50.0000
Copper	e (0.9422 [ln(hardness)]-1.3844)	e (0.8545 [ln(hardness)]-1.3860)
Cyanide	45.9300	10.7200
DDT	1.1000	0.0010
Demeton	--	0.1000
Dieldrin	2.5000	0.0019
Endosulfan	0.2200	0.0560
Endrin	0.1800	0.0023
Guthion	--	0.0100
Heptachlor	0.5200	0.0038
Hexachlorocyclohexane (Lindane)	2.0000	0.0800
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2591.5000	--
Lead	e (1.2730 [ln(hardness)]-1.4600)	e (1.2730 [ln(hardness)]-4.7050)
Malathion	--	0.1000
Mercury	2.4000	1.3020
Methoxychlor	--	0.0300
Mirex	--	0.0010
Nickel	e (0.8460 [ln(hardness)]+3.3612)	e (0.8460 [ln(hardness)]+1.1645)
PCB's (Total)	--	0.0440
Parathion	0.0650	0.0130
Pentachlorophenol	e [1.0050 (pH)-4.8300]	e [1.0050 (pH)-5.2900]
Selenium	20.0000	5.0000
Silver	e (1.7200 [ln(hardness)]-6.5200)	--
2,4,5-TP Silvex	--	10.0000
Tetrachloroethylene (PCE)	5280.0000	--
Thallium	1400.0000	--
Toluene	--	875.0000
Toxaphene	0.7800	0.0002
2,4,6-Trinitrotoluene	450.0000	--
Zinc	e (0.8473 [ln(hardness)]+0.8604)	e (0.8473 [ln(hardness)]+0.7614)
1 Cadmium limits for Trout Streams:	e (1.1280 [ln(hardness)]-3.8280)	e (0.7852 [ln(hardness)]-3.490)

(H) For purposes of determining permit conditions, criteria for dissolved metals may be ascertained and implemented as an alternative to the total recoverable metals criteria set forth in 785:45-5-12(e)(6)(G). Such dissolved metals criteria apply to all waters of the state designated with any of the beneficial use sub-categories of Fish and Wildlife Propagation. Such dissolved metals criteria may be determined by multiplying the total recoverable numerical criteria in OAC 785:45-5-12(e)(6)(G) by the conversion factors listed as follows:

TABLE 5: CONVERSION FACTORS FOR TOTAL TO DISSOLVED FRACTIONS

METAL	ACUTE	CHRONIC
Arsenic	1.000	1.000
Cadmium	1.136672-0.041838 InH	1.101672-0.041838 InH
Chromium	0.982	0.962
Copper	0.960	0.960
Lead	1.46203-0.145712 InH	1.46203-0.145712 InH
Mercury	0.85	N/A
Nickel	0.998	0.997
Silver	0.85	N/A
Zinc	0.978	0.986

(7) Fish Tissue Levels.

(A) Surface waters of the State shall be maintained to prevent bio-concentration of toxic substances in fish, shellfish, or other aquatic organisms.

(B) Concentrations of substances in fish tissue (fillets) in excess of the listed concern levels in the following table shall be cause for further investigation by the appropriate regulatory agency.

(C) Concentrations of substances in fish tissue (fillets) in excess of the listed alert levels in the following table shall be cause for evaluation of discharge permits to determine if point source discharges are causing or contributing to the alert level exceedance.

(D) Waste discharge permit limits shall be modified or established as necessary to restrict the discharge of the exceeded substance where an evaluation determines that point source discharge(s) are causing or contributing to the alert level exceedance.

(E) Non-point sources of these substances should be restricted by application of best management practices in areas where concern or alert levels are exceeded.

TABLE 6: ALERT AND CONCERN LEVELS IN FISH TISSUE

SUBSTANCE	**ALERT LEVEL (mg/kg)**	**CONCERN LEVEL (mg/kg)**
Aldrin	0.3	0.15
Chlordane	0.3	0.15
DDT	5	2.5
Dieldrin	0.3	0.15
Endrin	0.3	0.15
Heptachlor	0.3	0.15
Mercury	1	0.5
PCB’s	2	1
Toxaphene	5	2.5

(8) Water Column criteria to protect for the consumption of fish flesh.

(A) Surface waters of the State with the designated beneficial use of Warm Water Aquatic Community, Cool Water Aquatic Community or Trout Fishery shall be protected to allow for the consumption of fish and shellfish.

(B) The following water column numerical criteria to protect human health for the consumption of fish, shellfish and aquatic life shall apply to all surface waters designated with the beneficial use of Warm Water Aquatic Community, Cool Water Aquatic Community or Trout Fishery.

TABLE 7: WATER COLUMN NUMERICAL CRITERIA TO PROTECT HUMAN HEALTH FOR THE CONSUMPTION OF FISH FLESH

SUBSTANCES (Total Recoverable)	[NUMERICAL] CRITERIA (µg/L)
Acrylonitrile	6.700000000
Aldrin	0.001356000
Arsenic	205.000000000
Benzene	714.100000000
Chlordane	0.005870000
Dichlorobromomethane	157.000000000
Dieldrin	0.001440000
DDT	0.005900000
Gamma BHC (Lindane)	0.490800000
Heptachlor	0.002140000
Hexachlorobenzene	0.009346000
Carbon Tetrachloride	44.180000000
Chloroform	4708.000000000
PCB	0.000790000
2,3,7,8-TCDD (Dioxin)	0.000000138
1-1-1 TCE	173100.000000000
Cadmium	84.130000000
Chromium (Total)	3365.000000000
Endrin	0.814000000
Ethylbenzene	28720.000000000
Lead	25.000000000
Mercury	0.051000000
Nickel	4583.000000000
Pentachlorophenol	29370.000000000
Phenol	4615000.000000000
Silver	64620.000000000
Tetrachloroethylene (PCE)	88.500000000
Thallium	6.000000000
Toluene	301900.000000000

(9) Turbidity.

(A) Turbidity from other than natural sources shall be restricted to not exceed the following numerical limits:

(i) Cool Water Aquatic Community/Trout Fisheries 10 Nephelometric Turbidity Units

(ii) Lakes 25 Nephelometric Turbidity Units
(iii) Other surface waters 50 Nephelometric Turbidity Units

(B) In waters where background turbidity exceeds these values, turbidity from point sources shall be restricted to not exceed ambient levels.

(C) Numerical criteria listed above apply only to normal stream flow conditions.

(D) Elevated turbidity levels may be expected during, and for several days after, a runoff event.

(E) Nephelometric turbidity unit (NTU) is the method based upon a comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension (formazin). The higher the intensity of scattered light, the higher the turbidity. Readings in NTUs are considered comparable to the previously reported Jackson Turbidity Units (JTU)."

AGRICULTURE: LIVESTOCK AND IRRIGATION

Synopsis criteria to protect the Agriculture beneficial use include:

- Water quality management segment number yearly mean standard and sample standard chloride, sulfate and TDS values.

The following excerpts of actual WQS language are provided here for reference. Please consult Oklahoma's WQS, 1994 for actual statutory language.

"785:45-5-13. Agriculture: livestock and irrigation

(a) The surface waters of the State shall be maintained so that toxicity does not inhibit continued ingestion by livestock or irrigation of crops.

(b) Highly saline water should be used with best management practices as outlined in "Diagnosis and Reclamation of Saline Soils," United States Department of Agriculture Handbook No. 60 (1958).

(c) Guidelines for suitability of water quality for livestock and irrigation purposes are provided in Appendix C of the Oklahoma WQS.

(d) For chlorides, sulfates and total dissolved solids at 180EC (see Standard Methods), the arithmetic mean of the concentration of the samples taken for a year in a particular segment shall not exceed the historical "yearly mean standard" determined from the table following subsection (g) of this Section and 785:45-1-2 calculated for that segment. For permitting purposes, the long term average concentration shall not exceed the yearly mean standard. Yearly mean standards shall be implemented by the permitting authority using long term average flows and complete mixing of effluent and receiving water. Furthermore, not more than one (1) in twenty (20) samples randomly collected at a site shall exceed the historical value of the "sample standard" calculated for that segment. For permitting purposes, the short term average concentrations shall not exceed the sample standard. Sample standards shall be implemented by the permitting authority using short term average flows and complete mixing of effluent and receiving water.

(e) Increased mineralization from other elements such as calcium, magnesium, sodium and their associated anions shall be maintained at or below a level that will not restrict any beneficial use.

(f) The data from sampling stations in each segment are averaged, and the mean chloride, sulfate, and total dissolved solids at 180EC are presented in the table following (g) of this Section. Segment averages shall be used unless more appropriate data are available.

(g) The table below contains statistical values from historical water quality data of mineral constituents. In cases where mineral content varies within a segment, the most pertinent data available should be used."

(h) For permitting purposes, long term average mineral constituent concentrations to protect the Agricultural beneficial use shall not be required to be less than 700 mg/L for TDS, and 250 mg/L for chlorides and sulfates. These criteria shall be applied in the mixing zone.

TABLE 8: STATISTICAL VALUES OF THE HISTORICAL DATA FOR MINERAL CONSTITUENTS OF WATER QUALITY (BEGINNING OCTOBER 1976 ENDING SEPTEMBER 1983).

Segment	Monitoring Station	Chloride (mg/l)		Sulfate (mg/l)		Total Dissolved Solids at 180Ec (mg/l)	
		Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard
120400	1945	563	794	126	165		
	1946	313	412	91	116		
	AVG	472	656	113	147		
120410	16557	649	843	145	179	998	1168
120420	1644	774	1014	150	180		
	1645	695	881	150	183		
	1650	703	934	173	220		
	AVG	708	905	152	186	1398*	1743*
121300	1765	96	135	31	41		
	17805	88	113	64	84		
	1784	87	112	62	79		
	AVG	91	121	52	67	440*	544*
121400	1730	43	59	28	36		
	1742	128	178	263	477		
	1755	127	170	37	47		
	AVG	96	132	116	199	461*	585*
121500	1714	41	54	59	79		
	1760	74	101	71	95		
	17862	62	80	64	81	335	403
	1788	57	73	67	89		
	1790	70	94	58	75		
	AVG	60	80	64	84	335	403
121510	1710	66	94	58	133		
121600	1850	28	38	116	167		
	1880	18	23	63	82		
	1905	13	17	42	54		
	19122	17	21	30	50		
	1915	33	49	53	72		
	19155	60	103	134	222		
	1935	17	20	43	51	187	206
	AVG	25	36	67	96	187	206
121610	19156	103	152	117	159		

Segment	Monitoring Station	Chloride (mg/l)		Sulfate (mg/l)		Total Dissolved Solids at 180Ec (mg/l)	
		Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard
121700	1955 1960 1965 1970 1980 AVG	15 17 19 12 46 21	18 23 27 16 70 30	25 25 24 24 48 29	33 34 34 33 77 41	156 156	194 194
220100	24735 2485 24944 AVG	12 12 60 20	16 15 100 31	21 22 58 28	28 29 84 36	157 157	199 199
220200	2464	247	330	74	92	490*	596*
220300	2450	83	96	52	60	320	358
220600	2315 2316 2317 AVG	354 70 292 241	475 120 385 330	268 76 234 194	361 117 318 268	612*	777*
310800	3310	112	142	574	765	1192	1527
310810	3281 3285 AVG	114 145 133	149 199 180	772 717 738	981 923 946		
310820							
310830	3244 3255 3265 AVG	119 142 237 160	177 182 370 249	1227 1197 973 1124	1467 1494 1241 1398	2004 1244 2043	2391 2725 2599
310840	3242	163	251	1228	1532	2377	3038
311100	3155 3157 3159 3160 AVG	1904 467 460 1670 1059	2591 256 687 2353 1508	869 151 180 727 455	1163 242 266 1005 634	4064 4064	5347 5347
311200	31272 3135 3136 AVG	2163 144 320 229	2927 198 436 313	1744 222 272 246	2706 310 389 348		
311210	3134	66	90	317	436		

Segment	Monitoring Station	Chloride (mg/l)		Sulfate (mg/l)		Total Dissolved Solids at 180Ec (mg/l)	
		Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard
311300	3090	62	94	133	171		
	3110	81	105	80	99	478	570
		73	101	109	138	478	570
311310	3112	16	23	22	27	126	151
	311505	355	547	140	216		
	AVG	292	450	116	179	126	151
311500	3045	347	543	879	1187	1801	2323
311510	3015	2263	3778	1417	1879		
	3030	6750	10488	1427	1841		
	AVG	4541	1859	1422	1860	2334*	2815*
311600	3005	740	1123	1745	2128		
	30111	743	966	1597	2068	3730	4762
	AVG	704	1011	1680	2102	3730	4762
311800	3035	10940	15147	1892	2271	37568*	58087*
410100	33682	320	442	227	310		
410200	3385	33	49	22	28		
410210	3371	11	16	19	26		
	3379	13	19	51	84		
	3390	31	53	134	243		
	AVG	18	29	66	113		
410300	3362	17	25	23	30		
	33675	17	24	24	33		
	AVG	17	24	23	32		
410310	3357	11	14	<20	<20	31	38
410400	3340	38	53	52	75		
	3350	104	145	56	82		
	AVG	53	74	54	77	114*	172*
410600	3325	41	67	33	47		
410700							
520500	2420	351	452	169	218	1032	1285
	2422	324	412	140	185		
	AVG	346	423	163	211	1032	1285
520510	2417	307	395	146	188		

Segment	Monitoring Station	Chloride (mg/l)		Sulfate (mg/l)		Total Dissolved Solids at 180Ec (mg/l)	
		Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard
520520	2399	220	261	259	316		
	24155	739	873	198	246	1207	1537
	AVG	504	595	280	278	1207	1537
520530	2390	281	324	446	606		
	2395	269	341	443	588		
	AVG	270	324	415	519	1145*	1399*
520600	2294	261	345	318	428		
520610	2292	261	362	449	590		
520620	2285	310	456	557	695	1463	1841
520700	2424	218	282	137	187		
	2425	220	286	101	134		
	2435	226	296	95	128	723	927
	AVG	222	288	111	149	723	927
520710	24235	252	327	156	201	844	1090
520800	2300	100	127	34	43		
	2310	719	1048	58	87		
	AVG	532	752	55	81	1551*	2083*
520810						265*	294*
620900	1610	4084	5695	549	707	7953	10362
	1615	3708	5103	441	564		
	AVG	3894	5395	494	635	7553*	10012*
620910	1584			1901	2400		
	1591	6638	8976	723	908	14809	19580
	15972	176	221	255	306	885	1041
	15975	205	266	246	300	875	1087
	1600	5053	6779	666	847		
	1605	683	1008	543	730		
	AVG	4568	6439	730	927	9042	12466
620920	15795	7054	10309	1840	2983	16864	25021
	15796	477	678	2004	2560	3753	4756
	AVG	3518	5131	1929	2753	10200	14788
621000	1505	4786	6974	648	829	10834	15265
	15226	1176	1583	298	376		
	AVG	3065	4405	481	613	10834	15265
621010	14845	397	574	951	1179	1886	2297
621100	1520	379	573	167	236		

Segment	Monitoring Station	Chloride (mg/l)		Sulfate (mg/l)		Total Dissolved Solids at 180Ec (mg/l)	
		Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard	Yearly Mean Standard	Sample Standard
621200	14814 1525 1530 AVG	428 714 574 567	643 1030 860 837	122 171 39 114	169 228 51 153	1112 1112	1409 1409
621210		482*	728*	132*	182*		
720500	2340 2375 2380 AVG	1449 438 291 868	1885 544 362 1118	891 590 614 736	1195 773 829 984	3817 1893 2575	4910 2382 3275
720510	2325	96*	161*	79*	106*	541*	690*
720900							

HYDROELECTRIC POWER GENERATION

This beneficial use is not generally dependent upon water quality.

INDUSTRIAL AND MUNICIPAL PROCESS AND COOLING WATER

(a) Quality criteria for water used for process or cooling purposes varies with the type of industrial or municipal processes involved.
(b) This use will be protected by application of the criteria for other beneficial uses.

PRIMARY BODY CONTACT RECREATION

Section 785:45-5-16 states:

"(a) Primary Body Contact Recreation involves direct body contact with the water where a possibility of ingestion exists. In these cases the water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings.
(b) In waters designated for Primary Body Contact Recreation the following limits for bacteria set forth in (c) of this section shall apply only during the recreation period of May 1 to September 30. The criteria for Secondary Body Contact Recreation will apply during the remainder of the year.
(c) Compliance with 785:45-5-16 shall be based upon meeting the requirements of one of the three (3) options specified below for bacteria. Upon selection of one (1) group or test method, said method shall be used exclusively over that thirty (30) day period.

  (1) Coliform Bacteria: The bacteria of the fecal coliform group shall not exceed a monthly geometric mean of 200/100 ml, as determined by multiple-tube fermentation or membrane filter procedures based on a minimum of not less than five (5) samples collected over a

period of not more than thirty (30) days. Further, in no more than 10% of the total samples during any thirty (30) day period shall the bacteria of the fecal coliform group exceed 400/100 ml.

(2) Escherichia coli (E. coli): E. coli shall not exceed a monthly geometric mean of 126/100 ml based upon a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 235/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 406/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

(3) Enterococci: Enterococci shall not exceed a monthly geometric mean of 33/100 ml based upon a minimum of not less than five (5) samples collected over a period of not more than thirty (30) days. No sample shall exceed a 75% one-sided confidence level of 61/100 ml in lakes and high use waterbodies and the 90% one-sided confidence level of 108/100 ml in all other Primary Recreation beneficial use areas. These values are based upon all collected samples. Analysis procedures shall follow EPA-600/4-85/076, "Test Methods for Escherichia coli and Enterococci in Water by the Membrane Filter Procedure."

SECONDARY BODY CONTACT RECREATION

(a) The water quality requirements for Secondary Body Contact Recreation are usually not as stringent as for Primary Body Contact Recreation.

(b) The Secondary Body Contact Recreation beneficial use is designated where ingestion of water is not anticipated.

(c) Associated activities may include boating, fishing or wading.

(d) Waters so designated shall be maintained to be free from human pathogens in numbers which may produce adverse health effect in humans.

NAVIGATION

This beneficial use in generally more dependent upon quantity than quality of water.

AESTHETICS

Section 785:45-5-19 states:

"(a) To be aesthetically enjoyable, the surface water of the State must be free from floating materials and suspended substances that produce objectionable color and turbidity.

(b) The water must also be free from noxious odors and tastes, from materials that settle to form objectionable deposits, and discharges that produce undesirable effects or is a nuisance to aquatic life.

(c) The following criteria apply to protect this use:

(1) **Color.** Surface waters of the State shall be virtually free from all coloring materials which produce an aesthetically unpleasant appearance. Color producing substances, from other than natural sources, shall be limited to concentrations equivalent to 70 Platinum-cobalt color units.

(2) **Nutrients.** Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use.

(3) **Solids (Suspended or/or Settleable).** The surface waters of the State shall be maintained so as to be essentially free of floating debris, bottom deposits, scum, foam and other materials, including suspended substances of a persistent nature, from other than natural sources.

(4) **Taste and Odor.** Taste and odor producing substances from other than natural origin shall be limited to concentrations that will not interfere with the production of a potable water supply by modern treatment methods or produce abnormal flavors, colors, tastes and odors in fish flesh or other edible wildlife, or result in offensive odors in the vicinity of the water, or otherwise interfere with beneficial uses."

ANTIDEGRADATION POLICY

40 CFR §131.12 states:

"The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:

1. Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
2. Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the States continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost effective and reasonable best management practices for nonpoint source control.
3. Where high quality waters constitute and outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.
4. In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementation method shall be consistent with section 316 of the Act."

Oklahoma's WQS address these Antidegradation requirements in 785:45-3 which states:

"**785:45-3-1. Purpose of antidegradation policy statement**

(a) Waters of the State constitute a valuable resource and shall be protected, maintained and improved for the benefit of all the citizens.

(b) It is the policy of the State of Oklahoma to protect all waters of the State from degradation of water quality, as provided in OAC 785:45-3-2 and sub-chapter 13 of OAC 785:46."

"785:45-3-2. Applications of antidegradation policy

(a) Application to outstanding resource waters (ORW).
Certain waters of the State constitute an outstanding resource or have exceptional recreational and/or ecological significance. These waters include streams designated "Scenic River" or "ORW" in Appendix A of the Oklahoma WQS, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)(2)(A) and OAC 785:46-13-6(c). No degradation of water quality shall be allowed in these waters.

(b) Application to high quality waters (HQW).
It is recognized that certain waters of the State possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected.

(c) Application to beneficial uses.
No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed.

(d) Application to improved waters.
As the quality of any waters of the State improve, no degradation of such improved waters shall be allowed.

(e) Application to thermal discharges.
In cases where potential water quality impairment associated with a thermal discharge is involved, the anti-degradation policy and implementation method shall be consistent with Section 316 of Public Law 92-500 as amended."

SPECIAL REQUIREMENTS

Oklahoma's WQS contain supplementary information concerning numerous issues related to water quality. Foremost among them are compliance schedules, variances, endangered species protection and development of site specific metals criteria.

COMPLIANCE SCHEDULES

Oklahoma law at Section 321 (C) states: "In classifying waters and setting standards of water quality or making any modification or change thereof, the Board shall announce a reasonable time for persons discharging waste into the waters of the State to comply with such new or modified classifications or standards unless such discharges create an actual or potential hazard to public health."

Oklahoma's WQS build upon this statutory language in 785:45-5-4 (f) which states:

"Schedules for compliance with the Oklahoma Water Quality Standards may be granted to persons or facilities discharging wastes into waters of the State unless such discharge creates an actual or potential hazard to the public health in accordance with 82 O.S. §1085.30(D)."

This language allows facilities a reasonable time to make treatment modifications and/or retool in order that new WQS criteria may be met in their effluent.

VARIANCES

Oklahoma's WQS further allow that, within some stringent guidelines, a variance may be granted for selected criteria to individual discharges. "Variance" is defined in the 1997 Oklahoma WQS as "a temporary (not to exceed three years) exclusion of a specific numerical criterion for a specific discharge to a specific waterbody."

Further guidance is provided at 785:45-5-4(e) which states:

"A temporary variance may be granted at the sole discretion of the Oklahoma Water Resources Board in limited circumstances only for specific numerical criteria listed in 785:45-5-10 in the table entitled 'Water Column Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh and Water' and for specific numerical criteria listed in 785:45-5-12 in the tables entitled 'Numerical Criteria for Toxic Substances' and 'Water Column Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh.'

(1) General requirements and time limit for variance.

A variance or exception to listed numeric criteria may only be granted by the Board so long as the applicant complies with all procedural and application requirements, demonstrates to the satisfaction of the Board that the necessary conditions specified in 785:45-5-4(e)(4) exist, and that the variance will not otherwise be contrary to law or inconsistent with the Board's statutory duties. Variances shall be allowed only in very limited situations. In no circumstances shall a variance be granted which exceeds three(3) years in duration and no renewal shall be allowed.

(2) Applications and related requirements.

A variance may only be considered and granted upon application of a person for discharge from a specific facility to a specific stream segment(s). All applications for a variance must contain or include as attachments at the time of filing, at a minimum, all written documentation which supports a finding that the necessary conditions listed in 785:45-5-4(e)(4) exist, a description of the specific numerical criterion for which the variance is requested, the legal description of the stream segment(s) which would receive the discharge and the location of any other affected waters, and such other information as the Board may specify as necessary for adequate review of the application. A fee, as set forth in Chapter 5 of this Title, shall be submitted with the application for variance.

(3) Procedure and scope of variance.

(A) A variance may be granted only by the Oklahoma Water Resources Board, shall be restricted to those listed numerical criteria for which an application is filed, and shall apply only to the specific facility and specific stream segment(s) which receives the discharge.

(B) The applicant for a variance must prepare a public notice whose contents shall reflect the nature of the variance applied for and such other information as the Board may deem appropriate, and shall state the date, time and location of public hearing on the application. Such notice, after submission to and approval by the Board, shall be published at the expense of the applicant once a week for two consecutive weeks, minimum seven day interval, in a newspaper(s) having general circulation in the county(ies) in which the discharge is located. The Board may require additional publication of the notice in additional counties or publications at the applicant's expense. Proof of publication shall be provided as directed by the Board.

(C) The applicant shall deliver or mail such public notice to all persons who are on a standing list for receiving notice of such applications for variances. Such standing list shall be established and maintained by the Board and shall include the Office of the Attorney General, the chief executive of each affected municipality and county, all persons who shall request to receive such notices, and such other persons as may be specified by the Board.

(D) An administrative hearing shall be held not earlier than twenty-one days following the last publication or mailing of notice. At the hearing, the burden of proof shall be upon the applicant to produce evidence which demonstrates to the satisfaction of the Board that all conditions and requirements of these rules and applicable law are met. All interested persons may present oral or written comments prior to or at the hearing on the application, as specified in the notice.

(4) Conditions for variance.

(A) A variance shall be effective only after approval by the U. S. Environmental Protection Agency.

(B) A variance may be granted by the Board only if the following additional conditions are met:

  (i) The granting of a variance will not result in the violation of any other Oklahoma WQS, including those specified for ORW, HQW or other classes of waters; and

  (ii) New or previously unavailable information regarding toxicity, bioavailability, persistence or degradation of a specific pollutant refutes the scientific basis for the effective numerical criterion; or

  (iii) Non-attainment of a numerical criterion is documented in the stream segment which is the subject of the variance application or in close proximity upstream of such segment, and there is no increase in the concentration of the pollutant which is the subject of the variance outside the mixing zone or at some point downstream of the facility following complete mixing if appropriate relative to the concentration upstream of the facility, and

    (I) non-attainment is demonstrated to be the result of natural source concentrations of that pollutant in the water column, sediment or aquatic life, or

    (II) non-attainment is the result of human caused conditions which cannot be remedied or would cause more environmental damage if corrected than if left in place."

ENDANGERED SPECIES PROTECTION

Endangered species protection is provided in OAC 785:45-5-25(c)(2) (A) and (D). OAC 785:45, Appendix B, Table 1 and Table 2 (see below) lists National and State Parks, National Forests, Wildlife Areas, Wildlife Management Areas and Wildlife Refuges, inhabited by federally listed threatened or endangered species, may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Services.

The following tables list National and State parks, National forests, wildlife areas, wildlife management areas, wildlife refuges (Table 9) and areas which contain federally listed threatened or endangered species pursuant to the Federal Endangered Species Act (Table 10).

Table 9: National and State Parks, National Forests, Wildlife Areas, Wildlife Management Areas, and Wildlife Refuges

PROTECTED AREA / WATER	WQM Segment
Adair State Park	121700
Alabaster Caverns State Park	620920
Altus-Lugert Wildlife Management Area	311510
Arrowhead State Park	220600
Atoka Wildlife Management Area	410400
Beaver River Wildlife Management Area	720500
Beaver State Park	720500
Beavers Bend Resort State Park	410200
Black Kettle National Grasslands	310840
Black Kettle Wildlife Management Area	310840
Black Mesa State Park/Preserve	720900

PROTECTED AREA / WATER	WQM Segment
Boggy Depot State Park	410400
Boiling Springs State Park	720500
Boswell State Park	410400
Broken Bow Wildlife Management Area	410210
Candy Wildlife Management Area	121300
Canton Wildlife Management Area	720500
Cherokee State Parks I, II, III	121600
Cherokee Landing State Park	121700
Chickasaw National Recreation Area	310800
Chickasaw Wildlife Management Area	310800
Chouteau Wildlife Management Area	121500
Clayton Lake State Park	410300
Cookson Hills Wildlife Management Area	220200
Cooper Wildlife Management Area	720500
Copan Wildlife Management Area	121400
Crowder Lake State Park	310830
Deep Fork National Wildlife Refuge	520700
Deep Fork Wildlife Management Area	520700
Disney/Little Blue State Parks	121600
Dripping Springs State Park (Delaware)	121700
Dripping Springs State Park (Okmulgee)	520700
Ellis Co. Wildlife Management Area	520600
Eufaula Wildlife Management Area	520500
	520700
	220600
Five Civilized Tribes State Park	121600
Fobb Bottom Wildlife Management Area	311100
Fort Cobb State Park	310830
Fort Cobb Wildlife Management Area	310830
Fort Gibson Wildlife Management Area	121600
Fort Supply Wildlife Management Area	720500
Foss State Park	310830
Fountainhead State Park	520700
Gary Sherrer Wildlife Management Area	410310
Great Plains State Park	621010
Great Salt Plains State Park	621010
Greenleaf State Park	120400
Gruber/Cherokee Wildlife Management Area	120400
Hackberry Flat Wildlife Management Area	311310
Heavener Runestone State Park	220100
Heyburn Wildlife Management Area	120400
Hickory Creek Wildlife Management Area	311100
Hochatown State Park	410200
Honey Creek State Park	121600
Honobia Creek Wildlife Management Area	410210
Hugo Wildlife Management Area	410300

PROTECTED AREA / WATER	WQM Segment
James M. Collins Wildlife Management Area	220600
John Dahl Wildlife Management Area	621200
Kaw Wildlife Management Area	621210
Keystone State Park	620900
Keystone Wildlife Management Area	620900
	621200
Lake Eucha State Park	121600
Lake Murray State Park	311100
Lake Texoma Resort Park	310000
Lake Wister State Park	220100
Lexington Wildlife Management Area	520600
Little River National Wildlife Refuge	410200
Little River State Park	520810
Love Valley Wildlife Management Area	311100
McClellan-Kerr Wildlife Management Area	120400
McCurtain Co. Wilderness Area	410210
McGee Creek State Park	410400
McGee Creek Wildlife Management Area	410400
Mountain Park Wildlife Management Area	311500
Oklahoma Bat Caves National Wildlife Refuge	121600
Okmulgee State Park	520700
Okmulgee Wildlife Management Area	520700
Oologah Wildlife Management Area	121510
Optima National Wildlife Refuge	720510
Optima Wildlife Management Area	720510
Osage Hills State Park	121400
Osage-Western Wall Rock Creek Wildlife Management Area	121400
Ouachita National Forest	410210
	410310
	220100
Ouachita Wildlife Management Area	220100
Packsaddle Wildlife Management Area	520620
Pine Creek Wildlife Management Area	410201
Pushmataha Wildlife Management Area	410300
Quartz Mountain State Resort Park	311510
Raymond Gary State Park	410300
Red Rock Canyon State Park	310830
Redbud Valley Conservancy Area	121300
Rita Blanca National Grasslands	720510
Robbers Cave State Park	220100
Robbers Cave Wildlife Management Area	220100
Robert S. Kerr State Wildlife Management Area	220200
Roman Nose State Park	620910
Sallisaw State Park	220200
Sandy Sanders Wildlife Management Area	311800
Salt Plains National Wildlife Refuge	621010
Sequoyah National Wildlife Refuge	220200
Sequoyah State Park/Western Hills Resort Park	121600

PROTECTED AREA / WATER	WQM Segment
Skiatook Wildlife Management Area	121300
Spavinaw State Park	121600
Spavinaw Hills Wildlife Management Area	121600
Spiro Mound State Park	220200
Stinchcomb Wildlife Refuge	520520
Stringtown Wildlife Management Area	410400
Sutton Wilderness Area	520810
Talimena State Park	410310
Tenkiller State Park	121700
Tenkiller Wildlife Management Area	121700
Texoma/Washita Arm Wildlife Management Area	310800
Tishomingo National Wildlife Refuge	310800
Tishomingo Wildlife Management Area	310800
Turkey Creek Recreational Area	410210
Twin Bridges State Park	121600
Wahshashe State Park	121400
Walnut Creek State Park	621200
Washita National Wildlife Refuge	310840
Waurika Wildlife Management Area	311210
Webbers Falls Wildlife Management Area	120400
Wichita Mountains National Wildlife Refuge	311310
	311500
Yourman Wildlife Management Area	220600

Table 10 - Areas Which contain federally listed Threatened or Endangered Species pursuant to the Federal Endangered Species Act

PROTECTED AREA/WATER	WQM SEGMENT
Black Fork Creek in Pushmataha County from its junction with Little River upstream to Oklahoma Highway 144 crossing.	410210
East Fork and West Fork Creek. East Fork of Glover Creek (River), main channel in Pushmataha County from its junction with the West Fork Glover Creek (River) upstream to 4 air miles north-northwest of the community of Bethel	410210
Glover Creek (River), main channel in Pushmataha County from Oklahoma Highway 7 crossing upstream to the junction of the East Fork and West Fork of the Glover Creek (River)	410210
Kiamichi River above Hugo Reservoir	410300
Little River, main channel in Pushmataha County from the mouth to Cloudy Creek upstream to the Pushmataha County Line	410210
Little River below Pine Creek Reservoir	410200 410210
Mountain Fork Creek (River), main Channel in McCurtain county, from mouth of Boktukola Creek 6 air miles south-southwest of Smithville, upstream to the Oklahoma-Arkansas State line	410210
Neosho (Grand) River above Miami	121600
West Fork Glover Creek (River), main channel in Pushmataha County from its junction with the East Fork Glover River upstream to the community of Battiest	410210

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92; Revoked and reenacted at 12 Ok Reg 3305, eff 7-27-95; Revoked and reenacted at 16 Ok Reg 3250, eff 7-12-99]

REQUIREMENTS FOR DEVELOPMENT OF SITE SPECIFIC CRITERIA FOR METALS

A. GENERAL

Numerical criteria for total recoverable metals to protect aquatic life are found in OAC 785:45-5-12(e)(6)(G). For permitting purposes, such criteria for total recoverable Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, and Zinc may be translated into dissolved metals criteria using the conversion factors in OAC 785:45-5-12(e)(6)(H).

An additional alternative which may be utilized for permitting purposes is to determine site specific criteria from either the total recoverable or the dissolved criteria. However, federal regulations found at 40 CFR 122.45(C) require that permit limits must be expressed as total metals. Therefore, if dissolved criteria are implemented, they must be translated to site specific total metals criteria to be used in the issuance of permit limits consistent with OAC 785:46.

The permitting authority may issue a total recoverable permit limit if statewide total recoverable criteria are appropriate in the permitting authority's view, and/or satisfactory in the permittee's view. If permit limits obtained using total recoverable criteria are unsatisfactory to the permittee, the permittee may attempt to obtain different permit limits by developing site specific criteria in accordance with the provisions of this Appendix; provided, site-specific criteria shall not be implemented if they are more stringent than the total recoverable criteria set forth in 785:45-5-12(e)(6)(G).

Implementation of site specific criteria may reduce the margin of safety afforded by implementation of criteria per 785:45-5-12(e)(6)(G). Therefore, it is important that background concentration (which reduces the assimilation capacity of receiving water) be accounted for when site specific criteria are implemented. Background concentration determination requires a minimum of twelve samples in Oklahoma.

In order to develop permissible site specific criteria for the metals specified above, this Appendix must be followed to the satisfaction of the permitting authority and the OWRB. A work plan explaining sampling and analysis procedures and quality assurance/quality control must be approved by the OWRB prior to commencing the site-specific study. Upon completion, results must be submitted to OWRB and the permitting authority. Additional technical guidance is available through Appendices J and L of the "Water Quality Standards Handbook", EPA publication no. 823-B-94-005a (August 1995). Permittees are strongly encouraged to evaluate both the discharge and receiving water using clean sampling techniques.

Upon OWRB approval, site specific criteria studies shall be summarized in an OWRB technical report. The technical report shall be available for public inspection.

B. Site Specific Criteria Applicability

Oklahoma's site specific criteria apply where the maximum concentration on the chronic regulatory mixing zone boundary occurs under critical conditions for small and medium size streams. Oklahoma's site specific criteria apply on the acute regulatory mixing zone boundary for large streams. Critical conditions include regulatory effluent and receiving stream flows. OAC 785:46-5-2(C) requires that effluent flow, Q_e, be the highest monthly averaged discharge if sufficient data is available, or the design flow otherwise. When chronic criteria implementation is appropriate, OAC 785:45-5-4 requires that the receiving stream flow, Q_u, be the larger of 7Q2 or 1 cfs. One cfs shall be used if the 7Q2 cannot be determined.

The maximum concentration on the mixing zone boundary may be simulated by mixing effluent and receiving water. Percent effluent in receiving water, PE, depends on dilution capacity and shall not exceed 100% . Dilution capacity, $Q^* = Q_e/Q_u$ for streams.

The following formulas shall be used to determine PE for receiving streams.

For small and medium size streams:

For streams with large dilution capacities,

$$PE = 194Q^*/1+Q^*, \qquad Q^* \leq 0.1823 \tag{3}$$

For streams with intermediate dilution capacities,

$$PE = 100 / 6.17 - 15.51Q^*, \qquad 0.1823 < Q^* < 0.3333 \tag{4}$$

For streams with small dilution capacities,

$$PE = 100\%, \qquad Q^* \geq 0.3333 \tag{5}$$

For large streams:

$$PE = Q_e, Q_e \qquad \text{in cfs.} \tag{6}$$

Site specific criteria in Oklahoma lakes are also based on the maximum concentration on the mixing zone boundary. The following formulas shall be used to determine PE for lakes:

$$PE = 4.96D, \qquad D \geq 3ft \tag{7}$$

where D is pipe diameter.

$$PE = 23.8\sqrt{W}, \qquad W \geq 3ft \tag{8}$$

where W is canal width.

PE is less than or equal to 100% for streams and lakes.

C. Sampling Procedures

The permittee shall collect both receiving water and effluent, and mix them together to obtain PE. Ambient water collections shall be representative of low stream flow events and collected at a location unaffected by the discharge being permitted. Twenty four (24) hour composite effluent samples representative of normal operation shall be collected at the outfall such that any periodic toxic discharges are captured. Out falls may be combined proportional to flow if in close proximity. Clean sampling techniques shall be used where possible and samples shall be analyzed by an Oklahoma certified laboratory utilizing generally accepted methods. Dilution water must be made in accordance with EPA's acute biomonitoring manual entitled “Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms”, EPA publication no. 600/4-90-027 (1991). The pH, hardness, conductivity and alkalinity must be similar to that of the receiving water.

Three options are available if the permittee decides to develop site specific metals criteria for permitting purposes instead of utilizing the total recoverable criteria specified in 785:45-5-12(e)(6)(G).

Option 1: Water Effects Ratio (WER)

The permittee may obtain a site specific water effects ratio (WER) to translate a state wide total criterion to a site specific total criterion if the existing permit does not contain requirements for toxicity reduction evaluations or implementation of pollution prevention efforts. Toxicity tests using both laboratory dilution water and PE water must be performed. PE water is obtained by first determining the amount of water required for the toxicity test (e.g. 1L). Since PE ÿ 100Ve/(Ve + Vr), where Ve and Vr are volumes of effluent and receiving water required for the toxicity test, respectively, Ve = PE/100

(L). If PE = 25%, Ve = .25L. Given that Ve + Vr = 1 (L) in this example, Vr = 1 - PE/100, or .75L.

Toxicity tests using two different species are required. Acute 48 hour static renewal definitive toxicity tests shall be performed by the permittee in accordance with the EPA guidance for acute testing identified above. LC50 tests shall be used to determine WER's for both acute and chronic criteria. Toxicity tests require adding metal to both PE and dilution water. It shall not be acceptable to estimate metal concentrations by measuring the amount added. Total recoverable concentrations must be used to obtain LC50's for both test species for PE and laboratory water in Option 1.

Multiple WER's must be performed. At a minimum, three tests in three different seasons must be performed for two test species. WER is computed as $LC50_{dilution}/LC50_{PE}$. A geometric mean of the WER's is the final water effect ratio, FWER. A minimum of four WER's must be used in the computation of FWER. An explanation of any WER's obtained but not used in computation of FWER must be provided to the permitting authority and OWRB. The total criterion specified in 785:45-5-12(e)(6)(G) is divided by FWER to obtain a site specific total criterion. Background concentration must be determined to use with the site specific criterion to develop permit limits.

Option 2: Dissolved To Total Fraction

Dissolved and total recoverable concentrations must be obtained to determine a dissolved to total fraction. Samples must be taken from the effluent, receiving water and PE water. The dissolved to total fraction must be successfully computed a minimum of ten times.

The dissolved to total fraction is defined as $f_i = C_{Di}/C_{Ti}$, where C_{Di} is the dissolved concentration in the ith PE sample, and C_{Ti} is the total recoverable concentration. The dissolved fraction for the site shall be determined as the geometric mean for the n samples.

$$\therefore\ f = \exp\left[\sum_{i=1}^{n}\left[\ln(f_i)\right]/n\right] \tag{9}$$

To develop a site specific criterion from the dissolved fraction alone, divide the dissolved criterion determined from 785:45-5-12(e)(6)(H) by f. The result is a site specific total recoverable criterion.

Option 3: Combining F And FWER

The most definitive method of developing a site specific criterion is to modify a dissolved criterion to account for both the fraction of the concentration biologically available and the difference between the toxicity of the metal in the laboratory dilution water and in PE water. In order to perform option 3, WER's must be obtained using dissolved concentrations. This accounts for differences between the toxicity of the dissolved metal in laboratory dilution water and dissolved metal in PE water.

A translator, T, is obtained as the product of f and dissolved FWER. T is divided into the dissolved criterion determined from 785:45-5-12(e)(6)(H) to obtain a site specific total recoverable criterion.

[Source: Amended at 9 Ok Reg 1889, eff 5-26-92; Amended 14 Ok Reg at 2786, eff 7-1-97; Revoked and reenacted at 16 Ok Reg 3250, eff 7-12-99]

PROCEDURES FOR REVIEW AND REVISION OF WATER QUALITY STANDARDS

MINIMUM REQUIREMENTS FOR WATER QUALITY STANDARDS SUBMISSION

40 CFR §131.6 establishes minimum requirements for submission to EPA for review. These include:

"1. Use designations consistent with the provisions of sections 101(a)(2) of the Act.
2. Methods used and analyses conducted to support water quality standards revisions.
3. Water quality criteria sufficient to protect the designated uses.
4. An antidegradation policy consistent with §131.12.
5. Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to state law.
6. General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to state standards which may affect their application and implementation."

In general, these items are submitted to the EPA in what is termed a "WQS Submittal Packet". This packet at a minimum includes:

- a copy of the revised standards which include strike-outs and underlines,
- a copy of all documentation regarding the public participation process (i.e., public notices, copies of mailing lists, comment responsiveness summaries, etc.),
- a copy of all scientific justification documents, and,
- Attorney General certification as to the satisfactory completion of the public participation process.

A more exhaustive review of the public participation requirements, including required notices, rule impact statements, comment periods, etc. is included in the following chapter.

TRIENNIAL REVISIONS

FEDERAL REQUIREMENTS

Generally, revisions occur once every three years, however, interim revisions may occur. 40 CFR §131.20 gives procedures to follow when reviewing or revising Oklahoma's WQS. It states:

"1. State review. The State shall from time to time, but at least once every three years, hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Any water body segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act shall be re-examined every three years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly. Procedures states establish for identifying and reviewing water bodies for review should be incorporated into their Continuing Planning Process.
2. Public Participation. The State shall hold a public hearing for the purpose of reviewing water quality standards, in accordance with provisions of state law, EPA's water quality management regulation (40 CFR 130.3(b)(6)) and public participation regulation (40 CFR Part 25). The proposed water quality standards revision and supporting analyses shall be made available to

the public prior to the hearing.

3. Submittal to EPA. The State shall submit the results of the review and supporting analysis for the use attainability analysis, the methodologies used for site-specific criteria development, any general policies applicable to water quality standards and any revisions of the standards to the Regional Administrator for review and approval, within 30 days of the final state action to adopt and certify the revised standard, or if no revisions are made as a result of the review, within 30 days of the completion of the review."

40 CFR § 131.21 goes on to outline EPA review and approval requirements after submittal of water quality standards. It states: "(a) After the State submits its officially adopted revisions the Regional Administrator shall either: (1) Notify the State within 60 days that the revisions are approved, or (2) Notify the State within 90 days that the revisions are disapproved. Such notification of disapproval shall specify the changes needed to assure compliance with the requirements of the Act and this regulation, and shall explain why the State standard is not in compliance with such requirements. Any new or revised State standard must be accompanied by some type of supporting analysis. (b) The Regional Administrator's approval or disapproval of a State water quality standard shall be based on the requirements of the Act as described in §§131.5, and 131.6. (c) A state water quality standard remains in effect, even though disapproved by EPA, until the State revises it or EPA promulgates a rule that supersedes the State water quality standard. (d) EPA shall, at least annually, publish in the FEDERAL REGISTER a notice of approvals under this section.

Based upon the preceding regulations and the public participation regulations set forth in Part 25, public Notice must be given and a public meeting held 45 days after Notice. Then, the document and all required justifications, are forwarded to EPA for either approval within 60 days or disapproved within 90 days.

STATE REQUIREMENTS

State law governing the procedure for amending the Oklahoma WQS is codified at title 82 O.S. Supp. 1993, §1085.30, which requires 20 days advance notice of public hearings by publication as required by the APA (codified at 75 O.S. 1991, § 250.1 and following as amended) and by mailing to the chief executive of each municipality and county in the areas affected, to affected permit holders, and to persons who have requested such notice. Because the Oklahoma WQS are "rules" under the APA, they must be amended in accordance with the procedure for "rulemaking" provided in the APA. This rulemaking procedure is summarized in the following discussion.

PUBLIC NOTICE OF RULEMAKING INTENT

Prior to the revision of the Standards, the OWRB is required to publish notice of the intended action in The Oklahoma Register, a semi-monthly publication of the Secretary of State Office of Administrative Rules. APA Section 303(A)(1) (section references in this discussion of APA rulemaking are to sections of Title 75 of the Oklahoma Statutes 1991 as amended). The notice must include several elements prescribed by §303(B), including a brief summary of the rule; the proposed action being taken; the specific legal authority authorizing the proposed rule; the time, place and manner in which interested persons may make oral or written comments; the time, place and manner in which interested persons may demand a hearing, if a hearing is not specifically provided; and where copies of the proposed rule(s) may be obtained for review by the public. Prior to or within three (3) days of the publication of the notice in The Oklahoma Register, the agency must mail a copy of the notice to all persons who have made a timely request to the agency for advance notice of its rulemaking proceedings. For the Oklahoma

WQS, this will generally include the WQS Mailing List and the standing Water Resources Board Mailing List.

In addition, Section 303 (A)(2) requires the OWRB to send copies of the notice of the intended action to at least 25 newspapers "in the metropolitan and rural areas" for publication as public service announcements at the discretion of the newspaper editors. It is expressly provided, however, that the OWRB is not required to pay for any such publication.

Consideration of Comments and Possible Effects on Specified Groups

The OWRB must allow a comment period for at least 20 days after publication of the notice for all interested persons to submit data, views or arguments, orally or in writing. The agency must "consider fully" all written and oral submissions regarding the proposal.

The OWRB must also consider the effect its intended action may have on "the various types of business entities" and "the various types of consumer groups." This consideration is apparently required whether or not these groups make any comments. If the OWRB finds that its proposed rule may adversely affect any business entity or consumer group, then it may modify its proposed rule to exclude that type of business entity or activity. In the case of business entities, upon a finding of possible adverse effect, the agency may also "tier" its action to provide rules, penalties, fines or reporting procedures and forms which vary according to the size of a business or its ability to comply or both.

Rulemaking Hearing

Under the APA, the OWRB is not required to hold a hearing on the proposed rule unless one is requested pursuant to §303(C)(1). However, this flexibility is rendered moot by 82 O.S. Supp. 1993, §1085.30, which requires a public hearing on proposed WQS amendments. Accordingly, the notice of rulemaking intent must specify the time and place of the hearing.

The hearing may not be held earlier than 20 days after the notice is published in The Oklahoma Register. At the hearing, persons may present oral argument, data, and views on the proposed rule.

In addition, Title 27A O.S. Supp. 1993, § 1-1-102 requires each state environmental agency to participate in these hearings.

Preparation of Rule Impact Statement

Generally, the OWRB is required to issue a "rule impact statement" for a proposed rule prior to or within 15 days after the publication of the notice of rulemaking intent.

The rule impact statement shall include the elements specified in §303(D)(2), which include a brief description of the purpose of the rule; a description of the classes of persons who most likely will be affected by the proposed rule, including classes who will bear the cost of the rule and who will benefit from the rule; the probable costs to the agency and any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues; a determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the rule; and the date the rule impact statement was prepared. Note, however, that an insufficiency or inaccuracy in the contents of the rule impact statement is not a ground for invalidating the rule. Moreover, the rule impact statement may be modified after any hearing or comment period afforded per §303.

Furthermore, before the OWRB publishes its notice of rulemaking intent, to the extent an agency for good cause finds the preparation of a rule impact statement or the specified contents thereof are unnecessary, impracticable or contrary to the public interest in the process of adopting a particular rule, the agency may request the Governor to waive the requirement. (Section 303(D)(3))

If not waived by the Governor before the notice is published, then the agency must complete the rule impact statement.

ADOPTION OF THE PROPOSED RULE BY THE OKLAHOMA WATER RESOURCES BOARD

At the time the OWRB staff's recommendations for adoption are submitted to the OWRB members for review and consideration, each state environmental agency shall have the opportunity to present written comment to the OWRB members.

Section 303(E) provides that "upon completing the requirements of this section, an agency may adopt a proposed rule." Section 250.3(9) states that "'adopted' means that a proposed rule has been approved by the agency but has not been reviewed by the Legislature and the Governor...."

Note that in order to avoid complications later, the rule should be adopted in the style of language and format required by the Secretary of State, since the rule must be submitted to the Governor in the same format. See §303.1(C), discussed below. Note also that §303(E) provides that no rule is valid unless it is adopted in substantial compliance with the provisions of §303.

Also note that once the permanent rule becomes "adopted" it is still weeks, if not months, away from becoming effective.

FILING WITH GOVERNOR, SECRETARY OF STATE, AND LEGISLATURE

Once the OWRB adopts a revised or new WQS provision, it has ten (10) days to file one copy of the rule with the Governor and two copies each with the Speaker of the House of Representatives and the President Pro Tempore of the Senate. The Governor and Legislature are entitled to review and either approve or disapprove the rule. Copies of the rule must also be filed with the Secretary of State. Each of these steps are discussed more fully below.

Gubernatorial review. Section 303.1(A) requires the OWRB to file a copy of the rule and a copy of an agency rule report with the Governor for approval. The agency rule report condenses information about the rule and must include the elements prescribed by §303.1(D), including the name and address of the agency, the title and number of the rule, the date the notice of rule making intent was published, a brief summary of the content of the rule, the date and location of the meeting at which the rule was adopted, the members of the OWRB and their recorded votes on the adoption, and a statutory citation of authority for the rule. The agency must also submit to the Secretary of State for publication in The Oklahoma Register a statement that the adopted rule has been submitted to the Governor.

The Governor has 45 calendar days after receipt of the rule to approve or disapprove it. If the Governor approves the rule, the Governor shall immediately notify the OWRB in writing and give notice of the approval to the Speaker, President Pro Tempore, and Secretary of State for publication in The Oklahoma Register. If the Governor disapproves the rule, the Governor shall return the entire document to the OWRB with written reasons for the disapproval, and notice of the disapproval shall likewise be given to the Speaker, President Pro Tempore, and Secretary for publication. If the Governor does not expressly approve the rule within the 45-day period, the rule is disapproved by operation of §303.1(D)(2). However, §303.1(F) provides that a gubernatorial-disapproved rule may still become effective if the rule is approved by a joint resolution of the Legislature pursuant to §308(F).

Legislative review. Section 308(A) requires the agency to submit two copies of the rule and two copies of the agency rule report to both the Speaker of the House and the President Pro Tempore of the Senate. The agency must also submit to the Secretary of State's Office of Administrative Rules for publication in The Oklahoma Register a statement that the rules have been submitted to the Legislature. The elements required to be set forth in the agency rule report to the Legislature are virtually the same as those required for the agency rule report filed with the Governor; see §308(D).

Except as otherwise provided in §308, the Legislature shall have 30 legislative days to review the rules. Rules may be disapproved in whole or in part by the Legislature. Section 308(G).

Upon receipt of the adopted rules, the Speaker and President Pro Tempore shall assign the rules to appropriate legislative committees for legislative review. The Speaker and President Pro Tempore may each establish a rule review committee or designate standing committees of each house to review administrative rules. §§ 308(E) and 307.1. Such committees shall review the rules in an advisory capacity and may make recommendations concerning the rule to their respective houses, or to the agency, or both. §307.1(C).

By the adoption of a joint resolution, the Legislature may (1) disapprove any rule, (2) waive the 30 legislative day review period and approve the rule, or (3) otherwise approve the rule. The waiver of the 30 legislative day review period may also be done with a concurrent resolution.

The Legislature may by concurrent resolution disapprove a proposed rule or proposed rule amendment. Such a concurrent resolution must be approved by both houses prior to the end of the 30 legislative day review period. Section 308(F)(2) provides that any such concurrent resolution shall not require the approval of the Governor, and any rule so disapproved shall be invalid and of no effect regardless of the approval by the Governor of the rule.

Any resolution disapproving a rule shall be filed with the Secretary of State for publication in The Oklahoma Register.

Whenever a rule is disapproved by joint resolution or concurrent resolution as provided in §308(F), the agency does not have authority to submit an identical rule except during the first 60 calendar days of the next regular legislative session.

Timing in submitting the rule to the Legislature is critical. If the rule is submitted to the Legislature before April 1 of any year, it shall be deemed approved by the Legislature if (a) the Legislature is in regular session and has failed to disapprove the rule within 30 legislative days after the submission of the rule, or (b) the Legislature has adjourned before the expiration of the 30 legislative day period and has failed to disapprove the rule. However, if the rule is submitted to the Legislature after April 1 of the year, the rule is deemed approved by the Legislature only if the Legislature is in regular session and fails to disapprove the rule within 30 legislative days after the rule has been submitted. In the event the Legislature adjourns after April 1 and before 30 legislative days expire, the rule shall be carried over for consideration by the Legislature during the next regular session and the required 30 legislative day review period begins on the first day of such succeeding regular session. The OWRB has two alternatives to try to avoid these consequences of filing after April 1: it may (1) request direct legislative approval by adoption of a joint resolution waiving the 30 legislative day review period and approving the rule, or adoption of a joint resolution otherwise approving the rule, or (2) it may adopt emergency rules.

Final adoption. Upon surviving the gauntlet of legislative and gubernatorial approval, a rule attains the status of "final adoption." Section 308.1 provides that upon approval by the Legislature and the Governor, or upon approval by a joint resolution of the Legislature pursuant to §308(F) (i.e., a joint resolution waiving the 30 legislative day review period and approving the rule, or a joint resolution otherwise approving the rule), a rule shall be considered "finally adopted." However, there are still several more steps that must be completed before the rule becomes effective.

FILING FINALLY ADOPTED RULE WITH SECRETARY OF STATE

After a Water Quality Standard Revision becomes finally adopted, the OWRB has 30 calendar days to file the rule and the number of copies specified by the Secretary of State with the Secretary of State Office of Administrative Rules. The text of the rule submitted for publication shall be the same as the text considered by the Legislature and Governor.

Section 251(B)(2) prescribes several requirements which the agency must follow in conjunction with filing the rule with the Secretary of State. The first two of these requirements must be adhered to from the earliest stages of rule drafting. First, the rules must be prepared in plain language which can be easily understood. Second, the agency shall not unnecessarily repeat statutory language, and where it is necessary to refer to statutory language to effectively convey the meaning of the rule interpreting that language, the reference shall clearly indicate that portion which is statutory and that which is the agency's amplification or interpretation of that language. Section 251(B)(2)(b).

Additional requirements prescribed by §251(B)(2) include:

1. an indication whether the rule is new, amends an existing permanent rule, or repeals an existing permanent rule. If amendatory, any deleted language shall be shown by strikeout and any new language shall be shown by underscoring;
2. if the rule supersedes an existing emergency rule, a statement to that effect;
3. a reference to any rule requiring a new or revised form used by the agency, in a note to the rule. The Secretary of State shall insert that reference in The Oklahoma Register as a notation to the affected rule;
4. an analysis, prepared in plain language, of new or amended rules. The analysis shall include a reference to any statute that the rule interprets, any related statute or any related rule; and
5. other information required by the Secretary of State.

Section 251(B)(2)(i) also provides that the agency may change the format of existing rules without any rule making action in order to comply with the Secretary's standard provisions for publication in The Oklahoma Register and Oklahoma Administrative Code (OAC), so long as there is no substantive change to the rule.

PUBLICATION; PROMULGATION

The Secretary of State is to publish the WQS revisions in the first issue of The Oklahoma Register published per §§251, 253, 256, 303, 303.1 and 308, after the date of acceptance of the rule by the Secretary. Publication of rules and other items in The Oklahoma Register and the OAC is a major subject in itself, and is discussed more thoroughly below. In the context of this discussion of rulemaking procedure, it is sufficient at this point to state that once the rule has been filed and published in The Oklahoma Register, and otherwise complies with the APA, it shall be considered "promulgated."

EFFECTIVE DATE

Section 304(B) provides that each rule "finally adopted" is effective 10 calendar days after publication in The Oklahoma Register pursuant to §255 unless a later date is required by statute or specified in the rule, in which case the later date is the effective date.

PUBLICATION OF RULES IN THE OKLAHOMA REGISTER AND THE OKLAHOMA ADMINISTRATIVE CODE

The Oklahoma Register (the "Register") is the State counterpart to the Federal Register for publication of state agency rulemaking developments such as notices of rulemaking intent, adoption of rules, submission of adopted rules for gubernatorial and legislative review, and approval and promulgation of rules. Additionally, the Register has served for years as the official publication for promulgated rules or summaries of lengthy promulgated rules.

1. The Oklahoma Register
   Section 255 provides that the Secretary of State is authorized and directed to publish the Register not less than monthly for publication of new permanent rules, amendments or revocations of rules, emergency rules, and any notices of such rulemaking process.(The Register is now being published twice per month and is also used for publication of Executive Orders.) The Secretary may provide for the publication of rules in summary form when the rules are so lengthy that publication would be "too costly"; the summary is to be prepared by the submitting agency and must state where the text of the rule may be obtained. The Secretary of State is required to keep a copy of all rules, new rules, amendments and revocations of existing rules on file and available for public inspection in the Secretary of State's Office of Administrative Rules during normal office hours.

   The Secretary also must send a copy of each publication of the Register to every county clerk, to members of the Legislature upon request, and to such agencies, libraries and officials as the Secretary may select.

2. The OAC
   The OAC is a comprehensive compilation of law (i.e., agency rules of practice, procedure, and substantive law) for state agencies in a uniform format much like the Code of Federal Regulations for federal agencies. It is intended to be an annual, cumulative collection of the permanent rules published semi-

monthly in the Register. The OAC will not contain emergency rules. These are left to be published only in the Register.

Rules which are submitted and accepted for codification by June 30 of each year must be published in the next succeeding OAC or supplement. The OAC and its supplements must be published annually, and should be published as soon as possible after August 30 of each year.

Section 257.1 lists several public offices which are entitled to receive, as soon as available from the Secretary of State, without cost, one copy of the printed volumes of the OAC and its supplements. These offices include:

a. the county clerk of each county;
b. several specified state offices including the Attorney General, Governor, and Speaker and President Pro Tempore; and
c. the Department of Libraries for the Law Library.

To complement this free availability via public offices, the Secretary of State is authorized to sell or otherwise distribute the OAC and its supplements. The OAC shall be made generally available by the Secretary of State at a cost sufficient to defray the cost of publication and mailing.

3. Effect of Failure to Publish in *The Oklahoma Register* or OAC

Reading §§250.7 and 256 together, it may be concluded that the official permanent rules of the State shall be those which are published in the Register prior to the compilation of rules due to be completed by January 1, 1992; upon that date, any permanent rule not included in the official compilation by the Secretary of State in the OAC becomes void and has no effect.

The official permanent rules of the State shall be (1) those published in the OAC or its annual supplement, and (2) those published in the Register after the closing date for publication of the last preceding OAC or OAC supplement. Permanent rules published in the Register but not published in the next succeeding publication of the OAC or OAC supplement become void.

In short, any agency permanent rule not published in the OAC or a OAC supplement, or not published in an issue of the Register before the next publication of the OAC or OAC supplement, shall be void and of no effect.

NON-STATUTORY ACTIVITIES FOR WATER QUALITY STANDARDS REVISIONS

Generally, Board staff will hold a series of public meetings prior to the formal public hearing. These informal meetings have proven beneficial in that the informal setting promotes an active dialogue between Board staff and affected or concerned parties.

It is during these informal meetings that scientific justification documents and policy questions are discussed.

EMERGENCY WATER QUALITY STANDARDS RULEMAKING

The procedure for promulgating emergency rule provisions in the Oklahoma WQS is governed primarily by §253. They may be distinguished from permanent rules in several ways. Generally, emergency rules can be adopted by the OWRB at any time with or without an abbreviated notice and hearing process in order to respond to a compelling, extraordinary circumstance. They are not necessarily subject to immediate Legislative review, although they are subject to immediate gubernatorial approval before they can become effective. The Legislature can review and disapprove the rule or otherwise affect its effective term. Emergency rules are not permanent but are effective for only a limited period of time.

FINDING OF COMPELLING, EXTRAORDINARY CIRCUMSTANCE

Section 253(A) states that "[i]f an agency finds that an imminent peril to the preservation of the public health, safety, welfare, or other compelling extraordinary circumstance requires an emergency rule, amendment, revision, or revocation of an existing rule, then an agency may initiate emergency rulemaking procedures in an effort to promulgate a rule to meet the emergency. In practice, much emergency rulemaking is done as a stopgap measure to track changes in federal statutory or administrative agency law, or state statutory law, which must be implemented before permanent rules can be promulgated. In such cases, the emergency rules are put into effect until they are superseded by permanent rules.

ABBREVIATED NOTICE AND HEARING, RULE IMPACT STATEMENT

Section 253(J) provides that the notice and hearing, rule impact statement, agency rule report, and statement of submission requirements in permanent rulemaking are not applicable in emergency rulemaking. However, if an agency determines that an abbreviated notice and hearing procedure or an abbreviated rule impact statement are necessary, then this section does not prohibit such abbreviated procedures. Moreover, an agency has discretion to prepare an agency rule report although it is not required for emergency rulemaking.

ADOPTION AND FILING WITH GOVERNOR

Before the OWRB adopts an emergency rule, it must prepare the rule in the proper format required by the Secretary of State. Upon adoption, §253(B) requires the agency to transmit the rule to the Governor, and §253(C) requires the Governor to submit the emergency rule to the Secretary of State for review of proper formatting.

GUBERNATORIAL APPROVAL OR DISAPPROVAL; PROMULGATION; FILING WITH SECRETARY OF STATE; AGENCY FILING WITH LEGISLATURE; PUBLICATION

Section 253(C)(1) provides that the Governor shall review the emergency rule and decide whether or not it should be approved. Section 253(D)(2) provides that the Governor has 45 calendar days to review and approve or disapprove the emergency rule.

If the Governor fails to approve the emergency rule within the 45 calendar day period, the rule is deemed disapproved according to §253(D)(2). In any event, if the Governor disapproves the emergency rule, the Governor shall return the entire rule document to the agency with reasons for the disapproval. The agency then may elect to modify the emergency rule and resubmit it to the Governor for approval.

If the Governor approves the emergency rule, the emergency rule shall be considered promulgated and shall be effective immediately, unless a later effective date is specified in the rule. Section 253(D)(1); see also §304(B). The Governor's approval of the emergency rule shall be published in the next publication of The Oklahoma Register following approval by the Governor. Section 253(E)(3). A copy of the Governor's approval and the emergency rule shall be submitted by the agency to the Speaker and President Pro Tempore.

As a result of the "fast track" emergency rulemaking process, agencies are required by §304(B)(2)(b) to take appropriate measures to make emergency rules known to the persons who may be affected by them.

EFFECTIVE TERM; LEGISLATIVE REVIEW

An emergency rule may specify an expiration date which will control the rule's effective term unless other provisions of the APA dictate a different result.

In cases where the emergency rule does not state an expiration date (i.e., it is intended to have a continuing effect), §253(H)(1) requires the agency to initiate rulemaking proceedings to promulgate a permanent rule to supersede the emergency rule.

According to §253(F), if an emergency rule is promulgated while the Legislature is not in session, it shall be effective at least through the first day of the next succeeding regular legislative session, and thereafter effective through the sine die adjournment of such session unless it is first made ineffective pursuant to §253(H) (described below).

Section 253(G) provides that if an emergency rule is promulgated while the Legislature is in session, then unless otherwise specifically provided by the Legislature, it shall be in effect at least through the first day of the next succeeding regular session, and thereafter effective for the term of such session unless it is first made ineffective pursuant to §253(H) as described below.

Section 253(H) provides in paragraph 2 thereof that any promulgated emergency rule shall be made ineffective by (a) legislative disapproval of the emergency rule, (b) supersession by the promulgation of a permanent rule, (c) legislative disapproval of an adopted permanent rule based upon the emergency rule, or (d) an earlier expiration date if specified in the emergency rule. Paragraph 3 of subsection H provides that emergency rules in effect on the first day of a legislative session shall be null and void on July 15 immediately following sine die adjournment of the Legislature unless otherwise specifically provided by the Legislature. In the event of such nullity, the agency is expressly prohibited from evading this result by adopting the emergency rule again or adopting new emergency rules of similar scope or intent.

COORDINATION OF NEW STANDARDS, CRITERIA AND IMPLEMENTATION POLICIES

Oklahoma's WQS and Implementation documents are evolutionary documents. Consequently, as required by the CWA, at least once every three years, the WQS undergo a revision. During these revisions, modification suggestions to the current WQS are accepted from the U.S. EPA, other federal and state agencies, special interest groups and private citizens. Although all comments and suggestions are considered, time and staffing constraints may prohibit an in depth evaluation of all suggestions. Of course, those comments with the greatest potential merit will receive the greatest scrutiny.

WATER QUALITY STANDARDS CRITERIA MODIFICATION

Scientific advances and changes in public policy will periodically require the addition of new narrative and numerical water quality criteria. These criteria modifications may occur at any time, but will generally occur during the triennial revision process. During the triennial revision public participation process, justification for changes/modifications will be presented. The final adoption process is specified in a previous chapter.

WATER QUALITY STANDARDS IMPLEMENTATION MODIFICATION

To effectively implement Oklahoma's WQS into permits, enforcement, or other regulatory activities, WQS Implementation Documents are required. These documents are housed in a different chapter. Development of Implementation documents will be driven by Oklahoma's WQS. Consequently, Implementation documents must reflect the principals outlined in Oklahoma's WQS. This requires that Implementation documents will be developed either simultaneously or subsequent to the Standards. The development of Implementation documents will also require prioritization. This prioritization will consider existing needs and require input from other state and federal agencies.

As specified in enrolled House Bill 1002, Section 321 C. states: "The standards of quality of the waters of the State, implementation documents and classification of such waters or any modification or change thereof shall be adopted and otherwise comply with the APA and shall be enforced by all state agencies within the scope of their jurisdiction." Consequently, all WQS Implementation documents will be subjected to the public participation process as outlined in the APA. Both new, and modifications to existing documents are subject to APA requirements. These documents will principally reside in OAC 785:46. They may also be found in this Document. Although it is anticipated that Implementation documents will be dynamic, only those concepts supported by the WQS may be considered. Conversely, not all concepts found in the WQS are currently implemented. It is anticipated that additional implementation documents will be developed over time.

PART II PROCEDURES FOR ASSIGNMENT OF BENEFICIAL USES

40 CFR §131.10 states:

"(a) Each state must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a state adopt waste transport or waste assimilation as a designated use for any waters of the United States.

(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

(c) States may adopt sub-categories of a use and set the appropriate criteria to reflect varying needs of such sub-categories of uses, for instance, to differentiate between cold water and warm water fisheries.

(d) At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306 of the Act and cost-effective best management practices for nonpoint source control.

(e) Prior to adding or removing any use, or establishing sub-categories of a use, the State shall provide notice and an opportunity for public hearing under §131.20(b) of this regulation.

(f) States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses, however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season.

(g) States may remove a designated use which is not an existing use, as defined in §131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:
   (1) Naturally occurring pollutant concentrations prevent the attainment of the use; or
   (2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to by met; or
   (3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
   (4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
   (5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
   (6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

(h) States may not remove designated uses if:
   (1) They are existing uses, as defined in § 131.3, unless a use requiring more stringent criteria is added; or
   (2) Such uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices for nonpoint source control.

(i) Where existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.

(j) A state must conduct a UAA as described in §131.3(g) whenever:
   (1) The State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act, or
   (2) The State wishes to remove a designated use that is specified in section 101(a)(2) or the Act or to adopt subcategories of uses specified in section 101(a)(2) of the Act which require less stringent criteria.

(k) A state is not required to conduct a UAA under this regulation whenever designating uses which include those specified in section 101(a)(2) of the Act."

Oklahoma law in Section 319(15) mandates that the OWRB is "To adopt, modify or repeal and promulgate standards of quality of the waters of the State and *to classify such waters according to their best uses* in the interest of the public under such conditions as the OWRB may prescribe for the prevention, control, and abatement of pollution."

State statutory language specifies that the OWRB is to designate beneficial uses, by classification of waters according to their best uses, and the CFR establishes national guidelines for use designation.

Beneficial uses have been applied to Oklahoma streams and lakes since the initial WQS were adopted. These uses are revised periodically as more data is obtained. Oklahoma's 1997 WQS specifically list beneficial uses in Appendix A and 785:45-5-3(a) for Oklahoma waters. Uses defined in the WQS include: Public and Private Water Supply, Emergency Water Supply, Fish and Wildlife Propagation, Agriculture, Hydroelectric Power, M & I Process and Cooling Water, Primary Recreation, Secondary Recreation, Navigation, and Aesthetics.

Specific limitations may also apply to selected waters in order to provide them with additional protection.

Beneficial uses are assigned to Oklahoma Waters by three different methods. They are 1) Existing uses, 2) Assumed uses and 3) Designated uses.

EXISTING USES

40 CFR § 131.3(e) states that "Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Generally, in Oklahoma, existing uses are evaluated through literature surveys of each water body. Ultimately, existing uses become designated uses when they are included in Appendix A of the WQS Document.

ASSUMED USES

Oklahoma's WQS, 1997 in Section 785:45-5-2(a) state that: "Beneficial uses are designated for all waters of the State. Such uses are protected through the restrictions imposed by the antidegradation policy statement, narrative criteria and numerical standards. Some uses require higher quality water than others. When multiple uses are assigned to the same waters, all such uses shall be protected. Beneficial uses are also protected by permits or other authorizations issued to meet these Standards for point sources and through practical management or regulatory programs for nonpoint sources. The criteria to protect the beneficial uses designated in 785:45-5-3 or in Appendix A of [the Oklahoma WQS] this Chapter for certain surface waters of the State are described in the following sections:

(1) 785:45-5-10. Public and Private Water Supplies
(2) 785:45-5-11. Emergency Public and Private Water Supplies
(3) 785:45-5-12. Fish and Wildlife Propagation
   (A) Habitat Limited Aquatic Community
   (B) Warm Water Aquatic Community
   (C) Cool Water Aquatic Community (Excluding Lake Waters)
   (D) Trout Fisheries (Put and Take)
(4) 785:45-5-13. Agriculture: livestock and irrigation
(5) 785:45-5-14. Hydroelectric Power Generation
(6) 785:45-5-15. Industrial and Municipal Process and Cooling Water
(7) 785:45-5-16. Primary Body Contact Recreation
(8) 785:45-5-17. Secondary Body Contact Recreation

(9) 785:45-5-18. Navigation
(10) 785:45-5-19. Aesthetics"

785:45-5-3. Unlisted surface waters

"(a) Surface Waters Excluding Lakes.

(1) For those surface waters of the State not listed in Appendix A of [the Oklahoma WQS] this Chapter, excluding lakes, the following beneficial uses are designated:
 (A) Agriculture: livestock and irrigation (785:45-5-13),
 (B) Industrial and Municipal Process and Cooling Water (785:45-5-15),
 (C) Aesthetics (785:45-5-19),
 (D) Fish and Wildlife Propagation, (Warm Water Aquatic Community) (785:45-5-19 [error in the WQS, should read as 785:45-5-12]),
 (E) Primary Body Contact Recreation (785:45-5-16).
(2) Specifically, the Beneficial uses described under 785:45-5-10 (Public and Private Water Supplies), 785:45-5-11 (Emergency Public and Private Water Supplies), 785:45-5-12 (Fish and Wildlife Propagation, Habitat Limited Aquatic Community), 785:45-5-17 (Secondary Body Contact Recreation) shall only be designated following use attainability analyses.
(3) Beneficial use determinations, following Use Attainability Analyses, are subject to administrative proceedings including the public hearing process.

(b) Lakes.
(1) For lakes, including those listed in Appendix A of [the Oklahoma WQS] this Chapter, the following beneficial uses are designated:
 (A) Fish and Wildlife Propagation (Warm Water Aquatic Community) (785:45-5-12).
 (B) Agriculture (785:45-5-13).
 (C) Industrial and Municipal Process and Cooling Water (785:45-5-15).
 (D) Primary Body Contact Recreation (785:45-5-16).
 (E) Aesthetics (785:45-5-19).
(2) The beneficial use of Public and Private Water Supplies (785:45-5-10) is specifically designated for certain lakes in Appendix A of [the Oklahoma WQS] this Chapter, otherwise the beneficial uses designated in this paragraph take control over the uses designated for segments which include descriptions of lakes in Appendix A of [the Oklahoma WQS] this Chapter."

In Oklahoma, both Secondary Body Contact Recreation (SBCR) and Habitat Limited Aquatic Community (HLAC) are subcategories of uses requiring less stringent criteria. Therefore, prior to their designation to a waterbody, a UAA which provides the scientific justification for the SBCR or the HLAC designation must be completed. During the 1988 Oklahoma WQS revision, the Environmental Protection Agency (EPA) communicated that the State must meet the requirement of the federal regulation for EPA approval of that section of the standards. Because of the EPA comments which were a restatement of the applicable regulatory requirements, the Standards were amended to insure that a UAA is conducted prior to regulatory activity that affects the water quality of an unlisted water(OAC 785:45-5-3(a)(2),(3)).

Numerous streams not listed in Appendix A of Oklahoma's WQS (unlisted streams) are currently receiving permitted discharges based on the less stringent criteria associated with the HLAC and SBCR assumption. The EPA is currently withholding approval of discharge permit renewals for these streams. To satisfy Federal (EPA) requirements and comply with the Oklahoma WQS, the OWRB has designed and implemented a program to perform

UAA's on the concerned unlisted streams. Through these UAA's, assumed beneficial uses may be confirmed or refuted.

DESIGNATED USES

The process of designating beneficial uses generally involves a three step process which at any point may include sufficient information to designate uses. These three elements include, a literature review, a "one-day" survey, and an intensive survey.

LITERATURE REVIEW

The literature review involves the review of historical chemical, physical and biological data. Although information of this type may be available, it is seldom comprehensive enough to allow the designation of a beneficial use. Consequently, most UAA's in Oklahoma, including the unlisted streams surveys, utilize a minimum of "one-day" surveys.

ONE-DAY SURVEYS

One-day UAA have evolved much over the 15 year history of UAA's in Oklahoma. Recently, the unlisted streams program has incorporated one-day survey concepts into the designation of uses.

The Unlisted Streams Program was initiated in FY-89 as a project to identify affected unlisted streams and to prioritized them for UAA. As result, 192 unlisted receiving streams (this number does not include a large number of unlisted secondary receiving streams) were identified and prioritized for UAA by expiration date to allow for timely changes in the WQS prior to regulative activity. For example, receiving streams with 1992 discharge permit expiration dates were given highest priority with subsequent expiration dates prioritized in descending order. Following this prioritization, permit expiration dates in 1992 were targeted for the FY-89 survey and expiration dates in 1993, 1994 for the FY-90 survey, etc. Additional tasks were to conduct UAA's and report on at least 25 affected streams. Results and recommendations of those surveys were reported in FY-89 205(J)/604(b) Output 302 and its addendum.

It is the OWRB's task to perform UAA's to assess the current physical, chemical, and biological components of streams and to determine the highest beneficial uses each is capable of attaining without adverse human impacts. These UAA's were performed under a "one-day survey" method which has the benefit of allowing a large number of streams to be surveyed in a short period of time with a minimum amount of cost compared to more intensive stream studies.

The selection of streams for UAA's is based on permit expiration year. This allows a timely revision of the Oklahoma WQS based on performance of the UAA's prior to permit renewals.

There currently exists in the Oklahoma WQS (OWRB 1997), four subcategories of beneficial uses under the category of Fish and Wildlife Propagation, of which the highest attainable use should be designated through a UAA. All Oklahoma streams have been classified as capable of attaining one of these beneficial uses which are listed as follows:

Warm Water Aquatic Community (WWAC): - A subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality and habitat are adequate to support climax fish communities (OWRB 1997).

Habitat Limited Aquatic Community (HLAC): - A subcategory of the beneficial use "Fish and Wildlife Propagation" where the water chemistry and habitat are not adequate to support a WWAC because: (1) Naturally occurring water chemistry prevents the attainment of the use; or (2) Naturally occurring ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of a sufficient volume of effluent to enable uses to be met; or (3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or (4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use; or (5) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of the WWAC beneficial use (OWRB 1997).

Cool Water Aquatic Community - A subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality, water chemistry and habitat are adequate to support warm water intolerant climax fish communities and includes an environment suitable for the full range of cool water benthos. Typical species may include smallmouth bass, certain darters and stoneflies (OWRB 1997).

Trout Fishery - A water body which contains trout at least part of the year.

The highest beneficial use classification a stream is capable of attaining without excessive human induced interference or impacts is a function of five physical, chemical and biological factors described by Karr et al. (1986). Since the abiotic components are the limiting factors to the biological potential in any system, it is assumed that the existing biological integrity of a stream is a reflection of it's current physical and chemical well-being. The mechanism for determining the highest biological potential attainable in a stream must look at all abiotic components that currently exist in the system, then determine if the biological community is a true reflection of that potential. Through this mechanism it may be determined if the existing uses are the potentially attainable uses. Due to infinite combinations of environmental factors that may possibly exist in a stream (no two streams are chemically and physically identical), no precise formula has been devised to accurately predict and describe the biological community that should exist there. Only through the evaluation of several watershed, stream habitat, water quality, and biological factors of numerous Oklahoma streams may predictions be made on aquatic life uses attainable for a given set of conditions.

The optimal time of year for conducting a UAA is when a stream's biological community is most limited by its abiotic components. Karr's et al. (1986) five major classes of environmental factors that determine a biological community's performance are susceptible to seasonal perturbations and for most Oklahoma streams these environmental factors are generally most limiting to biological community performance between July and September or later if summer-like conditions persist. This is during the period of lowest stream flow which may decrease habitat availability and allow for higher concentrations of point source pollutants. It is also during the period of highest water temperatures which may be exceeding the maximum threshold of tolerance for some of the community organisms and decrease dissolved oxygen to near lethal levels.

Other uses considered in these surveys included body contact recreation and Public and Private Water Supply (PPWS) uses. Body contact recreation uses include Primary Body Contact Recreation (PBCR) and SBCR which are exclusive of each other within a stream. PBCR involves direct body contact with the water where a possibility of ingestion exists. Typically this involves a water body with sufficient depths for full body immersion to occur such as in swimming. In these cases the water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings. SBCR is designated where ingestion of water is not likely to occur such as in boating or wading. Body contact recreation uses are therefore dependent on attainment of physical, chemical and biological characteristics within a stream.

PPWS beneficial use is based principally upon water quantity. Methods used to evaluate the PPWS use are not as elaborate or exhaustive as for fish and wildlife uses. Typically, a base flow in excess of two cubic feet per second is considered the minimum required for maintenance of the PPWS use. In addition, a permits review to determine if water withdrawal records indicate an existing PPWS use is conducted. If an existing public withdrawal use is discovered, the PPWS use is assigned.

ONE-DAY SURVEY MATERIALS AND METHODS TO DETERMINE BENEFICIAL USES

The methods used to perform one-day UAA's involve evaluating the physical, chemical and biological components of each stream surveyed. Designating a beneficial use to a stream called for an integrated assessment of these biotic and abiotic components. UAA's should be performed between June 1 and October 31.

Depending on length of stream and availability of access, one or more sample sites should be selected per stream surveyed. Prior to selection of sample sites, U.S. Geological Survey topographical maps of the entire watershed should be reviewed for watershed characteristics and all potential access points. One to three of these access points are selected as sites for physical, chemical and biological measurements. If the stream is at least one mile long and has sufficient access, a site is selected in the lower reaches below any effluent but at least one-half mile upstream of its confluence with the receiving stream. A sample site is also selected near the headwaters and above any effluent discharge if the stream was not 100% effluent dominated at the point of discharge. If there is no water upstream of the point source discharge then a sample site should be selected immediately downstream of the outfall. If the stream is several miles long and has numerous access points, a third or more sample sites should be selected for collecting additional physical, chemical or biological data. On longer streams, sites are selected after reconnaissance to allow selection of the least impacted and most representative sites. The length of each sample site where physical and biological data are collected, generally range in length from 100 to 300 meters. Care should be taken to ensure that each site selected is representative of the particular reach of stream being evaluated.

PHYSICAL

Physical characteristics of each stream should be measured and inventoried by incorporating several methods of evaluation as described by Platts et al. (1983), U.S. Environmental Protection Agency (EPA)(1983), Karr et al. (1986) and EPA (1989).

A data sheet should be completed for each stream listing specific characteristics under the general headings of watershed description, hydrology, channel morphology and structure, streambed composition, and banks and riparian. These data sheets have evolved through several OWRB stream surveys with numerous authors. The function of these sheets is to facilitate describing the true condition of a given stream. These data sheets are available at the OWRB offices.

Watershed description characteristics include stream length, watershed area, recent precipitation and rural and urban land use descriptions. Some of this data is entered on site and some completed with the aid of U.S. Geological Survey topographical maps. Stream Order is determined with 7.5 minute (1:24,000) USGS maps including intermittent and ephemeral channels (Strahler 1957) as was stream link magnitude (Osborne 1992).

Methods for documenting stream habitat quality are as described in Sections 5.1.1, 5.2.1, 5.2.2 and 5.2.3 of the Rapid bioassessment Protocol (EPA 1989). Raw data for each site are recorded in the aforementioned data sheets for later assessment of the Habitat Metrics outlined in and modified from Section 5.2.

Hydrology includes total discharge measured with a Marsh-McBurney Model 201 portable water flow meter and utilizing methods described by Platts et al. (1983). A sheet for recording these data is included in the field sheet package. Water source is noted if possible. Total discharge is calculated with this formula:

$$Q = \sum_{i=1}^{n} (w_{i+1} - w_i) \frac{d_i + d_{i+1}}{2} \frac{v_i + v_{i+1}}{2} \tag{10}$$

where:

n	=	the total number of individual sections
w_i	=	horizontal distance from initial point
d_i	=	water depth at location i
v_i	=	measured velocity at location i

Calculation of total discharge is then accomplished with aid of a lotus spread sheet in a similar format to the field sheet.

Channel morphology and structure characteristics describe the macrohabitats and large features of the stream by estimating what percentage of each stream was comprised of pools, riffles and runs, descriptions of undercuts, and presence of large instream structures and channel alterations. Streambed composition characteristics describe microhabitats by estimating percent composition of streambed material, percent embeddedness, and presence of small and particulate organic material.

Banks and riparian zone characteristics require evaluating streamside cover by estimating percent composition of grasses, shrubs, trees, or other cover, shading by overhead canopy cover, bank material composition, bank slope, and presence of bank erosion. Estimated minimum, maximum and average riparian width are recorded. Any unusual or human-induced physical impacts are noted in this section as well.

Alternative/additional methods supplementing the previously described physical habitat assessment are semi-quantitative estimates of stream morphology and instream structure. This procedure is done on wadable streams for the purpose of documenting limiting habitat features. Streams with depths greater than 1.5 m proved too deep for this method. By breaking a site into small segments, depths, stream width, instream cover, substrate composition, etc. can be combined on a spreadsheet to derive a more objective description of the instream habitat. These methods were similar to, and partly modified from, McCain et al. 1990. Field sheets are photocopied on to all weather paper for use while wading.

Distance traveled for these methods are measured with a Chainman II trailing string distance measurer calibrated in 0.1 meter increments. With this device, stations are established beginning at a recorded starting point and every five, ten or twenty meters (depending on stream size and homogeneity) for a total of twenty to thirty stations. Total distance assessed should be approximately 30 times the average stream width. Generally, this is done wading along the center of the stream.

At each station, thalweg depth should be measured to the nearest 0.1 meter; stream width is estimated to the nearest meter using a 1.5 meter staff as reference, habitat type (pool, run, riffle, or dry) was noted and percent composition of each substrate type is estimated. Instream cover such as logs, undercutting, roots and trash are also noted.

Raw data are then entered in a Lotus spreadsheet to calculate mean habitat depths, maximum depth, depth distribution, percent habitat types and substrate composition. This information is used to supplement the previously described field sheets.

All physical characteristic information is recorded by photographic documentation and onto the data sheets while at the site or immediately thereafter.

Upon returning from the field, the recorded information is used to make an assessment of combined physical characteristics of a stream by means of the habitat assessment metric sheet modified from EPA (1989). The habitat assessment metric sheet is used to obtain an empirically derived habitat score for each stream.

For evaluating the physical characteristics of a stream for Body Contact Recreation classifications, a minimum criteria in which "... direct body contact with the water where a possibility of ingestion exists..." (Rule 300.11, OWRB) is used for classifying a stream as either PBCR or SBCR. This involves utilizing methodologies previously used by the OWRB (Unpublished manuscript). The criteria used for determining PBCR is water depth equal to or exceeding 0.5 meters in at least 20% of the stream. Instream log jams, boulders, and brush piles must be infrequent where the water is deep enough for total body submersion, and the substrate must be composed of a material which is not dangerous to walk on. This criteria was established in order to permit an objective decision to be made for body contact recreation classifications. Occasionally, a stream may be encountered that does not meet the established criteria for PBCR throughout most of its length but has a short section suitable for that classification. This exception is taken into consideration where appropriate.

For evaluating a stream for a PPWS beneficial use the total instream flow was measured. The criteria for assigning this beneficial use to a stream is a minimum stream discharge of at least 2.0 cfs from a reliable source (i.e. not effluent dominated) and good attainable water quality.

CHEMICAL

Chemical components of the stream are measured to obtain existing water quality information for several purposes. Usually, water quality is measured to detect natural and man-induced constraints to attaining Fish and Wildlife Propagation, body contact recreation and PPWS beneficial uses. In most cases water quality is measured at sites upstream and downstream of a discharge effluent mixing zone to measure impacts resulting from the discharge.

Chemical characteristics measured at most sites include: temperature, dissolved oxygen, pH, specific conductance, alkalinity, total hardness, total ammonia, and secchi disk depth. These parameters are measured at one to four sites on each stream, depending on presence and proximity of effluent discharges to sampling sites and proximity to other sampling sites. All measurements are made between late morning and late afternoon hours.

For pH, specific conductance, alkalinity, total hardness, and total ammonia, a one liter sample of water is collected in a clean plastic bottle. A Hach digital titrator is used for measuring alkalinity and total hardness using methods described by Hach (1988). pH is measured with an Orion model 2021 pH meter. Specific conductance is measured with a Yellow Springs Instruments (YSI) model 33 portable conductivity/salinity meter. Total ammonia is measured with a Hach model NI-8 ammonia test kit. Dissolved oxygen (DO) is measured at varying depths by utilizing a YSI model 57 dissolved oxygen meter. Temperature is measured with the YSI model 57 DO meter. All equipment is rinsed with deionized water between measurements.

BIOLOGICAL

In order to determine existing beneficial uses and biological integrity of a stream; aquatic macroinvertebrates, and fish, are sampled at most sites. Aquatic macrophytes and algae are also sampled if appropriate. Current beneficial uses are indicated by the presence or absence of an intolerant climax fish community and a full range of aquatic macroinvertebrates, both of which help define a WWAC. A stream capable of supporting an intolerant climax fish community is one with "Habitat and water quality adequate to support game fishes or other sensitive species introduced or native to the biotic province or ecological region, which require specific or narrow ranges of high quality environmental conditions" (OWRB 1994). Therefore, as part of the procedure to determine the existence of a WWAC, fish samples are analyzed to determine fish community composition. If the sample consists of game fishes or other sensitive species which require specific or narrow ranges of high quality environmental conditions, then the community is considered an existing WWAC and is recommended as a beneficial use. Fishes tolerances to habitat and water quality degradation as listed by Jester et al. (1992) are used to make this determination. Abundances within each species are not considered since the method of sampling (seining), which was used for most streams, is biased towards smaller pelagic species. Abundances are considered with age class structures, however, for situations requiring more information for a sound decision.

Fish sampling is done by two crew members pulling an eight foot 1/8 inch mesh seine for 1.5 to 5.0 meters through all available habitat types throughout the sample site. Riffle dwelling species are sampled by holding the lead-line of the seine on the substrate across the lower end of the riffle while one or two crew members agitated the substrate with their hands and feet for several square meters upstream of the seine. Electrofishing gear consisting of a 220 volt generator and Coffelt rectifier and electrodes or a Smith-Root backpack shocking unit are used in instances where representative sample sites are readily accessible but difficult to seine. All sampled species and abundances are noted for each sample site with samples of unidentifiable species preserved in 10% formalin solution for later identification. Identification is done utilizing keys by Miller and Robison (1980) and Robison and Buchanan (1989).

The presence of a full range of warm water benthos in a stream is also supporting and indicative of an existing WWAC. If the aquatic macroinvertebrate community consists of several species which collectively require a variety of microhabitats, then it was assumed that the habitat was suitable for the full range of warm water benthos. This is determined by utilizing methods described by EPA (1989) for Rapid Bioassessment Protocol I - Benthic Macroinvertebrates methodologies which were designed to detect the presence of an impact to a stream. These methods require sampling from all available habitat types to detect presence and estimate relative abundances of various macroinvertebrate taxons.

Sampling of aquatic macroinvertebrates is done with a 34 cm wide triangular shaped, fine mesh dip net. For riffle habitats, the net is held perpendicular to the substrate at the downstream end of the riffle while the upstream riffle substrate is agitated to release many of the clinging organisms to drift into the net. If riffle habitat is not available, the dip net is pulled through submerged aquatic vegetation or roots along with sampling fine particulate organic matter such as decaying leaves from most sites for sampling aquatic macroinvertebrates. All aquatic macroinvertebrates are identified to the order level and some identified to the family level. In many cases aquatic macroinvertebrates are semi-quantitatively assessed by identifying and counting in the lab after collection and preservation with 90% ethanol in the field. Other methods for sampling aquatic macroinvertebrates include visual observations such as mussels, picking up rocks and other suitable substrates for aquatic macroinvertebrate colonization, and incidental catch of larger species such as crayfish in the seine while sampling fish.

Other trophic levels of the biotic community sampled include primary producers (including shoreline macrophytes). This is done primarily to assist in detecting nutrient enrichment since periphyton and phytoplankton have been shown to increase in biomass with increased nutrient loads (Wetzel 1983, Elwood et al. 1981 and Triska et al. 1983).

The final steps in the process of assigning a beneficial use designation to a stream involves an analysis of the biotic and abiotic factors comprising the stream and watershed. Total fish species richness was plotted against habitat assessment scores. This graph, fish and macroinvertebrate community composition, and a frequency distribution of habitat assessment scores are used for comparative purposes and to determine if the stream community was at the highest biological potential attainable for the physical habitat available. After analyses of data, a flow chart for assigning beneficial uses to unlisted streams is followed to derive at a final recommendation. A stream is assigned a WWAC beneficial use unless the water chemistry and habitat were not adequate to support it as described in Oklahoma's WQS definitions for HLAC (OWRB 1994). Streams with a low habitat assessment score are assumed not capable of supporting a WWAC regardless of water quality and streams with a high habitat assessment score are capable of sustaining a WWAC unless precluded by naturally occurring water quality. In complying with 40 CFR §131.12(a)(1), if a WWAC type of community is found to currently exist in a stream, then that stream is designated a WWAC in order to protect that existing beneficial use even if it received an intermediate habitat assessment score. If, however, a stream receives a low habitat assessment score but is found to contain an existing WWAC, the stream is reassessed to determine if an error was made in assessing the habitat or if the fish sampled are actually an anomaly to the system, such as relics from farm pond washouts. If evidence indicates that a low habitat assessment score is a result of an impact to the habitat then a stream is more closely evaluated to determine if removal of the impact will allow the existence of a WWAC. In the event of lower than expected biological integrity for a given habitat assessment score, a water quality problem may be present which may be limiting the attainment of a WWAC. In this case a determination is made as to whether or not available habitat could support a WWAC if the cause of the poor water quality is removed. This is done by utilizing biological and water quality data collected upstream from possible sources of pollution or from a nearby reference stream to make the final beneficial use recommendation.

PUBLIC PARTICIPATION PROCESS/DESIGNATING DETERMINED USES

Upon completion of the UAA field work and report development phases, uses are designated in the Oklahoma's WQS Appendix A through the WQS revision process. In general, proposed uses are presented to affected industries and municipalities at an informal meeting. During this meeting, the Use

Attainability Process is presented along with recommended beneficial uses. During the subsequent WQS revision process, public meetings and hearings are conducted during which comments are received, and answered, from all concerned parties. The WQS revision process is reviewed more thoroughly in a subsequent chapter.

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Intensive Surveys

Intensive Survey Materials and Methods to Determine Beneficial Uses

In rare instances, it is not possible to designate uses to a waterbody based upon a one-day survey. In these instances, an more intensive survey is required.

These intensive studies generally involve more exhaustive chemical, physical and biological analysis. Continuous recording of physio-chemical parameters, and the deployment of periphytometers and benthic macroinvertebrate substrates are commonplace. Because of the time and manpower commitment required to perform intensive studies, they are undertaken only when one-day studies do not render uses.

Methods to perform an intensive UAA are given in EPA's "WQS Handbook" published in December, 1983. Oklahoma has refined these methods over the last decade, especially as illustrated by the OWRB's one-day survey (Unlisted Streams) program. Additional documentation is available through the OWRB. Because of the effectiveness of these one-day surveys, it is seldom necessary to undertake an intensive survey. Occasionally, after a single sampling season, a streams uses may be inconclusive. A reevaluation the next summer will usually allow the designation of uses.

Intensive UAA's are never-the-less invaluable tools in the designation of uses. Through the use of more exhaustive field and laboratory methods, uses can be more specifically assigned. The following are general intensive UAA methods.

Physicochemical

Physical and chemical variables are measured throughout the study to characterize water quality and detect potential limiting conditions for aquatic life. Water quality data may be obtained using two types of sampling: on-site, *in-situ* measurements (hereafter referred to as field measurements) and more exhaustive laboratory analysis. Most water quality data originate from field measurements. Several replicates of field measurements (to document temporal variability) are taken to allow statistical analysis among sites. Methods for field and laboratory measurements are given below.

Field Measurements

The following parameters should be measured on-site (method of analysis in parentheses): dissolved oxygen (Hydrolab 4041 or Hach digital titration method), water temperature (thermometer, Hydrolab 4041, or YSI Conductivity meter), pH (Hydrolab 4041), conductivity (YSI conductivity meter or Hydrolab 4041), total hardness (Hach digital titration method), total alkalinity (Hach digital titration method), and ammonia nitrogen (Hach colorimetric titration). The Hydrolab 4041 instrument must be calibrated prior to use using manufacturer's standards and methods. In addition, accuracy of Hydrolab dissolved oxygen measurements should be verified by comparison with Winkler titration results using split samples. The YSI conductivity meter must be calibrated before each analysis. Between 7-9 replicate field measurements should be taken at all sites during July through September, 1989.

Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity (hourly readings) during 3-4 days should be conducted using a Hydrolab DataSonde Model

2240H (or similar) continuous recorder. The purpose of this sampling is to determine diel variability of critical water quality parameters. Continuous monitoring should be conducted from July - September, or during critical conditions.

Pre-dawn measurements of dissolved oxygen, pH, conductivity, and temperature should be obtained at all sites. Pre-dawn measurements are taken to determine if limiting dissolved oxygen conditions are present at any site.

LABORATORY MEASUREMENTS

Water samples at all sites should be collected and preserved for laboratory analysis. At a minimum, the following parameters should be analyzed from these samples: Chloride, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Nitrite N as N, Nitrate N as N, Ammonia N as N, Kjeldahl N as N, Total phosphorus, Ortho-phosphorus as P, Turbidity, Total Suspended Solids (TSS), fecal coliform, fecal streptococcus, Sulfate, Copper, Iron, Zinc, and Manganese. Procedures for analysis should follow those in *Methods for Chemical Analysis of Water and Wastes* (EPA, 1982) and *Standard Methods for the Examination of Water and Wastewater* (APHA et al., 1988). Quality assurance procedures should follow those in *Quality Assurance Plan, Use Attainability Analysis Fishery, and Body Contact Uses* (OWRB: FY-88, 205(j)(1)).

HYDROLOGICAL

Flow measurements are taken using a top-setting flow rod and portable Water Flow Meter. Instantaneous cross sectional flows are taken at six inch or one foot intervals depending upon overall stream width. Utilizing instantaneous flow velocity (feet/second) and depth, a volume may be calculated in cubic feet per second (cfs).

This method is further described in the QA/QC plan or the *Marsh-McBirney, Inc. Model 201/201D Portable Water Flow Meter Instruction Manual* (Marsh-McBirney, Inc., 1985). Replicate measurements should be taken at least every fifth flow.

HABITAT

Both habitat quality and availability play major roles in the type and quantity of organisms in an aquatic community. However quantification of this qualitative parameter is difficult because habitat requirements for aquatic life uses vary among regions of the State.

In the past, the OWRB has utilized a pair wise statistical comparison to evaluate the quantity and quality of available habitat as it was assessed by field personnel. Although this method has proven effective, it still relied upon each member of the field team to make observations afield and transcribe them into non-standardized rankings or evaluation scores.

EPA's Rapid Bioassessment Protocol requires that similar habitat quantity and quality observations be made by field personnel, but transcribes those observations through the use of a standardized metric system. The result is an assignment of numerical values to a series of habitat questions. These numerical scores are then summed to achieve an overall habitat ranking score.

These habitat ranking forms have been modified to more accurately reflect Oklahoma conditions. The use of these forms is evaluated in the one-day survey method. Copies of this form is available through the offices of the OWRB. These forms should be filled out by each senior member of the UAA crew. For a more detailed description of this Habitat Assessment method, see the EPA publication *Rapid Bioassessment Protocols For Use In Streams And Rivers: Benthic Macroinvertebrates And Fish* (EPA/444/4-89/001, May 1989).

To retain some consistency within the State in habitat evaluations, OWRB habitat evaluation data sheets may also be utilized. These data sheets enable a knowledgeable investigator to evaluate instream habitat, bank habitat, erosion potential, etc. Although pair wise habitat comparisons need not be completed for these studies, the combination of previously used habitat evaluation forms and the EPA published Rapid Bioassessment Habitat Assessment techniques provide a definitive evaluation of extant aquatic habitat.

BIOLOGICAL

PERIPHYTON

Periphyton (attached algae) are useful indicators when assessing the environmental characteristics of a site. Periphyton analysis can be important when determining the overall health of a stream, assessing enrichment, or as an aid in evaluating other measurements such as dissolved oxygen or pH. Relative pollution levels may be estimated through taxonomic identification. For collection of periphyton these studies should utilize periphytometers deployed at each site for a two week colonization period.

Four replicate periphytometers are placed at each site following EPA methods (EPA, 1973). Sample locations are selected to maintain comparable shading and velocity among sites. These are standardized by placement in pool habitats and areas of similar canopy. Metal posts are driven into the substrate and periphytometers are attached using wire. Care should be taken to avoid heavily traveled roads (to prevent vandalism) and areas prone to rapid water level fluctuations during rainfall events.

Each periphytometer contains six standard microscope slides, giving a total of 24 separate slides per site. Three sets of five are then randomly sorted into three separate plastic containers. One replicate per site should be preserved with Lugols iodine for taxonomic identification and enumeration in the laboratory (EPA, 1973). Data from these samples are reported as total individuals, total species, density (individuals / unit area), and species diversity (d) (Wilhm and Dorris, 1968; and Patten, 1962).

The Oklahoma Conservation Commission have developed alternative periphyton methods which utilize glass rod, instead of slides, as the periphyton colonization substrate. These have proven effective.

BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrates are often reliable indicators of environmental quality. Because of their limited mobility and diverse habitat requirements, the quality and quantity of benthic organisms may be used as indicators of water quality when assessing the best present and potential beneficial uses of a stream.

UAA's may utilize two methods of invertebrate collection, Hester-Dendy artificial substrates and Rapid-Bioassessment techniques.

Hester-Dendy artificial substrate samplers are constructed according to Hester and Dendy (1962). These samplers are standardized by placement in areas of comparable shading and stream velocity. At these sites, metal posts are driven into the substrate with sampler attachment approximately 10 cm from the substrate. Each site utilizes four separate Hester-Dendy samplers and allowed a six week colonization period. Surface area of each sampler should equal 779 cm^2.

After this six week colonization period, the samplers are collected, resident organisms removed and field preserved for laboratory analysis.

The Rapid-Bioassessment method involves the use of a hand-held benthic collection net used to collect invertebrates from different habitats and substrates. We generally follow the procedures described in benthic Protocol II to randomly sort and identify collected organisms. These methods are more thoroughly discussed in the EPA publication *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish (1989)*.

FISHES

Fishes are sampled by both seining and electrofishing to collect as many different fish species as possible at each site because the singular use of one method may bias the sample (seining biases toward smaller fish and electrofishing toward larger fish). A depletion sample should be done to, as definitively as possible, collect the majority of fish species present at each site. This depletion sampling involves resampling high productivity areas until each resampling effort yields no additional results.

Seining is generally accomplished using a ten foot, 1/8 inch square mesh minnow seine following methods described by EPA (EPA, 1973). Approximately 200-400 meters are seined at each site. A variety of habitats must be included such as pools, riffles, runs, log jams and undercut banks. Because the goal of fish collection in UAA sampling is to obtain an estimate of fish species at a site, more time is expended in those areas which prove to be the most productive in terms of species richness.

Electrofishing consists of positive and negative hand held electrodes which discharged a manipulated DC electrical current or a back pack shocking unit. Electrical pulse width, frequency, amperage and voltage are manipulated with a Coffelt VVP-15 placed in series with a 220 volt generator or through varying the dials a-p and 1-20 on the backpack shocker. In general, a four man team requires approximately one hour of actual sampling time to adequately sample each site.

Every effort should be made to standardize both seining and shocking procedures among sites. Collection notes of importance include: seining and electrofishing occur at least four weeks apart with seining conducted first; seining and electrofishing both included approximately a one hour of sampling period and cover a minimum 200 meter stretch and; more productive areas of all sites receive a greater collection effort.

All fishes collected in the field are preserved in a 10% formalin solution and transported to the lab for identification and enumeration. Those individuals too large for proper preservation and/or easily identifiable in the field are identified, weighed, measured (total length), checked for diseases, parasites or abnormalities, and released.

Fishes are subsequently identified from the keys of Miller and Robison (1973), Pfliger (1968), and Robison and Buchanan (1984).

EVALUATION

Several indices, formulas and coefficients may be utilized in an effort to gain an understanding of the biological data. This understanding is important in establishing each sites relative quality, and both existing and potential aquatic life uses. They include:

Sorensens coefficient (Index of Similarity) (1948)

$$S_s = \frac{2c}{a+b} \tag{11}$$

where:

a	=	number of taxa in community a
b	=	number of taxa in community b
c	=	number of taxa common to both

Coefficient of Community (Johnson and Brinkhurst, 1971 and Jaccard, 1912)

$$S_{cc} = \frac{a}{a+b+c} \tag{12}$$

where:

a	=	number of taxa in community a
b	=	number of taxa in community b
c	=	number of taxa common to both

Margalefs Index (1958)

$$D_M = \frac{s-1}{\ln N} \tag{13}$$

where:

s	=	number of species in population sampled
N	=	number of individuals in population

Menhinicks Index (1964)

$$d = \frac{s}{\sqrt{n}} \tag{14}$$

Shannon-Weaver Index (H)(1949)

$$H = -\sum\left(\frac{n_i}{n}\log\frac{n_i}{n}\right) \tag{15}$$

where:

n_i	=	number of individuals in a species i of a sample population
n	=	number of individuals in a sample population

Hurlberts PIE (1971)

$$PIE = \left(\frac{N}{N-1}\right)\left(1-\sum P_i^2\right) \tag{16}$$

where:

N	=	number of individuals in a population
P_i	=	the fraction of a sample of individuals belonging to species i (n_i / n)

Other indices may provide additional insights, and many are given in numerous OWRB and EPA publications.

PUBLIC PARTICIPATION PROCESS/DESIGNATING DETERMINED USES

Upon completion of the UAA field work and report development phases, uses are designated in the Oklahoma's WQS Appendix A through the WQS revision process. In general, proposed uses are presented to affected industries and municipalities at an informal meeting. During this meeting, the Use Attainability Process is presented along with recommended beneficial uses. During the subsequent WQS revision process, public meetings and hearings are conducted during which comments are received, and answered, from all concerned parties. The WQS revision process was reviewed more thoroughly in Part I of this Chapter.

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PART III WATER QUALITY STANDARDS IMPLEMENTATION

The explanation of how both narrative and numerical criteria found within Oklahoma's WQS are to be translated into permits (commonly called water quality standards implementation) is statutorily assigned to the OWRB. These implementation procedures are to be followed in the development of both industrial and municipal permits under the National Pollutant Discharge Elimination System (NPDES).

ADOPTION AND ENFORCEABILITY OF WATER QUALITY STANDARDS IMPLEMENTATION DOCUMENTS

The OWRB has been given statutory authority to develop and promulgate implementation documents to be utilized by all Oklahoma agencies in the discharge of their duties. Specific language in 82 O.S. Supp. 1993, §1085.30(c) reads in part:

> "The standards of quality of the waters of the State, implementation documents and classification of such waters or any modification or change thereof shall be adopted and otherwise comply with the Administrative Procedures Act and shall be enforced by all state agencies within the scope of their jurisdiction."

Staff of the OWRB, through cooperation with other appropriate state agencies and the U.S. EPA, have currently completed implementation documents for (a) Narrative criteria to protect aquatic life, (b) Numerical criteria to protect aquatic life, (c) Numerical criteria to protect Human Health and the (d) Antidegradation Policy. These implementation documents are dynamic, and will require periodic updating.

Because of the potential impact of WQS Implementation Documents to permittees and the environment, the Board is statutorily mandated to subject these implementation documents to the rulemaking process as described in the APA. This includes: Public Notices and comment periods, public hearing(s), Board approval, and Legislative and gubernatorial approval. These requirements are outlined in the previous chapter concerning state requirements for water quality standards approval.

These implementation documents will principally reside in the OWRB's "Rules, Regulations, and Modes of Procedure" codified at Title 785, Chapter 46 in the OAC. These implementation documents are reiterated in part in the following sections. However, because the CPP is promulgated through the Department of Environmental Quality (DEQ) and not the OWRB, implementation documents found in OAC 785:46 take precedence over those outlined in the CPP, as specified at OAC 785:46-1-1. DEQ and OWRB will resolve disputes on implementation of the WQS through the rulemaking and public participation process.

These implementation documents represent the minimum requirements necessary to ensure discharger compliance with specific criteria of the WQS. Nothing contained within these implementation documents shall be construed to limit additional or more restrictive requirements placed on the permittee by a permitting authority.

PURPOSE, SCOPE AND APPLICABILITY OF IMPLEMENTATION DOCUMENTS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"<u>785:46-1-1. Purpose, scope and applicability</u>

(a) ÿImplementation rules in OAC 785:46 shall be applicable to all activities which may affect the quality of waters of the state. The implementation rules in OAC 785:46 are the only binding and enforceable statements for implementing the "Oklahoma Water Quality Standardsÿ.

(b) If a permittee can demonstrate to the satisfaction of the permitting authority that scientific methods, data, or implementation procedures different than those specified in this Chapter [OAC 785:46] will achieve a more appropriate or representative implementation of the Standards, then the permitting authority shall use or apply such methods, data, or procedures to implement the Standards. In those circumstances where the permitting authority does not agree that the permittee's proposed scientific methods, data, or implementation will result in a more appropriate or representative implementation of the Standards, the permittee may request a review of the proposed scientific methods, data, or implementation by the agency responsible for Standards implementation who shall determine its appropriateness.

(c) Implementation rules provide a bridge between water quality standards in OAC 785:45 and water quality management. For example, water quality standards contain numerical criteria to protect aquatic life. Permits incorporating these criteria must be issued to limit effluent concentrations so that the criteria are not violated outside the mixing zone. In this case the implementation rules describe how the criteria are translated into permit limits.

(d) Subchapters in OAC 785:46 are arranged in the sequence in which they were drafted by the Oklahoma Water Resources Board staff and adopted by the Oklahoma Water Resources Board. Following the initial promulgation of OAC 785:46, additional subchapters and implementation rules may be promulgated as the need arises."

IMPLEMENTATION OF NARRATIVE TOXICS CRITERIA IMPLEMENTATION TO PROTECT AQUATIC LIFE USING WHOLE EFFLUENT TOXICITY (WET) TESTING

DEFINITIONS

Acute test failure is defined as greater than or equal to 50% lethality to appropriate test organisms in 100% effluent in 48 hours. Acute test failure is used to determine compliance with the prohibition of acute toxicity in stream.

Acute toxicity means a statistically significant difference (at the 95% confidence level) between survival of the appropriate test organism in a test sample and a control sample.

The acute to chronic ratio is defined as $ACR = LC_{50} / NOEC$. The NOEC is the highest concentration at which no effect on test organisms is observed over a relatively long period. Quarterly biomonitoring over the life of the permit is sufficient to determine the ACR if the NOEC and LC_{50} may be determined. If the ACR is unknown, a default value of 10 may be used for implementation purposes.

Chronic test failure means a statistically significant difference (at the 95% confidence level) between survival of the appropriate test organism in the low flow dilution (LFD) after 7 or 21 days and a control. Statistical analyses shall be consistent with methods described in EPA 600/14-89/001, or most recent revision. Chronic test failure is used to determine compliance with the prohibition of chronic toxicity outside the mixing zone.

Chronic toxicity means a statistically significant difference (at the 95% confidence level) between longer term survival and/or reproduction or growth of the appropriate test organisms in a test sample and a control.

For implementation purposes, the endpoint for acute or chronic test failure is lethality.

For implementation purposes, a discharge to a lake is defined as a discharge within the lake's normal pool elevation, excluding lock and dam reservoirs, as listed in the Oklahoma Water Atlas.

48-hour LC_{50} (Lethal Concentration) as used in this section specifically for WET testing is defined as the percentage of effluent dilution water that causes mortality to 50 percent of the test organisms within 48 hours.

No Observed Effect Concentration (NOEC) as used in this section specifically for WET testing is defined as the greatest effluent dilution which does not result in growth, reproduction, or lethality that is statistically different from the control (0% effluent) at the 95 % confidence level.

An outfall is defined as a point source which contains all of the effluent being discharged to the receiving water.

For implementation purposes, a discharge to a stream is defined as any discharge outside the normal pool elevation (as listed in the Oklahoma Water Atlas) of a lake. Discharges to lock and dam reservoirs, such as Webbers Falls and Robert S. Kerr are considered discharges to streams.

Significant non-lethal effect is defined as a statistically significant difference (95% confidence level) between reproduction or growth of a specific test organism in a dilution specified by the LFD and the control. Statistical analyses used shall be consistent with methods described in EPA 600/4-89/001, or most recent revision.

A Toxicity Reduction Evaluation (TRE) is an investigation intended to determine those actions necessary to develop water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. It is defined as a step-wise process which combines toxicity testing and analysis 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.

INTRODUCTION

The CWA and EPA regulations require the use of an "integrated strategy" to achieve and maintain the fish and wildlife propagation beneficial use (EPA, 1990). This integrated strategy involves the use of both the whole effluent toxicity control approach and the chemical specific approach.

The integrated strategy is necessary to protect the fish and wildlife propagation beneficial use. The whole effluent approach can deal with a complex mix of toxic substances in an effluent, but the chemical specific approach cannot. The chemical specific approach can deal with background toxicity, but the whole effluent approach cannot.

The Oklahoma WQS 1994 contain narrative criteria to protect the fish and wildlife propagation beneficial use. Section 785:45-5-12(e)(6)(A) states "Surface waters of the State shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside the mixing zone. Acute test failure and chronic test failure shall be used to determine discharger compliance with these narrative aquatic life toxics criteria." Section 785:45-5-26(a)(2) states "Acute toxicity within the mixing zone is prohibited."

EPA Region 6 has provided guidance for the implementation of these narrative criteria. EPA's "Post Third Round NPDES Permit Implementation Strategy" addresses narrative criteria. The intent of the strategy is to prevent discharge of wastewater from any source which results in acute aquatic toxicity, or in chronic toxicity after dilution of the effluent with receiving water. This strategy is implemented by applying appropriate whole effluent toxicity (WET) limitations to the discharge. Specific state required effluent limits or monitoring for whole effluent toxicity will be imposed as required by the State water quality standards and implementation rules(see OAC 785:46-3). EPA Region 6's "Post Third Round Implementation Strategy" for narrative toxicity is incorporated into this document by reference.

This document sets forth an implementation procedure by which the State of Oklahoma regulates point source discharges so that they do not violate the narrative toxicity prohibitions in the Oklahoma WQS which protect aquatic life. The procedure follows EPA Region 6 guidance for whole effluent toxicity and insures that the criteria are met by effluent discharged to receiving waters. Section 785:45-5-12 of the Oklahoma WQS requires that this procedure be placed in this document. Certain sections which follow are excerpted from OAC 785:46.

APPLICABILITY AND SCOPE OF NARRATIVE CRITERIA IMPLEMENTATION

Section 785:45-5-4 of the 1994 Oklahoma WQS addresses applicability of narrative criteria. The narrative criterion which prohibits acute toxicity shall be maintained at all times and apply to all surface waters of the State. The narrative criterion which prohibits chronic toxicity applies at all times outside the mixing zone except when the receiving stream flow is less than the larger of 1 cfs or the ${}_7Q_2$, or to receiving streams listed as ephemeral in Appendix A of the Oklahoma WQS.

Although toxicity testing can be used to evaluate non-point source activities, the regulatory focus in Oklahoma is on point source discharges. At this time narrative implementation using the whole effluent approach will address only point sources.

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-3-1. Applicability and Scope

(a) The rules in this Sub-chapter provide a framework for implementing narrative criteria in OAC 785:45 which prohibit toxicity to aquatic life in waters of the state. This framework is based upon a testing method known as whole effluent toxicity (WET) testing. WET testing is to be used to address point source activities which have the potential for persistent effluent toxicity. A permitting agency may issue a whole effluent toxicity (WET) permit limit when more than one datum indicates a reasonable potential to exceed the water quality standards. However, a toxicity reduction evaluation (TRE) is not required unless continuing toxicity has been verified through WET testing.
(b) If effluent toxicity is not persistent, increased toxicity testing to determine the source of toxicity is required.
(c) If it is determined that toxicity is related to a particular chemical constituent, a numerical permit limit may be imposed for that toxicant.
(d) Toxicity from halogens (e.g. chlorine, bromine and bromo-chloro compounds) will be controlled by dehalogenation rather than WET testing. However, use of dehalogenation shall not exempt an effluent from the WET testing requirements of this Subchapter."

APPLICABILITY TO HALOGENS

The requirement of OAC 785:46-3-1(d) for dehalogenation is typically implemented as "no measurable amount in the effluent". For chlorine "no measurable amount" is considered to be less than 0.1 mg/L.

WHOLE EFFLUENT TOXICITY TESTING

Generally, two WET tests shall be used to implement the narrative criteria to protect fish and wildlife propagation. The 48 hour acute test will be used to protect against acute toxicity in the mixing zone, and the 7 or 21 day chronic test will be used to protect against chronic toxicity outside the mixing zone."

SPECIFIED WET TESTS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-3-2(b). Examples of Tests.

More specific tests and test organisms for determining whole effluent toxicity include:

(1) Chronic static renewal 7-day survival and reproduction test using *Ceriodaphnia dubia* (Method 1002.0) as described in Third Edition, EPA publication no. 600-4-91-002 (July 1994), "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", or most recent revision thereof.
(2) Chronic static renewal 7-day larval survival and growth test using fathead minnow (*Pimephales promelas*) (Method 1000.0) as described in Third Edition, EPA publication no. 600-4-91-002 (July 1994), "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", or most recent revision thereof.
(3) Acute 48-hour static renewal toxicity test using *Daphnia pulex* or *Ceriodaphnia dubia* as described in "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms", Fourth Edition, EPA publication no. 600/4-90/027F (August 1993), or most recent revision thereof.
(4) Acute 48-hour static renewal toxicity test using *Pimephales promelas* as described in "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms", Fourth Edition, EPA publication no. 600/4-90/027F (August 1993), or most recent revision thereof.
(5) Chronic 21 day test for *Daphnia magna* as described in American Society for Testing and Materials, "Standard Guidance for Conditions for the Renewal Life Cycle Toxicity Test with *Daphnia magna*", publication no. E1193, or most recent revision thereof.
(6) Other tests or test organisms specified by the permitting agency."

Differing requirements apply depending on the dilution capacity of the receiving water, which is represented by Q* and is defined as the ratio of effluent discharge (Q_e) to receiving stream flow (Q_u) and may be written as $Q^* = Q_e / Q_u$.

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language

"785.46-3-2(c). Differing Requirements Based Upon Dilution Capacity.

(1) Three different toxicity testing requirements exist. Each is based upon dilution capacity, represented by Q*.
(2) When Q* is less than 0.054, acute testing only will be required. This situation reflects a large stream dilution capacity or a lake discharge.
(3) When Q* is greater than 0.33, chronic testing only will be required. This situation reflects a small dilution capacity where the effluent comprises the entire mixing zone.
(4) When Q* is greater than or equal to 0.054 and less than or equal to 0.33, both acute and chronic testing will be required. This situation reflects intermediate dilution capacities when acute to chronic ratio variability does not allow either acute or chronic testing be run exclusively."

48 HOUR ACUTE TEST

In streams with large dilution capacities, the acute test will become more stringent than the chronic test and can be used alone to ensure that the prohibitions for both acute and chronic toxicity are met in stream. Two situations exist which satisfy these dilution requirements and allow the acute test only to be run. These are in large dilution capacity receiving streams and in lakes.

Hutcheson (1992 a) showed that the acute and chronic tests will be equally stringent when:

$$LFD * ACR = 1 \tag{17}$$

Where:

LFD = the low flow dilution and
ACR = the acute to chronic ratio

EPA's Technical Support Document (1990) recommends ACR = 10. For purposes of this implementation document the concept of ACR = 10 is converted to Q*, the dilution capacity. Therefore, Q* = 0.054 (See "Low Flow Dilution" below). When Q* < 0.054 it may be shown (Hutcheson, 1992 a) that the acute test is more stringent than the chronic test. In those situations where Q* < 0.054 the acute test can be used alone.

In lakes, the low flow dilution (LFD) cannot be determined because the assumptions in Equation11-13 are violated. It is not possible to establish a dilution series when the LFD cannot be determined. In these situations chronic testing is not appropriate and acute testing alone is used to implement narrative criteria.

In those situations where the dilution capacity is intermediate (0.054 < Q* < 0.33) the acute test is performed concurrently with a chronic test (See OAC 785:46-3-2(f), excerpted below).

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language

"OAC 785:46-3-2(d). Forty-Eight Hour Acute Test.

(1) “Acute screening tests are used for routine monitoring in lakes. when acute testing is required. Acute screening test investigations will utilize either *C. dubia* or *D. pulex* and *P. promelas*, and contain no less than 2 replicates of 10 organisms each (20 organisms) and one control sample containing no less than 2 replicates of 10 organisms each (20 organisms). Test duration shall be 48 hours. Test validity shall be based upon greater than or equal to 90% survival in the control. If acute test failure is observed in 100% effluent, the permittee shall, within 24 hours of becoming aware, notify the permitting agency and conduct a total of two acute definitive retests within the next 60 days. If acute test failure is not observed, the permittee shall continue testing, using the acute screening test.”

(2) Acute definitive tests are used to verify continuing acute toxicity following acute screening test failure. All procedures specified in 785:46-3-2(d)(2) for acute screening tests shall be employed for acute definitive tests. In addition, each acute definitive test shall contain no less than two replicates of a 0.75 dilution series (100%, 75%, 56%, 42%, 32% and control) containing no less than 10 individuals per dilution replicate to calculate an LC_{50} value. Test validity shall be based upon greater than or equal to 90% mean survival in the controls. If lethality is confirmed by acute test failure in a retest, the permittee shall initiate a toxicity

reduction evaluation (TRE). If acute test failure is not observed, the permittee shall continue testing, using the acute screening test."

7 OR 21 DAY CHRONIC TEST

In streams with small dilution capacities, the effluent comprises the entire mixing zone. Therefore, when Q* > 0.33 the chronic test only will prevent acute toxicity within, and chronic toxicity outside of, the mixing zone.

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-3-2(e). Seven or Twenty-One Day Chronic Test.

(2) Usually the 7 day test will be used to determine chronic test failure, and dilution and control water will be used in accordance with OAC 785:46-3-3(c). However, the 21 day test for *Daphnia magna* may be used to determine chronic test failure if the permitting agency determines that receiving stream toxicity is due solely to total dissolved solids in the *Ceriodaphnia dubia* test. In this case, *Daphnia magna* will allow use of the receiving stream for dilution and control water in the chronic toxicity test. *Daphnia magna* may not be used when the effluent TDS is greater than that of the receiving water. Chronic testing shall incorporate the 0.75 Low Flow Dilution (LFD) series (Appendix A of this Chapter [OAC 785:46]) with no less than 5 replicates of no less than 8 vertebrate organisms at each dilution and associated controls. For invertebrate organisms, the testing procedure specified in OAC 785:46-3-2(b)(1) shall be followed. Test validity shall be based upon greater than or equal to 80% mean survival in the controls. If chronic test failure is observed, the permittee shall, within 24 hours of becoming aware, notify the permitting agency. The permittee shall conduct a total of two chronic retests within 60 days following the failed test. If chronic test failure is not observed, the permittee shall continue chronic testing.

(3) Chronic retests are used to verify continuing chronic toxicity following initial chronic test failure. All procedures specified in 785:46-3-2(e)(2) for chronic testing shall be employed for the chronic retest. If chronic test failure is confirmed by either retest the permittee will initiate a TRE. If a toxicity retest at the low flow dilution demonstrates a significant non-lethal effect the permit may be reopened to require effluent limits, additional testing and/or a TRE to address non-lethal toxic effects. If toxicity retests indicate lethality at dilution # 5 but do not indicate lethality at the LFD the permit may be reopened to require effluent limits, additional testing, and/or a TRE to address chronic toxicity outside the mixing zone. If the effluent does not demonstrate chronic toxicity at the LFD, or lethality at dilution # 5 in either chronic retest, the permittee shall continue testing for the life of the permit."

Concurrent Acute and Chronic Testing

In streams with intermediate dilution capacities (0.054 < Q* < 0.33), acute to chronic ratio variability requires that both acute and chronic testing be conducted to prohibit acute toxicity within, and chronic toxicity outside of, the mixing zone.

All individual procedures described in 785:46-3-2(d) and 785:46-3-2(e) for acute and chronic testing respectively shall be followed for concurrent acute and chronic testing.

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-3-2(f). Concurrent Acute and Chronic Testing.

(2) If acute test failure is observed in 100% effluent, the permittee shall, within 24 hours of becoming aware, notify the permitting agency and conduct a total of two definitive retests in accordance with 785:46-3-2(d) during the next 60 days following the failed test. If acute test failure is not observed, the permittee shall continue testing, using the acute screening test. Chronic testing shall continue regardless of acute test results. The permittee shall conduct a total of two chronic retests in accordance with 785:46-3-2(e) during the next 60 days following the failed test. If chronic test failure is not observed, the permittee shall continue chronic testing.

(3) Retests required as a result of acute test failure only are not required to include chronic retesting. Retests required as a result of chronic test failure only are not required to include the 100% effluent samples to determine 50% mortality after 48 hours. If the effluent does not demonstrate chronic toxicity at the low flow dilution, or acute test failure in 100% effluent, the permittee shall continue testing for the life of the permit. If the effluent demonstrates chronic test failure or acute test failure during retesting, the permittee shall initiate a TRE."

SAMPLING FOR WHOLE EFFLUENT TOXICITY TESTING

WET testing shall be used to implement the narrative toxicity criteria in the Oklahoma WQS which apply to aquatic life. Procedures for obtaining samples for WET testing and reporting requirements will be set forth in this section.

SAMPLING FREQUENCY

WET sampling frequencies will be based on toxicity potential (both lethal and non-lethal effects) and effluent variability. Other factors may also influence the frequency of testing. The permitting authority has the option of increasing the frequency for highly variable effluent with a high potential for toxicity. Testing requirements for minor facilities will be determined on a case by case basis. The season when sampling is performed will be at the discretion of the permitting authority.

If, as the result of a TRE, the permitting authority suspects diazinon as the sole source of toxicity to *Ceriodaphnia spp*., it shall require the permittee to biomonitor quarterly during the period October through March, and monthly during the period April through September, inclusively. The permittee shall conduct influent and effluent diazinon monitoring concurrent with toxicity testing. The permit may be re-opened to require additional testing and/or inclusion of permit limits, including WET limits.

Minimum sampling frequencies for major industrial and municipal facilities are specified by EPA Region 6 (1992) and given below (Table 11). The sampling frequency is valid for the life of the permit.

TABLE 11: MINIMUM WET TESTING FREQUENCIES FOR MAJOR DISCHARGERS

MAJOR MUNICIPAL DISCHARGERS	

Size of Facility (MGD)	Sampling Frequency*
1 ≤ Design Flow < 5	1/year
5 ≤ Design Flow < 20	2/year
20 ≤ Design Flow	4/year
MAJOR INDUSTRIAL DISCHARGERS	
Type of Facility	Sampling Frequency*
Passed all third round testing	1/year
Failed a toxicity test or never tested	2/year
Facilities conducting TRE or toxicity likely	4/year
Facilities with highly variable toxic effluent	B.P.J.

* May vary on a case-by-case basis

SAMPLING PROCEDURES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"<u>OAC 785:46-3-3. Sampling for Whole Effluent Toxicity Testing</u>.

(a) A discrete 48 hour test will be required on each outfall. No combining of outfalls will be allowed for the 48 hour test, since acute toxicity is prohibited within the mixing zone. For chronic testing only, discharges with overlapping mixing zones may be combined, at the discretion of the permitting agency, and whole effluent chronic toxicity tests may be required on the combined effluent. Samples shall be combined in proportion to the flow for each outfall. If some of the discharges are not toxic, combining discharges may allow intermittent in stream toxicity if the discharge rates fluctuate. In these cases combined discharge testing will be disallowed. If the outfall originates from a lagoon with a retention time greater than 24 hours, composite samples may not be necessary. The permitting agency may determine that a grab sample near the discharge is sufficient.

(b) The toxicity test must be initiated within 36 hours after sample collection. No sample may be held for more than 72 hours prior to use.

(c) Laboratory dilution water or a grab sample shall be obtained for dilution and control water (0% effluent) to be used in the toxicity tests. The grab sample shall be uncontaminated receiving water collected upstream of and as close to the discharge point as possible. If the receiving water is unsatisfactory for dilution and control due to ambient toxicity, the permittee must substitute an appropriate dilution water, as described in "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms", EPA Publication no. 600/4-85/013, or "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", EPA Publication no. 600/4-89/001. The pH, hardness, conductivity and alkalinity must be similar to that of the receiving water. The permittee must report the toxicity of the upstream receiving water to the permitting agency."

REPORTING REQUIREMENTS

The permittee shall submit toxicity testing information to the permitting agency (DEQ) along with the self monitoring reports (SMR and DMR) at the end of the reporting period following the toxicity test unless otherwise required.

DILUTIONS FOR TOXICITY TESTING

WET testing requires that test organisms be subjected to various effluent dilutions. No dilutions are required for the acute screening test. A standard 0.75 dilution series is used for acute toxicity retesting. The dilution series for chronic toxicity testing is dependent on the LFD.

LOW FLOW DILUTION

The basis for the dilution series used for chronic toxicity testing will be the LFD. Hutcheson (1992 a) derived dilutions which are appropriate for implementation in Oklahoma. The LFD equations are given below:

$$LFD = \frac{1.94Q*}{1+Q*} \qquad Q* \leq 0.182 \qquad (18)$$

$$LFD = \frac{1}{6.17-15.51Q*} \qquad 0.182<Q*<0.3333 \qquad (19)$$

$$LFD = 1 \qquad Q* \geq 0.3333 \qquad (20)$$

where $Q* = Q_e/Q_u$.

Q_e is the largest thirty day average flow for an industrial discharge, if known, and the design flow otherwise. Q_u is 1 cfs or the ${}_7Q_2$ receiving stream flow, if known to be larger. Hutcheson (1992 b) discussed the assumptions which must be met in order to use these LFD's in whole effluent testing.

THE DILUTION SERIES

The dilution series is based on the LFD. A dilution series for toxicity testing is listed in Table 12.

TABLE 12: 0.75 DILUTION SERIES

Control				100 X LFD	
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	3.8	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	22	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
	12	16	21	28	37
	12	16	22	29	39

Control				100 X LFD	
0 %	1	2	3	4	5
	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

Control				100 X LFD	
0 %	1	2	3	4	5
	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
	29	38	51	68	91
	29	39	52	69	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
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	

Control				100 X LFD	
0 %	1	2	3	4	5
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	

To use Table 12, first find the applicable percent LFD in column 4. The dilution series is established by determining which row the LFD appears in. For example, where an LFD is 30%, the appropriate series would be 13%, 17%, 23%, 30%, and 40%, in addition to the required 0% Control. This series ensures that there will be only one dilution above the LFD, which aids statistical analysis. For facilities with LFDs greater than 75%, the LFD is the highest dilution used. This will result in four dilutions and the 0% Control below the LFD.

When the acute retest is being conducted, use the 0.75 dilution series with LFD = 100% (the last row in the Table) to calculate the LC_{50} value.

TOXICITY REDUCTION EVALUATION

The TRE is an important element in the implementation of narrative toxicity criteria in the Oklahoma WQS.

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"<u>OAC 785:46-3-4. Toxicity Reduction Evaluation</u>.

(a) A toxicity reduction evaluation (TRE) is required as a result of acute or chronic retest failure (lethality). However, the permitting authority may consider the use of a toxicity identification evaluation (TIE) as a means to correct the cause of observed toxicity before the implementation of a TRE. If the results of any failed toxicity retest are due to factors outside the control of the permittee, the permitting authority may allow the permittee to resample prior to requiring a TRE. If resampling does not result in test failure, no TRE is required. The TRE is an investigation intended to determine those actions necessary to achieve compliance with water quality based effluent limits by reducing an effluent's toxicity.
(b) The permittee shall submit a TRE Action Plan to the permitting agency."

TOXICITY REDUCTION EVALUATION INITIATION

The permittee shall submit a TRE Action Plan to the permitting authority within ninety (90) days of confirming persistent lethality.

TOXICITY REDUCTION EVALUATION ACTION PLAN

The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. The plan is intended to determine those activities necessary to achieve compliance with narrative toxicity limits by reducing effluent toxicity. The permittee shall follow EPA 600/2-88/062 for Municipal Facilities and EPA 600/2-88/070 for Industrial Facilities. Plan review by the permitting authority does not relieve the permittee of the consequences of failure to achieve the required toxicity reduction. The permittee shall initiate the TRE Action Plan within ninety (90) days of submittal.

TOXICITY REDUCTION EVALUATION SAMPLING PLAN

The sampling plan will describe the sampling locations, methods of collection and preservation, holding times and chain of custody. TRE sampling is conducted in addition to the regularly scheduled monitoring. The sampling plan, including analysis methods, must be approved by the permitting authority. Samples for both toxicity and suspected pollutants must be collected concurrently.

TOXICITY REDUCTION EVALUATION QUALITY ASSURANCE PLAN

The quality assurance plan must contain QA/QC implementation which conforms to approved test methods, be performed in accordance with established EPA guidance and be included by reference in the TRE Action Plan.

TOXICITY REDUCTION EVALUATION ACTIVITIES REPORT

The permittee shall submit a quarterly report on TRE and associated activities. This includes any documentation identifying the pollutants or sources of effluent toxicity and evaluations of the treatability of the effluent toxicity. Reports should be submitted with the self monitoring reports (SMR and DMR) following the reporting quarter.

FINAL REPORT

Within sixty (60) days of the completion of sampling the permittee shall submit a final report to the permitting authority. The report shall summarize TRE activities and evaluate various treatment alternatives. It shall identify the causative pollutant(s), identify the corrective action(s) chosen by the permittee and propose a reasonable schedule to eliminate effluent toxicity.

RE-OPENER CLAUSE

The permit may be re-opened to require additional testing and/or inclusion of permit limits based upon the results of the TRE. Usually The TRE will culminate in a WET test limit.

References

Generalized method for conducting industrial toxicity reduction evaluations (TRE). EPA 600/2-88/070.

Hutcheson, M. R. Wasteload allocation for whole effluent toxicity to protect aquatic organisms. Water Resource. Res., 28(11). 2989-2992, 1992a.

Hutcheson, M. R. Wasteload allocation for conservative substances to protect aquatic organisms. Water Resource. Res., 28(1). 215-220, 1992b.

Methods for aquatic toxicity identification evaluations: Phase I toxicity characterization procedures, EPA 600/6-91/003; Phase II toxicity identification procedures, EPA 600/3-88/035; and Phase III toxicity confirmation procedures, EPA 600/3-88/036.

Methods for aquatic toxicity identification evaluations: Phase II toxicity identification procedures for samples exhibiting acute and chronic toxicity, EPA 600/R-92/080; and Phase III toxicity confirmation procedures for samples exhibiting acute and chronic toxicity, EPA 600/R-92/081.

Methods for measuring the acute toxicity of effluent to freshwater and marine organisms. EPA 600/4-90/027F.

Oklahoma's water quality standards 1994. Oklahoma Water Resources Board, Oklahoma City, Oklahoma.

Oklahoma water atlas. Publication #135. Oklahoma Water Resources Board. Oklahoma City, Oklahoma. May 1990.

Post third round NPDES implementation strategy. EPA Region 6, Dallas Texas.

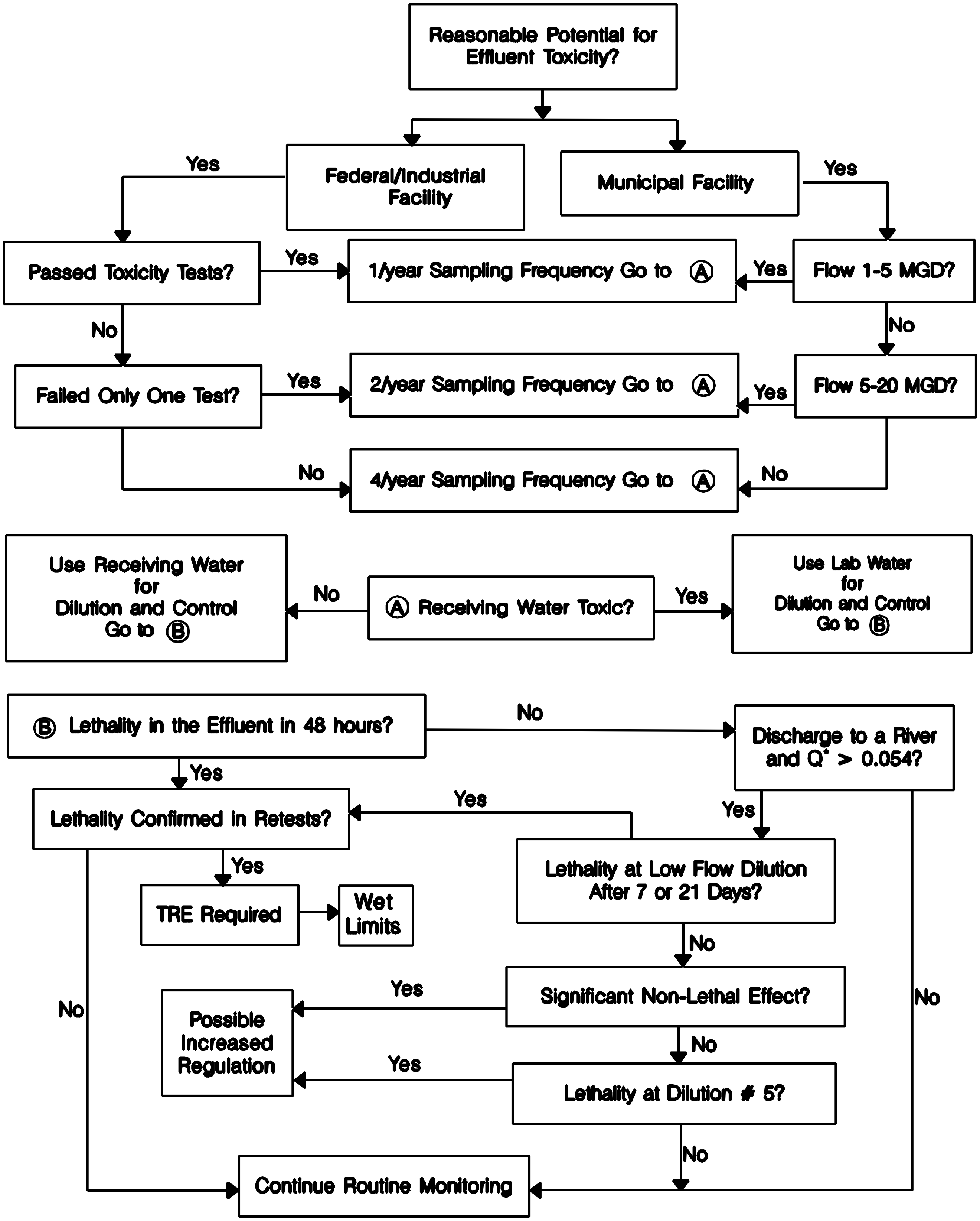
Short term methods for estimating the chronic toxicity of effluent and receiving waters to freshwater organisms. EPA 600/4-91/002.

Technical support document for water quality-based toxics control. EPA/505/2-90-001

Toxicity identification evaluation: characterization of chronically toxic effluents, Phase I. EPA 600/6-91/005F

Toxicity reduction evaluation protocol for municipal wastewater treatment plants. EPA 600/2-88/062.

FIGURE 1   DECISION TREE FOR NARRATIVE TOXICITY CRITERIA IMPLEMENTATION



Numerical Criteria Implementation to Protect Fish and Wildlife Propagation from Toxicity Due to Conservative Substances

Definitions

Acute Wasteload Allocation (WLA_a): WLA_a is the effluent concentration of a toxicant which will produce a maximum concentration on the mixing zone boundary equal to the numerical acute criterion.

Background Concentration (C_b): Concentration of the toxicant at the point of maximum concentration on the mixing zone boundary which is not attributable to the effluent. This concentration may be estimated using sites directly upstream from the discharge when it can be assumed that the background concentration is locally uniformly distributed in the receiving water.

Chronic Wasteload Allocation (WLA_c): WLA_c is the effluent concentration of a toxicant which will produce a maximum concentration on the mixing zone boundary equal to the numerical chronic criterion.

Conservative Substance: For implementation purposes, a conservative substance does not significantly change form chemically or biologically, volatilize or settle out of the receiving water before reaching the point of maximum concentration on the mixing zone boundary. All of the toxicants listed in the table on 785:45-5-12(e)(6)(G) of the Oklahoma WQS may be considered conservative.

Dilution Capacity: A measure of the ability of the receiving stream to dilute effluent, defined as the ratio of the permitted discharge to the receiving stream flow.

Lake Mixing Zone: The Oklahoma WQS specify that mixing zones in lakes shall be designated on a case by case basis. For purposes of implementation of numerical toxics criteria for protection of fish and wildlife, the lake mixing zone extends one hundred feet from the source, unless otherwise specified in the Oklahoma WQS. Discharges within the normal pool elevation of a lake, as specified in the Oklahoma Water Atlas, except lock and dam reservoirs, are considered discharges to lakes.

LC_{50}: The LC_{50} is the concentration of a toxicant required to elicit lethality in 50% of the test organisms within a specified period of time (48 hours).

Maximum Daily Level (MDL): The MDL is the concentration of a toxicant in the permit which may never be exceeded by the observed effluent concentration.

Mixing Zone Boundary For Streams: The mixing zone boundary for streams is at the edge of the regulatory mixing zone, located at one quarter of the total stream flow from the injection bank. The total stream flow is the flow directly upstream from the discharge point plus the discharge flow. For purposes of implementation of numerical toxics criteria for protection of fish and wildlife, a stream receiving water lies outside of the normal pool elevation of a lake, as defined in the Oklahoma Water Atlas. Mixing zones for lock and dam reservoirs, such as Webbers Falls Reservoir and Robert S. Kerr Reservoir, are the same as for streams.

Monthly Average Level (MAL): The MAL is the concentration of a toxicant in the permit which may not be exceeded by the observed effluent concentrations averaged over a calendar month.

No Observed Effect Concentration (NOEC): NOEC is the highest measured concentration at which no effect on test organisms is observed.

Reasonable Potential Factor: C_{95} is the 95th percentile maximum likelihood estimator for a log normal distribution.

Sensitive Representative Species: The Oklahoma WQS specifies *Ceriodaphnia dubia*, *Daphnia magna*, *Daphnia pulex*, *Pimephales promelas* (Fathead minnow), *Lipomas macrochirus* (Bluegill sunfish), or other sensitive organisms indigenous to a particular waterbody.

Total Maximum Daily Load (TMDL): The TMDL is the maximum load contributed by all sources which will not cause an exceedance of the criteria at the critical points in the receiving water. The critical points are at the maximum concentrations where the criteria apply.

Wasteload Allocation (WLA): WLA is the effluent concentration of a toxicant which is designed to attain a criterion.

INTRODUCTION

CWA and EPA regulations require the use of an "integrated strategy" to achieve and maintain the fish and wildlife propagation beneficial use (EPA, 1990). This integrated strategy involves the use of both the whole effluent toxicity control approach and the chemical specific approach.

The integrated strategy is necessary to protect the fish and wildlife propagation beneficial use. The whole effluent approach can deal with a complex mix of toxic substances in an effluent, which the chemical specific approach cannot. The chemical specific approach is better suited to addressing bioconcentration, background toxicity and the TMDL process.

Oklahoma's WQS (1994) protect the fish and wildlife propagation beneficial use through the numeric criteria listed in the table in section 785:45-5-12(e)(6)(G) of the Oklahoma WQS. The table lists numerical criteria to protect aquatic life from certain toxic substances. The acute criteria are expressed as Final Acute Values (FAV), while chronic criteria are the product of the FAV's and acute to chronic ratio's (ACR's).

This document sets forth the implementation procedure by which the State of Oklahoma regulates point source discharges so that such discharges are conducted in accordance with the numerical toxics criteria as specified in the Oklahoma WQS for fish and wildlife protection. WLA are developed to protect fish and wildlife for both chronic and acute criteria. Long term averages are derived from the WLA. Permit limits are developed from the most stringent long term average. The process for developing monthly average and daily maximum permit limits is described elsewhere in this document. Certain sections which follow are excerpted from OAC 785:46.

This implementation procedure conforms with EPA Region 6 guidance for numerical criteria. EPA Region 6's "Post Third Round Implementation Strategy" is incorporated into this document by reference.

APPLICABILITY AND SCOPE OF NUMERICAL CRITERIA AND IMPLEMENTATION

Numerical criteria applicability is dictated by constraints established in the Oklahoma WQS. Section 785:45-5-4 of the Oklahoma WQS addresses applicability of numerical criteria. It states ".....numerical criteria assigned for the protection of fish and wildlife propagation in 785:45-5-12 (except Water Column Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh), apply at all times outside the mixing zone and within the zone of passage to all waters of the State except:

(1) When a discharge into surface waters designated with the Fish and Wildlife Propagation beneficial use complies with and meets the discharge permit limitations but the flow

immediately upstream from the discharge is less than (1) cubic feet per second (cfs) or when the flow falls below the ${}_7Q_2$, whichever is larger.

(2) To streams listed as ephemeral in Appendix A [of the Oklahoma WQS]."

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-5-1. Applicability and Scope

Rules in this Subchapter [OAC 785:46-5] are designed to implement numerical criteria identified in OAC 785:45-5-12(e)(6)(G) for protection of the beneficial use of Fish and Wildlife Propagation."

REGULATORY FLOW DETERMINATION

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-2. Regulatory Flow Determination

(a) Section 785:45-5-4 of the OAC defines the critical receiving stream flow upstream of the discharge, Q_s, to be used in implementing fish and wildlife propagation criteria. The critical flow is the greater of the ${}_7Q_2$ or 1 cfs. The ${}_7Q_2$'s for some receiving streams are published in the United States Geological Survey publication entitled "Statistical Summaries Of Stream flow Records in Oklahoma and Parts of Arkansas, Kansas, Missouri and Texas Through 1984". Q_s is assumed to be 1 cfs if the ${}_7Q_2$ is unknown or the permittee chooses not to develop an actual ${}_7Q_2$.

(b) The horizontal jet plume model used to determine wasteload allocations for lakes does not require a critical flow. Therefore, receiving water flow need not be determined for discharges to lakes. A discharge to a lake is defined as a discharge within the lake's normal pool elevation as listed in the Oklahoma Water Atlas, Oklahoma Water Resources Board Publication 135, May 1990. Discharges to lock and dam reservoirs, such as Webbers Falls Reservoir and Robert S. Kerr Reservoir, are considered discharges to streams.

(c) The critical effluent flow, Q_e, is the highest monthly averaged flow over the past two years for industrial discharges with adequate data. For other dischargers (e.g. municipalities) Q_e is the design flow. If a significant daily or seasonal variability in effluent flow is present, a critical effluent flow should take this variability into account."

PERMITTING STRATEGY TO IMPLEMENT NUMERICAL AQUATIC CRITERIA

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-3. Permitting Strategy to Implement Numerical Aquatic Criteria.

(a) **General.**
When drafting NPDES permits, the permitting authority shall review the effluent data submitted by the permittee to determine which pollutants are present and regulated under the Oklahoma Water Quality Standards. The need for a permit limit will be determined, on a pollutant by pollutant basis, after utilization of reasonable potential, which considers assimilation capacity of the receiving water and effluent variability.

(b) **Use of reasonable potential factor; relationship with wasteload allocation process.**

(1) The technical report produced by the Oklahoma Water Resources Board entitled "The Incorporation of Ambient Concentration with That Due to Effluent for Wasteload Allocation" shall be used to determine if there is a reasonable potential for a criterion exceedance outside the mixing zone, and therefore a need for a permit limit. $C_{95} = 2.13C_{mean}$ is used for effluent concentration in the reasonable potential calculation. C_{mean} is the geometric mean of all effluent concentrations analyzed for the toxicant. If the geometric mean cannot be determined, an arithmetic mean may be substituted. If a large data set of effluent concentrations is available, the permitting authority may not need to estimate C_{95}; the 95th percentile value can be calculated from the data.

(2) The wasteload allocation process is used to determine reasonable potential. C, the maximum concentration on the mixing zone boundary, is calculated for streams as:

$$C = C_b + \frac{1.94Q^*(C_{95} - C_b)}{1 + Q^*} \qquad (21)$$

when Q* is less than or equal to 0.1823, or

$$C = C_b + \frac{C_{95} - C_b}{6.17 - 15.51Q^*} \qquad (22)$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$C = C_{95} \qquad (23)$$

when Q* is greater than or equal to 0.3333. $Q^* = Q_e/Q_u$. Q* is the dilution capacity.
C is calculated for lakes as:

pipe:
$$C = C_b + \frac{D(C_{95} - C_b)}{20.15} \qquad (24)$$

when D is greater than or equal to 3 feet, or

canal:
$$C = C_b + \frac{\sqrt{W}(C_{95} - C_b)}{4.2} \qquad (25)$$

when W is greater than or equal to 3 feet. D is the diameter of the discharge pipe in feet and W is the width of the canal in feet. D and W shall not be less than three feet for implementation purposes.

(3) Depending on the results of the reasonable potential computations, one of the following four actions will be required."

(A) CASES WHERE C INCLUDING C_B IS LESS THAN NUMERICAL CRITERION

When the maximum concentration on the mixing zone boundary computed using the reasonable potential factor is less than the numerical criterion, no further action is required for the life of the permit. No additional monitoring is required and no wasteload allocation need be performed.

(B) CASES WHERE C INCLUDING C_B IS GREATER THAN NUMERICAL CRITERION

When the reasonable potential computation shows that the concentration on the mixing zone boundary exceeds the numerical criterion a wasteload allocation and a water quality based limit will be developed for the permittee and a schedule of compliance (not to exceed three years) will be incorporated into the permit. A water quality based limit may be modified upon confirmed reduction of background concentrations due to application of best management practices or other factors.

(C) CASES WHERE C IS GREATER THAN NUMERICAL CRITERION WHEN C_B UNKNOWN

When a reasonable potential computation shows that the effluent alone (substitute 0 for C_b in the equations set forth in OAC Section 785:46-5-3(b)(2)) may cause the maximum concentration on the mixing zone boundary to exceed the numerical criterion, a wasteload allocation will be performed by the permitting authority. Receiving stream monitoring and reporting of the limited pollutant will be required to establish background pollutant contributions in order to reevaluate the limits. An NPDES permit limit, with compliance schedule, will be established by the permitting authority.

(D) CASES WHERE C IS LESS THAN NUMERICAL CRITERION WHEN C_B UNKNOWN

In those cases where the background concentration is unknown and the maximum concentration on the mixing zone boundary due to the effluent is less than the criterion, the long term average effluent concentration shall be compared to the most stringent long term average associated with the applicable criteria (calculated as provided in OAC 785:46-5-5 and 785:46-7-4(d)). If the effluent LTA is less than the most stringent criteria LTA, then background concentration monitoring shall not be required; otherwise, background monitoring shall be required. However, if only limited effluent data is available, then additional effluent monitoring may be required to verify the effluent concentration.

WASTELOAD ALLOCATION

Wasteload allocations are developed to insure that Oklahoma's numerical criteria are not exceeded outside the mixing zone. Since both acute and chronic criteria apply at the edge of the mixing zone, their wasteload allocations are determined in the same manner. Numerical criteria implementation requires a criterion, C_t, listed in the table in OAC 785:45-5-12(e)(6)(G). Wasteload allocations must be calculated for both acute and chronic criteria, if available. Because mixing zones for lakes are different from those for rivers, wasteload allocations are determined in a different manner for lakes than for rivers.

Both wasteload allocation methods assume that toxicants listed in the table are conservative. They do not significantly change form chemically, physically, biologically, settle out or volatilize during the short journey from the source to the point of maximum concentration on the mixing zone boundary. While toxicants may be considered conservative in the short term, this is not the case for long travel times (EPA, 1990).

WASTELOAD ALLOCATION FOR STREAMS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-4(b). Wasteload Allocation for Streams.

(a)The following formulas from the technical report produced by the Oklahoma Water Resources Board entitled "The Incorporation Of Ambient Concentration With That Due To Effluent For Wasteload Allocation" shall be utilized:

$$WLA = C_b + \frac{(1+Q^*)(C_t - C_b)}{1.94Q^*} \tag{26}$$

when Q* is less than or equal to 0.1823, or

$$WLA = C_b + (6.17 - 15.51Q^*)(C_t - C_b) \tag{27}$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$WLA = C_t \tag{28}$$

when Q* is greater than or equal to 0.3333.

WLA is the wasteload allocation. If $C_b > C_t$, an investigation of sources of upstream toxicity should be conducted. For implementation purposes, $C_b = C_t$ in this case, which results in a wasteload allocation equal to the criterion."

WASTELOAD ALLOCATION FOR LAKES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-4(c). Wasteload Allocation for Lakes.

The regulatory mixing zone in lakes is defined to extend 100 feet from the source for implementation purposes. The following formula shall be utilized:

pipe:

$$WLA = C_b + \frac{20.15(C_t - C_b)}{D} \tag{29}$$

when D is greater than or equal to 3 feet, or

canal:

$$WLA = C_b + \frac{4.2(C_t - C_b)}{\sqrt{W}} \tag{30}$$

when W is greater than or equal to 3 feet.

If $C_b > C_t$, then the lake is considered toxic and an investigation of toxicity sources should be conducted. For implementation purposes, $C_b = C_t$ in this case, which results in a wasteload allocation equal to the criterion."

WASTELOAD ALLOCATION LIMITATION

The WLA is never required to be less than the numerical criterion, for implementation purposes.

$$\therefore WLA \geq C_t \tag{31}$$

LONG TERM AVERAGE TO PROTECT AGAINST CHRONIC TOXICITY

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"<u>OAC 785:46-5-5. Long Term Average to Protect Against Chronic Toxicity</u>.

The chronic long term average (LTA_c) must be obtained from WLA_c, the chronic waste load allocation, in order to determine which criterion implementation will be used for permit development. The long term average concentration for chronic toxicity is determined using the 99% probability basis. In accordance with EPA guidance,

$$LTA_c = WLA_c \exp(0.5s_4^2 - 2.326s\ ) \tag{32}$$

where

$$0.5s_4^2 = \ln\left[\frac{CV^2}{4} + 1\right] \tag{33}$$

CV is the coefficient of variation for the effluent concentration distribution.

If effluent data is not sufficient to compute the coefficient of variation, CV = 0.6 shall be used. In this case,

$$LTA_c + 0.5274 WLA_c \tag{34}$$

LONG TERM AVERAGE TO PROTECT AGAINST ACUTE TOXICITY

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"<u>OAC 785:46-5-6. Long Term Average to Protect Against Acute Toxicity</u>

"The acute long term average, LTA_a, must be obtained from the acute wasteload allocation, WLA_a, to compare to other long term averages. Using the 99% probability basis in accordance with EPA guidance,

$$LTA_a = WLA_a \exp(0.5s^2 - 2.326s) \quad (35)$$

where

$$s^2 = \ln(CV^2 + 1) \quad (36)$$

If effluent data is not sufficient to compute the coefficient of variation CV = 0.6 shall be used. In this case,

$$LTA_a = 0.3211 WLA_a \quad (37)$$

OBTAINING PERMIT LIMITS FROM LONG TERM AVERAGES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-7. Obtaining Permit Limits from Long Tern Averages

Daily maximum and monthly average permit limits are required by EPA regulation. The maximum daily level (MDL) and the monthly average level (MAL) will be obtained from the long term average (LTA) using the method described in the CPP [see Chapter 3]. The LTA is the smallest of the long term averages for the acute criterion, the chronic criterion, the human health criterion and other long term averages. Load, as well as concentration, must be expressed in the NPDES permit."

PH AND HARDNESS DEPENDENT TOXICITY

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"OAC 785:46-5-8. pH and Hardness Dependent Toxicity.

“The criteria for some of the substances listed in 785:45-5-12(e)(6) are hardness or pH dependent. The segment averaged pH in Appendix B of this Chapter [OAC 785:46] shall be used to determine the criterion if there is insufficient site specific data to determine receiving stream pH. The mean hardness of the receiving stream, collected near the outfall but not affected by the discharge (as $CaCO_3$) may be used by the permitting authority if at least 12 monthly samples were collected over a twelve month period. The segment averaged hardness in Appendix B of this Chapter [OAC 785:46] shall be used in the determination of the criterion if there is insufficient site specific data to determine receiving stream hardness. If the required pH or hardness is not specified for a particular waterbody segment, the permitting authority may use appropriate data from surrounding waterbody segments."

The segment averaged pH and hardness values from Appendix B of OAC 785:46 are reproduced in Table 13 of this document.

CONSIDERATION OF BACKGROUND CONCENTRATION

Background concentration, C_b, is caused by sources upstream of the permitted discharge. These sources may be either point or nonpoint. Nonpoint sources may be either natural or anthropogenic. Background concentration must be accounted for in the WLA because the assimilation capacity of the receiving stream decreases as the background concentration increases. The permitting agency shall determine which constituents must be monitored near a particular point source.

DETERMINING C_B

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-5-9. Consideration of Background Concentration.

"(b) Data to determine background concentration may be available from STORET or other data bases with adequate and documentable quality assurance procedures which are acceptable to the permitting authority. If sufficient data is not available, the receiving water shall be monitored to determine the background concentration. Samples will be collected at a location that is representative of the receiving water and unaffected by the discharge being permitted. In lakes, samples shall be collected at a point outside the regulatory mixing zone, which extends 100 feet in any direction from the source. Samples shall be collected as close to low flow conditions as possible in streams. The geometric mean of at least twelve concentration observations is required to determine the background concentration. Hardness/pH must be obtained along with C_b if the criterion are hardness/pH dependent.

(c) Until twelve appropriate concentrations are available, C_b shall be assumed zero. Background concentration shall also be assumed zero for small streams with no ambient monitoring required, unless upstream sources of toxicity are known. Therefore, if $Q_s = 1$ cfs, $C_b = 0.0$, absent of known upstream sources. C_b shall also be assumed zero for discharges of "once through cooling water". However, these dischargers will be required to monitor both influent and effluent, as specified by the permitting authority."

The metal concentrations in the numerical criteria for toxic substances table in Section 785:45-5-12(e)(6)(G) of the Oklahoma WQS are listed as total. Therefore, background samples must be analyzed and reported as total recoverable metals in order to use them in the wasteload allocation process.

TOTAL MAXIMUM DAILY LOADS

The collection of background concentrations will allow Oklahoma to begin addressing the development of total maximum daily loads (EPA, Region 6, 1993). TMDL development avoids issuance of permits which direct the permittee to address water quality exceedances in the receiving stream for which the cause or significant contribution may be attributable to another permittee or controllable point source (EPA Region 6, 1993).

Oklahoma facilities will be required to meet current water quality based limits until further information is available. The ultimate development of TMDL's may result in modifications to existing permits (EPA Region 6,1993).

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Strategy For Addressing Background Concentrations 09/16/93. EPA, Region 6, Dallas Texas.

Technical Support Document For Water Quality-based Toxics Control. EPA/505/2-90-001

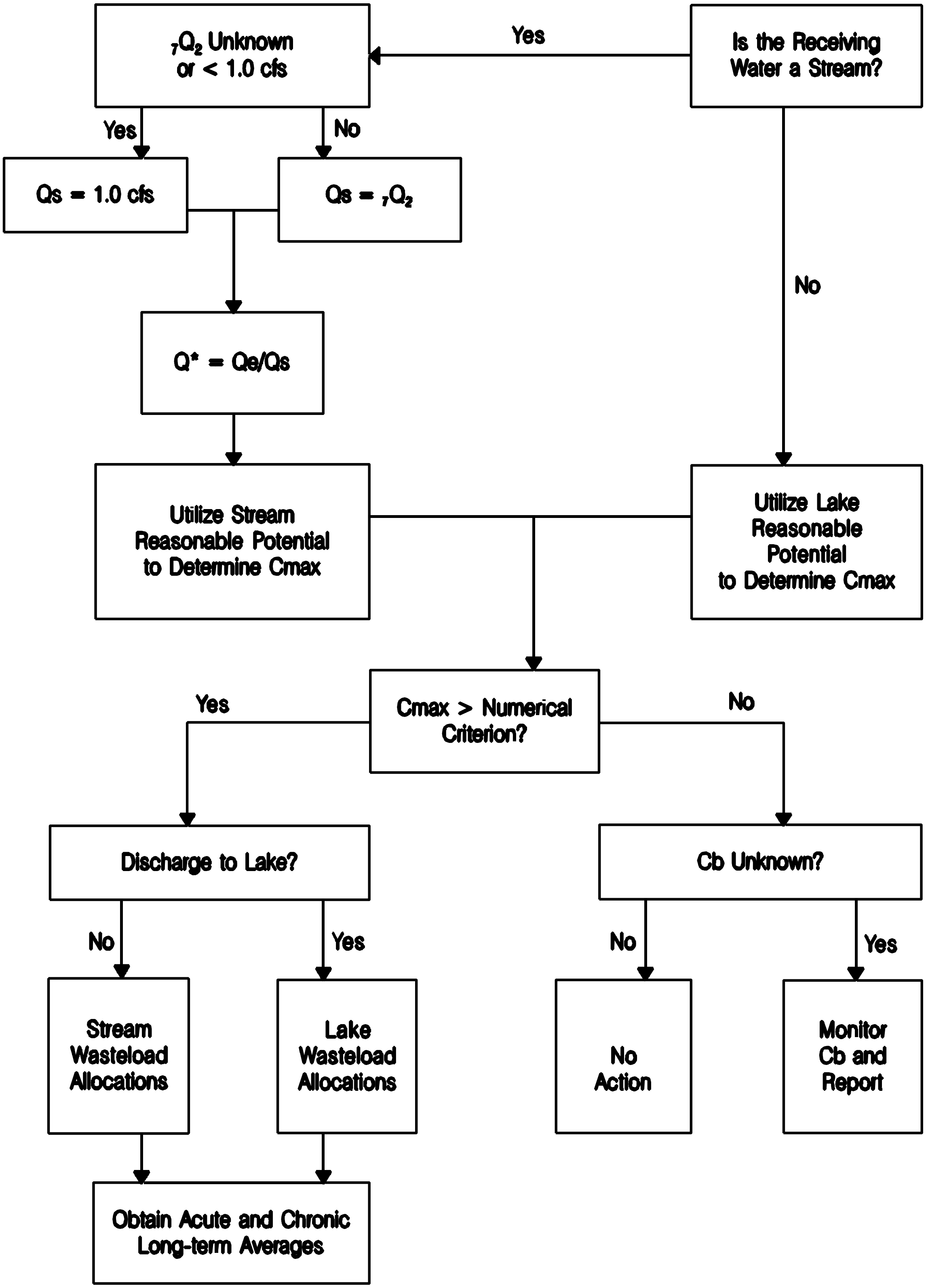
Water Quality Criteria Documents (e.g. Ambient Water Quality Criteria for Arsenic-1984 EPA 440/5-85-033)

TABLE 13: MEAN HARDNESS ($CaCO_3$) AND PH BY SEGMENT

SEGMENT	MEAN pH	MEAN HARDNESS
120400	7.87	197.40
120410	8.02	262.00
120420	7.77	267.83
121300	7.50	153.00
121400	7.62	170.41
121500	7.47	162.38
121510	7.67	186.00
121600	7.52	169.27
121610	7.40	133.65
121700	7.46	106.55
220100	6.96	25.76
220200	7.74	165.00
220600	7.66	253.48
250510	7.81	294.00
310800	7.89	532.00
310810	7.90	756.44
310830	7.84	924.35
310840	7.96	1137.00
311100	7.86	593.20
311200	7.78	532.94
311210	7.67	470.00
311300	7.65	268.33
311310	7.77	296.00
311500	8.04	838.12
311510	7.95	1041.00
311600	7.95	1540.00
311800	7.81	2095.00
331510	8.03	1147.00

SEGMENT	MEAN pH	MEAN HARDNESS
410200	6.82	32.00
410210	6.89	18.76
410300	7.17	28.42
410400	7.62	192.98
410600	7.84	234.00
520500	7.97	282.00
520520	7.70	344.00
520530	8.07	454.43
520600	8.04	380.00
520610	8.22	442.00
520620	8.08	612.00
520700	7.82	276.16
520710	7.80	272.00
520800	7.69	332.99
620900	8.10	506.01
620910	7.85	802.56
620920	7.99	1297.07
621000	8.08	512.06
621010	8.02	865.00
621100	7.80	367.00
621200	7.83	264.55
720500	8.16	622.00

FIGURE 2 **NUMERICAL AQUATIC LIFE IMPLEMENTATION DECISION TREE**



Implementation of Numerical Criteria in the Oklahoma Water Quality Standards to Protect Human Health

Definitions

Drainage area (A_D): A_D is the area drained above a discharge. It may be determined from USGS contour maps.

Drainage basins: Oklahoma is drained by the Arkansas and Red Rivers. For implementation purposes, drainage basins are the areas drained by the main stems and by their major tributaries.

Long term average flow (Q_u): Q_u is the mean annual flow for implementation purposes.

Wasteload Allocation (WLA): WLA is the maximum effluent concentration of a conservative substance which will not exceed the human health criterion after complete mixing.

Introduction

Certain of the numerical criteria in Oklahoma's WQS 1997 are designed to protect human health. Raw Water Numerical Criteria and Water Column Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh and Water (Section 785:45-5-10) apply to surface waters of the state designated Public and Private Water Supplies. Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh (Section 785:45-2-12) apply to surface waters designated Warm or Cool Water Aquatic Community or Trout Fishery. Sometimes more than one human health criterion is applicable to a waterbody. In this case the most stringent shall be used in the WLA. The WLA is the mechanism by which permit limits are developed to prevent exceedances of the criteria in the Oklahoma WQS.

The Oklahoma WQS provides two important regulations which aid in human health criteria implementation. Section 785:45-5-4 of the Oklahoma WQS specifies that to protect human health for the consumption of fish flesh and/or fish flesh and water, long term average receiving stream flows and complete mixing of effluent and receiving water shall be used to determine appropriate permit limits. Long term average flows and complete mixing form the basis for Oklahoma's WLA for human health criteria.

Applicability and Scope of Numerical Criteria and Implementation

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

785:46-7-1. Applicability and Scope.

“(a) **General.**
Rules in this Subchapter implement numerical criteria to protect human health for consumption of fish flesh and/or water.

(b) **Applicable public and private water supply criteria.**
Applicable criteria for waters designated Public and Private Water Supplies are found in OAC 785:45-5-10(1) and OAC 785:45-5-10(6) .

(c) **Applicable fish and wildlife propagation criteria.**
Applicable criteria for waters designated Warm Water Aquatic Community and/or Cool Water Aquatic Community and/or Trout Fisheries are found in 785:45-5-12(e)(8).

(d) **Appropriate criterion.**
If several criteria apply to human health implementation, the most stringent is used for implementation purposes.

(e) **Applicable receiving waters.**
The human health criteria apply in receiving waters designated as Public and Private Water Supplies and certain designated sub-categories of Fish and Wildlife Propagation. Some streams in Appendix A of OAC 785:45 are designated Habitat Limited Aquatic Communities, and are not designated for the Public and Private Water Supply beneficial use. Therefore, human health criteria do not apply to these streams. For implementation purposes these streams are considered conduits to the downstream water body. Human health criteria must be implemented on the first downstream water body to which they apply."

DETERMINATION AND USE OF REGULATORY FLOW, Q_U

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-2. Determination and Use of Regulatory Flow, Q_u.

"(a) **General.**
OAC 785:45-5-10(1), 785:45-5-10(6)(B) and 785:45-5-12(e)(8)(B) require that long term average receiving stream flows shall be used to implement water column numerical criteria to protect human health.

(b) **Long term average flow on gaged receiving streams.**
Mean annual average flow as determined in the technical report produced by the Oklahoma Water Resources Board entitled "Estimation Of Mean Annual Average Flows" shall be used for long term average flow in receiving streams which are or have been measured by USGS gages.

(c) **Mean annual average flows on ungaged receiving streams.**
Mean annual average flow may be estimated on streams where flow is not routinely measured. This method for estimation is demonstrated in the technical report produced by the Oklahoma Water Resources Board entitled "Estimation Of Mean Annual Average Flows". Other scientifically defensible methods of long term average flow estimation are permissible if approved by the permitting authority.

(d) **Long term average flow in lakes.**
Q_u cannot be estimated in a lake as easily as it can be for a stream. Therefore, mean annual average discharge from the lake shall be used for Q_u."

LONG TERM AVERAGE FLOWS ON STREAMS

Long term average flow must be precisely defined for use in a human health criteria WLA. Mean annual average flow shall be used for human health implementation. Mean annual average flow may be estimated on streams where flow is not routinely measured. This is demonstrated below, as excerpted from the technical report produced by the Oklahoma Water Resources Board entitled "Estimation of Mean Annual Average Flows". Other scientifically defensible methods of long term average flow estimation are allowable at the discretion of the permitting authority.

MEAN ANNUAL AVERAGE FLOWS ON GAGED RECEIVING STREAMS

If the discharge is near a gage on the receiving stream, the mean annual average flow at the gage may be used as Q_u at the discharge. If the flow is between gages, a weighted average may be used.

Mean Annual Average Flows On Ungaged Receiving Streams:

Mean annual average flow directly above the discharge on a receiving stream without a USGS gage is difficult to estimate. Sophisticated techniques can yield accurate mean annual average flows on ungaged streams but are usually too resource intensive for routine regulatory use. A map of mean annual average flows per unit drainage area, Q_u/A_D, is produced in Figure 3 to aid in rapidly estimating mean average annual flow. Q_u/A_D is in cfs/mi^2. Drainage area above a discharge may be obtained from USGS topographic maps. Multiplication of the drainage area by Q_u/A_D yields an estimate of mean annual average flow in the receiving stream at the discharge.

Three resources were used to produce isopleths of Q_u/A_D. The runoff pattern in "Appraisal of the Water and Related Land Resources of Oklahoma" was used because the runoff pattern and isopleths of Q_u/A_D should be similar. These patterns are not identical because more factors affect mean flow than runoff (e.g. springs, effluent discharges and water diversions).

The primary resource used to produce isopleths of Q_u/A_D was the hydrologic investigations commissioned by the OWRB. These investigations have been accomplished for all the basins in Oklahoma except the Neosho (Grand) and Poteau Rivers. Figure 4 shows the basins and sub-basins into which Oklahoma has been divided. Mean annual average flows leaving many of these sub-basins have been determined from the hydrologic investigations. Subtraction of the mean annual average flow entering a sub-basin from that leaving it yields the mean annual average flow generated in the sub-basin. Division of the flow generated in a sub-basin by the sub-basin area yields an estimate of Q_u/A_D. This estimate is not valid throughout a sub-basin because Q_u/A_D increases from west to east along with runoff. Therefore the estimate is assumed to be valid at the center of the sub-basin.

Estimates of the mean annual average flow generated in the Arkansas and Red River sub-basins are not useful in determining Q_u/A_D, because these rivers are not representative of small, ungaged receiving streams. The hydrology of the Arkansas River is too complicated, while the Red forms the southern boundary of Oklahoma, and is therefore not representative of Oklahoma basins. Sub-basins which are dominated by large lakes (like Eufaula) could not be used either.

The Bureau of Reclamation published a map of Q_u/A_D for southeast Oklahoma in its hydrologic investigations of that region. This map has been modified and combined with the rest of the data to produce the isopleths in Figure 3. Due to the diverse nature of the very limited data the isopleths are hand drawn, rather than produced by a computer driven contouring routine.

The map in Figure 3 does not include the panhandle, because Q_u/A_D is always less than 0.1 there. For implementation purposes, use $Q_u/A_D = 0.05$ for the entire panhandle.

Veracity Of Estimated Mean Annual Average Flows on Streams

The isopleths in Figure 3 are only useful if they help obtain adequate estimates of mean annual average flows. Although there is no completely independent data set with which to test Figure 3, data in the USGS Statistical Summaries were used to test the utility of the map. Since there are USGS gages on most of the larger streams in Oklahoma, only gages with a mean annual average flow of less than 500 cfs or a drainage area less than 5000 square miles were used in the comparison. The locations of the gages used are shown in Figure 5 at the end of this section. Values for Q_u/A_D are estimated at the gage by interpolating between isopleths. These values of Q_u/A_D are multiplied by the drainage areas at the gages to obtain estimates of the mean annual average flow.

The estimates are compared with the observed mean annual average flows in Figure 6 at the end of this section. The line represents the estimate equal to the observed flow. For example, if the estimated and observed flows are both 200 cfs, the resulting point will fall on the line. The estimated flow is greater than the observed flow if the point is above the line, and the estimated flow is less than that observed if the point is below the line. Figure 6 shows that the isopleth method yields relatively unbiased estimates of the observed flow.

The isopleth method may not yield an exact, appropriate regulatory flow at a specific site. Even though isopleth estimated flows are close to those observed, there are too many factors unaccounted for to be assured that a flow appropriate for WLA will always be obtained. The isopleth estimate should not be used downstream from impoundments in western Oklahoma. Much of the water in these reservoirs is lost to evaporation or used for agricultural or municipal purposes. Therefore, estimated flow is much greater than the dam discharge observed. Assumption of such a large mean annual average flow on a stream with a small dilution capacity allows for very high instream concentrations at low flows. For implementation purposes, the mean annual average flow from the dam shall be used for Q_u below dams in western Oklahoma.

PERMITTING STRATEGY TO IMPLEMENT NUMERICAL HUMAN HEALTH CRITERIA

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

<u>OAC 785:46-7-3. Permitting Strategy to Implement Numerical Human Health Criteria.</u>

“(a) **General.**
OAC 785:45-5-10(1), 785:45-5-10(6)(B), and 785:45-5-12(e)(8)(B) require that complete mixing of effluent and receiving water shall be used to determine appropriate permit limits. A mass balance model shall be used for implementation purposes.

(b) **Use of reasonable potential factor; relationship with wasteload allocation process.**

(1) When drafting NPDES permits, the permitting authority will review effluent data and identify those pollutants found in the effluent which are regulated under the Oklahoma WQS. The permitting authority will determine the need for a permit limit through utilization of the reasonable potential test.

(2) The mass balance equation will be used in the determination of human health reasonable potential:

$$C = (C_e Q^* + C_b) / (Q^* + 1) \tag{38}$$

$Q^* = Q_e/Q_u$, where Q_e is the regulatory effluent flow. OAC 785:45-5-4 requires that C be considered a long term average concentration after complete mixing. C_b is the background concentration. To determine if there is a reasonable potential to exceed the criterion after complete mixing, choose $C_e = 2.13C_{mean}$, where C_{mean} is a geometric mean of all effluent concentrations analyzed for the toxicant. If the geometric mean cannot be determined, an arithmetic mean may be used instead.

(3) Representative background concentrations will be used if available. Such representative data should reflect long term average pollutant concentrations for implementation purposes. Otherwise, C_b is assumed zero.

(4) C must be compared with the applicable water quality criterion to determine if there is a reasonable potential for the pollutant discharge to cause a criterion exceedance. If concentration after complete mixing is greater than the human health criterion, a permit limit will be required.

PERFORMANCE OF WASTELOAD ALLOCATION; IMPLEMENTATION INTO PERMITTING

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-4. Performance of Wasteload Allocation; Implementation Into Permitting.

"(a) **General**

When a reasonable potential computation shows that the effluent may cause the concentration after complete mixing to exceed the numerical criterion, a wasteload allocation will be performed. In those cases where the background concentration is unknown, the long term average effluent concentration shall be compared to the most stringent long term average associated with the applicable criteria (calculated as provided in OAC 785:46-5-5, 785:46-5-6 and 785:46-7-4(d)). If the effluent LTA is less than the most stringent criteria LTA, then background concentration monitoring shall not be required; otherwise, background monitoring shall be required.

WASTELOAD ALLOCATION TO PROTECT HUMAN HEALTH IN STREAMS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-4(b). Wasteload Allocation to Protect Human Health in Streams

“(1) For implementation purposes, the receiving water is considered a stream in all cases except when it is within a lake's normal pool elevation as listed in the Oklahoma Water Atlas, Oklahoma Water Resources Board Publication 135, May 1990. The human health mass balance wasteload allocation is written:

$$WLA = C + \frac{(C - C_b)}{Q*} \tag{39}$$

where C becomes the appropriate human health criterion. For implementation purposes, Q_e is the mean annual average flow over the preceding two years for industrial discharges with adequate data. For other dischargers (e.g. municipalities), Q_e is the design flow.

(2) For wasteload allocation purposes, it is assumed that $C_b < C$.

(3) Representative background concentrations will be used if available, but assumed zero otherwise. Representative data is assumed to be an estimator of long term average pollutant concentrations for implementation purposes.

(4) No discharge to a stream in excess of any human health criterion shall be allowed for 5 miles upstream of a public water supply intake. A complete mix of the effluent and the receiving water is required to insure that criteria are not exceeded at the point of intake.”

WASTELOAD ALLOCATIONS TO PROTECT HUMAN HEALTH IN LAKES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-4(c). Wasteload Allocations to Protect Human Health in Lakes

"A mass balance must be assumed for discharges within the normal pool elevation of lakes. The equation in 785:46-7-4(b) is applicable in such cases. Inflow concentration may not be representative of background concentration in a lake. Ambient monitoring, stipulated by a permit requirement to characterize background concentrations, will be collected within the normal pool elevation of the lake at a point unaffected by the discharge. No discharge within the normal pool elevation of a lake, in excess of any human health criterion, shall be allowed within one mile of a public water supply intake."

WASTELOAD ALLOCATION AND LONG TERM AVERAGE

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-4(d). Wasteload Allocation and Long Term Average.

"Since the wasteload allocation for human health is a long term average,

$$LTA_H = WLA \tag{40}$$

where LTA_H is the human health long term average."

OBTAINING PERMIT LIMITS FROM LONG TERM AVERAGES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

OAC 785:46-7-4(e). Obtaining Permit Limits from Long Term Averages.

"An NPDES permit limit will be established by the permitting authority, with compliance schedule if necessary. Permit limits will be obtained from the long term average (LTA) using methods outlined in the CPP [see Chapter 3]. The LTA is the smallest of the long term averages for the acute criterion, the chronic criterion, the human health criterion and other long term averages."

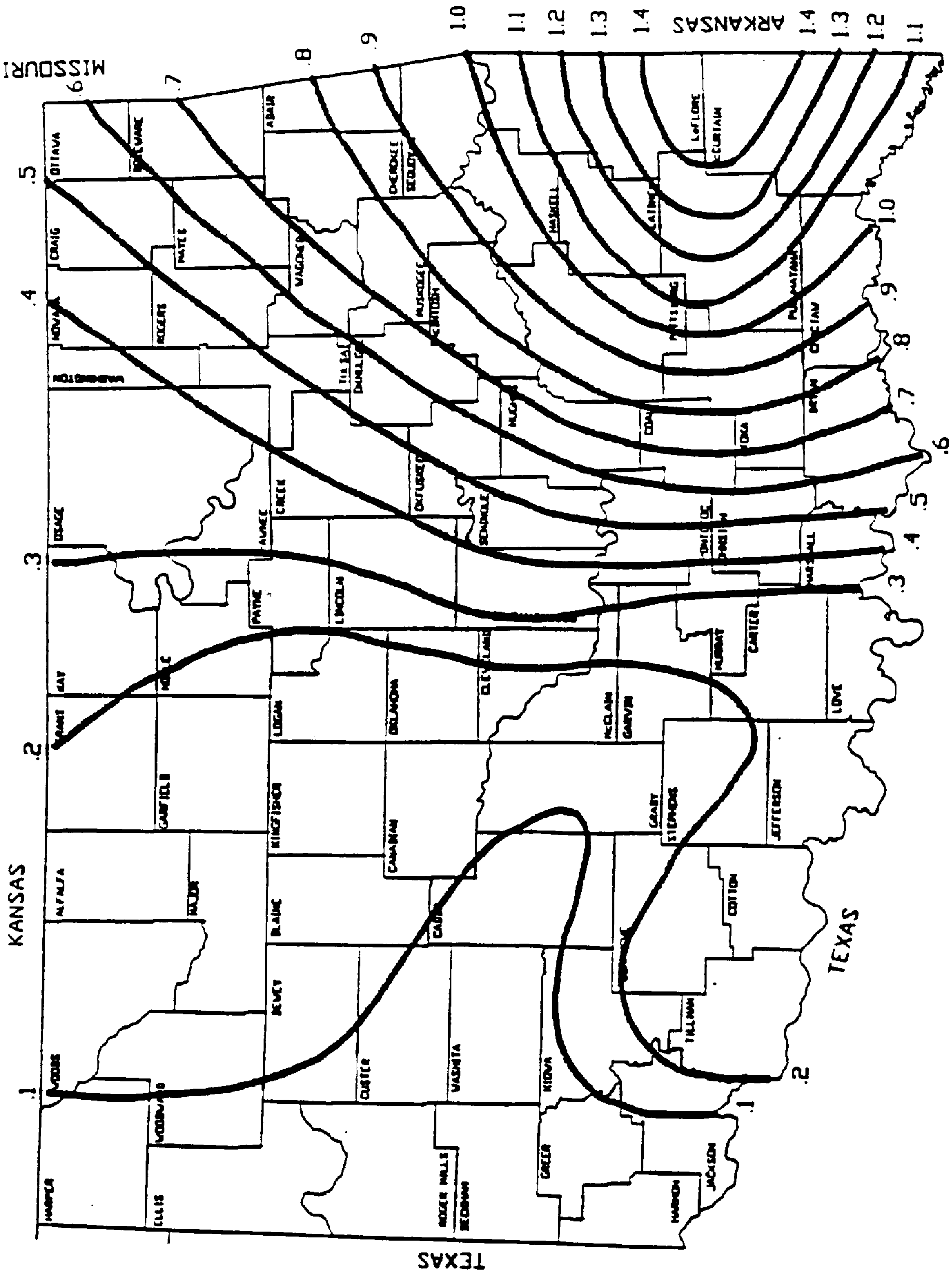


FIGURE 3 ISOPLETHS OF Q_U/A_D(CFS/MI^2)

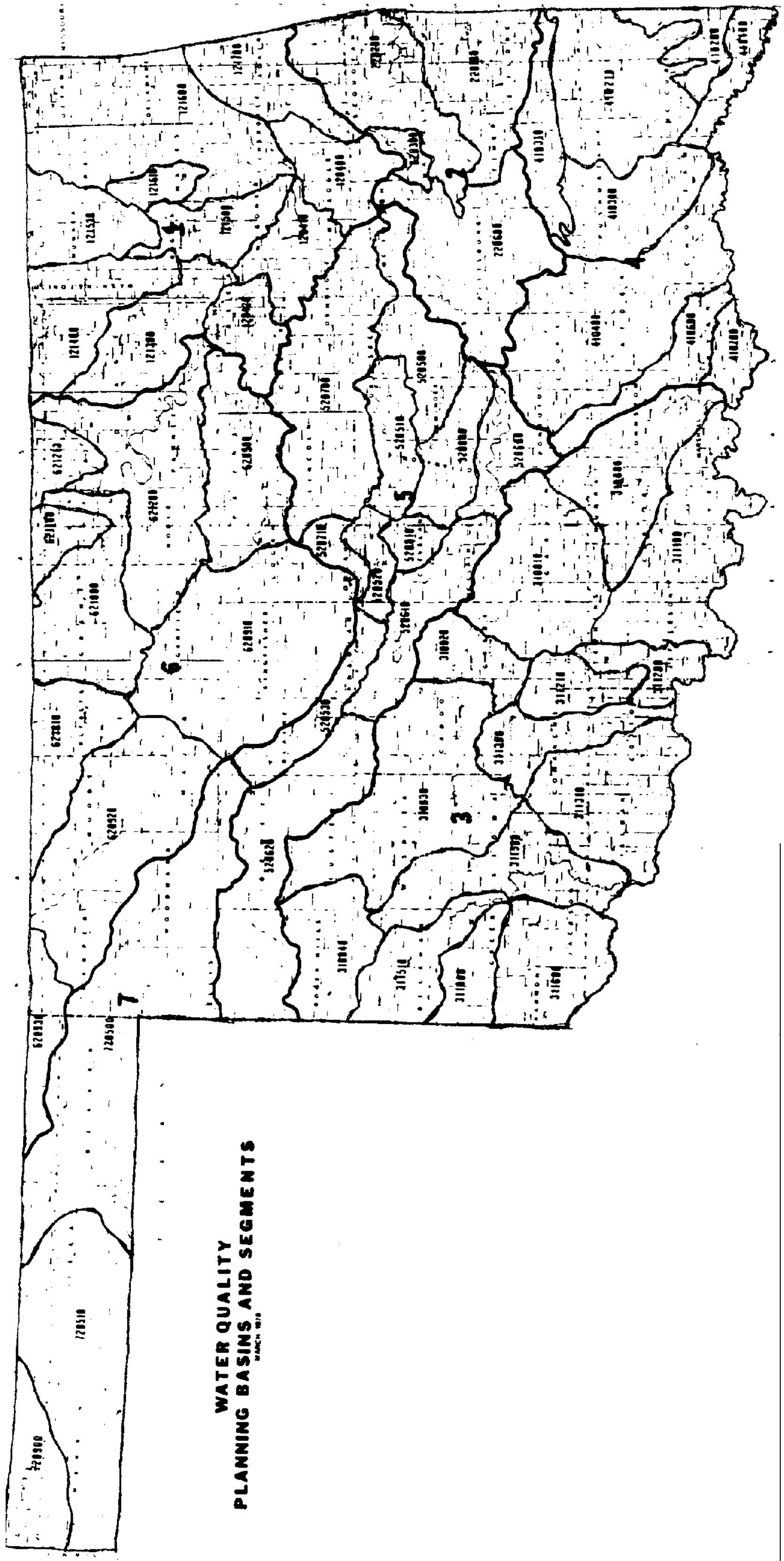


FIGURE 4 WATER QUALITY PLANNING BASINS AND SEGMENTS IN OKLAHOMA

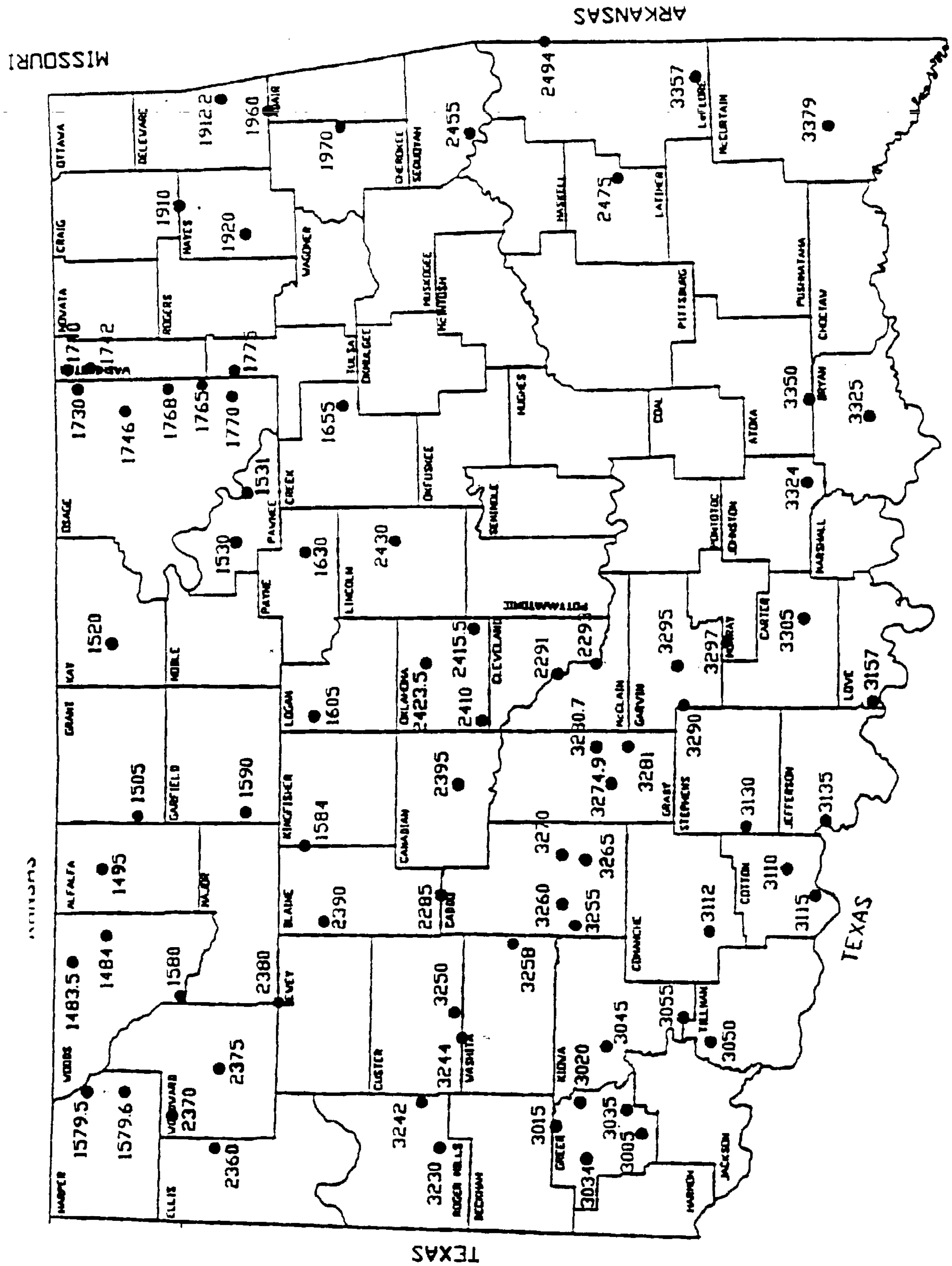


FIGURE 5 GAGE AT WHICH MEAN ANNUAL FLOWS WERE ESTIMATED

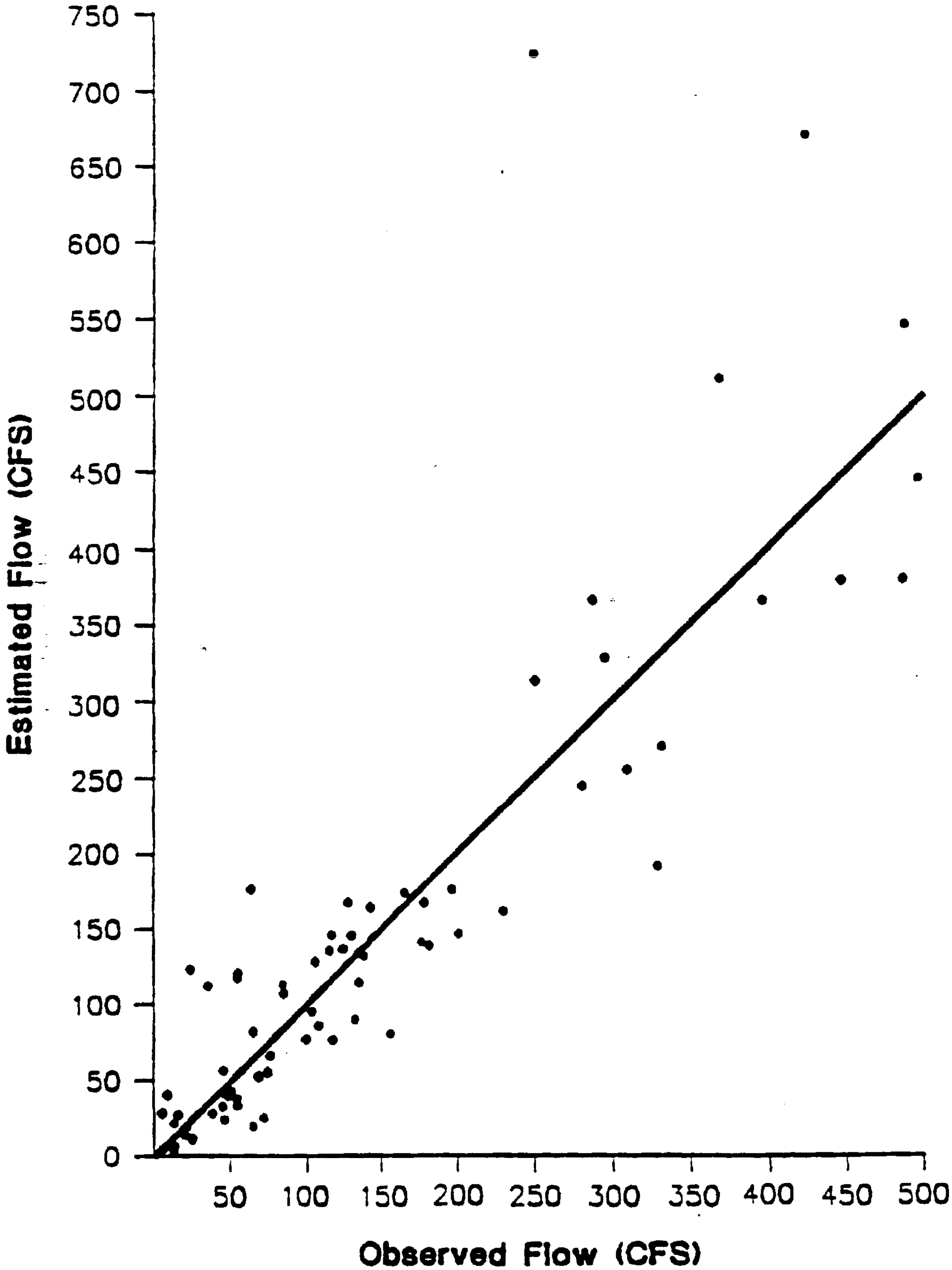


FIGURE 6 COMPARISON OF OBSERVED AND ESTIMATED MEAN ANNUAL FLOWS

Implementation of Criteria to Protect the Agriculture Beneficial Use

Definitions

"SS" means the sample standard.

"YMS" means yearly mean standard.

"WLA_s" means short term wasteload allocation.

"WLA_L" means long term wasteload allocation.

Applicability and Scope

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-1. Applicability and Scope.

Rules in this subchapter are designed to implement criteria in OAC 785:45-5-13(h) and OAC 785:45 Appendix F for the protection of the beneficial use of Agriculture. Included are criteria for chlorides, sulfates and total dissolved solids."

Applicable Mineral Criteria

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-2.

(a) General.

OAC 785:45 Appendix F contains yearly mean standards and sample standards for the protection of the Agriculture beneficial use. Historical values for chlorides, sulfates and TDS for water quality segments identified in OAC 785:45 Appendix F will not be updated. Data from surrounding segments shall be used by the permitting authority to develop yearly mean standards for those segments with inadequate historical data.

(b) Segment averages.

Segment averages of yearly mean standards and sample standards shall be the criteria for chlorides, sulfates and TDS to protect the Agriculture beneficial use."

Regulatory Flows

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-3.

(a) General.

Six regulatory flows are required for implementation of yearly mean standards and sample standards. They include stream flows, regulatory flows for lakes and regulatory effluent flows.

(b) Long term average flows for streams.

Mean annual average flow, A, will be used by the permitting authority for long term average flows to implement yearly mean standards. Mean average flows may be obtained from the USGS publication entitled, Statistical summaries of streamflow records in Oklahoma and parts of Arkansas, Kansas, Missouri, and Texas through 1984, on streams with USGS gages. They may also be estimated on streams without gages using the Oklahoma Water Resources Board publication entitled, Estimation of mean annual average flows, (OWRB Technical Report 96-2).

(c) Long term average flow for lakes.

Mean annual average discharge from the lake, A, shall be used to implement the Agriculture beneficial use.

(d) Regulatory long term effluent flows.

If the permitting authority determines that sufficient data is available to calculate the mean annual effluent discharge, then such discharge shall be the long term effluent flow, Q_{el}. If the permitting authority determines insufficient data is available to calculate the mean annual effluent discharge, then the design flow shall be the long term effluent flow, Q_{el}.

(e) Short term average flow for streams.

OAC 785:45-5-4(d) requires that short term average flow, Q_s, be used to implement sample standards. The short term average flow is determined so that short term and long term wasteload allocations are equally likely to be more stringent, depending on the historical concentration distribution for a particular segment. $Q_s = 0.68A$, where A is mean annual average stream flow.

(f) Short term average flows for lakes.

Short term average flows for lakes are also determined by the formula in OAC 785:46-9-3(e). In this case A is the mean annual average lake discharge.

(g) Short term average effluent flows.

If the permitting authority determines that sufficient data is available to calculate the highest monthly average discharge for industrial discharges, then such discharge shall be the short term average effluent flow, Q_{es}. If the permitting authority determines insufficient data is available to calculate the highest monthly average discharge for industrial discharges, then the design flow shall be the short term average effluent flow, Q_{es}."

[Source: Added at 15 Ok Reg 2879, eff 7-1-98]

Background Concentration

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-4.

Background concentration must be obtained for wasteload allocation purposes. OAC 785:45 Appendix F. May be used to determine background concentration. The definitions of both yearly mean standard, YMS, and sample standard, SS, must be used to obtain

$$BC = 2YMS - SS \tag{41}$$

The BC is background concentration for both yearly mean standards and sample standards implementation. If the permitting authority determines that abundant data directly upstream from the source is available, the discharger may elect to compute background concentration using this data.

[Source: Added at 15 Ok Reg 2879, eff 7-1-98]"

Permitting Strategy to Implement Mineral Criteria

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-5.

(a) General.
The need for a permit limit will be determined on a mineral constituent basis, after application of the reasonable potential equation specified in (b) of this Section, which considers assimilation capacity of the receiving water and effluent variability.

(b) Reasonable potential equation.
OAC 785:45-5-13(d) requires that complete mixing of effluent and receiving water be taken into account in the reasonable potential equation. The use of mass balance to obtain wasteload allocations for complete mixing is codified at OAC 785:46-7-3(a). Therefore, the reasonable potential equation for mineral constituents is

$$C = (Q_u BC + Q_e C_{95}) / (Q_u + Q_e), \tag{42}$$

where C_{95} = 2.13 C_{mean}, where C_{mean} is the geometric mean of all effluent concentrations analyzed for the mineral. If the geometric mean cannot be determined, an arithmetic mean may be used. If sufficient effluent concentration observations exist as determined by the permitting authority, then the permitting authority may compute the 95th percentile concentration and use it as C_{95}, in accordance with OAC 785:46-5-3(b)(1).

(c) Reasonable potential to exceed yearly mean standard.
Q_u = A and $Q_e = Q_{el}$ in OAC 785:46-9-5(b) to obtain a long term average concentration after complete mixing. If C is greater than YMS there is a reasonable potential to exceed an Agriculture beneficial use criterion, so a permit limit is required.

(d) Reasonable potential to exceed sample standard.
Q_u =0.68A and $Q_e = Q_{es}$ in OAC 785:46-9-5(b) to obtain a short term average concentration after complete mixing. If C is greater than SS there is a reasonable potential to exceed an Agriculture beneficial use criterion, so a permit limit is required.
[Source: Added at 15 Ok Reg 2879, eff 7-1-98]"

Wasteload allocations.

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-6.

(a) General.
Permit limits to implement the Agriculture beneficial use are obtained through wasteload allocations. Wasteload allocations are calculated for both sample standards and yearly mean standards to insure that mineral criteria are not exceeded after complete mixing.

(b) Wasteload allocation for YMS.

Since the yearly mean standard is a long term average, Q_{el} and A are used in the mass balance equation to obtain a long term wasteload allocation, WLA_l.

$$WLA_1 = (YMS(A + Q_{e1}) - A(BC)) / Q_{e1} \tag{43}$$

(c) Wasteload allocation for SS.

Since the sample standard is a short term average, Q_{es} and 0.68A are used in the mass balance equation to obtain a short term wasteload allocation, WLA_s.

$$WLA_s = (SS(0.68A + Q_{es}) - 0.68A(BC)) / Q_{es} \tag{44}$$

[Source: Added at 15 Ok Reg 2880, eff 7-1-98]"

Long term average.

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

"785:46-9-7.

(a) General.

WLA_s must be converted to a long term average for comparison with WLA_l.

(b) Long term average for WLA_s.

The long term average for WLA_s, LTA_s, may be determined using EPA's method with a 99% probability basis. If available effluent data is not sufficient to compute the coefficient of variation it shall be set equal to 0.6. In this case,

$$LTA_s = 0.5274 WLA_s \tag{45}$$

(c) Long term average for permit development.

The smaller of LTA_s and WLA_l shall be used for permit development, provided that it is not less than a minimum criterion found in 785:45-5-13(h). The minimum criteria are 700 mg/L for TDS and 250 mg/L for chlorides and sulfates. They represent the lowest concentrations that may be used for long term average.

[Source: Added at 15 Ok Reg 2880, eff 7-1-98]"

Obtaining permit limits from long term averages.

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997 for actual statutory language.

785:46-9-8.

(a) General.

EPA regulation requires that maximum daily limits and average monthly limits be obtained from a long term average.

(b) Loads.

Loads, as well as concentrations, must be expressed in the permit in order to implement mineral criteria.
[Source: Added at 15 Ok Reg 2880, eff 7-1-98]

IMPLEMENTATION OF TEMPERATURE CRITERIA TO PROTECT FISH AND WILDLIFE PROPAGATION

DEFINITIONS

"7T2" means the seven-day maximum temperature likely to occur with a 50% probability each year. The 7T2 is calculated using a moving average of seven consecutive days for each year in a given record. These seven day receiving stream temperature values are ranked in descending order. An order number, m, is calculated based on the number of years of record, n, with a recurrence interval of 2 years, as m = (n+1)/2. The m^{th} highest average temperature is the 7T2.

"Cooling water reservoir" means a privately owned reservoir used in the process of cooling water for industrial purposes.

"T'" means maximum temperature difference at the edge of the mixing zone boundary.

"T_a" means regulatory ambient temperature.

"T_c" means the temperature criterion.

"T_f" means the 95th percentile maximum observed effluent temperature.

INTRODUCTION

Oklahoma's WQS (1994) protect the fish and wildlife propagation beneficial use from temperature through the numeric criteria listed in section 785:45-5-12(e)(2) of the Oklahoma WQS. The WQS list numerical criteria to protect aquatic life from temperature, with the specific criterion varying depending on the applicable subcategory of the fish and wildlife propagation beneficial use.

This document sets forth the implementation procedure by which the State of Oklahoma regulates point source discharges so that such discharges are conducted in accordance with the numerical temperature criteria as specified in the Oklahoma WQS for fish and wildlife protection. A temperature WLA is developed to protect fish and wildlife. A long term average is derived from the WLA. Permit limits are developed from the long term average. The process for developing 30-day average and 7-day average permit limits is described elsewhere in this document(see Chapter 3). The following sections are excerpted from OAC 785:46.

APPLICABILITY AND SCOPE

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1994, for actual statutory language.

"785:46-11-1. Applicability and Scope.

(a) OAC 785:45-5-4(b) provides, with specific exceptions, that numeric criteria assigned for the protection of fish and wildlife propagation in OAC 785:45-5-12 apply at all times outside the mixing zone. Therefore, the wasteload allocation for temperature will be implemented at the maximum temperature on the edge of the mixing zone.

(b) OAC 785:45-5-26 provides generally to the effect that in streams the mixing zone encompasses 25% of the total flow. The mixing zone in lakes may be designated by the permitting authority on a case by case basis. To be consistent, the mixing zone used for numerical criteria implementation to protect fish and wildlife propagation from toxicity will be employed for temperature implementation in lakes. This mixing zone is defined to extend 100 feet into the lake from the source.

(c) Temperature implementation does not apply to privately owned cooling water reservoirs. Such reservoirs are specifically exempted in OAC 785:45-5-12(e)(2)(F) from implementation of temperature criteria to protect aquatic life. However, implementation of the antidegradation policy includes a maximum temperature (52EC) which applies to all waters of the state including privately owned cooling water reservoirs. Privately owned cooling water reservoirs, however, that demonstrate no reasonable potential to exceed the antidegradation temperature shall not be limited in permits by such temperature.

(d) All calculations to implement temperature criteria shall be done in EC at critical temperature conditions."

APPLICABLE TEMPERATURES

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:46-11-2. Applicable Temperatures.

(a) **General.**
OAC 785:45-5-12(e)(2) governs what the applicable temperature criteria are.

(b) **Habitat limited and warm water aquatic community.**

(1) In waters which are designated in OAC 785:45 to be Habitat Limited Aquatic Community and/or Warm Water Aquatic Community, no heat of artificial origin shall be added that causes the receiving water to exceed the critical temperature plus 2.8EC outside the mixing zone.

(2) The temperature criterion for Habitat Limited Aquatic Community and/or Warm Water Aquatic Community, T_c, is the critical temperature plus 2.8EC. In the absence of data, T_c is 32.24EC. Where data exist, the critical temperature is the higher of 29.44EC or the seven-day maximum temperature likely to occur with a 50% probability each year, 7T2. The 7T2 is calculated using a moving average of seven consecutive days for each year in a given record. These seven day receiving stream temperature values are ranked in descending order. An order number, m, is calculated based on the number of years of record, n, with a recurrence interval of 2 years, as $m = (n+1)/2$. The m^{th} highest average temperature is the 7T2. Provided, in the segment of the Arkansas River from Red Rock Creek to the headwaters of Keystone Reservoir, the maximum temperature outside the mixing zone shall not exceed 34.4EC.

(3) To implement the temperature criterion for Habitat Limited Aquatic Community and/or Warm Water Aquatic Community protection, the critical temperature also is the regulatory ambient temperature, T_a.

(c) **Cool water aquatic communities.**
In waters designated in OAC 785:45 to be Cool Water Aquatic Community, T_c is 28.9EC. To be consistent with implementation for warm water and habitat limited aquatic communities, the regulatory ambient temperature must be 2.8EC less than T_c. Therefore, T_a = 26.1EC for cool water aquatic communities.

(d) **Trout fisheries.**

In waters designated in OAC 785:45 to be Trout Fishery, no artificial heat shall be added such that the temperature in the receiving water exceeds 20EC outside the mixing zone. However, water temperatures regularly reach in excess of 20EC in Oklahoma's summers. When background levels exceed this criterion, the effluent level should equal the criterion. Therefore, the wasteload allocation for trout fisheries is 20EC."

REGULATORY FLOWS

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:46-11-3. Regulatory Flows.

(a) OAC 785:45-5-4(b) specifies the regulatory receiving stream flow to be used for wasteload allocation, Q_u. Q_u is the greater of the 7Q2 or 1 cfs. Q_u is assumed to be 1 cfs if the 7Q2 is unknown.

(b) The regulatory effluent flow, Q_e, is defined as the highest monthly averaged flow over the past two years for industrial discharges with adequate data. Q_e is the design flow for other dischargers."

PERMITTING STRATEGY TO PROTECT TEMPERATURE CRITERIA

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:46-11-4. Permitting Strategy to Protect Temperature Criteria.

(a) The permitting authority shall use a reasonable potential assessment to determine if the heated effluent will raise the temperature of the receiving water more than 2.8EC outside the mixing zone.

(b) If the maximum temperature difference at the edge of the mixing zone boundary, T', is greater than 2.8EC, then the permitting authority shall compute the wasteload allocation.

(c) For temperature implementation, the wasteload allocation shall be considered a weekly long term average temperature using a 50% probability basis."

REASONABLE POTENTIAL

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:46-11-5. Reasonable Potential.

A permit limit for temperature is required if there is a reasonable potential that the temperature increase at the edge of the mixing zone is greater than 2.8EC. EPA Region 6 uses a reasonable potential factor to determine if there is a reasonable potential that concentration of a given substance will exceed the criterion. An analogous reasonable potential factor, T_f, will be used to determine if there is a reasonable potential that temperature will exceed the criterion by 2.8EC at the edge of the mixing zone. T_f is determined such that only approximately 5% of the observed temperatures are higher. Therefore, T_f is the upper 95th percentile of the effluent temperature distribution."

Reasonable Potential Equations

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:46-11-6. Reasonable Potential Equations.

(a) The maximum temperature difference on the mixing zone boundary must be computed using the following equation to determine if there is a reasonable potential to exceed 2.8EC outside the mixing zone:

$$\therefore T^{/} = \frac{T_f - Ta}{df} \tag{46}$$

The dilution factor, df, must be that which yields the maximum temperature difference on the mixing zone boundary.

(b) Substituting for df, the following equations shall be used for discharges to streams:
when Q* is less than or equal to 0.1823, or

$$T^{/} = \frac{1.94Q^*(T_f - T_a)}{1 + Q^*} \tag{47}$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$T^{/} = \frac{T_f - T_a}{6.17 - 15.51Q^*} \tag{48}$$

$$T^{/} = T_f - T_a \tag{49}$$

when Q* is greater than or equal to 0.3333. $Q^* = Q_e/Q_u$ (the dilution capacity).

(c) The following equations shall be used for discharges to lakes:
when D is greater than or equal to 3 feet. D is pipe diameter, and

$$T^{/} = \frac{D(T_f - T_a)}{20.15} \tag{50}$$

when W is greater than or equal to 3 feet. W is canal width.

$$T^{/} = \frac{\sqrt{W}(T_f - T_a)}{4.2} \tag{51}$$

(d) There is a reasonable potential that the effluent may cause a criterion exceedance at the maximum concentration on the mixing zone boundary if T' > 2.8EC."

WASTELOAD ALLOCATION

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1994, for actual statutory language.

"785:46-11-7. Wasteload Allocation.

(a) Conservative substance models will be used for wasteload allocations to implement temperature criteria.

$$WLA = T_a + df(T_c - T_a) \tag{52}$$

where df is the dilution factor and T_c - T_a = 2.8EC.

$$\therefore WLA = T_a + 2.8df \tag{53}$$

(b) Substituting the appropriate dilution factors for discharges to streams,

$$WLA = T_a + \frac{1.44(1+Q^*)}{Q^*} \tag{54}$$

when Q* is less than or equal to 0.1823, or

$$WLA = T_a + 17.276 - 43.428Q^* \tag{55}$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$WLA = T_a + 2.8 \tag{56}$$

when Q* is greater than or equal to 0.3333.

(c) Substituting the appropriate dilution factors for discharges to lakes,

pipe: $$WLA = T_a + \frac{56.42}{D} \tag{57}$$

when D is greater than or equal to 3 feet, or

canal: $$WLA = T_a + \frac{11.76}{\sqrt{W}} \tag{58}$$

when W is greater than or equal to 3 feet.

WHAT IS ANTIDEGRADATION?

Antidegradation is a policy and implementation procedure whose goal is to prevent clean water from becoming degraded. It is deeply entrenched in both Federal Regulation and state law. Antidegradation concepts first appeared in Oklahoma's WQS in the late 1960's.

Antidegradation is one of the minimum elements required of a state's WQS. From the Federal perspective, antidegradation forms a three level, pyramidal, protection scheme, which states at its basic level, (termed Tier I) that all existing uses of the Nation's waters shall be maintained an protected. Examples of this level in Oklahoma include the North Canadian River, the Red River, the Washita River, and most of our streams and rivers.

At the second level (Tier II) there is a recognition that some of the Nation's waters are better in quality than that needed to merely support beneficial uses. Those waters, termed "high quality waters" under federal law, are to be maintained and protected (unless a lowering of water quality is needed to accommodate important social or economic development). Examples of this level in Oklahoma include the Blue River in Johnston County, Sallisaw Creek, Honey Creek and thirty-nine other streams and rivers.

The third level (Tier III), referred to as "Outstanding National Resource Waters", are essentially the same as high quality waters except that there is no allowance for the lowering of water quality for any reason. This level in Oklahoma is called "Outstanding Resource Waters (ORW)" and includes the legislatively set "Scenic Rivers" and their watersheds. Examples would be the Illinois River, Lee Creek, and the Upper Mountain Fork River.

In Oklahoma, this scheme has been altered because of interpretation of the Oklahoma Pollution Remedies Act by the Oklahoma Attorney General. These alterations will be discussed in more depth later in this report.

BACKGROUND

Oklahoma's WQS are reviewed and amended every three years in fulfillment of Clean Water Act requirements set forth in 40 CFR 131.1. During the 1991 triennial revision, the Antidegradation Implementation portion of the Standards was modified to allow differential levels of protection which parallel the three levels discussed below. These modifications were carried forward in the 1994 triennial revision and remain in the 1997 Oklahoma WQS (OAC 785:45-3-2).

In general, these modifications follow the U.S. EPA tiered protection scheme. This establishes:

Tier I — All waters must maintain existing or designated beneficial uses. In Oklahoma, these beneficial uses include Fish and Wildlife Propagation, Public and Private Water Supply, Emergency Water Supply, Agriculture, Hydroelectric Power, Municipal and Industrial Process Cooling Water, Primary Body Contact Recreation, Secondary Body Contact Recreation, Navigation, and Aesthetics. Specific language reads: "No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed" (Code Section 785:45-3-2(c)).

Tier II — Certain Oklahoma waters possess existing water quality which exceeds that necessary to maintain beneficial uses. Water Quality must be maintained at these higher levels. These waters are designated with the High Quality Water (HQW) limitation in Appendix A. Specific language reads: "It is recognized that certain waters of the state possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected" (785:45-3-2(b)).[Note: Federal guidelines allow that water quality of High Quality Waters may be lowered to that required to maintain beneficial uses if necessary for social or economic development. However, based upon a 1985 Oklahoma Attorney General opinions (No. 85-87 and 84-124) water quality in Oklahoma cannot be lowered for social or economic reasons.]

Tier III Select Oklahoma waters represent exceptional resources which are protected with the most stringent level of protection afforded any water, that of "no degradation". These waters are designated with the Outstanding Resource Water (ORW) limitation.

Specific language reads: "Certain waters of the state constitute an outstanding resource or have exceptional recreational and/or ecological significance. These exceptional waters include streams designated "Scenic River" or "ORW" in Appendix A, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)2(A). No degradation of water quality shall be allowed in these waters" (Code Section 785:45-3-2(a)).

Thus, this pyramidal protection system establishes baseline protection to all waters of the state (beneficial use maintenance), more protection to a subset of the state's waters called high quality waters, and the highest level of protection to those waters with exceptional ecological and/or recreational significance.

To be truly useful for water quality management, however, these concepts must be implemented into the state's water management scheme. These "Implementation Policies for the antidegradation policy statement" are located in Part 5, of the 1997 Oklahoma WQS and also appears later in this document. In addition, implementation documents promulgated under OAC 785:46 contain further procedures for implementation of the Antidegradation policy; these procedures also appear later in this document.

Implementation of Oklahoma's Antidegradation Policy has been found in Oklahoma's WQS since 1973. Initially, certain waters were given additional protection by restricting point source discharges. This concept was initiated with a footnote of "a" in Appendix A of the WQS. This "little a" restriction applied to approximately 150 waters. Additionally, 96 areas were listed in Appendix B which received this level of protection. From 1973 to 1988 there was no differential classification of "a" waters or differential protection applied to them. In 1988, water classes were developed which specify the reason for additional protection. Then, in 1991, specific protection strategies were assigned to the existing classes. These protective strategies were continued in the 1994 Oklahoma WQS. Implementation documents for the Antidegradation policy were also promulgated in 1994 under OAC 785:46-13.

EVOLUTION OF SPECIAL PROTECTION WATERS IN THE OWQS 1985-1988-1991

1985 OWQS	1988 OWQS	1991 OWQS
- Approx. 150 special protection identified as "a"	29 - ORW 43 - HQW 88 - SWS	29 - ORW 43 - HQW 88 - SWS
- 96 areas listed in Appendix B receive "ORW" protection	- 99 areas listed in Appendix B receive "ORW" protection	- 97 areas in App. B must maintain their ecological or recre-ational significance
Non-specific classes referred to as "a"	Specific classes (ORW, HQW, and SWS)	Specific classes maintained
Non-specific prot. (no new discharge)	Non-specific prot. (no new discharge)	Specific protection afforded

FIGURE 7 **OUTLINE OF THE EVOLUTION OF SPECIAL PROTECTION WATERS IN OKLAHOMA**

Although specific protection methods are now applied to different classes of Oklahoma waters, and a comprehensive policy has been developed, Antidegradation implementation will never be totally completed. Because of advances in science, changing public policy, and legal modifications, Antidegradation Implementation procedures will require constant updating. It is certainly possible that during each triennial revision, the Oklahoma WQS will see a refinement of Antidegradation and its companion implementation policy. It is also possible that implementation documents for the Antidegradation policy promulgated under OAC 785:46 will undergo periodic revision.

Antidegradation has a long history in Oklahoma's WQS. For clarity, these past revisions will not be described. Only the 1997 Oklahoma WQS Antidegradation Policy and Implementation procedures will be discussed.

The remainder of this document contains actual language from the 1997 Oklahoma WQS and brief descriptive language to clarify this statutory narrative, along with actual language from implementation rules promulgated under OAC 785:46. It is divided into three sections: 1) a generalized protection narrative which establishes how Oklahoma follows the Tiered water quality protection format; 2) actual 1997 WQS narratives with clarifying language; and, 3) actual implementation language from OAC 785:46.

Implementation of Oklahoma's Antidegradation Policy

Generalized Protection Narratives

Tier I Waters (Beneficial Use Protection)

WQS utilize both narrative and numerical criteria to protect designated beneficial uses. These statements and values are rooted in both policy and science, and provide maximum concentrations (levels) which do not impair recreation, aquatic life or affect human health in or on the water. These may be found in Part 3, Rule 785:45-5-10 through 785:45-5-19 of the 1994 Oklahoma WQS.

For example, numerical criteria to protect aquatic life were developed using concentrations which are lethal to 50% of the test organisms (LC50's). Then using statistical methods, a value was calculated which is protective of Oklahoma's aquatic life. A narrative statement is also incorporated into the Standards which prohibits acute toxicity to all waters of the state and chronic toxicity to all waters outside the mixing zone.

Body Contact Recreation is protected through maximum concentrations of bacteria (E. coli, fecal coliform or Enterococci) and a narrative statement which prohibits pathogenic organisms. The aesthetics beneficial use utilizes a series of "free forms", including scum, foam, objectionable bottom deposits, etc.

These narrative expressions and numerical criteria are effective when applied in water quality based permits or other regulatory activities to protect the beneficial uses assigned to Oklahoma waters in Appendix A of the WQS. Subchapter 5, Part 3 of the Oklahoma WQS establishes narrative and numerical criteria to protect existing and designated beneficial uses of all waters of the state.

Tier II and III Waters

Rule 785:45-3-2 "Applications of Antidegradation Policy" highlights which of Oklahoma's Tier II and Tier III waters may receive protection beyond that established for the protection of beneficial uses.

In general, the method that Tier II (High Quality) and Tier III (Outstanding) waters receive specific protection is given in Rule 785:45-5-25 of the 1997 Oklahoma WQS. This Rule outlines special protection provisions applicable to High Quality Waters (HQW), Appendix B areas, Sensitive Public and Private Water Supplies (SWS) and Outstanding Resource Waters (ORW).

It is the goal of Part 5 of the WQS to allow Oklahoma to maintain high and outstanding water quality in select waters.

The following policy gives specific standards language and clarifying language found in Subchapters 3 and 5. It will outline:

(1) where and when point source discharges will and will not be allowed
(2) which Oklahoma waters will receive additional protection
(3) when these protection measures will be applied, and
(4) outline non-point source pollution control strategies applicable to each water.

OKLAHOMA WATER QUALITY STANDARDS LANGUAGE

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:45-3-2. Applications of Antidegradation Policy.

(a) Application to outstanding resource waters (ORW).
Certain waters of the state constitute an outstanding resource or have exceptional recreational and/or ecological significance. These waters include streams designated "Scenic River" or "ORW" in Appendix A of this Chapter [of the Oklahoma WQS], and waters of the state located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)(2)(A). No degradation of water quality shall be allowed in these waters.

(b) Application to high quality waters (HQW).
It is recognized that certain waters of the state possess existing water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in an on the water. These high quality waters shall be maintained and protected.

(c) Application to beneficial uses.
No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed.

(d) Application to improved waters.
As the quality of any waters of the state improve, no degradation of such improved waters shall be allowed.

(e) Application to thermal discharge.
In cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementation method shall be consistent with Section 316 of Public Law 92-500 as amended."

GUIDANCE AND CLARIFYING LANGUAGE

Paragraph (a), Application to Outstanding Resource Waters, contains language which identifies special protection waters. Specifically, it specifies that "ORW" waters are only those designated with an "ORW" designation in Appendix A of the Oklahoma WQS. These include all legislatively designated "Scenic Rivers", and their watersheds. Language in the third sentence of this paragraph reconveys ORW status only to selected waters as described which are specifically listed as "ORW" in Appendix A of the Oklahoma WQS.

Paragraph (b), Application to High Quality Waters, contains language which identifies that water quality in waters which possess existing water quality, which exceeds that necessary to support beneficial uses, must be maintained and protected.

Paragraph (c), Application to beneficial uses, establishes baseline beneficial use protection. Specific protection levels to assure beneficial use protection may be found throughout the WQS in the form of narrative and numerical criteria. If a beneficial use is designated for a specific waterbody in Appendix A of the WQS, criteria necessary to maintain that beneficial use shall be implemented.

Paragraph (d), Application to improved waters, requires that as the water quality of the state's waters improve, that level of improved water quality must be maintained and protected.

Paragraph (e), Application to thermal discharge, in essence establishes that privately owned reservoirs used in the process of cooling water for industrial purposes are not considered waters of the state. This stipulation was established to maintain consistency between the antidegradation policy, beneficial use protection and the state's definition of waters of the state. Strictly speaking it is not addressed as part of antidegradation implementation.

SUBCHAPTER 5, PART 5, IMPLEMENTATION POLICIES FOR THE ANTIDEGRADATION POLICY STATEMENT

OKLAHOMA WQS LANGUAGE

The following excerpts of actual WQS language are provided here for reference. Please consult the Oklahoma WQS, 1997, for actual statutory language.

"785:45-5-25. Implementation Policies for the Antidegradation Policy Statement.

(a) The following provisions set forth exceptions to the limitations stated in 785:45-5-25(c) for additional protection of certain waters of the state:
    (1) The limitations contained in 785:45-5-25(c)(1) for additional protection of Outstanding Resource Waters shall apply to all discharges from point sources except such limitations do not apply to discharges of stormwater from temporary construction activities. Discharges of stormwater from point sources existing as of June 25, 1992, whether or not such stormwater discharges were permitted as point sources prior to June 25, 1992, are also excepted from the 785:45-5-25(c)(1) rule prohibiting any new point source discharges, but such stormwater discharges are prohibited from increased load of any pollutant.
    (2) The limitations for additional protection of Appendix B Waters (785:45-5-25(c)(2)), High Quality Waters (785:45-5-25(c)(3)), and Sensitive Public and Private Water Supplies (785:45-5-25(c)(4)), shall apply to discharges from all point sources except point source discharges of stormwater.
(b) For purposes of 785:45-5-25, the term "specified pollutants" means:
    (1) Oxygen demanding substances, measured as Carbonaceous Biochemical Oxygen Demand (CBOD) and/or Biochemical Oxygen Demand (BOD);
    (2) Ammonia Nitrogen and/or Total Organic Nitrogen;
    (3) Phosphorus;
    (4) Total Suspended Solids (TSS);
    (5) Such other substances as may be determined by the Oklahoma Water Resources Board.
(c) The following limitations for additional protection apply to various waters of the state:
    (1) Outstanding Resources Waters (ORW)
        (A) Outstanding Resource Waters (ORW) are those waters of the state which constitute outstanding resources or are of exceptional recreational and/or ecological significance as described in 785:45-3-2(a), Anti-Degradation Policy Statement.
        (B) The following waterbodies are prohibited from having any new point source discharge(s) of any pollutant or increased load of any pollutant from existing point source discharge(s):
            (i) Waterbodies designated "ORW" and/or "Scenic River" in Appendix A of this Chapter [of the Oklahoma WQS];

(ii) Waterbodies located within the watersheds of waterbodies designated "Scenic River" in Appendix A of this Chapter [of the Oklahoma WQS]; and

(iii) Waterbodies located within the boundaries of Appendix B areas which are specifically designated "ORW" in Appendix A of this chapter [of the Oklahoma WQS].

(2) Appendix B Waters.

(A) Appendix B waters are those waters of the state which are located within the boundaries of areas listed in Appendix B of this Chapter [of the Oklahoma WQS], including but not limited to the National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges. Appendix B also may include those areas which are inhabited by federally listed, threatened or endangered species, and other appropriate areas.

(B) Only those Appendix B waters specifically designated "ORW" in Appendix A of this Chapter [of the Oklahoma WQS] shall be afforded the limitations for additional protection described in 785:45-5-25(c)(1)(B).

(C) New discharges or increased loading from existing discharges to Appendix B waters may be allowed under such conditions that ensure that the recreational and ecological significance of these waters will be maintained.

(D) Discharges or other activities associated with those waters listed in Appendix B, Table 2 [of the Oklahoma WQS] containing Federally listed threatened or endangered species may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Service.

(3) High Quality Waters (HQW).

(A) High Quality Waters (HQW) are those waters of the state which possess existing water quality which exceeds that necessary to support propagation of fishes, shellfishes, wildlife, and recreation as described in 785:45-3-2(b), Anti-Degradation Policy Statement, and are designated "HQW" waters in Appendix A of this Chapter [of the Oklahoma WQS].

(B) All waterbodies designated with the limitation indicated by the letters "HQW" in Appendix A [of the Oklahoma WQS] are prohibited from having any new point source discharge(s) of any pollutant or increased load or concentration of specified pollutants from existing point source discharge(s), provided however that new point source discharge(s) or increased load of specified pollutants described in 785:45-5-25(b) may be approved by the Board in those circumstances where the discharger can demonstrate to the satisfaction of the Board that a new point source discharge or increased load from an existing point source discharge will result in maintaining or improving the level of water quality which exceeds that necessary to support recreation and propagation of fishes, shellfishes, and wildlife of the direct receiving water and downstream waterbodies designated HQW. As specified in 785:45-3-2(b)and (d), no discharge of any pollutant to a water designated HQW may lower existing water quality.

(4) Sensitive Public and Private Water Supplies (SWS).

(A) Waters designated "SWS" are those waters of the state which constitute sensitive public and private water supplies and are listed in Appendix A of this Chapter [of the Oklahoma WQS] as "SWS" waters.

(B) All waterbodies designated with the limitation indicated by the letters "SWS" in Appendix A [of the Oklahoma WQS] are prohibited from having any new point source discharge(s) of any pollutant or increased load of specified pollutants from existing point source discharge(s), provided however that new point source discharge(s) or increased load of specified pollutants described in 785:45-5-25(b) may be approved by the Board in those circumstances where the discharger can demonstrate to the satisfaction of the Board that a new point source discharge or increased load from an existing point source discharge will not lower water quality of either the direct receiving water or downstream waterbodies designated SWS.

(5) Prioritization of Limitations.
In situations where more than one beneficial use limitation exists for a waterbody, the more stringent limitation shall apply.

(6) Non-Point Source Discharges.
Best management practices for control of non-point source discharges should be implemented in watersheds of waterbodies designated "ORW", "HQW", or "SWS" in Appendix A of this Chapter [of the Oklahoma WQS] and/or located within areas listed in Appendix B [of the Oklahoma WQS] provided however that development of conservation plans shall be required in sub-watersheds where discharges from non-point sources are identified as causing, or significantly contributing to, degradation in a waterbody designated "ORW"."

(7) Culturally Significant Waters (CSW).
(a)Waters designated as CSW in Appendix A of 785:45 are those identified by recognized Tribal authorities as critical to maintaining the waters' utility for cultural, historic, recreational or ceremonial uses and which may require more stringent protection measures to protect human health or aquatic life or both.
(b) All activities associated with a CSW may require consulting with the duly authorized Tribal authority to assure that the proposed activity is consistent with applicable Tribal environmental laws.

GUIDANCE AND CLARIFYING LANGUAGE

Paragraph (a) contains language addressing discharges of stormwater in the various categories of protected waters. Note that permanent discharges from new sources of stormwater will not be allowed into ORW waters. Exceptions for discharges to ORW waters are given for existing sources of stormwater and from temporary construction activities. Both "existing point source discharge" and "stormwater" are defined in the definition section of the Standards (785:45-1-2) as follows:

> "Existing Point Source Discharge" means, for purposes of 785:45-5-25, point source discharges other than stormwater which were/are in existence when the ORW, HQW or SWS designation was/is assigned to the water(s) which receive(s) the discharge. The load from a point source discharge which is subject to the no increase limitation shall be based on the permitted mass loadings and concentrations, as appropriate, in the discharge permit effective when the limitation was assigned. Publicly owned treatment works may use design flow, mass loadings or concentration as appropriate if those flows, loadings or concentration were approved as a portion of Oklahoma's Water Quality Management Plan prior to the application of the ORW, HQW, SWS limitation.
>
> "Stormwater" means storm water runoff, snow melt runoff, and surface runoff and drainage."

Stormwater discharges (new, existing, permanent, and temporary) are not excluded in HQW, SWS, and Appendix B waters. Stormwater will be allowed in beneficial use waters as well, provided such stormwater discharges meet applicable permit restrictions.

Paragraph (b) introduces the concept of "specified pollutants" and defines this concept. Use of the term specified pollutants becomes more clear under the "High Quality Waters" (HQW) section and the "Sensitive Public and Private Water Supply" (SWS) section. The concept of specified pollutants does not apply to ORW or Appendix B waters.

OUTSTANDING RESOURCE WATERS (ORW) PROTECTION

Paragraph (c)(1) contains language which identifies additional protection methods for Outstanding Resource Waters. Paragraph (c)1(A) re-establishes which waters receive ORW protection.

Paragraph (c)(1)(B) contains language which emphasizes that Outstanding Resource Waters are "prohibited from having any new point source discharge of any pollutant, or increased load of any pollutant from existing point source discharge(s)." The definition section of the Oklahoma WQS defines the terms "pollutant" and "existing point source discharge". "Existing Point Source Discharge" has been previously defined. "Pollutant" is defined as:

> "Pollutant" means any material, substance or property which may cause pollution.

Language contained in (c)1(B) (i), (ii), and (iii) specifies which waters receive ORW protection.

In effect, this ties all "ORW" protection to a requirement that it be designated as "ORW" in Appendix A [of the Oklahoma WQS].

APPENDIX B WATERS PROTECTION

Appendix B waters receive ORW status only when they are specifically listed as ORW in Appendix A. This may occur for several reasons, but the ORW designation must occur in Appendix A to receive ORW protection.

Paragraph (c)(2) outlines provisions for those Appendix B waters not designated ORW. The 1994 Oklahoma WQS include language which provides variable protection to Appendix B waters. This was necessary because all waters listed in Appendix B are not alike with respect to their "ecological and recreational" significance (such as endangered species protection, canoeing recreation, scenic beauty, waterfowl refuge, or wildlife refuge). Therefore, there was a need to broaden the scope of permit review to allow consideration of each Appendix B area's specific ecological attribute. Within this context, areas such as the Glover River should receive a high level of protection in order to protect the threatened leopard darter (Percina pantherina). It also has very high water quality with canoeing recreation occurring throughout much of its length. Conversely, other areas, such as a wildlife management area, may contain marshes and swamps managed for waterfowl, where pristine nutrient levels would not be desirable. The intent is to allow the review of discharge applications against each Appendix B area's specific ecological or recreational attribute to ensure an areas "ecological or recreational integrity" is maintained.

Therefore (c)(2)(C) allows new discharges or increased loading from existing discharges to Appendix B waters under such conditions that ensure that the recreational and ecological significance of these waters will be maintained.

Discharge limitation requirements for Appendix B waters apply only to those discharges located within the boundaries of the Appendix B areas. Discharges located outside of Appendix B area boundaries must maintain beneficial uses. They may be considered for Appendix B limitation application only if the discharge would compromise the recreational and ecological integrity of the Appendix B water. For example, a discharge to the Arkansas River 200 miles upstream of the Lake Eufaula Wildlife Management Area would be unlikely to affect wildlife resources of that area. However, if the discharge is located within the boundaries of the area, wildlife impacts would be much more likely. This is not to say that such a discharge would not be allowed, but that it would require a higher level of scrutiny than a similar discharge outside the area.

HIGH QUALITY WATERS (HQW) PROTECTION

Paragraph (c)(3)(A)contains language defining High Quality Waters. This language is expanded in (c)(3)(B), which provides that new point source discharges or increased loads of specified pollutants from existing point source discharges may be allowed (subject to approval by the OWRB) if the level of water quality (which exceeds that level needed for beneficial use attainment) is maintained and improved. This change was made to HQW's to conform with the Antidegradation Policy. Only an increased load of specified pollutants, as defined in 785:45-5-25(b), may be allowed into HQW's. However, no discharge of any pollutant to a water designated HQW may lower existing water quality.

It should be remembered that "Water Quality" is defined in the Oklahoma WQS as "physical, chemical, and biological characteristics of water which determine diversity, stability, and productivity of the climax biotic community or affect human health".

SENSITIVE PUBLIC AND PRIVATE WATER SUPPLIES (SWS) PROTECTION

Paragraph (c)(4) describes limitations for additional protection to SWS waters. SWS waters are specifically designated in Appendix A of the Oklahoma WQS. Sensitive Public and Private Water Supplies do not follow the strict Antidegradation restrictions of the other waters with limitations for additional protection. Rather, they may be assigned to small municipal water supply impoundments where there is a high potential for contamination. To protect these waters, discharge controls similar to antidegradation limitations are applied.

Specifically, these waterbodies (or watersheds as stipulated in Appendix A) "are prohibited from having any new point source discharge(s) of any pollutant or increased load of specified pollutants from existing point source discharge(s), provided however that new point source discharge(s) or increased load of specified pollutants ... may be approved by the Board in those circumstances where the discharger can demonstrate to the satisfaction of the Board that a new point source discharge or increased load from an existing point source discharge will not lower water quality of either the direct receiving water or downstream waterbodies designated SWS" (Rule 785:45-5-25(c)(4)(B)). This language and rationale follows that previously discussed for HQW's.

It must be stressed that the "SWS" limitation is not a true component of the pyramidal protection scheme manifest through Antidegradation Implementation. This is because it incorporates water quality restrictions to protect an existing sensitive drinking water supply, not necessarily water quality. Therefore, although SWS waters utilize the HQW method of restricting degradation, the reason for this restriction is not to maintain "water quality", but to protect a sensitive surface water supply. It also maintains the HQW policy of prohibiting (or severely restricting) point source discharges into SWS waters and/or watersheds.

PRIORITIZATION OF LIMITATIONS

Rule 785:45-5-25(c)(5) establishes that where more than one beneficial use limitation (i.e.: ORW, Appendix B, HQW or SWS) exists for a waterbody, the more stringent limitation applies. This follows logic similar to all water quality criteria.

NONPOINT SOURCE DISCHARGES

Non-point source pollution represents the dominant portion of the Nation's existing surface water pollution problem. Figures 8 and 9 illustrate nonpoint source pollution impacts upon the nation's lakes and rivers.

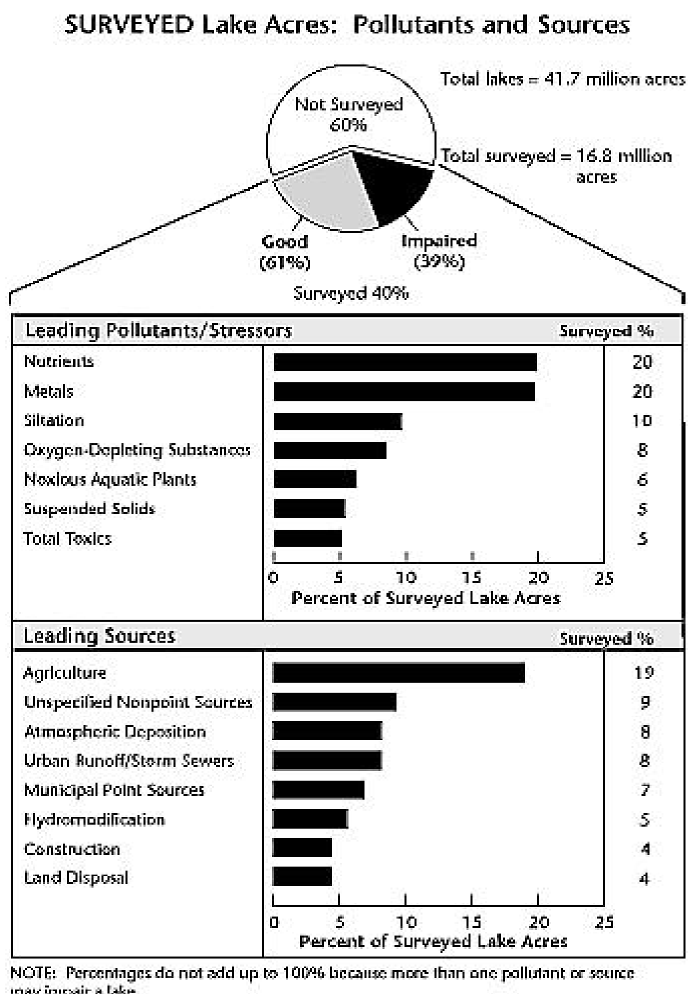


FIGURE 8 **POLLUTANTS AND SOURCES OF SURVEYED**

LAKE ACRES IN THE NATION

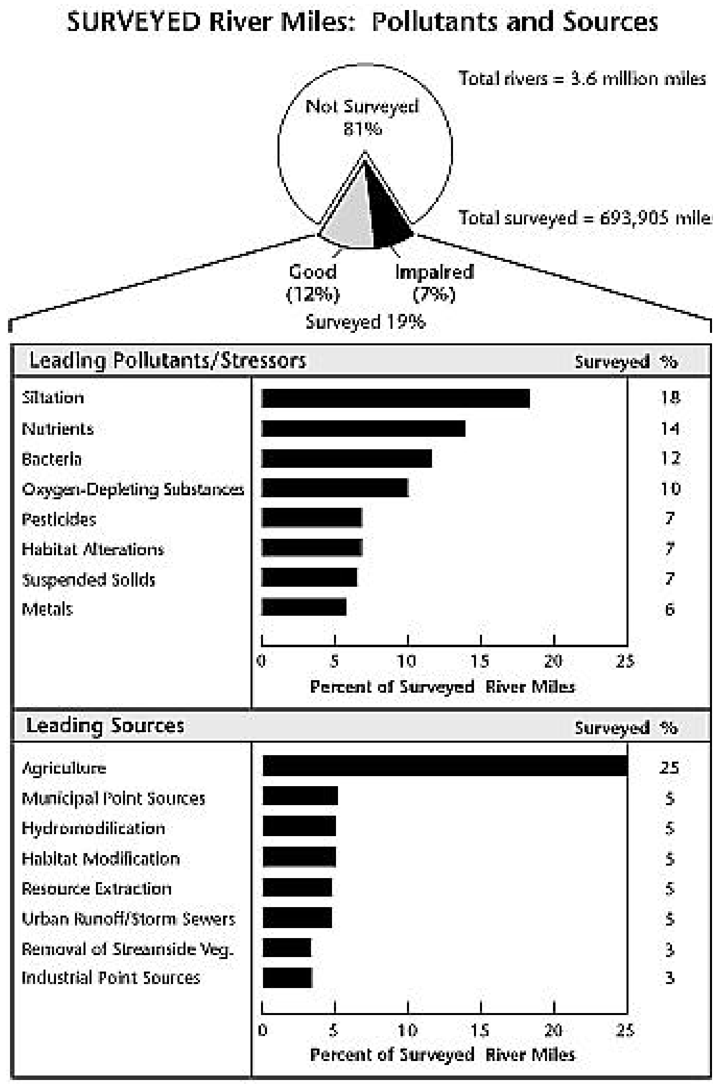


FIGURE 9 **POLLUTANTS AND SOURCES OF SURVEYED RIVER MILES IN THE NATION**

Although it is recognized that nonpoint source pollution is a major contributor of pollution, control measures have been difficult to implement. In an effort to begin to deal with this nonpoint source dilemma, Rule 785:45-5-25(c)(6) establishes that, in addition to the best management practices requested for all waters of the state, conservation plans are required in sub-watersheds where discharges from non-point sources are identified as causing, or significantly contributing to, degradation in a waterbody designated "ORW" in Appendix A [of the Oklahoma WQS].

This conservation plan requirement in existing or suspected degraded sub-watersheds, was inserted into the 1991 Oklahoma WQS, and continued in the 1994 Oklahoma WQS. It was done in an effort to formally address areas where non-point sources of pollutants are adversely affecting water quality.

Industrial Wasteload Evaluation Implementation Procedure for Streams and Rivers

Implementation procedures for oxygen demanding discharges associated with industrial discharges is addressed in another section of this document.

Chapter 46, Subchapter 13, Implementation of Antidegradation Policy

Implementation of Oklahoma's antidegradation policy is further developed in OAC Title 785, Chapter 46, "Implementation of Oklahoma's Water Quality Standards," Subchapter 13, "Implementation of Antidegradation Policy."

Applicability and Scope

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-1. Applicability and Scope.

(a) The rules in this Subchapter provide a framework for implementing the antidegradation policy stated in OAC 785:45-3-2 for all waters of the state. This policy and framework includes three tiers, or levels, of protection.
(b) The three tiers of protection are as follows:
  (1) Tier 1. Attainment or maintenance of an existing or designated beneficial use.
  (2) Tier 2. Maintenance or protection of High Quality Waters and Sensitive Public and Private Water Supply waters.
  (3) Tier 3. No degradation of water quality allowed in Outstanding Resource Waters.
(c) In addition to the three tiers of protection, this Subchapter provides rules to implement the protection of waters in areas listed in Appendix B of OAC 785:45. Although Appendix B areas are not mentioned in OAC 785:45-3-2, the framework for protection of Appendix B areas is similar to the implementation framework for the antidegradation policy.
(d) In circumstances where more than one beneficial use limitation exists for a waterbody, the most protective limitation shall apply. For example, all antidegradation policy implementation rules applicable to Tier 1 waterbodies shall be applicable also to Tier 2 and Tier 3 waterbodies or areas, and implementation rules applicable to Tier 2 waterbodies shall be applicable also to Tier 3 waterbodies.
(e) Publicly owned treatment works may use design flow, mass loadings or concentration, as appropriate, to calculate compliance with the increased loading requirements of this section if those flows, loadings or concentrations were approved by the Oklahoma Department of Environmental Quality as a portion of Oklahoma's Water Quality Management Plan prior to the application of the ORW, HQW or SWS limitation."

Definitions

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-2. Definitions.

The following words and terms, when used in this Subchapter, shall have the following meaning, unless the context clearly indicates otherwise:

"Specified pollutants" means
- (A) Oxygen demanding substances, measured as Carbonaceous Biochemical Oxygen Demand (CBOD) and/or Biochemical Oxygen Demand (BOD);
- (B) Ammonia Nitrogen and/or Total Organic Nitrogen;
- (C) Phosphorus;
- (D) Total Suspended Solids (TSS); and
- (E) Such other substances as may be determined by the Oklahoma Water Resources Board or the permitting authority."

TIER 1 PROTECTION; ATTAINMENT OR MAINTENANCE OF AN EXISTING OR DESIGNATED BENEFICIAL USE

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-3. Tier 1 Protection; Attainment or Maintenance of an Existing or Designated Beneficial Use.

(a) **General.**
- (1) Beneficial uses which are existing or designated shall be maintained and protected.
- (2) The process of issuing permits for discharges to waters of the state is designed to attain or maintain beneficial uses which have been designated for those waters. For example, Subchapters 3, 5, 7, 9 and 11 of this Chapter are rules for the permitting process. As such, the latter Subchapters not only implement numerical and narrative criteria, but also implement Tier 1 of the antidegradation policy.

(b) **Thermal pollution.**
Thermal pollution shall be prohibited in all waters of the state. Temperatures greater than 52 degrees Centigrade shall constitute thermal pollution and shall be prohibited in all waters of the state.

(c) **Prohibition against degradation of improved waters.**
As the quality of any waters of the state improves, no degradation of such improved waters shall be allowed."
(Source: Added at 13 Ok Reg 2891, eff 7-1-96; Amended at 16 Ok Reg 3258-3259, eff 7-12-99)

TIER 2 PROTECTION; MAINTENANCE AND PROTECTION OF HIGH QUALITY WATERS AND SENSITIVE WATER SUPPLIES

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-4. Tier 2 Protection; Maintenance and Protection of High Quality Waters and Sensitive Water Supplies.

(a) **General rules for High Quality Waters.**
New point source discharges of any pollutant after June 11, 1989, and increased load or concentration of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "HQW". Any discharge of any pollutant to a waterbody designated "HQW" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load or concentration of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load or concentration would result in maintaining or improving the level of water quality which exceeds that necessary to support recreation and propagation of fishes, shellfishes, and wildlife in the receiving water.

(b) **General rules for Sensitive Public and Private Water Supplies.**
New point source discharges of any pollutant after June 11, 1989, and increased load of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "SWS". Any discharge of any pollutant to a waterbody designated "SWS" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load would result in maintaining or improving the level of water quality which exceeds that necessary to support recreation and propagation of fishes, shellfishes, and wildlife in the receiving water.

(c) **Stormwater discharges.**
Regardless of subsections (a) and (b) of this Section, point source discharges of stormwater to waterbodies and watersheds designated "HQW" and "SWS" may be approved by the permitting authority.

(d) **Nonpoint source discharges.**
Best management practices for control of nonpoint source discharges should be implemented in watersheds of waterbodies designated "HQW" or "SWS" in Appendix A of OAC 785:45."

TIER 3 PROTECTION; PROHIBITION AGAINST DEGRADATION OF WATER QUALITY IN OUTSTANDING RESOURCE WATERS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-5. Tier 3 Protection; Prohibition Against Degradation of Water Quality in Outstanding Resource Waters.

(a) **General.**
New point source discharges of any pollutant after June 11, 1989, and increased load of any pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "ORW" and/or "Scenic River", and in any waterbody located within the watershed of any waterbody designated with the limitation "Scenic River". Any discharge of any pollutant to a waterbody designated "ORW" or "Scenic River" which would, if it occurred, lower existing water quality shall be prohibited.

(b) **Stormwater discharges.**
Regardless of 785:46-13-5(a), point source discharges of stormwater from temporary construction activities to waterbodies and watersheds designated "ORW" and/or "Scenic River" may be permitted by the permitting authority. Regardless of 785:46-13-5(a), discharges of stormwater to waterbodies and watersheds designated "ORW" and/or "Scenic River" from point sources existing as of June 25, 1992, whether or not such stormwater discharges were permitted as point sources prior to June 25, 1992, may be permitted by the permitting authority; provided, however, increased load of any pollutant from such stormwater discharge shall be prohibited.

(c) **Nonpoint source discharges.**
Best management practices for control of nonpoint source discharges should be implemented in watersheds of waterbodies designated "ORW" in Appendix A of OAC 785:45, provided, however, that development of conservation plans shall be required in sub-watersheds where discharges from nonpoint sources are identified as causing or significantly contributing to degradation in a waterbody designated "ORW"."

(d) LMFO's.
No licensed managed feeding operation (LMFO) established after June 10, 1998 which applies for a new or expanding license from the State Department of Agriculture after March 9, 1998 shall be located...(w)ithin three miles of any designated scenic river area as specified by the Scenic Rivers Act in 82 O.S. Section 1451 and following, or within one mile of a waterbody (2:9-210.3(D)) designated in Appendix A of OAC 785:45 as "ORW".
(Source: Added at 13 Ok Reg 2891, eff 7-1-96; Amended at 16 Ok Reg 3259, eff 7-12-99)

PROTECTION OF APPENDIX B AREAS

The following excerpts of actual implementation document language are provided here for reference. Please consult OAC 785:46 for actual statutory language.

"785:46-13-6. Protection for Appendix B Areas.

(a) **General.**
Appendix B of OAC 785:45 identifies areas in Oklahoma with waters of recreational and/or ecological significance. These areas are divided into Table 1, which includes national and state parks, national forests, wildlife areas, wildlife management areas and wildlife refuges; and Table 2, which includes areas which contain threatened or endangered species listed as such by the federal government pursuant to the federal Endangered Species Act as amended.

(b) **Protection for Table 1 areas.**
New discharges of pollutants after June 11, 1989, or increased loading of pollutants from discharges existing as of June 11, 1989, to waters within the boundaries of areas listed in Table 1 of Appendix B of OAC 785:45 may be approved by the permitting authority under such conditions as ensure that the recreational and ecological significance of these waters will be maintained.

(c) **Protection for Table 2 areas.**
Discharges or other activities associated with those waters within the boundaries listed in Table 2 of Appendix B of OAC 785:45 may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Service. Discharges or other activities in such areas shall not substantially disrupt the threatened or endangered species inhabiting the receiving water.

(d) **Nonpoint source discharges.**
Best management practices for control of nonpoint source discharges should be implemented in watersheds located within areas listed in Appendix B of OAC 785:45."

CHAPTER 3
PERMITTING PROCEDURES

INTRODUCTION

The water quality provisions of the Oklahoma Environmental Quality Act (OEQA) provide that pollution of the waters of the state constitutes a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs beneficial uses of water. It is therefore the public policy of this state to conserve the waters of the state and protect, maintain and improve the quality of such water for its legitimate beneficial uses. No waste or pollutant shall be discharged into any waters of the state or otherwise placed in a location likely to affect such waters without first being given the degree of treatment or taking such other measures as necessary to further the prevention, abatement and control of new or existing water pollution.

The primary mechanism used to control pollution from point source discharges to waters of the state is through the issuance of pollutant discharge permits. These permits may include schedules of compliance and other such conditions to prevent, control or abate pollution. They include such water-quality related and technology-based effluent limitations as are necessary to protect the water quality and existing and designated beneficial uses of the waters of the state. A sound basis for development of these effluent limitations is important to assure the permit is both reasonable and protective of waters of the state.

DEVELOPING EFFLUENT LIMITATIONS

Developing an effluent limitation in a permit is a multi-step process. The first step involves assuring that a certain minimum level of treatment is provided for a particular pollutant or category of pollutant. This is usually established through effluent limitation guidelines (ELG's) promulgated in 40 CFR, Part 400, Subchapter N, for industrial dischargers, or through the definition of secondary treatment promulgated in 40 CFR, Part 133, for municipal dischargers; unless more stringent state requirements apply. In those cases where there are no ELG's available for a particular pollutant or industrial category the permit writer may use his Best Professional Judgment (BPJ) in establishing a site-specific technology-based limitation.

The second step involves comparing the technology-based limit developed in the first step to water quality standards requirements. A more stringent, site-specific limit for a particular pollutant may be required to protect the water quality of the receiving water. The more stringent of the technology-based or water-quality based limit is used in the permit.

TECHNOLOGY-BASED REQUIREMENTS

The OEQA provides that the ODEQ Board shall have the power and duty to promulgate rules implementing or effectuating the Oklahoma Pollutant Discharge Elimination System (OPDES) Act. Such rules may incorporate by reference any applicable rules, regulations and policies of the EPA adopted under the CWA. Such rules shall be in reasonable accord with the EPA regulations and policies, including rules which allow the inclusion of technology-based effluent limitations in discharge permits to the extent necessary to protect the designated and existing beneficial uses of the waters of the state and to comply with the requirements of the CWA. In addition, they include rules which establish pretreatment standards and apply, in permits, applicable national standards of performance pursuant to Section 306 of the CWA.

Regulations promulgated by the DEQ (OAC 252:605-1-5) adopt by reference the majority of 40 CFR Part 125 (Criteria and Standards for the National Pollutant Discharge Elimination System). The regulations adopted by reference include Criteria and Standards for Imposing Technology-Based Treatment Requirements under Sections 301(b) and 402 of the Act, Criteria for Extending Compliance Dates for Facilities Installing Innovative Technology under Section 301(k) of the Act, Criteria and Standards for Determining Fundamentally Different Factors under Sections 301(b)(1)(A), 301(b)(2)(A) and (E) of the Act, Criteria for Determining Alternative Effluent Limitations under Section 316(a) of the Act, Criteria Applicable to Cooling Water Intake Structures under Section 316(b) of the

Act, Criteria for Extending Compliance Dates under Section 301(i) of the Act, and Criteria and Standards for Best Management Practices Authorized under Section 304(e) of the Act.

In general, these regulations require that technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act. Permits must contain the following technology based treatment requirements:

> For POTW's, effluent limitations based upon secondary treatment, and the best practicable waste treatment technology.
>
> For dischargers other than POTW's, effluent limitations requiring the best practicable control technology current available (BPT). For conventional pollutants, the best conventional pollutant control technology (BCT). For all toxic pollutants, and all pollutants which are neither toxic nor conventional, effluent limitations based on the best available technology economically achievable (BAT).

Technology-based treatment requirements may be imposed in permits by either application of EPA promulgated ELG's to dischargers by category or subcategory, or on a case-by-case basis to the extent that EPA promulgated ELG's are inapplicable, or by a combination of these methods. Technology-based treatment requirements are applied prior to or at the point of discharge. They cannot be satisfied through the use of "non-treatment" techniques such as flow augmentation and in-stream mechanical aerators. However, these techniques may be considered as a method of achieving water quality standards on a case-by-case basis when the technology-based treatment requirements are not sufficient to meet the standards, the discharger agrees to waive any opportunity to request a variance under section 301(c), (g), or (h) of the Act, and the discharger demonstrates that such a technique is the preferred environmental and economic method to achieve the standards after consideration of alternatives such as advanced waste treatment, recycle and reuse, land disposal, changes in operating methods, and other available methods. Technology-based effluent limitations may also be established for solids, sludge, filter backwash, and other pollutants removed in the course of treatment or control of waste waters in the same manner as for other pollutants.

EFFLUENT LIMITATION GUIDELINES (ELG)

Regulations promulgated by the ODEQ (OAC 252:605-1-5) also adopt by reference all of 40 CFR Parts 401-471 (Effluent Guidelines and Standards). This regulation prescribes effluent limitations guidelines for existing sources, standards of performance for new sources and pretreatment standards for new and existing sources pursuant to the Clean Water Act. The ELG's include the following categories:

Asbestos manufacturing point source category
Aluminum forming point source category
Battery manufacturing point source category
Builders' paper and board mills point source category
Canned and preserved fruits and vegetables processing point source category
Canned and preserved seafood processing point source category
Carbon black manufacturing point source category
Cement manufacturing point source category
Coal mining point sources category
Coil coating point source category
Copper forming point source category
Dairy products processing point source category
Electroplating point source category
Electrical and electronic components point source category
Explosives manufacturing point source category
Feedlots point source category

Ferroalloy manufacturing point source category
Fertilizer manufacturing point source category
Glass manufacturing point source category
Grain mills point source category
Gum and wood chemicals manufacturing point source category
Hospital point source category
Ink formulating point source category
Inorganic chemical manufacturing point source category
Iron and steel manufacturing point source category
Leather tanning and finishing point source category
Meat products point source category
Metal finishing point source category
Metal molding and casting point source category
Mineral mining and processing point source category
Nonferrous metals forming/metal powders point source category
Nonferrous metals manufacturing point source category
Oil and gas extraction point source category
Ore mining and dressing point source category
Organic chemicals, plastics, and synthetic fibers category
Paint formulating point source category
Paving and roofing materials point source category
Pesticide chemicals point source category
Petroleum refining point source category
Pharmaceutical manufacturing point source category
Phosphate manufacturing point source category
Photographic point source category
Plastics molding and forming point source category
Porcelain enameling point source category
Pulp, paper, and paperboard point source category
Rubber manufacturing point source category
Soap and detergent manufacturing point source category
Steam electric power generating point source category
Sugar processing point source category
Textile mills point source category
Timber products processing point source category

TREATMENT LEVELS

The ELG's include limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), the best conventional pollutant control technology (BCT), the best available technology economically achievable (BAT), new source performance standards (NSPS), and pretreatment standards for new (PSNS) and existing (PSES) sources. These technology-based limits consider the category of industry which produces the pollutant. Thus, the regulations take into account the specific factors unique to a particular type of industry (manufacturing process, type and quantity of pollutants generated, types of treatment facilities available to treat the pollutants, etc.). In using this approach, the regulations remove any economic advantage based upon pollution control for similar categories of industry. In theory, for example, a pulp and paper mill on the west coast of the U.S. would be required to meet the same BCT pollution controls for sulfate as an identical plant located on the east coast (unless there were special site-specific water quality concerns which had to be addressed).

These treatment levels were originally required under the CWA in a phased approach for existing industries. BPT was originally required by July 1, 1977 and applies to conventional, non-conventional, and toxic pollutants from all industries discharging wastes to waters of the state. BCT was originally required by July 1, 1984 and applies only to the discharge of conventional pollutants. BAT was also originally required by July 1, 1984 and applies to non-conventional and toxic pollutants. It is important to note that BPT represents the average of the best existing waste treatment performance within each industry category or subcategory. Thus, in most cases for conventional and non-conventional pollutants, BCT and BAT levels of treatment were found to be no more stringent than the old BPT levels and therefore, in many cases, BPT may equal BCT or BAT. In other words, the best practicable treatment may also be the best available treatment. However, BAT levels for many toxic pollutants have been added to the guidelines, where no such requirements previously existed under the BPT requirements.

Conventional pollutants include Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Fecal Coliform, pH, and Oil & Grease. Toxic pollutants are those defined in Section 307(a)(1) of the CWA and include:

Acenaphthene
Acrolein
Acrylonitrile
Aldrin/Dieldrin
Antimony and compounds
Arsenic and compounds
Asbestos
Benzene
Benzidine
Beryllium and compounds
Cadmium and compounds
Carbon tetrachloride
Chlordane (technical mixture and metabolites)
Chlorinated benzenes (other than di-chlorobenzenes)
Chlorinated ethanes (including 1,2-di-chloroethane, 1,1,1-trichloroethane, and hexachloroethane)
Chloroalkyl ethers (chloroethyl and mixed ethers)
Chlorinated naphthalene
Chlorinated phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols)
Chloroform
2-chlorophenol
Chromium and compounds
Copper and compounds
Cyanides
DDT and metabolites
Dichlorobenzenes (1,2-, 1,3-, and 1,4-di-chlorobenzenes)
Dichlorobenzidine
Dichloroethylenes (1,1-, and 1,2-dichloroethylene)
2,4-dichlorophenol
Dichloropropane and dichloropropene
2,4-dimethylphenol
Dinitrotoluene
Diphenylhydrazine

Endosulfan and metabolites
Endrin and metabolites
Ethylbenzene
Fluoranthene
Haloethers (other than those listed elsewhere; includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers)
Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane
Heptachlor and metabolites
Hexachlorobutadiene
Hexachlorocyclohexane
Hexachlorocyclopentadiene
Isophorone
Lead and compounds
Mercury and compounds
Naphthalene
Nickel and compounds
Nitrobenzene
Nitrophenols (including 2,4-dinitrophenol, dinitrocresol)
Nitrosamines
Pentachlorophenol
Phenol
Phthalate esters
Polychlorinated biphenyls (PCBs)
Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenz-anthracenes, and indenopyrenes)
Selenium and compounds
Silver and compounds
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
Tetrachloroethylene
Thallium and compounds
Toluene
Toxaphene
Trichloroethylene
Vinyl chloride
Zinc and compounds

Non-conventional pollutants are those which do not fall under either of the above categories and include parameters such as Chemical Oxygen Demand, Total Organic Carbon, Color, etc.

CATEGORIZATION/SUBCATEGORIZATION

In order to properly use and apply effluent guidelines information a determination must first be made as to what industrial category is applicable to the facility under consideration. The subcategory must then be determined. This is primarily done using the Standard Industrial Classification (SIC) Code. Usually the SIC Code will determine the appropriate category. However, in some cases the plants do not fall into a single category and then a single subcategory. In this regard it is helpful not to place the plant into a category or subcategory, but rather find all those categories under which the plant falls. By using a process of elimination by either classifying the categories as "not applicable" or "possibly applicable" the proper categorization can be made. In those cases where multiple categories and subcategories are applicable the final effluent limitation may be calculated by the summation of individual production and loading rates.

PRODUCTION

Most effluent limitation guidelines are expressed in terms of allowable pollutant discharge rate per unit of production rate. To determine permit limits, these standards are multiplied by the facility's production rate. In most cases, where production is constant from day to day and month to month, the average production rate is used to calculate limitations. In practice, production rates vary because of market factors, maintenance, product changes, down times, breakdowns, and facility modifications. In those cases where the production rate of a facility varies with time, the value used to calculate limits should be based on a reasonable measure of the actual production rate that is expected to exist during the term of the permit.

The use of a limited amount of production data in estimating the production for a specific facility should be avoided. For example, the data from a particular month may be unusually high and thus lead to the derivation of an effluent limitation which is not actually reflective of the normal plant operations. Effluent limitation guidelines already account for variations which occur within long term production rates. The use of too short a time frame in the calculation of production based limitations for a specific industrial facility may lead to "double accounting" of the variability factors. The objective in determining a production estimate for a facility is to develop a single estimate of the long term average production rate (in terms of mass of product per day) which can reasonably be expected to prevail during the term of the permit.

ALTERNATE LIMITS

If production rates are expected to change significantly during the life of the permit, the permit can include alternate limits. These alternate limits would become effective when production exceeds a threshold value, such as during seasonal production variations. Typically, alternate limits are developed when changes in production exceed 50%. Alternate limits should be used only after careful consideration and only when a substantial increase or decrease in production is likely to occur.

MASS AND CONCENTRATION LIMITS

Most of the effluent limitations for industrial facilities are expressed in terms of allowable mass (in units of pounds or kilograms) of pollutant per day. In order to encourage the proper operation of the treatment facility at all times equivalent concentration limits should usually be included in the permit. This is also helpful in tracking plant performance to compare treatment efficiencies with those indicated in treatability manuals for a particular type of waste. In determining applicable effluent concentration limitations, the monthly average and daily maximum mass limits divided by the average flow will provide concentrations which are appropriate.

In certain instances, the use of concentration limits may be counterproductive since they may discourage the use of innovative techniques such as water conservation. Likewise, in some instances it is inappropriate to express limitations in terms of mass. This includes limitations for pH, temperature, radiation, or where the mass of the pollutant cannot be related to a measure of operation and permit conditions insure that dilution will not be used as a substitute for treatment. For example, in those cases where storm water discharges are commingled with process water discharges, use of mass limitations for those pollutants present only in the storm water is most likely inappropriate. Special requirements and conditions may be required to insure adequate treatment is provided those pollutants present in the process stream as well as the storm water stream. The applicability of concentration limits should therefore be a case-by-case determination based upon the professional judgment of the permit writer.

OTHER ELG CONSIDERATIONS

Development documents should be utilized to confirm that proper categorization and subcategorization has been determined for a particular facility. In addition, information provided in the development document can sometimes be used to determine if an appropriate treatment technology or other control measures are being used at a facility. For example, the development document may indicate that a particular treatment is the recognized BPT treatment technology for a particular subcategory, and that BAT treatment consists of the existing BPT technology plus in-plant control measures or additional end-of-pipe treatment. The choice of whether to institute in-plant control measures (e.g., water reuse, water reduction through conservation, chemical substitution, segregation of waste streams, etc.) or provide additional treatment is ultimately up to the facility to decide. However, the regulatory requirements associated with a particular course of action should be considered during permit development and may affect selection of the most appropriate course of action.

In some cases toxic pollutants are specifically regulated through effluent guidelines for a particular category and subcategory of facility. Other toxic pollutants may be present in the discharge at low levels or at levels difficult to quantify because of the difficulty of performing lengthy and expensive analytical procedures. Information in the development documents can be used to determine when this may be a concern. In some cases an indicator pollutant, such as TSS, is sometimes used to effectively control toxic pollutant levels even though the toxins are not expressly regulated by numerical limitations. Where conventional pollutants are used as indicator pollutants for toxic pollutants, BAT limitations for these pollutants have been established to assure installation and performance of waste treatment technology that is adequate for the removal of toxic pollutants.

Sludge management is another topic usually addressed in the development document for a particular point source category. In some cases, existing sludge management practices may be of particular concern for a particular industrial subcategory. Special conditions addressing sludge management may be warranted in the permit in this case. However, because of the wide range in production, types of handling systems, and processing these special conditions are specific to a particular facility and should be developed on a case-by-case basis by selecting from among the variety of alternatives that are available.

BEST PROFESSIONAL JUDGMENT (BPJ)

For non-categorical industries, or where there are no ELG's for a particular pollutant or industrial subcategory the permit drafter may use his Best Professional Judgment (BPJ) in establishing a site-specific technology-based limitation. BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information which forms the basis for the terms and conditions of an NPDES permit. BPJ allows the permit writer considerable flexibility in establishing permit terms and conditions. However, inherent in this flexibility is the burden on the permit writer to show that his/her BPJ is based on sound engineering analysis. The determination of a permit condition is subject to challenge by the permittee and/or the public, and, if unresolved through negotiation between the parties, may be the subject of an evidentiary hearing or other legal challenge. Therefore, the need for the permit condition and the basis for its establishment should be clearly defined and documented.

BEST POLLUTANT CONTROL TECHNOLOGY CURRENTLY AVAILABLE (BPT) REQUIREMENTS

In setting BPT limitations on a case-by-case basis the permit drafter must consider certain factors, including:

1) the age of equipment and facilities involved,
2) the process employed,
3) the engineering aspects of the application of various types of control techniques,
4) process changes,
5) non-water quality environmental impact (including energy requirements), and
6) the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application.

BEST CONVENTIONAL POLLUTANT CONTROL TECHNOLOGY (BCT) REQUIREMENTS

In setting BCT limitations on a case-by-case basis the permit drafter must consider certain factors, including:

1) the age of equipment and facilities involved,
2) the process employed,
3) the engineering aspects of the application of various types of control techniques,
4) process changes,
5) non-water quality environmental impact (including energy requirements),
6) the reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived, and
7) the comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources.

BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE (BAT) REQUIREMENTS

In setting BAT limitations on a case-by-case basis the permit drafter must consider certain factors, including:

1) the age of equipment and facilities involved,
2) the process employed,
3) the engineering aspects of the application of various types of control techniques,
4) process changes,
5) non-water quality environmental impact (including energy requirements), and
6) the cost of achieving such effluent reduction.

OTHER BPJ CONSIDERATIONS

Case-by-case limitations may be expressed, where appropriate, in terms of toxicity (e.g., "the LC_{50} for fat head minnow of the effluent from outfall 001 shall be greater than 25%"). However, it must be shown that the limits reflect the appropriate requirements (for example, technology-based or water-quality based standards) of the Act.

A technically sound and reasonable permit is not likely to be successfully challenged by the permittee or a third party. In this context, "technically sound" permit conditions means that the conditions are achievable with existing technology and "reasonable" means they are achievable at a cost which is affordable by the facility. Historically, some of the other factors such as age, process employed, and non-water quality impacts have assumed lesser importance than the technical and economic feasibility (technically sound and reasonable) tests.

SECONDARY TREATMENT REQUIREMENTS

MECHANICAL PLANTS

(1) For facilities discharging to perennial streams, a monthly average of 30 mg/l BOD_5 and 30 mg/l TSS shall be considered secondary treatment. A $CBOD_5$ of 25 mg/l is considered to be equivalent to a BOD_5 of 30 mg/l.

(2) For discharges to intermittent streams (those with 7-day, 2-year, low flow of zero), a monthly average of 20 mg/l BOD_5 and 30 mg/l TSS shall be considered secondary treatment. A $CBOD_5$ of 18 mg/l is considered to be equivalent to a BOD_5 of 20 mg/l.

LAGOON SYSTEMS

For discharges where treatment is solely provided by lagoons, a monthly average of 30 mg/l BOD_5 (25 mg/l $CBOD_5$) and 90 mg/l TSS shall be considered secondary treatment whether the discharge is to a perennial or an intermittent stream. This is not applicable to a discharge to a lake.

DISCHARGES TO LAKES

A discharge to a lake is defined as any discharge from a point source which is either a direct discharge into a lake, or within five river miles upstream of the conservation pool of any lake. A lake is considered to be an impoundment of the waters of the state which exceeds fifty acre-feet in volume which either:

- is owned or operated by a unit of government,
- appears in Oklahoma's Clean Lakes Inventory, or
- is a privately-owned lake which has beneficial uses similar to those of publicly-owned or operated lakes.

For all discharges to lakes, a monthly average of 20 mg/l BOD_5 and 30 mg/l TSS shall be considered secondary treatment. A $CBOD_5$ of 18 mg/l is considered to be equivalent to a BOD_5 of 20 mg/l.

WATER QUALITY BASED REQUIREMENTS

Any discharge to waters of the state must meet the requirements of Oklahoma's Water Quality Standards (Oklahoma WQS). The standards are comprised of two parts: use classifications, and narrative and/or numerical standards. The following sections describe the strategy used to assure that a discharge meets the requirements of these standards.

MIXING ZONE REQUIREMENTS

Oklahoma's Water Quality Standards define mixing zone and zone of passage requirements for discharges to streams. These requirements vary dependent on the designated beneficial use. In general, criteria for toxic substances for Fish & Wildlife propagation are applied at the edge of the mixing zone and criteria for most other substances are applied after complete mix. Limits to meet criteria for toxic substances for Fish & Wildlife propagation, for a bank outfall point source, are usually calculated using a mixing zone model which calculates expected pollutant concentrations at the edge of the mixing zone. See Figure 9 below for an illustration of the mixing zone and zone of passage for a river bank outfall point source discharge into a stream. However, if a discharger uses a diffuser at their outfall such that complete mixing is achieved instream, permit limits could be calculated using a complete-mix mass balance model. Documentation showing size, geometry, etc., and/or an instream study may be required to confirm mixing.

Mixing zones in lakes are designated on a case-by-case basis. However, for permitting purposes for numerical chronic criteria for toxic substances for Fish & Wildlife propagation a mixing zone is defined to extend a radius of 100 feet from the source. The Fischer model for pipe discharges and the Fischer variation for canals is used to perform the wasteload evaluation for these pollutants.

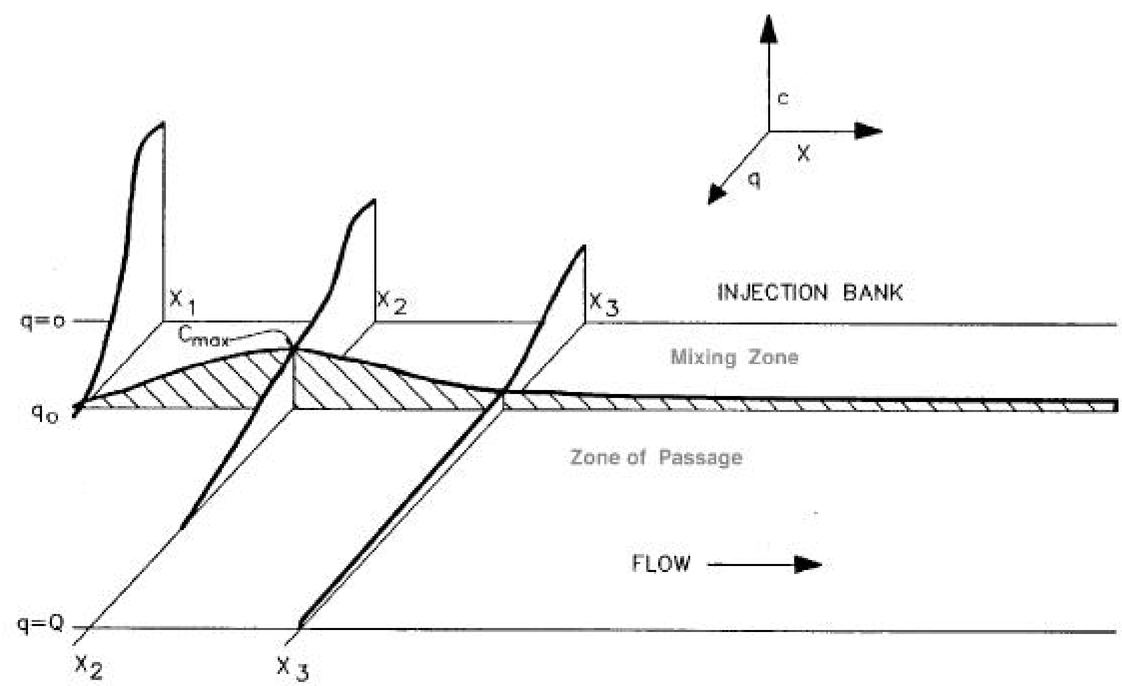


Figure 10 **MIXING ZONE AND ZONE OF PASSAGE FOR A RIVER BANK OUTFALL POINT SOURCE DISCHARGE**

REASONABLE POTENTIAL EVALUATION

An effluent limit shall be developed and placed in a permit when a discharge has the reasonable potential to violate water quality standards. This evaluation will be based upon meeting a particular numerical or narrative water quality standards criteria at those critical conditions in the receiving stream. If the receiving stream is a tributary to a waterbody with different beneficial uses or water quality standards, those uses and standards will also be maintained. In cases where multiple criteria apply to a particular pollutant, the most stringent requirement shall be used as the basis for the evaluation.

Factors to be considered when evaluating the potential for a discharge to violate water quality standards include the following: expected upstream pollutant concentrations and/or loading, expected effluent pollutant concentration and/or loading, mixing zone requirements, and overlapping impacts from multiple dischargers.

Reasonable potential evaluations are specific to the type of beneficial use being protected. The evaluations consider numerical and narrative criteria for protection of fish and wildlife propagation, human health, public and private water supplies, agriculture livestock and irrigation, body contact and ingestion, and waterbody aesthetics. In addition, they must also consider antidegradation requirements of the standards for all waters as well as ORW, HQW), SWS.

REASONABLE EXPECTATION EVALUATION

The first step in performing a reasonable potential evaluation involves determining if a pollutant can reasonably be expected to be present in the effluent as a result of processes or operations at the facility. This generally requires an in-depth review of processes and operations performed at a facility. An inventory of raw materials, products, treatment chemicals, and additives should be performed to establish the quantity and presence of regulated pollutants and their tendency to be discharged in a stream.

A pollutant can reasonably be expected to be present in the effluent from a facility if effluent limitation guidelines (ELG's) for that pollutant are applicable to discharges from that facility, the pollutant is used as a raw material in a process, or added during treatment of wastewater. Reasonable expectation can also be met if the facility concentrates naturally occurring pollutants in process operations (cooling water) or wastewater treatment operations (leaching from process vessels).

For those facilities which do not concentrate naturally occurring pollutants in process operations (once-through cooling water) reasonable expectation is not met if the effluent pollutant level does not exceed one standard deviation from the mean of the influent pollutant level. The influent and effluent level should be calculated consistent with the type of reasonable potential evaluation.

SAMPLING EFFLUENT FOR TOXICANTS

Procedures for obtaining samples from discharges to analyze for toxicants and reporting requirements are set forth in this section. The Oklahoma WQS (1997) allow for the use of either total recoverable or dissolved metals criteria. However, NPDES regulations require permit limits to be expressed in terms of total recoverable. EPA Region 6 (1991) developed minimum quantification levels, (MQL's) considered to be the lowest concentration at which a particular substance can be quantitatively measured. "If any individual analytical test result.....is less than the minimum quantification level listed below, then a value of zero (0) shall be used for the discharge monitoring report (DMR) calculations and reporting requirements". MQL's are listed in Chapter 3.

SAMPLING PROCEDURES

Flow weighted 24 hour composite effluent samples representative of normal operation will be collected at the outfall such that any periodic toxic discharges are captured. The 24 hour composite sample shall consist of at least 12 effluent portions collected at equal time intervals and combined proportional to the flow. Discharges with overlapping mixing zones may be combined, at the discretion of the permitting authority, and the combined effluent sampled for toxicants. Samples shall be combined in proportion to the flow from each outfall. If some of the discharges do not contain the toxicant being permitted, combining discharges may allow numerical criteria violations if the discharge rates fluctuate.

In these cases combined discharge testing will be disallowed. Exceptions for highly variable discharges may be required.

If the outfall originates from a lagoon with a retention time greater than 24 hours, composite samples may not be necessary. The permitting authority may determine that a grab sample near the discharge is sufficient.

Sample Handling

Samples shall be preserved according to standard methods (40 CFR 136) when collected, shipped and/or stored.

Effluent Quality Characterization

The effluent quality and quantity characterization should be consistent with the type of reasonable potential evaluation. The number and type of effluent samples taken to characterize a particular pollutant should be consistent with the critical condition associated with a particular standards criteria as well as the type of water quality modeling analysis used to evaluate instream impacts. Specific factors to be considered include the frequency, duration, and magnitude of pollutant levels in the discharge.

The procedures detailed below for effluent quality characterization for agriculture are tentative pending OWRB's promulgation and adoption of implementation of criteria to protect the agriculture beneficial use (OAC 785:46-9 [currently reserved]).

Numerical Criteria for Public & Private Water Supplies

Raw water numerical criteria are average values not to be exceeded instream. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

Water column criteria to protect for the consumption of fish flesh and water are long term average values. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the critical effluent flow for raw water numerical criteria is the design flow of the facility.

For industrial facilities, the critical effluent flow for raw water numerical criteria is usually calculated as the highest 30-day average flow occurring in the most recent two year period of record. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

For municipal facilities, the critical effluent flow for human health criteria is the design flow of the facility.

For industrial facilities, the critical effluent flow for human health criteria is usually calculated as the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR FISH & WILDLIFE PROPAGATION

Numerical criteria for Toxic Substances are maximum values never to be exceeded instream. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

Water column criteria to protect for the consumption of fish flesh are long term average values. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

Numerical criteria for temperature are mean values. For the purposes of performing reasonable potential evaluations for temperature when there is a reasonable expectation that such a pollutant is present in the effluent, the expected effluent value is calculated, using a non-parametric method, as the maximum likelihood estimator of the upper 95th percentile of the effluent data set, in degrees Celsius.

For municipal facilities, the critical effluent flow for toxic substances and temperature is the design flow of the facility.

For industrial facilities, the critical effluent flow for toxic substances and temperature is usually calculated as the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal critical effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

For municipal facilities, the critical effluent flow for human health criteria is the design flow of the facility.

For industrial facilities, the critical effluent flow for human health criteria is usually calculated as the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR AGRICULTURE

Numerical criteria for mineral constituents (chlorides, sulfates and total dissolved solids) are statistical measures of ambient levels present in specified waterbody segments in the state. The yearly mean standard is defined as the arithmetic mean of historical data from October 1976 to September 1983 plus one standard deviation from the mean. The sample standard is defined as the arithmetic mean of historical data from October 1976 to September 1983 plus two standard deviations from the mean. Segment averages are used to evaluate reasonable potential unless more appropriate site-specific data is available. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the critical effluent flow is the design flow of the facility.

For industrial facilities, the critical effluent flow used to implement the yearly mean standard is usually calculated as the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years, while the critical effluent flow used to implement the sample standard is usually calculated as the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal critical effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR PRIMARY BODY CONTACT RECREATION

Numerical criteria for bacteria (coliform bacteria, *Escherichia coli*, or *Enterococci*) are the geometric mean values. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the critical effluent flow is the design flow of the facility.

For industrial facilities, the critical effluent flow is usually calculated as the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal critical effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR AESTHETICS

Numerical criteria for color are values never to be exceeded instream solely as a result of effluent color levels. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set, measured as "true" color.

For municipal facilities, the critical effluent flow is the design flow of the facility.

For industrial facilities, the critical effluent flow is usually calculated as the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal critical effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR ANTIDEGRADATION (THERMAL POLLUTION)

The numerical criteria for thermal pollution is a value never to be exceeded instream. For the purposes of performing a reasonable potential evaluation for thermal pollution when there is a reasonable expectation that such pollution is present in the effluent, the expected effluent value is calculated, using a non-parametric method, as the upper 95th percentile of the daily maximum effluent data set, in degrees Celsius.

The critical effluent flow is not used in the reasonable potential evaluation for thermal pollution.

RECEIVING WATER CHARACTERIZATION

The receiving water characterization should be consistent with the type of reasonable potential evaluation. Data to determine background concentration may be available from STORET or other data bases with adequate and documental quality assurance procedures. The number and type of upstream samples taken to characterize a particular pollutant should be consistent with the critical condition associated with a particular standards criteria. Specific factors to be considered include the frequency, duration, and magnitude of pollutant levels in the upstream receiving water.

NUMERICAL CRITERIA FOR PUBLIC & PRIVATE WATER SUPPLIES

Raw water numerical criteria are average values not to be exceeded instream. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream concentration is calculated as the long term average of the upstream data set.

Water column criteria to protect for the consumption of fish flesh and water are long term average values. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream concentration is calculated as the average of the upstream data set.

The critical upstream flow is a long term average flow. This long term average is calculated as the mean annual average flow for the period of record.

NUMERICAL CRITERIA FOR FISH & WILDLIFE PROPAGATION

Numerical criteria for Toxic Substances are maximum values never to be exceeded instream. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream concentration is calculated as the geometric mean of the upstream data set.

Water column criteria to protect for the consumption of fish flesh are long term average values. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream concentration is calculated as the long term average of the upstream data set.

Numerical criteria for temperature are mean values. For the purposes of performing reasonable potential evaluations for temperature when there is a reasonable expectation that they are present in the effluent the regulatory ambient (critical) temperature value, in degrees Celsius, is the higher of the seven-day maximum temperature likely to occur with a 50% probability each year, ${}_7T_2$, or the critical temperature defined as follows for the particular designated use:

Beneficial Use	Critical Temperature
Habitat Limited Aquatic Community	29.44°C
Warm Water Aquatic Community	29.44°C
Cool Water Aquatic Community	26.10°C
Arkansas River: from Red Rock Creek to headwaters of Keystone Lake	31.60°C

For trout fisheries, which normally exceed the temperature criterion of 20°C during critical conditions, the upstream temperature is not used in the wasteload allocation (WLA) process. This use is protected by setting the temperature WLA equal to 20°C. The ${}_7T_2$ is calculated using a moving average of seven consecutive days for each year in a given record. These seven day receiving stream temperature values are ranked in descending order. An order number, m, is calculated based on the number of years of record, n, with a recurrence interval of 2 years, as m=(n+1)/2. The m^{th} highest average temperature is the ${}_7T_2$.

The critical upstream flow is the greater of 1.0 cfs or ${}_7Q_2$, except for water column criteria to protect for the consumption of fish flesh, for which the critical flow is a long term average flow. This long term average is calculated as the mean annual average flow for the period of record.

Numerical Criteria for Agriculture

Numerical criteria for mineral constituents (chlorides, sulfates and total dissolved solids) are statistical measures of ambient levels present in specified waterbody segments in the state. Segment averages are used to evaluate reasonable potential unless more appropriate site-specific data is available. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream value is calculated as the arithmetic mean of the upstream data set.

The critical upstream flow is a long term average flow for implementing the yearly mean standard and a short term average flow for implementing the sample standard. This long term average flow is calculated as the mean annual average flow; short term average flow is calculated as 68% of the annual average flow.

Numerical Criteria for Primary Body Contact Recreation

Numerical criteria for bacteria (Coliform, Escherichia coli, or Enterococci) are geometric mean values never to be exceeded instream. For the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream value is calculated as the geometric mean of the upstream data set.

The critical upstream flow is the greater of 1.0 cfs or ${}_7Q_2$.

Numerical Criteria for Aesthetics

Numerical criteria for color are values never to be exceeded instream, from other than natural sources. Thus, for the purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent the expected upstream value is considered zero unless upstream color is from other than natural sources.

The critical upstream flow is the greater of 1.0 cfs or $_7Q_2$.

NUMERICAL CRITERIA FOR ANTIDEGRADATION (THERMAL POLLUTION)

The numerical criterion for thermal pollution is a value never to be exceeded instream. For the purposes of performing a reasonable potential evaluation for thermal pollution when there is a reasonable expectation that such pollution is present in the effluent the expected upstream value is not used in the evaluation. Instead, a direct comparison is made between the expected effluent value and the criterion of 52°C.

The critical upstream flow is not used in the reasonable potential evaluation for thermal pollution.

DATA SET ANALYSIS

An important step in performing a reasonable potential evaluation is to assure that the data used to characterize either the effluent or receiving water is representative of critical conditions associated with a particular standards criteria. Nonrepresentative data or data determined to be inappropriate should not be used in the evaluation process.

MINIMUM QUANTIFICATION LEVELS (MQL'S)

Table 14 lists minimum quantification levels (MQL's) developed by EPA Region VI for use in assessing acceptable analytical sensitivity. The MQL is defined as the lowest concentration at which a particular substance can be quantitatively measurable. Although the listed MQL's are the lowest concentrations required to be used in the calibration of a measurement system they are not necessarily the minimum acceptable sensitivity. They were chosen to be appropriate for a scan of all pollutants present in a discharge and do not represent the most sensitive analysis that may be achieved for a particular pollutant (volatile and semivolatile organics). If specific pollutants are known to be present and pose water quality concerns, the discharger should be required to analyze those pollutants by the most sensitive approved method available and determine a site-specific quantification level which will be used in the reasonable potential evaluation.

Where the data used to characterize the effluent or upstream concentration and/or loading levels is reported as unmeasurable at the MQL, the data will be assumed to be zero. Where appropriate data are collected indicating some measurable and unmeasurable quantities, an assumed value of one-half the reported level of sensitivity will be used for the unmeasurable quantities. If a pollutant is reported as "nondetectable" with a level of sensitivity above the MQL, the permit writer will assume that the pollutant is present at the reported level of sensitivity. An opportunity to perform additional analyses may be provided to confirm and quantify actual pollutant levels. In addition, data may be discarded if it is determined to be inappropriate, nonrepresentative or of insufficient quality. Examples of such situations include: data points represent statistical outliers, significant changes have been made in inputs or processes since the time the data was collected, appropriate QA/QC methods were not used, a certified lab was not used, approved sampling and analytical methods were not used, analytical sensitivity was not equivalent to MQL. In general, data will not be discarded without first requiring the submission of new data which is more appropriate, more representative and/or of higher quality.

TABLE 14: MINIMUM QUANTIFICATION LEVELS (MQLS)

Substances		ug/L	EPA Method
Metals and Cyanide			
Antimony	(Total)[1]	60	200.7
Arsenic	(Total)[1]	10	206.2
Beryllium	(Total)[1]	5	200.7
Cadmium	(Total)[2]	1	213.2
Chromium	(Total)[1]	10	200.7
Chromium	(3+)[1]	10	200.7
Chromium	(6+)[1]	10	200.7
Copper	(Total)[2]	10	220.2
Lead	(Total)[2]	5	239.2
Mercury	(Total)[1]	0.2	245.1
Molybdenum	(Total)[9]	30	200.7
Nickel	(Total)[1](Freshwater)	40	200.7
Nickel	(Total)[2](Marine)	5	249.2
Selenium	(Total)[1]	5	270.2
Silver	(Total)[2]	2	272.2
Thallium	(Total)[1]	10	279.2
Zinc	(Total)[1]	20	200.7
Cyanide	(Total)[1]	10	335.2
Dioxin[3]			
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)	0.00001		1613.0
Volatile Compounds			
Acrolein[4]		50	624
Acrylonitrile[4]		50	624
Benzene[4]		10	624
Bromoform[5]		10	624
Carbon Tetrachloride[5]		10	624
Chlorobenzene[5]		10	624
Chlorodibromomethane[5]		10	624
Chloroethane[6]		50	624
2-Chloroethyl vinyl ether[4]		10	624
Chloroform[5]		10	624
Dichlorobromomethane[5]		10	624
1,1-Dichloroethane[5]		10	624
1,2-Dichloroethane[5]		10	624
1,1-Dichloroethylene[5]		10	624
1,2-Dichloropropane[5]		10	624
1,3-Dichloropropylene[5]		10	624
Ethylbenzene[5]		10	624

Substances		ug/L	EPA Method
Methyl Bromide [Bromomethane][6]		50	624
Methyl Chloride [Chloromethane][6]		50	624
Methylene Chloride[5]		20	624
1,1,2,2-Tetrachloroethane[5]		10	624
Tetrachloroethylene[5]		10	624
Toluene[5]		10	624
1,2-trans-Dichloroethylene[5]		10	624
1,1,1-Trichloroethane[5]		10	624
1,1,2-Trichloroethane[5]		10	624
Trichloroethylene[5]		10	624
Vinyl Chloride[5]		10	624
Acid Compounds			
2-Chlorophenol[5]		10	625
2,4-Dichlorophenol[5]		10	625
2,4-Dimethylphenol[7]		10	625
4,6-Dinitro-o-Cresol [2 methyl 4,6-dinitrophenol[8]		50	625
2,4-Dinitrophenol[5]		50	625
2-Nitrophenol[6]		20	625
4-Nitrophenol[5]		50	625
p-Chloro-m-Cresol [4 chloro-3-methylphenol][5]		10	625
Pentachlorophenol[5]		50	625
Phenol[5]		10	625
2,4,6-Trichlorophenol[5]		10	625
Base/Neutral Compounds			
Acenaphthene[5]		10	625
Acenaphthylene[5]		10	625
Anthracene[5]		10	625
Benzidine[4]		50	625
Benzo(a)anthracene[5]		10	625
Benzo(a)pyrene[5]		10	625
3,4-Benzofluoranthene[5]		10	625
Benzo(ghi)perylene[6]		20	625
Benzo(k)fluoranthene[5]		10	625
Bis(2-chloroethoxy) methane[5]		10	625
Bis(2-chloroethyl) ether[5]		10	625
Bis(2-chloroisopropyl) ether[5]		10	625
Bis(2-ethylhexyl) phthalate[5]		10	625
4-Bromophenyl phenyl ether[5]		10	625

Substances		ug/L	EPA Method
Butyl benzyl phthalate[5]		10	625
2-Chloronapthalene[5]		10	625
4-Chlorophenyl phenyl ether[5]		10	625
Chrysene[5]		10	625
Dibenzo (a,h) anthracene[6]		20	625
1,2-Dichlorobenzene[5]		10	625
1,3-Dichlorobenzene[5]		10	625
1,4-Dichlorobenzene[5]		10	625
3,3'-Dichlorobenzidine[6]		50	625
Diethyl Phthalate[5]		10	625
Dimethyl Phthalate[5]		10	625
Di-n-Butyl Phthalate[5]		10	625
2,4-Dinitrotoluene[5]		10	625
2,6-Dinitrotoluene[5]		10	625
Di-n-octyl Phthalate[5]		10	625
1,2-Diphenylhydrazine[4]		20	625
Fluoranthene[5]		10	625
Fluorene[5]		10	625
Hexachlorobenzene[5]		10	625
Hexachlorobutadiene[5]		10	625
Hexachlorocyclopentadiene[5]		10	625
Hexachloroethane[6]		20	625
Indeno (1,2,3-cd) pyrene[6] (2,3-o-phenylene pyrene)		20	625
Isophorone[5]		10	625
Naphthalene[5]		10	625
Nitrobenzene[5]		10	625
N-nitrosodimethylamine[6]		50	625
N-nitrosodi-n-propylamine[6]		20	625
N-nitrosodiphenylamine[6]		20	625
Phenanthrene[5]		10	625
Pyrene[5]		10	625
1,2,4-Trichlorobenzene[5]		10	625
Pesticides			
Aldrin[7]		0.05	608
Alpha-BHC[7]		0.05	608
Beta-BHC[7]		0.05	608
Gamma-BHC (Lindane)[7]		0.05	608
Delta-BHC[7]		0.05	608
Chlordane[7]		0.2	608

Substances		ug/L	EPA Method
4,4'-DDT[7]		0.1	608
4,4'-DDE (p,p-DDX)[7]		0.1	608
4,4'-DDD (p,p-TDE)[7]		0.1	608
Dieldrin[7]		0.1	608
Alpha-endosulfan[7]		0.1	608
Beta-endosulfan[7]		0.1	608
Endosulfan sulfate[7]		0.1	608
Endrin[7]		0.1	608
Endrin aldehyde[7]		0.1	608
Heptachlor[7]		0.05	608
Heptachlor epoxide[7] (BHC-hexachlorocyclohexane)		0.05	608
PCB-1242[7]		1.0	608
PCB-1254		1.0	608
PCB-1221		1.0	608
PCB-1232		1.0	608
PCB-1248		1.0	608
PCB-1260		1.0	608
PCB-1016		1.0	608
Toxaphene		5.0	608

1 CRDL
2 Method 213.2, 239.2, 220.2, 272.2
3 Dioxin National Strategy
4 No CRQL established
5 CRQL basis, equivalent to ML
6 ML basis, higher than CRQL
7 CRQL basis, no ML established
8 CRQL basis, higher than ML
9 Based on 3.3 times IDL published in 40 CFR Part 136, Appendix C

EFFLUENT LIMITATIONS REQUIREMENTS

If a reasonable potential evaluation for a facility shows that a potential exists to violate water quality standards for a specific pollutant then an effluent limitation shall be placed in the permit for that pollutant. Development of a water quality-based effluent limit must be consistent with the assumptions and requirements of a WLA/TMDL for that pollutant in the discharge, prepared by the State and approved by EPA pursuant to 40 CFR 130.7.

WLA's/LA's and TMDL's shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality criteria with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. This evaluation requires a certain minimum level of information be provided to assure that the allocation is both reasonable and protective of water quality standards, within an acceptable level of uncertainty.

EPA regulations provide that load allocations for nonpoint sources and/or natural background are best estimates of the loading which may range from reasonably accurate estimates to gross allotments. A phased approach to developing TMDL's may be appropriate where estimates are based on limited information. The phased approach is a TMDL that includes monitoring requirements and a schedule for reassessing TMDL allocations to ensure attainment of water quality standards. Uncertainties that cannot be quantified may also exist for certain pollutants discharged primarily by point sources. In such situations a large margin of safety and follow-up monitoring is appropriate.

When background monitoring is determined to be necessary for conservative pollutants, a background monitoring requirement will be placed in the permit. A monitoring schedule (including both frequency and duration of sampling) will be developed on a case-by-case basis, using Best Professional Judgment, to insure that the minimum requirement of at least 12 data points to determine background concentration is met. In those situations in which limited background concentration information is available a margin of safety of not less than 20% shall be used in allocating wasteloads for a particular segment. In addition a requirement shall be included in the permit to perform instream monitoring to confirm the allocation. A reopener clause should also be included so that the permit can be modified or revoked and reissued if the data indicate an exceedance of water quality standards.

Where nonpoint source controls are involved, the phased approach to developing TMDL's is also necessary. Under the CWA, point sources implement the wasteload allocations through enforceable water quality-based discharge limits in NPDES permits. Non-point sources implement the load allocations within TMDL's through a wide variety of state, local and federal programs. In order to allocate loads among both nonpoint and point sources, there must be reasonable assurances that nonpoint source reduction will in fact be achieved. With the phased approach, the TMDL includes a description of the implementation mechanisms and the schedule for the implementation of nonpoint source control measures.

A compliance schedule which allows no more than three years to complete any additional treatment plant construction or facility modifications needed in order to meet the water quality-based limit may be included in the permit for existing facilities. New facilities, or existing facilities which propose increases in production or changes in operation which will result in the discharge of new pollutants or increased levels of existing pollutants, must meet the water quality-based limit at start-up.

Whole Effluent Toxicity

Whole effluent toxicity (WET) tests are used to assess discharger compliance with narrative criteria to protect the fish and wildlife propagation beneficial use. WET testing involves measuring the aggregate toxicity of an effluent discharged into surface waters, including synergistic effects. The intent of this strategy is to prevent the discharge of wastewater from any source which results in acute toxicity within the mixing zone and/or chronic toxicity outside the mixing zone of the receiving water. WET limits may be applied to the discharge to comply with State Water Quality Standards. Implementation procedures for WET testing and WET limits may be found in Chapter 2, Part III, of this document.

OTHER WATER QUALITY CONSIDERATIONS

Development of a water quality-based limit is a multi-step process that must consider a number of factors. Some of the other more important considerations are addressed below.

SITE-SPECIFIC CALCULATIONS

In many cases, criteria or requirements used to establish water quality-based limits are defined using a more general basis; e.g., waterbody segment-based criteria. A more specific value may be calculated if more detailed site-specific data is available. The following sections address the development of these more specific criteria.

SEVEN-DAY, TWO-YEAR LOW FLOW, $_7Q_2$

For oxygen-demanding parameters, Oklahoma WQS define the seven-day, two-year low flow ($_7Q_2$) as the receiving stream flow for determining allowable discharge load to a stream. The flow is calculated as a moving average of seven consecutive days for each year in a given record, and represents a yearly low flow value. $_7Q_2$ values used in developing WLA's/TMDL's are typically taken from USGS publications, such as "Statistical Summaries of Stream flow Records in Oklahoma and Parts of Arkansas, Kansas, Missouri, and Texas Through 1984", USGS Water-Resources Investigations Report 87-4205, or the most recent version.

The $_7Q_2$ is calculated as a moving average of seven consecutive days for each year in a given record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of years of record (n), with a recurrence interval (R) of two years, as m=(n+1)/R, where R = two years. A value of flow corresponding to the mth order is taken as the seven day, two-year low flow for those historical data.

The Oklahoma WQS, OAC 785:45-5-12(e)(1)(B)(iii) also allow use of a seasonal $_7Q_2$ on streams designated as habitat-limited and warm water aquatic communities (HLAC and WWAC). The seasonal $_7Q_2$ is calculated as a moving average of seven consecutive days for the applicable dates specified in OAC 785:45-5-12(e)(1)(C) in a given period of record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of seasons (n) specified in OAC 785:45-5-12(e)(1)(C) during the period of record, with a recurrence interval (R) of two years, as m = (n+1)/R, where R = two years. A value of flow corresponding to the mth order is taken as the seasonal seven-day, two-year low flow for those historical data.

A minimum of ten years of daily flow measurements for a particular site are typically used to calculate a $_7Q_2$; i.e., the recurrence interval is less than or equal to the number of years of record divided by 5 (2 # 10/5). If sufficient continuous data are not available to develop low-flow frequency curves then low-flow characteristics may be estimated by relating this data to nearby continuous-record sites. The partial-record site must have enough flow measurements to establish a correlation between it and a continuous-record (index) station. An index station must represent a specific area of the State with respect to topographic and geologic conditions that may have an effect on low flow and have no major regulation or other manmade changes in the drainage basin. Also, an index station must have the same period of record as the partial-record site. An attempt should be made to use streams of relatively small drainage area to avoid incorporating many varied topographic and geologic factors into one record. The index site should be less intermittent than any partial record site.

Other appropriate methods may be used to estimate low-flow if approved by the permitting agency.

APPROPRIATE SEASONAL TEMPERATURE

Oklahoma WQS require that allowable loadings to meet dissolved oxygen criteria be calculated using the seven-day, two-year low flow and the appropriate seasonal temperature. The values for the appropriate seasonal temperature are given in the Oklahoma WQS as a seasonal temperature associated with a particular fishery class, applicable season date, and associated DO criteria. However, the use of an appropriate seasonal temperature other than the one specified may be allowed where site-specific data of sufficient quantity and quality are available.

In those cases where sufficient site-specific data is available, the appropriate seasonal temperature should be calculated as the upper 90th percentile value of the average daily temperatures for the season or a portion thereof, if appropriate.

If sufficient continuous data are not available to develop low-flow, high-temperature frequency curves, then low-flow, high-temperature characteristics may be estimated by relating this data to nearby continuous-record sites. The partial-record site must have enough flow and temperature measurements to establish a correlation between it and a continuous-record (index) station. An index station must represent a specific area of the State with respect to topographic and geologic conditions that may have an effect on low flow and temperature and have no major regulation or other manmade changes in the drainage basin. Also, an index station must have the same period of record as the partial-record site. An attempt should be made to use streams of relatively small drainage area to avoid incorporating many varied topographic and geologic factors into one record. The index site should be less intermittent than any partial record site.

Other appropriate methods may be used to estimate an appropriate seasonal temperature if approved by the permitting agency.

WATER QUALITY BASED LIMIT DEVELOPMENT

In calculating water quality-based permit limits the general approach given in The Technical Support Document for Water Quality-based Toxins Control, EPA/505/2-90-001, March 1991, will be utilized for aquatic life and human health protection. This approach recognizes the variability of both effluent and receiving water pollutant levels and uses a statistical method to derive an effluent limitation that meets the requirements of the WLA/TMDL derived to meet a specific water quality criteria.

STATISTICAL PERMIT LIMIT DERIVATION

The method used to translate a WLA into permit limits is dependent on the type of model, steady state or dynamic, used to develop the allocation. The WLA provides a definition of effluent quality that is necessary to meet the water quality standards of the receiving water. The variability of both the effluent and receiving stream pollutant levels must be addressed in development of the WLA. If not considered specifically in the water quality model used in development of the WLA (i.e., dynamic model) then this variability must be specifically considered in translation of the WLA into a permit limitation.

DYNAMIC MODEL ALLOCATIONS

Dynamic models use estimates of effluent variability and the variability of receiving water assimilation factors to develop effluent requirements in terms of concentration and variability. They account for the daily variations of and relationships between flow, effluent, and environmental conditions and therefore directly determine the actual probability that a water quality standards criteria exceedance will occur. Since variability is directly accounted for in a dynamic model the WLA determined by the model can usually be used directly in developing permit limits. Dynamic models, although very data and resource intensive, are acceptable for determination of WLA's and corresponding permit limits. Their use, as appropriate, will be approved on a case-by-case basis.

Steady State Model Allocations

Steady state models are the most commonly used basis for developing water quality based permit limits. Development of a technically defensible water quality based permit limitation from a steady state wasteload allocation is a multi-step process. In most cases more than one water quality standards criteria applies to a particular pollutant (e.g., acute, chronic, and human health criteria). As a result, multiple corresponding WLA's are developed to be protective of the multiple criteria. The most stringent limit associated with a particular WLA is then used in the permit for that particular pollutant.

Effluent Variability

Effluent quality and quantity vary over time in terms of volumes discharged and constituent concentrations. Variations occur due to a number of factors, including changes in human activity over a 24-hour period for publicly owned treatments works, changes in production cycles for industries, variation in responses of wastewater treatment systems to influent changes, variation in treatment system performance, and changes in climate. Very few effluents remain constant over long periods of time. Even in industries that operate continuous processes, variations in the quality of raw materials and activities, such as back-washing of filters, cause peaks in effluent constituent concentrations and volumes.

If effluent data for a particular pollutant or pollutant parameter for a typical POTW are plotted against time, the daily concentration variations can be seen. This behavior can be described by constructing frequency-concentration plots of the same data. This frequency concentration plot can be described in terms of a particular type of statistical distribution. Treated effluent data, unless specific data show otherwise, usually follows a log normal distribution. This is because effluent values are non-negative and treatment efficiency at the low end of the concentration scale is limited, while effluent concentrations may vary widely at the high end of the scale, reflecting various degrees of treatment system performance and loadings. These factors combine to produce the characteristically positively skewed appearance of the log normal curve when data are plotted in a frequency histogram.

Effluent data from any treatment system may be described using standard descriptive statistics, such as the mean concentration of the pollutant or pollutant parameters (i.e., the long-term average, LTA, and the coefficient of variation, CV). Using a statistical model, such as the log normal, an entire distribution of values can be projected from limited data, and limits can be set at a specified probability of occurrence. All permit limits, whether technology-based or water quality-based, are set at the upper bounds of acceptable performance. The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality-based requirements, the limits are based on maintaining the effluent quality at a level that will comply with water quality standards, even during critical conditions in the receiving water. The requirements are determined by the WLA. The WLA dictates the required effluent quality which defines the desired level of treatment plant performance or target LTA. Permit limits may then be derived from this targeted LTA and CV. Note that highly variable effluents require a much lower targeted LTA to meet the WLA and account for the variability that occurs in effluent concentration above the LTA.

Calculation of a Long Term Average (LTA) for Acute, Chronic, and Human Health Criteria

The calculation of the $LTA_{a,c}$ of treatment system performance that is necessary to meet a particular WLA (either acute or chronic) is based on a log normal distribution, unless specific data is available to show otherwise. Note that the Average Monthly Limit for human health is equal to the WLA for human health.

The LTA is calculated as follows:

$$LTA_{a,c} = WLA * \exp(0.5s^{2} - zs) \quad (59)$$

where

ó^{2}	=	$\ln(CV^2/n_1 + 1)$
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
Z	=	probability statistic
	=	2.326 for 99th percentile probability basis
n_1	=	averaging period for the WLA
	=	4 for the chronic WLA
	=	1 for the acute WLA

The LTA_a, using a 99th percentile probability basis is then calculated as:

$$LTA_a = WLA_a * \exp(0.5\ln(\frac{CV^2}{n_1} + 1) - z(\ln(\frac{CV^2}{n_1} + 1))^{1/2}) \quad (60)$$

$$= WLA_a * \exp(0.5\ln(\frac{0.6^2}{1} + 1) - 2.326(\ln(\frac{0.6^2}{1} + 1))^{1/2}) \quad (61)$$

$$= WLA_a * 0.3211 \quad (62)$$

The LTA_c, using a 99th percentile probability basis is then calculated as:

$$LTA_c = WLA_c * \exp(0.5\ln(\frac{CV^2}{n_1} + 1) - z(\ln(\frac{CV^2}{n_1} + 1))^{1/2}) \quad (63)$$

$$= WLA_c * \exp(0.5\ln(\frac{0.6^2}{4} + 1) - 2.326(\ln(\frac{0.6^2}{4} + 1))^{1/2}) \quad (64)$$

$$= WLA_c * 0.5274 \quad (65)$$

In summary, LTA multipliers for aquatic life criteria are as follows:

$$LTA_a = WLA_a * 0.32 \quad (66)$$

$$LTA_c = WLA_c * 0.53 \quad (67)$$

CALCULATION OF MONTHLY AVERAGE AND DAILY MAXIMUM PERMIT LIMITS FOR ACUTE, CHRONIC, AND HUMAN HEALTH CRITERIA

Once the limiting LTA of treatment plant performance has been calculated it must be translated into permit limits. These permit limits are usually expressed as the Daily Maximum limit and the Monthly Average limit. The Daily Maximum is calculated using a 99th percentile probability basis and the Monthly Average a 95th percentile probability basis. The Monthly Average and Daily Maximum are calculated as follows:

$$\textbf{Daily Maximum} = LTA * \exp(z s - 0.5 s^2) \quad (68)$$

$$\textbf{Monthly Average} = LTA * \exp(z s_n - 0.5 s_n^2) \quad (69)$$

where

ó^2	=	ln(CV^2 + 1)
ó$_n^2$	=	ln(CV^2/n + 1)
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
Z	=	probability statistic
	=	1.645 for 95th percentile probability basis
	=	2.326 for 99th percentile probability basis
n	=	number of samples per month

The Daily Maximum, using for example 12 samples, and a 99th percentile probability basis, can then be calculated as:

$$\textbf{Daily Maximum} = LTA * \exp(z(\ln(CV^2 + 1))^{1/2} - 0.5 \ln(CV^2 + 1)) \quad (70)$$

$$= LTA * \exp(2.326(\ln(0.6^2 + 1))^{1/2} - 0.5 \ln(0.6^2 + 1)) \quad (71)$$

$$= LTA * 3.114 \quad (72)$$

The Monthly Average, using for example 12 samples, and a 95th percentile probability basis, can then be calculated as:

$$\textbf{Monthly Average} = LTA * \exp(z(\ln(\frac{CV^2}{n}+1))^{1/2} - 0.5\ln(\frac{CV^2}{n}+1)) \qquad (73)$$

$$= LTA * \exp(1.645(\ln(\frac{0.6^2}{12}+1))^{1/2} - 0.5\ln(\frac{0.6^2}{12}+1)) \qquad (74)$$

$$= LTA * 3.114 \qquad (75)$$

When the human health based Monthly Average Limit is the more limiting long term average the Daily Maximum is calculated from the ratio of the Daily Maximum to the Monthly Average. Calculations are as follows:

$$\textbf{Daily Maximum = Monthly Average} * \frac{\exp(z_1 s - 0.5s^2)}{\exp(z_2 s_n - 0.5s_n^2)} \qquad (76)$$

where

ó^2	=	ln(CV^2 + 1)
ó$_n^2$	=	ln(CV^2/n + 1)
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
Z	=	probability statistic
	=	1.645 for 95th percentile probability basis
	=	2.326 for 99th percentile probability basis
Z$_1$	=	Z statistic for the Daily Maximum
Z$_2$	=	Z statistic for the Monthly Average
n	=	number of samples per month

Using 12 samples, and a 99th percentile probability basis the Daily Maximum for human health can be calculated as:

$$\textit{Daily Maximum} \;'\; \textit{Monthly Average} \;(\; \frac{\exp\ (z_1ó\ \&\ 0.5ó^2)}{\exp\ (z_2ó_n\ \&\ 0.5ó_n^2)} \qquad (77)$$

$$= \text{Monthly Average} * \frac{\exp(z_1(\ln(CV^2+1))^{1/2} - 0.5\ln(CV^2+1))}{\exp(z_2(\ln(\frac{CV^2}{n}+1))^{1/2} - 0.5\ln(\frac{CV^2}{n}+1))} \qquad (78)$$

$$= \text{Monthly Average} * \frac{\exp(2.326(\ln(0.6+1))^{1/2} - 0.5\ln(0.6+1))}{\exp(1.645(\ln(\frac{0.6}{12}+1))^{1/2} - 0.5\ln(\frac{0.6}{12}+1))} \qquad (79)$$

$$= Monthly\ Average \times \frac{3.114}{1.307} \tag{80}$$

$$= Monthly\ Average \times 2.38 \tag{81}$$

In summary, the most limiting WLA is used to derive permit limits. If the aquatic life WLA is more limiting:

$$Daily\ Maximum = Min\ (LTA_a, LTA_c) \times 3.11 \tag{82}$$

$$Monthly\ Average = Min\ (LTA_a, LTA_c) \times 1.31 \tag{83}$$

If the human health WLA is more limiting:

$$Daily\ Maximum = WLA_h \times 2.38 \tag{84}$$

$$Monthly\ Average = WLA_h \tag{85}$$

Other distributions, coefficients of variation, monitoring frequencies, and probability bases may be considered on a site-specific basis. Non-parametric methods may be used if sufficient data is available.

Calculation of a Long Term Average (LTA) for Agriculture Criteria

Since the yearly mean standard is a long term average, the long term average of treatment system performance is equal to the wasteload allocation for the yearly mean standard (WLA_l). Since WLA_s is a short term average effluent concentration, it must be converted to a long term average (LTA_s) for comparison with WLA_l. The calculation of LTA_s is based on a log normal distribution, unless specific data is available to show otherwise. LTA_s is calculated as follows:

$$LTA_s = WLA_s * \exp(0.5s^{2} - zs) \qquad \textbf{(86)}$$

where

$ó^2$	=	ln (**CV**^{2}/n + 1)
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
z	=	probability statistic
	=	2.326 for 99th percentile probability basis
n	=	averaging period for the WLA
	=	4

The LTA_s, using a 99th percentile probability basis, is then calculated as:

$$LTA_s = WLA_s * \exp(0.5\ln(CV^{2}/n = 1) z(\ln(CV^{2}/n+1))^{1/2}) \qquad (87)$$

$$= WLA_s * \exp(0.5\ln(0.6^2/4+1) - 2.326(\ln(0.6^2/4+1))^{1/2}) \qquad (88)$$

$$= WLA_s * 0.5274 \qquad (89)$$

The smaller of LTA_s and WLA_l is used for permit limit development, provided that it is not less than a minimum criterion found in OAC 785:45-5-13(h). The minimum criteria are 700 mg/l for TDS and 250 mg/l for chlorides and sulfates. They represent the lowest concentrations that may be used for the long term averages of treatment system performance.

Calculation of Monthly Average and Daily Maximum Limits for Agriculture Criteria

Once the limiting LTA of treatment system performance has been calculated it must be transplanted into permit limits. These permit limits are expressed as the Daily Maximum limit and the Monthly Average limit. The Daily maximum and Monthly Average are calculated using a 95th percentile probability basis. The Monthly Average and Daily Maximum are calculated as follows:

Daily Maximum = $LTA * \exp(zs - 0.5s^{2})$ (90)

Monthly Average = $LTA * \exp(zs_n - 0.5s_n^{2})$ (91)

where

$ó^2$ = ln (CV^2 + 1)

s_n^2	=	ln (CV^2/n + 1)
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
z	=	probability statistic
	=	1.645 for 95th percentile probability basis
n	=	number of samples per month
	=	10

The Daily Maximum, using for example 10 samples and a 95th percentile probability basis, can then be calculated as:

Daily Maximum = $$LTA * \exp(z(\ln(CV^2 + 1))^{1/2} - 0.5\ln(CV^2 + 1)) \quad (92)$$

$$= LTA * \exp(1.645(\ln(0.6^2 + 1))^{1/2} - 0.5\ln(0.6^2 + 1)) \quad (93)$$

$$= LTA * 2.135 \quad (94)$$

The Monthly Average, using for example 10 samples and a 95th percentile probability basis, can then be calculated as:

Monthly Average = $$LTA * \exp(z(\ln(CV^2 / n + 1))^{1/2} - 0.5\ln(CV^2 / n + 1)) \quad (95)$$

$$= LTA * \exp(1.645(\ln(0.6^2 / 10 + 1))^{1/2} - 0.5\ln(0.6^2 / 10 + 1)) \quad (96)$$

$$= LTA * 1.339 \quad (97)$$

Other distributions, coefficients of variation, monitoring frequencies and probability bases may be considered on a site-specific basis. Non-parametric methods may be used if sufficient data is available.

CALCULATION OF A LONG TERM AVERAGE (LTA) FOR TEMPERATURE CRITERIA

The calculation of the LTA of treatment system performance that is necessary to meet a particular WLA is based on a log normal distribution, unless specific data is available to show otherwise. The LTA is calculated as follows:

$$\mathit{LTA}\ \text{'}\ \mathit{WLA}\ X\ \mathit{exp}\ (0.5ó^2\ \&\ zó) \quad (98)$$

where

$ó^2$	=	ln(CV^2/n_1 + 1)
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
Z	=	probability statistic
	=	0.0 for the 50th percentile probability basis

n_1	=	averaging period for the WLA
	=	7 for temperature
WLA	=	wasteload allocation (in degrees Celsius for temperature)

The LTA_T (in degrees Celsius), using a 50th percentile probability basis, is then calculated as:

$$LTA_T = WLA_T \times \exp\left(0.5 \ln\left(\frac{CV^2}{n_1} + 1\right) - z\left(\ln\left(\frac{CV^2}{n_1} + 1\right)\right)^{1/2}\right) \quad (99)$$

$$= WLA_T \times \exp\left(0.5 \ln\left(\frac{0.6^2}{7} + 1\right) - 0.0\left(\ln\left(\frac{0.6^2}{7} + 1\right)\right)^{1/2}\right) \quad (100)$$

$$= WLA_T \times 1.0 \quad (101)$$

CALCULATION OF MONTHLY AVERAGE AND WEEKLY AVERAGE PERMIT LIMITS FOR TEMPERATURE

Once the limiting LTA of treatment plant performance has been calculated it must be translated into permit limits. These permit limits are usually expressed as the Weekly Average limit and the Monthly Average limit. The Weekly Average and the Monthly Average are calculated using a 95th percentile probability basis. The Monthly Average and Weekly Average (in degrees Celsius) are calculated as follows:

$$Limit = LTA_T \times \exp\left(z\sigma_n - 0.5\sigma^2\right) \quad (102)$$

where

σ_n^2	=	$\ln(CV^2/n + 1)$
CV	=	coefficient of variation
	=	0.6 unless data is available to show otherwise
Z	=	probability statistic
	=	1.645 for 95th percentile probability basis
n	=	number of samples per week for weekly average
	=	number of samples per month for monthly average

The Weekly Average (in degrees Celsius), using for example 7 samples and a 95th percentile probability basis, can then be calculated as:

Weekly Average = $LTA_T * \exp\left(z\left(\ln\left(\frac{CV^2}{n} + 1\right)\right)^{1/2} - 0.5\ln\left(\frac{CV^2}{n} + 1\right)\right)$ (103)

$$= LTA_T \times \exp\left(1.645\left(\ln\left(\frac{0.6^2}{7} + 1\right)\right)^{1/2} - 0.5 \ln\left(\frac{0.6^2}{7} + 1\right)\right) \quad (104)$$

$$= LTA \times 1.41 \tag{105}$$

The Monthly Average (in degrees Celsius), using for example 30 samples and a 95th percentile probability basis, can then be calculated as:

$$Monthly\ Average = LTA \times \exp\left(z \left(\ln\left(\frac{CV^2}{n} + 1\right)\right)^{1/2} - 0.5 \ln\left(\frac{CV^2}{n} + 1\right)\right) \tag{106}$$

$$= LTA \times \exp\left(1.645 \left(\ln\left(\frac{0.6}{30} + 1\right)\right)^{1/2} - 0.5 \ln\left(\frac{0.6}{30} + 1\right)\right) \tag{107}$$

$$= LTA \times 1.19 \tag{108}$$

In summary, the Weekly and Monthly Average permit limits for temperature (in degrees Celsius) can be calculated as:

$$Weekly\ Average = WLA_T \times 1.0 \times 1.41 \tag{109}$$

$$= 1.41 \times WLA_T \tag{110}$$

$$Monthly\ Average = WLA_T \times 1.0 \times 1.19 \tag{111}$$

$$= 1.19 \times WLA_T \tag{112}$$

Permit limits for temperature are often expressed in degrees Fahrenheit. However, all calculations to implement temperature criteria must be done in degrees Celsius. Only after the temperature limits have first been determined in degrees Celsius may conversion to degrees Fahrenheit be done.

Other distributions, coefficients of variation, monitoring frequencies, and probability bases may be considered on a site-specific basis. Non-parametric methods may be used if sufficient data is available.

EXPRESSING WATER QUALITY BASED EFFLUENT LIMITATIONS

Limits must be expressed clearly in the permit so that they clearly are enforceable and unambiguous. All limits, both chemical specific and whole effluent, should appear in the permit.

MASS-BASED EFFLUENT LIMITS

Mass-based effluent limits are required by NPDES regulations at 40 CFR 122.45(f). The regulation requires that all pollutants limited in NPDES permits have limits, standards, or prohibitions expressed in terms of mass with three exceptions, including one for pollutants that cannot be expressed appropriately by mass. Examples of such pollutants are pH, temperature, radiation, and whole effluent toxicity. Mass limitations in terms of pounds per day or kilograms

$$\textit{Daily Maximum Concentration} \;(\; Q_e \;(\; 8.34 \;'\; \textit{Dai} \tag{113}$$

per day can be calculated for all chemical-specific toxins such as arsenic or chromium. Mass-based limits should be calculated using concentration limits at the same effluent flow used to calculate the WLA. This is done as:

$$\textit{Monthly Average Concentration} \;(\; Q_e \;(\; 8.34 \;'\; \textit{Mc} \tag{114}$$

where Q_e is the critical effluent flow (in MGD) used to calculate the WLA. For Equations 72 and 73 to apply, concentration must be expressed in mg/l; this yields mass limits in lbs/day.

CONCENTRATION-BASED EFFLUENT LIMITS

Mass-based effluent limits alone may not assure attainment of water quality standards in water with low dilution. In these waters, the quantity of effluent discharged has a strong effect on the instream dilution and the instream pollutant concentration. In this situation, it is the effluent concentration rather than the effluent mass discharge that dictates the instream concentration. In addition, concentration is a most often a readily apparent measure of treatment performance. Including concentration limits encourages the proper operation of the treatment facility at all times.

In some instances, the use of concentration limits may be counter productive since they may discourage the use of innovative techniques such as water conservation. If a facility has a history of providing efficient treatment of its wastewater and also wishes to practice water conservation, inclusion of concentration limits would probably not be appropriate. Flow reductions and their associated energy savings should be encouraged where appropriate by allowing water quality-based permit limits to be mass-based and by allowing concentration based limits to vary in accordance with flow reduction requirements.

Therefore, effluent limitations should usually be expressed in terms of both concentration and mass loading. Concentration-based limits may be waived if a discharger can demonstrate, on a site-specific basis, that concentration-based limits are not appropriate and that sufficient dilution exists to provide an adequate margin of safety to protect the WLA.

DETECTION LEVEL LIMITS

Where water quality-based limits are calculated which are below the MQL for that particular pollutant a level of compliance will be established in the permit based upon the MQL. The calculated water quality-based limit will be placed in the permit and if any analytical test result for that pollutant is less than the MQL a value of zero may be used for monitoring report calculations and reporting requirements. If a pollutant is of particular concern (i.e., if the pollutant has a high bioconcentration factor) the permittee may also be required to develop an effluent specific method detection limit. Additional requirements such as fish tissue collection and analyses, limits and/or monitoring requirements on internal waste streams, and limits and/or monitoring for surrogate parameters may also be required in the permit.

MONITORING FREQUENCY

Typically, a minimum of ten samples per month is required for those pollutants for which water quality-based limits are developed from acute, chronic, or human health criteria. However, a number of factors must be considered in establishing monitoring frequency. 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.

Therefore, monitoring frequency is usually determined on a case specific basis for each discharger. For municipal dischargers, a minimum frequency of testing for conventional pollutants is based on the requirements listed in Tables 15 through 19 below (taken from OAC 252:605, Appendix D).

TABLE 15: DISCHARGING LAGOONS

Parameters & Sample Site	Design Capacity (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	$ 10.0
pH-each cell & effluent	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
D.O.-each cell & effluent	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
Alkalinity-each cell & effluent	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
Temperature-each cell & effluent	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
Flow-effluent	2/wk Instantaneo us	5/wk Instantaneo us	7/wk Totalized	7/wk Totalized	7/wk Totalized	7/wk Totalized
BOD_5-influent & effluent	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-effluent	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
Appearance of effluent	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk

TABLE 16: TRICKLING FILTER PLANTS

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
PH-EACH INFLUENT & EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
D.O.-EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
TEMPERATURE-EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
SETTLEMENT SOLIDS-INFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
FLOW	Daily	Daily	Daily	Daily	Daily	Daily
BOD_5-INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
CHLORINE RESIDUAL (ONLY IF CL IS ADDED AS PART OF TREATMENT)	Daily	Daily	Daily	Daily	Daily	Daily

TABLE 17: ACTIVATED SLUDGE FACILITIES (INCLUDING EXTENDED AERATION, OXIDATION DITCHES, AND SEQUENTIAL BATCH REACTORS)

Parameters & Sample Site	**Design Capacity (MGD)**					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
pH influent & effluent	Daily	Daily	Daily	Daily	Daily	Daily
D.O.-effluent	Daily	Daily	Daily	Daily	Daily	Daily
Temperature- effluent	Daily	Daily	Daily	Daily	Daily	Daily
Settleable Solids-influent	Daily	Daily	Daily	Daily	Daily	Daily
Flow	Daily	Daily	Daily	Daily	Daily	Daily
BOD_5-influent & effluent	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-influent & effluent	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
BOD_5 and TSS Effluent for SBR Process	1/mo single composite SBR sample	2/mo single composite SBR sample	3/mo single composite SBR sample	1/wk 2-cycle composite SBR sample	5/wk 3-cycle composite SBR sample	7/wk 3-cycle composite SBR sample
Chlorine Residual (if Cl added as part of treatment)	Daily	Daily	Daily	Daily	Daily	Daily
30 minute Settleability-mixed liquor	Daily	Daily	Daily	Daily	Daily	Daily
Sludge Volume index	2/wk	2/wk	3/wk	3/wk	5/wk	7/wk
D.O.-aeration basins	2/wk	2/wk	3/wk	3/wk	5/wk	7/wk

Parameters & Sample Site	Design Capacity (MGD)					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
Waste Activated Sludge Control Tests-select 1, 2, or 3 below- 1. Food/Mass 2. Mean Cell 3. Sludge age	as to necessary control operation		3/wk	3/wk	3/wk	3/wk

Table 18: Aerobic Digestors

Parameters & Sample Site	Design Capacity (MGD)					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
D.O.-basin contents	2/wk	2/wk	3/wk	5/wk	7/wk	7/wk
pH-basin contents	2/wk	2/wk	3/wk	5/wk	7/wk	7/wk
% Volatile suspended solids destruction	None	None	None	None	3/wk	3/wk
% Solids	None	None	None	when drawn	when drawn	when drawn

Table 19: Anaerobic Digestors

Parameters & Sample Site	Design Capacity (MGD)					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
pH	1/wk	1/wk	3/wk	5/wk	7/wk	7/wk
Temperature	1/wk	1/wk	3/wk	5/wk	7/wk	7/wk
Volatile Acids	when drawn	when drawn	2/wk	3/wk	3/wk	3/wk
Total Alkalinity	when drawn	when drawn	2/wk	3/wk	3/wk	3/wk

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	**0.1 < 0.5**	**0.5 < 1.0**	**1.0 < 5.0**	**5.0 < 10.0**	**$ 10.0**
% VOLATILE SUSPENDED SOLIDS	None	None	None	None	3/wk	3/wk
% SOLIDS	None	None	None	when drawn	when drawn	when drawn

PERFORMANCE-BASED MONITORING REDUCTIONS

NPDES authorities can grant relief to regulated facilities that have a record of good compliance and pollutant discharges at levels below permit requirements. This relief provides incentives for voluntary reductions of pollutant discharges through such means as reuse and recycling. The approach outlined below is based on EPA's "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (April 1996). It applies to both major and minor individual NPDES permits for direct discharges, and will be implemented through the existing NPDES permitting cycle for facilities.

TIMING OF DECISIONS

Monitoring reductions will be considered during permit reissuance. Reductions based on facility performance may also be considered if the permit is reopened to accommodate other issues. ODEQ may modify the permit solely to reduce monitoring requirements if sufficient resources are available.

ENTRY CRITERIA FOR PARTICIPATION

FACILITY ENFORCEMENT HISTORY

<u>Criminal Actions (all environmental statutes)</u>

Facilities which have been criminally convicted under any federal or state environmental statute of falsifying monitoring data or committing violations which presented an imminent and substantial endangerment to public health or welfare will not receive any reductions at any time in future. The sole exception shall be that, whenever the permit writer, on a case-by-case basis, determines that there has been a wholesale change in ownership and management, that facility may become eligible for consideration under this guidance as a new permittee.

Facilities convicted of any other criminal violation under federal or state environmental statute will not receive any reductions for five years.

Reductions will be available for those facilities where an individual employed by the permittee, but not the permittee itself, was convicted of a criminal violation under any federal or state statute, provided the permittee discovered and self-disclosed the violation, and took prompt action to correct the root cause in order to prevent future criminal violations.

Civil Judicial Actions (CWA/NPDES/OPDES related)

Facilities are eligible for consideration of reductions 1 year after completion of injunctive relief and payment of penalty.

Administrative Actions (CWA/NPDES/OPDES related)

Facilities are eligible for consideration after the permittee has complied with Administrative Penalty Order (APO) or Administrative Order (AO) requirements, and payment of any assessed penalty. A permittee that is issued an AO, in conjunction with reissuance of its permit, to extend a compliance schedule, may be eligible if the permittee is in compliance with the interim milestones and schedule in the AO.

For example, in order to comply with a newly promulgated effluent guideline, an industrial sector may be required to install a new technology. Some facilities may not be able to attain the new technology immediately so an AO is issued at the time the facility's permit is reissued. The AO sets a compliance schedule to allow the permittee additional time to install the technology needed to meet the new effluent guideline limitation.

PARAMETER-BY-PARAMETER COMPLIANCE

ODEQ will examine each of the following entry criteria:

Significant Noncompliance for Parameters Under Consideration

A facility may not have had any Significant Noncompliance (SNC) violations for the parameters for which monitoring/reporting reductions are being considered during the last two years and,

Any Effluent Violations of Selected Parameters

A facility may not have had any effluent violations of selected (critical) parameters during the last year. The "selected parameters" can be permit-specific and would be determined at the discretion of ODEQ. These parameters could include pollutants which pose heightened risks to human or environmental health, such as highly toxic or bioaccumulative compounds.

PARAMETER-BY-PARAMETER PERFORMANCE HISTORY

At a minimum, the two most recent years of monthly average effluent data representative of current operating conditions for the parameter at the particular outfall will be used to calculate the long-term average discharge rate for use in Table 18.

The baseline frequencies in Table 19 below will normally be considered the level of monitoring in the existing effective NPDES permit. It is important to recognize that permittees that receive monitoring frequency reductions in accordance with Table 18 or Table 19 are still expected to take all appropriate measures to control both the average level of pollutants of concern in their discharge (mean) as well as the variability of such parameters in the discharge (variance), regardless of any reductions in monitoring frequencies granted from the baseline levels. Reliance on monitoring the discharge at a reduced frequency as the sole means of tracking and controlling the discharge could increase the risk of violations.

TABLE 20: RATIO OF LONG-TERM EFFLUENT AVERAGE TO MONTHLY AVERAGE LIMIT

Baseline Monitoring	**75-66%**	**65-50%**	**49-25%**	**<25%**
7/wk	5/wk	4/wk	3/wk	1/wk
6/wk	4/wk	3/wk	2/wk	1/wk
5/wk	4/wk	3/wk	2/wk	1/wk
4/wk	3/wk	2/wk	1/wk	1/wk
3/wk	3/wk	2/wk	1/wk	1/wk
2/wk	2/wk	1/wk	2/mo	1/mo
1/wk	1/wk	1/wk	1/mo	1/mo
2/month	2/mo	2/mo	1/mo	1/quarter
1/month	1/mo	1/mo	1/quarter	1/6 mo

New permittees should go through one permit cycle (5 years) before being eligible for consideration for reduced monitoring.

Facilities would not normally be considered for reductions in monitoring frequencies below once per quarter, except in unusual circumstances of reliable performance at the requisite levels and outstanding compliance/enforcement histories.

Facilities which satisfy the entry criteria but are not experiencing discharges of 75% or less of their permitted levels of water quality-based parameters may still be eligible for reductions in monitoring/reporting frequencies at the discretion of the permitting authority. To control an increased risk of undetected violations, monitoring should only be reduced for such parameters if the applicant can demonstrate a very low variation in the concentrations being discharged.

Parameters that show a long-term (2 year) average discharge between the permitted concentration and 76% of a water quality-based permit limit should demonstrate a coefficient of variation (ratio of standard deviation to average) of 20% or less. An additional safeguard should stipulate that parameters which showed any exceedance of the monthly average limitation during the two year averaging period would not be subject to monitoring reductions. It should be noted that discharges with a long-term average at or near the permit limit have a probability of reporting a violation 50 of the time, regardless of low coefficient of variation or sample size. Reductions may be made as shown in Table 21 below:

TABLE 21: RATIO OF LONG-TERM EFFLUENT AVERAGE TO MONTHLY AVERAGE LIMIT @ 100-76%

Baseline Monitoring	Reduced Monitoring
7/wk	6/wk
6/wk	5/wk
5/wk	4/wk
4/wk	4/wk
3/wk	3/wk
2/wk	2/wk
1/wk	1/wk
2/month	2/month
1/month	1/month

RESIDENCY CRITERIA FOR CONTINUED PARTICIPATION

Permittees are expected to maintain the performance levels that were used as the basis for granting monitoring reductions. To remain eligible for these reductions, the permittee may not have any SNC violations for effluent limitations of the parameters for which reductions have been granted or failure to submit DMRs, or may not be subject to a new formal enforcement action. For facilities that do not maintain performance levels, the permitting authority may require increased monitoring in accordance with a Section 308 or 309 Order (or State equivalent).

Special Considerations

Discontinuous Data

Monitoring should not be reduced using the methodology described above if effluent data have not been continuously reported over the period of time being considered. Effluent averages from interrupted or discontinuous data sets may not be representative of long-term performance. Monitoring frequencies for discharges that are intermittent or short-term, such as seasonal discharges and highly variable batch processes, should not be assessed or reduced using the methods described above and would need to be considered on a case-by-case basis.

Independent/Dependent Control Parameters

The procedures for reductions described in this guidance are intended for effluent parameters which are normally independently controlled by the permittee. That is, for each parameter limited in the permit there should be significantly different control mechanisms/factors—either in the permittee's treatment, pretreatment or process operations. In situations where there are several parameters, each of which could be used to measure the performance of a given system, it will generally be appropriate to primarily monitor only the best indicator parameter. For example, if a biological treatment system can be evaluated by either BOD, CBOD, COD or TOC measurements, it would normally be appropriate to require monitoring of only one of these oxygen demanding parameters.

The permitting authority should, therefore, examine the parameters being monitored from each facility during the permit issuance process to establish which parameters are independently controlled and/or which can be used to determine the proper operation of a facility. Monitoring of other parameters can be either eliminated or reduced to a minimum frequency.

Monitoring Frequency "Floor"

Current federal NPDES regulations do not establish a monitoring frequency "floor" but do establish a reporting frequency floor of once per year. The monitoring frequency from which reductions could be made is considered to be the level of the monitoring in the existing effective NPDES permit. It is important to recognize that the guidance given in Table 1200 does not advocate any reductions in statistical confidence in the ability of a permitting authority to determine whether or not a permit limit is being violated at reduced monitoring frequencies. The guidance also does not advocate any reductions for parameters that are currently monitored only once per quarter.

The permitting authority may, however, consider other factors specific to the State or facility. For example, a State policy may establish the baseline. If a facility has already been given monitoring reductions due to superior performance, the baseline may be a previous permit. As a point of reference, federal regulations do not stipulate minimum monitoring frequencies but do require that reporting cannot be less than once per year. Future guidance may also be used to establish a baseline for monitoring.

EXCEPTIONS

The permitting authority may elect to maintain higher monitoring levels in individual situations where there may be a particular interest in human health, endangered species or a sensitive aquatic environment. An example would be where a permitting authority has assessed water quality problems in a watershed and determined which point and nonpoint sources are particularly critical from the standpoint of protection of aquatic resources (e.g., endangered species) and human health (e.g., drinking water source). The permitting authority may well decide not to reduce monitoring of critical point sources in these instances, while continuing to monitor the overall situation.

APPLICABILITY TO MINOR FACILITIES

Minor facilities are fully eligible for reductions under this guidance, even though they are not automatically tracked for SNC in the Permits Compliance System database. (Avoidance of SNC is one of the minimum criteria that should be met for participation in this program.) However, permitting authorities may apply the SNC criteria on a case-by-case basis to minor facilities in order to allow them to participate in this program based on permit-specific effluent compliance.

LIMITS BELOW LEVELS OF DETECTION

Reductions in monitoring frequencies are not recommended in cases where stringent water quality-based limits are below levels of quantification (the level at which a constituent present in a wastewater sample can be reliably detected and quantified). Permittees with these types of limits will normally be deemed to be in compliance when monitored levels are below the level of quantification; however, by definition, it is not scientifically possible (until analytical methods improve) to certify that the water quality-based limits are actually being achieved. However, the permitting authority may still use its discretion in considering reductions on a case-by-case basis.

USE OF DAILY MAXIMUM VALUES

This guidance does not provide a specific methodology for considering daily maximum permit values when considering monitoring/reporting reductions. However, EPA is in the process of implementing a revised definition of SNC that accounts for daily maximum violations. The new definition will be included in the entry criteria of this guidance at a later date. In the interim, permitting authorities should consider such situations on a case-by-case basis. There may be concerns over instances where, for example, there are acutely toxic conditions in a receiving water due to violations of daily maximum permit limitations. In such cases, the permitting authority may elect to maintain higher monitoring levels. In addition, it is important to recognize that dischargers who frequently violate daily maximum permit limitations will likely be unable to achieve high levels of performance in monthly average limits and effectively would not be eligible to participate in this program on that basis. In addition, such facilities may also trigger one of the various compliance/enforcement-based entry criteria.

THE TMDL PROCESS

The Total Maximum Daily Load (TMDL) process provides a reasonable, technically sound, consistent procedure for implementing water quality related standards in permits in Oklahoma. These permits are issued to allow the legal discharge of treated wastewater without adverse impact to waters of the state. Limits set in the permit must ensure that the discharge will comply with the water quality standards of the receiving stream.

Water quality standards include three elements, designated beneficial uses for the waterbody, narrative or numerical criteria (physical, chemical, and biological) to protect the designated uses, and an antidegradation statement. Those waters identified as not meeting any one of these components of water quality standards require the development and implementation of water-quality based point and nonpoint source pollution control measures.

The TMDL process begins with the determination of which waters do not meet, or are not expected to meet, water quality standards after the implementation of technology based controls. Waters identified through this process are considered water quality limited and must be prioritized so that an overall management plan can be developed to manage the excess pollutants. A determination is then made as to the number and amount of pollutants entering the waterbody. Once quantified, limits for point sources, and BMP's for non-point sources can be established which are protective of water quality standards. After these control actions are implemented an assessment can be made to determine their effectiveness.

THE TMDL OBJECTIVE

The objective of a TMDL is to allocate allowable loads among different pollutant sources so that the appropriate control actions can be taken and water quality standards achieved. The TMDL provides an estimate of pollutant loadings from all sources and predicts the resulting pollutant concentrations.

The first step in developing a TMDL involves establishing a goal, or target, which is related to achieving a particular numerical or narrative water quality standard. Because of the complexity of the WQS, this goal may be specific to a particular pollutant or may involve a number of pollutants. In addition, this goal may be set differently dependent on the type of waterbody. Multiple targets are appropriate in some cases. This can result from different requirements being applied at different points in the waterbody or because of differing requirements associated with multiple uses. A phased approach can be appropriate in some cases.

STREAMS AND RIVERS

Oklahoma's WQS define a regulatory mixing zone for discharges into different types of waterbodies. In streams, the mixing zone extends downstream a distance equivalent to thirteen times the width of the water within the receiving stream at the point of effluent discharge and encompasses 25% of the total stream flow of the ${}_7Q_2$ or 1 cfs, whichever is larger, immediately downstream of the point of effluent discharge. Where overlapping mixing zones occur because of multiple outfalls, the total length of the mixing zone will extend thirteen stream widths downstream from the downstream discharge point. It is important to note that the total stream flow includes both the upstream and the effluent flow.

Dependent on the use being protected a standard may apply in the mixing zone, at the edge of the mixing zone, or after complete mixing. In addition, beneficial uses may change in a waterbody segment. Since the zone of impact of a discharge may extend through multiple waterbody segments this change may result in multiple requirements and targets. In general, if more than one narrative or numerical criteria are assigned to a stream, the most stringent shall be maintained. These multiple requirements should be considered in setting a target for a TMDL.

LAKES

Oklahoma's WQS require that mixing zones for lakes be designated on a case-by-case basis. Dependent on the use being protected a standard may apply in the mixing zone, at the edge of the mixing zone, or after complete mixing. For purposes of implementation of numerical toxics criteria for protection of fish and wildlife, the lake mixing zone extends one hundred feet from the source, unless otherwise specified in the Oklahoma WQS.

The dynamics between lake hydrology, water quality, and attainment of beneficial uses is very complex. For other than numerical toxics criteria for protection of fish and wildlife, implementation of water pollution control strategies for lakes may sometimes be directed more towards a qualitative rather than quantitative objective (e.g., change in trophic state).

As with TMDL's for streams and rivers, multiple requirements may necessitate setting multiple goals. These multiple goals may lend themselves more readily to a phased approach for lakes than for streams and rivers.

POINT SOURCE ASSESSMENT

Determination of a TMDL in the wasteload evaluation process requires assessment of point source (PS), nonpoint source (NPS), and natural background loadings to a receiving water. Figure 10 shows pictorially the relationship between these elements. Quantification of these loadings is pollutant and segment specific since the TMDL is actually the total pollutant loading for a segment of a waterbody that results in an instream pollutant concentration equal to a numerical limit required by a numerical or narrative criteria in the WQS.

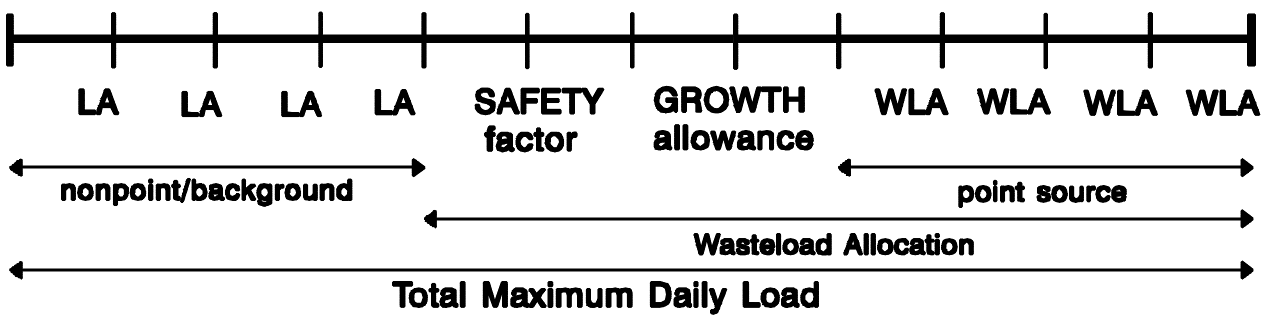


Figure 11 **TMDL Elements**

The magnitude of a TMDL, for a particular stream segment, is dependent on the specified stream's flow, water quality standards, and in-stream reactions. A TMDL is also based on specific critical conditions, and the degree of sophistication of the model used to develop that TMDL. The TMDL is equivalent to the assimilative capacity of a particular stream reach for a particular pollutant under critical stream conditions.

NON-POINT SOURCE ASSESSMENT

Assessment of NPS and background conditions is a necessary initial step in the WLE process. Table 22 (Nonpoint Source Impacts/Modeling Effort for Streams) shows the conditions under which NPS loadings may be important and the minimum level of effort needed to model the impact. If a known or suspected NPS problem for a constituent of concern has been documented then the level of effort expended to quantify NPS loads should be increased. The State of Oklahoma Nonpoint Source Assessment Report is a good starting place to gather information on potential impacts from nonpoint sources.

For a Method 1 analysis (Uncalibrated Model) of an intermittent stream, assessment of NPS impacts is not usually required. Likewise, for a perennial stream, a NPS impact would be difficult, if not impossible to estimate without site specific data. If the NPS load impacts the stream above the Zone of Impact it would be difficult to separate from naturally occurring background conditions. For uncalibrated models the background loading is assumed to account for any NPS impact above the Zone of Impact. NPS impacts in the Zone of Impact are not usually accounted for with an uncalibrated model. However, if necessary, and sufficient data is available for their characterization, they may be modeled at this level of analysis. In most cases this NPS assessment will be performed only at the calibrated model level of analysis.

TABLE 22: NONPOINT SOURCE IMPACTS/MODELING EFFORT FOR STREAMS

Potential Impact Level/Modeling Effort			
Stream Type	Critical Conditions Low Flow	Non-Critical Conditions	
		Moderate Flow	Intense Flow
Intermittent	Negligible Impact	Moderate Impact	Highest Impact
	No model required	Calibrated SS*	Calibrated Dynamic
Perennial	Minimal Impact	Moderate Impact	Highest Impact
	Calibrated SS*	Calibrated SS*	Calibrated Dynamic

*SS - steady state model

ZONE OF IMPACT ASSESSMENT

Determination of a TMDL also requires definition of the stream segment impacted by point and nonpoint source and background loadings. This stream segment is defined as the zone of impact. Because the zone of impact is specific to the TMDL it is also dependent on the degree of sophistication of the model used to determine the TMDL. The zone of impact for each point source discharge or group of point source discharges shall be identified in the WLE.

GROWTH ALLOWANCE AND SAFETY FACTOR

Both a growth allowance and safety factor are included in determination of a TMDL. The growth allowance is dependent on the type and number of dischargers, as well as regulatory considerations (costs in updating WLA's and inconvenience due to delays in management actions). For instance, the design flow of a municipal facility is usually used as the critical effluent flow in the WLE. This design flow usually incorporates a population growth increase into the 15-25 year design life of the plant. No additional allowance may be necessary. However, if there are a number of dischargers in a segment, some municipal and industrial plants, each with different lives, it may be appropriate to assess the combined effects of these differing lives, as well as the potential for deletion or addition of existing or proposed dischargers. A 15-25 year assessment period should be used, when possible, in TMDL determination. This 15-25 year period may be effected in the WLE by adjustment of critical effluent flow estimation of the individual point sources, or by adjusting the growth allowance or safety factor.

The safety factor is primarily dependent on the total uncertainty in the modeling process. This includes the number and type of discharger and wastes, as well as the level of the modeling effort. The criteria given in Table 23 (Modeling Effort/TMDL Safety Factor) indicates the relative magnitude of the safety factor for various levels of analysis. Other factors, such as the magnitude of impact, and calculated model uncertainty for a specific model, may be important in this determination. In most cases the margin of safety is incorporated into the conservative assumptions used to develop the TMDL. If the margin of safety needs to be larger than that which is provided through the conservative assumptions, an additional margin of safety can be added as a separate component of the TMDL.

TABLE 23: MODELING EFFORT/TMDL SAFETY FACTOR

Model	Model Complexity	Safety Factor
Uncalibrated	Multiple Source/Complex Waste	25 %
	Single Source/Uniform Waste	20 %
Calibrated	Multiple Source/Complex Waste	15 %
	Single Source/Uniform Waste	10 %
Confirmed	-----	5 %

Safety factors shown above, based essentially on residual uncertainties in the model projections of impacts, will in some cases preempt a significant portion of an otherwise allocatable load. The type of residual uncertainties in projected impacts addressed by the wasteload evaluation will tend to be greater when data and data acquisition are limited, and model confirmation efforts are constrained as a result. Where the economic impact of providing treatment is substantially influenced by the magnitude of such an assigned safety factor, and if environmental risks do not justify neglecting this consideration, then additional model confirmation efforts (with attendant data acquisition) may be appropriate.

UNCERTAINTY ANALYSIS

A final step in the WLE process involves assessment of the uncertainty level associated with a particular TMDL or WLA. Several methods are available for the quantification of uncertainty in water quality modeling. Some of the more often used are sensitivity analysis, first order error analysis, and Monte Carlo Simulation. The method used should be consistent with the type of model and available data. At a minimum, a sensitivity analysis should be performed for any of the four levels of analysis used in Oklahoma. For a calibrated model the magnitude of the perturbation should reflect the actual uncertainty of that parameter. Results of an uncertainty analysis should be reviewed within the context of the effluent quality expected for various treatment levels. If a required treatment level is heavily sensitive to, and dependent on, the selection of an input value, further study may be appropriate to adequately characterize that model variable.

POINT SOURCE ALLOCATION

Determination of a TMDL requires some initial assessment of expected loadings from a point source discharge, or discharges. Consideration should be given in the wasteload evaluation process to existing treatment facilities and expected effluent levels of pollutants. If the initial WLA to a waterbody is not water quality limited the corresponding TMDL shall be calculated by increasing the loading from the point sources until any additional loading would result in a violation of water quality standards. If a calibrated model is being used this may be done by increasing either the flow rate or a parameter concentration from one or more point sources. If an uncalibrated model is being used the point source flow rate shall be held constant, and the concentrations of pertinent parameters be increased by multiples of the initial loading. In those cases where technology based limits (BCT/BAT for industrials, secondary treatment for municipals) preclude increasing the concentration above a certain level, the TMDL may be determined by using the maximum concentration and increasing the effluent flow rate.

Allocation of Wasteloads

Once the TMDL has been calculated it can be divided among the various discharges of the particular pollutant within the given segment of the stream. This division can be made in many ways and the process of doing so is called allocation of wasteloads.

The primary method of allocating wasteloads shall be determined by priority of application and demonstration of need. The date of receipt of an application for discharge permit, or modification of a discharge permit, shall establish a priority date of filing. Once a present or future need for assimilative capacity is established in the application, a WLA may be established for that discharge. Subsequent applications for permit, or modification of a permit, may be allocated a wasteload only to the maximum of the remaining assimilative capacity. New dischargers, or increased loadings from existing dischargers to a waterbody may be allowed only to the extent that the existing TMDL can be reallocated among all dischargers, based on demonstration of need, in an equitable manner.

A present or future need for assimilative capacity shall be established in the application and may be supported by other documentation. This may consist of an Engineer's Report, Facility Plan, or other appropriate information. A summary of the method and critical factors considered to evaluate present, or future need, shall be fully presented. A determination will then be made by the appropriate regulatory agency as to whether the present or future need has been demonstrated. If it is determined that a need in some lesser amount has been demonstrated the applicant may then amend the application and apply for the lesser amount. The priority date of filing shall remain the same if all other application requirements are met.

In some cases a schedule of need, showing increasing or decreasing levels of future need, may be developed. Permits may then be issued allowing this incremental assimilative capacity to be allocated among other dischargers. Provision shall be made in the permits to include interim schedules of allocation.

In those cases where established allocations require updating, due to a change in beneficial uses (e.g.- upgrading of an aquatic life use) or other conditions (e.g.- significant change in low flow), site specific constraints shall be considered in allocating the available assimilative capacity among the dischargers. Allocation of the TMDL is made considering technical, socio-economic, institutional, and political constraints. Priority of application shall not be considered the sole basis for the method of allocation.

When considering the method for allocating wasteloads the conditions that favor one approach over another should be taken into account . Often, local conditions will limit the assimilative capacity available at some of the sources. At the remaining sources several allocation methods may be used. The final allocation scheme should provide an equitable method of allocation considering the level of analysis used to determine the allocation as well as the uncertainty associated with the allocation scheme.

Best Management Practices

The wasteload evaluation process provides for nonpoint source control tradeoffs. If Best Management Practices (BMP's) or other nonpoint source pollution controls make more stringent load allocations practicable, then WLA's can be made less stringent. BMP's include but are not limited to structural and nonstructural controls and operating and maintenance procedures. BMP's can be applied before, during and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. BMP's, as justified by a WLE, may be incorporated into discharge permits on a case-by-case basis or issued as a separate, stand-alone plan.

In those cases where a point source WLA is based on nonpoint source reductions the TMDL process provides for a phased approach. This phased approach provides assurance that nonpoint source control measures will achieve expected load reductions. This is primarily achieved through permit requirements which include schedules for the installation and evaluation of point and nonpoint source control measures, data collection, the assessment for water quality standards attainment, and, if needed, additional predictive modeling. A reopener clause is also usually included so that the permit can be modified or revoked and reissued if the data indicate an exceedance of water quality standards.

ANTIBACKSLIDING

The procedures developed in this document for developing a WLA for water quality based permit limits will normally result in new or more stringent water quality based limits than those contained in a previously issued permit. In a limited number of cases, however, it is conceivable that less stringent water quality based limits could result. In these cases, permit limits must conform to existing federal regulations governing antibacksliding (issuance of permit limits that are less stringent than those contained in an existing permit is generally prohibited unless certain criteria are met).

WATER QUALITY MODELS

The primary tool used in setting water quality based permit limits for point source dischargers is the water quality model. Results provided in wasteload evaluation studies from these models are used to assist in making effective decisions on levels of treatment required for a source or sources of pollutant load. A complete discussion of the process of water quality modeling is beyond the scope of this document. However, guidelines will be developed for use of applicable models in the wasteload evaluation process.

LEVELS OF ANALYSIS

The level of effort that can be expended in development of a wasteload evaluation covers a broad spectrum in terms of resources assigned to collect water quality data and the extent of analysis efforts to calibrate and confirm the model. At one extreme, simple preliminary analyses would rely on existing data and estimates of additional information needed to perform the evaluation. At the other extreme water quality studies could be very thorough and comprehensive. The following four levels of analysis are to be used in development of a wasteload evaluation in Oklahoma.

The levels of analysis are listed in order of increasing complexity, data requirements, and cost of application. In general, the more complicated approaches should provide more detailed and accurate analyses, assuming enough data is available for proper model calibration. In order to select the appropriate level of analysis, a combination of technical, economic, and scientific factors must be taken into consideration. For oxygen demanding substances (BOD, NH3, etc.) EPA Region VI "Criteria for Performing Wasteload Analysis", September 1983, is used as a guideline for determining necessary levels of analysis. Method 1-Uncalibrated Model should be used initially in all modeling analyses. The results from this Method 1 analysis are then used to determine if further study is needed.

Other factors which should be considered in determining the level of study include the complexity of the loading (multiple sources, variable flow rates and/or concentrations), complexity of the waterbody (complex configuration), number of constituents and processes (nutrient cycles and phytoplankton dynamics), severity of receiving water conditions (poor quality ambient conditions), sensitivity of waterbody (antidegradation of HQW, ORW, etc.), economic implications of WLA results (costs of expected treatment levels), and type of problem (dynamic/steady-state analysis).

METHOD 1 - UNCALIBRATED MODEL

This includes any 1, 2, or 3 dimensional, steady state or dynamic model in which water quality data and/or kinetics are estimated from existing literature or other data, rather than from an intensive survey. At a minimum the model should account for the more significant pollutant related transport mechanisms. Model inputs should be based on expected values at critical conditions. Initially, this method should be used for all modeling analyses. Development of a TMDL or wasteload allocation should then be made with regard to the degree of confidence placed in the modeling. An uncertainty analysis should be performed to assure that variations in critical parameters do not substantially alter the WLA.

CONSERVATIVE SUBSTANCE MIXING ZONE MODEL

The Conservative Substance Mixing Zone Model (Hutcheson, 1992) will be used for calculating effluent wasteload allocation concentrations based on meeting Oklahoma's WQS at the edge of the mixing zone. The following equations are used to calculate the WLA:

$$WLA = C_b + \frac{(1 + Q^*)(C_t - C_b)}{1.94Q^*} \qquad (115)$$

when Q* is less than or equal to 0.1823, or

$$WLA = C_b + (6.17 - 15.51Q^*)(C_t - C_b) \qquad (116)$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$WLA = C_t \qquad (117)$$

when Q* is greater than or equal to 0.3333.

such that

WLA $\geq$ C_t for wasteload allocation purposes

where:

C	=	water quality standards criterion
C_b	=	background concentration
Q^*	=	Q_E/Q_U
Q_E	=	effluent flow (MGD)
Q_U	=	upstream flow (MGD)

Complete Mix Mass Balance Model

A complete mix mass balance model will be used in calculating effluent wasteload allocation concentrations based on meeting Oklahoma's WQS after complete mix in the receiving water. For a single source discharger this can be expressed as:

$$WLA = C + \frac{(C - C_b)}{Q^*} \qquad (118)$$

where:

C	=	water quality standards criterion
C_b	=	background concentration
Q^*	=	Q_E/Q_U
Q_E	=	effluent flow (MGD)
Q_U	=	upstream flow (MGD)

Horizontal Jet Model

The horizontal jet model for a simple jet, as described in Section 9.2.1 of *Mixing in Inland and Coastal Waters*, Fischer et al, 1979, can be used to calculate the concentration of a surface plume for lentic waterbodies in the absence of site specific data. If an applicant can provide site specific data, this data may be used in lieu of the Fischer model.

The model represents the jet as a constantly spreading fan. Time averaged concentrations can be shown to fit a Gaussian distribution dependent on the width and distance along the centerline of the jet.

The following equations are used to calculate the WLA:

$$\textbf{pipe:} \quad WLA = C_b + \frac{20.15(C_t - C_b)}{D} \qquad (119)$$

when D is greater than or equal to 3 feet, or

$$\textbf{canal:} \quad WLA = C_b + \frac{4.2(C_t - C_b)}{\sqrt{W}} \qquad (120)$$

when W is greater than or equal to 3 feet.

where

C_t	=	water quality standards criterion
C_b	=	background concentration
D	=	pipe diameter in feet
W	=	canal width in feet

MULTI-DISCHARGER DESKTOP DISSOLVED OXYGEN MODEL

The Multi-discharger Desktop Model (MULTID) is a Fortran program for performing dissolved oxygen related wasteload allocations for single or multiple dischargers. MULTID should be utilized initially for all modeling analysis as a screening method and to identify model sensitivity to various parameters. Selection of a treatment level should then be made with regard to the degree of confidence placed in the modeling. If the results indicate limits more stringent than technology based, a calibrated/verified model may be required, or desired.

The model is a modified version of the classic Streeter-Phelps formulation. The approach incorporates both carbonaceous (CBOD) and nitrogenous (NBOD) oxygen demands in the analysis, as well as CBOD settling and sediment oxygen demand. Figure 11 shows the interaction between state variables.

The basis of the model is the principle of conservation of mass. The general transport equation in one dimension for a uniform cross sectional plug flow reactor can be written as:

$$\frac{\partial C}{\partial t} = E\,\frac{\partial^2 C}{\partial x^2} - U\,\frac{\partial C}{\partial x} \pm \sum S \qquad (121)$$

where:

C	=	concentration of dissolved oxygen (mg/L)
t	=	time at a stationary point (days)
U	=	velocity of flow in the x direction (meters/day)
E	=	coefficient of dispersion in the x direction (m^2/day)
x	=	distance downstream (miles)
S	=	sources and sinks of oxygen

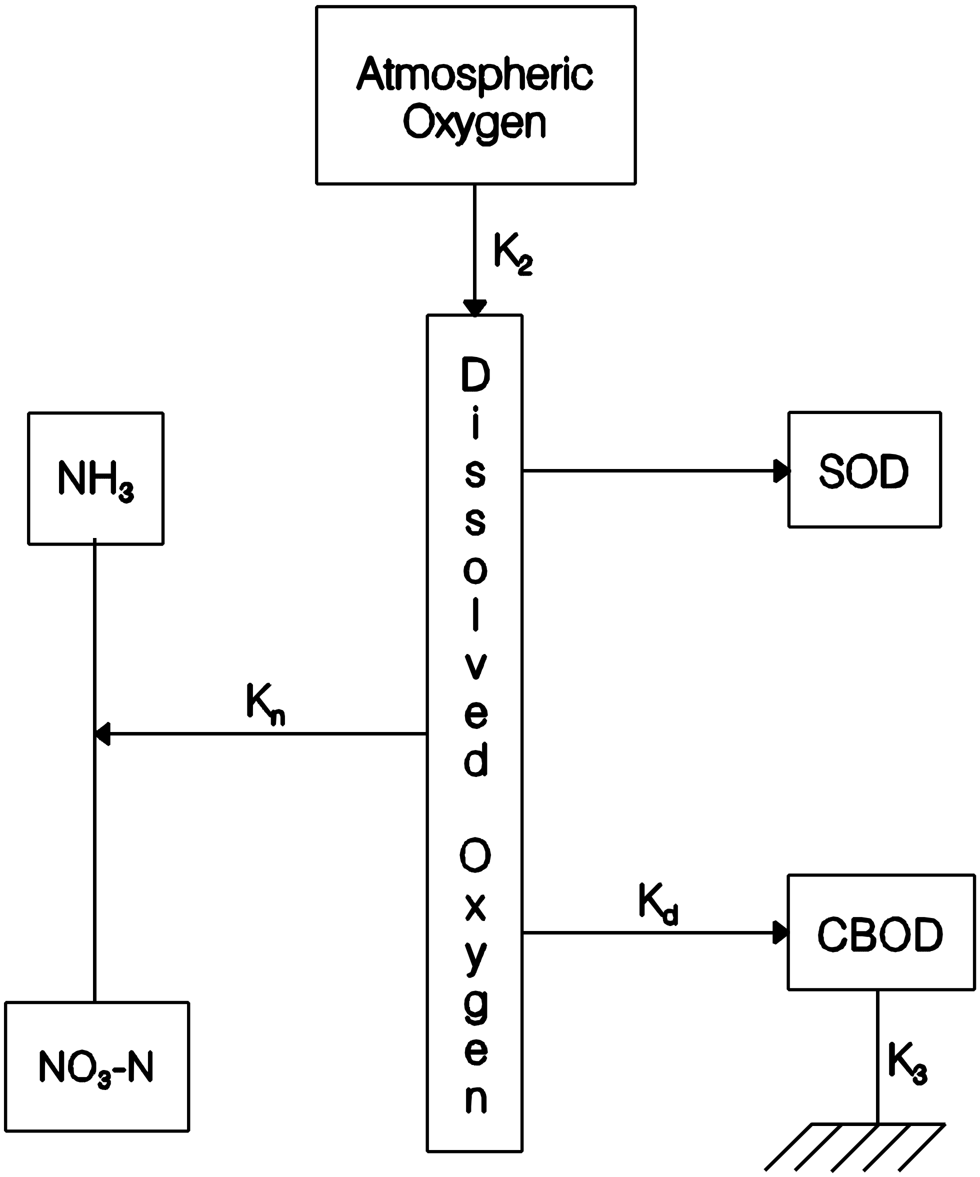


Figure 12 **Multid Oxygen Balance**

When considering streams, the turbulent diffusion (longitudinal mixing) is generally insignificant and equation (97) becomes:

$$\frac{\partial C}{\partial t} = -U \frac{\partial C}{\partial x} + \sum S \tag{122}$$

Under low flow conditions steady state is assumed and the above expression can be further simplified to

$$0 = -U \frac{dC}{dx} + \sum S \tag{123}$$

The more significant sources and sinks of reaeration, carbonaceous biochemical oxygen demand, nitrogenous biochemical oxygen demand, and sediment (benthal) demand, are included in the analysis. If first order rate models are hypothesized for CBOD removal, NBOD removal, and reaeration, these can be written as:
For CBOD:

$$\frac{dL}{dt} = -K_r L \tag{124}$$

where:

K_r	=	$K_d + K_s$
K_r	=	overall rate of CBOD removal from water column
K_d	=	instream CBOD decay rate (1/day, base e)
K_s	=	CBOD settling rate (1/day, base e)
L	=	concentration of CBOD (mg/L)

Solution of this equation, using the boundary condition (B.C.) that $L = L_o$ at $t = 0$, gives:

$$L = L_o e^{(-K_r)\, t} \tag{125}$$

$$= L_o e^{-(K_d + K_s)\, t} \tag{126}$$

$$= L_o e^{(-K_d)\, t}\, e^{(-K_s)\, t} \tag{127}$$

For NBOD removal, a semi-empirical approach is used to formulate a 1st order model which represents the overall oxidation rate of the organic plus ammonia nitrogen (the TKN) to nitrate nitrogen:

$$\frac{dL^n}{dt} = -K_n L^n \tag{128}$$

where:

K_n	=	NBOD oxidation rate (1/day, base e)
L^n	=	concentration of NBOD (mg/L)

Solution of this equation using the B.C. that $L^n = L^n_o$ at t = 0 gives:

$$L^n = L_o^n e^{(-K_n)\,t} \tag{129}$$

The formulation for reaeration can be written as:

$$\frac{dC}{dt} = K_2\,(C_s - C) \tag{130}$$

where:

K_2	=	reaeration rate coefficient (1/day, base e)
C_s	=	O_2 saturation concentration (mg/L)

If the oxygen deficit is defined as:

$$D = C_s - C \tag{131}$$

substitution into (107) gives:

$$\frac{dD}{dt} = -K_2\,D - \frac{dC_s}{dt} \tag{132}$$

If the assumption is made that the temperature, salinity, and pressure are constant in time, then C_s = constant and $dC_s/dt = 0$. Thus,

$$\frac{dD}{dt} = -K_2\ D \tag{133}$$

Solution of this equation using the B.C. that D = D_o, the initial deficit (C_s - C_o), at time t = 0, gives:

$$D = D_o e^{(-K_2)\ t} \tag{134}$$

$$C = C_s - (C_s - C_o)e^{(-K_2)\ t} \tag{135}$$

The final sink included in the analysis is sediment oxygen demand, which is usually formulated as a zero order model:

$$\frac{dC}{dt} = -\frac{SOD}{H} \tag{136}$$

where:

SOD	=	sediment oxygen demand (gm O_2/ft^2-day)
H	=	water depth, ft. Substitution of these sources and sinks into equation (136) gives the general equation:

$$0 = -U\ \frac{dC}{dx} + K_2\ (C_s - C) - K_r L - K_n L^n \tag{137}$$

or, using the more specific terms for the sources and sinks:

$$U\frac{dD}{dx} = -K_2 D + K_r L_o e^{(-K_r)\ t} + K_n L_o^n e^{(-K_n)\ t} \tag{138}$$

Assuming a uniform cross section, at steady state

$$t = \frac{U}{x} \tag{139}$$

which results in:

$$\frac{dD}{dx} = \frac{K_2}{U} D + \frac{K_r L_o}{U} e^{-K_r \left(\frac{U}{x}\right)} + \frac{K_n L_o^{\,n}}{U} e^{-K_n (\cdot} \tag{140}$$

This is a nonhomogeneous first-order linear ordinary differential equation. Assuming no change of the saturation value with distance, and using the B.C. that D = D_o at x = 0, the solution is given by:

$$D = D_0^{(-K_2)t} + \frac{K_d L_o}{K_2 - K_r}\left(e^{(-K_r)t} - e^{(-K_2)t}\right) + \frac{K_n L^n}{K_2 - K_n}\left(e^{(-K_n)t} - e^{(-K_2)t}\right) + \frac{SOD}{HK_2}\left(1 - e^{(-K_2)t}\right) \tag{141}$$

or, in terms of DO concentration:

$$C = C_s - (C_s - C_0)e^{(-K_2)t} \frac{K_d L_o}{K_2 - K_r}\left(e^{(-K_r)t} - e^{(-K_2)t}\right) - \frac{K_n L^n}{K_2 - K_n} - \frac{SOD}{HK_2}\left(1 - e^{(-K_2)t}\right) \tag{142}$$

This final equation for DO () is utilized in the modeling approach. The DO concentration is calculated at time t (with t = U/x) for the user specified number of points in a reach. The DO at the sag point is then compared to the required DO target for the reach. Changes in effluent levels are made until DO standards are met. Instream levels of CBOD and NBOD are also calculated at the specified number of points using the integrated forms of the first order decay models.

The resolution of the model can be adjusted by increasing or decreasing the number of stream reaches, as well as the number of calculation points in a reach. The level of resolution should be selected so that sufficient detail can be maintained to adequately reproduce the primary variable interactions and their effect on the DO concentration at the sag point.

OTHER MODELS

Other models, as appropriate for a particular evaluation, may be used in a method 1 analysis with prior approval of the permitting agency.

METHOD 2 - CALIBRATED MODEL

This includes any model in which the hydraulic parameters, water quality conditions, and biochemical kinetic rates are determined from data collected during an intensive survey conducted as near as possible to critical conditions. The model should be calibrated to those parameters which most affect the receiving water. As with Method 1 an uncertainty analysis should be performed to determine the degree of confidence placed in the model and resulting allocation.

METHOD 3 - CONFIRMED MODEL

This level of analysis requires all the elements specified for Method 2 along with a second intensive stream survey. The model should again be calibrated using the second set of data with the same parameters used in the original calibration. Coefficients determined during both calibrations should then be compared. If there is no significant difference between the two sets of coefficients the models are confirmed. The final step in the wasteload evaluation involves using both calibration data sets to again estimate all coefficients so that all of the data is used in the final model. It would be expected that the level of uncertainty associated with the final model would be less than that associated with each individual calibrated model.

METHOD 4 - POST AUDIT MODEL

If the level of uncertainty associated with a calibrated or confirmed model is unacceptably high a subsequent intensive survey may be required after implementation of a wasteload allocation or other control mechanism. The post audit model is used to further confirm the model as well as the effectiveness of the control mechanism developed from the previous wasteload evaluation.

DEVELOPING THE 303(D) LIST OF WATERBODIES NEEDING A TMDL

BACKGROUND

According to section 303(d) of the Clean Water Act, States are to identify waters that do not meet water quality standards even after technology-based controls required by the Act and any other controls required by state or local authority are in place. Waters that are not expected to meet standards in the future, after the required controls are in place, are also to be identified. These waters are called water quality-limited and may require the development of a TMDL in order to establish what additional controls or management measures are necessary to meet water quality standards. Once the water quality-limited waters requiring a TMDL are identified, a priority ranking is established to guide the scheduling of TMDL development. The priority ranking takes into account such factors as the severity of the pollution, the uses assigned to the water, threats to public health, and public interest and support.

A three-step process will be utilized. The first step involves a screening process to identify potential candidates for listing. Step two refines the candidate list to produce the final proposed list and step three establishes the priority ranking.

The list and priority ranking is compiled in even-numbered years on the same schedule as the 305(b) report. Public participation is required in its development and the list, along with priority rankings, must be submitted to EPA for review and approval. Federal regulations governing the 303(d) listing process and TMDL development are found at 40 CFR Part 130.

IDENTIFICATION

The Water Quality Planning and Management regulations, 40 CFR 130.7, require that “all existing and readily available water quality related data and information” must be evaluated in developing the 303(d) list. The following criteria will be utilized in evaluating information to develop the list of candidates for further consideration.

1. Waters identified in the most recent Oklahoma Water Quality Assessment (305(b) Report) as either "partially achieving" or "not achieving" designated uses.

2. Waters identified in the most recent Oklahoma Water Quality Assessment (305(b) Report) as “threatened”.

3. Waters identified as impaired in the most recent nonpoint source assessment report prepared pursuant to section 319 of the Clean Water Act.

4. Waters identified as impaired in the most recent Clean Lake Assessments conducted under section 314 of the Clean Water Act.

5. Waters where public health advisories are in place, including fishing or shellfish bans and/or advisories, swimming or recreational use restrictions related to water quality, and drinking water advisories.

6. Waters where there have been repeated fish kills or where abnormalities (cancers, lesions, tumors, etc.) have been observed in fish or other aquatic life.

7. Waters where modeling or dilution calculations indicate nonattainment of water quality standards.

8. Waters where ambient data indicate potential or actual exceedances of water quality criteria sufficient to cause impairment of designated uses.

9. Waters for which effluent toxicity test results indicate possible or actual exceedances of State WQS or where toxicity tests demonstrate ambient toxicity in receiving waters.

10. Waters with requests for new or re-located discharges, requests for increased flows or loadings, permit renewals requiring a wasteload allocation, new stream classifications resulting from use attainability analyses, or other programmatic needs.

11. Waters where a variance to water quality standards is in place.

12. Waters where documented water quality problems have been reported by other agencies, Tribes, academic institutions, or the public.

After the initial identification of potential candidate waters, available data and conditions of each candidate are evaluated to determine the appropriateness for inclusion on the 303(d) list. The final list contains only those water quality-limited waters that still require a TMDL. In some cases, adequate data may not exist to verify impaired conditions, a TMDL may have been completed already, or needed controls may have already been established. Some problems may be effectively addressed by other programs rather than TMDL development. The following criteria will be utilized to screen the potential candidate waters identified in step 1. Waters meeting these criteria will not be included on the final list.

1. Waters where the determination of an impaired use is based on evaluated data rather than monitoring. However, where an impaired use is suspected but monitored data are not available, evaluative data may be considered valid for listing purposes.

2. Waters where the determination of an impaired use is based on monitoring data more than 5 years old and more recent data do not indicate continued impairment.

3. Waters with a threatened use that is not expected to actually become impaired within 2 years.

4. Impairments that are already addressed by existing control strategies. Examples would include a watershed plan being implemented, a phased TMDL, waters where a TMDL has already been completed, or an impairment addressed by a Superfund cleanup project.

5. Cases where adequate controls have been required and are expected to lead to attainment, but have not yet been fully implemented. Examples would include problems due to noncompliance that can be addressed by enforcement, situations where a compliance schedule is in place but not completed, contested permit conditions that would lead to compliance when implemented, a Toxicity Reduction Evaluation study is underway, or problems due to substances no longer in use or banned (such as chlordane or PCB's).

6. Aquatic life impairments that are caused by physical habitat loss not associated with any pollutant.

7. Drinking water advisories that are not related to source water contamination.

8. Problems that are not amenable to a TMDL approach. Examples would include impairments due to physical habitat loss or alteration, flow alteration, or hydrographic modifications.

PRIORITY RANKING

After the final determination of waters to be included on the list is made, a priority ranking is developed. According to EPA regulations, priority determinations are to take into account the severity of pollution and the uses to be made of the waters. Additional factors are also considered. Waters on the final list will be categorized into four priority levels: Priority 1, Priority 2, Priority 3, Priority 4. TMDLs will be scheduled for waters on the list in accordance with the priority ranking, starting with Priority 1.

Priority rankings will be assigned primarily based on professional judgement deliberations. Within priority rankings, scheduling will be determined by professional judgement considering such factors as resource requirements and limitations, relation to on-going work, and immediate programmatic considerations. The following criteria and guidance will be considered in assigning priority rankings and establishing TMDL schedules.

1. Waters with an ORW designation will be assigned to Priority 1.

2. Waters where threatened or endangered aquatic species are known to be present will be assigned to Priority 1.

3. Waters with an impairment that presents a threat to public health will be assigned to Priority 1 or 2.

4. Waters designed as HQW or SWS will be assigned to Priority 1 or 2.

5. Waters with a pending permit renewal, UAA results, flow increase request, new discharge proposal or other immediate programmatic needs will be assigned to Priority 1 or 2.

6. Distinguish between non-supported, partially supported, and threatened beneficial uses. Non-support will generally be assigned a higher priority than partial support. Threatened uses will generally be assigned a lower priority.

7. Waters where there are on going projects will be assigned a higher priority.

8. Upstream/downstream considerations; if upstream work is needed first a lower priority will be assigned; if the water could be included in another TMDL that was extended downstream a higher priority will be assigned.

9. Waters where data to support TMDL development are readily available will be assigned a higher priority. Waters where extensive data collection is necessary will be assigned a lower priority.

10. The type of pollutant causing impairment: toxic pollutants and dissolved oxygen impairments will be assigned a higher priority; impairments from nutrients, suspended solids, and sediment will be assigned a medium priority; impairments from temperature, minerals, and bacteria will be assigned a lower priority.

11. A high degree or public or political interest will increase the priority.

12. Particularly vulnerable or fragile systems will be assigned a higher priority.

13. A high degree of recreational, economic, or aesthetic importance will increase the priority.

COORDINATION, **REVIEW AND APPROVAL**

The Office of the Secretary of Environment (OSE) is responsible for coordinating the development and submittal of the 303(d) list. The process will begin with a notice and request for input sent to EPA Region 6 and all state environmental agencies, and Tribal environmental offices. A series of interagency meetings will be conducted to explain the 303(d) listing process, review and discuss the draft list along with priority rankings and scheduling, and facilitate the exchange of information. The draft list will be circulated to EPA Region 6 and state environmental agencies for comment prior to release for public participation.

Public participation will be undertaken in two phases. When the process to identify candidate waters is begun, nominations from the public will be solicited. This will involve the distribution of press releases, announcements, articles for publication, and limited mailings. Once the final draft list is compiled, it is submitted for formal public review with notice and a 30-day comment period. Upon the close of the comment period, a responsiveness summary will be prepared. OSE will coordinate public participation activities. After the public review period and finalization of the list, it is formally submitted to EPA Region 6 for review and approval.

REFINING OKLAHOMA'S 303(D) LIST

INTRODUCTION

It is important for all State environmental agencies to review all available records and data collections over the next year as OSE begins the process of refining Oklahoma's 303(d)(1) list in preparation for the 2000 revision process. Because many agencies are involved in monitoring activities, it is important for all agencies to identify their respective roles early in the process in order to verify the information contained on the State's list. A major review of historical information used for previous listing decisions also will be necessary prior to the 2000 revision process, so it is equally important to identify each agency's record review responsibilities as early as possible.

To that end, each agency was asked to take an objective look at the segments for which that agency is responsible to determine the basis and validity of the original listing. Those segments that were originally listed in error (i.e., the water body is not impaired or threatened) will be removed or partially removed from the State's 303(d)(1) list without further investigation or monitoring. Moreover, each agency was asked to review previous listing decisions and subject those decisions to the definition for "threatened" contained in current EPA clarifying guidance:

> "For the 1998 section 303(d) lists, a reasonable time frame is the two-year section 303(d) listing cycle itself. States should therefore include a waterbody on the 1998 section 303(d) lists if the waterbody presently meets an applicable water quality standard, but is expected to exceed that standard before the next list submission deadline, i.e., April 2000."

Based on this clarifying guidance from EPA, removals/partial removals will be recommended if an agency determines from its records that a particular threatened water body is currently meeting water quality standards ("WQS") and is expected to continue to meet WQS within the next two years.

In addition to removing segments that were originally listed in error or no longer meet the listing criteria for "threatened" found in EPA guidance, agencies were asked to assess the validity of listings based on the supporting data, or lack thereof. The age and confidence of support data will be considered by agencies as they strive to verify current listings. Regardless of the methods used, agencies will only make removal recommendations based on a case-by-case review. If more than one Cause Code is involved with listing a segment, then the segment would need to comply with all water quality standards in order to be removed. However, individual Cause Codes may be removed without removing the segement.

For those segments where additional data/information is necessary to verify its impaired or threatened status, each agency outlined its efforts to collect the information necessary to verify the status of the segments in time for the 2000 revision process. Decision criteria for determining whether or not a stream segment remains on the list are set out below for each pollutant cause code.

It is important to note that the procedures outlined in the below are for verifying current listings and will be used only to remove or maintain waterbodies that were listed on the 1998 revision of the 303(d) list. These procedures will be revised to conform with the use support assessment protocols when they are finalized by the OWRB.

Record Review Results and Verification Procedures

CAUSE CODE 100–UNKNOWN TOXICITY

Record Review: 1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

3. Remove if agency or university fish collection records report a stable, healthy fish population characterized by the presence of pollution intolerant species.

4. Maintain listing if Oklahoma Department of Wildlife Conservation ("ODWC") fish kill records report two or more fish kills in the last five years, that were not attributable to natural causes.

Verification Procedure: 1. One field assessment using Oklahoma's Standardized Bioassessment Protocol ("SBP") will be performed by any qualified agency on each segment to determine if the aquatic community is still impacted/displaced; presence of a stable, healthy aquatic community will justify removal.

2. Alternatively, a qualified agency can conduct four biomonitoring toxicity tests; no lethal effects on any tested species will justify removal.

CAUSE CODE 200– PESTICIDES

Record Review: 1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure: 1. If the pesticide can be identified in the record review, five samples will be taken (using the most sensitive detection level for the pesticide) to screen for the current presence of the pesticide.

2. If WQS criteria exist for the pesticide and the criteria are exceeded (as found in the five samples taken), then the listing will be verified.

3. Alternatively, or if no WQS criteria exist for the pesticide, SBP can be used to determine if the waterbody is supporting its fish and wildlife beneficial use; waterbodies shown to be supporting beneficial uses using SBP will be removed from the 303(d) list.

4. If a waterbody is found to be threatened by pesticides, and an upward trend in pesticide concentration is established, the waterbody will remain on the list.

5. Additionally, if the identified pesticide is prone to bioconcentration, then the pesticide will be tested for presence in fish flesh; any pesticides found in fish tissue that exceed DEQ action levels will verify the listing.

CAUSE CODE 300– PRIORITY ORGANICS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:

1. If the pollutant can be identified in the record review, five samples will be taken (using the most sensitive detection level for the pollutant) to screen for the current presence of the pollutant.

2. If WQS criteria exist for the pollutant and the criteria are exceeded (as found in the five samples taken), then the listing will be verified.

3. Alternatively, or if no WQS criteria exist for the pollutant, SBP can be used to determine if the waterbody is supporting its fish and wildlife beneficial use; waterbodies shown to be supporting beneficial uses using SBP will be removed from the 303(d) list.

4. If a waterbody is found to be threatened by priority organics, and an upward trend in organics concentrations is established, the waterbody will remain on the list.

5. Additionally, if the identified pollutant is prone to bioconcentration, then the pollutant will be tested for presence in fish flesh; any priority organics found in fish tissue that exceed DEQ action levels will verify the listing.

CAUSE CODE 400– NONPRIORITY ORGANICS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:

1. If the pollutant can be identified and there is a water quality standard that applies, five samples will be collected and analyzed for compliance with WQS; compliance with WQS will justify removal.

2. If there is no standard, EPA criteria will be used for screening; compliance with EPA criteria will justify removal.

3. If the pollutant cannot be identified, or if no WQS or EPA criteria exist, the listing will be determined to have been an error and will be removed.

CAUSE CODE 500– METALS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

4. Additionally, OWRB will review STORET information on the remaining waterbodies to verify listings. Review of historical records from 303(d) lists and 305(b) reports will be conducted in an attempt to identify the pollutant of concern.

Verification Procedure: 1. If the pollutant can be identified, and there is a water quality standard that applies, five samples will be collected and analyzed for documenting beneficial use impairments for toxicity following the protocols outlined below; compliance with WQS will justify removal.

2. If there is no WQS, EPA criteria will be used for screening purposes; compliance with EPA criteria will justify removal.

3. If the pollutant cannot be identified, or if no WQS or EPA criteria exist, the listing will be determined to have been in error and will be removed.

Assessment Protocols: Support of the aquatic life use is based on an evaluation of the prevalence and magnitude of toxic chemicals in water. Acute and chronic criteria for many metals are listed in the table in OAC 785:45-5-12(e)(6)(G). The relationship of toxicity is defined as a function of pH or hardness for several toxic substances. Their criteria are expressed as an equation based on this relationship. Appropriate pH and hardness values are listed by water quality segment in OAC 785:46 Appendix B and are used to compute the criteria. Individual measurements of listed toxic substances shall be compared against the acute criteria. Support of assigned aquatic life uses is based on ranges for the percent of exceedances among concentration measurements. Partial support is indicated if the percent exceedances is greater than 0 and $\leq$ 10%. Nonsupport is indicated if more than 10% of the measurements exceed the acute criterion.

Support of the aquatic life use is also based on toxic substance chronic criteria. For each parameter at each site, the mean of all values collected during a five-year period is compared against the chronic criterion to determine aquatic life use support. If the mean exceeds the criterion, the use is not supported.

CAUSE CODE 600 – AMMONIA

Record Review: 1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure: 1. Five samples will be collected over a period of one year. For screening purposes only, the results will be compared to the EPA criteria. If the average is less than the chronic (“CCC”) value listed in EPA guidance, and no one sample exceeds the acute (“CMC”) value listed in EPA guidance, removal is justified.

Note – the ammonia criteria vary with pH, so pH must be determined at the same time.

2. Alternatively, SBP can be used to determine if the waterbody is supporting its fish and wildlife beneficial use; waterbodies shown to be supporting beneficial uses using SBP will be removed from the 303(d) list.

3. If SBP shows an impaired aquatic community, further sampling will be conducted to determine whether ammonia is causing the impairment; if further sampling suggests that ammonia is not causing the impairment, then the listing will be removed.

CAUSE CODE 700–CHLORINE

Record Review: Point source discharge records and facility records will be reviewed to identify disinfection practices. Any use of chlorine without de-chlorination will be addressed through enforcement. If dischargers in the waterbody are practicing de-chlorination, monitoring records will be reviewed for noncompliance. Any noncompliance will be addressed through enforcement. The state policy on disinfection should allow all of these listings to be removed.

CAUSE CODE 800– OTHER INORGANICS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.
3. DEQ will review historical records from the 303(d) lists and 305(b) reports to attempt to identify the pollutant of concern.

Verification Procedure:

1. If the pollutant can be identified, and there is a water quality standard that applies, five samples will be collected and analyzed for compliance with the standard; compliance with WQS will justify removal.

2. If there is no standard, EPA criteria will be used for screening purposes; compliance with EPA criteria will justify removal.

3. If the pollutant cannot be identified, or there are no applicable standards or criteria, the listing will be determined to have been an error and will be removed.

CAUSE CODE 900 – NUTRIENTS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:	1. Remove if the waterbody does not meet the criteria to be labeled threatened due to nutrients. If a waterbody is not threatened, it cannot be impaired and will be removed from the list for further investigation and/or TMDL development if a negative environmental response to nutrients is recorded (e.g., excessive periphyton as compared to a referance stream, insufficient dissolved oxygen to support fish and wildlife beneficial uses, or high chlorophyll-a and algal turbidity). Waterbodies that do not meet the nutrient threatened criteria will remain on the list unless removed for other reasons.

Determining Nutrient Threats For Lakes

Oklahoma's Water Quality Standards specify a Carlson's TSI value of 62 to indicate nutrient threats for lakes. Thus, those lakes that do not exceed 62 TSI will be removed from the list.

Determining Nutrient Threats For Streams

The procedure to determine nutrient threats for streams is based on classifying aquatic systems using a dichotomous key. At each numbered step of the key a question is asked and the user must choose correctly from the answer couplet. A preliminary run of the key in the office helps to determine what observations are required in the field. For example, different observations are required for higher order streams than for lower. A primary indicator of nutrient sensitivity is light limitation. If productivity is light limited a stream will not be very sensitive to nutrient loading.

All data used for threat determination should be collected in the last five years. A minimum of ten observations from a stream reach is required to evaluate a nutrient threat. A threat constitutes greater than twenty five percent exceedance of the applicable screening criterion. Samples should be collected during every season.

Screening criteria for total phosphorus, P, and nitrite + nitrate will both be used in the dichotomous key. Since nitrite is usually small compared to nitrate concentration, it may be assumed zero if not analyzed.

Classification Key for Nutrient Threatened Streams

1. Stream order 1, 2, 3?

Yes	go to 2
No	go to 9

12. How much inorganic turbidity?

Turbidity > 20 NTU	not threatened
Turbidity < 20 NTU	go to 13

2. Stream slope > 20 ft/mi.?
   - Yes go to 3
   - No go to 4

3. P > 0.24 mg/L or nitrite + nitrate > 4.95 mg/L?
   - Yes go to 5
   - No not threatened

4. P > 0.15 mg/L or nitrite + nitrate > 2.4 mg/L?
   - Yes go to 5
   - No not threatened

5. What is the percent canopy shading?
   - Greater than 80% not threatened
   - Less than 80% got to 6

6. What type of turbidity?
   - Organic go to 7
   - Inorganic go to 8

7. How much phytoplankton?
   - see stream bottom at > 18 in. Depth or turbidity < 20 NTU go to 13
   - cannot see stream bottom at >18 in. Depth or turbidity > 20 NTU threatened

8. How much suspended solids?
   - see stream bottom at 18 in. Depth or turbidity < 20 NTU go to 13
   - cannot see stream bottom at 18 in. Depth or turbidity > 20 NTU not threatened

9. Stream slope > 17 ft/mi?
   - Yes go to 10
   - No go to 11

10. P > 1.00 mg/L or nitrite + nitrate > 4.65 mg/L?
    - Yes go to 12
    - No not threatened

11. P > 0.36 mg/L or nitrite + nitrate > 5.0 mg/L?
    - Yes got to 12
    - No not threatened

13. What is bottom type?
    - Mud/sandy/soft not threatened
    - Rock/hard threatened

CAUSE CODE 1000 – PH

Record Review: All listings will be verified using the procedures outlined below.

Verification Procedure:

1. Five samples will be taken over the course of a year on all listed waterbodies. An exception will be made for streams or reaches of streams that are 25 miles or less in length, where water quality conditions are similar. For these water bodies or portions of water bodies, field measurements and water quality constituents collected at multiple sites may be aggregated to meet the ten sample minimum requirement. Monitoring personnel often make vertical field measurement profiles in deep freshwater streams that are generally mixed from the surface to the bottom. Individual pH measurements made in the profile are compared to the minimum/maximum criteria. Only one exceedance is counted in cases where more than one pH measurement in the profile does not meet the minimum/maximum criteria.

2. Support of the fish and wildlife propagation beneficial use may also be examined based on pH criteria listed in OAC 785:45-5-12(e)(3), which states that "...pH values shall be between 6.5 and 9.0 in waters designated for fish and wildlife propagation...." A screening interval for pH is defined in WQS.

3. In lakes, individual pH measurements should be collected throughout the water column from the lake surface to the lake bottom at one (1) meter intervals. Values in the profile are compared to minimum/maximum criteria (6.5 and 9.0 units). Violations of pH criteria in the lake hypolimnion due to natural conditions do not constitute a WQS violation. Low pH concentrations in the hypolimnion which cannot be definitively attributed to natural conditions constitute a beneficial use threat.

4. Values in violation of minimum/maximum criteria in the hypolimnion and epilimnion constitute a WQS violation and the water body has impaired beneficial uses. Only one exceedance is counted in cases where a single profile has more than one pH measurement which does not meet the minimum/maximum criteria. A screening interval for pH is defined by the pH criteria. Fish and Wildlife Propagation sub-uses shall be considered supported if pH naturally falls outside the screening interval.

5. Compliance with WQS will justify removal.

CAUSE CODE 1100–SILTATION

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years; a review of land use practices will determine whether impairment may occur within the next two years.

CAUSE CODE 1200–ORGANIC ENRICHMENT/DO

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:

1. To assess the aquatic life use in lakes, 5 samples will be collected over the course of a year. Vertical profiles for dissolved oxygen will be taken at 1 meter intervals from the lake surface to the lake bottom. For dissolved oxygen concentrations in the water column, if >70% of the water column (by volume) has dissolved oxygen concentrations less than 2.0 mg/l, then the lake is not meeting designated beneficial uses. If >50% of the water column (by volume) has dissolved oxygen concentrations less than 2.0 mg/l, then the lake is considered to be "partially supporting" beneficial uses. Removal of lakes listed under this cause code will be justified where WQS criteria are not exceeded.

2. For streams, 5 samples will be collected over the course of a year. Screening levels for dissolved oxygen are 4.0 mg/L from 1 April through 15 June and 3.0 mg/L for the remainder of the year for "habitat limited aquatic communities." Screening levels for dissolved oxygen are 4.0 mg/L from 16 June through 15 October and 5.0 mg/L for the remainder of the year for "warm water aquatic communities." Screening levels for dissolved oxygen are 5.0 mg/L from 1 June through 15 October and 6.0 mg/L for the remainder of the year for "cool water aquatic communities" and trout fisheries. An eight hour diurnal fluctuation of 1.0 mg/L is allowed from 1 March through 15 October. Removal of streams listed under this cause code will be justified where WQS screening levels are not exceeded.

CAUSE CODE 1300–SALINITY

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:

1. Each waterbody will be sampled quarterly over the course of a year. Sampling will be conducted at normal to low flow stream conditions (e.g., not at or near flood stage). A hand-held TDS meter will be used to determine if the water exceeds the segment-specific TDS criteria, or 700 ppm TDS, whichever is greater (per WQS).

2. If the TDS in the water exceeds the WQS criterion according to the meter used, a water sample will be taken for cation/anion analysis (to verify instrument reading).

3. If sampling results indicate that excess salinity is present in the stream/streambed at one or more sites during any of the quarterly sampling events, the listing will be verified.

CAUSE CODE 1400–THERMAL STRATIFICATION

Record Review:

According to the OWRB, recent Lake Water Quality Assessments suggest that the following waterbodies be removed because thermal stratification is not causing beneficial use impairment, nor will impairments result from thermal stratification prior to the next listing cycle:

CAUSE CODE 1500–FLOW ALTERATION

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedures:

1. SBP will be used to determine if changes in stream bank stability, bank slope, stream sinuosity (channelization), stream channel location, stream flow (through a dam or some other impediment to stream flow), and riparian area width have altered the natural stream flow such that fish and wildlife beneficial use are not met; no impairment (due to flow alteration) of the fish and wildlife beneficial use will justify removal.

2. Alternatively, a modified, one-day Use Attainability Analysis will be used to determine whether designated beneficial uses are being attained.

CAUSE CODE 1600–OTHER HABITAT ALTERATIONS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedures:

1. SBP will be used to verify the presence of habitat alterations by comparison to upstream or reference reaches. Habitat alteration will be verified by comparison to a reference reach of both the overall habitat metrics score and changes in individual metrics. Comparison of the overall stream assessment score must be based upon reaches with equivalent flows, watershed area, underlying geology, bioregion, etc. Habitat alteration will be determined to be a threat if there is a change in stream morphology, in stream cover, substrate, etc. Degradation of the riparian condition through change in stream bank stability, slope, vegetation, presence of eroding areas, canopy cover, and change in riparian area width will be considered as evidence that habitat alteration is threatening stream beneficial use support.

2. Changes in land use practices will determine whether impairment may occur within the next two years.

3. Removal is justified if no habitat alterations are recorded using SBP or if the fish and wildlife beneficial use is not impaired.

CAUSE CODE 1700–PATHOGENS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

3. Removal if waterbody is not listed in WQS as "primary body contact recreation."

Verification Procedure:

1. Five samples for Fecal Coliform will be collected and analyzed during the period May through September (i.e., the swimming season). A geometric mean for the five samples greater than 200 colonies/100ml will verify the listing. Any one sample exceeding 400 colonies/100ml will verify the listing. Measurements less than both of these screening values will justify removal.

CAUSE CODE 1900–OIL AND GREASE

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure:

1. A Corporation Commission staff member will visually inspect each listed waterbody quarterly for one year approximately once per three stream miles. Inspections will be done at normal to low flow stream conditions, not at or near flood stage. Inspection locations will be plotted on a map; latitude/longitude will be determined using a GPS or approximated from topographic maps.

2. Staff will:

1) look for a rainbow sheen, floating golden tan to dark gold oil film, oily sediments in the bed/bank, or other evidence of an oil & grease/petroleum problem;
2) stir any sheen or possible product seen to make sure it streams and swirls like petroleum, instead of "crackling" or "breaking up" into sharp edged slivers and polygons like an organic/iron/bacteria sheen; and 3) (if staff is uncertain whether material seen is petroleum) scoop the material into a

transparent jar to check for free product, check for odor, and/or feel for the characteristic slipperiness of oil (per BPJ).

3. If the stream is a “PPWS” or “SWS” waterbody (per WQS), a BTEX sample will be taken to determine if drinking water MCLs have been exceeded at the site. DRO water samples (1 quart glass bottle) and/or sediment samples may also be taken at the staff member’s discretion (per BPJ). For all PPWS/SWS streams, at least one BTEX sample during the year will be taken at the downstream end of the segment. Other sampling will be done as necessary (per BPJ).

4. If one or more visual inspections find evidence of oil and grease contamination, or if sampling records values that exceed drinking water MCLs, the listing will be verified.

CAUSE CODE 2000–TASTE AND ODOR

Verification Procedures: 1. DEQ will review complaint records and Public Water Supply information. No complaints filed in the last five years and no information in the PWS records indicating any taste and odor problems will justify removal.

CAUSE CODE 2100–SUSPENDED SOLIDS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedures:

1. Five turbidity samples will be collected over the course of a year to determine if TSS levels exceed WQS criteria. If the WQS turbidity criteria are exceeded (turbidity >50 NTU for WWAC, turbidity > 10 NTU for CWAC, and turbidity > 25 NTU for lakes), then the TSS criteria for aesthetics will also be considered exceeded.

2. The listing (for TSS from other than natural sources) will be verified if greater than 10% of samples taken exceed the criteria. Land use within the watershed will be reviewed to determine if the turbidity is due to natural sources.

3. If 0 to 10% of samples taken exceed the criteria then a determination will be made as to whether the condition is expected to be persistent or temporary. If a waterbody is expected to be impaired within two years because of a persistent source, then it will remain on the 303(d) list.

CAUSE CODE 2200–NOXIOUS AQUATIC PLANTS

Verification Procedure:

1. A detailed visual field assessment will be conducted once during peak aquatic macrophyte growing season; absence of abnormally high concentrations of aquatic macrophytes will justify removal.

2. SBP (Habitat Assessment) will be used on any "questionable" waterbodies to determine whether the presence of aquatic macrophytes is causing impairment to the fish and wildlife beneficial use.

CAUSE CODE 2300–FILLING AND DRAINING

Verification Procedures: None necessary as this segment has been recommended for removal.

CAUSE CODE 2400–TOTAL TOXICS

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

3. Remove if agency or university fish collection records report a stable, healthy fish population characterized by the presence of pollution intolerant species.

4. Maintain listing if Oklahoma Department of Wildlife Conservation ("ODWC") fish kill records report two or more fish kills in the last five years.

Verification Procedure:

1. One field assessment using Oklahoma's Standardized Bioassessment Protocol ("SBP") will be performed by any qualified agency on each segment to determine if the aquatic community is still impacted/displaced; presence of a stable, healthy aquatic community will justify removal.

2. Alternatively, a qualified agency can conduct four biomonitoring toxicity tests; no lethal effects on any tested species will justify removal.

CAUSE CODE 2500–EXOTIC SPECIES

Record Review:

1. Remove if review finds error in original basis for listing.

2. For threatened waterbodies, remove if waterbody is supporting beneficial uses and is not expected to exceed WQS within the next two years.

Verification Procedure: 1. If no bioassessment records exist to establish a healthy, stable aquatic community, ODWC fish surveys or SBP will be conducted on listed segments to verify presence/absence of exotic species.

CONTROL OF RESIDUAL WASTE

PERMIT REQUIREMENTS

In accordance with Section 208(b)(2)(J) of the Act, Federal Regulations 40 CFR 130.6.(c)(4)(iii)(A) requires the identification of a process to control the disposition of all residual waste in the area which could affect water quality. Under 40 CFR Part 503, the use or disposal of sewage sludge including domestic/municipal sludge and domestic septage are regulated. Likewise, 40 CFR Part 257 regulates grit and screenings removed from the treatment of domestic sewage, drinking water treatment sludge, commercial and industrial septage, industrial/sewage sludges generated at an industrial facility during the treatment of industrial wastewater or a combination of industrial and domestic wastewater. The NPDES regulations on sludge management allow the permit writer the discretion to permit any entity/facility that has the potential for adverse effects on public health and environment. These facilities either generate sewage sludge or otherwise effectively control the quality of sewage sludge or the manner in which it is disposed. Thus, NPDES permit will not only be issued to wastewater discharging facilities, but also to sludge producing and/or disposal facilities. In case of a discharging facility, sludge requirements are included in the joint Oklahoma DEQ/EPA NPDES permit. The permit language on sludge requirements reflects the most updated EPA's version on sludge pertaining to 40 CFR Parts 257, 258 and 503.Under the Oklahoma Pollutant Discharge (OPDES) Regulations (State Rules; OAC 252:605-7-7), all facilities which generate sludge shall comply with the requirements of the State Solid Waste Management Act and rules of the Department promulgated thereunder (State Rules; OAC 252:510, Municipal Solid Waste Landfill Rules; and OAC 252:647 Sludge Management Rules), and any requirement of the discharge permit regarding sludge.

SLUDGE MANAGEMENT PLANS

The OPDES Regulations also require facilities generating sludge to comply with sludge management plan. The plan shall be approved by the Department prior to any disposal of sludge, and will be appended to the facility's discharge permit or other Department-issued permit.

The Plan shall include at least the following information:

the source and type of sludge,
sludge treatment process,
amount of sludge generated,
sludge characteristics: chemical, physical and biological characteristics,
storage, transportation to the disposal site and disposal techniques
disposal site location and site characteristics (surface area, soil type, water table, certain chemical characteristics of the soil, if land applied....),
life expectancy of the disposal site and closure plan,
sludge testing, sampling and report requirements
administration of the sludge treatment and disposal program.

PERMIT ISSUANCE PRIORITIES

The following priorities will be observed in allocating resources for issuance/reissuance/modification of NPDES permits.

1. Issuance or re-issuance of permits for major dischargers

2. Issuance or reissuance or modification of permits for minor dischargers in order to address toxicity or toxic pollutants

3. Issuance of permits for minor industrial dischargers with expired "First Round" NPDES permits

4. Issuance or reissuance of permits for all other minor dischargers

5. Issuance of storm water permits

6. Issuance of other general permits

With the exception of item 3, these activities are anticipated to occur as they come up. However, item 3, minor industrial dischargers with expired "First Round" NPDES permits, involves a significant number of facilities. These will be prioritized using a watershed approach. The State's existing planning segments will be utilized for watershed boundaries. Individual watersheds will be prioritized by considering such factors as the 303(d) list, the 305(b) water quality assessment, special designations (such as ORW or HQW) in the WQS, and the number of dischargers in the watershed.

These priorities may be modified in some cases for businesses who are considering locating in Oklahoma and bringing new jobs to the State. As the DEQ Customer Services Division begins to work with a new business, they will identify those permits that need to be placed at the head of the permit processing line and coordinate directly with the Water Quality Division to arrange for this level of treatment. In order to minimize processing time for certain high profile permit applications, they may be assigned a priority status so that every step of the process can be accomplished in the absolute minimum time. When it appears that a high profile permit may require such expedited treatment, the Customer Services Division will seek approval from the Office of the Executive Director to arrange for this level of priority.

CHAPTER 4
PLANNING AND INTERGOVERNMENTAL COOPERATION

INTRODUCTION

This Chapter describes the planning process and the process for assuring adequate authority for intergovernmental cooperation in the implementation of Oklahoma's Water Quality Management Programs. The first part is a historical summary regarding the development of planning documents and the participation of the various state agencies which have authority related to water quality. The second part is a general description of the public participation process and its opportunities. The next part deals with the planning process and procedures for making major, minor, and comprehensive updates to the State's Water Quality Management (WQM) Plan. The last section describes, in detail, the intergovernmental coordination with regard to local, regional, state and federal entities.

HISTORICAL SUMMARY

Section 208 of the Federal Water Pollution Control Act of 1972 (as amended) mandates that the states develop a process and procedure for managing and planning their waters. The outcome of this process was the development of a planning document called the "Water Quality Management Plan" (WQM Plan or the 208 Plan). The 208 Plan describes the process used in identifying point and nonpoint sources of pollution and the implementation of programs and procedures for the abatement or prevention of pollution to waters of the state.

For the purpose of water quality management planning, the State was divided into seven major planning basins for each river system. This was mainly due to the State's great diversity in climate, topography, geology, and population distribution. The seven major basins are further subdivided into fifty-nine subbasins, or stream segments, allowing for more precise water quality assessment, planning and management. The boundary of each segment was based on either hydrological features such as flow patterns, dams, reservoirs or gauging stations, political constraints such as county boundaries, or in some cases it was due to the convenience of a bridge or road crossing. These 208 segments are utilized as the basic units in establishing the Oklahoma WQS.

The initial State WQM Plan consisted of seven separate Basin Plans which were completed and approved by EPA in 1975. These plans were completed under Section 303(e) of the Clean Water Act as part of the continuing planning process. This planning process constituted Phase I in the development of basin-wide WQM Plans. Phase I planning dealt largely with developing wasteload allocations for point sources. Neither nonpoint source pollution, nor the required management and implementation steps, were included in the Phase I plans.

Phase II of the planning process was completed under Section 208 of the Clean Water Act. Phase II WQM Plans for each basin were completed and approved by EPA in 1979. The purpose of Phase II planning was to utilize, update, and expand the water quality planning information gained in the Phase I planning and to coordinate and integrate area wide 208 planning into the overall Statewide 208 Plan. One goal of water quality management planning was to identify all sources of pollution. Pollution information derived in the original seven basin plans was reviewed and incorporated into the more comprehensive 208 Plan.

Since the initial WQM Plans were completed, planning efforts have focused on identifying water quality pollution problems in the State and developing implementable plans for control, abatement, or prevention of pollution. In 1981, the WQM Plan Updates for each of the seven basins were completed by the State. These updates were addenda to the WQM Plan completed in 1979 and served to expand, with more detail, Chapters II and III of the initial plan (Basin Description and Point Sources Analysis).

In FY 1981, the State developed a single document format which could be easily and less expensively updated instead of the previous seven separate Basin Plans. Statewide information was included in the single plan with more specific information for each basin being discussed as appropriate. The 1981 updates included both Industrial and Municipal Inventories as appendices to the plan.

In FY 81, funding under Section 208 of the Clean Water Act ended. Since that time, the State's efforts in water quality management planning have been greatly curtailed. Other funding sources that have been used for water quality management planning effort have included sections 205(j), 604(b)(3), and 106. To date, only funds from sections 604(b)(3) and 106 are being used. The utilization of other funding sources, federal, state, and local, for water quality management planning will continue to be explored.

In FY 1985, the WQM Plan was updated again to reflect advancements in monitoring, quality, assessment, and pollution identification in various stream segments.

PUBLIC PARTICIPATION IN THE CONTINUING PLANNING PROCESS

GENERAL DESCRIPTION

Public participation opportunities in the planning processes are offered primarily through four procedures, generally described as follows:

Revision and update of the water quality management plans,
Permitting procedures for point source discharge permits and 401 water quality certifications,
Rulemaking activities of the DEQ and other state and federal agencies, and
Public forums designed to allow public comment and input on issues of public concern.

The specific procedures for allowing public participation are described as follows:

REVISION AND UPDATE OF THE WATER QUALITY MANAGEMENT PLANS

Opportunity for public participation is provided through and in compliance with 40 CFR Part 25 and this Chapter. One of these opportunities include the issuance of 45 day notices for public comment and request for public formal meeting issued to interested persons, news media, and other special interest groups. These opportunities are further described in detail below:

1. "Press Releases" to amend the WQM Plan with a 45 day comment period required:
    a. Contents as required by 40 CFR 25.4: timetable for decision, issues, tentative determinations made by the agency, cite applicable law and rules, location where relevant documents can be reviewed or obtained, identification of public participation opportunities such as meeting (if significant interest), name of contact person for additional information, an address to mail in comments, the type of revision, facility, location, limits/loadings, etc.
    b. Press Releases distributed to:
        (1) Mailing list (kept current as needed),
        (2) State/local government agencies including Oklahoma Department of Wildlife Conservation, Oklahoma Department of Tourism and Recreation, substate planning agencies (COGs), and DEQ local offices,

    (3) Minimum of 2 newspapers in area affected - to be published at their discretion only (DEQ will not be responsible for cost of publication of any "Press Releases").

2. DEQ determines if there is "significant public interest" or if a public meeting would be useful.
   a. If answer is no, then prepare a Responsiveness Summary for any comments received and forward with draft letter for Water Quality Division Director's signature to send to EPA requesting final approval of WQM Plan amendments.
   b. If answer is yes, go to #3.
3. Notification made to Customer Assistance of the need for a meeting:
   a. Make arrangements for date, time, and location of the meeting;
   b. Must be not less than 45 days after notice is given to hold the meeting;
   c. Preferable in the evening, and in the area affected;
4. "Press Releases" to hold public meeting:
   a. 45 day notice and comment period required;
   b. Press Releases must comply with 40 CFR 25.5: identify the matters to be discussed at the formal public meeting, include a discussion of the agency's tentative determination on major issues, procedures for obtaining further information, notice of meeting not less than 45 days after the notice given. Reports, information, data must be available to the public at least 30 days before the date of the meeting;
   c. Location, time, (preferable in the evening) and place of meeting, (in the area affected if possible);
   d. Notice distributed to:
      (1) Mailing list (kept current as needed),
      (2) State/local government agencies including Oklahoma Department of Wildlife Conservation, Oklahoma Department of Tourism and Recreation, substate planning agencies (COGs), DEQ local offices, and to all persons submitting comments.
      (3) Additional mailing list to include all respondents to first "Press Releases."
5. Holding Public Meetings:
   a. First part of the meeting is to be an informal presentation, question and answer period, and discussion of the issues;
   b. Second part is to be a formal meeting with tape recording of the meeting;
   c. Written comments and oral statements will be included in the record;
   d. Must comply with 40 CFR 25.5(e) and (f);
   e. The record may be kept open for not more than five (5) days following the meeting to allow for additional comments.
6. Prepare Responsiveness Summary in compliance with 40 CFR 25.8. Make it available to the public.
7. Make any necessary modifications in response to comments received during public participation process.
8. Draft final letter for the Water Quality Division Director's signature, or if unavailable then the Water Quality Division Assistant Director's signature to send to EPA requesting final approval with description of the public participation process attached. See Figure 12.

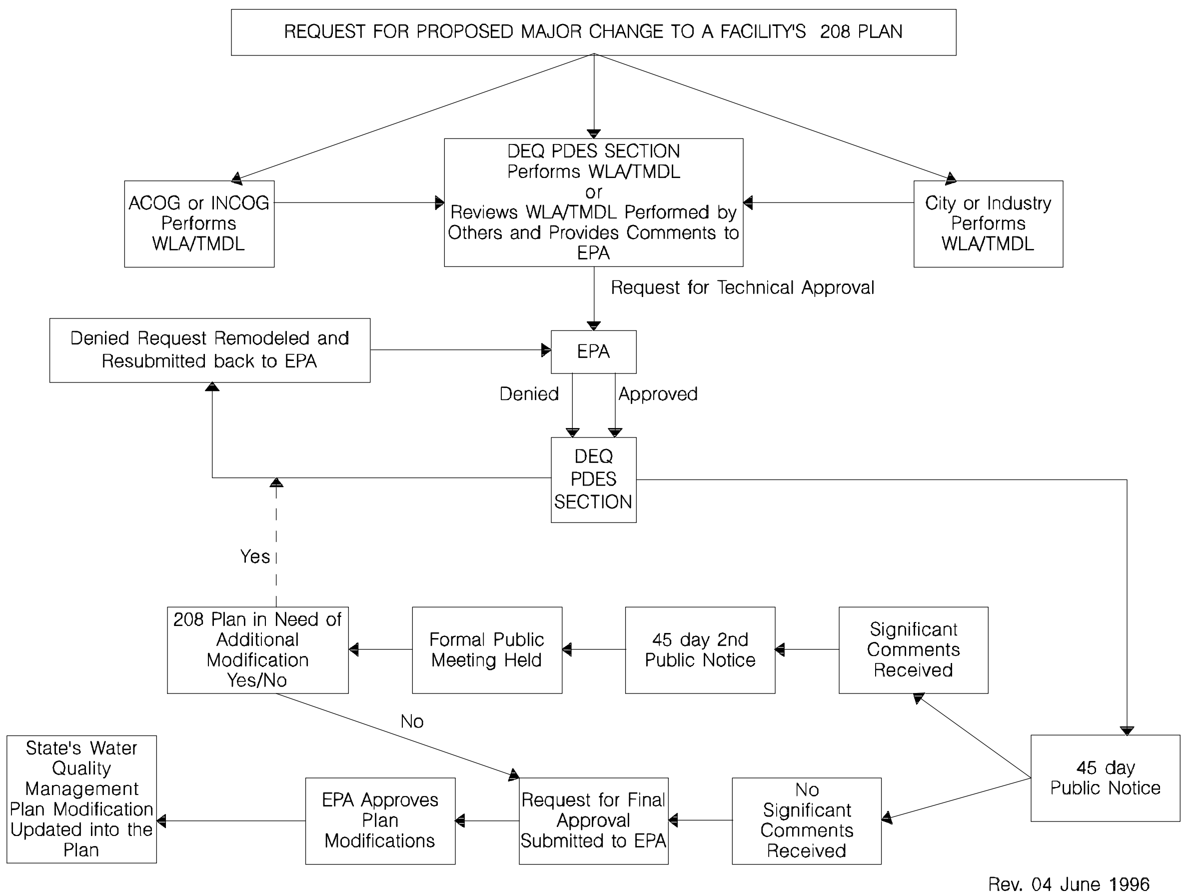


FIGURE 13 **FLOW CHART FOR MAJOR CHANGES TO THE OKLAHOMA WQM PLAN**

Permitting Procedures for Point Source Discharge Permits and 401 Water Quality Certifications

Public notice, comment, opportunity for public meeting, and (after authorization of DEQ's proposed NPDES program) opportunity to request an administrative permit hearing are provided under the DEQ discharge permit program as specified in OAC 252:605. The rules contained in OAC 252:605 incorporate by reference applicable regulations of the EPA regarding public participation in the discharge permit program, except that the process for administrative hearings will be slightly different. OAC 252:605 procedures will also apply to sewage sludge permits encompassed by the EPA program. Opportunities for public notice regarding 401 water quality certifications are described in applicable federal regulations of the federal permitting authority and in the DEQ's rules contained in OAC 252:610.

Rulemaking Activities of the Oklahoma Department of Environmental Quality and Other State and Federal Agencies

The APA, 75 OS 1991 §251 et seq., requires public participation in rulemaking activities for all permanent rules through publication of notice in *The Oklahoma Register*, public comment for 20 days, rulemaking hearing to accept verbal comments, and publication of final rules. The APA's definition of "rule" is quite broad in scope, so that the state will be required to promulgate rules even in situations where federal agencies might not be required to do so. All requirements relating to water quality management plans, pollution abatement, wastewater treatment and disposition, permitting, approval of remediation plans, enforcement of Oklahoma WQS, administrative proceedings, natural resource damage assessments, and similar requirements shall be contained in appropriate Chapters of the DEQ's rules. These requirements are for the most part now contained in OAC 252 Chapters 600 through 660.

Public Forums Designed to Allow Public Comment and Input on Issues of Public Concern

Both the Water Quality Management Advisory Council and the Environmental Quality Board are authorized by law to conduct public forums around the State of Oklahoma. The Environmental Quality Code provides this authority, implemented by the Board in quarterly meetings at different locations in the state. It is anticipated that water quality issues such as those involved in the CPP and WQM Plan will be addressed at such public forums.

Updating and Maintaining the Water Quality Management Plan

Authorities of State Agencies and Others

Prior to enactment of the Environmental Quality Code, 27A OS Supp. 1993, §2-1-101 et seq., seven state agencies (the OCC, OSDH, ODWC, OSDA, the Conservation Commission, the Department of Mines and OWRB) had some statutory authority over water quality in Oklahoma and all were involved to some extent in water quality management planning and in developing the State WQM Plan. Designated Area wide Agencies were also involved with water quality management planning by development of area plans and preparation of planning reports for their regions.

This information was provided to the State (the Pollution Control Coordinating Board and the Department of Pollution Control) for review and incorporation into the Statewide WQM Plan.

Since the enactment of the Environmental Quality Code, effective July 1, 1993, primary authority over water quality planning resides with the DEQ as follows:

1. The DEQ has statutory authority under the Environmental Quality Code, 27A OS Supp., 1993, §2-6-103(6), to "...Establish, implement and enforce the Water Quality Management Plan, the continuing planning process documents, and wasteload allocations..."
2. The Environmental Quality Board has the authority under 27A OS Supp., 1993, §2-6-103 to adopt by reference Oklahoma Water Quality Standards and "... to promulgate other rules to protect, maintain and improve the best uses of waters of this State in the interest of the public under such conditions as may be necessary or appropriate for the prevention, control and abatement of pollution."
3. The Executive Director, or his appointed elective, has the authority to issue point source discharge permits for all municipal and industrial facilities regulated by the DEQ, sources and activities, coextensive authority over nonpoint source pollution, the authority on behalf of the State of Oklahoma to issue water quality certifications for all activities subject to Section 401 of the Clean Water Act, and authority to exercise all incidental powers necessary to carry out the duties of the DEQ relating to the CPP, the WQM Plan, and other water quality matters (27A OS Supp., 1993, §2-1-103(C)). The powers of the Executive Director include the authority to enter into any appropriate or necessary intergovernmental agreements, contracts or memoranda of understanding in order to carry out the duties of the DEQ relating to the CPP and WQM Plan.

REQUIRED CONTENTS OF PLANS

Sections 205(j), 208 and 303 of the Clean Water Act and 40 CFR Part 130 specify water quality planning requirements. Key provisions which set forth required elements of the WQM Plans are included here for reference.

Section 208 of the Clean Water Act requires each state to prepare, and update as needed, a WQM Plan which contains the following:

1. the identification of treatment works necessary to meet the anticipated municipal and industrial waste treatment needs of the area over a twenty-year period, including an analysis of alternative waste treatment systems, including any requirements for the acquisition of land for treatment purposes; the necessary waste water collection and urban storm water runoff systems; and a program to provide the necessary financial arrangements for the development of such treatment works, and an identification of open space and recreation opportunities that can be expected to result from improved water quality, including consideration of potential use of lands associated with treatment works and increased access to water-based recreation;
2. the establishment of construction priorities for such treatment works and time schedules for the initiation and completion of all treatment works;
3. the establishment of a regulatory program to
    a. implement the waste treatment management requirements of Section 201(c),
    b. regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area, and,
    c. assure that any industrial or commercial waste discharged into any treatment works in such area meet applicable pretreatment requirements,
4. the identification of those agencies necessary to construct, operate, and maintain all facilities required by the plan and otherwise to carry out the plan;
5. the identification of the measures necessary to carry out the plan including financing, period of time, costs, and the economic, social, and environmental impacts;

6. a process to
   a. identify, if appropriate, agriculturally and silviculturally related nonpoint sources of pollution, including return flows from irrigated areas, and from land used for livestock and crop production, and;
   b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;

7. a process to
   a. identify, if appropriate, mine-related sources of pollution including new, current, and abandoned surface and underground mine runoff, and;
   b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;
8. a process to
   a. identify construction activity related sources of pollution, and;
   b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources.
9. a process to control the disposition of all residual waste generated in such area which should affect water quality; and
10. a process to control the disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality.

The DEQ in revising the WQM Plans will ensure that the requirements of 40 CFR Part 130, adopted by reference in DEQ rules at OAC 252:610, are met. The plans will be updated and revised to include all required elements set forth in 40 CFR Section 130.6(c), including the following:

1. Total Maximum Daily Loads (TMDLs);
2. Effluent limitations including water quality based limitations and schedules of compliance in accordance with CWA Section 303(e)(3)(A) and 40 CFR §130.5;
3. Municipal and industrial waste treatment, including identification of anticipated treatment works, financial programs, construction priorities and schedules;
4. Nonpoint source management and control, including description of programs and BMPs;
5. Description of agencies, authorities and intergovernmental coordination;
6. Implementation measures, including financing, time schedule and impacts of plans;
7. Identification of dredge and fill regulatory programs;
8. Basin plans; and
9. Description of groundwater pollution programs.

FORMAT OF PLANS AND INFORMATION SOURCES

The format of the statewide WQM Plan should be structured to facilitate utilization of its contents and it should contain adequate information to describe the water quality, pollution problems and management activities in each basin. The goal should be to identify all municipal, industrial, nonindustrial, agricultural, oil and gas related, and other dischargers as well as potential sources of nonpoint source pollution, prioritize water quality problems, consider alternative solutions and recommend control measures for implementing solutions.

There are currently three "designated area" WQM Plans affecting Oklahoma. These are the Association of Central Oklahoma Government's (ACOG) plan of the greater Oklahoma City area (Oklahoma, Cleveland, Canadian and Logan Counties); the Indian Nations Council of Government's (INCOG) plan for the greater Tulsa area (all of Tulsa, Creek and Osage Counties, as well as parts of Rogers and Wagoner Counties); and the Arkhoma Regional Planning Commission's (ARKHOMA) plan for the area surrounding Fort Smith, Arkansas (including all of Sequoyah and LeFlore Counties in Oklahoma and Crawford and Sebastian Counties in Arkansas). The area wide plans go through a certification process similar to the statewide plan, with the exception that the plans must be formally adopted by the governing board of the designated agency.

Historically, information which was utilized in updating/developing the overall statewide plan resulted from specific studies conducted by state agencies under the 208 Plan to identify pollution problems, develop implementation strategies, abatement and prevention programs, and to develop educational programs. Additional information came from 208 studies that were carried out by Designated Area wide Agencies and the associated WQM Plans developed for their respective areas. It is anticipated that these information sources will continue to be utilized in future updates.

SCHEDULES AND PROCEDURES FOR REVISION

State and/or area wide agency WQM Plans "...shall be updated as needed to reflect changing water quality conditions, results of implementation actions, new requirements or to remove conditions in prior conditional or partial plan approvals", as required by 40 CFR 130.6(e) of EPA regulations and OAC 252:610 of DEQ rules. OAC 252:605 incorporates by reference applicable EPA regulations relating to revisions of the WQM Plan for point source discharges contained in 40 CFR Parts 122 and 124. Updates and revisions shall comply with the public participation requirements of 40 CFR Part 25.

The state will distinguish between "comprehensive updates" conducted yearly or at larger intervals as needed, and more frequent updates ("as-needed updates") which generally relate to particular stream segments and/or discharges. As-needed updates are subject to slightly different procedures according to their classification as "major" or "minor" modifications of the Plan(s). The procedures for updates are discussed in the following sections.

COMPREHENSIVE UPDATES

The process by which the Statewide WQM Plan will be comprehensively updated is as follows:

a. The DEQ and area wide agencies prepare planning outputs which serve as technical support for the plan.
b. The DEQ synthesizes the information and compiles recommendations into the WQM Plan document.
c. All significant outputs (or their executive summaries) and draft plans are submitted to appropriate state agencies, area wide agencies and EPA for review and comment.
d. The draft updates are submitted for review and comment to the local environmental committees and other local decision makers, and through the area wide programs.
e. The proposed revisions are subject to public participation procedures consistent with 40 CFR 25, as detailed in this Chapter. For comprehensive updates, a minimum public comment period of sixty days shall be provided and at least two public meetings shall be held in different locations across the state (usually in Tulsa and in Oklahoma City).
f. A responsiveness summary is prepared in accordance with 40 CFR Part 25 and is made available to the public for review.
g. Changes and revisions are made by the DEQ in response to comments received and a final output or revised plan update is developed. The proposed update is provided to the Division Director of the Water Quality Division of the Department of Environmental Quality for certification.

h. The approved plan or output is forwarded to the Regional Administrator of the EPA with the letter of certification signed by the Water Quality Division Director of the DEQ.
i. The EPA then approves or disapproves the document and notifies the Water Quality Division Director of the DEQ.

CHANGES, ADDITIONS OR DELETIONS TO THE WATER QUALITY MANAGEMENT PLAN UPDATE ON AN "AS-NEEDED BASIS"

Procedures have been established to allow for changes in "Appendix A" (Industrial Inventory) and "Appendix B" (Municipal Point Source Inventory) or other appropriate portions of the last certified fiscal year plan update on an "as-needed" basis. These procedures are designed to meet the requirements of applicable state and federal law and regulations relating to point source discharges, including 40 CFR 122.44(d), 122.4, 130.6(e) and 130.7, and OAC 252:610 Subchapter 9 (General Water Quality - Planning and Wasteload Allocations). More frequent updates allow resolution of Section 201, Section 208, and other issues on a timely basis.

Criteria have been established which distinguish between major or minor modifications to the last updated WQM Plan. The difference between minor and major modifications establishes the level of public participation and review each will receive; minor modifications may be postponed where allowed until the next comprehensive update of the Plan.

MINOR MODIFICATIONS

Minor Modifications may be made when changes to the Plan will not result in a significantly different plan recommendation and any water quality impacts of the change are negligible. Minor modifications will be subject to administrative approval by the Water Quality Division Director of the DEQ and submitted to EPA as needed, but without the public notice and comment period prior to this first submittal. All minor modifications will later be subject to public review and comment at the next comprehensive update. EPA will notify the Water Quality Division Director of their decision on each minor modification within 45 days of receipt. Proposed modifications which are not determined to be minor will require formal public notice and public comment period prior to recommendation by the Water Quality Division Director.

The following modifications may be considered minor.

(1) Make corrections to the facility name, legal description for the facility, NPDES number, legal description for the Point of Discharge for the facility, etc.
(2) Corrections to the facility's current treatment process, assuming the change does not require a modification to the WLA.
(3) Increase in Effluent Flow
  (a) The increase in design flow for municipal facilities does not exceed the smaller of the following two: a maximum increase in flow of 30% of the approved WQM Plan occurring since its last major update, or any increase in flow which is not more than 0.5 mgd.
  or
  The increase in the present average daily flow for industrial facilities, does not exceed the smaller of the following two: a maximum increase in flow of 30% of the approved

WQM Plan occurring since its last major update, or any increase in flow which is not more than 0.5 mgd.

(b) Water quality modeling shows that the increased flow will have a negligible impact on the receiving water, will not result in a change of existing effluent limits, and that applicable water quality standards will be met. The results of the water quality model will be submitted to EPA in advance for initial review and approval.

(c) The design flow for municipal facilities or present average daily flow for industrial facilities, has not been previously increased under these criteria. and

(d) The receiving water is not designated "ORW", "HQW", or "SWS" in the WQS or considered environmentally sensitive for other reasons.

(4) Corrections to the receiving stream for the facility without effecting the WLA for the facility.

(5) Correction in ${}_7Q_2$ of receiving stream without effecting the WLA for the facility.

(6) Change or correction the in Designated Management Agency (DMA) and its Status for Municipal Facilities. The status of DMA may be changed to "approved" if the necessary acceptance form has been signed, filed, and approved by the DEQ provided the DMA has been previously designated in the WQM Plan.

(7) Change in Facility Ownership for Industrial Facilities. A change in ownership or operational control may be reflected in the WQM Plan if a request for permit modification has been approved by the regulating state agency.

(8) Increase in Population Projections (Municipal Facilities)

(a) Projections to the end of a 20 year planning period which extends beyond the design year of the WQM Plan may be added to the WQM Plan provided they do not exceed the projection most recently published by the Oklahoma Department of Commerce (ODOC) for that year.

(b) Present or projected population may be modified so as to exceed the ODOC figures only if:

i) The service area of the facility is larger than the community boundary on which the ODOC figure is based; and/or

ii) Industrial flows to the facility are included as a population equivalent. The population equivalent will be calculated based on one person for each 100 gpd of industrial flow.

These changes must be adequately justified in a facility plan or an engineering report.

(c) Population projections developed and adopted by a designated area wide planning agency may be incorporated in the state plan. These projections will be reviewed on a case-by-case basis and may exceed the ODOC figures if adequate justification is provided.

PROCEDURES FOR MINOR UPDATES

The following procedures will apply to updates which qualify as minor changes to the WQM Plan:

(a) PDES Permitting Section of DEQ receives the request from the municipal or industrial discharger to modify the WQM Plan or otherwise determines such a change is necessary or appropriate.
(b) PDES Permitting Section prepares a modified 208 fact sheet.
(c) PDES Permitting Section forwards the proposed 208 Plan modification to the Water Quality Division Director and then to EPA for their approval.
(d) When EPA's approval is received, PDES Permitting Section will update all appropriate records and database of the modification; PDES Permitting Section will update, as appropriate, the Appendices of the WQM Plan.
(e) The minor changes will be subject to public comment at the next comprehensive update of the WQM Plan.

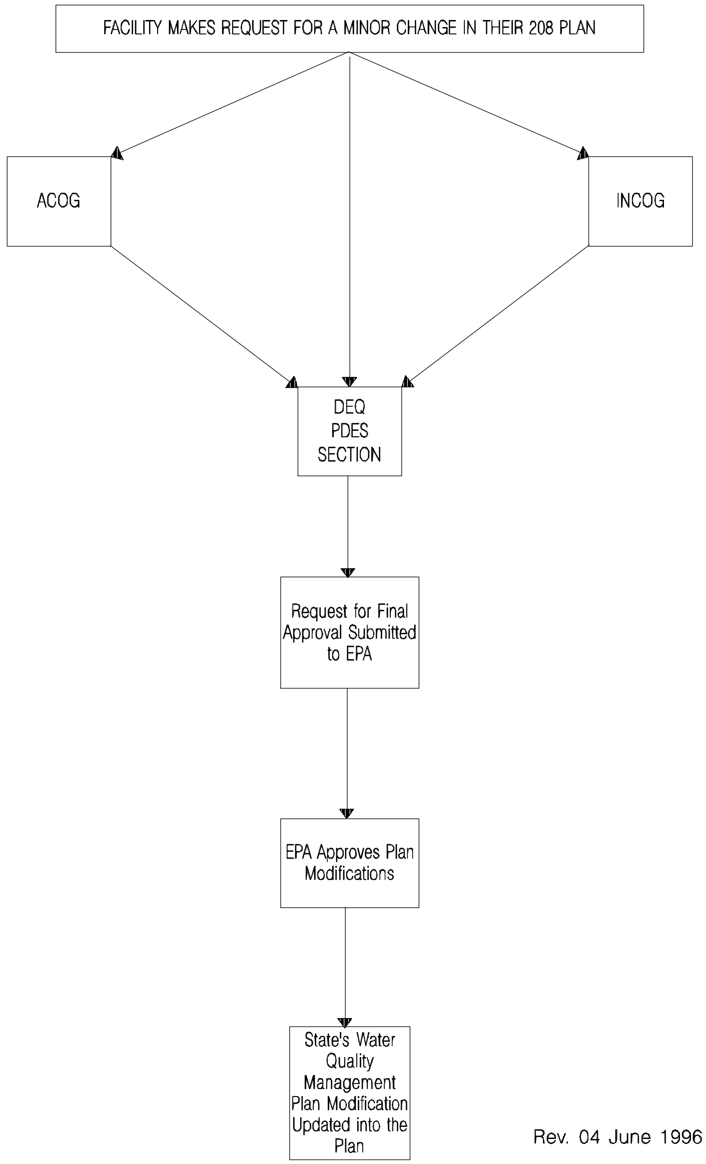


FIGURE 14 **FLOW CHART OF MINOR CHANGES TO THE WQM PLAN**

PUBLIC PARTICIPATION AND STATE REVIEW OF "AS-NEEDED" MAJOR REVISIONS OF THE WATER QUALITY MANAGEMENT PLAN

Changes which do not qualify under the described criteria as "minor changes" will follow the procedures described in the following paragraphs. The DEQ has incorporated by reference applicable provisions of 40 CFR Part 130 relating to the planning process in OAC 252:610. Applicable provisions of 40 CFR Part 25 describing adequate public participation shall be followed. The DEQ's policy is to enhance and encourage public participation and education about matters of public interest.

PROCEDURES FOR MAJOR CHANGES

In order to provide public notification to the persons identified by federal regulations in 40 CFR Part 25, the public participation procedures detailed earlier in this Chapter will be followed. These procedures will conform to the requirements of 40 CFR Part 25.

In addition, the following administrative procedures shall apply to major as-needed updates of WQM Plans:

(1) Pollutant Discharge Elimination System (PDES) Section of the DEQ receives a request from the municipal or industrial discharger to modify the WQM Plan or the DEQ otherwise determines that such a change is appropriate or necessary.

(2) If WLA/TMDL modeling work is needed or required, the discharger may perform the work itself, contract with a consultant to perform the work, or request DEQ to perform the work. If DEQ accepts the request, they will prepare an estimate of all cost for such work and submit a contract to conduct said work to a requesting entity or other responsible party. Upon execution of the contract and agreement to pay for costs, the DEQ will perform the necessary modeling work and send the results to EPA for review and technical approval. If the requesting entity or responsible party chooses to use an outside contractor to perform all necessary work, the work must be performed in a timely manner and submitted to the DEQ for approval and transmittal to EPA.

(3) Upon EPA's technical approval of the WLA/TMDL, the requesting entity or other responsible party shall pay to the DEQ within 30 days all costs and expenses of the modeling work, if it is performed by the DEQ.

(4) When EPA's approval is received, the DEQ PDES Permitting Section will prepare a modified 208 fact sheet, reflecting all necessary changes.

(5) PDES Permitting Section will prepare public notification documents for the Plan modification and send it out for public comment in accordance with the requirements of 40 CFR Part 25, applicable state law, and the procedures of this Chapter. PDES Permitting Section will be responsible for responding to comment(s) received from the public. Requests from the News Media will be forwarded to the Public Information and Education Section to answer questions about public notification and participation procedures. The Public Information and Education Section will forward the caller back to the PDES Permitting Section for specific information regarding the WQM Plan.

(6) After the public comment period is over, if no comments are received and the DEQ determines that there is not significant interest or that a public meeting is not otherwise appropriate, the PDES Permitting Section will forward the proposed 208 Plan modification to the Water Quality Division Director for certification and for forwarding the proposed 208 Plan modification to EPA for their final approval.

(7) If public comments are received, the DEQ will determine if there is significant public interest or if a meeting is otherwise appropriate. If a public meeting is to be held, arrangements for a public hearing (a formal meeting) will be made by the Customer Assistance Division in coordination with the Water Quality Division. The procedures in 40 CFR Part 25 will be followed in developing the contents of and issuing a notice of the public meeting/hearing and in conducting the same. A tape recording of the formal portion of the public hearing will be kept with any comments received. The public hearing will be held, if possible, within the town or locality being affected by the proposed modification to the WQM Plan. If it is impossible to hold the public hearing in the affected location, an alternative site as close as possible to the affected site will be utilized for the public hearing.

(8) After any public hearing, or after the end of the comment period, the DEQ shall prepare a responsiveness summary responding to comments and make the same available to the public. The DEQ will make any appropriate changes to the update which is recommended to the Water Quality Division Director for his certification. Upon certification, the Water Quality Division Director will forward the update to EPA Region VI for final approval.

(9) When EPA's final approval is received, PDES Permitting Section will update their records and database of the modification; PDES Permitting Section will update, as appropriate, the Appendices of the WQM Plan.

(10) Sample form for 208 Plan format is provided in Appendix A.

(11) The process for approval of a plan revision may be conducted simultaneously with the public participation process for a draft point source discharge permit.

(12) WLA/TMDL for non-dissolved-oxygen-demanding substances:
To expedite the WQM planning and permitting process, EPA in a memorandum of understanding (MOU) of June 8, 1996, has authorized DEQ to proceed with public notification of the plan change/update prior to EPA's approval for WLA's/TMDL's for non-dissolved-oxygen-demanding substances. For this type of change, EPA's approval as outlined above in steps (2), (4), (8), and (9) shall not be required. However, EPA shall be informed of the plan change/update during the public notification process (step 5). EPA may review and comment on the proposed changes(s) when necessary.

DEQ/EPA 208 MOU Modifications for Industrial Dischargers

The EPA Region 6 and the DEQ have developed a MOU that designates and changes some of the agency's roles in the process of updating the WQMP. This MOU will assist both agencies in providing more timely updates for permit issuance.

The WQMP had included guidelines for processing all the municipal discharging facilities but there were very few guidelines for the industrial dischargers to be incorporated into the WQMP. In the past, most of the industrial dischargers did not have their approved effluent limitations listed in the WQMP. A backlog had developed in an effort to incorporate all industrial dischargers. Executing this MOU established an expedited method to allow routine updates to the WQMP. This will avoid excessive delays in the permit issuance process.

The MOU designated both agency's responsibilities as:

> DEQ will utilize the procedures set forth in the approved CPP. If the proposed effluent limitations for draft permits indicate a need to update or modify the WQMP, DEQ will prepare all necessary documentation and justifications including the public participation procedures for modifications to the WQMP. The public participation process for WQMP modifications may

be undertaken concurrently with public participation activities for the facility's draft permit. DEQ will notify EPA of the proposed modifications to the WQMP when public participation commences.

EPA reserved the right to review and formally approve or disapprove any individual proposed modification to the WQMP. EPA will notify DEQ of their intentions within 20 working days of receiving the request. Unless the WQMP modification is exempted from the MOU (see below), EPA will waive its review and formal approval of any WQMP modification and allow DEQ to approve the modification and incorporate it into the approved WQMP. The exemptions are as follows:

a. Effluent limitations for oxygen-demanding substances derived form a wasteload allocation model;
b. Effluent limitations derived from a TMDL that includes multiple waste sources;
c. Any modification for which EPA has exercised its right of review and approval.

The MOU does not restrict EPA's authority to review and modify all draft permits.

This MOU became effective as of June, 1996. A copy of this MOU is included in Appendix E.

UPDATES AND OTHER INFORMATION SUBMITTALS

Water quality limited stream segments requiring WLA's/LA's and TMDL's identified under 40 CFR 130.7(b) will be updated and submitted to EPA as required under 40 CFR 130.7(d). The DEQ, in coordination with other appropriate federal, state, regional and local governmental agencies, will also update and revise required lists of waters and provide information required under 40 CFR §130.10, including:

(1) waters which cannot reasonably be anticipated to attain or maintain water quality standards due to toxic pollutants or that water quality which will assure protection of public health, water supplies, and designated uses;
(2) waters for which the applicable standard under Section 303 of the CWA (numeric criteria for priority pollutants) is not expected to be achieved due to discharges of toxic pollutants; and
(3) determination of point sources discharging toxic pollutants and amount of pollutants discharged for sources believed to be the cause of impairment of water quality for stream segments on the lists.

The lists required under §130.10(d) will be prepared and revised utilizing the information and data specified in 40 CFR 130.10(d)(6), including information relating to waters identified under Section 303(d) of the CWA as waters needing water quality-based controls, waters identified in the 305(b) Report, waters identified as priority waterbodies, and other available information identified in 40 CFR 130.10(d).

REQUIREMENTS AND AUTHORITIES

A description of the process for assuring adequate authority for intergovernmental cooperation in the implementation of Oklahoma's Water Quality Management Program is a required component of the Continuing Planning Process pursuant to 40 CFR §130.5(b)(5) and Section 303(e)(3)(E). This Chapter will describe the process for intergovernmental coordination in these major areas:

- Coordinate activities with federal agencies as required under applicable federal laws,
- Ensure participation by all state agencies with jurisdiction over certain point and nonpoint sources of pollutants as set forth by 27A OS Supp., 1993, §1-3-101,
- Ensure adequate involvement of entities with functions related to area wide waste management plans under Section 208 and applicable basin plans under Section 201 of the Clean Water Act, and
- Coordinate planning efforts with other states, interstate compact commissions, and regional entities.

COORDINATE ACTIVITIES WITH FEDERAL AGENCIES AS REQUIRED UNDER APPLICABLE FEDERAL LAWS

Compliance with state water quality requirements by applicants for federal permits and coordination with the federal permitting authority is ensured in part through the 401 water quality certification program implemented by the DEQ under OAC 252:610. Other coordination activities are carried out as required by applicable federal legislation, including but not limited to, the following:

a. The Solid Waste Disposal Act, as amended (PL 91-512)
b. The Safe Drinking Water Act (PL 99-339)
c. The Clean Water Act, as amended (PL 91-604)
d. The Coastal Zone Management Act (PL 92-583)
e. The Watershed Protection and Flood Protection Act (PL 83-566)
f. The Wild and Scenic Rivers Act (PL 90-542)
g. The Rural Development Act of 1972 (PL 92-542)
h. The Land and Water Conservation Fund Act, as amended (PL 88-578)
i. The National Historic Preservation Act (PL 89-665)
j. The Fish Restoration Act (PL 81-081) and the Federal Aid in Wildlife Restoration Act (PL 75-415)
k. The Endangered Species Act (PL 93-205)
l. Wastewater Management Urban Studies Programs administered by the U.S. Army Corps of Engineers (PL 685, 1938, PL 429, 1913)
m. Transportation Planning administered by the Department of Transportation (PL 87-866, PL 93-366, PL 93-503)
n. The Housing and Community Development Act of 1974 (PL 93-383)
o. The Resource Conservation and Recovery Act of 1976 (PL 94-580)
p. The Comprehensive Environmental Response, Compensation, and Liability Act (popularly known as "Superfund") of 1980 (PL 96-510)
q. The Clean Water Act of 1977 (PL 97-117, PL 92-500, PL 95-217)
r. The Fish and Wildlife Coordination Act
s. National Environmental Policy Act and other Federally assisted planning and management programs being carried on in Oklahoma.

Additionally, Oklahoma will coordinate with specific State and Federal water quality and natural resource agencies such as the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, and others.

Ensure Participation by all State Agencies with Jurisdiction Over Certain Point and Nonpoint Sources of Pollutants as set forth by 27A OS Supp., 1993, §1-3-101

General

The respective jurisdictions of Oklahoma state environmental agencies over nonpoint and point sources discharges of pollutants to waters of the state are clearly defined in 27A OS Supp. 1993, §1-3-101. "Waters of the state" is defined to include both surface waters and ground water, and in all cases includes "waters of the United States which are contained within the boundaries of, flow through or border upon this state or any portion thereof". 27A OS Supp., 1993, §2-6-101(16).

Jurisdiction and Authorities

Point Source Discharges

The DEQ has authority pursuant to 27A OS Supp., 1993, §1-3-103(B) over all point source discharges of pollutants and storm water to waters of the state which originate from municipal, industrial, commercial, mining, transportation and utilities, construction, trade, real estate and finance, services, public administration, manufacturing, and other sources, facilities and activities, except those under the jurisdiction of the Corporation Commission and Department of Agriculture as specified in Sections 1-3-101 (D) and (E). Those under the jurisdiction of the Corporation Commission and Department of Agriculture, to the extent a permit is required under the NPDES program, are by state law required to obtain a permit only from the EPA and these NPDES permits will be subject to the 401 Certification authority of the DEQ.

Nonpoint Sources

The DEQ has authority under Section 1-3-101(B)(2) over all nonpoint source discharges of pollutants, except as provided in Subsection (D) [Department of Agriculture] Subsection (E) [Corporation Commission], and Subsection (F) [Conservation Commission].

Other Statutory Authority

The DEQ has additional, unqualified, authority under Section 1-3-101(B) of the Code for "surface and groundwater quality and protection and water quality certifications", "public and private water supplies", "freshwater wellhead protection", and "environmental regulation of any entity or activity, and the prevention, control and abatement of any pollution, not subject to the specific statutory authority of another state environmental agency."

RULES

The DEQ has codified rules for point source discharges in OAC 252:605 and rules relating to nonpoint source, groundwater quality, general water quality, and the CPP in OAC 252:610. OAC 252:610 incorporates 40 CFR Part 130 by reference.

METHODS OF COORDINATION

DISCHARGES

The DEQ will ensure coordination with regard to sources, activities and facilities which have point source discharges of pollutants requiring an NPDES permit from EPA in part through its 401 water quality certification program. Rules relating to certifications (OAC 252:610) provide that the federal agency, EPA, may provide public notice and both the rules and Section 401 of the CWA allow the DEQ to take measures to provide public notice on applications for 401 certifications. The DEQ and EPA will cooperate to ensure that mailing lists for providing notice of NPDES draft permits and applications for 401 certification, include all appropriate state, local, and federal agencies, and other governmental entities.

For point source discharges requiring a permit from the DEQ, joint permitting will ensure coordination with EPA. Notices of applications filed with the DEQ will be published in a newspaper and mailing lists for notices of draft permits will include all affected states, and all local, municipal and federal agencies as required under 40 CFR §124.10. Comments will be accepted and public meetings will be held as required under 40 CFR §122.10, OAC 252:605 and applicable state law.

NONPOINT SOURCES

The DEQ will coordinate with the Oklahoma Conservation Commission, which has the authority for monitoring, evaluation and assessment of waters to determine the extent of nonpoint source pollution and the development of conservation plans, including the authority to serve as the technical lead agency for Section 319 of the CWA except for activities related to industrial and municipal stormwater. The DEQ will consult with the Conservation Commission to coordinate information and controls of pollutants relating to abandoned mine reclamation sites, soil conservation and erosion controls, conservation plans for clean lake watersheds, and wetlands strategy. The Department of Agriculture and Corporation Commission will be involved in consultations and implementation of controls for nonpoint source discharges from all sources, activities and facilities under their respective jurisdictions as specified in the Code.

IMPLEMENTATION AND ENFORCEMENT OF THE OKLAHOMA WATER QUALITY STANDARDS

The CPP and updates thereof will be written by the DEQ in cooperation with the Oklahoma Water Resources Board, which has authority under the Code and other statutes for promulgation of Oklahoma Water Quality Standards and implementation documents for such Standards. 27A OS Supp., 1993, §1-3-103(C) and 82 OS Supp. 1993, §1082.6. Enforcement actions for violations of the Oklahoma WQS will be conducted by the DEQ, Corporation Commission, and

Department of Agriculture, in accordance with delineated boundaries of their jurisdictions under Section 1-3-101 of Title 27A of the Oklahoma Statutes.

FUNDING AND PRIORITIZATION

For wastewater treatment facilities and other funding activities, the DEQ will coordinate and exchange information with the Oklahoma Water Resources Board and the Secretary of the Environment, which have authorities as follows:

OWRB the Sate Revolving Fund (SRF) program, state water/wastewater loans and grants revolving fun and other related financial aid programs,

Secretary other federal funding under the CWA.

The OWRB has authority for inventory and ranking of construction needs, and has established rules relating thereto in OAC 785. The 1987 Amendments to the Clean Water Act set forth a schedule and mechanism for completing the transition to achieve full state and municipal responsibility for financing, building, operating, maintaining and replacing wastewater treatment facilities. To facilitate the transition from the construction grants to the SRF program, the Clean Water Act provides each state with the option to transfer a portion of its allotment from Title II authorizations for deposit, through a capitalization grant into a revolving fund.

EPA is authorized to make grants to capitalize State water pollution control revolving funds. The primary purpose of this authority is to provide loans and other financial assistance to municipalities for the construction of publicly owned wastewater treatment facilities. The last year in which funds could be appropriated for direct project funding through construction grants was FY-90. Separate appropriations for SRF capitalization grants are authorized from FY-89 through FY-96. Thereafter, the states and municipalities have the sole responsibility for providing financing to meet the enforceable requirements of the act unless funding for State SRF programs is re-authorized.

The Oklahoma Revolving Fund is a loan program that applies to all public projects receiving financial assistance from the Wastewater Facility Construction Revolving Loan Account for the construction or replacement of wastewater treatment works.

Development of the Oklahoma Revolving Fund was authorized by 82 OS Supp. 1988, Sections 1085.56 et seq. The program regulations are necessary for determining the eligibility and priority of entities to receive financial assistance pursuant to the Federal Water Quality Act of 1987 and the Wastewater Facility Construction Revolving Loan Account, and are contained in OAC 785.

Projects which are funded in whole or in part with assistance from the SRF will be required to comply with the requirements applicable state law and rules promulgated by the OWRB in OAC 785.

The categories of wastewater treatment projects eligible for assistance are as follows:

Secondary Treatment	Category I
Advanced Treatment	Category II
Infiltration/Inflow Correction	Category IIIA
Major Sewer System Rehabilitation	Category IIIB
New Collection Systems	Category IVA
New Interceptors	Category IVB
Combined Sewer Overflow Correction	Category V

The OWRB will determine annually the amount of funding necessary and the project categories that will be placed on the fundable portion of the Priority List (See Appendix 4-C).

Costs associated with the planning, design and building of the eligible categories of wastewater projects are considered allowable by the OWRB. Maximum eligible non-construction costs will be determined by guidelines developed by the OWRB. Eligible construction costs will be based on the lowest responsible bidder.

Eligibility for projects is subject to the applicable Subchapter 9, SRF Regulations (Parts 1, 3, 5 and 7) of the OWRB's rules in OAC 785. Funding and prioritization criteria and requirements are set forth in Appendix D of this Chapter.

Ensure Adequate Involvement of Entities with Functions Related to Area wide Waste Management Plans Under Section 208 and Applicable Basin Plans Under Section 201 of the Clean Water Act

For permits which require revisions of the WQM Plan, coordination with other agencies and entities will be achieved through providing notice and opportunity for participation in compliance with 40 CFR Part 25, Chapter VI of the Environmental Quality Code, other applicable federal regulations, and the provisions of the CPP as set forth in herein.

Rulemaking

Additional coordination can be achieved through allowing other state, local and federal entities an opportunity to comment on rules promulgated by the Environmental Quality Board which relate to the CPP and WQM Plan, nonpoint source pollution, groundwater quality, and point source discharges, contained in OAC 252:605 and OAC 252:610. Public comment and public meeting opportunities are provided for all permanent rules by the DEQ in conjunction with the Water Quality Management Advisory Council and the Environmental Quality Board, as required by the Oklahoma Administrative Procedures Act, 75 OS 1991 §302 et seq. All state, local and federal entities may request to be placed on the mailing list for notices of rulemakings and a Notice of Rulemaking Intent with a description of proposed rules and other appropriate information is published in the *Oklahoma Register* a minimum of 20 days prior to a public meeting. The composition of both the Water Quality Management Advisory Council and the Environmental Quality Board, by law, must include members representing major interests such as agriculture, industry, nonprofit environmental organizations, local government, etc.

Complaints and Data Management

Guidelines and computerized systems for recording and analyzing information about complaints have been developed, are being utilized by all state environmental agencies, and information resulting from this process will be subject to disclosure to the public, including other agencies, pursuant to the Open Records Act. The complaint system is designed to direct complaints to the appropriate state agency with jurisdiction over the subject matter, to produce a timely response to each complaint and document the resolution of the complaint.

OFFICES OF CITIZEN, LOCAL GOVERNMENT AND BUSINESS ASSISTANCE AND POLLUTION PREVENTION ACTIVITIES

The Environmental Quality Code established within the DEQ, a separate office with the express purpose of assisting citizens, local governments and businesses in interacting with the DEQ and to provide these interests with information. The Office of Customer Services is staffed with persons with expertise in water quality and other environmental areas, and will act as a liaison with the Water Quality Division and other Divisions of the DEQ in matters directed to them. Development and implementation of new pollution prevention activities are also a priority in the new DEQ, and these activities are being coordinated with local, regional and state governmental entities as appropriate.

WATER QUANTITY/WATER QUALITY

Coordination with the Oklahoma Water Resources Board, which has jurisdiction over water quantity matters, is ongoing with respect to matters with water quality implications. The OWRB and DEQ are coordinating agency rules involving construction requirements for wells to avoid inconsistency or overlap. The OWRB also has authority for Oklahoma's Comprehensive Water Plan, which has water quality implications. DEQ staff are cooperating with the OWRB in providing input to the Water Law Advisory Council on how water quality considerations may be accounted for in granting stream water appropriations and permits to withdraw groundwater under state statutes, assessing the need for state policy or law relating to minimum instream flows, flow augmentation, and resolving other water quantity/water quality issues.

NATURAL RESOURCE DAMAGES

The Secretary of Environment has been designated under the Environmental Quality Code as the Natural Resource Trustee of Oklahoma for purposes of the Oil Pollution Act of 1990 and CERCLA responsibilities. The Secretary will utilize appropriate state environmental agencies in carrying out natural resource trustee duties. The Board of Environmental Quality has adopted rules, contained in OAC 252:610, which provide the DEQ with authority to fulfill duties pursuant to any contracts or memoranda of understanding with the Secretary regarding natural resource damage assessments and related activities. The Department of Wildlife Conservation will be promulgating rules relating to wildlife damage assessments in relation to pollution incidents.

Coordinate Planning Efforts with Other States, Interstate Compact Commissions, and Regional Entities

Local Government Coordination

Coordination with local governmental entities, such as municipalities, is achieved by providing notices on individual point source discharge permits which may affect their area (in compliance with 40 CFR §124.10), the stormwater program and through cooperation in development of ordinances and regulations such as those designed for reservoir protection (see OAC 252:635).

Regional Planning Agencies

Three substate planning agencies have been designated in Oklahoma, the Indian Nations Council of Governments (INCOG), the Association of Central Oklahoma Government (ACOG), and the Arkhoma Regional Planning Commission. These substate planning agencies have participated through past development of 208 WQM Plans for their respective areas, which have been incorporated into the State's WQM Basin Plans conditionally approved by EPA in 1979. Currently, the substate planning agencies are cooperating with the DEQ in planning efforts to the extent resources allow.

Within the respective boundaries of the INCOG and ACOG areas, these entities will be responsible for the following activities:

(1) Identification of any new or modified Designated Management Agencies and coordination to secure properly executed acceptance forms;
(2) Preparation and submittal of requests for modifications to the WQM Plan, along with supporting documentation;
(3) Conducting "desktop" level wasteload allocations/TMDL's for municipal dischargers;
(4) Assisting with public participation activities related to the respective area;
(5) On-going review and recommendation of changes to the WQM Plan;
(6) Developing population projections including disaggregation to facility service areas;
(7) Additional targeted projects, including more detailed wasteload allocations/TMDL studies needed to comply with state and federal water quality modeling requirements and guidelines, whether grant funded or locally funded, may be negotiated as part of an annual workplan agreement.

When needed modifications to the Plan are identified by INCOG or ACOG, a request will be submitted to DEQ, Water Quality Division along with all necessary supporting documentation and technical justification. These materials will be reviewed by the technical staff and any comments addressed prior to submitting the modification to the Water Quality Division Director for approval. The proposed modification will be subject to the public participation procedures of this Chapter identified for minor and major modifications.

The ARKHOMA Regional Planning Commission has indicated their desire to be de-designated and relieved of any responsibility for water quality management planning activities in the two Oklahoma counties for which they had previous planning responsibility. The ARKHOMA Regional Planning Commission has not performed any water quality management planning activities in Oklahoma for several years. As soon as the official request is received, the de-designation process will be initiated. Responsibility for planning activities in LeFlore and Sequoyah counties will be exercised by the DEQ. Proposed major and minor modifications identified by the DEQ or others will be subject to the public participation procedures identified in this Chapter.

INTERSTATE COORDINATION

In addition to coordination through appropriate notification of affected states under the permit program for point source discharges, as specified in OAC 252:605, water quality issues and planning efforts are coordinated by the State through the following:

(1) Provision of draft plans such as 201 facility plans, updates to the State WQM Plan or basin plans, and similar documents will be provided to affected states where interstate implications are involved, and an opportunity to comment will be provided.

(2) Entities such as the Illinois River Task Force and the Scenic Rivers Commission are established to address specific situations and these entities regularly confer with pertinent governmental bodies in neighboring states. Other more informal contacts are also regularly made to address issues of mutual concern.

(3) Interstate Compact Commissions have been established and approved by appropriate state legislation as follows:

KANSAS-OKLAHOMA ARKANSAS RIVER BASIN COMPACT

The major purposes of this Compact are:

(a) To promote interstate comity between the states of Kansas and Oklahoma;
(b) To divide and apportion equitably between the states of Kansas and Oklahoma the waters of the Arkansas River Basin and to promote the orderly development thereof;
(c) To provide an agency for administering the water apportionment agreed to herein; and
(d) To encourage the maintenance of an active pollution-abatement program in each of the two states and to seek further reduction of both natural and man-made pollution in the waters of the Arkansas River Basin.

ARKANSAS-OKLAHOMA ARKANSAS RIVER BASIN COMPACT

The major purposes of this Compact are:

(a) To promote interstate comity between the states of Arkansas and Oklahoma;
(b) To provide for an equitable apportionment of the waters of the Arkansas River between the states of Arkansas and Oklahoma and to promote the orderly development thereof;
(c) To provide an agency for administering the water apportionment agreed to herein;
(d) To encourage the maintenance of an active pollution-abatement program in each of the two states and to seek the further reduction of both natural and man-made pollution in the waters of the Arkansas River Basin; and
(e) To facilitate the cooperation of the water administration agencies of the States of Arkansas and Oklahoma in the total development and management of the water resources of the Arkansas River Basin.

RED RIVER COMPACT

The principle purposes of this Compact are:

(a) To promote comity and remove causes of controversy each of the affected states by governing the use, control and distribution of interstate water of the Red River and its tributaries;
(b) To promote an equitable apportionment among the signatory states of the water of the Red River and its tributaries;
(c) To promote an active program for the control and alleviation of natural deterioration and pollution of the water of the Red River Basin and to provide for enforcement of the laws related thereto;
(d) To provide the means for an active program for the conservation of water, protection of lives and property from floods, improvement of water quality, development of navigation and regulation of flows in the Red River Basin; and
(e) To provide a basis for state or joint state planning and action by ascertaining and identifying each state share in the interstate water of the Red River Basin and the apportionment thereof.

CANADIAN RIVER COMPACT

The major purposes of this compact are:
(a) To promote interstate comity;
(b) To remove causes of present and future controversy;
(c) To make secure and to protect present developments within the states and;
(d) To provide for the construction of additional works for the conservation of the waters of the Canadian River.

The State interacts with these Compacts primarily through the Secretary of the Environment and the Oklahoma Water Resources Board. The Board has statutory authority for water quantity, including but not limited to, water rights, surface and underground water, planning and interstate stream compacts pursuant to 27A OS Supp. 1993, §1-3-103(C).

PROCEDURES FOR ISSUING FISH CONSUMPTION ADVISORIES

Fish tissue contaminant levels, which would trigger an advisory, are calculated according to EPA risk assessment guidance. This is a departure from the older policy of accepting FDA levels for commercial-caught fish. This approach is consistent with the agency-wide policy on risk based decisions and allows protection of the public, especially vulnerable populations such as pregnant women and children under the age of six. It also encourages the beneficial consumption of fish.

The method for determining fish tissue contaminant levels which trigger a consumption advisory can be found in the EPA Guidance Document, Fish Assessment and Fish Consumption Limits, 1994.

The chemical concentration at which pregnant women and children, the vulnerable population, could not safely eat fish is first calculated. Then, that concentration was used in calculations for the effect of this level of chemical on the rest of the population. Generally, at the level at which the vulnerable population could not consume fish at all, the general population could still consume fish but in limited quantities. A separate calculation of the concentration of chemical at which the general population could not safely eat fish was also done. For most of the chemicals, this has resulted in a two tiered advisory system. At the lower level, or restricted level, the vulnerable population is warned not to eat the contaminated fish at all and the general population is warned to limit consumption. At the higher level, no consumption of the contaminated fish is allowed. Since these are risk based consumption levels, if, in the future, EPA should modify a risk number for a chemical, this would change the consumption level.

TOXICS AND RESERVOIRS PROGRAM

GOALS

The goal of the Toxics and Reservoirs program is to protect the public's health by evaluating levels of commonly found toxic compounds in fish flesh from Oklahoma's reservoirs.

This will be accomplished by targeting three general categories of fish for collection and analysis: predator species, bottom feeders, and rough fish. This will ensure that species analyzed are those most susceptible to bioaccumulation of toxics and most frequently consumed.

SAMPLE COLLECTION

METHODS

Since the intent of the program is to measure toxics in fish flesh, any legal method of obtaining uncontaminated samples is acceptable. Most samples will be collected by DEQ personnel by use of gill nets or seines. In addition, samples may be provided by ODWC when specific species or size ranges are required. ODWC generally uses electrofishing methods or angler surveys as collection methods.

Generally, reservoirs will be routinely sampled every 7 years. If sample results indicate elevated levels of toxics, sampling frequency will be increased to at least annual.

Table 25 lists the reservoirs routinely sampled and the number of sites sampled on each reservoir.

Table 25: Reservoirs Routinely Sampled and Number of Sites Sampled

Reservoir	Number of Sites
Lake Arcadia	1
Altus-Lugert Reservoir	1
Lake Arbuckle	2
Lake Atoka	1
Broken Bow Reservoir	2
Birch Lake	1
Boomer Lake	1
Lake Carl Blackwell	1
Canton Lake	1
Copan Reservoir	1
Draper Lake	3
Lake Eufaula	4
Lake Ellsworth	1
Ft. Gibson Reservoir	4
Foss Reservoir	2
Lake Fuqua	1
Fort Supply Reservoir	2
Grand Lake	3
Great Salt Plains Reservoir	2
Greenleaf Lake	1
Guthrie Lake	1
Lake Hudson	3
Lake Hefner	1
Hugo Lake	2
Hulah Reservoir	1
Lake Heyburn	1
Kaw Reservoir	3
Lake Keystone	4
Liberty Lake	1
Lake Lawtonka	1
McAlester City Lake	1
McGee Creek Reservoir	1
Lake McMurtry	1

Reservoir	Number of Sites
Lake Murray	3
Newt-Graham Lock & Dam	1

Reservoir	Number of Sites
Lake Oolagah	2
Lake Overholser	1
Pine Creek Reservoir	1
R S Kerr Reservoir	2
Sardis Lake	1
Shawnee Lake	1
Skiatook Lake	1
Lake Thunderbird	2
Lake Tenkiller	2
Tom Steed Reservoir	2
Lake Texoma	4
Webbers Falls Lock & Dam	2
Lake Wister	2
Waurika Lake	2

SPECIES SELECTION

Fish will be composited according to size and species for analysis. A valid composite consists of 3 to 8 individuals of the same species with the smallest fish being at least 75% the length of the largest. Only valid composites will be analyzed.

To provide the best screening tool for the evaluation of concentrations of toxics that could effect human health, it is desired that each category of fish be available for analysis. For screening purposes, it is necessary that only one composite be run for each category of fish. If the preferred species is available, that species should be chosen for analysis. If the preferred species is not available for a given category, then one of the other acceptable species may be analyzed. If more than one composite of a selected species is available, the composite of the largest individual fish should be chosen for analysis.

Table 26 lists the preferred fish and other acceptable species.

Table 26: Preferred Fish and other Acceptable Species

Category	Preferred Species	Acceptable Species
Predators	Largemouth Bass	Hybrid, White, or Striped Bass, Walleye, or Flathead Catfish
Bottom Feeders	Channel Catfish or Blue Catfish	Black Bullhead
Rough Fish	Smallmouth Buffalo	Carp, River Carpsucker, Largemouth Buffalo

Upon receipt in the laboratory, all fish will be separated by species and weighed and measured. These values will be recorded and the fish will be composited according to length recommendations. Filets will be collected from each fish and combined into the appropriate composites. The composited filets will be wrapped in aluminum foil and labeled according to site, species, and size. All composites will be held frozen until sample analysis and data evaluation is complete. Composites selected for analysis will be logged in and held in a separate plastic container. Composites not selected for analysis will be combined according to site and held frozen in labeled plastic bags until the screening process is complete.

The samples chosen for analysis will be logged into the SELs Aquarius data management system. They will be held frozen separately until prepared for analysis. Fields in the Aquarius system will be filled out as in Table 27:

Table 27: Fields in the Aquarius System to be Filled Out

Project Code	The appropriate project code - generally TS-XF
Date Collected	Date of collection
Station ID	The Aquarius station id if available. Reserve this field if station id has not yet been assigned.
Source	The total number, number analyzed, and species of the sample, e.g. "5 of 7 Largemouth Bass".
Samplers Comments	The site name, collecting agency (if not ODEQ), and other pertinent information.

SAMPLE ANALYSIS

Sample preparation, analytical methods, detection limits, and QA/QC procedures are spelled out in the SEL Quality Assurance Project Plan.

DATA ANALYSIS

Screening values will be used to determine potential problems and if other samples and species need to be analyzed. Screening levels will be set at 75 percent of the lowest level a consumption advisory would be issued. Screening levels are as follows:

Contaminant	Screening Value (mg/kg)	Lowest Consumption Advisory Value (mg/kg)
Aldrin	0.225	0.300
Chlordane	0.225	0.300
DDT	2.250	3.000
Dieldrin	0.225	0.300
Endrin	1.500	2.000
Heptachlor	0.150	0.200
Mercury	0.750	1.000
PCBs	0.750	1.000
Toxaphene	3.750	5.000

If all analyzed values at a given site fall below the screening values, the other composites will not be analyzed. If an analyzed value exceeds the screening value, all the held composites from that site will then be logged in and analyzed.

SAMPLE FREQUENCY

Reservoirs will be routinely sampled once every 7 years.

If during routine sampling screening values are exceeded, samples will be recollected as soon as practicable with emphasis on collecting the species and categories of fish that showed contamination. As long as sample results for a site remain above screening levels, that site will be recollected annually for the species and categories showing contamination.

If a site has a consumption advisory issued for it, that site will be sampled annually for the species or category of fish for which the consumption advisory applies.

CONSUMPTION ADVISORIES

Consumption advisories may be issued for a particular species or a general category of fish, e.g.: predator species. Consumption advisories may also be issued within size ranges, e.g., Largemouth bass greater than 14” in length.

Consumption advisories will only be issued after sampling indicates contaminant levels consistently above ODEQ standards. Generally, this will mean at least two sampling events. The use of selective sampling techniques will be used to try to determine if only certain species or categories of fish are affected.

Consumption advisories will only be issued with the cooperation of the Oklahoma Department of Wildlife Conservation. In addition other interested parties will be notified and consulted before consumption advisories are issued. These may include other state and federal agencies, tribes, and municipalities.

Consumption advisories will be rescinded only after sampling indicates contaminant levels consistently below ODEQ standards. Generally, this will mean three consecutive sampling events.

Table 28 on the following page lists the levels at which consumption advisories will be issued.

Table 28: Levels at which Consumption Advisories will be Issued

Contaminant	Level (mg/kg)	Recommendation

Aldrin (FDA level = 0.3 mg/kg)	0.300	No consumption.
Chlordane (FDA level = 0.3 mg/kg)	0.300 0.500	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked. No consumption.
DDT FDA level = 5.0 mg/kg)	3.000 5.000	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked. No consumption.
Dieldrin (FDA level = 0.3 mg/kg)	0.300	No consumption.
Endrin No FDA level established	2.000	No consumption.
Heptachlor (FDA level = 0.3 mg/kg)	0.200 0.300	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked. No consumption.
Mercury (FDA level = 1.0 mg/kg)	1.000 1.500	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month. No consumption.
PCBs (FDA level = 2.0 mg/kg)	1.000 2.000	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked. No consumption.
Toxaphene	5.000	No consumption by pregnant women or

(FDA level = 5.0 mg/kg)	8.000	children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked. No consumption.

FACILITY:

NPDES:
SIC CODE:
STATE FACILITY NUMBER: I-

OPERATIONS DESCRIPTION:

CITY/TOWN:

COUNTY:

LEGAL: Section Township Range
or
LATITUDE: +
LONGITUDE: -

OUTFALL NUMBER:

WASTE WATER DESCRIPTION:

CRITICAL EFFLUENT FLOW(MGD):
(Highest 30 day average flow, enter the value or not available)

RECEIVING STREAM:
STREAM CLASS:
7 DAY 2 YEAR LOW FLOW (MGD):

EVALUATION TYPE:

TREATMENT PROCESS:

SEGMENT:

POINT OF DISCHARGE

LEGAL: Section Township Range
and
LATITUDE: +
LONGITUDE: -

WASTELOAD ALLOCATION: (Final Discharge only, no internal monitoring points)

DEQ/WQD/PDES/ENGINEER:

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FACILITY:	**CITY/TOWN:**
LEGAL:	**COUNTY:**
POD:	**SEGMENT:**
NPDES:	
CURRENT TREATMENT PROCESS:	**PRIORITY RANKING LIST?**
PRESENT AVG. DAILY FLOW (MGD):	**PRESENT POPULATION:**
DESIGN AVG. DAILY FLOW (MGD):	**YEAR 2015 POPULATION:**
RECEIVING STREAM:	**STREAM CLASS:**
7 DAY 2 YEAR LOW FLOW (MGD):	**WATER QUALITY RANKING:**
DMA:	**DMA STATUS:**

WASTELOAD ALLOCATION:

STRATEGY:

Recommended Treatment Alternatives
A)
B)
C)

Date: 06/04/96

OKLAHOMA FY96 SRF PRIORITY LIST (10/01/95 - 09/30/96)

NO.	FUND CODE	PRIORITY POINTS	PROJ. NO. C-40	NAME	TARGET CERT.	PL AMOUNT	PROJECT DESCRIPTION
1.0	PF	5075.1200	114203	GLENPOOL USA	A11/14/96	$3,751,300.00	STP (CAT II)
2.0	PF	5065.5140	117611	VINITA UA	06/11/96	$2,000,000.00	STP (CAT I)
3.0	PF	5035.8908	118003	LOCUST GROVE PWA	07/09/96	$1,100,000.00	STP (CAT II)
4.0	PF	5028.0000	114611	OWASSO PWA	A04/09/96	$2,853,000.00	STP PHASE I (CAT I)
5.0	PF	5028.0366	117103	FAIRFAX PWA	A03/19/93	$882,000.00	STP (CATI)
6.0	PF	5027.0000	117703	MARLOW MA	A10/10/96	$3,925,000.00	STP (CAT II & IIIA)
7.0	PF	5024.0000	113021	PONCA CITY UA	A05/14/96	$19,000,000.00	STP PHASE II (CAT I)
8.0	PF	5024.0000	113090	PONCA CITY UA	09/07/96	$2,272,400.00	1st REFINANCE (CAT I)
9.0	PF	5024.0000	113903	POTEAU PWA	07/09/96	$2,335,000.00	STP-I/I CORR (CAT I & IIIA)
10.0	PF	5023.3838	116003	PITTSBURG PWA	A05/14/96	$105,000.00	REFINANCE (STP)
11.0	PF	5023.0000	118211	TMUA	A05/14/96	$4,000,000.00	SEWER REHAB. (CAT IIIA)
12.0	PF	5017.0000	113690	DUNCAN PUA	A10/10/95	$2,328,867.00	1st REFINANCE (CAT IIIA)
13.0	PF	5017.0000	116311	WILBURTON PWA	07/09/96	$3,000,000.00	STP/I-I CORR. (CATII & IIIA)
14.0	PF	5017.0000	118303	RUSH SPRINGS MIA	05/14/96	$680,000.00	STP/INTERCEPTOR (CAT I & IVB)
15.1	PF	5016.0000	118503	HELENA PWA	05/14/96	$446,000.00	STP (CAT II)
15.0	PF	5015.5366	110190	BEAVER PWA	A01/12/96	$844,000.00	REFINANCE (CAT I)
16.0	PF	5013.0000	89990	NORMAN UA	A12/12/95	$2,720,000.00	REFINANCE (CAT IVB)
16.1	PF	5011.0000	118711	BIXBY PWA	07/08/96	$1,608,000.00	COLLC./INTERC. (CAT IVA&B)
17.0	PF	5010.0000	112003	SKIATOOK PWA	A12/12/95	$600,000.00	INTERCEPTORS (CAT IVB)
18.0	PN	4083.3620	117911	LAWTON WA	12/01/96	$18,000,000.00	STP (CAT II)
19.0	PN	4049.6242	110841	MUSKOGEE MA	10/08/96	$15,060,000.00	PHASE IB STP (CAT I)
20.0	PN	4030.9937	114403	PAWHUSKA	11/01/96	$1,800,000.00	STP (CAT I)
21.0	PN	4027.5695	115303	McCLOUD PWA	12/14/96	$1,255,000.00	STP (CAT I)
21.1	PN	4024.0000	118603	GER279ONIMO PWA	10/08/96	$613,656.00	STP (CAT II)
22.0	PN	4024.0000	115703	BIG CABIN PWA	10/08/96	$150,000.00	STP (CAT I)
23.0	PN	4023.0000	116411	TMUA	10/15/96	$9,200,000.00	S.S. I/I CORR. (CAT IIIA)

NO.	FUND CODE	PRIORITY POINTS	PROJ. NO. C-40	NAME	TARGET CERT.	PL AMOUNT	PROJECT DESCRIPTION
24.0	PN	4023.0000	116611	TMUA	12/15/96	$1,700,000.00	MOOS. CRK I/I CORR. (CAT IIIA)
25.0	PN	4022.0000	116711	TMUA	04/12/96	$4,300,000.00	DOUG. CRK I/I CORR (CAT IIIA)
26.0	PN	4022.0000	116511	TMUA	12/01/96	$3,300,000.00	I/I CORR. (CAT IIIA)
26.5	PN	4021.0000	119211	INOLA PWA	10/01/96	$491,000.00	I/I CORR. (CAT IIIA) - PHASE II
26.1	PN	4020.0000	118803	OKEMAH UA	09/01/97	$3,750,000.00	STP (CAT I)
27.0	PN	4019.0000	117090	BROKEN ARROW	10/01/96	$1,210,267.00	HAIKEY CRK STP (CAT I) - REFIN.
28.0	PN	4019.0000	110831	MUSKOGEE UA	12/15/96	$6,000,000.00	COODY INTERC. (CAT IVB)
29.0	PN	4019.0000	117011	BROKEN ARROW	10/01/96	$5,000,000.00	PHASE II HAIKEY CRK STP (CAT I)
30.0	PN	4019.0000	115203	MUSTANG IA	11/09/96	$4,000,000.00	INTERC./COLL. (CAT IVB)
30.5	PN	4017.0000	119111	WAGONER NO. 4	09/01/97	$2,700,000.00	STP/COLL. (CAT I, IVA & IVB)
31.0	PN	4016.1475	115503	LINCOLN RWSD # 4	10/01/96	$200,000.00	TREATMENT (CAT II)
31.5	PN	4016.0000	118903	WOODWARD, CITY OF	10/01/96	$3,524,068.00	NO DISCHARGE STP (CAT II)
31.7	PN	4016.0000	119003	SHATTUCK, CITY OF	12/09/96	$421,600.00	NO DISCHARGE STP (CAT II)
32.0	PN	4016.0000	117103	COUNCIL HILL	10/01/96	$350,000.00	NEW COLLECT/STP (CAT I & IVB)
33.0	PN	4016.0000	115111	LONGTOWN RWSD	07/30/97	$7,000,000.00	STP/COLLEC (CAT I)
34.0	PN	4014.0000	117311	IDABEL PWA	07/30/97	$125,000.00	COLLEC (CAT IVA)
35.0	PN	4013.0000	116203	NINNEKAH PWA	10/01/96	$500,000.00	STP/COLLEC. (CAT I/IIIA)
35.1	PN	4011.0000	118721	BIXBY PWA	07/01/97	$1,418,000.00	COLLC./INTERC. (CAT IVA & B)
36.0	PN	4009.0000	110903	BROKEN ARROW	09/30/97	$800,000.00	INTERCEPTORS (CAT IVB)
37.0	PN	4007.0000	118411	ENID MA	10/15/96	$9,700,000.00	INTERCEPTORS (CAT IVB)
38.0	PN	3296.5400	106892	TMUA	08/15/98	$8,400,000.00	REFINANCE (CAT I)
39.0	PN	3028.0000	113703	SPENCER	09/30/98	$100,000.00	LAGOON/ROCK REED (CAT I)
40.0	PN	3028.0000	114603	OWASSO PWA	09/01/98	$4,200,000.00	STP REFINANCE (CAT I)
41.0	PN	3027.0000	112103	SAPULPA MA	08/15/98	$10,000,000.00	REGIONAL STP (CAT I)
42.0	PN	3025.0000	109103	MOORE PWA	10/01/97	$4,183,636.00	STP EXP. (CAT II)
43.0	PN	3024.0000	111990	HENRYETTA MA	01/08/98	$1,906,000.00	REFINANCE (CAT I)
44.0	PN	3024.0000	111911	HENRYETTA MA	01/08/98	$770,000.00	STP PHASE II (CAT I)
45.0	PN	3021.3773	114703	MOUNDS PWA	10/01/97	$288,050.00	SYSTEM IMPROV. (CAT I)
46.0	PN	3021.0000	109503	TMUA	10/01/97	$1,551,400.00	CSO (CAT V)

NO.	FUND CODE	PRIORITY POINTS	PROJ. NO. C-40	NAME	TARGET CERT.	PL AMOUNT	PROJECT DESCRIPTION
47.0	PN	3019.0000	106815	TMUA	10/01/97	$5,821,000.00	NEW BLK SEWER (CAT IVB)
48.0	PN	3019.0000	115090	BROKEN ARROW	10/01/97	$1,157,000.00	LYNN LANE (CAT I) REFINANCE
49.0	PN	3018.0000	112703	HEAVENER UA	10/01/97	$2,500,000.00	STP - I/I CORR. (CAT II & IIIA)
50.0	PN	3014.0000	113503	McCURTAIN MA	10/01/97	$250,000.00	STP/COLLECTION (CAT I)
51.0	PN	3007.0000	118411	ENID MA	02/01/98	$4,750,000.00	INTERCEPTOR (CAT IVB)
52.0	PN	2296.5400	106892	TMUA	10/01/98	$6,400,000.00	PHASE IIIB REF. (CAT I)
52.5	PN	2027.9974	119221	INOLA PWA	10/01/98	$808,000.00	PHASE III (CAT I, IVB)
53.0	PN	2021.0000	106827	TMUA	10/01/98	$4,500,000.00	S.E. W1 W./PH1 *(CAT IVB)
54.0	PN	2021.0000	106826	TMUA	10/01/98	$2,500,000.00	LA FORTUNE PARK (CAT IVB)
55.0	PN	2021.0000	106929	TMUA	10/01/98	$1,500,000.00	WEST/PHASE II (CAT IVB)
56.0	PN	2021.0000	106832	TMUA	10/01/98	$2,804,000.00	CENTRAL PARK (CAT IVB)
57.0	PN	2019.0000	112314	RMUA	10/01/98	$4,012,000.00	ROSE LYNN INTCPT (CAT IVB)
58.0	PN	2017.0000	113691	DUNCAN PUA	09/01/99	$1,507,000.00	2nd REFINANCE (CAT IIIA)
59.0	PN	2015.0000	117621	VINITA UA	09/01/99	$5,292,900.00	RELIEF SEWERS (CAT IIIB)
60.0	PN	1817.3199	112503	TMUA	10/01/99	$65,000,000.00	NORTH SIDE AT/FEB REHAB
61.0	PN	1022.0000	116911	TMUA	10/01/99	$8,500,000.00	COAL CRK. I/I CORR. (CAT IIIA)
62.0	PN	1022.0000	116811	TMUA	10/01/99	$10,000,000.00	FLT. ROCK I/I CORR. (CAT IIIA)
63.0	PN	1021.0000	106823	TMUA	10/01/99	$3,713,000.00	FRED CRK. RELIEF (CAT IVB)
64.0	PN	1018.6164	114503	CATOOSA	10/01/99	$1,500,000.00	STP (CAT II)

PF = FUNDABLE
PN = PLANNING

FISCAL YEAR 96	$ 54,450,567.00
FISCAL YEAR 97	$ 102,568,591.00
FISCAL YEAR 98	$ 45,877,086.00
FISCAL YEAR 99	$ 29,323,900.00
FISCAL YEAR 00	$ 88,713,000.00
TOTAL	$ 320,933,144.00

NO.	FUND CODE	PRIORITY POINTS	PROJ. NO. C-40	NAME	TARGET CERT.	PL AMOUNT	PROJECT DESCRIPTION
FY '96 FUNDS REQUIRED (W/O SRF REFINANCED LOANS					$	49,458,167.00	

CAPACITY FUNDING LIMITATIONS

The eligible capacity shall be determined using average dry weather flow and peak flows in accordance with population and per capita flow estimates provided by the applicant. Project capacity must be consistent with environmental constraints.

Eligible capacity for treatment plants will be up to a period of 20 years from the estimated date of initiation of construction.

Eligible capacity for interceptors and outfalls will be up to 40 years from the estimated date of initiation of construction.

Eligible capacity shall be calculated by multiplying the OWRB's approved local population projection by an appropriate local per capita flow figure. The flow thus calculated will be deemed to include all the eligible project flows (residential, commercial, federal facilities, industrial, and infiltration/inflow). Eligible capacity will be determined during the development of the planning documents. The applicant will be responsible for documenting, in the planning document, the peaking factors used for the project. Eligible capacity will be determined when planning documents are approved by the Board.

COLLECTION SYSTEMS

Construction of new collection systems necessary to serve existing communities will be eligible for assistance. Collection systems which will primarily serve undeveloped areas will not be eligible for assistance.

POPULATION AND FLOW PROJECTIONS

Section 208 Water Quality Management Plan population and flow projections will be used to determine the eligible project capacity. A discussion of the local projections should be included in the planning document.

LAND COSTS

Land costs will be ineligible, except as allowed by the Clean Water Act.

REVENUE PROGRAM

The applicant must demonstrate that it has legal, institutional, managerial and financial capability to construct, operate and maintain the treatment works. The applicant will be required to prepare a revenue program, user charge system and establish an acceptable dedicated sources of revenue to repay the loan. The applicant will be required to identify and make projections of the amount of revenue available from specific sources necessary to repay the loan.

A proposed Revenue Program must be prepared and submitted with the Planning Report. The proposed Revenue Program shall be updated as appropriate prior to submission of the formal assistance application. As indicated, the recipient will be required to demonstrate, at the time of the actual application (at the approval to award stage), that a "dedicated" source of revenue is available to repay the loan. Revenue will be considered dedicated when the recipient passes an ordinance or a resolution committing a source or sources of funds for repayment.

The resolution or ordinance dedicating a source of funding for repayment of the loan and final Revenue Program must be adopted before finalization of the loan agreement. The final approved Revenue Program should be reviewed annually during the useful life of the project and modified as necessary by the Board.

PRIORITY RANKING FORMULA

SRF PROJECT PRIORITY SYSTEM PREPARATION

Each year, the OWRB shall prepare a SRF Project Priority List for the next federal fiscal year, listing potential eligible projects in the order of priority.

PROJECTS INCLUDED

FUNDABLE PORTION

The fundable portion includes projects scheduled for financial assistance during the first year of the planning period, and which are within the limits of currently available funds.

PLANNING PORTION

That portion of the priority list containing all of those projects outside the fundable portion of the list, and which are anticipated to receive financial assistance in future fiscal years. The planning portion will also include contingency projects which are scheduled for assistance during the first year of the planning period, but for which adequate funds are not available to provide financial assistance during that first year. Contingency projects may receive assistance due to bypass provisions or due to additional funds becoming available.

PUBLIC PARTICIPATION

Before the OWRB adopts its annual SRF Project Priority List and SRF Project Priority System, the OWRB shall ensure that adequate public participation has taken place. A public meeting will be held to discuss the SRF Project Priority List and any revisions that were made to the SRF Project Priority System. The notice of public meeting shall precede the public meeting by 30 days and shall be published in a statewide publication. At this time, the OWRB shall circulate information about the Project Priority List including a description of each proposed project. Attendees of the public meeting will be allowed to express their views concerning the list and system.

SRF PROJECT PRIORITY LIST

A SRF Project Priority List shall become effective and supersede all previous lists upon the beginning of the federal fiscal year for which it is designated.

PROJECT RANKING

The ranking factors are based on the relative impact of the project in achieving the pollution control objectives of the Act.

FORMULA

The project priority points (P) are derived from the formula:

$$P = T + S + Q + H$$

where:

T = Project Type Factor
S = Segment Ranking Factor
Q = Effluent Quality Factor
H = Public Health Factor

PROJECT TYPE FACTOR (T)

The system establishes a priority factor for each of the following categories of need. These categories comprise mutually exclusive classes of facilities. Included are:

Category I	The treatment facility necessary to discharge an effluent meeting the secondary treatment definition. This category may include outfall lines and lines which take existing treatment plants out of operation by transporting the effluent to a different plant.
Category II	The additional treatment necessary to meet more stringent than secondary effluent requirements as established in water quality management plans.
Category IIIA	Infiltration/Inflow Correction. The correction of infiltration/inflow conditions including all costs necessary for removing excessive infiltration/inflow from the sewer system, such as replacement or relining sewer sections, flow routing systems, etc.
Category IIIB	Replacement or major rehabilitation of sewers, where it has been determined that such replacement or rehabilitation is necessary to the total integrity and performance of the wastewater treatment works.
Category IVA	Sewage collection system is the common lateral sewers, within a publicly owned treatment system, which are primarily installed to receive wastewater directly from facilities which convey wastewater from individual structures or from private property, and which include service connection "Y" fittings designed for connection with those facilities. Pumping units, and pressurized lines, for individual structures or groups of structures when such units are cost effective and are owned and maintained by the applicant are included in this category.
Category IVB	Interceptor Sewer and Appurtenances. A sewer whose primary purpose is to transport wastewater from collector sewers to a treatment facility.
Category V	Correction of Combined Sewer Overflows. Correction of combined sewer overflows including cost of new collectors, interceptors, storm sewers, retention basin, etc., necessary to alleviate the overflow problem.

Category factors The factors for the above categories are:

CATEGORY RANKING	FACTOR
I	10
II	10
IIIA	4
IIIB	2
IVA	2
IVB	2
V	2

SEGMENT RANKING FACTOR (S)

The segment ranking factor is assigned to each segment or a part of a segment based on the severity of the pollution and the uses to be made of such waters. These segments are priority water quality areas which have been ranked based on an evaluation of which regulatory or water quality control decisions are most needed to prevent or reverse the impairment of a designated use adopted under State Water Quality Standards.

EFFLUENT QUALITY FACTOR (Q)

The effluent quality factor (Q) is calculated by use of the following formula:

$$Q = \left(\frac{\text{Monitored BOD}_5 \text{ in mg/l}}{\text{Required BOD}_5 \text{ in mg/l}}\right) + \left(\frac{\text{Monitored TSS in mg/l}}{\text{Required TSS in mg/l}}\right)$$

$$+ \left(\frac{\text{Monitored NH}_3 \text{ in mg/l}}{\text{Required NH}_3 \text{ in mg/l}}\right) + \left(\frac{\text{Monitored PO}_4 \text{ in mg/l}}{\text{Required PO}_4 \text{ in mg/l}}\right)$$

$$\times \text{ Flow in MGD} \times 8.34$$

For proposed projects to replace, upgrade, expand or modify a single existing facility, Q will be calculated from the existing facility data.

For proposed projects to eliminate more than one existing facility, Q will be the summation of the effluent quality factors for each existing facility.

The monitored element shall be the average concentration of the effluent for the preceding calendar year indicated by the Discharge Monitoring Reports. The required element shall be the limit of concentration in the most currently approved water quality management plan. The ratio of the monitored parameter concentration over the required parameter concentration must be greater than 1. Any ratio not greater than 1 will be considered to be 0. The flow will be the design flow for proposed facility in MGD. When any element of the formula is not established, that portion of the effluent quality factor (Q) shall be zero (O). This factor may be applied only to Category I and Category II projects. Where seasonal limits have been established, the most stringent limits will be used in calculating Q.

PUBLIC HEALTH FACTOR (H)

The Executive Director of the Oklahoma Water Resources Board, may determine that a project is necessary to preclude or alleviate a threat to public health. Projects so identified will receive a factor of 10. Such a condition will be considered to exist if there is an administrative fine order or a signed consent order between the applicant and the Department of Environmental Quality, or EPA has issued an Administrative Order or an NPDES permit with compliance schedules which require construction/modification of the facility. The project will receive an additional five points if the Department of Environmental Quality has issued a moratorium of the existing system. The H factor will apply only to those categories for which the enforcement orders and moratorium are issued.

READINESS TO PROCEED

Projects ready to proceed during the current fiscal year will receive an additional 5000 points. Projects ready to proceed during the second year of the priority list will receive an additional 4000 points. Projects ready to proceed during the third year of the priority list will receive an additional 3000 points. Projects ready to proceed during the fourth year of the priority list will receive an additional 2000 points. Projects ready to proceed during the fifth year of the priority list will receive an additional 1000 points. This determination will be based on projected funds available and best estimates of the date of the project would qualify to receive financial assistance from the SRF.

MANAGEMENT OF THE PROJECT PRIORITY LIST

TIE BREAKING PROCEDURE

A tie breaking procedure shall be utilized when two or more projects have equal points under the Project Priority System and are in competition for funds. Projects will be ranked according to existing population. According to the most recent Water Quality Management Plan, i.e., the project with the greatest existing population will receive the higher ranking.

PROJECT BYPASS

A project on the fundable portion of the list may be bypassed if it is determined that the project will not be ready to proceed during the funding year. This determination will be made on projects that are unable to meet the schedule established on the priority list. The applicant whose project is affected shall be given written notices that the project is to be bypassed. Projects that have been bypassed may be reinstated on the funded portion of the list if the following conditions are met:

- sufficient funds are available, and
- the project completes the necessary tasks to proceed.

Funds which become available due to the utilization of these bypass procedures will be treated in the same manner as additional allotments.

PROJECT PRIORITY LIST UPDATE

The priority list is continually reviewed and changes (i.e., loan award dates, estimated construction assistance amounts, project bypass, addition of new projects, etc.) may occur at least quarterly.

ADDITIONAL ALLOTMENTS

After defining the fundable portion of the SRF Project Priority List, the Board may determine that it is necessary or desirable to obligate additional funds that are available and the list may be extended to include the next highest ranked project or projects on the contingency section of the planning portion of the list. Any sum made available to a state by reallotment or de-obligation shall be treated in the same manner as the most recent allotment.

PROJECT REMOVAL

The Board may remove a project from the SRF Project Priority List when (1) the project has been funded, (2) the project is found to be ineligible, (3) it is indicated that the applicant does not intend to continue in the State Revolving Loan Program, or (4) the Board has determined that the applicant does not have financial capability to construct the project.

AMOUNT OF FINANCIAL ASSISTANCE

The amount of financial assistance shall be the sum of the total eligible costs related to construction. The amount is contingent upon the availability of funds for this purpose. During each funding year, loans totaling 25% of the funds available from the capitalization grant and state match for that year shall be provided to those eligible small municipalities with a population of 10,000 or less. Until the last federal CAP grant is awarded, if the state has not met the federal requirement of making binding commitments in an amount equal to 120% of each quarterly grant payment within one year of receipt of each quarterly payment, other eligible applicants may apply for a loan or an increase to an existing loan to utilize the small community set aside. This can occur if such actions will permit the state to comply with the federal binding commitment requirement.

PLACEMENT OF PROJECTS ON THE FUNDABLE PORTION OF THE SRF PROJECT PRIORITY LIST

Prior to projects being considered for placement on the fundable portion of the SRF Project Priority List, applicants must have met the following requirements:

- The applicant has completed the Environmental Information Document (EID) and submitted it to the Board for review. The Board must have prepared the Environmental Assessment and Finding of No Significant Impact (FNSI);
- In the case of an Environmental Impact Statement (EIS) the Board must have prepared a Record of Decision; or,
- The project must have received a categorical exclusion.

ADDITION OF NEW PROJECTS TO THE SRF PROJECT PRIORITY LIST

Prior to the placement of any new projects on the SRF Project Priority List, the applicant must submit a request for such placement to the Board. The request must specify that the applicant intends to apply for financial assistance from the SRF. The Board will evaluate the request, and if it is indicated that a viable project could result which would be in conformance with the requirements of the Act, the applicant will be required to submit a schedule including, but not limited to, the submittal and completion of the following: Infiltration/Inflow analysis, SSES (if required), revenue program, planning documents, plans and specifications, and application for construction assistance. The estimated construction start and initiation of operation of the project should be included.

CATEGORIES OF NEED

All projects receiving financial assistance must fit into at least one of the categories of need. A project may include all eligible categories of need. If a project consists of more than one category, its project ranking calculation will be based on that category which will result in the greatest priority points.

CHANGE OF SCOPE

A change of scope, such as the addition of new construction items, will not be eligible after loan closing unless:

- The change of scope is necessary to result in an operable treatment works due to an oversight and not to replace faulty construction or equipment already funded, or
- The change of scope is necessary due to changes in Federal or State requirements.

ASSISTANCE

Assistance in the form of a loan may contain a contingency equivalent to 10 percent of a loan amount.

INTENDED USE PLAN

Each fiscal year (after Congress appropriates and the State receives its allocation of funds for the SRF) the Board shall prepare, an Intended Use Plan (IUP) which shall be subjected to a public meeting. The IUP will identify projects anticipated to receive financial assistance from that year's appropriation. The IUP will comply with Federal Clean Water Act SRF guidance and shall include the following items:

- A description of both the short and long term goals and objectives of the fund. A list of projects for construction of sewage facilities which are included on the priority list and a list of activities eligible for assistance under Section 319 of the Act. The list of projects will include the following items:

- Name of the recipient
- Facility description
- Project treatment/use categories
- Treatment requirements
- Terms of financial assistance
- Type of Assistance
- NPDES Permit Number
- Projects that require an EIS.

Assurances for meeting the requirements of Section 602(b) of the Act:

- The Board will enter into binding commitments equal to 120% of the capitalization grant payments within one year after the receipt of the grant payment.
- All funds will be expended in an expeditious manner.
- All capitalization grant funds will first be used toward compliance with the enforceable requirements of the Act, including the municipal compliance deadline of July 1, 1988, and
- All projects funded with capitalization grant funds with construction starts prior to October 01, 1994 will meet the requirements under Sections 201(b), 201(g)(1), 201(g)(2), 201(g)(3), 201(g)(5), 201(g)(6), 201(n)(1), 201(o), 204(a)(1), 204(a)(2), 204(b)(1), 204(d)(2), 211, 218, 511(c)(1), and 513 of the Act.

A payment and disbursement schedule.

Included in the IUP are the criteria and method that are established for distribution of funds.

- The Board shall prepare a preliminary IUP prior to the beginning of each federal fiscal year. The applicants considered for funding will be those legal entities that have indicated to the Board that they desire to receive assistance within the next federal fiscal year. The preliminary IUP will be subjected to a public participation, including a public meeting.
- Each project to be included in the IUP shall be ranked according to priority points and shall be rated under the priority rating process.
- Projects will be ranked as follows:
- Each project shall be ranked according to the priority ranking system.
- Projects which are to be refinanced shall be rated on facility conditions which existed prior to start of construction on their treatment works.

The apportionment of funds shall be as follows:

- Projects within the range of available funds shall be eligible to receive financial assistance. Other projects shall be eligible for financial assistance at such time funds become available.
- Applicants designated to receive financial assistance must submit an approvable application.

ANNUAL REPORT TO THE LEGISLATURE AND GOVERNOR

Submission of a joint report by the Board to the Governor, Speaker of the House of Representatives and the President Pro Tempore of the Senate within one hundred twenty (120) days of the end of each fiscal year concerning the Wastewater Facility Construction Revolving Loan Account and implementation of the provisions of this act.

EPA ANNUAL REPORT

As required by Section 602(b)(10) of the Act, the Board will submit Annual Reports to the Regional Administrator no later than 90 days after the end of the fiscal year. The report shall provide information as specified by EPA and shall identify assistance recipients, assistance amounts, assistance terms, project categories and other details as negotiated between the Board and EPA with the emphasis on how the State met the goals set forth in the IUP and stability of the SRF.

TYPES OF ASSISTANCE

The Fund may be used for the following purposes:

To make loans on the condition that:

- Such loans are made at or below market interest rates, including interest free loans at terms not to exceed 20 years.
- Principal and interest payments will commence not later than one year after
- project completion and all loans will be fully amortized not later than 20 years
- after project completion.
- The recipient of a loan will establish a dedicated source of revenue for repayment
- of loans.

To buy or refinance the debt obligation of eligible applicants within the State at or below market rates, when such debt obligations were incurred and construction started after March 7, 1985, for the sole purpose of funding projects that meet the following requirements:

- The applicant is the approved designated management agency.
- The project is consistent with the water quality management plan.
- The project must be listed on the State priority list.
- The project has complied with requirements of these regulations and has been approved by the Board.
- The project must have approved plans and specifications and construction permit issued by the Department of Environmental Quality.

For the reasonable costs of administering the fund and conducting activities under Title VI of the Act, not to exceed 4% of the federal capitalization grant awards.

REQUEST FOR PLACEMENT ON THE SRF PRIORITY LIST

- The interested applicant sends an initial letter requesting funding, stating the type and amount of the proposed project & project schedule.
- The applicant will complete ORF-1, Pre-application for funding, and submit to the Board prior to placement on the SRF Priority List.
- Pre-applications that are acceptable to the Board will be sufficient for placement on the planning portion of the State's priority list.
- The Board will advise the applicants whether or not to proceed with planning documents for financial assistance based on the information provided in the pre-application form.

PREPLANNING CONFERENCE

Potential applicants shall confer with the Board staff as early in its planning process as practical. During the conference the Board will provide information, advice, instruction, and guidance on the scope of work and level of effort needed to define eligible projects in order to ensure that the applicant expeditiously complies with the environmental and planning requirements dictated by State and Federal Law. Guidance on the scope of the required environmental information and planning requirements will also be given at the conference.

PLANNING DOCUMENTS

The purpose of the planning document is to present the findings in a precise fashion with enough attention given to detail so as to allow adequate review of the project by the owner and applicable regulatory agencies. The plan will allow the review of the alternatives from the viewpoints of function, operation, economics, reliability, safety, efficiency, cost-effectiveness and environmental compatibility.

Two copies of the planning document must be submitted to the OWRB. The document shall contain but not be limited to the following information:

- Identification of the planning area boundaries and characteristics, the existing problems and needs related to wastewater management, and the projected needs and problems for the next 20 or more years.
- Cost-effective analysis of feasible wastewater treatment or conveyance alternatives capable of meeting State and federal water quality and public health requirements. The cost effective analysis shall detail all monetary costs

including but not limited to the present worth or equivalent annual value of all capital costs and operation.

- All basic information necessary for the design of the sewage system and/or treatment works.
- A Revenue Program, including a draft user charge system that complies with Boards guidelines.
- Adequate evaluation of the environmental impacts of alternatives in accordance with the regulation relating to Environmental Review and Determination to support the cost-effectiveness analysis.
- Resolution passed by the applicant which accepts the planning documents and provides a commitment to build the proposed project.
- Proposed project must be consistent with the State's approved Water Quality Management Plan established by Section 208 of the Act.
- Fiscal Data. The applicant shall submit a statement of the project engineer's most current estimate of project cost itemized as to major facilities or items including land and right-of-way costs, fees of engineers, all legal fees, fees of financial advisors and/or consultants, contingencies (10%), and interest during construction.

Planning documents, when necessary, will contain a Sludge Management Plan consistent with the Department of Environmental Quality sludge management regulations.

A Sludge Management Plan will be submitted with the planning document if the proposed project includes any construction, modification, or upgrade of a sewage treatment plant. The Sludge Management Plan will address sludge produced by the treatment plant after initiation of operation and will comply with applicable rules of the DEQ in OAC 252:647 and OAC 252:605. If the construction necessitates the disposal of inventoried sludge, the Sludge Management Plan will also address existing sludge.

The Sludge Management Plan will address the following minimum information requirements, and must otherwise comply with the requirements of OAC 252:605 and OAC 252:605:

- Quantity to be disposed of in dry tons per year
- Method of stabilization
- Method of disposal,
- A chemical analysis of the sludge
- Legal description of the area used for ultimate disposal of the sludge.

PRE-APPLICATION CONFERENCE

An applicant seeking financial assistance from the SRF may make an appointment with the

Board for a pre-application conference. As a minimum, the preapplication conference should be attended by a member of the governing body of the political subdivision, the entity's engineer, and fiscal representative. If possible the applicant should bring information documenting the existence of a dedicated source of revenue for repaying the loan. The primary purpose of the meeting is to acquaint the applicant with program requirements and to assist the applicant in preparing an application.

PLANS AND SPECIFICATIONS

Submittals. The applicant shall prepare plans and specifications and a final engineering design report on all significant elements of the project. These documents shall conform to the Water Pollution Control Facility Standards, contained in Department rules in OAC 252. Two copies of the documents shall be submitted to the Board.

Additional requirements. The plans and specifications shall contain the following:

- Provisions assuring compliance with the Board's rules and regulations and the Oklahoma bidding laws.
- Forms by which the bid bond, statutory, performance and maintenance bonds will be provided.
- Bonding requirements outlined in 61 OS 1981, Section 113(B), as amended.

Provisions requiring the contractor to obtain and maintain the appropriate insurance coverage.

Provisions giving authorized representatives of the Board access to all such construction activities, books, records, documents, and other evidence of the contractor for the purpose of inspection, audit and copying during normal business hours.

Those conditions, specifications, and other provisions provided by or requested by the Board to comply with State law and the SRF regulations.

Bid proposal that separates eligible construction from ineligible construction.

APPROVAL OF PLANS AND SPECIFICATIONS

The Board will approve the plans and specifications if they:

- Conform to the requirements the SRF regulations and have a permit to construct issued by the Department of Environmental Quality.
- Are consistent with all relevant statutes.
- Pass a bid-ability, operability, and constructability review by the Board.
- Are consistent with Board's approved planning documents and environmental determinations.

Approval of the plans and specifications does not relieve the applicant of any liabilities or responsibilities with respect to the design, construction, operation, or performance of the project.

The applicant shall obtain authorization from the Board before advertising for bids on the project.

Application for Financial Assistance

Two copies of an application shall be filed with the Board along with plans and specifications. The information required on all applications for financial assistance must meet the requirements of the Board presented to the applicant at the pre-application conference and must be on the fundable portion of the State priority list and included on the current year Intended Use Plan.

A copy of the proposed Revenue Program including draft user charge system may be submitted with the application.

Binding Commitment

Upon approval of the planning and environmental documents by the Department of Environmental Quality and Board, and approval of the application by the Board, the Board will issue a letter of binding commitment. This will be a commitment of financial assistance and shall contain those conditions deemed necessary by the Board.

Loan Closing

Prior to loan closing the applicant will submit to the Board, two copies of the following bid and contract documents:

- Contract documents, including all addenda.
- A tabulation of all bids received and an explanation for any rejected bids or otherwise disqualified bidders.
- Contingently executed construction contract to be entered into by the applicant for building of the projects containing the appropriately executed bonds, insurance certificates, act of assurance, and other documents required by this chapter.
- Other or additional engineering data and information, if deemed necessary by the Board staff.
- A certification that all required acquisitions, leases, easements, rights-of-way, relocations, (both voluntary and involuntary) have been obtained for the project to be built.
- Evidence that the applicant has obtained all required permits and financing to build the wastewater facilities.
- Information requested by the Board regarding loan closing documents.
- Prior to concurrence by the Board in the award of a construction contract, any and all bid protests must be resolved by the applicant.

Refinancing Construction Loans

If the project includes the refinancing of a loan, the applicant shall submit all of the items specified and any records, assurances, or appraisals concerning the construction of the project.

Additionally, the project must pass Board inspection verifying that the facility was constructed in accordance with the approved plans and specifications.

MINIMUM ASSISTANCE AGREEMENT CONDITIONS

The Board will furnish a list of conditions to be included in the assistance agreement. To include as a minimum:

- Any condition identified in the letter of commitment that applies to the loan.
- Federal requirements mandated by the Clean Water Act.
- A project schedule that has been coordinated with State and Federal enforcement authorities.
- Any Federal, State or local requirement previously identified that has a significant impact on the project.
- Conditions and mitigative measures identified during the environmental review.

CONSTRUCTION PHASE

AWARDING CONSTRUCTION CONTRACTS

The recipient shall be responsible for assuring that every appropriate procedure and incidental legal requirement is observed in advertising for bids and awarding the construction contract. The text of the construction contract shall not vary from the text of the Board approved draft contract documents in the approved plans and specifications or addenda to the plans and specifications.

INSPECTION DURING CONSTRUCTION

During the building phase of the project, the recipient shall provide engineering services necessary to assure completion of the project in accordance with the loan agreement and the approved plans and specifications.

RESIDENT INSPECTION

After the construction contract is awarded, the recipient shall provide for adequate full-time resident inspection of the project and require assurance that the work is being performed in a satisfactory manner in accordance with the approved plans and specifications, approved alterations, sound engineering principles and building practices. The Board is authorized to inspect the building of any project at any time in order to assure that plans and specifications are being followed and that the works are being built in accordance with sound engineering principles and building practices, but such inspection shall never subject the State of Oklahoma to any action for damages. The Board shall bring to the attention of the recipient and the project engineer any variances from the approved plans and specifications. The recipient and the project engineer shall immediately initiate necessary action rectifying construction deficiencies.

INSPECTION OF MATERIALS

- The Board is also authorized to inspect all materials furnished, including inspection of the preparation or manufacture of the materials to be used. The state inspector is to report the manner and progress of the building or to report conditions relating to the materials furnished and the compliance by the contractor with approved plans and specifications for the project. Such inspection will not release the contractor from any obligation to perform the work in accordance with the requirements of the contract documents or the project engineer from determining compliance with the requirements of the contract documents.
- In the event building procedures or materials are determined by the Board to be substandard or otherwise unsatisfactory and/or not in conformity with approved plans and specifications, the Board may order the recipient to take such action in the manner provided for in the construction contract to correct any such deficiency.
- In those instances of dispute between the recipient project engineer and the Board's representative as to whether material furnished or work performed conforms with the terms of the construction contract, the Board may order the recipient to direct the project engineer to reject questionable materials and/or initiate other action provided for in the construction contract, including suspension where necessary, until all disputed issues are resolved in accordance with the terms of the construction contract.
- The contractor and recipient shall furnish the Board's representative with every reasonable facility for ascertaining whether the work as performed is in accordance with the requirements and intent of the contract.
- In addition to normal testing procedures required of the recipient, the Board may require reasonable additional tests of building materials which the Board determines to be necessary during the building of projects financed in whole or in part by SRF funds. All tests, whether for the Board or the project engineer, will conform to current American Water Works Association, American Association of State Highway and Transportation Officials, American Society of Testing and Materials, and the Oklahoma Department of Transportation published procedures, or similar criteria. The Board shall specify which tests are applicable. Samples for testing shall be furnished at no cost to the Board upon request on the construction site.

PROJECT CHANGES

Minor changes in the project work that are consistent with the objectives of the project and within the scope of the assistance agreement do not require the approval of the Board before the applicant's implementation of the change. However, the amount of the funding provided by the assistance agreement may only be increased by a formal amendment which will require Board approval.

The recipient must receive approval from the Board before implementing changes which:

- Alter the project performance standards.
- Alter the type of wastewater treatment provided by the project.
- Significantly delay or accelerate the project schedule.

- Substantially alter the design drawings and specifications, or the location, size, capacity, or quality of any major part of the project.

BUILDING PHASE SUBMITTALS

The following submittals and accompanying actions by the recipient will be required during the building phase of the project.

- A complete set of as-built drawings will be submitted to the Department of Environmental Quality upon completion of all construction.
- Notice of completion of construction will be submitted to the Board upon completion of project construction.
- Any other building phase submittals required as part of the financial assistance documents will be submitted for the Board's approval.

PROGRESS PAYMENTS

Disbursements from the construction fund established by the recipient will require approval by the Board. Certified requests for payment and documentation shall be submitted to the Board monthly. Upon approval by the Board who will authorize the progress payments to be made from the fund.

RETAINAGE

Retainage withheld. Ten percent (10%) of all partial payments made may be withheld as retainage.

Partial release of retainage. At any time that the contractor has completed in excess of fifty percent (50%) of the total contract amount the retainage may be reduced to five percent (5%) of the amount earned to date, if prior approval is obtained from the Board.

Final release. After completion of construction and acceptance by the applicant, the final release of retainage may be made with approval of the project by the Board.

POST BUILDING PHASE RESPONSIBILITIES OF THE RECIPIENT

After the satisfactory completion of the project, the recipient shall be held accountable by the Board for the continued validity of all representations and assurances made to Board. Continuing cooperation with the Board is required. To facilitate such cooperation and to enable the Board to protect the State's investment and public interest, the following provisions shall be observed:

The Board is authorized to inspect the project and the records of operation and maintenance of the project at any time. If it is found that the project is being improperly or inadequately operated and maintained to the extent that the project objectives are not being properly fulfilled or that integrity of the State's investment is being endangered, the Board shall require the recipients to take appropriate action.

The Board may request certified copies of all minutes, operating budgets, monthly operating statements, contracts, leases, deeds, audit reports, and other documents concerning the operation and maintenance of the project in addition to the requirements of the covenants of applicable bond indenture and/or the loan agreement. The financial assistance provided by the Board is based on the project's economic feasibility, and the Board shares the recipient's desire to maintain this feasibility in the project's operation and maintenance at all times. The Board may periodically inspect, analyze, and monitor the project's revenues, operation, and any other information the Board requires in order to perform its duties and to protect the public interest.

The recipient shall maintain debt service fund accounts and all other fund accounts related to the SRF debt in accordance with standards set forth by the Governmental Accounting Standards and the Board.

Recipients which were required to implement mitigative measures as a result of the environmental review process shall continue to comply with those measures.

- Payment of principal and interest on loans shall be made to the Board as provided in the loan documents.

ACCOUNTING

The recipient shall submit with the application an adopted ordinance, resolution or similar instrument that shall contain sections providing:

That project accounts for the construction fund shall be maintained in accordance with standards set forth by the Governmental Accounting Standards and the Board. The construction fund shall be established at an official depository of the recipient and all funds in the construction fund shall be secured in the manner provided by law for the security of county funds or city funds, as appropriate. All proceeds acquired by the recipient to plan, design and construct the project shall be placed in the construction fund. All proceeds in the construction fund shall be used for the sole purpose of planning, design and building the project as approved by the Board.

Upon completion of the project a final accounting will be made to the Board. The final accounting shall provide:

- A final accounting be made to the Board of the total cost of the project upon completion of the project. Such resolution or ordinance shall also provide that if the project be completed at a total cost less than the amount of available funds for building the project, or if the Board disapproves construction of any portion of the project as not being in accordance with the plans and specifications, the recipient shall immediately, with filing the final accounting, return to the SRF the amount of any such excess and/or the cost as determined by the Board relating to the parts of the project not built in accordance with the plans and specifications, to the nearest multiple of $1,000, or to the nearest denomination of bonds being sold (where funding was provided by bonds issued by the Board).
- That an annual audit of the recipient, prepared by a certified public accountant or licensed public accountant be provided to the Board.
- That the recipient shall maintain adequate insurance coverage on the project in an

amount adequate to protect the State's interest.

- That the recipient will comply with any special conditions specified by the Board's environmental determination until all financial obligations to the State have been discharged.
- That the recipient covenants to continually abide by the terms of the financial assistance agreement, the Board's rules and regulations, and relevant State statutes for operation and maintenance of the facility.

ALLOWABLE LAND AND RIGHT-OF-WAY COSTS

Allowable costs for land and rights-of-way include the cost (including associated legal, administrative, and engineering costs) of land acquired in fee simple or by lease or easement that will be an integral part of the treatment process or that will be used for the ultimate disposal or residues resulting from such treatment.

GENERAL

The financial assistance recipient, who receives funds as a result of the federal capitalization grants to the state, must comply with all applicable federal laws and orders. These include but are not limited to the following:

1. Environmental

    Archeological and Historic Preservation Act of 1974, PL 93-291
    Clean Air Act, 42 U.S.C. 7506(c)
    Coastal Barrier Resources Act, 16 U.S.C. 3501 et seq.
    Coastal Zone Management Act of 1972, as amended.
    Endangered Species Act 16 U.S.C. 1531, et seq.
    Executive Order 11593, Protection and Enhancement of the Cultural Environment
    Executive Order 11988, Floodplain Management
    Executive Order 11990, Protection of Wetlands
    Farmland Protection Policy Act, 7 U.S.C. 4201 et seq.
    Fish and Wildlife Coordination Act, PL 85-624, as amended
    National Historic Preservation Act of 1966, PL 89-665, as amended
    Safe Drinking Water Act, Section 1424(e), PL 92-523, as amended
    Wild and Scenic Rivers Act, PL 90-542, as amended

2. Economic

    Demonstration Cities and Metropolitan Development Act of 1966, PL 89-754, as amended Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, including Executive Order 11738,
    Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans.

3. Social Legislation

    Age Discrimination Act, PL 94-135
    Civil Rights Act of 1964, PL 88-352
    Section 13 of PL 92-500; Prohibition against sex discrimination under the Federal Water

Pollution Control Act
Executive Order 11246, Equal Employment Opportunity
Executive Order 11625 and 12138, Women's and Minority Business Enterprise
Rehabilitation Act of 1973, PL 93-112 (including Executive Orders 11914 and 11250)

4. Miscellaneous authority
Uniform Relocation and Real Property Acquisition Policies Act of 1970, PL 91-646
Executive Order 12549 - Debarment and Suspension

STATE REVOLVING FUND ENVIRONMENTAL REVIEW PROCESS

As required by the provisions of Section 602(b) (6) of the 1987 Amendments to the Clean Water Act, the Board shall conduct an interdisciplinary environmental review consistent with the National Environmental Policy Act of the project proposed for funding through the Wastewater Facility Construction Revolving Loan Account. This review will insure that the project will comply with the applicable local, state and federal laws and Board regulations relating to the protection and enhancement of the environment. Based upon the staff's review, the Board will make formal determinations regarding the potential social and environmental impacts of the proposed project. As necessary, the determination will include mitigative provisions as a condition of financial assistance for building and no financial assistance will be provided until a final environmental determination has been made. Nothing in the Board's ~~these~~ regulations shall prohibit any public, private or governmental party from seeking administrative or legal relief from the determinations of the Board. Potential applicants to the Wastewater Facility Construction Revolving Loan Account should obtain guidance from the staff regarding the scope of the environmental review to be conducted by the Board and the environmental information which the applicant will be required to submit in support of the proposed project.

BASIC ENVIRONMENTAL DETERMINATION

There are three (3) basic environmental determinations that will apply to projects proposed to be implemented with assistance from the Wastewater Facility Construction Revolving Loan Account. These are: a determination to categorically exclude a project from a formal environmental review; a finding of no significant impact (FNSI) based upon a formal environmental review supported by an environmental information document (EID); and a determination to provide or not to provide financial assistance based upon a Record of Decision following the preparation of an environmental impact statement (EIS). The appropriate determination will be based on the following criteria.

1. The categorical exclusion determination applies to categories of projects that have shown over time not to entail significant impacts on the quality of the human environment.

    a. Projects which meet the following criteria may be categorically excluded from formal environmental review requirements.

        i. The project is directed solely toward minor rehabilitation of existing facilities, functional replacement of equipment, or toward the construction of related facilities adjoining the existing facilities that do not affect the degree of treatment or the capacity of the works (i.e. infiltration and inflow correction, rehabilitation of existing equipment and structures, and the construction of small structures on existing sites).

        ii. The project is in a community of less than 10,000 population and is for minor expansions or upgrading of existing treatment works or on-site disposal systems are proposed.

b. Categorical exclusions will not be granted for projects that entail:
   i. the construction of new collection lines;
   ii. a new discharge or relocation of an existing discharge;
   iii. a substantial increase in the volume or loading of pollutants;
   iv. providing capacity for a population thirty (30) percent or greater than the existing population;
   v. known or expected impacts to cultural resources, threatened or endangered species, or other environmentally sensitive areas; and
   vi. the construction of facilities that are known or expected to be not cost-effective or are likely to cause significant public controversy. The Board may exclude, by amendment to these regulations, other categories of projects for which there is sufficient documentation demonstrating that they are not likely to have significant effects on the quality of the human environment.

2. The FNSI will be based upon an environmental review by the staff supported by an EID prepared by the applicant in conformance SRF rules. Based upon its review, the staff will prepare an environmental assessment (EA) resulting in the issuance of either a FNSI or a public notice that the preparation of an EIS will be required. All applicants whose projects do not meet the criteria for either a categorical exclusion or EIS will be required to prepare an EID. The Board's issuance of a FNSI will be based upon an EA documenting that the potential environmental impacts will not be significant or that they may be mitigated without extraordinary measures.

3. The Record of Decision may only be based upon an EIS in conformance with the format and guidelines described in Board's regulation. An EIS will be required when the Board determines any of the following:

   a. the project will significantly affect the pattern and type of land use or growth and distribution of the population;
   b. the effects of the project's construction or operation will conflict with local or state laws or policies;
   c. the project may have significant adverse impacts upon:
      i. wetlands,
      ii. floodplains,
      iii. threatened and endangered species or their habitats,
      iv. cultural resources including parklands, reserves, other public lands or areas of recognized scenic, recreational, agricultural, archeological or historic value;
   d. the project will displace population or significantly alter the characteristics of existing residential areas;
   e. the project may directly or indirectly (i.e., through induced development) have significant adverse effect upon local ambient air quality, local noise levels, surface and ground water quality or quantity, fish, shellfish, wildlife or their natural habitats;

f. the project may generate significant public controversy;
g. the treated effluent will be discharged into a body of water where the present classification is too lenient or is being challenged as too low to protect present or recent uses, and the effluent will not be of sufficient quality to meet the requirements of those uses.

OTHER DETERMINATIONS THAT ARE REQUIRED OF THE BOARD

1. Recognizing that a project may be altered at some time after an environmental determination on the project has been issued, the Board will provide that, prior to approval, the plans and specifications, assistance application, and related documents will be examined for consistency with the environmental determination. If inconsistencies are found, the Board may revoke a categorical exclusion and require the preparation of an EID or an EIS, or require the preparation of amendments to an EID or supplements to an EIS, as appropriate. Based upon the staff's review of the amended project, the Board will:

   a. reaffirm the original determination through the issuance of a public notice or statement of finding;
   b. issue a FNSI for a project for which a categorical exclusion has been revoked, or issue a public notice that the preparation of an EIS will be required;
   c. issue an amendment to a FNSI, or revoke a FNSI and issue a public notice that the preparation of an EIS will be required, or
   d. issue a supplement to a record of decision, or revoke a record of decision and issue a public notice that financial assistance will not be provided.

2. When five (5) or more years have elapsed between the last environmental determination and the submittal of an application to the Fund, the Board will re-evaluate the project, environmental conditions and public views.

OTHER DETERMINATIONS THAT ARE AVAILABLE TO THE BOARD

1. An applicant may request advance authority to construct part of the proposed wastewater treatment project prior to completion of the necessary environmental review when the part of the project will:

   a. immediately remedy a severe public health, water quality or environmental problem;
   b. not preclude any reasonable alternatives identified for the complete system;
   c. not cause significant or indirect environmental impacts including those which cannot be acceptably mitigated without completing the entire project; and
   d. not be highly controversial.

Based upon the review the Board will issue a FNSI so conditioned as to prohibit construction of the remainder of the project until a complete environmental review has been performed and a subsequent environmental determination has been issued.

2. The Board may choose to accept determinations made by EPA in previously issued FNSIs in lieu of conducting a formal environmental review when the proposed project will not cause adverse impacts to the environment and is not highly controversial.

ENVIRONMENTAL INFORMATION REQUIRED BY THE BOARD

A minimum of two (2) copies of all information required in this subsection will be submitted to the Board.

1. Applicants seeking a categorical exclusion will provide the Board with sufficient documentation to demonstrate compliance with the criteria of this regulation. At a minimum, this will consist of:

    a. a brief, complete description of the proposed project and its costs;
    b. a statement indicating that the project is cost-effective and that the applicant is financially capable of constructing, operating and maintaining the facilities; and
    c. a plan map or maps of the proposed project showing:
        i. the location of all construction areas,
        ii. the planning area boundaries, and
        iii. any known environmentally sensitive areas.

2. An EID must be submitted by those applicants whose proposed projects do not meet the criteria for a categorical exclusion and for which the Board has made a preliminary determination that an EIS will not be required. The Board will provide guidance on both the format and contents of the EID to potential applicants prior to initiation of planning.
    a. At a minimum, the contents of an EID will include:

        i. the purpose and need for the project;
        ii. the environmental setting of the project and the future of the environment without the project;
        iii. the alternatives to the project as proposed and their potential environmental impacts;
        iv. a description of the proposed project;
        v. the potential environmental impacts of the project as proposed including those which cannot be avoided;
        vi. the relationship between the short term uses of man's environment and the maintenance and enhancement of long term productivity;
        vii. any irreversible and irretrievable commitments of resources to the proposed project;
        viii. a description of public participation activities conducted, issues raised, and changes to the project which may be made as a result of public participation process; and
        ix. documentation of coordination with appropriate governmental agencies.

b. Prior to the applicant's adoption of the planning document, the applicant will hold a public hearing on the proposed project and the EID, and provide the Board with a transcript of the hearing. The Board will provide guidance to the applicant regarding the contents of the hearing notice and of the hearing. The hearing will be advertised at least thirty (30) days in advance in a local newspaper of general circulation. Concurrent with the advertisement, a notice of the public hearing and availability of the documents will be sent to all local, state, and federal agencies and public and private parties that may have an interest in the proposed project. Included with the transcript will be a list of attendees, written testimony, and the applicant's responses to the issues raised.

c. The applicant will make copies of the EID available to all federal, state, and local agencies and others with an interest in the project. The Board will provide guidance to the applicant regarding coordination requirements.

3. The format of an EIS will encourage sound analysis and clear presentation of alternatives, including the no action alternative and the selected alternative, and their environmental, economic and social impacts. The following format must be followed by the applicant unless the Board determines there are compelling reasons to do otherwise.

a. A cover sheet identifying the applicant, the project(s), the program through which financial assistance is requested, and the date of publication.

b. An executive summary of the critical issues of the EIS in sufficient detail that the reader may become familiar with the proposed project and its cumulative effects. The summary will include:
   i. a description of the existing problem;
   ii. a description of each alternative;
   iii. a listing of each alternative's potential environmental impacts, mitigative measures and any areas of controversy; and
   iv. any major conclusions.

c. The body of the EIS, which will contain the following information.
   i. A complete and clear description of the purpose and need for the proposed project that clearly identifies its goals and objectives.
   ii. A balanced description of each alternative considered by the applicant. The description will include the size and location of the facilities, pipelines, land requirements, and construction schedules. The alternative of no action will be discussed and the applicant's preferred alternative(s) will be identified. Alternatives that are eliminated from examinations will be presented with reasons.
   iii. A description of the alternatives available to the Board including:
      - providing financial assistance to the proposed project;
      - requiring that the proposed project be modified prior to providing financial assistance to reduce adverse impacts, or providing assistance with conditions requiring the implementation of mitigative measures; and
      - not providing financial assistance.
      - A description of the alternatives available to other local, state, and federal agencies which may have the ability to issue or deny

a permit, provide financial assistance or otherwise affect or have an interest in any of the alternatives.

- A description of the effected environment and environmental consequences of each alternative. The effected environment on which the evaluation of each alternative will be based includes, as a partial listing: hydrology, geology, air quality, noise, biology, socioeconomics, land use, and cultural resources of the facilities planning area. The Board will provide guidance, as necessary, to the applicant regarding the evaluation of the affected environment. The discussion will present the total impacts of each alternative in manner that will facilitate comparison. The effects of the no action alternative must be included to serve as a baseline for comparison of the adverse and beneficial impacts of the other alternatives. A description of the existing environment will be included in the no action section to provide background information. The detail in which the effected environment is described will be commensurate with the complexity of the situation and the significance of the anticipated impacts.

d. The draft EIS will be provided to all local, state and federal agencies and public groups with an interest in the proposed project and be made available to the public for review. The final EIS will include all objections and suggestions made before and during the draft EIS review process, along with the issues of public concern expressed by individuals or interested groups. The final EIS must include discussions of any such comments pertinent to the project or the EIS. All persons submitting comments will be identified. If a comment has led to a change in either the project or the EIS, the reason should be given. The Board will always endeavor to resolve any conflicts that may have arisen, particularly among permitting agencies, prior to the issuance of the final EIS. In all cases, the comment period will be no less than 45 days.

e. Material incorporated into an EIS by reference will be organized to the extent possible into a Supplemental Information Document and be made available for public review upon request. No material may be incorporated by reference unless it is reasonably available for inspection by interested persons within the comment periods specified.

f. When an EIS is prepared by contractors, either in the service of the applicant or the Board, the Board will independently evaluate the EIS prior to issuance of the Record of Decision and take responsibility for its scope and contents. The Board staff who undertake this evaluation will be identified under the list of preparers along with those of the contractor and any other parties responsible for the content of the EIS.

g. The public participation required for an EIS is extensive; but should, depending upon the nature and scope of the proposed project, be supplemented by the applicant. The following requirements represent the minimum allowable to the applicant and the Board.

i. Upon making the determination that an EIS will be required of a proposed project, the Board will publish in the Oklahoma Register and distribute a notice of intent to prepare an EIS.

ii. As soon as possible after the notice of intent has been issued, the

Board will convene a meeting of the effected federal, state and local agencies, the applicant, and other interested parties to determine the scope of the EIS. A notice of this scoping meeting may be incorporated into the Notice of Intent and the notification period will not be less than forty-five (45) days. As part of the scoping meeting the Board will, at a minimum:

- determine the significance of issues for and the scope of those significant issues to be analyzed in depth in the EIS;
- identify the preliminary range of alternatives to be considered;
- identify potential cooperating agencies and determine the information or analyses that may be needed from cooperating agencies or other parties;
- discuss the method for EIS preparation and the public participation strategy;
- identify consultation requirement of other laws and regulations;
- determine the relationship between the preparation of the EIS and the completion of the facilities plan and any necessary arrangements for coordination of the preparation of both documents.

iii. Following the scoping process the Board will begin the identification and evaluation of all potentially viable alternatives to adequately address the range of issues developed in the scoping. A summary of this, including a list of the significant issues identified, will be provided to the applicant and other interested parties. Preparation of the EIS will be done, at the discretion of the Board: directly, by its own staff; by consultants to the Board; or by a consultant, contracted by the applicant subject to approval by the Board. In the latter two cases, the consultant will be required to execute a disclosure statement prepared by the Board signifying they have no financial or other conflicting interest in the outcome of the project. Both the draft EIS and final EIS will be distributed and made available for public review except that the advertisement and comment period for the public participation will be no less than forty-five (45) days. The Board will publish, in the Daily Oklahoman and a newspaper(s) of general circulation in the project area, a notice of availability of the EIS giving locations at which it will be available for public review at least forty-five (45) days prior to making any environmental determination.

ENVIRONMENTAL REVIEW BY THE BOARD

When the Board has determined that an applicant's proposed project may be excluded from a formal environmental review or has determined that a categorical exclusion is to be rescinded, the Board will prepare a public notice of the determination to categorically exclude the project and stating the availability of supporting documentation for public inspection. The notice will be published in a local newspaper of community-wide circulation by the applicant. The Board, concurrent with the publication, will distribute the notice to all interested parties.

An environmental review of the proposed project, supported by the applicant's EID, will be conducted by the Board to determine whether any significant impacts are anticipated and whether any changes may be made in the proposed project to eliminate significant adverse impacts. As part of this review, the Board may require the applicant to submit additional information or undertake additional public participation and coordination to support its environmental determination. Based on the environmental review, the Board will prepare an environmental assessment, describing:

- the purpose and need for the proposed project;
- the proposed project, including its costs;
- the alternatives considered and the reasons for their rejection or acceptance;
- the existing environment;
- any potential adverse impacts and mitigative measures; and
- any proposed conditions to the provision of financial assistance and any means provided for the monitoring of compliance with the conditions.

Based upon this environmental assessment, the Board will issue a FNSI or a notice of intent to prepare an EIS. The FNSI will include a brief description of the proposed project, its costs, any mitigative measures required of the applicant as a condition of its receipt of financial assistance, and a statement to the effect that comments supporting or disagreeing with the FNSI may be submitted for consideration by the Board. The environmental assessment will be attached when mitigative measures are specified by conditions of the financial assistance. The FNSI will be distributed to all parties, governmental entities, and agencies that may have an interest in the proposed project. No action regarding approval of the facilities plan or the provision of financial assistance will be taken by the Board for at least thirty (30) days after the issuance of a FNSI.

Following the comment period and public hearings on the final EIS and at the time of the decision to approve the facilities plan or to provide or deny financial assistance to the proposed project, the Board will prepare a concise public record of decision. The record of decision will describe those mitigative measures to be taken which will make the selected alternative environmentally acceptable.

The Board will conduct environmental reviews and issue public notices or amended determinations, as appropriate.

HARDSHIP GRANT FOR RURAL COMMUNITIES (HGRC)

The 1996 congressional Appropriations Act reserved $50,000,000.00 in federal funds from the Clean Water State Revolving Funds to establish a new grant program to help small, dis-advantaged rural communities address their wastewater needs. The State of Oklahoma has a total of $1,039,080.00 available for the HGRC during State Fiscal Year 1998 (July 1, 1997 to June 30, 1998). In consultation with the EPA Regional office, the State may provide hardship assistance, to benefit any community of more than a single household but no more than 3,000 inhabitants that is identified by the State as a rural community, is not a remote area within the corporate boundaries of a larger city, and is not served by any centralized sewage collection or wastewater treatment system. In order for an interested rural community to qualify, an eligible community will submit to the OWRB an SRF Loan Application requesting to be put on the SRF Priority List. An interested rural community must seek at least 15 % of the total amount of the project for SRF loan with the remaining 85 % being eligible for a hardship grant. The amount of SRF Loan vs. Grant will be based upon the OWRB evaluation of the communities 1994 Median Household Income (MHI), Unemployment Rate and/or Per Capita Income through the Bureau of Economic Analysis (BEA) and/or verifiable local survey data. The hardship Grant /SRF Loan request letter should include, a brief description of the project for which loan funds will be requested, identify a dollar amount of the loan request, and identify when the funds will be necessary, or target a loan closing date. The community will be rated according to the SRF Project priority system which is based on the project type factor, the stream segment ranking factor, effluent quality factor and public health factor. If the community is qualified for a HGRC, the hardship grant will be awarded based upon economic hardship, environmental needs, availability of hardship grant money, and the readiness to proceed of the communities project.

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Please note: References below to specific page numbers in the CPP are to pages as numbered in the September 1, 1999 Draft.

GENERAL

1. I'm mainly concerned with the protection of impaired water streams with respect to nutrients, especially Nitrogen and Phosphorus. And that if the water data sets that were used to develop this methodology were skewed to the right (higher values), then I would say using a normal distribution plus 1 standard deviation would probably get you at about the average level. However, if the data were skewed to the left (lower levels), then a normal distribution plus 1 standard deviation would actually create a much higher level of Nitrogen and Phosphorus allowed or than what would normally be seen.

I would like to have known in the response to comments, proof positive, whether this data was skewed to the right or the left (was it skewed to the higher concentrations or to the lower concentrations). This would make a significant difference whether I would accept the mean plus 1 standard deviation.

Response: More details on the data utilized in the statistical approach proposed by Simpson are available on request. However, the Simpson methodology has been removed from the CPP and the Use Support Assessment Protocol developed by the Water Resources Board has been placed in.

2. I know that we need quality water for our potable needs but we also need water quantity. If we keep getting more strict on the quality standards, we will soon not be pumping water. Some of the new proposed standards are not science based and are not for conditions in Oklahoma. Perhaps if we use a more common sense approach as was originally in Sept., we would all be better off. The screening levels as proposed are in the Sept. draft are more the actual conditions in Oklahoma and are based on actual screening data. I therefore urge you to reject the new revised model until it can be more fully evaluated.

Response: The dichotomous key approach has been more fully evaluated by the State Agency Technical Committee and has further discussed at public meetings associated with the USAP development process. There is a consensus that this is the best approach available at this time.

3. We urge you to reject the proposed Use Support Assessment Protocol (USAP) for Determining Nutrient Threats to Streams, to place into the CPP. This USAP needs further study. Before this complex USAP can be used in any kind of regulatory scheme, many questions must be answered, and the USAP model must be adapted for Oklahoma conditions.

Response: It is true that the USAP for determining nutrient threats to streams is not a panacea. The USAP procedure has been further evaluated. Where data were available, some criteria were adjusted for Oklahoma conditions. Oklahoma cannot wait another decade or more to determine nutrient threats to streams.

It is our belief that the USAP process is the best currently available. It is the only one that combines nutrient thresholds with nutrient sensitivity. Both must be considered in order to determine nutrient threats. If nutrient concentrations are below threshold, beneficial uses will not be threatened no matter how sensitive the stream is. If the receiving stream is very sensitive to nutrients, even relatively low concentrations can result in threats.

4. The Dutch study that serves as the basis for the concentration criteria values used in the Nutrient USAP for Oklahoma was conducted using waterbodies in the Netherlands. It is doubtful that the protective criteria developed for streams in the Netherlands have comparable ecological significance for streams in Oklahoma.

Response: It is unknown if protective criteria developed for streams in the Netherlands have comparable significance for streams in Oklahoma. Aquatic life in Oklahoma may be more sensitive to nutrient loadings than is aquatic life in the Netherlands. However, this is the most complete, comprehensive data set that relates nutrient loading and ecological impact.

5. It is not clear from review of the Dutch study that nutrients were the only environmental stress factors that could have influenced the macro invertebrate collections used to determine and rate the quality of the study streams. Were nutrients isolated as the only stressors influencing the macro invertebrate communities or did other factors such as dissolved oxygen, habitat, and substrate type influence the collections?

Response: One of the ways nutrient loads influence macroinvertebrate communities is through dissolved oxygen (D.O.) levels. Habitat and substrate types were accounted for through separating streams from ditches and segregating streams into six separate categories. The Dutch analyzed sixty different environmental factors and chemical constituents in over 4000 samples. Their analysis would have discovered other environmental stressors or chemical constituents that could have influenced the macroinvertebrate communities.

6. The nutrient USAP merges two protection schemes that are not necessarily compatible. The USAP uses a process designed to determine sensitivity to nutrient threats on the basis of physical characteristics of the stream system. The sensitivity that is estimated is the susceptibility of the system to support excessive plant growth, in the form of periphyton, phytoplankton or aquatic macrophytes. This is a sound concept. However, the nutrient concentration criteria used in the USAP are not based on plant growth response to nutrients. The nutrient concentration criteria are based on an ecological response of macro invertebrates to nutrients. Unless it can be shown that plants and aquatic insects have the same responses to nutrients it is not appropriate to merge these two protection schemes.

Response: The Fish and Wildlife Propagation Beneficial Use is threatened when the macroinvertebrate community is in decline. This community becomes unhealthy when there is excessive primary productivity. Changes in productivity can determine which taxa dominate a community. Dissolved oxygen (D.O.) levels can drop to near "0" at dawn in streams with excess primary productivity, thereby impairing the macroinvertebrate community.

Excess primary productivity is the result of both nutrient loading and nutrient sensitivity. "Specific Environmental Quality" (SEQ) criteria may be used as thresholds for nutrient loadings because they were developed under reference conditions. These streams were sensitive to nutrient loading.

When concentrations exceed the SEQ values in sensitive streams, the macroinvertebrate community is diminished and the Fish and Wildlife Propagation Beneficial Use is threatened. Conversely, if the SEQ values are not exceeded, no matter how sensitive the stream, there is no chance of the Beneficial Use being threatened. Fish and Wildlife Propagation Beneficial Use is not threatened even if the concentrations exceed General Environmental Quality (GEQ) criteria when the stream is not sensitive to nutrients. For example, turbid streams are light limited, rather than nutrient limited, and therefore are not sensitive to nutrient loading. The State agency USAP sub-committee recently met to reconsider the use of SEQ values and unanimously agreed that it is appropriate.

Therefore, it not only appropriate to merge these two protection schemes, it is absolutely necessary in order to determine nutrient threats to the Fish and Wildlife Beneficial Use.

7. The stream slope value (>20 feet/mi) used in the USAP is much too high for use in Oklahoma to describe "hilly" streams.

Response: The slope factor was re-evaluated using the suggested approach. The 80^{th} percentile level was applied to stream miles rather than number of sites. This results in a criterion of 17 feet/mile, which was incorporated in the USAP.

8. The canopy value (>80%) listed in the USAP is not reasonable for use on Oklahoma streams. Virtually all Western Oklahoma streams have less than 80% canopy cover and few Eastern Oklahoma streams will have more than 80% canopy cover throughout their entire length.

Response: USDA developed the canopy value of 80%. There is no reason to believe that it is inappropriate. Simply because parts of western Oklahoma are treeless is no reason to believe that light limitation can be achieved with less than 80% canopy.

9. Is a sandy substrate considered soft?

Response: Yes. Sandy substrate is listed as soft in USDA guidance and OAC 785:46-15. A classification was added to the language to reflect this.

10. If the numerical criteria from the Dutch study are to be used in the Oklahoma USAP, the General Environmental Quality (GEQ) values should be substituted for the Specific Environmental Quality (SEQ) values. It will be virtually impossible to relax the numerical criteria once they are included with the USAP in the CPP. If necessary, future revisions of the CPP could include refinement of the nutrient criteria to be more stringent values.

Response: There are several reasons why the Specific Environmental Quality (SEQ), rather than the General Environmental Quality (GEQ), values must be used:

a. Dutch criteria may not be entirely appropriate for Oklahoma. Therefore, it is appropriate to be conservative. EPA invariably chooses the conservative approach when faced with a level of uncertainty in the choice of criteria.

b. USAP determines nutrient threats, not impairments. The universe of nutrient threats must include all potential impairments. Therefore, thresholds for nutrient threats should be more stringent than nutrient criteria that may be developed in the future.

c. SEQ values were developed under reference conditions. These streams are assumed to be equivalent to reference streams in Oklahoma. It may also be assumed that these streams with SEQ criteria are very sensitive to nutrient loading. Therefore, SEQ values are appropriate for nutrient thresholds. Concentrations below SEQ values will not produce nutrient threats no matter how sensitive the receiving stream.

GEQ values were developed using at least minimally impacted streams. Therefore, a majority of the streams used to develop these values might not be very sensitive to nutrients. It cannot be assumed that concentrations below GEQ values will not result in nutrient threats and therefore GEQ values serve no purpose as thresholds for determining nutrient threats.

d. The use of SEQ values in the dichotomous key has been tested in Oklahoma by OWRB and OCC personnel. Both agencies found that the use of SEQ's delineated streams that were obviously impacted by nutrients.

e. The State agency USAP sub-committee for nutrient-threatened streams met recently to revisit the use of SEQ's versus GEQ's. The members agreed unanimously to retain the use of SEQ's.

11. The proposed USAP is too much in a draft form to be used for the CPP. The original proposal released in the CPP is a practical and workable way to reassess stream waterbodies on the current list.

Response: The dichotomous key approach has been more fully evaluated by the State Agency Technical Committee and has further discussed at public meetings associated with the USAP development process. There is a consensus that this is the best approach available at this time.

12. The so-called nutrient screening values they came up with have no relationship to water quality standards, no scientific validity, and no usefulness for making impairment decisions. In essence, they are asking us to compare conditions today with an estimate of what conditions may have been 20 years ago. Even if that comparison shows that water quality may have improved, it does not mean that everything is fine. We object to the whole concept of using some statistically derived historical condition as a screening value for determining if a stream is impaired. The only science-based nutrient criteria for water quality of which we are aware were derived and published by the EPA in their guidance document known as the "Gold Book". Since Oklahoma's Water Quality Standards offer no quantitative values, we support using those EPA values.

Response: EPA no longer supports "Gold book" values and has not offered any substitute values. Nutrient criteria have been and continue to be very elusive for a variety of reasons. The most obvious and frequently cited reason is the fact that nutrients are not conservative and their presence in any aquatic system may be transient.

13. In a more general sense, we object to the proposed approach of removing streams from the list if it cannot be proved that they should stay on. The burden of proof should be on justifying the removal of a stream from the list, not justifying keeping it on the list. The procedures should be revised to require an adequate justification for each proposed removal.

Response: The language allowing removals based on a lack of supporting data was removed.

14. My comments are based on oral information received at the public meeting in Tulsa on Sept. 21, and on discussions with representatives from Save The Illinois River (STIR) and the Oklahoma Wildlife Federation (and indirectly the U.S.Geological Survey).

Our Association is concerned over the methodology used in setting criteria for the 303d list of impaired-water-quality streams. The use of "average plus one standard deviation" does not seem like valid statistics for a very diverse set of samples - with measured values ranging over an order of magnitude. We are also concerned that the criteria were tailored principally to meet the demands of the agriculture industry. While we recognize the vital interests of agriculture and its economic importance, we would point out that (with well-developed control over urban and industrial effluent) a majority of our water-quality problems now come from noncompliance with best management practices in agriculture. It is regrettable that we are legally required to submit the CPP revision a year in advance of the completion of the Water Resources Board study that is more scientific, and in particular considers the impact of seasonal variations in flow. We hope the CPP document will reflect a firm commitment to revising the water-quality standards in 2000 on the basis of the OWRB study.

Response: The statistical approach has been dropped in favor of the USAP Approach**.**

15. The STORET data used by Mr. Simpson is flawed, according to comments received by e-mail from Kathy Peter of the USGS. The samples were not collected using methods reliably representing stream conditions, especially for phosphorus.

Different labs using different detection levels varying by at least one order of magnitude performed analyses, so the censored data can influence any statistical analyses. Also, at least one of the labs had known quality control problems during the period these samples were taken. Sample handling and analyses differed between labs during this period, adding to the credibility problems with the data. The data are highly biased because samples were almost exclusively collected during low flow conditions. Nutrients vary with flow, so this is not a good representative of system conditions. Also, the concentration plus flow varies depending on the source of the nutrients. Finally, the samples were taken during a period of wastewater treatment plant upgrades, installation of sewage lines, and differing agriculture practices. It is very likely do not portray natural backgrounds of nutrients.

There is no information provided to prove whether or not this criteria has any ecological relevance or that it will show whether a stream is actually impaired or not. The use of a standard deviation above the mean is totally arbitrary and has no supporting rationale. Mr. Simpson randomly selected which samples to discard and to discard certain high flow data. What is left, combined with low flow data, results in a larger standard deviation thus producing higher criteria.

As per the National Science Foundation, if phosphorus is found in a detectable amount, it is probably too much. Even the Gold Book standard of 0.05 ml/l is a gift to industry, but the standards arrived by Mr. Simpson are not going to paint an accurate picture of impairment. If we are going to pull figures out of the air, we recommend a standard of 0.02 mg/l, and a 5:1 ration for nitrogen to phosphorus.

Some have suggested using a percentile approach, but this is worthless unless a concurrent analysis is done of correlation's between nutrient concentrations and any environmental problems caused by elevated concentrations or limiting the data set to high quality water bodies (the USGS can recommend some to you).

Response: The statistical approach has been dropped in favor of the USAP approach.

16. The OWF found out about a meeting sponsored by the Secretary of Environment's Office held a few weeks ago by hearsay– it was not advertised to the public. The purpose of this meeting purportedly was to have Mr. Simpson explain his methodology, with many farming/ranching organizations present, to the state environmental agencies and get their ideas. During this meeting, OSE executive director J.D. Strong stated that the agencies needed to agree that day to supporting inclusion of this methodology in the Draft CPP document before it went out for public comment. Having found out about this meeting, I attended in an attempt to gain information about the process. Though the water quality experts from several agencies had only a few days to review Mr. Simpson's work, they brought forth many reasons why it was flawed and ought not to be supported. Staff for the Conservation Commission pleaded for first the mean minus one standard deviation, then for the mean plus one standard deviation if linked to frequency of exceedances. A representative from one of the farming groups flatly vetoed the latter proposal.

Mr. Simpson explained that his methodology for arriving at the standard deviation was based on work done by a Water Resources Board staffer in the 1980's to develop criteria for absorption of minerals in the water. The staff, present at the meeting, stated clearly that this method was for minerals only, and should not br applied to nutrients as they behaved differently. Others stated problems, but at the end of the meeting, Mr. Strong put each agency on the spot and, with the exception of the Wildlife department representative, got agreement from agency heads over-riding their experts' advice due to political pressure.

To the Water Board representative, Mr. Strong said he already had agreement to this approach from OWRB director Duane Smith, so he didn't need to say anything. Clearly, the scientific merits of this approach were not to be given any weight. Therefore, what we have is the result of the OSE facilitating a meeting where a polluting industry dictates how things are going to be to the industries that are charged with protecting our state's waters.

It would seem that the ultimate goal here is to remove streams from the 303(d) list, irregardless of whether or not they are impaired.

> **Response:** The Simpson approach based on statistical measures has been dropped in favor of the USAP approach.

17. Regarding the 303(d) list, the DEQ's public notice states: " The CPP serves as an overall guide for how the State will clean up and protect our streams, lakes and rivers." By embracing a non-scientific, expedient approach designed simply to remove as many streams as possible from the 303(d) list, without attempting to find out whether the stream is truly impaired, DEQ is not fulfilling this goal.

By embracing this scientifically indefensible methodology, the DEQ puts its own credibility at risk. The DEQ also calls into question its determination to develop TMDL's for all Oklahoma's impaired water bodies.

> **Response:** The statistical approach has been dropped in favor of the USAP approach. The goal is to develop an accurate 303 (d) list, not necessarily a short list. DEQ is committed and directed by state law to develop TMDL's for all waterbodies which are shown to be impaired.

18. Many of the OWQS changes are incorporated in the draft, but the DEQ has left out the entire section on acute criteria implementation. The way acute criteria are implemented in your permitting process must change because OWQS now contain an acute regulatory mixing zone. Both acute numerical and acute narrative criteria apply at the boundary of the acute mixing zone. Ignoring these changes in the permitting process means DEQ is ignoring state law. If DEQ takes the view that standards drive permitting, then DEQ permitting must reflect all the changes made to the OWQS last year, not just some of them. If this is not done, then there is no point in the DEQ revising the CPP at this time.

Response: Prior to the draft CPP undergoing public comment in September 1999, the DEQ identified serious permitting implementation problems in the amendments to OAC 785:45 and 785:46 adopted July 12, 1999. There were two areas of concern: (a) the wasteload allocation equation for the new acute mixing zone in 785:46-5-4(c) was incorrect, and (b) the narrative whole effluent toxicity (WET) testing criteria in785:46-5-3-2(c), and the related definitions of "large streams" and "small and medium streams" in 785:45, were inappropriate for implementation in NPDES/OPDES permits. The correct acute criteria wasteload allocation equation is now part of the proposed revisions to the OWQS to be adopted in July 2000, and the DEQ will incorporate the acute regulatory mixing zone and related equations into the draft CPP revision. However, the Ecosystems Protection and NPDES Permits Branches at EPA Region 6 concurred with the DEQ's problematic observations with the newly-adopted WET testing criteria, and issued an objection to these specific issues in a letter dated November 10, 1999. Just prior to EPA issuing the letter, DEQ and OWRB staff met with EPA Region 6 staff to discuss these issues and jointly develop acceptable and defensible revisions to OAC 785:45 and 785:46. The OWRB and DEQ propose to s imultaneously present and promulgate these revisions to the WQS, WQS Implementation rules and the CPP document early in 2000.

19. We support the proposal to use the current Oklahoma Water Quality Standard of a Carlson's Trophic State Index (TSI) of 62 or greater to indicate nutrient threats for lakes, as the screening value for listed with nutrient impairments on the 303 (d) list. Thus, those lakes, which do not exceed the TSI, would be removed from the list.

Response: Thank you.

20. The DEQ is required to follow the Administrative Procedures Act. Therefore, the DEQ should take the proposed CPP revisions through public hearings, the Water Quality Council, the DEQ Board, and the Legislature, prior to forwarding it to the EPA.

Response: Much of the CPP is based on, or incorporates directly, rules that have been adopted through the APA process. However, not all agency actions constitute a "Rule" within the meaning of the APA. A review of the current CPP did not reveal any obvious deficiencies with regard to the APA. However, this issue will be considered further. If it is found to be necessary, appropriate rule making procedures will be undertaken.

21. We call on the DEQ to adopt all the OWQS revisions so that your permitting is legal, and to throw out this methodology for 303(d) revisions. We recommend adopting by reference the method of assessing streams for nutrient threats currently under development by the Water resources Board as part of this year's Water Quality Standards Revision.

Response: The USAP approach for determining nutrient threats has been incorporated.

22. CPP revisions relating to Water Quality Standards and Implementation Procedures should be revised as agreed upon between Region 6, OWRB, and ODEQ and addressed in the November 10, 1999 and November 12, 1999 letters from Region 6 to OWRB and ODEQ.

Response: Agreed. These changes will be made in coordination with revisions to the OWRB Rules. As soon as the rules are changed the CPP will be updated.

23. A monitoring strategy that includes a description of a monitoring program design that integrates data and information generated from each agency to meet the information requirements of section 305(b), described in 40 CFR 130.8, over a specified period of time, with either a census assessment of all waters or a representative selection of waters.

Response: These suggestions will be considered for future revisions to the CPP.

CHAPTER 1 ACRONYMS AND DEFINITIONS

24. Please amend the following definitions to agree with state law effective November 1, 1999, as per Senate Bill 549.

Page 13 Amend to:

NPS — The contamination of the environment with a pollutant for which the specific point of origin may not be well defined and includes but is not limited to agricultural storm water runoff and return flows for irrigated agriculture.

Page 15 Amend to:

PS — any discernible, confined and discrete conveyance or outlet including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure container, rolling stock or vessel or other floating craft from which pollutants are or may be discharged into waters of the state. The term "point source" shall not include agricultural storm water runoff and return flows from irrigated agriculture.

Response: The requested changes were made.

25. All references to non-point source discharge and nonpoint source discharge should be amended to reflect the correct terminology as nonpoint source runoff. The term non-point source discharge is a misnomer. (See SB 549, Sec. 4, D, 1, a). The term needs to be corrected on pages 152 (3 references); 155 (1 reference); 156 (1 references); 158 (2 references); 159 (3 references); and 160 (2 references).

Response: The reference on page 155 was changed to “nonpoint source pollution”. The remainder of the referenced language is taken directly from the WQS and can not be changed unless the WQS are changed.

CHAPTER 2, PART I **WATER QUALITY STANDARDS**

26. Page 34.
Are the conversion factors for zinc correct- the chronic factor is higher than the acute factor?

Response: The conversion factors were taken from EPA guidenance, The Federal Register, vol. 60, no. 86, May 4, 1995.

CHAPTER 2, PART III **WATER QUALITY STANDARDS IMPLEMENTATION**

27. I am submitting a comment on the language in Chapter 2, Part III, Numerical Criteria Implementation to Protect Fish and Wildlife Propagation from Toxicity Due to Conservative Substances. Specifically, the language describing the decision-making process for background monitoring requirements for discharge permits is lacking in description and details regarding the rationale.

A more complete description of the assumptions and calculations should be included following the sentence "If the effluent LTA is less than the most stringent criteria LTA, then background concentration monitoring shall not be required; otherwise, background monitoring shall be required."

Response: This has been identified as an issue for future consideration. The DEQ, in cooperation with the OWRB, will examine this “LTA contingency language” to determine if changes are appropriate. Any changes that may need to be made to the requirements for background monitoring must be promulgated concurrently by the OWRB and DEQ in OAC 785:46 and the CPP, respectively.

28. Page 129
Performance of Wasteload Allocation: Implementation into Permitting. First paragraph: ....If the effluent LTA (Long Term Average) is less than the most stringent criteria LTA, then <u>the effluent LTA shall be utilized until background concentration is known.</u>

We feel that until the TMDL process becomes institutionalized and adopted widely throughout the state, the most stringent LTA for one stream, at any point in time, may not adequately reflect background for other streams. However, once enough background information is established across the regions of the state, the “most stringent LTA” for a given region may be applicable to other streams in that region.

Response: The language cited refers to the process used to determine the need for background monitoring requirements in OPDES discharge permits. This method only applies when background concentration data are unavailable or inadequate to determine the proper effluent limit. Furthermore, this method applies only to streams for which a TMDL for the pollutant in question has not been established.

The misinterpretation of the language cited may stem from a poor description of the terms used. The primary comparison to be made is between the "effluent LTA" and the "most stringent criteria LTA." The working definition of these terms is provided below and will be incorporated into the CPP.

Effluent LTA (long-term average) is the mean (arithmetic or geometric) of the effluent concentration dataset for the pollutant in question.

"Most stringent criteria LTA" is the lowest possible value for the applicable LTAs described on pages 117-118 and 130 of the draft CPP posted on the DEQ website. All of the equations for calculating the LTAs are dependent on wasteload allocation (WLA). The lowest possible WLA is the applicable numerical criterion (see page 117 of the draft CPP) and is ***independent of background conditions***. The lowest of the applicable LTAs, based on the designated beneficial uses of the waterbody, represents the "most stringent criteria LTA."

To complete the decision-making process, the effluent LTA is compared to the most stringent criteria LTA. If the effluent LTA is lower, background monitoring is not required.

29. Page 136
1st paragraph - This paragraph, which is an excerpt of the Water Quality Standards Implementation (OAC 785:46-9-3), states that the mean annual upstream flow for gauged streams may be obtained from a USGS publication that has statistical summaries of streamflow through 1984. Because this publication includes data through 1984, the mean annual flow for some gages will be significantly different if data since 1984 are included. This text does not specify whether or not more recent data can be used. Therefore, we request that a statement be added to clarify the excerpted language from the Water Quality Standards. The additional statement could read as follows: “The permitting authority may also calculate a mean annual flow for a gauged stream by using USGS flow data over an appropriate period, particularly when more recent data are available.”

Response: We agree that this comment has merit, however this section is a direct quote from the Water Quality Standards Implementation Rules and cannot be changed unless the rule changes. Additional factors, such as period of record, should also be considered. This concept could apply to the Human Health Criteria as well. This has been identified as an issue for consideration in a future update.

30. Page 138
Equation 43 (typographical) - The first plus sign in the equation appears that it should be an equal sign.

Response: The typographical error has been corrected.

31. Page 139
1st sentence - This sentence, which is also an excerpt of the Water Quality Standards Implementation (OAC 785:46-9-8), states that permit limits for minerals must be expressed as loads as well as concentrations. For facilities where stormwater and process water enter the same treatment system and are discharged through one outfall, a large storm may cause a significant increase in the mass discharge of a mineral constituent over which the facility may have little or no control. Therefore, we request that this sentence be modified with text such as the following: " Loads, as well as concentrations, will be expressed in the permit in order to implement mineral criteria, except in cases where stormwater contributions to an outfall may cause a significant and uncontrollable increase in the mass discharge of a mineral."

Response: NPDES rules require mass load limits in individual permits for permitting purposes, discharges of commingled storm water and process water must be considered as a treated process water discharge. As such, permit loading limits must be established for the combined discharge, based on monthly average and daily maximum concentration limitations determined in accordance with OAC 785:45, 785:46, any applicable technology-based guidelines and the CPP, and the high 30-day average flow over the past two years, Qe(30), for industrial facilities, or the treatment facility design flow, Qe, for municipal treatment facilities. Exceptions in the applicability of the loading limit cannot be made for periods of high storm water runoff into a process water wastestream. Typically, during periods of high storm water runoff, any commingling of storm water and process water would result in a diluting of the concentration of any mineral constituents. Established outfalls in individual permits, whether for storm water runoff only or for combined process/storm water flowstreams, may not be converted to a general storm water general permit due to anti-backsliding restrictions. New outfalls, separate from any existing outfalls permitted in an individual permit, which are dedicated to storm water runoff only, may be considered for coverage under a storm water general permit. In this manner, given appropriate engineering controls, the storm water runoff of concern may be removed from the process flowstream.

32. Pages 155-156
Please delete or rewrite the section entitled Nonpoint Source Discharges. We disagree with the graphs that show nonpoint source pollution is the biggest contributor of pollution to the waters in the nation's lakes and rivers. This information we assume, was taken from

erroneous information from the states' 305 (b) reports. Our own experience with Oklahoma's faulty and unsubstantiated 305 (b) report and 303 (d) list should prove that this EPA information is unreliable. Please find as attached a report entitled "EPA's National Water Quality Inventory" by the American Farm Bureau Federation. This report explains our misgivings about using the EPA's information.

Again, we object to the inclusion of this misrepresentation of nonpoint source pollution in the CPP.

Response: While there may be problems in any National Assessment Data, the State 305 (b) Reports are considered to be the most consistent comprehensive assessments available. There is no credible reason to believe the conclusions of those reports are erroneous. The statistics were updated to reflect more recent data from 1998 reports**.**

CHAPTER 3

33. Page 170. Mixing Zones.

It is the position of the Tribe that mixing Zones potentially threaten the goals of NPDES and TMDL programs. This is especially true of Bioaccumulative Chemicals of Concern (BCC). The assumption of mixing zones is that discharges of toxic chemicals will mix with receiving waters and dilute. Periods of low and high flow may become problematic. The federal definition of a mixing zone is: established areas where water quality standards *may be exceeded* while a discharge is mixed with receiving water.

Without proper pre-treatment prior to discharge, TMDL's may not prove adequate to achieving our water quality goals for Oklahoma. We advocate, therefore, to end the allowance for mixing zones in Oklahoma streams.

Response: Oklahoma's Water Quality Standards are dedicated to protecting aquatic life from toxicity. OAC 785:45-5-12(e)(6) requires that surface waters of the "*…state shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside of the mixing zone"*. Mixing zones are areas where criteria exceedances are allowed and yet short exposure times still support the Beneficial Use.

Even though exceedances are allowed, toxicity is not. Criteria are developed by exposing test organisms to high concentrations of toxicants for long periods of time. If the exposure time to criteria exceedances is short, no toxicity will be experienced. Therefore, Oklahoma's mixing zones are designed to restrict exposure to criteria exceedances to periods less than that which will allow toxicity in the receiving water.

Mixing zones are important water quality management tools. Large streams can assimilate more toxicants than small streams. The use of mixing zones allows dischargers on large streams a fair share of this assimilative capacity. The goal of water quality management in Oklahoma is to allow dischargers a share of the receiving stream's assimilative capacity while protecting Beneficial Uses. Oklahoma does not wish to restrict economic growth unfairly. Unilateral loss of the use of mixing zones would be extremely detrimental to dischargers.

Bioaccumulation is accounted for when criteria are developed. Criteria for bioaccumulative substances are more stringent than other criteria. Therefore, there is no justification to disallow the use of mixing zones for bioaccumulative substances as their bioaccumulative tendencies have already been considered.

34. Pages 209-255

The procedures outlining the Total Maximum Daily Load (TMDL) public participation procedure is outlined in the *Public Participation and State Review of "As-Needed" Major Revision of the Water Quality Management Plan*. To our knowledge, the only official notification that is released to the public about TMDL's is contained in the Water Quality Management Plan Public Notice, after the TMDL has been completed. The Notice allows for a public hearing to be requested.

As TMDL's currently encompass both point and nonpoint source pollution, it is important to make the TMDL process public beyond the regulated community and other government agencies. We're concerned this lack of an effective public participation does not allow for knowledge or participation in the TMDL process for people living and operating businesses in the affected watersheds.

With TMDL's pending for the Illinois River and Wister Lake watersheds, and the rest of the more than 500 waterbodies on the 1998 303(d) list, development of a public participation process for TMDLs should be a top priority for the Oklahoma Department of Environmental Quality.

We suggest a process with multiple steps that includes community involvement. We feel there needs to be public participation:

- before information for a TMDL is gathered.
- after a draft TMDL has been formulated, but before completion.
- after completion when means to accomplish implementation must be determined.

Texas has a comprehensive public participation process, which we urge you to consider. We have included Chapter 5, "Public Participation in the TMDL Projects," from the *Developing Total Maximum Daily Load Projects in Texas: A guide for Lead Organizations,* for your information.

We urge DEQ to make development of an effective TMDL public participation process a top priority.

Response: This has been identified as an issue for future consideration. Currently the TMDL Public Participation process is being revised. It will be incorporated in the next updated CPP. Public participation opportunities similar to those suggested are incorporated in current TMDL workplans.

35. Pages 224-225

Identification. Item 12 should read:

Waters where documented water quality problems have been reported by other agencies, ***Tribes***, academic institutions, or the public.

Response: The proposed change has been added to the CPP.

36. Page 226

Add a number 14.

Should include language regarding tribal information on stream segment protected by Tribal Water Quality Standards, requiring Culturally Significant Water Designation by the state upstream of Tribal jurisdiction.

Response: There are no Tribal Water Quality Standards as yet and no "Culturally Significant Waters" are currently designated in the WQS. This issue will be addressed in the future, if necessary.

37. Page 227

2nd sentence should read: The process will begin with a notice and request for input sent to EPA Region 6, all state environmental agencies, ***and all Tribal environmental offices.***

Addresses, contact persons, and e-mail addresses of all Tribes with environmental offices can be obtained from the Regional Native American Office at region 6. Adding other Tribes with the Chiefs/Chairmen as contacts is not difficult. We would be glad to assist in getting this data to the Office of the Secretary of the Environment.

Response: Even though Tribes are treated as independent jurisdictions with full authority to develop there own 303(d) lists for water quality limited segments within their territories, OSE would be pleased to coordinate a list that includes Tribal concerns. OSE feels strongly that a 303(d) list that includes water quality concerns on Tribal lands would better serve the natural resources, not to mention the residents, of Oklahoma. As such, we will try to maintain a current list of all Tribal contacts in Oklahoma and make every effort to notify those Tribes of opportunities for 303(d) list input. The proposed language has been added to the CPP.

38. A supporting rationale should be provided for the procedures proposed for refinement of the 303(d) list. The assessment protocals should be considered as an integral component of a quality assurance project plan and documented, as required by 40 CFR 31.45. For the purpose of removing a waterbody from the 303(d) list, States should design and implement a monitoring and assessment program or study that will yield a reasonable probablity of detecting the condition that resulted in the initial listing, if the problem [still] exists. The program should include environmental indicators that offer the most direct approach to assessment of beneficial use attainment, in addition to traditional surrogate measures of use support from water chemistry monitoring.

Response: A great deal of discussion and debate went into the State of Oklahoma's proposed process for refining the 303(d) list. In almost every case, we proposed a more rigorous method for validating impairment than was used in the original listing of each waterbody. Where monitoring is necessary to validate stream listings, any monitoring that is conducted using Federal Clean Water Act funds will be done according to an EPA-approved QAPP, which is all that is required by our reading of 40 CFR 31.45. Regardless, we undoubtedly will have higher confidence in our listing/de-listing decisions than we had on our original listing decisions by using the proposed validation techniques.

Furthermore, most of the procedures outlined in our refinement process were developed to help us make better decisions about which waterbodies may have been originally listed in error. It is only after we cannot prove an error in the original basis for listing, or where we cannot prove that the waterbody meets the 303(d) guidance definition for "threatened," that we will proceed to monitoring for validation purposes. Again, any monitoring conducted using Federal Clean Water Act grant funds will be done according to a QAPP.

39. Water chemistry monitoring and biological monitoring should be used in combination, rather than as alternatives, for all decisions associated with aquatic life use attainment.

Response: The State included a combination of water chemistry and biological monitoring where we felt it was appropriate (i.e., where scientifically accepted numerical criteria are nonexistent). In general, Oklahoma favors using EPA-approved WQS numerical criteria to make beneficial use impairment determinations until such time as biological numerical criteria are promulgated into the State's WQS. Because our WQS do not contain numerical biocriteria, nor implementation language for the narrative in 785-46-15, we will only use biological monitoring information for beneficial use determinations in the absence of water chemistry criteria or when it will allow higher confidence or a more cost effective means of assessing the beneficial use of a water body.

40. Fish tissue monitoring should be an intergral component of assessments where bio-accumulative pollutants were the original reason for listing.

Response: The State recommended fish tissue monitoring where appropriate (i.e., where the pollutant of concern tends to bioaccumulate).

41. We urge that the lakes and streams included on the 303(d) list as threatened be labeled as such. As the state currently has no methodology for determining impairment of waterbodies due to nutrients, the list should reflect the true measure.

Response: OSE is in full agreement, and, to the extent possible, we will make every effort to identify those water quality limited segments that are listed due to water quality threats, rather than impairments.

42. Page 228.
The section indicates that waterbodies will be listed if two or more fish kills occurred in the last five years. We suggest adding "fish kills that were not attributable to natural causes" to avoid listing waterbodies where fish kills are not related to anthropogenic impacts.

Response: The suggested language has been added to the CPP.

43. The narrative should be clarified to assure that if there is more than one Cause Code involved with listing a segment that they all would need to comply with water quality standards before the segment is removed. For example: Page 231- Ammonia- The CPP indicates that if the aquatic community assessment indicates impairment and ammonia is not the cause of impairment, the waterbody will be removed from the list. In this case, the waterbody should remain on the list, and studies should be conducted to identify the cause of impairment.

Response: This clarification was added.

44. We believe, as does the State Legislature regarding State jurisdiction, that in order to bring as much of the Federal Environmental protection Standards as possible under local control, tribes are justified in adopting Water Quality Standards. Without Tribal delegation under the Clean Water Act, the EPA retains jurisdiction of Indian Country- not the State; thus, local control of federal Acts is limited.

We appreciate the development, by the State, of the use classification designated as "Culturally Significant Waters." In order for the Tribes and the State to work cooperatively, however, the CSW Standards must be applied upstream of Tribal jurisdiction (State jurisdiction) in order to meet the needs/Water Quality Standards of a particular Tribe. A Tribe that does not have, or desires not to adopt Water Quality Standards, might work with the State and EPA for CSW Standards, enacted and enforced by the State, to apply to stream segments within Tribal jurisdiction without giving up sovereignty.

Response: There are no Tribal Water Quality Standards as yet and no "Culturally Significant Waters" are currently designated in the WQS. This issue will be addressed in the future, if necessary.

CHAPTER 4

45. Pages 266-273
Procedures for Issuing Fish Consumption Advisories. We have a question. Is this information being placed in the CPP before it has been promulgated into the state's water quality standards? If the answer is yes, why?

Response: The procedures for issuing fish advisories have never been included in the WQS and are not anticipated to be adopted there. A recent statutory change gave that responsibility to ODEQ. The concentrations at which fish advisories are issued are proposed to be removed from the WQS during the current revision and new threshold levels consistent with this risk-based approach established.

46. We are pleased to see the addition of procedures for issuing fish consumption advisories. Our only comment in that regard is to question whether one sampling event every 7 years is sufficient to identify problems early enough.

Response: The 7 year sampling cycle is a function of available resources for conducting the Toxics in Reservoirs program. The limitations are (a) the amount of money appropriated annually in support of the program, (b) the number of reservoirs that can be sampled annually by field personnel, and (c) analytical capacity at the State Environmental Laboratory.

The contaminants in question, with the exception of mercury, are all chlorinated organics whose use has been restricted. These contaminants tend to bind with clay particles and fall out in the bottom sediments. Over time, as new sediments cover the old, less of the contaminant is available to enter the food chain. It is therefore more likely that fish flesh concentrations of these contaminants will decrease in the future. The exception to this might occur if older sediments become exposed through dredging.

In the case of mercury, it is seldom a question of there being enough mercury present for it to contaminate fish flesh. It is more a question of whether the water chemistry is correct to convert the mercury to a bioavailable form (methylmercury). The formation of methylmercury is not favored in eutrophic lakes. It is more favored in clear, low pH, low alkalinity lakes and in newly impounded reservoirs. As a lake ages, the bioavailability of mercury generally decreases.

In summary, the 7 year sample cycle is probably appropriate for most reservoirs in Oklahoma. A shorter sample cycle might be appropriate in specific situations such as a newly impounded reservoir or if bottom sediments are known to have been disturbed.

47. In the discussion of fish consumption advisories at the Tulsa meeting, two water bodies were identified in which fish slesh contains high concentrations of heavy metals: McGee Creek reservoir and Stinking Creek. It is hard to believe that there is no problem in the Spring River, which drains the tri-State mining area, and in particular recieves water from Tar Creek. I would urge that this be re-examined.

Response: Presently Oklahoma has two fish advisories in effect. There is an advisory in effect for largemouth bass from McGee Creek Reservoir due to elevated levels of mercury in bass larger than 12 inches. Other fish from the Reservoir are not under a fish advisory. Mercury bioaccumulates through the food chain in fish, the result is that larger, predatory fish accumulate enough mercury to pose a potential health threat to humans through consumption, while smaller fish and non-predators to not accumulate mercury in these amounts. The actual mercury levels in the water column of McGee Creek do not pose a health threat from contact with or consumption of the water. The fish advisory on Stinking Creek restricts consumption of catfish due to elevated levels of two pesticides, DDT and Toxaphene. Heavy metals are not a problem in fish flesh consumed from Stinking Creek.

The presence of heavy metals in a water column does not necessarily indicate a problem of elevated metals in fish flesh from the water body. The metals must be uptaken and accumulated by fish before a problem in fish flesh consumption results. Not all water bodies have the specific conditions, which are necessary for metal uptake and accumulation in fish. There are some heavy metals, particularly lead and zinc, in the water column of Spring River. The concentration of these metals varies along the River depending upon location and water level. Fish flesh samples were taken from Spring River, Tar Creek, and the Neosho River in the early 1980"s. All lead concentrations were below the detection limits used at that time. Levels of zinc were detected in some of the fish, but not consistently. Neither lead nor zinc is presently among the Environmental Protection Agency's (EPA) list of target analytes for consideration in issuing fish advisories. As part of the ongoing Superfund clean-up in Ottawa County, concerns have been raised by citizens about the concentration of heavy metals in rivers feeding Grand Lake and in the fish flesh of these waters. There are plans to resample and analyze of both the water and fish flesh in the areas of concern. Those results will be made available to the public. If elevations are detected, these levels will be evaluated for possible human and ecological health threats. In keeping with the policy of DEQ, any reproducible detected levels, which pose potential threats to the health of the community through fish consumption, will result in fish advisories.