

GUAM ENVIRONMENTAL PROTECTION AGENCY

GUAM WATER QUALITY STANDARDS



TODO Y NILALA Y TANO MAN UNO
ALL LIVING THINGS OF THE EARTH ARE ONE

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GARGEPA.
Division II- Water Control.
Chapter 5.
Water Quality Standards.

Section 5101. Policies.

A. Statement of Policy.

It shall be the public policy of Guam to:

1. conserve, protect, maintain, and improve the quality of Guam's waters for human consumption (drinking, fish and shellfish harvesting and food processing); for the growth and propagation of aquatic life; for marine research; for the preservation of coral reefs and wilderness areas; and for domestic, agricultural, commercial, industrial, recreational and other legitimate uses;
2. provide that no pollutant is discharged into any of Guam's waters, unless:
(a) the discharge first receives processing/treatment to remove all harmful or hazardous products, or provides the control technology necessary to protect the designated beneficial uses of waters; (b) the discharge meets the effluent limitations established for that discharge; and (c) best management practices are applied as necessary;
3. provide for the prevention, abatement and control of new and existing water pollution sources;
4. maintain and improve the chemical, physical and biological integrity of the waters of Guam as necessary to meet Clean Water Act Section 101(a);
5. provide protection from point or non-point source discharges to wetlands in the same way as other surface waters;
6. provide protection from point and non-point discharges, including discharges from ponding basins and sinkholes to groundwater in the same way as surface waters; and
7. eliminate all point source discharges to certain near-shore waters.

Further, under the terms of the U.S. Water Pollution Control Act 92-500, as amended by all Public Laws through 1986:

1. it is Guam's goal to eliminate the discharge of pollutants into Guam's waters; and
2. it is Guam's goal that effective water quality guidelines are established and enforced which provide for the protection and propagation of fish, shellfish and other aquatic and marine life, and provide for safe public recreation in and on Guam's waters.

Therefore, pursuant to the authority contained in the Guam Water Pollution Control Act (Sections 47104 and 47108 of Chapter 47, Title 10 of the Guam Code Annotated), which authorized the formulation of standards of water purity and classification of waters according to their most beneficial uses, the Guam Environmental Protection Agency hereby adopts the following standards of water quality for Guam.

B. Anti-Degradation Policy.

1. Existing in-stream water uses, and the level of water quality necessary to protect these uses, shall be maintained and protected. No further water quality degradation which would interfere with or become injurious to existing designated uses is allowable.
2. Water quality for those waters not attaining their uses due to impacts from pollution shall be improved so uses are attained. Where the natural conditions are of lower quality than criteria assigned, the natural conditions shall constitute the water quality criteria.
3. If a project has been proposed, and its implementation may lower water quality in a water whose quality exceeds levels necessary to support the propagation of fish, shellfish and other commonly harvested organisms, and wildlife and recreation in and on the water, that water quality shall be maintained and protected unless:
 - a. an interdisciplinary review consistent with the National Environmental Policy Act ("NEPA") has been submitted for the project. This review will insure that the project complies with the applicable local and Federal laws and regulations and procedures relating to the protection and enhancement of the environment. As necessary, the determination will include mitigative provisions as a condition for granting approval of a specific project. The three (3) basic environmental determinations that will apply to a specific project are:

- i. a determination to categorically exclude a project from a formal environmental review;
 - ii. a Finding of No Significant Impact ("FNSI") based upon formal environmental review supported by an Environmental Impact Document ("EID"); and
 - iii. a determination to prepare an Environmental Impact Statement ("EIS"). The environmental impact determination will consider such technical, economic, social and other criteria as provided by Sections 301 and 302 of the Clean Water Act;
 - b. the public has been notified of the anticipated action, and has been provided the information necessary for meaningful public involvement and response at least thirty (30) days before the action; a public hearing or meeting has been held (in accordance with the Administrative Adjudication Law, 5 GCA Chapter 9, and with a thirty (30) day notice) if the Agency determines that there is significant public interest or that a hearing or meeting would be useful; and a responsiveness summary has been completed (which shall identify the public participation activity conducted, describe the matter on which the public was consulted, summarize the public's views and significant comments and set forth the Agency's responses); and
 - c. the Administrator finds that:
 - i. allowing lower water quality is necessary to accommodate important economic or social development;
 - ii. existing uses will be protected; and
 - iii. the project associated with the lowering includes the highest statutory and regulatory requirements for all new and existing point and non-point sources, and all cost-effective and reasonable best management practices for non-point sources.
4. When more than one (1) set of water quality criteria apply, including an overlap of category designations or at a boundary water between two (2) categories, the more stringent standard shall prevail.
5. Water quality shall be maintained and protected in Guam's Outstanding Resource Waters.

6. In those cases where potential water quality impairment associated with a thermal discharge is involved, the anti-degradation policy and implementing method shall be consistent with Section 316 of the Clean Water Act.

C. Groundwater Protection Zone ("GPZ").

A primary means of groundwater pollution prevention is to direct, control and encourage appropriate land uses, land use intensities and land use development patterns to achieve sustainable groundwater quality over the long term. The Groundwater Protection Zone ("GPZ") is an environmental land use management system which designates much of the land surface above Guam's principal source aquifer, the Northern Aquifer, for the protection of Resource Zone (G-1) waters and the Recharge Zone (G-2) waters.

A GPZ map has been developed as a land use management overlay applicable to any and all zoning and subdivision development requirements in Guam, including military land use activities. One (1) primary determinate of land use development potential, use intensity, density and patterns of growth is the availability of public sewer systems. This determinant is especially critical over Guam's Northern Aquifer to ensure that many potentially harmful (wastewater) pollutants generated are transported to acceptable treatment/disposal works.

The GPZ includes most, but not all, of the following: drinking water production wells and their respective well head protection zones, the Northern Guam Watershed, high development-potential, substantial agricultural, government subsidized rural housing, military, and existing industrial and commercial development lands.

1. Land use guidelines and performance standards should be applied in all appropriate circumstances within the GPZ and over the Northern Aquifer, including, but not limited to, the following:
 - a. industrial development should not occur without adequate public sewer infrastructure;
 - b. high density residential development (more than one (1) dwelling per one-half (1/2) acre should not occur without adequate public sewer service;
 - c. individual wastewater disposal systems and pending basins and similar point source waste or storm water disposal works should not be permitted within a Wellhead Protection Zone; and

- d. as practical, storm water disposal systems should be designed and operated to terminate in close proximity to, or within project property boundaries, to facilitate groundwater recharge.

Section 5102. Categories of Waters.

The categories of water established under these standards are Groundwater, Marine waters, and Surface waters. All categories of water are referenced on the Water Classification Map. Scaled down copies of these maps are included in these standards, enabling readers to understand their relative position, application and use.

A. Groundwater.

This category encompasses all subsurface water and includes basal and parabasal water, perched water, all water below the groundwater table, water percolating through the unsaturated zone (vadose water), all saline waters below and along the perimeter of the basal fresh water body (freshwater lens), and water on the surface that has been collected with the specific intent of recharging or disposing of that water to the subsurface by means of injection, infiltration, percolation, etc. The Northern Guam Water lens, which is the Principal Source Aquifer, and any other groundwater resources, as they are identified, shall continue to receive protection under the Guam Wellhead Protection Program and other applicable groundwater regulations.

1. Category G-1 Resource Zone.

The primary use of groundwater within this zone is for drinking (human consumption) and this use must be protected. Virtually all water of the saturated zone of Guam is included. Specifically, it includes all water occurring in the saturated zone below the groundwater table, all vadose water occurring in an unsaturated zone extending one hundred (100) feet (30.5 m) above any water table, or within twenty (20) feet of the ground surface of all fresh groundwater bodies, all water of the basal and parabasal freshwater bodies, and all water of and below the freshwater/salt-water transition zone beneath the basal water body (e.g. Wells A-1, A-2, A-3, MJ-1, & MJ-5). Tables 1 and 2 contain specific numerical standards for inorganic and organic chemicals, radionuclides and microorganisms.

2. Category G-2 Recharge Zone.

Water within this zone is tributary to, replenishes, and recharges the Category G-1 groundwater and must be of drinking water quality before it enters the Resource Zone. Water discharges within the Recharge Zone must receive treatment to the degree necessary to protect the underlying Category G-1 groundwater from any contamination, and must comply with the requirements of the groundwater quality standards, unless it can be shown by an engineering feasibility study that there will be no significant adverse effects on G-1 waters.

B. Marine Waters.

This category includes all coastal waters off-shore from the mean high water mark, including estuarine waters, lagoons and bays, brackish areas, wetlands and other special aquatic sites, and other inland waters that are subject to ebb and flow of the tides.

1. Category M-1 Excellent.

Water in this category must be of high enough quality to protect for whole body contact recreation, and to ensure the preservation and protection of marine life, including corals and reef-dwelling organisms, fish and related fisheries resources, and enable the pursuit of marine scientific research as well as aesthetic enjoyment. This category of water shall remain substantially free from pollution attributed to domestic, commercial and industrial discharges, shipping and boating, or mariculture, construction and other activities which can reduce the waters' quality.

2. Category M-2 Good.

Water in this category must be of sufficient quality to allow for the propagation and survival of marine organisms, particularly shellfish and other similarly harvested aquatic organisms, corals and other reef-related resources, and whole body contact recreation. Other important and intended uses include mariculture activities, aesthetic enjoyment and related activities.

3. Category M-3 Fair.

Water in this category is intended for general, commercial and industrial use, while allowing for protection of aquatic life, aesthetic

enjoyment and compatible recreation with limited body contact. Specific intended uses include the following: shipping, boating and berthing, industrial cooling water, and marinas.

C. Surface Waters.

This category includes all of surface freshwater and includes: (1) waters that flow continuously over land surfaces in a defined channel or bed, such as streams and rivers; (2) standing water in basins, such as lakes, wetlands, marshes, swamps, ponds, sinkholes, ponding basins, impoundments, and reservoirs, either natural or man-made; and (3) all waters flowing over the land as runoff, or as runoff confined to channels with intermittent flow.

1. Category S-1High.

Surface water in this category is used for drinking water, wilderness areas, propagation and preservation of aquatic life, whole body contact recreation and aesthetic enjoyment. It is the objective of these standards that these waters shall be kept free of substances or pollutants from domestic, commercial and industrial discharges, or agricultural activities, construction or other land-use practices that may impact water quality.

2. Category S-2 Medium.

Surface water in this category is used for recreational purposes, including whole body contact recreation, for use as potable water supply after adequate treatment is provided, and propagation and preservation of aquatic wildlife and aesthetic enjoyment.

3. Category S-3 Low.

Surface water in this category is primarily used for commercial, agricultural and industrial activities. Aesthetic enjoyment and limited body contact recreation are acceptable in this zone, as well as maintenance of aquatic life. Discharges within this zone may be required to have construction and/or discharge permits under existing Guam Sediment and Soil Erosion regulations or under National Pollution Discharge Elimination System ("NPDES").

D. Outstanding Resource Waters.

1. Category Outstanding Resource Waters.

These waters may include surface waters (marine, freshwater, wetlands, etc.) in parks, wildlife refuges, and publicly owned lakes and reservoirs, and waters of exceptional recreational or ecological significance (e.g. waters which provide a habitat for identified threatened or endangered species), as determined by the Administrator.

Section 5103. Water Quality Criteria.

A. General Criteria Applicable to All Waters of Guam.

1. All waters shall meet generally accepted aesthetic qualifications, shall be capable of supporting desirable aquatic life, and shall be free from substances, conditions or combinations thereof attributable to domestic, commercial and industrial discharges or agricultural, construction and land-use practices or other human activities that:

a. cause visible floating materials, debris, oils, grease, scum, foam, or other floating matter which degrades water quality or use;

b. produce visible turbidity, settle to form deposits or otherwise adversely affect aquatic life;

c. produce objectionable color, odor or taste, directly or by chemical or biological action;

d. injure or are toxic or harmful to humans, animals, plants or aquatic life; or

e. induce the growth of undesirable aquatic life.

2. Analytical testing methods for these criteria shall be in accordance with the most recent editions of "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by American Public Health Association ("APHA"), American Water Works Associations ("AWWA"), and Water Pollution Control Federation ("WPCF") (now Water Environment Federation); "Methods for Chemical Analysis of Water and Wastes" (U.S. Environmental Protection Agency Environmental Monitoring & Support Division, Cincinnati, Ohio 45268, (EPA-600/4-79-020))

March 1983), and other methods acceptable to GEPA and possessing adequate procedural precision and accuracy.

B. Water Quality Criteria For Groundwater G-1 and G-2.

1. The numerical groundwater quality standards limit the physical, chemical, radiological and microbiological characteristics of drinking water in terms of maximum acceptable concentrations. Although the groundwater limits presented herein represent drinking water of acceptable quality, there is no inference that better quality water supplies may be degraded.

2. Table 1 presents groundwater quality standards to protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known to occur in public water systems. The table divides these contaminants into Inorganic Chemicals, Organic Chemicals, Radionuclides and Microorganisms.

TABLE 1.
INORGANIC CHEMICALS.

Pollutants	(mg/l)
Antimony	0.006
Arsenic	0.05
Asbestos (fibers > 10um)	7 MF/L (million fibers/liter> 10 um)
Barium	2.0
Beryllium	0.004
Cadmium	0.005
Chromium (total)	0.1
Copper	1.3
Cyanide (as free cyanide)	0.2
Fluoride	4
Lead	0.015
Inorganic Mercury	0.002
Nickel	0.1
Nitrate (as nitrogen)	10
Nitrite (as nitrogen)	1
Selenium	0.05
Sulfate	500
Thallium	0.0005

TABLE 1. continued
ORGANIC CHEMICALS.

Pollutants	(mg/l)
Acrylamide	zero
Alachlor	0.002
Aldicarb	0.001
Aldicarb sulfone	0.001
Aldicarb sulfoxide	0.001
Atrazine	0.003
Benzo(a)anthracene (PAH)	0.0001
Benzene	0.005
Benzo(a)pyrene (PAH)	0.0002
Benzo(k)fluoranthene (PAH)	0.0002
Butyl benzyl phthalate (PAE)	0.1
Carbofuran	0.04
Carbon tetrachloride	0.005
Chlordane	0.002
Chrysene (PAH)	0.00032
2,4-D	0.07
Dalapon	0.2
Di{2-ethylhexyl}adipate	0.4
Dibenzo(a,h)anthracene (PAH)	0.0003

TABLE 1. continued
ORGANIC CHEMICALS.

Pollutants	(mg/l)
1,2-Dibromo-3-chloropropane (DBCP)	0.0002
Dichlorobenzene(orth-)	0.6
Dichlorobenzene (dmeta-)	0.6
Dichlorobenzene (para-)	0.075
Dichloroethane (1,2-)	0.005
Dichloroethylene (1,1-)	0.007
Dichloroethylene (cis-1,2-)	0.07
Dichloroethylene (trans-1,2-)	0.1
Dichloromethane (methylene chloride)	0.005
Dichloropropane (1,2-)	0.005
Di(2-ethylhexyl) phthalate (PAE)	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Epichlorohydrin	Zero
Ethylbenzene	0.7
Ethylene dibromide	0.00005
Gylphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002

TABLE 1. continued
ORGANIC CHEMICALS.

Pollutants	(mg/l)
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Indeno(1,2,3-c,d)pyrene	0.0004
Lindane	0.0002
Methoxychlor	0.04
Monochlorobenzene	0.1
Oxamyl (vydate)	0.2
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated Biphenyls (PCB's)	0.0005
Simazine	0.004
Styrene	0.1
2,3,7,8-TCDD (dioxin)	3E-08
Tetrachloroethylene	0.005
Toluene	1
Toxaphene	0.003
2,4,5-TP (silvex)	0.05
1,2,4-Trichlorobenzene	0.07
Trichloroethane (1,1,1-)	0.2
Trichloroethane (1,1,2-)	0.003

TABLE 1. continued
ORGANIC CHEMICALS.

Pollutants	(mg/l)
Trichloroethylene	0.005
Trihalomethanes <ul style="list-style-type: none"> • Chloroform • Bromodichloromethane • Dibromochloromethane • Bromoform 	0.100
Vinyl chloride	0.002
Xylenes (total)	10

TABLE 1. continued
RADIONUCLIDES.

Pollutants	Acceptable levels
Beta particle and photon activity (formerly man-made radionuclides)	4 mrem/year
Gross alpha particle activity	15 pCi/l
Radium 226 & Radium 228	5 pCi/l
Uranium	0.02 pCi/l

TABLE 1. continued
MICROORGANISMS.

Pollutants	Acceptable levels
Giardia lamblia	zero
Legionella	zero
Standard Plate Count	n/a
Total Coliform (including fecal coliform and E. Coli)	zero
Turbidity	1.0 NTU
Viruses	zero

3. Table 2 presents groundwater quality standards that are considered advisory (MTBE (methyl-t-butyl ether)), or secondary. Secondary standards are those which may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. The Administrator may choose to utilize these as enforceable standards.

TABLE 2.

Pollutants	Numeric Standards (mg/l)
Aluminum	0.05 to 0.2
Chloride	250
Color	15 (color units)
Copper	1.0
Corrosivity	non-corrosive
Fluoride	2.0
Foaming Agents	0.5

TABLE 2. continued.

Pollutants	Numeric Standards (mg/l)
Iron	0.3
Manganese	0.05
Odor	3 threshold odor number
pH	6.5- 8.5
Silver	0.10
Sulfate	250
Total Dissolved Solids	500
Zinc	5
Oil and Grease	0
MTBE (methyl-t-butyl ether)	0.02

C. Numeric Water Quality Criteria for Marine and Surface Waters.

1. Microbiological Requirements	Applicable to
<p>a. All marine and surface waters water bodies require the use of enterococci bacterial indicator.</p> <p>i. Concentrations of enterococci bacteria shall not exceed 35 CFU/100 ml based upon the geometric mean of samples taken in any thirty (30) day interval and the Statistical Threshold Value (STV) OF 130 CFU/100 ml should not be exceeded by more than 10 percent of the samples taken during the same thirty (30) day interval.</p> <p>b. For all surface waters, microbiological analysis may include the use of <i>Escherichia coli</i> (<i>E. coli</i>) indicator and/or enterococci indicator.</p> <p>i. Concentrations of <i>E. coli</i> shall be no greater than 126 CFU/100 ml based upon the geometric mean of samples taken over a thirty (30) day period AND the Statistical Threshold Value (STV) of 410 CFU/100 ml should not be exceeded by more than 10 percent of the samples taken.</p>	<p>M-1, M-2, M-3 S-1, S-2, S-3</p> <p>S-1, S-2, S-3</p>

C. Numeric Water Quality Criteria for Marine and Surface Waters.
(continued)

1. Microbiological Requirements (continued)	Applicable to
<p>c. Where shellfish are commonly collected for human consumption, the following criteria apply: (1) water samples collected at growing areas will maintain no more than a median of fourteen (14) fecal coliform/100 ml; and (2) ten percent (10%) of water samples taken from a growing area should not exceed forty-three (43) fecal coliform/100 ml.</p>	<p>M-1, M-2, M-3</p> <p>S-1, S-2, S-3</p>

2. pH	Applicable to
<p>i. pH shall remain within the range of 6.5-8.5</p> <p>ii. pH shall remain within the range of 6.5-9.0</p> <p>iii. For open ocean waters where the depth is substantially greater than the euphotic zone, the pH should not be changed more than 0.2 units from the naturally occurring variation, or in any case outside the range of 6.5-8.5.</p>	<p>M-1, M-2, M-3</p> <p>S-1, S-2, S-3</p> <p>M-1, M-2, M-3</p>

3. Nutrients	Applicable to																						
<p>a. Phosphorus:</p> <p>Orthophosphate (P04-P) shall not exceed 0.025 mg/l</p> <p>Orthophosphate (P04-P) shall exceed 0.05 mg/l</p> <p>Orthophosphate (P04-P) shall not exceed 0.10 mg/l</p> <p>b. Nitrogen</p> <p>Nitrate-nitrogen (N03-N) shall not exceed 0.10 mg/l</p> <p>Nitrate-nitrogen (N03-N) shall not exceed 0.20 mg/l</p> <p>Nitrate-nitrogen (N03-N) shall not exceed 0.50 mg/l</p> <p>c. Ammonia nitrogen per liter limits vary with pH:</p> <p>i. The one (1) hour average concentration of total ammonia nitrogen (mg N/l) does not exceed, more than once every three (3) years on the average, the Criteria Maximum Concentration ("CMC") (see Section 5105 Definitions) calculated using the following equation:</p> $CMC = 0.411 / (1 + 10^{(7.204 - pH)}) + 58.4 / (1 + 10^{(pH - 7.204)})$ <p>ii. The thirty (30) day average concentration of total ammonia nitrogen (mg N/l) does not exceed, more than once every three (3) years on the average, the Criteria Chronic Concentration ("CCC") (see Section 5105 Definitions) calculated using the following equation:</p> $CCC = 0.0858 / (1 + 10^{(7.688 - pH)}) + 3.70 / (1 + 10^{(pH - 7.688)})$ <p>iii. CMC and CCC (mg N/l) at a few example pH Values.</p> <table border="1"> <thead> <tr> <th>pH</th><th>CMC</th><th>CCC</th></tr> </thead> <tbody> <tr><td>6.5</td><td>48.8</td><td>3.48</td></tr> <tr><td>7.0</td><td>36.1</td><td>3.08</td></tr> <tr><td>7.5</td><td>19.9</td><td>2.28</td></tr> <tr><td>8.0</td><td>8.4</td><td>1.27</td></tr> <tr><td>8.5</td><td>3.2</td><td>0.57</td></tr> <tr><td>9.0</td><td>1.32</td><td>0.25</td></tr> </tbody> </table> <p>iv. The ambient concentration, averaged over a period of thirty (30) days, should not exceed the CCC. The ambient concentration, averaged over four (4) days, should not exceed a concentration two (2) times greater than the CCC. The averaging period applicable to the CMC is one (1) hour.</p>	pH	CMC	CCC	6.5	48.8	3.48	7.0	36.1	3.08	7.5	19.9	2.28	8.0	8.4	1.27	8.5	3.2	0.57	9.0	1.32	0.25	<p>M-1 S-1</p> <p>M-2 S-2</p> <p>M-3 S-3</p> <p>M-1 S-1</p> <p>M-2 S-2</p> <p>M-3 S-3</p> <p>S-1, S-2, S-3</p>	
pH	CMC	CCC																					
6.5	48.8	3.48																					
7.0	36.1	3.08																					
7.5	19.9	2.28																					
8.0	8.4	1.27																					
8.5	3.2	0.57																					
9.0	1.32	0.25																					

4. Dissolved Oxygen	Applicable to
Concentration of dissolved oxygen shall not be decreased to less than seventy-five percent (75%) saturation at any time, as influenced by salinity or naturally occurring temperature variations. Where natural conditions cause lower dissolved oxygen levels, controllable water quality factors shall not cause further reductions.	M-1, M-2, M-3 S-1, S-2, S-3

TABLE I. Saturation Dissolved Oxygen (D.O.).

Freshwater			Marine Water And Wetlands		
Sat. mg/l	75% mg/l	Temp. C	Salinity ppt	Sat. mg/l	75% mg/l
7.6	5.6	30	32	6.2	4.6
8.2	6.2	26	32	6.7	5

5.Salinity	Applicable to
a. No alterations of marine environments shall occur that would alter the salinity of marine or estuarine waters and wetlands of Guam more than +10% of the ambient conditions, except when due to natural conditions.	M-1, M-2, M-3 estuarine waters and wetlands
b. The maximum allowable amount of chlorides and sulfates shall be 250 mg/l, and the total dissolved solids shall not exceed 500 mg/l or one hundred thirty-three percent (133%) of the ambient condition. The salinity of freshwater sources and wetlands shall not be more than twenty percent (20%) above ambient by discharges of saline water.	S-1, S-2, S-3

6. Total Non-Filterable Suspended Solids	Applicable to
a. Concentrations of suspended matter at any point shall not be increased from ambient conditions at any time, and the total concentration should not exceed 5 mg/l, except when due to natural conditions.	M-1, S-1
b. Concentrations of suspended matters at any point shall not be increased more than ten percent (10%) from ambient at any time, and the total concentration should not exceed 20 mg/l, except when due to natural conditions.	M-2, S-2
c. Concentrations of suspended matter at any point shall not be increased more than twenty-five percent (25%) from ambient at any time, and the total concentration should not exceed 40 mg/l, except when due to natural conditions.	M-3, S-3

7. Turbidity	Applicable to
a. Turbidity at any point, as measured by nephelometric turbidity units ("NTU"), shall not exceed 0.5 NTU over ambient conditions, except when due to natural conditions.	M-1, S-1
b. Turbidity values (NTU) at any point shall not exceed 1.0 NTU over ambient conditions, except when due to natural conditions.	M-2, M-3 S-2, S-3
c. When debris, rapidly settling particles and true color give low readings when using nephelometric methods in making turbidity determinations, and one (1) or more of these conditions exist in marine and surface water, secchi-disc determinations will be used. Secchi-disc visibility shall not decrease by more than five (5) meters from ambient conditions, except when due to natural conditions.	

8. Radioactive Materials	Applicable to
Discharges of radioactive materials at any level into any waters of Guam is strictly prohibited.	M-1, M-2, M-3 S-1, S-2, S-3

9. Temperature	Applicable to
Water temperature shall not be changed more than 1.0 degree Centigrade (1.8 of the degree Fahrenheit) from ambient conditions. Effluent (thermal) not meeting this standard shall be considered as having an adverse effect on coral and other aquatic resources.	M-1, M-2, M-3 S-1, S-2, S-3

10. Concentrations of Oil or Petroleum Products	Applicable to
The limits described below are unacceptable: 1) detectable as a visible film, or sheen, or results in visible discoloration of the surface with a corresponding oil or petroleum product odor; 2) causes damage to fish, invertebrates or objectionable degradation of drinking water quality; or 3) forms an oil deposit on the shores or bottom of the receiving body of water.	M-1, M-2, M-3 S-1, S-2, S-3

11. Toxic Substances.

A. General.

- i. All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological, acute or

chronic 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, or other appropriate, scientifically defensible methods.

ii. All waters shall be maintained free of toxic substances in concentrations that produce contamination in harvestable aquatic life to the extent that it causes detrimental physiological acute or chronic responses in humans or protected wildlife, when consumed.

iii. The survival of aquatic life in marine and 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.

iv. Whenever natural concentrations of any toxic substance or element occur and exceed the limits established in these standards, this greater concentration shall constitute the limit; provided, that this natural concentration was not directly affected by human-induced causes.

B. Numeric Criteria.

i. Appendix A contains a matrix of the 126 CWA Section 307(A) Toxic Pollutants, as well as a table of several additional toxic pollutants. Absence from this matrix or table does not mean that a substance is non-toxic, as the results of on-going or future research may result in it being added at a later date.

All Appendix A Toxic Pollutant Criteria are to be Applied to Guam's Categories of Waters, as Follows:

Water Categories	Applicable Criteria
M-1	Columns C1, C2 and D2 all pollutants
M-2	Columns C1, C2 and D2 all pollutants
M-3	Columns C1, C2 and D2 all pollutants

Water Categories	Applicable Criteria
S-1	Columns B1, B2 and D1 all pollutants
S-2	Columns C1, C2 and D2 all pollutants
S-3	Columns C1, C2 and D2 all pollutants

ii. For those priority pollutants in the Appendix A matrix that are metals, the limits are applied as total recoverable; for those that are carcinogens, the 10 to the minus sixth power risk level will be used (10^{-6}).

C. Pesticides.

i. For acceptable concentrations of all pesticides (Organochlorides, Organo-phosphates, Carbamates, Herbicides, Fungicides, Defoliants, and Botanicals) please refer to the U.S. Water Quality Criteria Guidance "Blue Book" (NAS/ NAE,1973) (US-GPO#5501-00520), "Red Book" (USEPA, 1976), "Green Book", (FWPCA, 1968) and "Gold Book" (USEPA, 1986a), which is updated periodically.

ii. The setting or publishing of maximum concentration (limits) for specific pesticides and other toxics should in no way be construed as official approval or authorization for their use where such use is contrary to U.S. Environmental Protection Agency, or other Federal or local regulations.

Section 5104. Effluent Limitations.

A. General Requirements.

The Agency reserves the right to amend or extend the following criteria as improved standard methods are developed or revisions consistent with the enhancement of water quality are justified.

1. Dilution of effluent as a sole means of treatment is not acceptable as a method of treatment of wastes in order to meet the standards set forth in this Section. Rather, it shall be the obligation of any person discharging pollutants to the waters of Guam to provide the best pollutant removal or control consistent with technological feasibility, economic reasonableness and sound engineering judgment. In making a determination as to what degree of treatment is the best pollutant removal or control within the meaning of this Paragraph, the following shall be considered:

- a. the degree of waste reduction that can be achieved by process change, improved house-keeping and recovery of individual waste components for reuse; and
- b. whether individual process wastewater streams should be segregated or combined.

2. All point source discharges to Guam's waters will be controlled (permitted) through the Federal National Pollutant Discharge Elimination System ("NPDES"), or through the Guam Environmental Protection Agency's local permit program, consistent with the requirements of these programs.

3. A new or expanded facility using seawater shall conduct independent baseline studies of the existing ecosystems in the area that could be affected by the facility, before its construction.

4. For each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating or industrial processing, the best available site, design, technology and mitigation measures feasible shall be used to minimize the intake, detrimental impacts to and mortality of all forms of marine life.

5. Where otherwise permitted, new warmed or cooled water discharges into coastal wetlands or into areas of special biological importance, such as marine reserves, shall not impair the designated use or significantly lower the water quality of the receiving area.

6. All sewage shall be treated to the degree required by the Agency to achieve standards of water quality prior to being discharged to the waters of Guam. Industrial waters and other wastes shall also be treated to the degree required by the Agency. All permitted discharges shall comply with all applicable water quality criteria. Highest priority shall be given to improving or eliminating discharges that adversely affect any of the following:

- a. wetlands, estuaries, coral and other biologically sensitive sites;
- b. areas important for water contact sports;

- c. areas that produce shellfish or other similarly harvested for human consumption; and
- d. ocean areas subject to massive waste discharge.

7. **Secondary Treatment.** The following Paragraphs describe the minimum level of effluent quality to be attained when secondary treatment is required. However, a lower percent removal may be allowed on a case-by-case basis; provided, that the permittee satisfactorily demonstrates that: (1) the treatment works is consistently meeting, or will consistently meet, its permit effluent concentration limits, but its percent removal requirements cannot be met due to less concentrated influent wastewater; (2) to meet the percent removal requirements, the treatment works would have to achieve significantly more stringent limitations than would otherwise be required by the concentration-based standards; and (3) the less concentrated influent wastewater is not the result of excessive infiltration /inflow.

a. Biochemical Oxygen Demand (five (5) day).

- i. The arithmetic mean of the values for effluent samples collected over a period of thirty (30) consecutive days shall not exceed 30 mg/l.
- ii. The arithmetic mean of the values for effluent samples collected in over a period of seven (7) consecutive days shall not exceed 45 mg/l.
- iii. The arithmetic mean of the values for effluent samples collected over a period of thirty (30) consecutive days shall not exceed fifteen percent (15%) of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (eighty-five percent (85%) removal).

b. Suspended Solids.

- i. The arithmetic mean of the values for effluent samples collected over a period of thirty (30) consecutive days shall not exceed 30 mg/l.
- ii. The arithmetic mean of the values for effluent samples collected over a period of seven (7) consecutive days shall not exceed 45 mg/l.

- iii. The arithmetic mean of the values for effluent samples collected over a period of thirty (30) consecutive days shall not exceed fifteen percent (15%) of the arithmetic mean of the values for influent samples collected approximately the same times during the same period (eighty-five percent (85%) removal).

c. Microbiology.

- i. The appropriate Guam EPA microbiological indicator and standard for receiving waters classification will apply to effluent and/or;
- ii. The arithmetic mean of the fecal coliform values for effluent samples collected over a period of thirty (30) consecutive days shall not exceed 200 per 100 ml.
- iii. The arithmetic mean of the fecal coliform values for effluent samples collected over a period of seven (7) consecutive days shall not exceed 400 per 100 ml.

d. pH.

- i. The effluent values for pH shall remain within the limits of 6.0 to 9.0.

8. Toxic and hard-to-treat substances should be pretreated at the source if such substances result in pass-through or interfere with treatment process of a municipal treatment plant or which may contaminate sludge. In addition, effluent limits based upon acute and/or chronic toxicity tests of effluents may be prescribed by the Administrator.

9. No effluent shall, alone, or in combination with other sources, cause a violation of any applicable water quality standard. If the Agency finds that a discharge which complies with treatment requirements under the Authority of §5103(A) of these standards would cause, or is causing, a violation of water quality standards, the Administrator shall take appropriate action under §47109 of the Water Pollution Control Act to require the discharge to meet whatever effluent limits are necessary to ensure compliance with the water quality standards. When such a violation is caused by the cumulative effect of more than one (1) source, several sources may be joined in a schedule of compliance. Measures necessary for effluent limitations will be determined on the basis of technical feasibility, economic reasonableness and fairness to all dischargers.

10. Measurement of pollutant concentrations to determine compliance with the effluent limitations shall be made by the discharger at the point immediately following the final treatment process and before mixing with other waters. Points of measurement shall be designated by the Agency in an individual permit, after consideration of the elements contained in this Section. If necessary, the concentrations so measured shall be recomputed to exclude the effect of any dilution that is improper under this standard.

11. Compliance with toxicity requirements may be evaluated with a ninety-six (96) hour bioassay, or short-term method for estimating chronic toxicity. Allowable concentration(s) of the toxic pollutant(s) shall not exceed five percent (5%) of the ninety-six (96) hour LC50 at any time or place, one percent (0.01) of the twenty-four (24) hour average ninety-six (96) hour LC50 concentration, or a level calculated by multiplying the appropriate application factor, where available, by the ninety-six (96) hour LC50 value. The tests are to be conducted using the receiving water in question and the most sensitive species of affected aquatic organisms, as is practical.

References for these methods are: EPA 600/4-91/002 Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Second Edition, 1994; or EPA 600/4-90/027F Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Cincinnati, Ohio, EMSL, Fourth Edition, 1993; or EPA 600/4-600 R-95/136 Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine Estuarine Organisms, Cincinnati, Ohio, EMSL, May, 1995.

12. Every permitted facility discharging effluent to the waters of Guam shall submit operating reports to the Agency at a frequency to be determined by the Agency. Such reports shall contain information the Agency may reasonably require.

13. Schedule of Compliance.

a. It is presumed that new and existing permitted point source dischargers will promptly comply with any new or more restrictive water quality-based effluent limitations ("WQBELs") based upon adopted water quality criteria.

b. Where an existing discharger reasonably believes that it will be infeasible to promptly comply with a new or more restrictive WQBEL, the discharger may request approval from the permit issuing authority for a schedule of compliance.

c. A compliance schedule shall require compliance with WQBEL, as soon as possible, taking into account the discharger's technical ability to achieve compliance with such WQBEL.

d. In no event shall the permit issuing authority approve a schedule of compliance for a point source discharge which exceeds five (5) years from the date of a new permit's issuance, or an existing permit's reissuance or modification.

e. If the schedule of compliance exceeds one (1) year from the date of a new permit's issuance, or an existing permit's reissuance or modification, the schedule shall set forth interim requirements and dates for their achievement. The dates of completion between each requirement may not exceed one (1) year. If the time necessary for completion of any requirement is more than one (1) year and is not readily divisible into stages for completion, the permit shall require, at a minimum, specified dates for annual submission of progress reports on the status of interim requirements.

f. The administrative record for the permit shall reflect final permit limits and final compliance dates.

14. All discharges within Zone S-3 which are not otherwise required to have construction and / or discharge permits under existing Guam Soil Erosion Control Regulations, operating permits and/ or NPDES, may be required by this Agency to obtain such permits under these regulations.

15. Any existing permitted point source discharging to near-shore waters classified as M-1 shall submit to the Administrator for approval a plan and schedule for elimination of the discharge to near-shore waters. Any such plan shall consider all alternate disposal options and give preferential consideration to eliminating all point source discharges to the waters of Guam.

B. Effluent Discharge Limitations for Groundwater Category Ga2.

1. The Agency may allow discharges to G-2 waters if it can be shown by an engineering feasibility study that there will be no significant adverse effects upon G-1 waters.

2. The Agency reserves the right to set more stringent standards than those provided in Section 5103(B) Tables 1 and 2, if there is reason to believe that significant environmental damage may result from the discharge.

C. **Mixing Zones in Receiving Waters.**

The following requirements apply to all mixing zones:

1. Mixing Zones may be permitted during the NPDES permit process on a case-by-case basis after careful analyses of the nature of the effluent, a thorough study to assess the consequences of the effluent on the environment, and approval of an Environmental Impact Statement. A mixing zone shall be considered designated only when approved by the Guam Environmental Protection Agency and when concurrence of the U.S. E.P.A. has been received.
2. The area or volume of an individual mixing zone shall be limited to an area or volume that will minimize impacts on uses. Whenever a mixing zone is allowed by the Agency, the zone in which mixing occurs will not adversely affect the designated uses of the receiving waters. Water quality standards for a receiving water must be met at every point outside the boundaries of the designated mixing zone.
3. Water quality limits will be established if the limits in Section 5104 are to be revised in the zone of mixing.
4. Mixing Zones will not be allowed within categories M-1 and S-1.
5. Mixing Zones shall be restricted such that they do not encroach upon areas often used for fish harvesting, particularly of stationary species such as shellfish.
6. Whenever mixing zones are allowed, zones of passage shall be provided.
7. Biologically important areas, including spawning and nursery areas, and habitat for threatened and endangered species, shall be protected.
8. Mixing Zones shall not cause conditions to be lethal to those aquatic life and wildlife passing through the zone, or become injurious to human health in the event of a temporary exposure.
9. **Mixing Zones for Aquaculture Projects.** The Federal regulations relating to aquaculture (40 CFR §§ 122.56 and 125.11) provide that the aquaculture project area and project approval must not result in the enlargement of any previously approved mixing zone, or include so large a portion of the body of water that a substantial portion of the indigenous biota will be exposed to conditions within the designated projects area. Areas designated for approved aquaculture

projects should be treated in the same manner as other mixing zones. Special allowances shall not be made for these areas.

10. **Mixing Zones for the Discharge of Dredged or Fill Material.** The Federal regulations (40 CFR § 230.11(f)) provide guidelines for determining the acceptability of mixing discharge zones. The particular pollutant involved should be evaluated carefully in establishing dredging mixing zones. Dredged spoil discharges generally result in temporary short-term disruption and do not represent continuous discharge that will affect designated uses on a long-term. Minimal disruption of uses should be the primary consideration in establishing mixing zones for dredge and fill activities.

11. **Critical Low-Flows.** During critical low-flow conditions, waters shall be free from substances that settle to form objectionable deposits; float as debris, scum, oil or other matter; produce objectionable color, odor, taste or turbidity; cause acutely toxic conditions; or produce undesirable or nuisance aquatic life.

Specific low-flow requirements for streams and rivers are adopted to protect designated uses against the effects of toxics (refer to Technical Guidance Manual for Water Quality-based Toxics Control (USEPA, 1991a); Technical Guidance Manual for Performing Wasteloads, Book 6, Design Conditions, (USEPA, 1986c)). In the case of aquatic life, more frequent violations than the assumed exceedance of once every three (3) years would result in diminished vitality of stream ecosystems characteristics by the loss of desired species. Numeric water quality criteria should apply at all flows that are equal to or greater than flows specified in Table 3.

TABLE3.

AQUATIC LIFE	
Acute Criteria (CMC)	1Q10 or 1B3
Chronic Criteria (CCC)	7Q10 or 4B3

HUMAN HEALTH	
Non-carcinogens	30Q5
Carcinogens	Harmonic Mean Flow

TABLE 3. CONTINUED.

Where:

1Q10 - is the lowest one (1) day flow with an average recurrence frequency of once in ten (10) years, determined hydrologically;

1B3 - is biologically based and indicates an allowable exceedance of once every three (3) years. It is determined by EPA's computerized method (DFLOW model);

7Q10 - is the lowest average seven (7) consecutive day low-flow with an average recurrence frequency of once in ten (10) years, determined hydrologically;

4B3 - is biologically based and indicates an allowable exceedance for four (4) consecutive days once every three (3) years. It is determined by EPA's computerized method (DFLOW model);

30Q5 - is the lowest average thirty (30) consecutive day low-flow with an average recurrence frequency of once in five (5) years, determined hydrologically; and Harmonic Mean Flow - is a long-term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows.

It should be noted that when a criterion specifies a four (4) day average concentration that should not be exceeded more than once every three (3) years, this should not be interpreted as implying that a 4Q3 low-flow is appropriate for use as the design flow.

D. Mixing Zones for Non-Thermal Discharges.

1. Mixing Zones for Non-Thermal Discharges into Streams and Rivers.

a. For non-thermal discharges into streams and rivers, the mixing zone, at the point of discharge, is limited to twenty-five percent (25%) of the cross sectional area of the stream at the minimum flow at which the appropriate water quality standard can be met by thorough mixing of the effluent with the receiving waters.

b. The length of the mixing zone shall extend downstream no more than five (5) times the natural width of the stream at the point of discharge at the minimum flow condition.

c. The applicable water quality standard must be achieved at all points outside the mixing zone.

d. Mixing zones will not be permitted in standing bodies of water.

2. Mixing Zones for Non-Thermal Discharges into Coastal Waters.

a. For non-thermal discharges to coastal waters, the mixing zone shall be equal in depth to the depth of the water over the diffuser, in width to twice the depth of the water plus the width of the diffuser, and in length to twice the depth of the water plus the length of the diffuser, with the diffuser geographically centered within the mixing zone.

b. All discharges to marine waters will comply with the ocean discharge criteria promulgated under Section 403(6)(c) of the Federal Clean Water Act.

c. When practical, discharges and mixing zones should be located within coastal waters entrapped below the thermocline.

E. Mixing Zones for Thermal Discharges.

Thermal discharges pertain to effluent water with a temperature component either above or below ambient conditions of the receiving body of water. All thermal discharges, existing or proposed, into M-2 or M-3 receiving bodies of water shall be subject to provisions established in Section 316(a) of the Federal Water Pollution Control Act ("FWPCA"), Public Law Number 95-217.

1. All Above-Ambient Discharges.

a. Above-Ambient Discharges shall conform to a zone of mixing defined for that particular discharge on a case-by-case basis. This zone of mixing shall be defined by "EPA/505/2-90-001, PB91-127415, March 1991 Technical Support Document For Water Quality- based Toxic Control," or other references depicting appropriate thermal mixing zone models, and take into consideration the following criteria:

- i. time of exposure;
- ii. temperature of effluent;
- iii. depth of discharge;
- iv. type of environment;
- v. volume of discharge;
- vi. mass of pollutant rate of critical materials; and