

# **Pueblo of Acoma Water Quality Standards**

**November 1998  
(Rev. December 2005)**

---

— Enclosure A —

# Pueblo of Acoma Water Quality Standards

## Table of Contents

<b>Section</b>	<b>Page</b>
List of Acronyms and Abbreviations.....	iii
Section I. Introduction, Authority, Applicability, General Provisions, and Exclusions.....	1
Section II. Antidegradation Policy and Implementation Plan .....	6
Section III. General Standards.....	10
Section IV. Water Body Uses and Standards Specific to the Uses .....	16
Section V. Designated Uses for Water Bodies of the Pueblo of Acoma.....	18
Section VI. Sampling and Analyses.....	19
Section VII. Definitions.....	21

## List of Figures

<b>Figure</b>	<b>Page</b>
1 Antidegradation Flow Chart .....	9

## List of Appendices

### Appendix

#### A Numeric Criteria

Table A-1 Numeric Criteria for Toxic Constituents

Table A-2 Equations for Calculating Freshwater Aquatic Life Criteria for Metals as a Function of Total Hardness

Table A-3 Numeric Criteria

Table A-4 Acute Criteria (CMC) for Ammonia

Table A-5a Allowable Ammonia Concentrations, Chronic Criteria (CCC), Early Life Stages Present

Table A-5b Allowable Ammonia Concentrations, Chronic Criteria (CCC), Early Life Stages Absent

#### B Acoma Tribal Council Resolutions

## List of Acronyms and Abbreviations

- A&W<sub>c</sub>**: Aquatic and wildlife (cold water habitat)
- A&W<sub>e</sub>**: Aquatic and wildlife (ephemeral habitat)
- A&W<sub>w</sub>**: Aquatic and wildlife (warm water habitat)
- AgI**: Agricultural irrigation
- AgL**: Agricultural livestock watering
- CaCO<sub>3</sub>**: Calcium carbonate
- cfu/100 mL**: Colony forming units per 100 milliliters
- CU**: Color units
- DO**: Dissolved oxygen
- DWS**: Domestic water source
- EPA**: U.S. Environmental Protection Agency
- FC**: Fish consumption
- FDA**: U.S. Food and Drug Administration
- GWR**: Groundwater recharge
- MCL**: Maximum contaminant level
- µg/L**: Micrograms per liter
- mg/L**: Milligrams per liter
- NC**: No criterion established
- NPDES**: National Pollutant Discharge Elimination System
- NTU**: Nephelometric turbidity units, a measure of turbidity in water
- PBC**: Partial body contact
- PCBs**: Polychlorinated biphenyls
- PCR**: Primary contact recreational use
- pCi**: Picocurie

**ppb:** Parts per billion

**ppm:** Parts per million

## **Section I. Introduction, Authority, Applicability, General Provisions, and Exclusions**

**A. Authority.** Section 518 of the Clean Water Act<sup>1</sup> allows federally recognized Indian Tribes to enact water quality standards for the purpose of protecting waters within the exterior boundary of Tribal lands. The Pueblo of Acoma, a sovereign nation exercising powers of self-government and a federally recognized Indian Tribe, has developed these Water Quality Standards (hereinafter "Standards") in accordance with the provisions of the Clean Water Act.

**B. Purposes.** The Acoma people recognize that they are part of a larger community that includes the heavens, the ocean depths, the elements, and all species of plant and animal life. Our sense of unity with all assures our continued survival and gives rise to a duty to preserve and protect the air, water, and land for future generations.

As the first and foremost user of water in the region, the Pueblo of Acoma acknowledges that water is essential to all life at Acoma and is indispensable to the practice of age-old traditions and to our cultural preservation. Within this context, the Pueblo of Acoma Water Quality Standards are intended to accomplish the following:

- To promote the health, welfare, political integrity, economic well-being, and traditional culture of the Acoma people.
- To promote the health, welfare, and economic well-being of all other community residents.
- To promote and sustain the healthy propagation of fish, other aquatic life, and wildlife.
- To designate the existing and attainable uses for which the surface waters and groundwaters of the Pueblo of Acoma shall be protected.
- To prescribe water quality criteria (narrative and numeric) in order to sustain the designated uses.
- To prescribe water quality criteria (narrative and numeric) in order to protect groundwater.
- To ensure that degradation of existing water quality does not occur.

---

<sup>1</sup> 33 U.S.C. Section 1377 (enacted February 4, 1987).

- To guide water management decisions and activities that affect the waters of the Pueblo of Acoma.

These purposes shall be accomplished by incorporating the Standards established herein into the permitting and management process for point source dischargers and nonpoint source generators by using those standards to determine when a designated use is threatened and by using (1) current treatment technologies to control point sources of pollution and (2) best management practices to control nonpoint sources of pollution.

The Standards are consistent with Section 101(a)(2) of the Clean Water Act (33 U.S.C. Section 1251[a][2]), which declares that ". . . it is the national goal that, wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. . . ." Additional uses of the Pueblo of Acoma waters may include but are not limited to ceremonial and agricultural and livestock water supply uses.

**C. Applicability.** The Standards apply to all Pueblo waters, inclusive of all waters within the exterior boundaries of the Pueblo of Acoma, and water situated wholly or partly within or bordering upon the Pueblo. The Standards apply to substances attributable to discharges, nonpoint sources, or instream activities. The Standards shall not apply to acts of God or to natural phenomena not brought about by human activity. These Standards are not intended to interfere in any way with traditional or religious uses of Acoma waters.

**D. Enforcement.** The Pueblo of Acoma Tribal Council has primary responsibility for adopting ordinances, fines, or other enforcement mechanisms needed to ensure compliance with the Water Quality Standards. The Haaku Water Office may take enforcement actions in support of the enforcement mechanisms adopted by the Tribal Council. The Acoma Water Office shall work in cooperation with the U.S. Environmental Protection Agency (EPA) and other agencies of the Pueblo, other Tribes, the federal government, and the State of New Mexico.

**E. Antidegradation.** The antidegradation policy for Pueblo waters and the procedures for implementing it are set forth in Section II herein.

**F. Periodic Review and Revision.** Pursuant to Section 303(c)(1) of the Clean Water Act (33 U.S.C. Section 1313[c]), the Standards shall be reviewed once every three years following enactment. The Pueblo of Acoma shall hold public hearings at least once each three-year period

for the purpose of reviewing and, as appropriate, revising the Standards. Revisions shall incorporate relevant scientific and engineering advances. In addition to the triennial reviews, the Standards may be revised from time to time as the need arises or as the result of updated scientific or monitoring information.

Errors resulting from inadequate and erroneous data or human or clerical oversight will be subject to correction by the Pueblo of Acoma. The discovery of such errors does not render the remaining and unaffected Standards invalid. If any provision of the Standards or the application of any provision of these Standards to any person or circumstance should be held to be invalid, the application of such provision to other persons and circumstances and the remainder of the Standards shall not be affected thereby.

#### **G. Surface Water and Groundwater Use Designations.**

1. The Pueblo of Acoma Tribal Council shall issue and approve surface water and groundwater designations for Pueblo waters and shall determine the suitability of bodies of water for recreational and ceremonial purposes.

2. The most stringent numerical criteria applicable to any perennial stream shall be maintained any time the flow equals or exceeds the critical design flow, which is either the seven-day ten-year low flow value (7Q10) or the harmonic mean flow, the latter being used when human health criteria apply. When ephemeral and intermittent streams have a low flow value of zero, all discharges shall meet standards for the designated use. For standing water bodies, standards particular to a use shall be maintained whenever the water body is suitable for the use. The General Standards (Section III) shall apply to streams, lakes, reservoirs, canals, drains, groundwater, ponds, springs, and wetlands, whether perennial, ephemeral, or intermittent in nature. The standards assigned to a body of water shall be the most stringent standards required to protect all uses designated for that body of water. Reservoirs constructed for domestic wastewater treatment are exempt from these standards, provided that the water released from any such reservoir meets the standards that apply to the receiving body of water.

**H. Point and Nonpoint Discharges.** The Standards shall be the basis for managing discharges attributable to point and nonpoint sources of pollution.

**I. Attainability and Modification.** In the event that monitoring of water quality identifies reaches where attainable water quality is less than that which is required by the Standards, then the Pueblo of Acoma may modify the Standards to reflect attainability. Modification thereof shall



be within the sole discretion of the Pueblo of Acoma, but shall be subject to the provisions of the Clean Water Act (33 U.S.C. Section 1251[a][2]) and shall be carried out in accordance with use-attainability analysis procedures or development of a site-specific criterion.

**J. Exclusions.** The Standards prescribed herein do not apply to waste treatment systems, including ponds, lagoons, and constructed wetlands that are a part of such waste treatment systems. This exclusion applies only to man-made bodies of water that neither are originally created in a surface water nor result from the impoundment of a surface water. The exclusion does not apply to discharges from waste treatment systems.

**K. Compliance Schedules.** It shall be the policy of the Pueblo of Acoma to allow on a case-by-case basis the inclusion of a compliance schedule in a National Pollutant Discharge Elimination System (NPDES) permit issued to an existing facility. Such a schedule of compliance will be for the purpose of providing a permittee with adequate time to make treatment facility modifications necessary to comply with water quality-based permit limitations determined to be necessary to achieve water quality standards. Compliance schedules may be included in NPDES permits at the time of permit reissuance or modification and shall require compliance at the earliest practicable time, not to exceed three years. Compliance schedules shall also specify milestone dates so as to measure progress toward final project completion.

**L. Variances.** The Pueblo of Acoma Tribal Council may allow variances from these standards on a case-by-case basis. A variance from the Pueblo's criteria may be allowed in certain cases where the appropriateness of the specific criterion is questionable. The variance provides a period of time during which issues concerning the appropriateness of the criterion may be resolved and shall be valid for no more than three years. Variances are not renewable but may be reissued upon adequate justification. A variance shall be granted only after appropriate public participation and review and approval by the Environmental Protection Agency.

Variances from criteria will be allowed for anticipated non-attainment of water quality standards due to one or more of the reasons listed in 40 CFR 131.10 (Use-attainability reasons). Variances from criteria shall be for specific pollutants, time-limited, and shall not forego the current designated use. Variances are to be issued instead of removing a designated use for a waterbody where such use is not now attainable but can be expected with reasonable progress toward water quality.

**M. Short-Term Exceedances.** The Haaku Water Office, with consent from the Tribal Council, may permit short-term activities that may cause temporary exceedances of the water quality

criteria if the Pueblo determines that these activities are necessary to accommodate legitimate uses or emergencies or to protect the public health and welfare. A short-term exceedance will only be allowed for activities that are not likely to cause permanent or long-term impairment of designated uses. They will be allowed for activities such as, but not limited to, bank stabilization, wetlands restoration, algae and weed control, hydrological studies that use tracers, or activities that result in overall enhancement or maintenance of designated uses. Activities that could result in adverse impact on any federally listed endangered or threatened species or on the critical habitat of such species may preclude authorization of short-term exceedances. Consideration may also be given to federal or Pueblo proposed species. The Haaku Water Office shall specify the degree of exceedance, the time limit, and where applicable, restoration procedures. Nothing herein shall be intended to supersede existing Pueblo and federal permitting processes or requirements.

## **Section II. Antidegradation Policy and Implementation Plan**

### **A. Antidegradation Policy.**

The purpose of the Antidegradation Policy is to maintain, protect, and restore the waters of the Pueblo of Acoma. This policy assures the following:

1. Existing uses shall be maintained and protected and the level of water quality necessary to protect existing uses shall be maintained.
2. Where existing water quality exceeds levels necessary to support propagation of fish and wildlife and recreation in and on the water, that level of water quality shall nonetheless be maintained and protected unless it is found, after full satisfaction of governmental and public participation requirements, that a lower level of water quality is required in order to accommodate important economic or social development in the area of or upgradient of the waters. In no case shall water quality be decreased below that necessary to fully maintain the existing designated uses. In allowing such degradation of water quality, the Pueblo of Acoma shall impose the most protective statutory and regulatory requirements for point sources and shall impose best management practices for nonpoint sources.
3. As high quality waters of exceptional recreational or ecological significance are identified, the water quality and uses of those water bodies shall be maintained and protected by controls on water quality, maintenance of natural flow regimes, protection of instream habitats, or other appropriate actions.
4. In those cases where potential water quality impairments associated with thermal discharge are involved, the antidegradation policy and implementation method shall be consistent with Section 316 of the Clean Water Act, as amended (33 U.S.C. Section 1326 [1987]).

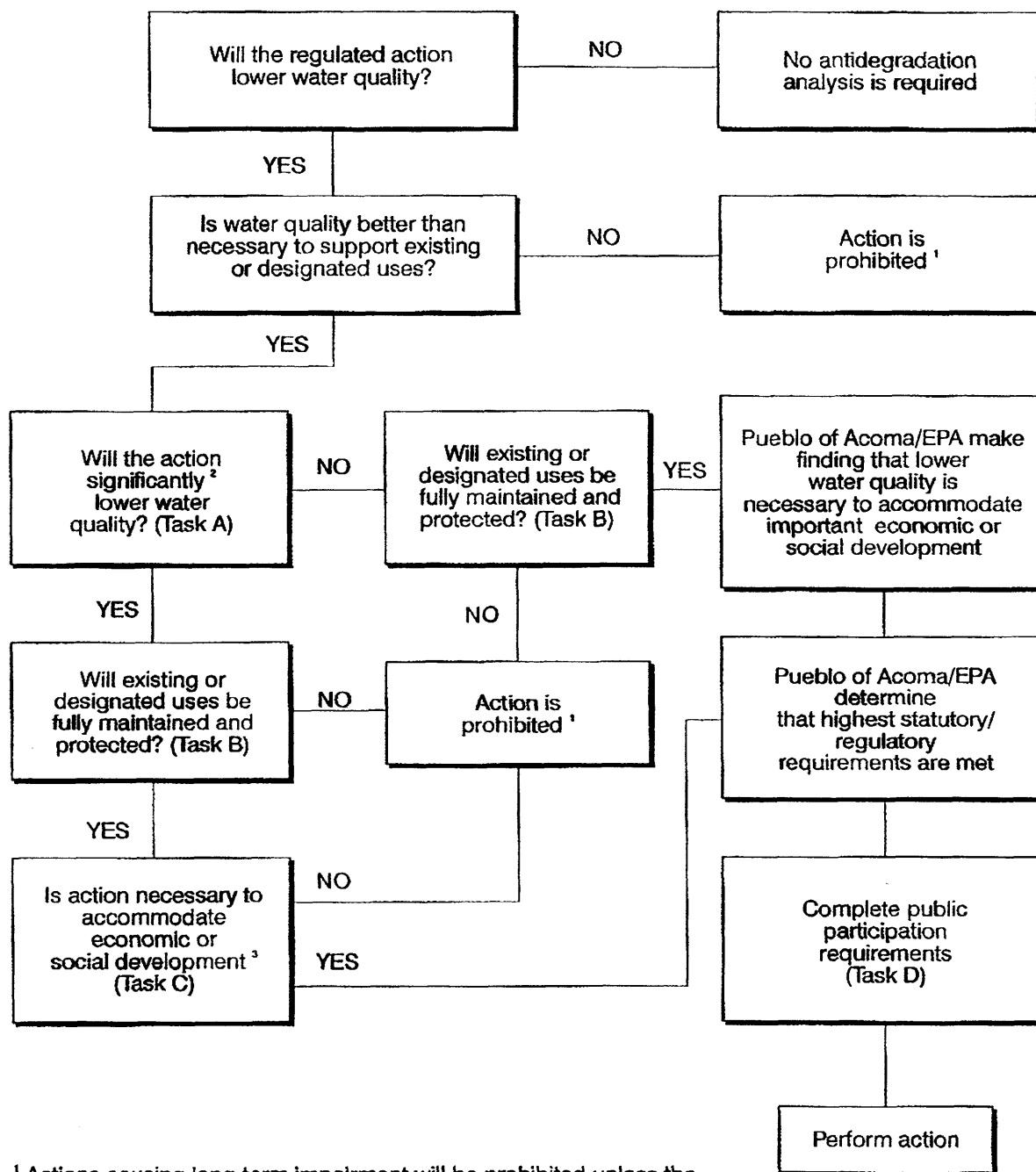
### **B. Implementation Plan.**

1. The Haaku Water Office shall be responsible for implementing the Pueblo of Acoma Water Quality Standards, including the antidegradation policy, by maintaining controls on the introduction of pollutants into surface waters and groundwaters. The Tribal Council may adopt additional regulations for enforcement of these Standards. NPDES permits shall be issued to dischargers within the Pueblo, and these permits shall comply with these Standards.

2. To ensure compliance with these Standards and the Groundwater Quality Protection Plan, the Haaku Water Office shall do the following:

- (a) Monitor water and sediment quality to assess the effectiveness of pollution controls and to determine whether water quality standards are being attained.
- (b) Obtain information as to the impact of effluents on receiving waters.
- (c) Advise prospective dischargers of discharge and/or permit requirements.
- (d) Review the adequacy of the existing database and obtain additional data when required.
- (e) Assess the probable impact of effluents on receiving waters in light of designated uses and numeric and narrative standards.
- (f) Require the highest and best degree of wastewater treatment that is economically achievable and commensurate with protecting and maintaining designated or attainable uses and existing water quality.
- (g) Develop water-quality-based effluent limitations and comment on technology-based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the Clean Water Act (33 U.S.C. Section 1342).
- (h) Require that these effluent limitations or any other appropriate limitations applicable to mining or other activities be included in any such permit as a condition for Pueblo certification pursuant to Section 401 of the Clean Water Act (33 U.S.C. Section 1341).
- (i) Coordinate water pollution control activities with other constituent agencies and other local, state, and federal agencies, as appropriate.
- (j) Develop and pursue inspection and enforcement programs in order to (1) ensure that dischargers comply with requirements of the Pueblo of Acoma Water Quality Standards and any requirements promulgated thereunder and (2) support the enforcement of federal permits by the EPA.

- (k) Coordinate with the Pueblo of Acoma Public Works Department to provide continuing technical training for wastewater treatment facility operators through training and certification programs.
- (l) Coordinate with the Pueblo of Acoma Planning Department to seek funds to assist in the construction of publicly owned wastewater treatment facilities through the construction grants and revolving funds program authorized by the Clean Water Act (33 U.S.C. Section 1281) and other federal funds available for the purpose.
- (m) In conjunction with other agencies, encourage voluntary implementation of best management practices to control nonpoint sources of pollutants to achieve compliance with the Standards.
- (n) Evaluate the effectiveness of best management practices implemented to prevent or abate nonpoint sources of pollutants.
- (o) Evaluate whether instream flows are sufficient to meet the narrative and numeric criteria specified herein.
- (p) Require that surface water and groundwater withdrawals do not cause impairment of surface water or groundwater bodies.
- (q) Examine existing and future Pueblo policies pertaining to septic systems, solid waste disposal, range management practices, and any other relevant activities to ensure that these policies are sufficient to meet the criteria specified herein.
- (r) Recommend to appropriate Pueblo departments and/or the Tribal Council management practices and policies that are consistent with these Standards.
- (s) Ensure that groundwater withdrawals do not occur in quantities that will cause degradation of springs or riparian habitat.
- (t) Conduct an antidegradation analysis for regulated actions that may potentially impair water quality as detailed in Figure 1.



<sup>1</sup> Actions causing long-term impairment will be prohibited unless the impairment can be mitigated or offset by other management practices, as approved by the Pueblo of Acoma. Actions that may cause short-term impairment will be evaluated on a case-by-case basis.

<sup>2</sup> Significance level and effect of cumulative impacts are defined by Pueblo of Acoma

<sup>3</sup> Based on criteria defined by Pueblo of Acoma

**Antidegradation Flow Chart**

Figure 1

- (u) Ensure that the provisions for public participation required by the Clean Water Act and the Pueblo of Acoma Water Quality Standards are followed.
- (v) Provide other technical support as necessary to accomplish the objectives of these Standards.
- (w) Develop procedures for assessing use attainment.
- (x) Ensure wellhead protection zones are maintained to protect groundwater quality.

### Section III. General Standards

The following General Standards apply to all surface waters and groundwaters of the Pueblo of Acoma, including intermittent and ephemeral streams. However, where Sections IV and V of this document set stricter standards for designated water bodies, the stricter standards supersede the General Standards:

**A. Stream and Lake Bottom Deposits.** Surface waters shall be free from contaminants (other than those resulting from natural causes) that may settle and have a deleterious effect on the aquatic biota or that will significantly alter the physical or chemical properties of the water or the bottom sediments of streams or lakes.

**B. Floating Solids, Oil, and Grease.** Acoma waters shall be free from objectionable oils, scum, foam, grease, and other floating materials and suspended substances of a persistent nature resulting from other than natural causes (including visible films of oil and globules of oil, grease, or solids in or on the water, or coatings on stream banks). As a guideline, oil and grease discharged shall not exceed 10 milligrams per liter (mg/L) average or 15 mg/L maximum.

**C. Color.** Acoma waters shall be free from color-producing materials (other than those resulting from natural causes) that create an aesthetically undesirable condition. Color shall not impair the designated or other attainable uses of a water body. Color-producing substances from other than natural sources are limited to concentrations equivalent to 70 color units (CU).

**D. Odor and Taste.** Contaminants from other than natural causes are limited to concentrations that do not impart unpalatable flavor to fish, that do not result in offensive odor or taste arising from the water, and that do not otherwise interfere with the designated and other attainable uses of a water body.

**E. Nuisance Conditions.** Plant nutrients or other substances stimulating algal growth from other than natural causes shall not be present in concentrations that produce objectionable algal densities or nuisance aquatic vegetation, or that result in a dominance of nuisance species instream, or that cause nuisance conditions in any other fashion. When stricter requirements are not established elsewhere in these Standards, the dissolved oxygen shall be maintained at 2 mg/L in order to prevent nuisance conditions from other than natural causes. Phosphorus and nitrogen concentrations shall not be permitted to reach levels that result in man-induced eutrophication problems. As a guideline, total phosphorus shall not exceed 100 micrograms per liter ( $\mu\text{g/L}$ ) in streams or 50  $\mu\text{g/L}$  in lakes and reservoirs, except in waters highly laden with natural silts or color



that reduces the penetration of sunlight needed for plant photosynthesis, or in other waters where it can be demonstrated that algal production will not interfere with or adversely affect designated and other attainable uses. Alternative or additional nutrient limitations for surface waters may be established by the Pueblo of Acoma and incorporated into water quality management plans.

**F. Pathogens.** Waters shall be virtually free from pathogens (viruses, bacteria, or parasites). Waters used for irrigation of table crops (e.g., lettuce) shall be free of salmonella and shigella species.

**G. Turbidity.** Turbidity attributable to other than natural causes shall not reduce light transmission to a point at which aquatic biota are inhibited or to a point that causes an unaesthetic and substantial visible contrast with the natural appearance of the water. Specifically, turbidity shall not exceed 5 nephelometric turbidity units (NTU; a measure of turbidity in water) over background when background turbidity is 50 NTU or less or, when background turbidity is more than 50 NTU, no more than a 10 percent increase over background turbidity.

**H. Mixing Zones.** Where effluent is discharged into surface waters, a continuous zone shall be maintained in which the water is of adequate quality to allow the migration of aquatic life with no significant effect on their population. The cross-sectional area of wastewater mixing zones shall generally be less than one quarter of the cross-sectional area or critical low-flow volume of the receiving stream. Mixing zones in lakes may be assessed and limited on a case-by-case basis. Mixing zones shall not overlap recreational or ceremonial use sites. Water quality standards shall be maintained throughout zones of passage. Zones of passage in lakes and intermittent streams may be designated on a site-specific basis. The water quality in a zone of passage shall not be permitted to fall below the standards for the designated water body(ies) within which the zone is contained. With regard to toxicity in mixing zones, see Subsection III.P. Mixing zones are prohibited in ephemeral waters or where no water is available for dilution.

**I. Radioactive Materials.** Concentrations of radioactive constituents shall not exceed the concentrations caused by naturally occurring materials. Specific numeric criteria for radioactive constituents are listed in Appendix A, Table A-3.

**J. Temperature.** The introduction of heat by other than natural causes shall not increase the temperature in a stream, outside a mixing zone, by more than 2.7°C (5°F), based upon the monthly average of the maximum daily temperatures measured at mid-depth or 3 feet (whichever is less) outside the mixing zone. In lakes, the temperature of the water column or epilimnion (if thermal stratification exists) shall not be raised more than 1.7°C (3°F) 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 stratified). The normal daily and seasonal variations that were present before the addition of heat from other than natural sources shall be maintained. In no case shall man-introduced heat be permitted when the maximum temperature specified for the reach (20°C [68°F] for cold water fisheries and 32.2°C [90°F] for warm water fisheries) would thereby be exceeded. Privately owned lakes and reservoirs used in the process of cooling water for industrial purposes may be classified using a less stringent special-use standard for thermal components, provided, however, that the water released from any such lake or reservoir into a stream system meets the water quality standards of the receiving stream. High water temperatures caused by unusually high ambient air temperatures are not violations of these standards.

**K. Salinity/Mineral Quality (total dissolved solids, chlorides, and sulfates).** Existing mineral quality shall not be altered by municipal, industrial, and instream activities or by other waste discharges in a manner that interferes with the designated or attainable uses for a water body. Numerical criteria for inorganic constituents as defined in Appendix A shall not be exceeded.

**L. pH.** The water quality standards for pH shown in Appendix A, Table A-3 shall not be violated by other than natural causes.

**M. Dissolved oxygen.** If a stream or lake is capable of supporting aquatic biota, the dissolved oxygen standard will be a minimum of 5 mg/L.

**N. Dissolved gases.** Surface water and groundwater shall be free of nitrogen and other dissolved gases at levels above 110 percent saturation when this super saturation is attributable to municipal, industrial, or other discharges.

**O. Fecal coliform bacteria.** The water quality standards for fecal coliform and E. coli bacteria shown in Appendix A, Table A-3 shall not be exceeded.

**P. Toxic Substances.**

1. Toxic substances shall not be present in receiving waters in quantities that are toxic to human, animal, plant, or aquatic life, or in quantities that interfere with the normal propagation, growth, and survival of the sensitive indigenous aquatic biota. Within the mixing zone, there shall be no acute toxicity, and at the edge of the mixing zone, there shall be no chronic toxicity. For toxic substances lacking EPA-published criteria, biomonitoring data may be used to determine

compliance with this narrative standard in accordance with EPA standard acute and chronic biological test protocols. These protocols can be found in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, EPA-821-R-02-012, and in *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA-821-R-02-013. Additional guidelines can be found in the EPA documents, *Technical Support Document for Water Quality-Based Toxics Control, Post-Third Round Permitting Strategy (Region VI document)*, and *Quality Criteria for Water, 1986*. The requirements for waters receiving toxic substances that are known to be persistent, bioaccumulative, carcinogenic, and/or synergistic with other waste stream components shall be addressed on a case-by-case basis.

Should the Pueblo of Acoma need to derive numeric criteria without actually conducting toxicity tests, it shall use the AQUIRE (Aquatic Toxicity Information Retrieval) database and EPA's guidance, *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses* (Stephan et al., 1985, PB85-227049), to calculate any criteria. If sufficient data are not available to derive a numeric criterion following the above guidance, the Pueblo may use the results of toxicological studies to calculate a criterion based on the following methods:

- (a) Concentrations of non-persistent toxic materials shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 10% of LC<sub>50</sub> values) to representative sensitive aquatic organisms.
- (b) Concentrations of persistent toxic materials that do not bioaccumulate shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 5% of LC<sub>50</sub> values) to representative sensitive aquatic organisms.
- (c) Concentrations of toxic materials that bioaccumulate shall not exceed concentrations that are chronically toxic (as determined from appropriate chronic toxicity data or calculated as 1% of LC<sub>50</sub> values) to representative sensitive aquatic organisms.

Toxicants in the receiving water known to be persistent, bioaccumulative, carcinogenic, and/or synergistic with other waste stream components may be addressed on a case-by-case basis.

2. The numerical water quality standards that apply for toxic substances for specific uses are listed in Appendix A of these Standards. As new documents addressing criteria for toxic substances are published by EPA, these will become incorporated into and made a part of

Appendix A of the Standards during triennial review, and the numeric criteria established by EPA shall equally apply. Numeric criteria for carcinogens will reflect a risk level of one in one million ( $10^{-6}$ ).

For specific segments where the above criteria may need to be recalculated using appropriate species or water quality factors, the Pueblo of Acoma may, after public participation and EPA approval, adopt site-specific criteria modifications. Because pesticides and polychlorinated biphenyls (PCBs) can accumulate in bottom sediments and tissues of aquatic organisms, sediment and tissue analyses shall be used when appropriate to complement water analyses. Chemical concentration levels in tissues of aquatic organisms that exceed U.S. Food and Drug Administration (FDA) action levels or risk-based tissue criteria shall require investigation.

#### Q. Biological Integrity

Biological integrity refers to the ability to support and maintain a healthy and diverse community of organisms representative of the natural habitat of the region.

Biological integrity shall be maintained within all waters of the Pueblo of Acoma. Modifications through the addition of pollutants or through physical alteration that adversely affect or decrease the diversity and propagation of aquatic biota are not allowed. Effects will be measured by comparisons to upstream conditions or other appropriately selected reference sites within a comparable ecological region. Selected reference locations will represent natural conditions in which indigenous aquatic communities are healthy and can reproduce fertile offspring (e.g., the Rio San Jose near Anzac Springs).

## Section IV. Water Body Uses and Standards Specific to the Uses

**A. Applicability of Uses and Standards.** The water quality standards prescribed in this section and in Appendix A of these Standards apply to all Pueblo of Acoma surface waters and groundwaters and their tributaries. The numeric standards for toxic substances specific to the uses are listed in Appendix A.

### **B. Specific Water Quality Uses and Standards.**

The water body uses for the Pueblo of Acoma and standards specific to these uses are as follows:

1. *Aquatic and Wildlife (cold water habitat) (A&W<sub>c</sub>).* A cold water habitat is a stream reach, lake, or other water body where water temperature and other characteristics are suitable for support and propagation of animals, plants, and other organisms, including salmonids. Standards specific to the use are outlined in Appendix A.

2. *Aquatic and Wildlife (warm water habitat) (A&W<sub>w</sub>).* A warm water habitat is a stream reach, lake, or other water body where water temperature and other characteristics are suitable for support and propagation of animals, plants, or other organisms (excluding salmonids). Standards specific to the use are outlined in Appendix A.

3. *Aquatic and Wildlife (ephemeral) (A&W<sub>e</sub>).* An ephemeral habitat is a stream reach, lake, or other water body where water temperature and other characteristics are periodically suitable for support and propagation of animals, plants, or other organisms (excluding salmonids). Standards specific to the use are outlined in Appendix A.

4. *Primary Contact Recreational Use (PCR).* The use of a stream reach, lake, or other water body for recreational or ceremonial purposes by members of the Pueblo of Acoma. The ceremonial use of water by members of the Pueblo of Acoma requires protection of sensitive and valuable aquatic and riparian habitat. This use may cause the human body to come into direct contact with the water to the point of complete submergence. The use is such that intentional or accidental ingestion of the water is likely to occur and certain sensitive body organs, such as the eyes, ears or nose, may be exposed to direct contact with the water. Standards specific to the use are outlined in Appendix A. In addition to those standards, the open water shall be free from concentrations of algae that cause a nuisance condition or gastrointestinal or skin disorders.

5. *Partial Body Contact (PBC)*. Partial body contact means the use of a stream reach, lake, or other water body in which contact with the water may, but need not, occur and in which the probability of ingesting water is minimal; examples are fishing and boating. Standards specific to the use are outlined in Appendix A, Table A-3. In addition, the open water shall be free from concentrations of algae that cause a nuisance condition or gastrointestinal or skin disorders.

6. *Agricultural Irrigation (Agl) and Agricultural Livestock Watering (AgL)*. Agricultural irrigation means the use of surface waters or groundwaters for irrigation of crops. Agricultural livestock watering means the use of surface waters or groundwaters as a supply for water consumption by livestock. Standards specific to the uses are outlined in Appendix A, Table A-3.

7. *Fish Consumption (FC)*. Fish consumption is the use of a surface water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, turtles, freshwater shellfish, and frogs. Standards specific to the use are listed in Appendix A.

8. *Groundwater Recharge (GWR)*. Groundwater recharge use means any surface water that recharges groundwater. Surface waters designated as groundwater recharge must meet the standards for the aquifer being recharged as well as the surface water standards. Standards specific to the use are listed in Appendix A, Table A-3.

9. *Domestic Water Source (DWS)*. Domestic water source is the use of a Pueblo surface water or groundwater as a potable water supply. Standards specific to the use are presented in Appendix A, including the human health criteria shown in Table A-1 and the standards shown in Table A-3.

## Section V. Designated Uses for Water Bodies of the Pueblo of Acoma

The designated uses for specific water bodies of the Pueblo of Acoma are as set forth below.

**A. Streams.** The uses for the Rio San Jose upstream of Acomita Lake are A&W<sub>w</sub>, AgI, AgL, PCR, and FC. The use for the Rio San Jose downstream of Acomita Lake are A&W<sub>w</sub>, AgI, AgL, and PBC. The uses for all other perennial, intermittent and ephemeral streams that pass through the Pueblo of Acoma, including all tributaries, branches, springs, standing water, and wetlands thereof, are A&W<sub>e</sub><sup>2</sup>, GWR<sup>3</sup>, AgI<sup>4</sup>, AgL, and PBC.

**B. Lakes.** The uses that apply to Acomita Lake are A&W<sub>w</sub>, AgL, AgI, PCR, and FC. The uses that apply to all other manmade lakes and ponds are AgL and PBC. The uses that apply to all natural lakes and ponds are A&W<sub>w</sub>, AgL, and PBC.

**C. Springs.** The designated uses for springs on the Pueblo of Acoma are A&W<sub>w</sub>, PCR, and DWS.

**D. Groundwater.** The uses are listed below for groundwater on the Pueblo of Acoma.

Name	Designated Use
Alluvium/basalt <sup>a</sup>	DWS <sup>b</sup> , AgI <sup>c</sup> , AgL <sup>c</sup>
Sandstone aquifer <sup>d</sup>	DWS <sup>b</sup> , AgI <sup>c</sup> , AgL <sup>c</sup>
San Andres/Glorieta <sup>e</sup>	DWS <sup>b</sup> , AgI <sup>c</sup> , AgL <sup>c</sup>

<sup>a</sup> Quaternary mixed alluvium and basalt

<sup>b</sup> The drinking water standard use designation shall apply only at locations within 2,000 feet of a drinking water supply well or within another designated wellhead protection zone.

<sup>c</sup> The agricultural irrigation and livestock use designations shall apply at all locations within the aquifer, unless a site-specific variance is granted.

<sup>d</sup> Jurassic sandstones including the Zuni Sandstone, San Rafael Group/Bluff Sandstone, Summerville Formation, Todilto Limestone, Entrada Sandstone

<sup>e</sup> Permian San Andres Limestone and Glorieta Sandstone

<sup>2</sup> Where streams designated A&W<sub>e</sub> are perennial in specific localities, such as below spring discharges, the A&W<sub>w</sub> and FC designations shall also apply.

<sup>3</sup> The groundwater recharge designation shall apply only at locations within 2,000 feet of a drinking water supply well or within another designated wellhead protection zone.

<sup>4</sup> The agricultural irrigation use designation shall apply except in specific localities where it can be demonstrated that no irrigation use is occurring.

## Section VI. Sampling and Analyses

**A. Methodology.** Sample collection, preservation, and analysis used to determine water quality and to maintain the standards set forth in Sections III and IV of these Water Quality Standards shall be performed in accordance with procedures prescribed by the latest EPA authoritative analytical reference and Pueblo of Acoma Quality Management Plan, including but not limited to the latest editions of any of the following authorities:

- American Public Health Association, *Standard Methods for the Examination of Water and Wastewater*
- Environmental Monitoring and Support Laboratory, *Methods for Chemical Analysis of Water and Wastes* (U.S. Environmental Protection Agency Office of Research and Development, Cincinnati, Ohio, 1983)
- U.S. Environmental Protection Agency, *Guidelines Establishing Test Procedures for the Analysis of Pollutants* (40 CFR Part 136)
- Quality Management Plan for Environmental Programs of the Pueblo of Acoma, 1998 and any updated versions
- The *Pueblo of Acoma Quality Assurance Project Plan for Water Quality Monitoring*, 1999 and any updated versions
- *Methods for Determination of Inorganic Substances in Water and Fluvial Sediments* (Techniques of Water-Resource Investigations of the U.S. Geological Survey)
- *Methods for the Determination of Organic Substances in Water and Fluvial Sediments* (Techniques of Water-Resource Investigations of the U.S. Geological Survey)

**B. Bacteriological Surveys.** When a minimum of five samples are collected in a 30-day period, the monthly geometric mean is used in assessing attainment of standards. When fewer than five samples are collected in a 30-day period, no single sample shall exceed the applicable upper limit for bacterial density set forth in Section IV.



### **C. Sampling Procedures.**

1. *Streams:* Stream monitoring stations below waste discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.

2. *Lakes:* Sampling stations in lakes, including reservoirs and other water bodies, shall be located where the attainment of a water quality standard is to be assessed, but at least 250 feet from a waste discharge. Water quality measurements shall be taken at depth intervals in the water column at a sampling station. For toxic substances and nutrients, the entire water column shall be monitored. For dissolved oxygen in stratified lakes, measurements shall be made in the epilimnion. In nonstratified lakes, measurements shall be made at intervals throughout the entire water column.

**D. Biological Surveys.** Any biological assessment program shall be established in accordance with EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish* (EPA-841-B-99-002) or other established procedures. As needed, artificial collection sites shall be installed in lowland stream beds to determine potential species diversity under improved stream conditions.

## Section VII. Definitions

Unless otherwise provided, or unless the context requires another definition, the definitions set forth in this chapter shall apply to the terms used throughout these Standards.

**Acute toxicity:** Toxicity that exerts short-term lethal impacts on representative organisms with a duration of exposure generally less than or equal to 48 hours. Acute toxicity shall be determined in accordance with procedures specified in EPA-821-R-02-012, *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Other methods may be used as appropriate to determine acute effects other than lethality such as, but not limited to, behavioral changes or immobilization.

**Agricultural irrigation:** The use of a water for the irrigation of crops.

**Agricultural livestock watering:** The use of a water as a supply of water for consumption by livestock.

**Algae:** Simple plants without roots, stems, or leaves that contain chlorophyll and are capable of photosynthesis.

**Annual mean:** The arithmetic mean of monthly values determined over a consecutive 12-month period, provided that monthly values are determined for at least 3 months. The monthly value shall be the arithmetic mean of all values determined in a calendar month.

**Antidegradation:** The policy set forth in the Pueblo of Acoma Water Quality Standards whereby existing uses and the level of water quality necessary to maintain those uses is protected (see 40 CFR Section 131.12 [1987]).

**Aquatic and wildlife (cold water habitat):** The use of a surface water where water temperature and other characteristics are suitable for propagation of cold water fish by animals, plants, or other organisms, including salmonids, for habitation, growth, or propagation.

**Aquatic and wildlife (ephemeral):** The use of an ephemeral water by animals, plants, or other organisms, excluding fish, for habitation, growth, or propagation.

**Aquatic and wildlife (warm water habitat):** The use of a surface water where water temperature and other characteristics are suitable for propagation of warm water fish, animals, plants, or other organisms, excluding salmonids, for habitation, growth, or propagation.

**Aquatic biota:** Animal and plant life in the water.

**Attainable use:** A use of a surface water or groundwater body that has the level of water quality and other characteristics that are needed to support the use, or which would have the level of water quality and other characteristics needed to support the use upon implementation of and compliance with the pertinent narrative and numeric standards in the Pueblo of Acoma Water Quality Standards.

**Best management practices (BMPs):** Schedules of activities, prohibitions of certain practices, implementation of maintenance procedures, or other measures or practices approved by the Pueblo of Acoma Tribal Council and/or Haaku Water Office that are consistent with the purposes of the Pueblo of Acoma Water Quality Standards and with the narrative and numeric standards contained therein and that prevent or reduce the pollution of waters of the Pueblo. BMPs include, but are not limited to, structural and nonstructural controls, changes in management practices, and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

**Bioaccumulation:** The uptake and retention of a substance by an aquatic organism from its surrounding medium and food. Biomagnification, resulting from bioaccumulation through the food chain, can lead to drastic increases in the body burden of some toxins.

**Bioaccumulation factor:** The ratio of a substance's concentration in the tissue of an aquatic organism to the concentration of this substance in ambient water.

**Bioconcentration:** The process by which a compound is absorbed from the water through gills or epithelial tissues and is concentrated in the body.

**Bioconcentration Factor (BCF):** The ratio of a substance's concentration in tissue versus its concentration in water, in situations where the food chain is not exposed or contaminated. For non-metabolized substances, it represents equilibrium partitioning between water and organisms.

**Biomagnification:** The process by which the concentration of a compound increases in species occupying successive trophic levels (e.g., consuming species through the food chain).

**Biomonitoring or biological monitoring:** The use of living organisms to test the suitability of effluents for discharge into receiving waters or to test the quality of surface waters of the Pueblo.

**Carcinogenic:** Cancer producing.

**Chronic toxicity:** Toxicity that exerts sublethal negative effects, such as impairment of growth or reproduction, or becomes lethal after long-term exposure, generally measured in a 7-day test on representative sensitive organisms. Chronic toxicity shall be determined in accordance with procedures specified in EPA-821-R-02-013, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. Other methods may be used as appropriate.

**Clean Water Act:** The Federal Water Pollution Control Act, as amended by the Water Quality Act of 1987 (and all subsequent amendments), which is incorporated by reference and is on file with the Haaku Water Office.

**Cold water habitat:** A stream reach, lake, or other water body where water temperature and other characteristics are suitable for support and propagation of cold water fish such as brown trout, cutthroat trout, brook trout, rainbow trout, longnose dace, Rio Grande chub, and Rio Grande sucker.

**Color:** True color as well as apparent color. True color is the color of the water from which turbidity has been removed. Apparent color includes not only the color due to substances in solution (true color), but also that color due to suspended matter.

**Criteria:** Elements of water quality standards that are expressed as pollutant concentrations or levels, or narrative statements representing a water quality that supports a designated use.

**Cumulative:** Increasing by successive additions.

**Design flow:** The flow used for steady-state waste load allocation modeling as defined in EPA/505/2-90-001.

**Designated uses:** Those uses set forth in Section IV of these water quality standards.

**Dissolved:** A constituent of a water sample that will pass through a filter with pores averaging 0.45 microns in diameter, under a pressure differential not exceeding one atmosphere.

**Dissolved oxygen:** The amount of oxygen dissolved in water or the amount of oxygen available for biochemical activity in water, commonly expressed as a concentration in milligrams per liter.

**Domestic water source:** The use of a surface water or groundwater as a potable water supply. Coagulation, sedimentation, filtration, disinfection, or other treatments may be necessary to yield a finished water suitable for human consumption.

**Drinking water:** Water that meets the general standards set forth in Section III and that only requires disinfection in order to be usable for drinking or cooking.

**Effluent:** Discharge into surface waters and groundwaters from other than natural sources.

**Ephemeral stream:** A stream or reach that flows briefly only in direct response to precipitation or snowmelt in the immediate locality, the channel bed of which is always above the water table in the surrounding area.

**Epilimnion:** The layer of water that overlies the thermocline of a lake and that is subject to the action of wind; the upper, well mixed, well illuminated, nearly isothermal region of a stratified holomictic lake.

**Eutrophication:** The maturation of a body of water involving increasing concentrations of dissolved nutrients and seasonal oxygen deficiency.

**Existing uses:** Those uses actually attained in an Acoma water body on or after November 28, 1975, whether or not they are referred to in the Pueblo of Acoma Water Quality Standards, or a use that the existing water quality will allow.

**FDA action limits:** Levels promulgated by the U.S. Food and Drug Administration concerning concentrations of substances in food.

**Fecal coliform bacteria:** Gram negative, nonspore-forming rod-shaped bacteria that are present in the gut or the feces of warm-blooded animals. Fecal coliform bacteria generally include

organisms that are capable of producing gas from lactose broth in a suitable culture medium within 24 hours at  $44.5 \pm 0.2^\circ\text{C}$ .

**Fish consumption:** The use of a surface water by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, turtles, freshwater shellfish, and frogs.

**Fish culture:** The production of cold water or warm water fish in a hatchery or rearing station.

**Geometric mean:** The antilog of the log of a set of numbers. The geometric mean is calculated using the following formula.

$$GM_y = \sqrt[n]{(Y_1)(Y_2)(Y_3)\dots(Y_n)}$$

**Groundwater recharge:** The use of a surface water as a source of recharge to groundwater.

**Hardness:** The sum of the calcium and magnesium concentrations, expressed as calcium carbonate ( $\text{CaCO}_3$ ) in milligrams per liter.

**Harmonic mean:** The number of daily streamflow measurements divided by the sum of the reciprocals of the flow.

**Indigenous:** Produced, growing, or living naturally in a particular region or environment.

**Industrial:** Refers to production of goods or services for profit.

**Intermittent stream:** A stream or reach of a stream that flows only at certain times of the year, such as when receiving flow from springs, melting snow, or localized precipitation.

**LC<sub>50</sub>:** The concentration of a substance that is lethal to 50 percent of the test organisms within a defined time period.

**Micrograms per liter ( $\mu\text{g/L}$ ):** The concentration at which one microgram is contained in a volume of one liter; one microgram per liter is equivalent to one part per billion (ppb) at unit density.

**Milligrams per liter ( $\text{mg/L}$ ):** The concentration at which one milligram is contained in a volume of one liter; one milligram per liter is equivalent to one part per million (ppm) at unit density.

**Mixing zone:** A three-dimensional zone in which discharged effluent mixes with the receiving water and within which there is a gradation of water quality.

**Narrative standard:** A standard or criterion expressed in words rather than numerically.

**National Pollutant Discharge Elimination System:** The point-source discharge permit program established by Section 402 of the Clean Water Act.

**Natural conditions:** Characteristics that are not man-induced that are related to water quality; the levels of pollutants present in ambient water that are from natural, as opposed to man-induced, sources. Natural conditions do not include point source discharges, nonpoint source pollution, or any other man-induced impairment of the chemical, physical, biological, or radiological integrity of water.

**Ninetieth percentile:** The value that may not be exceeded by more than 10 percent of the observations in a consecutive 12-month period.

**Nonpoint source:** A source of pollution that is not a discernible, confined, and discrete conveyance; a diffuse source that flows across natural or man-made surfaces, such as run-off from agricultural, construction, mining, or silvicultural activities, or from urban areas.

**NTU:** Nephelometric turbidity units based on a standard method using formazin polymer or its equivalent as the standard reference suspension. Nephelometric turbidity measurements expressed in units of NTU are numerically identical to the same measurements expressed in units of FTU (formazin turbidity units).

**Nuisance condition:** A condition involving uncontrolled growth of aquatic plants, usually caused by excessive nutrients in the water.

**Nutrient:** A chemical element or inorganic compound taken in by green plants and used in organic synthesis.

**Oil:** Petroleum in any form, including but not limited to crude oil, gasoline, kerosene, fuel oil, diesel oil, lubricating oil, or sludge.

**Partial body contact:** The use of a surface water that may cause the human body to come into direct contact with the water, but normally not to the point of complete submergence. The use is such that ingestion of the water is not likely to occur, nor will sensitive body organs such as the eyes, ears, or nose normally be exposed to direct contact with the water; examples are fishing and boating.

**Perennial stream:** A stream or reach of a stream that flows continuously throughout the year, the upper surface of which is generally lower than the water table of the region adjoining the stream.

**Persistent:** Resistant to degradation or change.

**pH:** The negative logarithm of the effective hydrogen-ion concentration in gram equivalents per liter; a measure of the acidity or alkalinity of a solution, increasing with increasing alkalinity and decreasing with increasing acidity.

**Picocurie:** That quantity of radioactive material producing 2.22 nuclear transformations per minute.

**Point source:** Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged into a water body; does not include return flows from irrigated agriculture.

**Primary contact recreational use:** The use of a stream reach, lake, or other water body for recreational or ceremonial purposes by members of the Pueblo of Acoma. The ceremonial use of water by members of the Pueblo of Acoma requires protection of sensitive and valuable aquatic and riparian habitat. This use may cause the human body to come into direct contact with the water to the point of complete submergence. The use is such that intentional or accidental ingestion of the water is likely to occur and certain sensitive body organs, such as the eyes, ears or nose, may be exposed to direct contact with the water.

**Pueblo lands:** All land within the exterior boundaries of the Pueblo of Acoma.

**Pueblo waters:** For regulatory purposes, all surface and subsurface waters flowing on, across, through, beneath, or bordering Pueblo lands.

**Regional Administrator:** The regional administrator of Region VI of the U.S. Environmental Protection Agency.



**Segment:** A portion of a surface water that has common hydrologic characteristics or flow regulation regimes, possesses common natural physical, chemical, and biological characteristics, and exhibits common reactions to external stresses such as the discharge of pollutants.

**Synergism:** Cooperative action of discrete agents such that the total effect is greater than the sum of the effects taken independently.

**Technology-based controls:** The application of technology-based effluent limitations as required under Section 301(b) of the Clean Water Act.

**Thermal stratification:** Horizontal layers of different densities produced in a lake and caused by temperature.

**Thermocline:** A density gradient or pycnocline owed to changing temperatures; the planar thermocline is the imaginary plane at the depth where the rate of temperature change is the greatest in a vertical temperature profile.

**Total:** A constituent of a water sample that is analytically determined without filtration.

**Total phosphorus:** All the phosphorus present in the sample, regardless of form, as measured by a persulfate digestion procedure.

**Toxic pollutant:** Those pollutants, or combination of pollutants, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, reproductive impairment, or physical deformations in such organisms or their offspring.

**Toxicity:** State or degree of being toxic or poisonous; producing lethal or sublethal adverse effects on representative sensitive organisms due to exposure to toxic materials.

**Turbidity:** A measure of the amount of suspended material, particles, or sediment that has the potential for adverse impacts on aquatic biota. This measurement is an expression of the optical property in water that causes incident light to be scattered or absorbed rather than transmitted in straight lines.

**Use-attainability analysis:** A structured scientific assessment of the factors affecting attainment of a use for a body of water. Such assessment may include physical, chemical, biological, and economic factors, such as those referred to in 40 CFR Section 131.10(g). Guidance for such assessment may be found in U.S. Environmental Protection Agency *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use-Attainability Analyses* (Volume 1 - Streams; Volume 2 - Estuarine Systems; Volume 3 - Lake Systems).

**Warm water habitat:** A stream reach, lake, or other water body in which water temperature and other characteristics are suitable for support and propagation of warm water fish such as large-mouth black bass, small-mouth black bass, crappie, white bass, bluegill, flathead catfish, channel catfish, white sucker, flathead chub, or fathead minnow.

**Water contaminant:** Any substance that alters the physical, chemical, or biological qualities of water.

**Water quality-based controls:** Effluent limitations, as provided under Section 301(b)(1)(C) of the Clean Water Act, which are developed and imposed on point-source dischargers in order to protect and maintain applicable water quality standards. These controls are more stringent than the technology-based effluent limitations required under other paragraphs of Section 301(b).

**Wellhead protection zone:** The surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield.

**Wetlands:** Those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs, cienegas, tinajas, and similar areas. Constructed wetlands used for treatment purposes are not included in this definition.

**Zone of passage:** The portion of the receiving water outside the mixing zone (where water quality throughout is the same as that of the receiving water).

**Appendix A**  
**Numeric Criteria**

**Table A-1. Numeric Criteria for Toxic Constituents**  
Page 1 of 5

Compound	Chemical Abstracts Service Number	Concentration (µg/L)			
		Freshwater <sup>a</sup>		Human Health	
		Acute Criteria (CMC <sup>b</sup> )	Chronic Criteria (CCC <sup>c</sup> )	Consumption of Water and Organisms <sup>d</sup>	Consumption of Organisms Only <sup>e</sup>
Aluminum	7429905	750 <sup>f</sup>			
Antimony	7440360			14 <sup>g</sup>	4,300 <sup>g</sup>
Arsenic	7440382	340 <sup>f,h,i</sup>	150 <sup>f,h,i</sup>		20.5 <sup>i,k,l</sup>
Beryllium	7440417			NC <sup>m</sup>	NC <sup>m</sup>
Cadmium	7440439	See Table 2 <sup>f,h,i,n</sup>	See Table 2 <sup>f,h,i,n</sup>	NC <sup>m</sup>	NC <sup>m</sup>
Chromium (III)	16065831	See Table 2 <sup>f,h,n</sup>	See Table 2 <sup>f,h,n</sup>	NC <sup>m</sup>	NC <sup>m</sup>
Chromium (VI)	18540299	15.7 <sup>o,p</sup>	10.6 <sup>o,p</sup>	NC <sup>m</sup>	NC <sup>m</sup>
Copper	7440508	See Table 2 <sup>f,h,i,n</sup>	See Table 2 <sup>f,h,i,n</sup>	1,300	
Lead	7439921	See Table 2 <sup>f,h,n</sup>	See Table 2 <sup>f,h,n</sup>	NC <sup>m</sup>	NC <sup>m</sup>
Mercury	7439976	1.4 <sup>f,h,i</sup>	0.77 <sup>f,h,i</sup>	0.050 <sup>g</sup>	0.051 <sup>g</sup>
Nickel	7440020	See Table 2 <sup>f,h,i,n</sup>	See Table 2 <sup>f,h,i,n</sup>	610 <sup>g</sup>	4,600 <sup>g</sup>
Selenium	7782492	20	2.0 <sup>q</sup>	170	4200
Silver	7440224	See Table 2 <sup>f,h,n</sup>			
Thallium	7440280			0.24 <sup>r</sup>	0.47 <sup>r</sup>
Zinc	7440666	See Table 2 <sup>f,h,i,n</sup>	See Table 2 <sup>f,h,i,n</sup>	7400 <sup>s</sup>	26,000 <sup>s</sup>
Cyanide	57125	22 <sup>t</sup>	5.2 <sup>t</sup>	140 <sup>r</sup>	140 <sup>r</sup>
Asbestos	1332214			7,000,000 fibers/L <sup>u</sup>	
2,3,7,8 Tetrachloro-dibenzo-p-dioxin (TCDD or Dioxin)	1746016			5.0 x 10 <sup>-9j</sup>	5.1 x 10 <sup>-9j</sup>
Acrolein	107028			190	290
Acrylonitrile	107131			0.051 <sup>iv</sup>	0.25 <sup>iv</sup>
Benzene	71432			2.2 <sup>iv</sup>	51 <sup>iv</sup>
Bromoform	75252			4.3 <sup>g,w</sup>	140 <sup>iv</sup>
Carbon tetrachloride	56235			0.23 <sup>iv</sup>	1.6 <sup>iv</sup>
Chlorobenzene	108907			130 <sup>r</sup>	1600 <sup>r</sup>
Chlorodibromomethane	124481			0.40 <sup>iv</sup>	13 <sup>iv</sup>
Chloroform	67663			5.7 <sup>g,w</sup>	470 <sup>g,w</sup>
Dichlorobromomethane	75274			0.55 <sup>iv</sup>	17 <sup>iv</sup>
1,2-Dichloroethane	107062			0.38 <sup>g,w</sup>	37 <sup>iv</sup>
1,1-Dichloroethylene	75354			330 <sup>r</sup>	7100 <sup>r</sup>
1,2-Dichloropropane	78875			0.50 <sup>iv</sup>	15 <sup>iv</sup>
1,3-Dichloropropylene	542756			0.34 <sup>r</sup>	21 <sup>r</sup>
Ethylbenzene	100414			530 <sup>r</sup>	2100 <sup>r</sup>
Methyl bromide	74839			47 <sup>v</sup>	1500 <sup>v</sup>
Methyl chloride	74873			NC <sup>m</sup>	NC <sup>m</sup>
Methylene chloride	75092			4.6 <sup>iv</sup>	590 <sup>iv</sup>
1,1,2,2-Tetrachloroethane	79345			0.17 <sup>g,w</sup>	4.0 <sup>iv</sup>
Tetrachloroethylene	127184			0.69 <sup>j</sup>	3.3 <sup>j</sup>
Toluene	108883			1300 <sup>r</sup>	15000 <sup>r</sup>
1,2-Trans-dichloroethylene	156605			140 <sup>r</sup>	10000 <sup>r</sup>
1,1,1-Trichloroethane	71556			NC <sup>m</sup>	NC <sup>m</sup>
1,1,2-Trichloroethane	79005			0.59 <sup>iv</sup>	16 <sup>iv</sup>

**Table A-1. Numeric Criteria for Toxic Constituents**  
Page 2 of 5

Compound	Chemical Abstracts Service Number	Concentration (µg/L)			
		Freshwater <sup>a</sup>		Human Health	
		Acute Criteria (CMC <sup>b</sup> )	Chronic Criteria (CCC <sup>c</sup> )	Consumption of Water and Organisms <sup>d</sup>	Consumption of Organisms Only <sup>e</sup>
Trichloroethylene	79016			2.5 <sup>i</sup>	30 <sup>i</sup>
Vinyl chloride	75014			0.025 <sup>r</sup>	2.4 <sup>r</sup>
2-Chlorophenol	95578			81 <sup>s,v</sup>	150 <sup>s,v</sup>
2,4-Dichlorophenol	120832			77 <sup>s,v</sup>	290 <sup>s,v</sup>
2,4-Dimethylphenol	105679			380 <sup>v</sup>	850 <sup>s,v</sup>
2-Methyl-4,6-dinitrophenol	534521			13	280
2,4-Dinitrophenol	51285			69 <sup>v</sup>	5300 <sup>v</sup>
Pentachlorophenol	87865	Variable <sup>i,x</sup>	Variable <sup>i,x</sup>	0.27 <sup>iv</sup>	3.0 <sup>iv,y</sup>
Phenol	108952			21,000 <sup>g</sup>	1700000 <sup>s,v</sup>
2,4,6-Trichlorophenol	88062			1.4 <sup>iv</sup>	2.4 <sup>i,s,v</sup>
Acenaphthene	83329			670 <sup>s,v</sup>	990 <sup>s,v</sup>
Anthracene	120127			8300 <sup>v</sup>	40000 <sup>v</sup>
Benzidine	92875			0.000086 <sup>iv</sup>	0.00020 <sup>iv</sup>
Benzo(a)anthracene	56553			0.0038 <sup>iv</sup>	0.018 <sup>iv</sup>
Benzo(a)pyrene	50328			0.0038 <sup>iv</sup>	0.018 <sup>iv</sup>
Benzo(b)fluoranthene	205992			0.0038 <sup>iv</sup>	0.018 <sup>iv</sup>
Benzo(k)fluoranthene	207089			0.0038 <sup>iv</sup>	0.018 <sup>iv</sup>
Bis(2-chloroethyl)ether	111444			0.030 <sup>iv</sup>	0.53 <sup>iv</sup>
Bis(2-chloroisopropyl)ether	108601			1,400 <sup>g</sup>	65000 <sup>v</sup>
Bis(2-ethylhexyl)phthalate	117817			1.2 <sup>iv</sup>	2.2 <sup>iv</sup>
Butylbenzyl phthalate	85687			1500 <sup>v</sup>	1900 <sup>v</sup>
2-Chloronaphthalene	91587			1000	1600 <sup>v</sup>
Chrysene	218019			0.0038 <sup>iv</sup>	0.018 <sup>g,w</sup>
Dibenzo(a,h)anthracene	53703			0.0038 <sup>g,w</sup>	0.018 <sup>iv</sup>
1,2 Dichlorobenzene	95501			420 <sup>r</sup>	1300 <sup>r</sup>
1,3 Dichlorobenzene	541731			320	960 <sup>r</sup>
1,4 Dichlorobenzene	106467			63 <sup>r</sup>	190 <sup>r</sup>
3,3 Dichlorobenzidine	91941			0.021 <sup>iv</sup>	0.028 <sup>iv</sup>
Diethyl phthalate	84662			17000 <sup>v</sup>	44000 <sup>v</sup>
Dimethyl phthalate	131113			270000	1,100,000
Di-n-butyl phthalate	84742			2000 <sup>w</sup>	4500 <sup>v</sup>
2,4-Dinitrotoluene	121142			0.11 <sup>w</sup>	3.4 <sup>c</sup>
1,2-Diphenylhydrazine	122667			0.036 <sup>iv</sup>	0.20 <sup>iv</sup>
Fluoranthene	206440			130 <sup>v</sup>	140 <sup>v</sup>
Fluorene	86737			1100 <sup>v</sup>	5300 <sup>v</sup>
Hexachlorobenzene	118741			0.00028 <sup>iv</sup>	0.00029 <sup>iv</sup>
Hexachlorobutadiene	87683			0.44 <sup>g,w</sup>	18 <sup>iv</sup>
Hexachlorocyclopentadiene	77474			40 <sup>s</sup>	1100 <sup>s</sup>
Hexachloroethane	67721			1.4 <sup>iv</sup>	3.3 <sup>iv</sup>
Indeno(1,2,3-cd)pyrene	193395			0.0038 <sup>iv</sup>	0.018 <sup>iv</sup>
Isophorone	78591			35 <sup>iv</sup>	960 <sup>iv</sup>
Nitrobenzene	98953			17 <sup>g</sup>	690 <sup>s,v,y</sup>
N-Nitrosodimethylamine	62759			0.00069 <sup>g,w</sup>	3.0 <sup>g,w</sup>

**Table A-1. Numeric Criteria for Toxic Constituents**  
Page 3 of 5

Compound	Chemical Abstracts Service Number	Concentration (µg/L)			
		Freshwater <sup>a</sup>		Human Health	
		Acute Criteria (CMC <sup>b</sup> )	Chronic Criteria (CCC <sup>c</sup> )	Consumption of Water and Organisms <sup>d</sup>	Consumption of Organisms Only <sup>e</sup>
N-Nitrosodi-n-propylamine	621647			0.005 <sup>g</sup>	0.51 <sup>iv</sup>
N-Nitrosodiphenylamine	86306			3.3 <sup>iv</sup>	6.0 <sup>iv</sup>
Pyrene	129000			830 <sup>v</sup>	4000 <sup>v</sup>
Aldrin	309002	3 <sup>z</sup>		0.000049 <sup>iv</sup>	0.000050 <sup>iv</sup>
alpha-BHC	319846			0.0026 <sup>iv</sup>	0.0049 <sup>iv</sup>
beta-BHC	319857			0.0091 <sup>iv</sup>	0.017 <sup>iv</sup>
gamma-BHC	58899	0.95 <sup>i</sup>		0.98 <sup>s</sup>	1.8 <sup>s</sup>
Chlordane	57749	2.4 <sup>z</sup>	0.0043 <sup>z</sup>	0.00080 <sup>iv</sup>	0.00081 <sup>iv</sup>
4,4'-DDT	50293	1.1 <sup>z</sup>	0.001 <sup>z</sup>	0.00022 <sup>iv</sup>	0.00022 <sup>iv</sup>
4,4'-DDE	72559			0.00022 <sup>iv</sup>	0.00022 <sup>iv</sup>
4,4'-DDD	72548			0.00031 <sup>iv</sup>	0.00031 <sup>iv</sup>
Dieldrin	60571	0.24 <sup>i</sup>	0.056 <sup>i</sup>	0.000052 <sup>iv</sup>	0.000054 <sup>iv</sup>
alpha-Endosulfan	959988	0.22 <sup>z</sup>	0.056 <sup>z</sup>	62 <sup>v</sup>	89 <sup>v</sup>
beta-Endosulfan	33213659	0.22 <sup>z</sup>	0.056 <sup>z</sup>	62 <sup>v</sup>	89 <sup>v</sup>
Endosulfan sulfate	1031078			62 <sup>v</sup>	89 <sup>v</sup>
Endrin	72208	0.086 <sup>i</sup>	0.036 <sup>i</sup>	0.059 <sup>r</sup>	0.060 <sup>r</sup>
Endrin aldehyde	7421934			0.29 <sup>v</sup>	0.30 <sup>v,y</sup>
Heptachlor	76448	0.52 <sup>z</sup>	0.0038 <sup>z</sup>	0.000079 <sup>iv</sup>	0.000079 <sup>iv</sup>
Heptachlor epoxide	1024573	0.52 <sup>z</sup>	0.0038 <sup>z</sup>	0.000039	0.000039
Polychlorinated biphenyls (PCBs)	Multiple <sup>f</sup>		0.014 <sup>z,aa</sup>	0.000064 <sup>iv,ab</sup>	0.000064 <sup>iv,ab</sup>
Toxaphene	8001352	0.73	0.0002	0.00028 <sup>iv</sup>	0.00028 <sup>iv</sup>
Tributyltin		0.46 <sup>ad</sup>	0.072 <sup>ad</sup>		
1,2,4-trichlorobenzene	120821			35 <sup>r</sup>	70 <sup>r</sup>
Methylmercury	22967926				0.3 µg/kg <sup>i</sup>

NC = No criterion  
µg/L = Micrograms per liter  
µg/kg = Micrograms per kilogram

Notes: -- This chart lists all of EPA's priority toxic pollutants for which criteria guidance are available. Because of variations in chemical nomenclature systems, this listing of toxic pollutants does not duplicate the listing in Appendix A of 40 CFR Part 423. EPA has added the Chemical Abstracts Service (CAS) registry numbers, which provide a unique identification for each chemical.

-- Zinc and 3-methyl-4-chlorophenol have organoleptic-based criteria recommendations that are not included on this chart.

- <sup>a</sup> Fresh water aquatic life criteria apply to the following uses: aquatic and wildlife (cold) (A&W<sub>c</sub>), aquatic and wildlife (warm) (A&W<sub>w</sub>), and aquatic and wildlife (ephemeral) (A&W<sub>e</sub>)
- <sup>b</sup> CMC = Criteria maximum concentration, the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects.
- <sup>c</sup> CCC = Criteria continuous concentration, the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects.
- <sup>d</sup> Human health criteria for "consumption of water and organisms" applies to: domestic water source (DWS), groundwater recharge (GWR), and primary contact recreation (PCR)
- <sup>e</sup> Human health criteria for "consumption of organisms only" applies to fish consumption.
- <sup>f</sup> These freshwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column. Criterion values were calculated by using EPA's Clean Water Act 304(a) guidance values (described in the total recoverable fraction) and then applying the conversion factors.

**Table A-1. Numeric Criteria for Toxic Constituents**  
**Page 4 of 5**

- <sup>g</sup> These criteria have been revised to reflect the EPA q1\* or RfD, as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996. The fish tissue bioconcentration factor (BCF) from the 1980 documents was retained in each case.
- <sup>h</sup> Criteria for these metals are expressed as a function of the water-effect ratio (WER). A WER is an appropriate measure of the toxicity of a material obtained in a site water divided by the same measure of the toxicity of the same material obtained simultaneously in a laboratory dilution water. See interim guidance on the determination and use of the water-effect ratios for metals (EPA 823-B-94-001) now incorporated into the updated second edition of the Water Quality Standards Handbook, Appendix L.
- <sup>i</sup> This criterion has been recalculated pursuant to the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA-820-B-96-001, September 1996. See also Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA-80-B-95-004, March 1995. Both documents are available from the Water Resource Center, U.S. EPA, 401 M St. SW, mail code RC 4100, Washington, DC 20460.
- <sup>j</sup> This criterion is based on carcinogenicity of  $10^{-6}$  risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of  $10^{-5}$ , move the decimal point in the recommended criterion one place to the right).
- <sup>k</sup> EPA is currently reassessing the criteria for arsenic.
- <sup>l</sup> This recommended water quality criterion for arsenic refers to the inorganic form only.
- <sup>m</sup> EPA is not promulgating human health criteria for these contaminants. However, permit authorities should address these contaminants in NPDES permit actions using the Pueblo's existing narrative criteria for toxics.
- <sup>n</sup> These freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/L) in the water body. The equations are provided in Table A-2.
- <sup>o</sup> Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. The recommended water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). CF represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (CFs for saltwater CCCs are not currently available. CFs derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria", October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource Center, USEPA, 401 M St., SW, Main Code RC4100, Washington, DC 20450; and 40CFR§131.36(b)(1).
- <sup>p</sup> This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A).
- <sup>q</sup> This recommended water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996-CMC or 0.922-CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.
- <sup>r</sup> This criterion taken from U.S. EPA. 2003. Fact sheet: Revised national recommended water quality criteria for the protection of human health. December 2003.
- <sup>s</sup> The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.
- <sup>t</sup> This recommended water quality criterion is expressed as  $\mu\text{g}$  free cyanide (as CN)/L.
- <sup>u</sup> This criterion for asbestos is the MCL (40 CFR 131.36).
- <sup>v</sup> This criterion has been revised to reflect the EPA's q1\* or RfD, as contained in the IRIS as of May 17, 2002. The fish tissue BCF from the 1980 Ambient Water Quality Criteria document was retained in each case.
- <sup>w</sup> These criteria are based on carcinogenicity of  $10^{-6}$  risk.
- <sup>x</sup> These freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH and are calculated as follows: acute (CMC) =  $\exp(1.005(\text{pH}) - 4.869)$ , chronic (CCC) =  $\exp(1.005(\text{pH}) - 5.134)$
- <sup>y</sup> No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the *1986 Quality Criteria for Water*. Nevertheless, sufficient information was present in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.
- <sup>z</sup> The aquatic life criteria for these compounds were issued in 1980 using the 1980 Guidelines for Criteria Development. The acute values shown are final acute values (FAV), which by the 1980 Guidelines are instantaneous values, as contrasted with a CMC, which is a short-term average.
- <sup>aa</sup> PCBs are a class of chemicals that includes Aroclors 1242, 1254, 1221, 1232, 1248, 1260, and 1016, CAS numbers 53469219, 11097691, 11104282, 11141165, 12672296, 11096825, and 12674112, respectively. The aquatic life criteria apply to this set of PCBs.
- <sup>ab</sup> This criterion applies to total PCBs (i.e., the sum of all congener or all isomer or homolog or Aroclor analyses).

**Table A-1. Numeric Criteria for Toxic Constituents**  
**Page 5 of 5**

<sup>ac</sup> These totals sum the criteria in each column. For aquatic life there are 30 priority toxic pollutants with freshwater acute or chronic criteria. For human health there are 100 priority toxic pollutants with either "water + organism" or "organism only" criteria. Note that these totals count chromium as one pollutant even though EPA has developed criteria based on two valence states.

<sup>ad</sup> This criterion is taken from the U.S. EPA *Ambient Aquatic Life Water Quality Criteria for Tributyltin (TBT) - Final* (EPA 822-R-03-031, December 2003).



**Table A-2. Equations for Calculating Freshwater Aquatic Life Criteria for Metals as a Function of Total Hardness**

Metal	CCC (Chronic Criteria)	CMC (Acute Criteria)
Cadmium	$WER \times \{1.101672 - [(\ln \text{hd})(0.041838)]\}^{a,b} \times \exp \{0.7409(\ln \text{hd}) - 4.719\}$	$WER \times \{1.136672 - [(\ln \text{hd})(0.041838)]\}^{a,b} \times \exp \{1.0166(\ln \text{hd}) - 3.924\}$
Chromium (III)	$WER \times 0.860^a \times \exp \{0.819(\ln \text{hd}) + 0.6848\}$	$WER \times 0.316^a \times \exp \{0.819(\ln \text{hd}) + 3.7256\}$
Copper	$WER \times 0.960^a \times \exp \{0.8545(\ln \text{hd}) - 1.702\}$	$WER \times 0.960^a \times \exp \{0.9422(\ln \text{hd}) - 1.700\}$
Lead	$WER \times \{1.46203 - [(\ln \text{hd})(0.145712)]\}^{a,b} \times \exp \{1.273(\ln \text{hd}) - 4.705\}$	$WER \times \{1.46203 - [(\ln \text{hd})(0.145712)]\}^{a,b} \times \exp \{1.273(\ln \text{hd}) - 1.460\}$
Nickel	$WER \times 0.997^a \times \exp \{0.8460(\ln \text{hd}) + 0.0584\}$	$WER \times 0.998^a \times \exp \{0.8460(\ln \text{hd}) + 2.255\}$
Silver	EPA has not published an aquatic life criterion value.	$WER \times 0.85^a \times \exp \{1.72(\ln \text{hd}) - 6.59\}$
Zinc	$WER \times 0.986^a \times \exp \{0.8473(\ln \text{hd}) + 0.884\}$	$WER \times 0.978^a \times \exp \{0.8473(\ln \text{hd}) + 0.884\}$

<sup>a</sup> This numeric value represents the recommended conversion factor for converting a metal criterion derived as the total recoverable fraction to a criterion expressed as the dissolved fraction in the water column.

<sup>b</sup> Conversion factors for these pollutants are hardness dependent.

WER = The water-effect ratio. EPA notes that performing the testing to use a site-specific water-effect ratio is optional but strongly encourages the application of the WER on a watershed or water body basis as opposed to application on a discharger-by-discharger basis. If no site-specific WER will be determined, a default WER value of 1.0 will be assumed.

exp = Base exponential function.

ln hd = The natural log value of the hardness expressed as mg/L as calcium carbonate. For waters with a hardness of 400 mg/L or less as calcium carbonate, the actual ambient hardness of the surface water shall be used. For waters with a hardness over 400 mg/L as calcium carbonate, a hardness of 400 mg/L shall be used with a default Water-Effect Ratio (WER) of 1, or the actual hardness of the ambient surface water shall be used with a WER.

Table A-3. Numeric Criteria  
Page 1 of 2

Constituent/Parameter	Numeric Criteria (mg/L unless otherwise noted)								
	Aquatic and Wildlife			Fish Consumption	Domestic Water Source (DWS) and Groundwater Recharge (GWR)	Agricultural Irrigation (Agl)	Agricultural Livestock Watering (AgL)	Primary Contact Recreational (PCR)	Partial Body Contact (PBC)
	Warmwater Habitat (A&W <sub>w</sub> )	Coldwater Habitat (A&W <sub>c</sub> )	Ephemeral (A&W <sub>e</sub> )						
Dissolved oxygen	≥5.0	≥6.0	≥5.0	---	---	---	---	---	---
Temperature (°C)	≤32.2	≤20	≤32.2	---	---	≤2.7 <sup>a</sup> increase from monthly maximum	≤2.7 <sup>a</sup> increase from monthly maximum	≤2.7 <sup>a</sup> increase from monthly maximum	≤2.7 <sup>a</sup> increase from monthly maximum
Total ammonia (as N)	See Table A-5	See Table A-4	See Table A-5	---	---	---	---	---	---
Chloride	230	230	230	---	250	---	---	250	---
Nitrate (as N)	---	---	---	---	10.0	---	---	10.0	10.0
Fluoride	---	---	---	---	4.0	---	---	4.0	---
pH range	6.0-9.0	6.6-8.8	6.0-9.0	---	6.6-8.5	≤1 unit change over 24 hrs	≤1 unit change over 24 hrs	6.6-9.0	≤1 unit change over 24 hrs
Sulfate	600	600	600	---	500	---	---	500	---
Total dissolved solids	1000	1000	1000	---	1000	---	---	1000	---
Total residual chlorine	0.003	0.003	0.003	---	---	---	---	---	---
Total trihalomethane	---	---	---	---	0.10	---	---	0.10	---
Dissolved aluminum	See Table A-1	See Table A-1	See Table A-1	---	---	5.0	5.0	---	---
Dissolved arsenic	See Table A-1	See Table A-1	See Table A-1	See Table A-1	0.01	0.10	0.20	0.01	---
Dissolved barium	---	---	---	---	2.0	---	---	2.0	---
Dissolved boron	---	---	---	---	---	0.75	5.0	---	---
Dissolved cadmium	See Table A-2	See Table A-2	See Table A-2	See Table A-1	0.005	0.01	0.05	0.005	---
Dissolved chromium (tri and hex)	See Table A-2				0.1	0.10	1.0	0.1	---
Dissolved chromium (hex)	See Table A-1				0.1	0.10	1.0	0.1	---
Dissolved cobalt	---	---	---	---	---	0.05	1.0	---	---
Dissolved copper	See Table A-2	See Table A-2	See Table A-2	---	---	0.20	0.5	---	---
Dissolved cyanide	See Table A-1	See Table A-1	See Table A-1	See Table A-1	0.2	---	---	0.2	---
Dissolved lead	See Table A-2	See Table A-2	See Table A-2	See Table A-1	0.05	5.0	0.1	0.05	---
Dissolved lithium	---	---	---	---	---	2.5	---	---	---
Dissolved mercury	See Table A-1	See Table A-1	See Table A-1	See Table A-1	0.002	---	0.012 µg/L	0.002	---
Dissolved molybdenum	---	---	---	---	---	0.01	---	---	---
Dissolved selenium	See Table A-1	See Table A-1	See Table A-1	See Table A-1	0.05	0.13, 0.25 <sup>b</sup>	0.002	0.05	---
Dissolved silver	See Table A-2	See Table A-2	See Table A-2	---	0.05	---	---	0.05	---

<sup>a</sup>The higher value applies when sulfates are greater than 500 mg/L.

<sup>b</sup>1/3 increase over naturally occurring levels.

<sup>c</sup>≤5 NTU variation for waters with ≤50 NTU background, and a 10% increase from background for waters >50 NTU.

--- = No standard

Table A-3. Numeric Criteria  
Page 2 of 2

Constituent/Parameter	Numeric Criteria (mg/L unless otherwise noted)								
	Aquatic and Wildlife			Fish Consumption	Domestic Water Source (DWS) and Groundwater Recharge (GWR)	Agricultural Irrigation (Agl)	Agricultural Livestock Watering (Agl)	Primary Contact Recreational (PCR)	Partial Body Contact (PBC)
	Warmwater Habitat (A&W <sub>w</sub> )	Coldwater Habitat (A&W <sub>c</sub> )	Ephemeral (A&W <sub>e</sub> )						
Dissolved uranium	---	---	---	---	0.03	---	---	0.03	---
Dissolved vanadium	---	---	---	---	---	0.1	0.1	---	---
Dissolved zinc	See Table A-2	See Table A-2	See Table A-2	---	---	2.0	25.0	---	---
Electrical conductivity (µmhos/cm)	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>	Variable <sup>b</sup>
Turbidity (NTU)	Variable <sup>c</sup>	Variable <sup>c</sup>	Variable <sup>c</sup>	Variable <sup>c</sup>	25	Variable <sup>c</sup>	Variable <sup>c</sup>	25	Variable <sup>c</sup>
E. coli (colonies/100 mL) (geometric mean maximum)	---	---	---	---	Variable <sup>d</sup>	---	---	Variable <sup>d</sup>	Variable <sup>d</sup>
Fecal coliforms (colonies/100 mL)	---	---	---	---	Variable <sup>d</sup>	1,000/2,000 <sup>f</sup>	1,000/2,000 <sup>f</sup>	Variable <sup>d</sup>	Variable <sup>d</sup>
<i>Radioactive Contaminants</i>									
Gross alpha (pCi/L) excluding Rn and U	---	---	---	15	15	15	15	15	15
Gross beta (pCi/L)	---	---	---	50	50	---	---	50	50
Gross beta and photon emitters (mrem/yr) from manmade radionuclides	---	---	---	---	Variable <sup>g</sup>	---	---	Variable <sup>g</sup>	Variable <sup>g</sup>
Radium-226 + radium-228 (pCi/L)	---	---	---	5.0	5	30	30	5.0	5.0
Strontium-90 (pCi/L)	---	---	---	8.0	8.0	8.0	8.0	8.0	8.0
Tritium (pCi/L)	---	---	---	20,000	20,000	20,000	20,000	20,000	20,000

--- = No numeric criteria

<sup>a</sup>Compliance shall be based upon meeting the requirements of one of the three options specified below for bacteria. Upon selection of one group or test method, said method shall be used exclusively over that 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 samples collected over a period of not more than 30 days. Further, in no more than 10% of the total samples during any 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 samples collected over a period of not more than 30 days. No sample shall exceed a 75% one-sided confidence level of 235/100 mL in Acomita Lake and high-use waterbodies and the 90% one-sided confidence level of 406/100 mL in all other ceremonial or recreational 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 or Methods 1103.1, 1603 or 1604*

(3)Enterococci: Enterococci shall not exceed a monthly geometric mean of 33/100 mL based upon a minimum of not less than five samples collected over a period of not more than 30 days. No sample shall exceed a 75% one-sided confidence level of 61/100 mL in Acomita Lake and high-use waterbodies and the 90% one-sided confidence level of 108/100 mL in all other ceremonial or recreational 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 or Methods 1106.1 or 1600*.

<sup>b</sup>In accordance with EPA Region 8 guidance (*Recreation standards and the CWA Section 101(a)(2) "swimmable" goal*, January 1998), bacteriological criteria shall be 10 times the values specified under footnote d.

<sup>c</sup>Geometric mean maximum and single sample maximum, respectively.

<sup>d</sup>Average annual concentration shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year; examples are tritium: 20,000 pCi/L = 4 mrem/yr; strontium-90: 8 pCi/L = 4 mrem/yr

**Table A-4. Acute Criteria (CMC) for Ammonia**

pH	Total Ammonia (mg/L as N)	
	Salmonids Present	Salmonids Absent
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

mg/L as N = Milligrams per liter as nitrogen

**Table A-5a. Allowable Ammonia Concentrations, Chronic Criteria (CCC), Early Life Stages Present**

pH	Total Ammonia (mg/L as N)																													
	0	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30												
Temperature (°C)	0	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30												
6.5	6.67	6.67	6.46	6.06	5.68	5.33	4.99	4.68	4.39	4.12	3.86	3.62	3.39	3.18	2.98	2.80	2.62	2.46												
6.6	6.57	6.57	6.36	5.97	5.59	5.25	4.92	4.61	4.32	4.05	3.80	3.56	3.34	3.13	2.94	2.75	2.58	2.42												
6.7	6.44	6.44	6.25	5.86	5.49	5.15	4.83	4.52	4.24	3.98	3.73	3.50	3.28	3.07	2.88	2.70	2.53	2.37												
6.8	6.29	6.29	6.10	5.72	5.36	5.03	4.72	4.42	4.14	3.89	3.64	3.42	3.20	3.00	2.82	2.64	2.47	2.32												
6.9	6.12	6.12	5.93	5.56	5.21	4.89	4.58	4.30	4.03	3.78	3.54	3.32	3.11	2.92	2.74	2.57	2.41	2.25												
7.0	5.91	5.91	5.73	5.37	5.04	4.72	4.43	4.15	3.89	3.65	3.42	3.21	3.01	2.82	2.64	2.48	2.32	2.18												
7.1	5.67	5.67	5.49	5.15	4.83	4.53	4.25	3.98	3.73	3.50	3.28	3.08	2.88	2.70	2.53	2.38	2.23	2.09												
7.2	5.39	5.39	5.22	4.90	4.59	4.31	4.04	3.78	3.55	3.33	3.12	2.92	2.74	2.57	2.41	2.26	2.12	1.99												
7.3	5.08	5.08	4.92	4.61	4.33	4.06	3.80	3.57	3.34	3.13	2.94	2.76	2.58	2.42	2.27	2.13	2.00	1.87												
7.4	4.73	4.73	4.59	4.30	4.03	3.78	3.55	3.32	3.12	2.92	2.74	2.57	2.41	2.26	2.12	1.98	1.86	1.74												
7.5	4.36	4.36	4.23	3.97	3.72	3.49	3.27	3.06	2.87	2.69	2.53	2.37	2.22	2.08	1.95	1.83	1.72	1.61												
7.6	3.98	3.98	3.85	3.61	3.39	3.18	2.98	2.79	2.62	2.45	2.30	2.16	2.02	1.90	1.78	1.67	1.56	1.47												
7.7	3.58	3.58	3.47	3.25	3.05	2.86	2.68	2.51	2.36	2.21	2.07	1.94	1.82	1.71	1.60	1.50	1.41	1.32												
7.8	3.18	3.18	3.09	2.89	2.71	2.54	2.38	2.23	2.10	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17												
7.9	2.80	2.80	2.71	2.54	2.38	2.24	2.10	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17	1.10	1.03												
8.0	2.43	2.43	2.36	2.21	2.07	1.94	1.82	1.71	1.60	1.5023	1.41	1.32	1.24	1.16	1.09	1.02	0.957	0.897												
8.1	2.10	2.10	2.03	1.91	1.79	1.68	1.57	1.47	1.38	1.2947	1.21	1.14	1.07	1.00	0.938	0.879	0.824	0.773												
8.2	1.79	1.79	1.74	1.63	1.53	1.43	1.34	1.26	1.18	1.1070	1.04	0.973	0.912	0.855	0.802	0.752	0.705	0.661												
8.3	1.52	1.52	1.48	1.39	1.30	1.22	1.14	1.07	1.00	0.941	0.882	0.827	0.775	0.727	0.682	0.639	0.599	0.562												
8.4	1.29	1.29	1.25	1.17	1.10	1.03	0.966	0.906	0.849	0.796	0.747	0.700	0.656	0.615	0.577	0.541	0.507	0.475												
8.5	1.09	1.09	1.06	0.990	0.928	0.870	0.816	0.765	0.717	0.672	0.630	0.591	0.554	0.520	0.487	0.457	0.428	0.401												
8.6	0.920	0.920	0.892	0.836	0.784	0.735	0.689	0.646	0.606	0.568	0.532	0.499	0.468	0.439	0.411	0.386	0.362	0.339												
8.7	0.778	0.778	0.754	0.707	0.663	0.622	0.583	0.547	0.512	0.480	0.450	0.422	0.396	0.371	0.348	0.326	0.306	0.287												
8.8	0.661	0.661	0.641	0.601	0.563	0.528	0.495	0.464	0.435	0.408	0.383	0.359	0.336	0.315	0.296	0.277	0.260	0.244												
8.9	0.565	0.565	0.548	0.513	0.481	0.451	0.423	0.397	0.372	0.349	0.327	0.306	0.287	0.269	0.253	0.237	0.222	0.208												
9.0	0.486	0.486	0.471	0.442	0.414	0.389	0.364	0.342	0.320	0.300	0.281	0.264	0.247	0.232	0.217	0.204	0.191	0.179												

Table A-5b. Allowable Ammonia Concentrations, Chronic Criteria (CCC), Early Life Stages Absent

pH	Total Ammonia (mg/L as N)									
Temperature (°C)	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

\* At 15 C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

**Appendix B**  
**Acoma Tribal**  
**Council Resolutions**



P.O. BOX 309  
ACOMA, NEW MEXICO 87034

**PUEBLO OF ACOMA**  
OFFICE OF THE GOVERNOR

TELEPHONE 505/552-6604  
FAX 505/552-6600

**RESOLUTION NO. TC-SEP-23-98-1A**

**ADOPTING THE PUEBLO OF ACOMA WATER QUALITY STANDARDS**

At a duly called meeting of the Tribal Council of the Pueblo of Acoma held on this 23rd day of September, 1998, the following resolution was adopted:

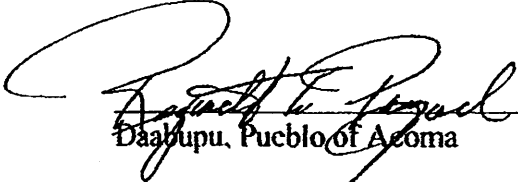
**WHEREAS:**

- Section No. 1** The Pueblo of Acoma is a sovereign Indian nation, recognized as such by the federal government of the United States of America, and in the exercise of its tribal sovereignty remains organized in accordance with Pueblo tradition; and
- Section No. 2** The Pueblo of Acoma accepted the terms of the Indian Reorganization Act (Congressional Act of June 18, 1934, Chapter 576, Codified at 25 United States Code Sections 461-479 (IRA)). However, the Pueblo is not organized under the IRA and has no written Constitution; and
- Section No. 3** The Tribal Council is the legislative authority for the Pueblo of Acoma. This resolution is passed in exercising the responsibilities and authorities of the Tribal Council for and in the best interest of the Pueblo of Acoma; and
- Section No. 4** Pursuant to this status, the Pueblo of Acoma is authorized to establish water quality standards enforceable under federal law for all waters within the exterior boundaries of the Pueblo's lands; and
- Section No. 5** That the protection of water resources available for use by the Acoma community is an essential part of the Pueblo's duty to protect the health, safety and welfare of the community for now and into the future; and
- Section No. 6** Establishing water quality standards for all waters located within the exterior boundaries of the Pueblos' land will help to ensure that usable water will be available for the Acoma community now and into the future.



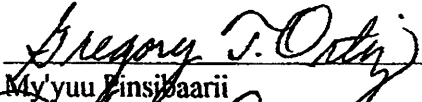
NOW, THEREFORE, BE IT RESOLVED THAT:

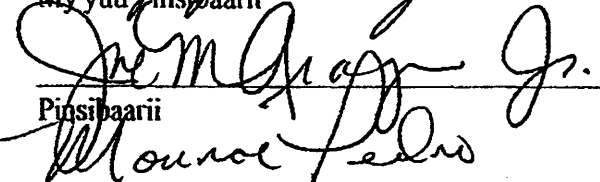
- Section No. 1        The Pueblo of Acoma Water Quality Standards, which are attached to this Resolution and designated Attachment A, should be and hereby are, adopted; and
- Section No. 2        That the Pueblo of Acoma Water Quality Standards are meant to supplement, not replace, existing unwritten traditional laws governing water use and water quality; and
- Section No. 3        The tribal attorney shall incorporate this resolution and the attached water quality standards into code form as part of Title 15 of the written laws of the Pueblo of Acoma, which shall be designated "Natural Resources."

  
\_\_\_\_\_  
Daahupu, Pueblo of Acoma

\_\_\_\_\_  
Tinyenti

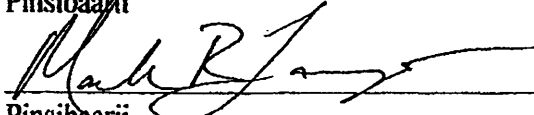
\_\_\_\_\_  
Ayuranti

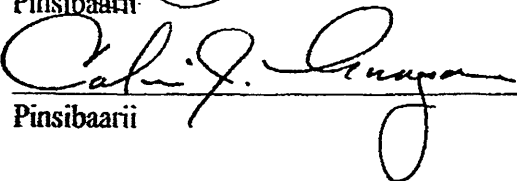
  
\_\_\_\_\_  
My'yu Pinsibaarii

  
\_\_\_\_\_  
Pinsibaarii

\_\_\_\_\_  
Pinsibaarii

  
\_\_\_\_\_  
Pinsibaarii

  
\_\_\_\_\_  
Pinsibaarii

  
\_\_\_\_\_  
Pinsibaarii

*Sand Juan Shroulata*  
Pinsibaarii

*George Valley*  
Pinsibaarii

Pinsibaarii

*David L. Vero*

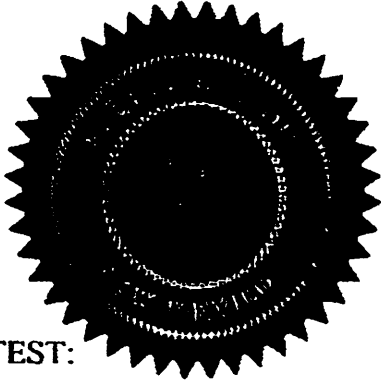
Pinsibaarii

*Chad*

Pinsibaarii

*Benedict King*

Pinsibaarii

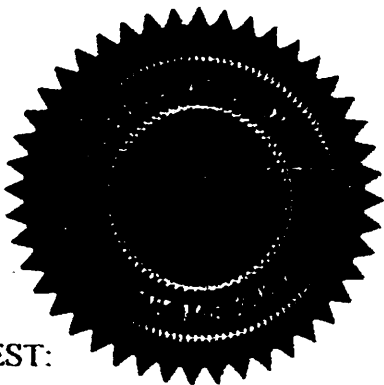


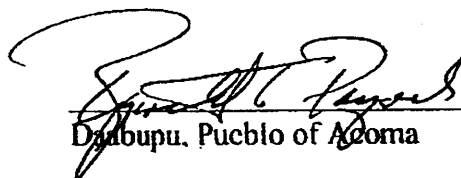
ATTEST:

*Kudyaaf'ita*  
Kudyaaf'ita, Pueblo of Acoma


**CERTIFICATION**

I, the undersigned as Governor of the Pueblo of Acoma, "Sky City", hereby certify that the Acoma Tribal Council at a duly called meeting of the Tribal Council held on the 23rd day of September, 1998, at Acoma Pueblo, New Mexico, approved this resolution, a quorum being present and that 11 voted for; 0 opposed and 0 abstained.



  
Dabupu, Pueblo of Acoma

ATTEST:

  
Kudyaat'ita, Pueblo of Acoma



Section No. 7            There is a reasonable prospect that future mining and processing of uranium will result in permanent damage to the air, land, and water available to future generations and adversely affect the health of community residents; and


Section No. 8            Existing water quality standards for all waters located within the exterior boundaries of the Pueblo's land have helped to ensure that usable water will be available for the Acoma community now and into the future

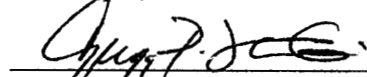
**NOW, THEREFORE BE IT RESOLVED THAT:**

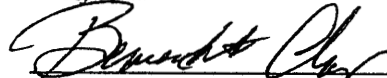
Section No. 1            The revised Pueblo of Acoma Water Quality Standards, which are attached as "Attachment A", should be and hereby are, adopted; and


Section No. 2            That the Pueblo of Acoma Water Quality Standards as originally enacted and subsequently revised are meant to supplement, not replace the unwritten traditional laws governing water use and water quality; and

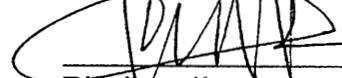
Section No. 3            The "Tribal Attorney", shall incorporate this resolution and replace the existing water quality standards with the attached revised Water Quality Standards into Code form as part of Title 15 of the written laws of the Pueblo of Acoma, which shall be designated, "Natural Resources".

  
\_\_\_\_\_  
Daabupu, Pueblo of Acoma

  
\_\_\_\_\_  
Tinventi

  
\_\_\_\_\_  
Ayuranti

  
\_\_\_\_\_  
My'yu Pinsibaarii

  
\_\_\_\_\_  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

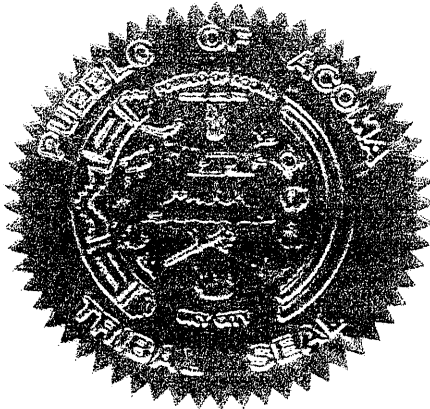
[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii

[Signature]  
Pinsibaarii




ATTEST:

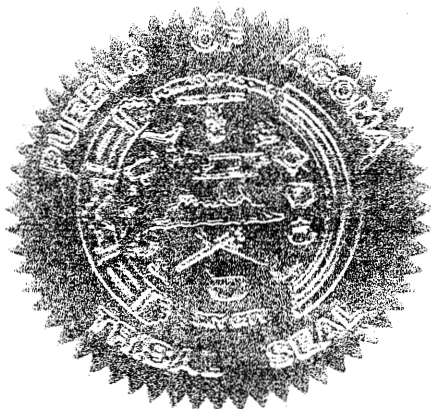
[Signature]  
Kudyaat'ita, Pueblo of Acoma

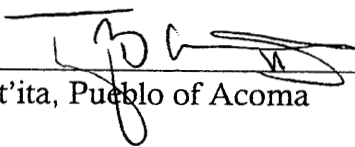
## CERTIFICATION

I, the undersigned as Governor of the Pueblo of Acoma, "Sky City", hereby certify that the Tribal Council of the Pueblo of Acoma, at a duly called meeting, held on the 15th day of December, 2005 at Pueblo of Acoma, New Mexico approved this resolution, a quorum being present and that 9 voted for 0 opposed and 0 abstained.

  
Daabupu, Pueblo of Acoma

ATTEST:



  
Kudyaat'ita, Pueblo of Acoma