

**Water Quality Standards  
Big Pine Indian Reservation**

**Big Pine Paiute Tribe  
of the Owens Valley**

**Submitted to the US Environmental Protection Agency  
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## Preamble

The Federal Clean Water Act recognizes tribal authority over the “Management and protection of water resources...within the borders of an Indian Reservation”. The Big Pine Paiute Tribe has established water quality standards within the boundaries of the Big Pine Indian Reservation, specifically, for Big Pine Creek, which crosses the northwest corner of the Reservation. Big Pine Creek is the only natural waterbody flowing through the Reservation, and is the only surface water that the Tribe has proposed standards for.

Water quality standards are intended to protect public health and aquatic life, and to maintain or enhance water quality in relation to the beneficial uses of the water. It is with this intention that these water quality standards were devised in accordance with US Environmental Protection Agency guidelines.

Water quality standards are expressed in both narrative and numeric forms. The standards, when compared to future water quality data from creek water samples, will provide the basis for detecting any future trend toward degradation of Reservation waters. Through regular water sampling and monitoring, the Big Pine Paiute Tribe will have the requisite information to make a determination on the short and long term trends of the water quality of Big Pine Creek.

These standards are based primarily on those established by the California State Regional Water Quality Board, Lahontan District, for Big Pine Creek. Where state standards vary from acceptable federal standards, federal standards are incorporated. This provides the basis for a regulatory program administered by the Big Pine Tribe to protect its water resources presently and in the future.

The standards also present a permitting and management process for point source dischargers within and upstream of Reservation boundaries. The authorization to certify or condition dischargers is part of the Water Quality Standards Program for which general policies for administration and implementation are presented in this document.

Public participation is a critical part of the standards approval process and stakeholders have been notified of the contents of this document and have been given an opportunity to comment. Comments received have been responded to by the Tribal Environmental Office staff.

A triennial review of the standards is required and the process is described in this document. It is critical that standards are kept up to date for the most stringent protection of the high water quality that currently exists on the Big Pine Indian Reservation.

## **WATER QUALITY STANDARDS FOR THE BIG PINE INDIAN RESERVATION**

### **I. PURPOSE**

The federal Clean Water Act designates authority to Indian Tribes to manage water resources for the health and benefit of Tribal members. As part of this effort, the Big Pine Paiute Tribe (Tribe) is establishing water quality standards within the boundaries of the Big Pine Indian Reservation. Big Pine Creek flows from the Sierra Nevada Mountains east through the Reservation, and is the only surface water that flows through the Reservation and the only waters for which the Tribe is establishing water quality standards. Beneficial uses for Big Pine Creek as well as water quality objectives in both narrative and numeric forms are designated within this document.

Water quality standards are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. "Water quality objectives" are defined as the allowable "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." The objectives, when compared to future water quality data, will also provide the basis for detecting any future trend toward degradation or enhancement of reservation waters.

### **Reservation Setting**

The Big Pine Indian Reservation of the Big Pine Paiute Tribe of the Owens Valley consists of 279.08 acres of land in the Owens Valley of northern Inyo County, California. On June 26, 1939, a deed executed between the City of Los Angeles and the United States government allowed for the exchange of 2,913.5 acres of land held in trust for the Owens Valley Paiute Indians for 1,391.48 acres owned by the Los Angeles Department of Water and Power (LADWP). The latter acreage was divided into three parcels that comprise the current Big Pine (279.08 acres), Bishop (875 acres) and Lone Pine (237.4 acres) Reservations. The Land Exchange was authorized by an Act of Congress dated April 20, 1937 (P.L. 75-43). The Tribe is recognized by the United States Secretary of the Interior as indicated on the list of federally recognized Indian Tribes as the "Big Pine Band of Owens Valley Paiute Shoshone Indians of Big Pine Reservation, California".

Located at an elevation of approximately 4,000 feet above sea level, the Big Pine Reservation is bounded to the north and northwest by the town of Big Pine, and the south and east by property owned by the City of Los Angeles. Big Pine Creek crosses the northwest corner of the Reservation. The highest elevation, 4,050 feet, is found in the southwest corner of the Reservation, while the lowest elevation, 3,957 feet, lies in its northeast corner. The Sierra Nevada Mountains rise dramatically a few miles to the west and the Big Pine Canal skirts the eastern boundary of the Reservation (see enclosed map). Highway 395, the main north-south transport artery in the region, crosses the Reservation just west of its center; approximately forty acres lie to the west of the highway.

The Big Pine Indian Reservation consists entirely of trust lands. There are no non-Indian fee lands contained within the Big Pine Indian Reservation and currently no discharges, permitted or non-permitted, within the boundaries of the Reservation. Additionally, there are currently no

Indian or non-Indian owned or leased businesses within the boundaries of the Reservation which would be regulated by water quality standards.

The federal Clean Water Act defines “water quality standards” to include both beneficial uses (i.e., current or potential uses) and “water quality criteria” (i.e., water quality objectives). Thus, the beneficial uses designated herein and the water quality objectives comprise the Tribe’s water quality standards.

## **II. METHODOLOGY FOR ESTABLISHING WATER QUALITY STANDARDS**

Water quality objectives are numerical or narrative. Numerical and narrative water quality objectives define the upper concentration or other limits that the Big Pine Tribe considers protective of beneficial uses.

The general methodology used in establishing water quality objectives involves, first, designating beneficial water uses; second, selecting and quantifying the water quality parameters necessary to protect the most vulnerable (sensitive) beneficial uses; and third, a narrative description of physical characteristics that should or should not be present. To comply with the Antidegradation Policy (see below), water quality objectives may be established at levels better than that necessary to protect the most vulnerable beneficial use.

In establishing water quality objectives, factors in addition to designated beneficial uses and the Antidegradation Policy are considered. These factors include environmental and economic considerations, as well as the level of water quality which could be achieved through coordinated control of all factors which affect water quality in an area. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the Reservation, and that may be reasonably controlled.

## **III. TRIENNIAL REVIEW**

Public participation from the Big Pine Tribe General Council and other stakeholders is an integral part in establishing these standards, and the promulgation of these standards has been approved by the Tribal Council through resolution. Water quality standards shall be reviewed, and if necessary, revised, at a minimum of every three years by the Tribal Environmental Office, General Council, and other stakeholders. Upon approval of the Tribal Council and the USEPA, revised water quality objectives will then be adopted as part of these standards by amendment.

As part of the review process, the Tribe shall notify stakeholders who will have an opportunity to comment on current or proposed standards. Updated state and federal standards shall also be reviewed at this time, and if appropriate, adopted into the Tribe’s water quality standards. The Tribal Environmental Office shall make recommendations to the Tribal Council regarding the proposed changes, and if adopted by Tribal Council, shall be sent to the EPA for review and approval and incorporated into the standards.

As a component of the Tribe’s continuing planning process, data may be collected and numerical water quality objectives may be developed for additional water bodies and/or constituents where sufficient information is presently not available for the establishment of such objectives. If

appropriate, these objectives may be adopted by the Tribe and amended to the Tribe's water quality standards.

#### **IV. BENEFICIAL USES OF BIG PINE CREEK**

Several beneficial uses are commonly identified for a given body of water. Water quality objectives are established which are sufficiently stringent to protect the most sensitive use. The Big Pine Tribal Council reserves the right to resolve any conflicts among beneficial uses, based on the facts in a given case. It should be noted that the assimilation of wastes is not a beneficial use.

An effective water quality control plan requires determination of the beneficial water uses which are to be designated and maintained. This section identifies beneficial water uses on the Big Pine Reservation and projects probable future uses. Section 303 of the federal Clean Water Act (P.L. 92-500, as amended) defines water quality standards as both the uses of the waters involved and the water quality criteria applied to protect those uses.

#### **Definitions of Beneficial Uses**

The following list of beneficial uses has been designated for Big Pine Creek by the Lahontan Regional Water Quality Board and are accepted by the Big Pine Tribe:

**AGR Agricultural Supply.** Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.

**COLD Cold Freshwater Habitat.** Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

**COMM Commercial and Sportfishing.** Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

**FRSH Freshwater Replenishment.** Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

**GWR Ground Water Recharge.** Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

**MUN Municipal and Domestic Supply.** Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.

**REC-1 Water Contact Recreation.** Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.

**REC-2 Non-contact Water Recreation.** Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

**SPWN Spawning, Reproduction, and Development.** Beneficial uses of waters that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.

**WILD Wildlife Habitat.** Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The following beneficial use has been adopted by the Big Pine Tribe in addition to the above: **CULT Cultural** Beneficial uses of waters that support the past and present indigenous culture and way of life for the Big Pine Paiute Tribe.

## **V. NUMERICAL OBJECTIVES FOR BIG PINE CREEK**

Where available data were sufficient to define existing ambient levels of constituents, these levels were used in developing the numerical objectives for specific water bodies. By utilizing annual mean, 90<sup>th</sup> percentile values and flow-weighted values, the objectives are intended to be realistic within the variable conditions imposed by nature. This approach provides an opportunity to detect changes in water quality as a function of time through comparison of annual means, while still accommodating variations in the measured constituents. Specific numerical criteria for Big Pine Creek are organized in a tabular format (Table 1).

## **VI. WATER QUALITY OBJECTIVES—NARRATIVE CRITERIA**

The narrative water quality objectives which follow are directed toward protection of surface waters within the Big Pine Reservation.

### **a. Ammonia**

The neutral, unionized ammonia species ( $\text{NH}_3^\circ$ ) is highly toxic to freshwater fish. The fraction of toxic  $\text{NH}_3^\circ$  to total ammonia species ( $\text{NH}_4^+ + \text{NH}_3^\circ$ ) is a function of temperature and pH. Tables 2 and 3 were derived from USEPA ammonia criteria for freshwater. Ammonia concentrations shall not exceed the values listed for the corresponding conditions in these tables. For temperature and pH values not explicitly in these tables, the most conservative value neighboring the actual value may be used or criteria can be calculated from numerical formulas developed by the USEPA. For one-hour (1h-NH3) and four-day (4d-NH3) unionized ammonia criteria, the following equations apply:

$$\begin{aligned} 1\text{h-NH}_3 &= 0.052 \div (\text{FT} \times \text{FPH} \times 2) \\ 4\text{d-NH}_3 &= 0.80 \div (\text{FT} \times \text{FPH} \times \text{RATIO}) \end{aligned}$$

where:

$$FT = 10[0.03(20TCAP)]$$

for:  $TCAP \leq T \leq 30$

$$FT = 10[0.03(20T)]$$

for:  $0 \leq T \leq TCAP$

$$FPH = (1+10(7.4pH)) \div 1.25$$

for:  $6.5 \leq pH \leq 8.0$

$$FPH = 1$$

for:  $8.0 \leq pH \leq 9.0$

$$RATIO = 20.25 \times (10(7.7pH)) \div (1+10(7.4pH))$$

for:  $6.5 \leq pH \leq 7.7$

$$RATIO = 13.5$$

for:  $7.7pH \leq 9.0$

and:  
T = temperature in °C  
TCAP = temperature cap in °C

For 1h-NH<sub>3</sub>, TCAP is 20°C with salmonids present and 25°C with salmonids absent.  
For 4d-NH<sub>3</sub>, TCAP is 15°C with salmonids present and 20°C with salmonids absent.

For interpolation of total ammonia (NH<sub>4</sub><sup>+</sup> + NH<sub>3</sub><sup>°</sup>) criteria, the following equations can be used:  
 $n1h = 1h-NH_3 \div f$ , or  $n4d = 4d-NH_3 \div f$

where:  
n1h is the one-hour criteria for total ammonia species (NH<sub>4</sub><sup>+</sup> + NH<sub>3</sub><sup>°</sup>)  
n4d is the four-day criteria for total ammonia species (NH<sub>4</sub><sup>+</sup> + NH<sub>3</sub><sup>°</sup>)  
 $f = 1 \div (10(pKaH)+1)$   
 $pKa = 0.0901821 + [2729.92 \div (T+273.15)]$

and:

pKa is the negative log of the equilibrium constant for the NH<sub>4</sub><sup>+</sup> NH<sub>3</sub><sup>°</sup> + H<sup>+</sup> reaction

f is the fraction of unionized ammonia to total ammonia species:  $[NH_3^\circ \div (NH_4^+ + NH_3^\circ)]$

Values outside of the ranges 0-30°C or pH 6.5-9.0 cannot be extrapolated from these relationships. Site specific objectives must be developed for these conditions.

### **b. Bacteria, Coliform**

Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes. Based on a statistically sufficient number of

samples (generally not less than 5 samples equally spaced within a 30-day period), the geometric mean of the E. coli density should not exceed 126 coliform units per 100 ml.

No sample should exceed a one sided confidence limit (C.L.) calculated using the following as a guidance:

|                            |          |
|----------------------------|----------|
| Designated bathing beach   | 75% C.L. |
| Moderate use for bathing   | 82% C.L. |
| Light use for bathing      | 90% C.L. |
| Infrequent use for bathing | 95% C.L. |

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.4 as the log standard deviation.

**c. Biostimulatory Substances**

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.

**d. Chemical Constituents**

Waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions: Table 4 (Inorganic Chemicals), Table 5 (Fluoride), Tables 6 and 7 (Organic Chemicals), Table 8 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 9 (Secondary Maximum Contaminant Levels-Ranges). Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

**e. Chlorine, Total Residual**

For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.

**f. Color**

Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

**g. Dissolved Oxygen**

The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 10 percent of saturation. For waters with the beneficial uses of COLD, COLD with SPWN, WARM, and WARM with SPWN, the minimum dissolved oxygen concentration shall not be less than that specified in Table 10.

**h. Floating Materials**



Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses. For natural high quality waters, the concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10 percent significance level.

**i. Oil and Grease**

Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water that cause nuisance, or that otherwise adversely affect the water for beneficial uses. For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.

**j. Nondegradation of Aquatic Communities and Populations**

All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants; or which lead to the presence of undesirable or nuisance aquatic life. All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical and hydrologic processes.

**k. Pesticides**

For the purposes of this document, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, piscicides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi or weeds capable of infesting or harming vegetation, humans, or animals.

Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life. Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations specified in Tables 6 and 7 (Organic Chemicals).

**l. pH**

In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the Region, the pH shall not be depressed below 6.5 nor raised above 8.5.

**m. Radioactivity**

Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life, nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life. Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 11 (Radioactivity).

**n. Sediment**

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

**o. Settleable Materials**

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of settleable materials shall not be raised by more than 0.1 milliliter per liter.

**p. Suspended Materials**

Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

**q. Taste and Odor**

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. For naturally high quality waters, the taste and odor shall not be altered.

**r. Temperature**

The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Big Pine Tribal Council that such an alteration in temperature does not adversely affect the water for beneficial uses. For waters designated COLD, the temperature shall not be altered.

**s. Toxicity**

All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Big Pine Tribal Council. The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for “experimental water” as defined in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al. 1992).

The Big Pine Tribe adopts the National Recommended Water Quality Criteria: 2002 for national priority pollutants and Human Health Criteria (2003), incorporated herein by reference, and all amendments forthcoming, consistent with Section 303(c)(2)(b) of the Clean Water Act.

**t. Turbidity**

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

## **VII. ANTIDegradation Policy**

Discharges which cause violation of the Antidegradation Policy or any narrative or numerical water quality objective are prohibited. After application of reasonable control measures, ambient water quality shall conform to the narrative and numerical water quality objectives included in this document. When other factors result in the degradation of water quality beyond the limits established by these water quality objectives, human activities shall not cause further degradation of water quality in either surface or ground waters.

In some cases, the Tribal Council may allow limited degradation of existing water quality to benefit the Tribe for economic, developmental, or cultural reasons. The conditions upon which this may be allowed will be fully disclosed by the Tribal Council and will follow an application process and public participation. The level of water quality to protect existing beneficial uses shall be fully protected. All reasonable and cost-effective strategies shall be implemented for nonpoint source releases.

Where the Antidegradation Policy applies, it does not absolutely prohibit any changes in water quality. The policy requires that any reduction in water quality be consistent with the three-part test established by the policy, as described below. If it is determined that some degradation is in the best interest of the members of the Big Pine Tribe, some increase in pollutant level may be appropriate. However, in no case may such increases cause adverse impacts to existing or probable future beneficial uses of waters of the Tribe.

### **a. Part One—Instream Uses**

The first part of the test establishes that existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Reductions in water quality should not be permitted if the change in water quality would seriously harm any species found in the water (other than an aberrational species). Waters of this type are generally referred to as “Tier I” waters.

### **b. Part Two—Public Interest Balancing**

The second part of the test applies where water quality is higher than necessary to protect existing instream beneficial uses. This part of the test allows reductions in water quality if the Tribe finds “that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located” **and** existing beneficial uses are protected. Waters of this type are generally referred to as “Tier II” waters.

### **c. Part Three—Outstanding National Resource Waters (ONRWs)**

The third part of the test requires that the water quality of the waters which constitute an outstanding national resource be maintained and protected. No permanent or long-term reduction in water quality is allowable in areas given special protection as Outstanding National Resource Waters (48 Fed. Reg. 51402). Waters which potentially could qualify for ONRW designation are generally classified as “Tier III” waters.

Examples of such waters include, but are not limited to, waters of National and State Parks and wildlife refuges, waters of exceptional recreational or ecological significance, and state and federally designated wild and scenic rivers.

#### **d. Implementation**

Any one or a number of activities may trigger the Antidegradation Policy analysis. Activities may include a scheduled water quality standards review, issuance of NPDES permits, or development activity.

If the Antidegradation Policy is triggered, public participation is required and opportunity for comment must be given. This can be done by holding a public meeting, filing public notice, and/or allowing opportunity for the public to request a hearing.

#### **e. Actions and Determinations needed to conduct an Antidegradation review**

If a proposed action has the possibility to adversely affect the water quality of Big Pine Creek, an application must be filed with the Tribal Environmental Office. The application must describe the action proposed and its effects on the Creek, how this information was derived, and a justification for the action. Upon satisfying these requirements, the Tribal Environmental Office will recommend or not recommend this proposal to be considered by the Tribal Council. Tribal Council will make a determination whether to consider the proposal further. If the Tribal Council wishes to consider the application further, the public participation process will take place (see paragraph VII(d)). The Tribal Council has the sole authority in permitting degradation to Big Pine Creek. If the Tribal Council makes the decision to allow degradation, they will submit their decision to the USEPA for review and approval.

### **VIII. POLICIES FOR IMPLEMENTATION**

#### **a. Control Actions under Big Pine Tribal Authority for Point and Nonpoint Sources**

It is within the discretion of the Big Pine Tribal Council to establish direction on compliance with Tribal water quality standards. Control measures implemented by the Big Pine Tribal Council must provide for the attainment of beneficial uses and water quality objectives as established herein. The Big Pine Tribal Council regulates the sources of water quality related problems which could result in actual or potential impairments of beneficial uses or degradation of water quality.

The Big Pine Tribal Council can regulate both point and nonpoint source discharge activities within the Reservation boundaries. A point source discharge generally originates from a single, identifiable source, while a nonpoint source discharge comes from diffuse sources. To regulate the point and nonpoint sources, control actions are required for effective water quality protection and management. Such control actions are set forth for implementation by the Big Pine Tribal Council and specific measures for nonpoint sources are addressed in the Tribe's Nonpoint Source Management Plan.

To prevent water quality problems, waste discharge restrictions are often used. The waste discharge restrictions can be implemented through Water Quality Certification, National Pollutant Discharge Elimination System (NPDES) permits, waste discharge requirements/permits (WDRs), discharge prohibitions, enforcement actions, special designations, and/or "Best Management Practices" (BMPs). Generally, WDRs and NPDES permits are used to regulate point sources of waste, with BMPs used to control nonpoint sources of waste.

#### **b. Enforcement Actions**

All enforcement actions are under the direction and review of the Big Pine Tribal Council. To facilitate remediation of water quality problems or in instances where waste discharge restrictions or other provisions of the Tribe's standards or objectives are violated, the Big Pine Tribal Council can use different types of enforcement measures. These measures include, but are not limited to:

1) A Notice of Violation (NOV) is a letter formally advising a discharger in noncompliance that additional enforcement actions may be necessary if appropriate corrective actions are not taken.

2) A Time Schedule Order (TSO) is a time schedule for specific actions a discharger shall take to correct or prevent violations of requirements. A TSO is issued by the Big Pine Tribal Council for situations in which the Tribe is reasonably confident that the problem will be corrected.

3) A Cleanup and Abatement Order (CAO) is an order requiring a discharger to clean up a waste or abate its effects or, in the case of a threatened pollution or nuisance, take other necessary remedial action. A CAO can be issued by the Big Pine Tribal Council or by the Big Pine Tribal Council Administrative Officer for situations when immediate action is needed on an urgent problem from regulated or unregulated discharges which are creating or threatening to create a condition of pollution or nuisance.

4) A Cease and Desist Order (C&D) is an order requiring a discharger to comply with prohibitions according to a time schedule, or if the violation is threatening, to take appropriate remedial or preventative action. A C&D is issued by the Big Pine Tribal Council when violations of standards or prohibitions are threatened, are occurring, or have occurred and probably will continue in the future. Issuance of a C&D requires a public hearing. Monetary liabilities or fines may also be imposed administratively by the Big Pine Tribal Council. Under certain circumstances, enforcement actions may be referred to the US Environmental Protection Agency.

5) If the above actions do not rectify the polluting act, the Tribal Council may bring the case to a court of law in accordance with the Tribal Pollution Discharge Ordinance 97-01, Sections 4-6, which describe civil penalties, clean up and abatement, and court action and injunctions. This court would be the Inyo County Superior Court located in Independence, CA.

## **IX. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)**

### **Water Quality Objectives and Effluent Limits**

NPDES permits are issued to regulate discharges of waste to "waters of the nation" including discharges of storm water from urban separate storm sewer systems and certain categories of industrial activity. Waters of the nation are surface waters such as rivers, lakes, bays, estuaries, oceans, etc. The permits are authorized by Section 402 of the federal Clean Water Act. The permit content and the issuance process are contained in the Code of Federal Regulations (40 CFR Part 122) and Chapter 9 of the California Code of Regulations. Enforcement may be only a simple order requiring the discharger to take corrective action to comply with the terms of its permit or may be an order prescribing civil monetary penalties. In extreme cases it may result in criminal charges. NPDES permits are required to prescribe conditions of discharge which will ensure protection of beneficial uses of the receiving water as described in this document.

The US Environmental Protection Agency has approved the State of California's program to regulate discharges of waste water to "waters of the nation." The State, through the Regional Water Boards, issues the NPDES permits outside of the Reservation boundaries, reviews discharger self-monitoring reports, performs independent compliance checking, and takes enforcement actions as needed.

No person shall discharge a pollutant into the waters of the Reservation without attaining a NPDES permit. For discharges within the Reservation boundaries, permit applications will be submitted to the US Environmental Protection Agency who will grant, deny, or condition the permit in compliance with the Tribe's water quality standards. For upstream dischargers, applicants will submit an application to the Regional Water Quality Control Board, who must consider the Tribe's water quality standards and grant, deny, or condition the permit in compliance with these standards. Any discharge in excess of effluent limitations is prohibited, and no permit shall be given which would allow a pollutant in excess of Tribal water criteria.

It is important to recognize the distinction between ambient water quality objectives and "effluent limitations" or "discharge standards" which are conditions in state and federal waste discharge permits. Effluent limitations are established in permits both to protect water for beneficial uses within the area of the discharge, and to meet or achieve water quality objectives.

## **X. WATER QUALITY CERTIFICATION**

Clean Water Act Section 401 (Water Quality Certification) gives the Big Pine Tribal Council extremely broad authority to review proposed activities in and/or affecting the Reservation's waters requiring certification of state or federal permits or licenses. The Big Pine Tribal Council can recommend to the permitting agency that it grant, deny, or condition certification of federal and state permits or licenses that may result in a discharge to "waters of the United States" to achieve compliance with the Tribe's water quality standards. For waters within the Reservation boundaries, the Tribal Council shall have full authority to grant, deny, or condition certification.

### **Section 401 Certification Process**

Applications for water quality certification within the Reservation boundaries shall be submitted to the Tribal Council. They will be reviewed by the Tribal Environmental Office for compliance with Tribal water quality standards. After a thorough analysis, the Environmental Office shall make a recommendation to the Tribal Council who will grant, deny, or condition the application. The Tribal Council is the only entity which holds the authority to permit or deny water quality certification applications. If certification is denied, the applicant may request a meeting with the Tribal Council to appeal the decision.

## **XI. NONPOINT SOURCE PROGRAM**

Nonpoint sources of pollution are generally defined as sources which are diffuse and/or not subject to regulation under the federal National Pollutant Discharge Elimination System (for surface water discharges). Nonpoint sources include agriculture, grazing, silviculture, abandoned mines, construction, stormwater runoff, economic development, etc. Nonpoint sources have been identified as a major cause of water pollution in California according to the State Board's 1990 Water Quality Assessment report and 1988 Nonpoint Source Problem Inventory for Surface Waters. The federal Clean Water Act (CWA) is the principal federal water quality protection

statute. For point source discharges to surface waters, the CWA establishes the NPDES permit system. However, nonpoint sources are exempt from federal permitting requirements, as are discharges to ground water.

The Tribe's Nonpoint Source Management Plan relies on Best Management Practices (BMPs) to address nonpoint source problems. Specific BMPs are described in the Tribe's Management Plan to abate the nonpoint sources identified on the Reservation. The Tribe is employing this plan currently and working with residents to alleviate Nonpoint source problems.

**Voluntary Implementation of Best Management Practices (BMPs).** Land assignment holders, contractors and managers will be encouraged to implement BMPs in all cases. Implementation could occur for economic reasons and/or through awareness of environmental benefits.

**Effluent Limitations.** The Big Pine Tribal Council can adopt and enforce requirements on the nature of any proposed or existing waste discharge, including discharges from nonpoint sources. Although the Big Pine Tribal Council is precluded from specifying the manner of compliance with waste discharge limitations, in appropriate cases, limitations may be set at a level which, in practice, requires implementation of BMPs.

**Table 1  
Water Quality Objectives for Big Pine Creek**

|          | <b>TDS</b> | <b>Cl</b>  | <b>SO4</b>  | <b>F</b>    | <b>B</b>    | <b>NO3-N</b> | <b>Total N</b> | <b>PO4</b>  |
|----------|------------|------------|-------------|-------------|-------------|--------------|----------------|-------------|
| <b>1</b> | <b>55</b>  | <b>2.0</b> | <b>6.0</b>  | <b>0.06</b> | <b>0.03</b> | <b>0.6</b>   | <b>0.7</b>     | <b>0.03</b> |
| <b>2</b> | <b>93</b>  | <b>4.0</b> | <b>10.0</b> | <b>0.20</b> | <b>0.07</b> |              |                |             |

1: Annual average value/90<sup>th</sup> Percentile Value

2: Objectives are as mg/L and are defined as follows:

|    |                 |       |                          |
|----|-----------------|-------|--------------------------|
| B  | Boron           | NO3-N | Nitrogen as Nitrate      |
| Cl | Chloride        | SO4   | Sulfate                  |
| F  | Fluoride        | PO4   | Dissolved Orthophosphate |
| N  | Nitrogen, Total | TDS   | Total Dissolved Solids   |



**TABLE 2**

**ONE-HOUR AVERAGE CONCENTRATION FOR AMMONIA<sup>1,2</sup>**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

| pH   | Temperature, °C |        |        |       |       |       |       |
|--|-----------------|--------|--------|-------|-------|-------|-------|
|  | 0               | 5      | 10     | 15    | 20    | 25    | 30    |
| Un-ionized Ammonia (mg/liter NH <sub>3</sub> ) |                 |        |        |       |       |       |       |
| 6.50   | 0.0091          | 0.0129 | 0.0182 | 0.026 | 0.036 | 0.036 | 0.036 |
| 6.75   | 0.0149          | 0.021  | 0.030  | 0.042 | 0.059 | 0.059 | 0.059 |
| 7.00   | 0.023           | 0.033  | 0.046  | 0.066 | 0.093 | 0.093 | 0.093 |
| 7.25   | 0.034           | 0.048  | 0.068  | 0.095 | 0.135 | 0.135 | 0.135 |
| 7.50   | 0.045           | 0.064  | 0.091  | 0.128 | 0.181 | 0.181 | 0.181 |
| 7.75   | 0.056           | 0.080  | 0.113  | 0.159 | 0.22  | 0.22  | 0.22  |
| 8.00   | 0.065           | 0.092  | 0.130  | 0.184 | 0.26  | 0.26  | 0.26  |
| 8.25   | 0.065           | 0.092  | 0.130  | 0.184 | 0.26  | 0.26  | 0.26  |
| 8.50   | 0.065           | 0.092  | 0.130  | 0.184 | 0.26  | 0.26  | 0.26  |
| 8.75   | 0.065           | 0.092  | 0.130  | 0.184 | 0.26  | 0.26  | 0.26  |
| 9.00   | 0.065           | 0.092  | 0.130  | 0.184 | 0.26  | 0.26  | 0.26  |
| Total Ammonia (mg/liter NH <sub>3</sub> )      |                 |        |        |       |       |       |       |
| 6.50   | 35              | 33     | 31     | 30    | 29    | 20    | 14.3  |
| 6.75   | 32              | 30     | 28     | 27    | 27    | 18.6  | 13.2  |
| 7.00   | 26              | 26     | 25     | 24    | 23    | 16.4  | 11.6  |
| 7.25   | 23              | 22     | 20     | 19.7  | 19.2  | 13.4  | 9.5   |
| 7.50   | 17.4            | 16.3   | 15.5   | 14.9  | 14.6  | 10.2  | 7.3   |
| 7.75   | 12.2            | 11.4   | 10.9   | 10.5  | 10.3  | 7.2   | 5.2   |
| 8.00   | 8.0             | 7.5    | 7.1    | 6.9   | 6.8   | 4.8   | 3.5   |
| 8.25   | 4.5             | 4.2    | 4.1    | 4.0   | 3.9   | 2.8   | 2.1   |
| 8.50   | 2.6             | 2.4    | 2.3    | 2.3   | 2.3   | 1.71  | 1.28  |
| 8.75   | 1.47            | 1.40   | 1.37   | 1.38  | 1.42  | 1.07  | 0.83  |
| 9.00   | 0.86            | 0.83   | 0.83   | 0.86  | 0.91  | 0.72  | 0.58  |

1 To convert these values to mg/liter N, multiply by 0.822

2 Source: U. S. Environmental Protection Agency, 1986. Quality criteria for water, 1986. EPA 440/5-86-001

**TABLE 3**

**FOUR DAY AVERAGE CONCENTRATION FOR AMMONIA<sup>1,2</sup>**

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

| pH   | Temperature, °C |        |        |        |        |        |        |
|--|-----------------|--------|--------|--------|--------|--------|--------|
|  | 0               | 5      | 10     | 15     | 20     | 25     | 30     |
| Un-ionized Ammonia (mg/liter NH <sub>3</sub> ) |                 |        |        |        |        |        |        |
| 6.50   | 0.0009          | 0.0011 | 0.0016 | 0.0022 | 0.0022 | 0.0022 | 0.0022 |
| 6.75   | 0.0014          | 0.0020 | 0.0028 | 0.0039 | 0.0039 | 0.0039 | 0.0039 |
| 7.00   | 0.0025          | 0.0035 | 0.0049 | 0.0070 | 0.0070 | 0.0070 | 0.0070 |
| 7.25   | 0.0044          | 0.0062 | 0.0088 | 0.0124 | 0.0124 | 0.0124 | 0.0124 |
| 7.50   | 0.0078          | 0.0111 | 0.0156 | 0.022  | 0.022  | 0.022  | 0.022  |
| 7.75   | 0.0129          | 0.0182 | 0.026  | 0.036  | 0.036  | 0.036  | 0.036  |
| 8.00   | 0.0149          | 0.021  | 0.030  | 0.042  | 0.042  | 0.042  | 0.042  |
| 8.25   | 0.0149          | 0.021  | 0.030  | 0.042  | 0.042  | 0.042  | 0.042  |
| 8.50   | 0.0149          | 0.021  | 0.030  | 0.042  | 0.042  | 0.042  | 0.042  |
| 8.75   | 0.0149          | 0.021  | 0.030  | 0.042  | 0.042  | 0.042  | 0.042  |
| 9.00   | 0.0149          | 0.021  | 0.030  | 0.042  | 0.042  | 0.042  | 0.042  |
| Total Ammonia (mg/liter NH <sub>3</sub> )      |                 |        |        |        |        |        |        |
| 6.50   | 3.0             | 2.8    | 2.7    | 2.5    | 1.76   | 1.23   | 0.87   |
| 6.75   | 3.0             | 2.8    | 2.7    | 2.6    | 1.76   | 1.23   | 0.87   |
| 7.00   | 3.0             | 2.8    | 2.7    | 2.6    | 1.76   | 1.23   | 0.87   |
| 7.25   | 3.0             | 2.8    | 2.7    | 2.6    | 1.77   | 1.24   | 0.88   |
| 7.50   | 3.0             | 2.8    | 2.7    | 2.6    | 1.78   | 1.25   | 0.89   |
| 7.75   | 2.8             | 2.6    | 2.5    | 2.4    | 1.66   | 1.17   | 0.84   |
| 8.00   | 1.82            | 1.70   | 1.62   | 1.57   | 1.10   | 0.78   | 0.56   |
| 8.25   | 1.03            | 0.97   | 0.93   | 0.90   | 0.64   | 0.46   | 0.33   |
| 8.50   | 0.58            | 0.55   | 0.53   | 0.53   | 0.38   | 0.28   | 0.21   |
| 8.75   | 0.34            | 0.32   | 0.31   | 0.31   | 0.23   | 0.173  | 0.135  |
| 9.00   | 0.195           | 0.189  | 0.189  | 0.195  | 0.148  | 0.116  | 0.094  |

<sup>1</sup> To convert these values to mg/liter N, multiply by 0.822.  
<sup>2</sup> Source: U. S. Environmental Protection Agency, 1992. Revised tables for determining average freshwater ammonia concentrations. USEPA Office of Water Memorandum, July 30, 1992.

**Table 4**  
**Maximum Contaminant Levels**  
**Inorganic Chemicals**

| <i>Chemical</i>                   | <i>Maximum Contaminant Level, mg/L</i> |
|-----------------------------------|--|
| Aluminum                          | 1.                                     |
| Antimony                          | 0.006                                  |
| Arsenic                           | 0.05                                   |
| Asbestos                          | 7 MFL*                                 |
| Barium                            | 1.                                     |
| Beryllium                         | 0.004                                  |
| Cadmium                           | 0.005                                  |
| Chromium                          | 0.05                                   |
| Cyanide                           | 0.15                                   |
| Fluoride                          | 2.0                                    |
| Mercury                           | 0.002                                  |
| Nickel                            | 0.1                                    |
| Nitrate (as NO <sub>3</sub> )     | 45.                                    |
| Nitrate+Nitrite (sum as nitrogen) | 10.                                    |
| Nitrite (as nitrogen)             | 1.                                     |
| Selenium                          | 0.05                                   |
| Thallium                          | 0.002                                  |

\* MFL=million fibers per liter; MCL for fibers exceeding 10 um in length.

**Table 5**  
**Optimal Fluoride Levels**

| <i>Annual average of<br/>maximum daily air<br/>temperatures, degrees</i> |                | <i>Optimal fluoride<br/>level, mg/L</i> | <i>Control Range, mg/L</i> |             |
|--|----------------|---|----------------------------|-------------|
| <i>Fahrenheit</i>  | <i>Celsius</i> |   | <i>Low</i>                 | <i>High</i> |
| 50.0 to 53.7   | 10.0 to 12.0   | 1.2                                     | 1.1                        | 1.7         |
| 53.8 to 58.3   | 12.1 to 14.6   | 1.1                                     | 1.0                        | 1.6         |
| 58.4 to 63.8   | 14.7 to 17.7   | 1.0                                     | 0.9                        | 1.5         |
| 63.9 to 70.6   | 17.8 to 21.4   | 0.9                                     | 0.8                        | 1.4         |
| 70.7 to 79.2   | 21.5 to 26.2   | 0.8                                     | 0.7                        | 1.3         |
| 79.3 to 90.5   | 26.3 to 32.5   | 0.7                                     | 0.6                        | 1.2         |

**Table 6**  
**Maximum Contaminant Levels**  
**Volatile Organic Chemicals (VOCs)**

| <i>Chemical</i>                       | <i>Maximum Contaminant Level,<br/>mg/L</i> |
|---------------------------------------|--|
| Benzene                               | 0.001                                      |
| Carbon                                | 0.0005                                     |
| 1,2-Dichlorobenzene                   | 0.6  |
| 1,4-Dichlorobenzene                   | 0.005                                      |
| 1,1-                                  | 0.005                                      |
| 1,2-                                  | 0.0005                                     |
| 1,1-                                  | 0.006                                      |
| cis-1,2-Dichloroethylene              | 0.006                                      |
| trans-1,2-Dichloroethylene            | 0.01                                       |
| Dichloromethane                       | 0.005                                      |
| 1,2-Dichloropropane                   | 0.005                                      |
| 1,3-Dichloropropene                   | 0.0005                                     |
| Ethylbenzene                          | 0.3  |
| Methyl- <i>tert</i> -butyl            | 0.013                                      |
| Monochlorobenzene                     | 0.07                                       |
| Styrene                               | 0.1  |
| 1,1,2,2-Tetrachloroethane             | 0.001                                      |
| Tetrachloroethylene                   | 0.005                                      |
| Toluene                               | 0.15                                       |
| 1,2,4-Trichlorobenzene                | 0.005                                      |
| 1,1,1-Trichloroethane                 | 0.200                                      |
| 1,1,2-Trichloroethane                 | 0.005                                      |
| Trichloroethylene                     | 0.005                                      |
| Trichlorofluoromethane                | 0.15                                       |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | 1.2  |
| Vinyl Chloride                        | 0.0005                                     |
| Xylenes                               | 1.750*                                     |

**Table 7**  
**Maximum Contaminant Levels**  
**Non-Volatile Synthetic Organic Chemicals (SOCs)**

| <i>Chemical</i>           | <i>Maximum Contaminant Level, mg/L</i> |
|---------------------------|--|
| Alachlor                  | 0.002                                  |
| Atrazine                  | 0.001                                  |
| Bentazon                  | 0.018                                  |
| Benzo(a)pyrene            | 0.0002                                 |
| Carbofuran                | 0.018                                  |
| Chlordane                 | 0.0001                                 |
| 2,4-D                     | 0.07                                   |
| Dalapon                   | 0.2                                    |
| Dibromochloropropane      | 0.0002                                 |
| Di(2-ethylhexyl)adipate   | 0.4                                    |
| Di(2-ethylhexyl)          | 0.004                                  |
| Dinoseb                   | 0.007                                  |
| Diquat                    | 0.02                                   |
| Endothall                 | 0.1                                    |
| Endrin                    | 0.002                                  |
| Ethylene Dibromide        | 0.00005                                |
| Glyphosate                | 0.7                                    |
| Heptachlor                | 0.00001                                |
| Heptachlor Epoxide        | 0.00001                                |
| Hexachlorobenzene         | 0.001                                  |
| Hexachlorocyclopentadiene | 0.05                                   |
| Lindane                   | 0.0002                                 |
| Methoxychlor              | 0.03                                   |
| Molinate                  | 0.02                                   |
| Oxamyl                    | 0.05                                   |
| Pentachlorophenol         | 0.001                                  |
| Picloram                  | 0.5                                    |
| Polychlorinated Biphenyls | 0.0005                                 |
| Simazine                  | 0.004                                  |
| Thiobencarb               | 0.07                                   |
| Toxaphene                 | 0.003                                  |
| 2,3,7,8-TCDD (Dioxin)     | 3 x 10 <sup>-8</sup>                   |
| 2,4,5-TP (Silvex)         | 0.05                                   |

\*MCL is for either a single isomer or the sum of the isomers.

**Table 8**  
**Secondary Maximum Contaminant Levels**  
**Consumer Acceptance Limits**

| <i>Constituents</i>            | <i>Maximum Contaminant Levels/Units</i> |
|--------------------------------|---|
| Aluminum                       | 0.2 mg/L                                |
| Color                          | 15 Units                                |
| Copper                         | 1.0 mg/L                                |
| Corrosivity                    | Non-corrosive                           |
| Foaming Agents (MBAS)          | 0.5 mg/L                                |
| Iron                           | 0.3 mg/L                                |
| Manganese                      | 0.05 mg/L                               |
| Methyl-tert-butyl ether (MTBE) | 0.005 mg/L                              |
| Odor--Threshold                | 3 Units                                 |
| Silver                         | 0.1 mg/L                                |
| Thiobencarb                    | 0.001 mg/L                              |
| Turbidity                      | 5 Units                                 |
| Zinc                           | 5.0 mg/L                                |

**Table 9**  
**Secondary Maximum Contaminant Levels -- Ranges**

| <i>Constituent,<br/>Units</i>      | <i>Recommended</i> | <i>Upper</i> | <i>Short Term</i> |
|------------------------------------|--------------------|--------------|-------------------|
| Total Dissolved Solids, mg/L       | 500                | 1,000        | 1,500             |
| or Specific Conductance, micromhos | 900                | 1,600        | 2,200             |
| Chloride, mg/L                     | 250                | 500          | 600               |
| Sulfate, mg/L                      | 250                | 500          | 600               |



TABLE 10

WATER QUALITY CRITERIA FOR  
 AMBIENT DISSOLVED OXYGEN CONCENTRATION<sup>1,2</sup>

|                              | Beneficial Use Class     |      |                          |      |
|------------------------------|--------------------------|------|--------------------------|------|
|                              | COLD & SPWN <sup>3</sup> | COLD | WARM & SPWN <sup>3</sup> | WARM |
| 30 Day Mean                  | NA <sup>4</sup>          | 6.5  | NA                       | 5.5  |
| 7 Day Mean                   | 9.5 (6.5)                | NA   | 6.0                      | NA   |
| 7 Day Mean Minimum           | NA                       | 5.0  | NA                       | 4.0  |
| 1 Day Minimum <sup>5,6</sup> | 8.0 (5.0)                | 4.0  | 5.0                      | 3.0  |

- <sup>1</sup> From: USEPA. 1986. Ambient water quality criteria for dissolved oxygen. Values are in mg/L.
- <sup>2</sup> These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column (SPWN), the figures in parentheses apply.
- <sup>3</sup> Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching (SPWN).
- <sup>4</sup> NA (Not Applicable).
- <sup>5</sup> For highly manipulatable discharges, further restrictions apply.
- <sup>6</sup> All minima should be considered as instantaneous concentrations to be achieved at all times.

**Table 11**  
**MCL Radioactivity**

| <i>Constituent</i>   | <i>Maximum Contaminant Level, pCi/l</i> |
|--|---|
| Combined Radium-226 and Radium-228   | 5                                       |
| Gross Alpha particle activity (including Radium-226 but excluding Radon and Uranium) | 15                                      |
| Tritium  | 20,000                                  |
| Strontium-90   | 8                                       |
| Gross Beta particle activity   | 50                                      |
| Uranium  | 20                                      |