

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Water Quality Control Commission

REGULATION NO. 31 - THE BASIC STANDARDS AND METHODOLOGIES FOR SURFACE WATER

5 CCR 1002-31

31.5 DEFINITIONS

See the Colorado Water Quality Control Act, section 25-8-101 et seq., C.R.S., and the codified water quality regulations additional definitions.

- (1) "ACT" means the Colorado Water Quality Control Act, section 25-8-101 et seq., C.R.S..
- (2) "ACUTE STANDARD" means the level not to be exceeded by the concentration for either a single sample or calculated as an average of all samples collected during a one-day period, except for temperature, which shall be based on the DM (see DM definition). As used in tables II and III, acute represents one-half of the LC-50 that protects 95 percent of the genera in a waterbody from lethal effects. The acute standard is implemented in combination with a selected duration and frequency of recurrence (section 31.9(1)). In determining attainment of the applicable acute standard, the representative nature of the data must be considered.
- (3) "ANTIDegradation RULE" means the rule established in section 31.8.
- (4) "BASIC STANDARDS" means those standards as established in section 31.11.
- (5) "BENEFICIAL USES" means those uses of state surface waters to be protected such as those identified in the classification system.
- (6) "BMP" (Best Management Practices) means a practice or a combination of practices that is determined by a governmental agency after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic; and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with quality goals.
- (7) "CHRONIC STANDARD" means the level not to be exceeded by the concentration for either a single representative sample or calculated as an average of all samples collected during a thirty-day period, except for temperature, which shall be based on the WAT (see WAT definition). As used in tables II and III, chronic represents the level that protects 95 percent of the genera from chronic toxic effects. Chronic toxic effects include, but are not limited to, demonstrable abnormalities and adverse effects on survival, growth, or reproduction. The chronic standard is implemented in combination with a selected duration and frequency of recurrence (section 31.9(1)). In determining attainment of the applicable chronic standard, the representative nature of the data must be considered.
- (8) "COLD WATER BIOTA" means aquatic life, including trout, normally found in waters where the summer weekly average temperature does not frequently exceed 20 °C.
- (9) "COMMISSION" means the Colorado Water Quality Control Commission.

- (10) "COMPENSATORY WETLANDS" means wetlands developed for mitigation of adverse impacts to other wetlands (e.g. wetlands developed pursuant to section 404 of the federal Act).
- (11) "CONSTRUCTED WETLANDS" means those wetlands intentionally designed, constructed and operated for the primary purpose of wastewater or stormwater treatment or environmental remediation provided under CERCLA, RCRA, or section 319 of the federal Act, if (a) such wetlands are constructed on non wetland sites that do not contain surface waters of the state, or (b) such wetlands are constructed on previously existing wetland sites, to the extent that approval or authorization under section 404 of the federal Act has been granted for such construction or it is demonstrated that such approval or authorization is not, or was not, required. This term includes, but is not limited to, constructed swales, ditches, culverts, infiltration devices, catch basins, and sedimentation basins that are part of a wastewater or stormwater treatment system or a system for environmental remediation mandated under CERCLA or RCRA. Compensatory wetlands shall not be considered constructed wetlands. Constructed wetlands are not state waters.
- (12) "CREATED WETLANDS" means those wetlands other than compensatory wetlands created in areas which would not be wetlands in the absence of human modifications to the environment. Created wetlands include, but are not limited to wetlands created inadvertently by human activities such as mining, channelization of highway runoff, irrigation, and leakage from man-made water conveyance or storage facilities. Wetlands resulting from hydrologic modifications such as on-channel reservoirs or on-channel diversion structures that expand or extend the reach of adjacent classified state waters are not considered created wetlands.
- (13) "DAILY MAXIMUM TEMPERATURE (DM)" means the highest two-hour average water temperature recorded during a given 24-hour period.
- (14) "DISSOLVED METALS" means that portion of a water and suspended sediment sample which passed through a 0.40 or 0.45 um (Micron) membrane filter. Determinations of "Dissolved" constituents are made using the filtrate. This may include some very small (Colloidal) suspended particles which passed through the membrane filter as well as the amount of substance present in true chemical solution.
- (15) "DIVISION" means the Division of Administration of the Colorado Department of Public Health and Environment of which the Water Quality Control Division is a part.
- (16) "*E.coli*" means *Escherichia coli*.
- (17) "EFFLUENT-DEPENDENT STREAM" means a stream that would be ephemeral without the presence of wastewater effluent, but has continuous or periodic flows for all or a portion of its reach as the result of the discharge of treated wastewater.
- (18) "EFFLUENT-DOMINATED STREAM" means a stream that would be intermittent or perennial without the presence of wastewater effluent whose flow for the majority of the time is primarily attributable to the discharge of treated water (i.e. greater than 50 percent of the flow consists of treated wastewater for at least 183 days annually, for eight out of the last ten years).
- (19) "EPHEMERAL STREAM" means a stream channel or reach of a stream channel that carries flow during, and for a short duration as the result of, precipitation events or snowmelt. The channel bottom is always above the groundwater table.

- (20) "EXISTING QUALITY" means the numeric value that represents the quality of a water body and is generally used for comparison with the water quality standard. Existing quality shall be calculated as:
- Total ammonia, nitrate, and the dissolved metals: 85th percentile
 - Total recoverable metals: 50th percentile
 - Dissolved oxygen: 15th percentile
 - *E. coli*: geometric mean
 - pH: the range between the 15th and 85th percentiles
 - Temperature: for the purposes of implementing the acute and chronic standard, "existing quality" is the seasonal maximum DM and WAT and which allows one warming event with a 3-year average exceedance frequency. For data records less than or equal to 3 years, existing quality is equal to the maximum WAT and DM. For data records with 4-6 years, one warming event above the standard is permitted.
- (21) "FEDERAL ACT" means the Clean Water Act, U.S.C. Section 1251 et seq., as amended.
- (22) "FIRST (1st) ORDER STREAM" means a stream that has no tributaries, based on USGS mapping at 1:100,000 scale.
- (23) "FLOODPLAIN" means any flat or nearly flat lowland that borders a stream, a lake, or an on-channel reservoir and that may be covered by its waters at flood or high stage as described by the parameter of the probable maximum flood or probable maximum high stage.
- (24) "HIGHEST ATTAINABLE USE" means the modified use that is both closest to the uses specified in section 31.13 and attainable based on the evaluation of the factors in 31.6(2)(b) that preclude attainment of the use and any other information or analyses that were used to evaluate attainability.
- (25) "LC-50" means the concentration of a parameter that is lethal to 50% of the test organisms within a defined time period.
- (26) "MAXIMUM WEEKLY AVERAGE TEMPERATURE (MWAT)" means the largest WAT in the period of interest. For lakes and reservoirs, the summertime MWAT is assumed to be equivalent to the maximum WAT from at least three profiles distributed throughout the growing season (generally July-September).
- (27) "MIXED LAYER" means that part of a lake that is well-mixed by wind action and can be expected to have relatively homogeneous physical and chemical conditions. In a thermally stratified lake, the mixed layer corresponds to the *epilimnion*; in an unstratified lake, the mixed layer extends to the bottom. The vertical extent of the mixed layer usually is determined by inspection of a vertical profile of temperature.
- (28) "MIXING ZONE" means that area of a water body designated on a case-by-case basis by the Division which is contiguous to a point source and in which certain standards may not apply.
- (29) "NUMERIC VALUE" means the measured concentration of a parameter.

- (30) "PARAMETER" means the chemical constituents or other characteristics of the water such as algae, *E. coli*, total dissolved solids, dissolved oxygen, or the magnitude of radioactivity levels, temperature, pH, and turbidity, or other relevant characteristics.
- (31) "PERMIT" means a National Pollutant Discharge Elimination System (NPDES) permit, a Colorado Discharge Permit System (CDPS) permit, or other state water quality permit.
- (32) "POTENTIALLY DISSOLVED METALS" means that portion of a constituent measured from the filtrate of a water and suspended sediment sample that was first treated with nitric acid to a pH of less than 2.0 and let stand for 8 to 96 hours prior to sample filtration using a 0.4 or 0.45 μm membrane filter. Note the "Potentially Dissolved" method cannot be used where nitric acid will interfere with the analytical procedure used for the constituent measured.
- (33) "PRIMARY CONTACT RECREATION" means recreational activities where the ingestion of small quantities of water is likely to occur. Such activities include but are not limited to swimming, rafting, kayaking, tubing, windsurfing, water-skiing, and frequent water play by children.
- (34) "REGIONAL WASTEWATER MANAGEMENT PLAN" means a water quality planning document prepared pursuant to section 208 of the federal Act, sometimes referred to as "208 Plans" or "Water Quality Management Plans."
- (35) "REPRODUCTIVE SEASON" means the portion of the year when fish migration, spawning, egg incubation, fry rearing or other reproductive functions occur.
- (36) "SALINITY" means total dissolved solids (TDS).
- (37) "SECOND (2nd) ORDER STREAM" means a stream which begins downstream of the confluence of two first (1st) order streams and ends downstream of the confluence of two second (2nd) order streams, based on USGS mapping at 1:100,000 scale.
- (38) "STANDARD" means a narrative and/or numeric restriction established by the Commission applied to state surface waters to protect one or more beneficial uses of such waters. Whenever only numeric or only narrative standards are intended, the wording shall specifically designate which is intended.
- (39) "STATE WATERS" means any and all surface and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.
- (40) "TABLES" means tables I, II, and III, appended to this regulation, which set forth accepted levels for various parameters which will generally protect the beneficial uses of state surface waters.
- (41) "THIRD (3rd) ORDER STREAM" means a stream which begins at the confluence of two second (2nd) order streams and ends downstream of the confluence of two third (3rd) order streams, based on USGS mapping at 1:100,000 scale.
- (42) "TOTAL RECOVERABLE METALS" means that portion of a water and suspended sediment sample measured by the total recoverable analytical procedure described in "Methods for Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, March, 1979, or its equivalent.

- (43) "TRIBUTARY WETLANDS" means wetlands that are the head waters of surface waters or wetlands within the floodplain that are hydrologically connected to surface waters via either surface or ~~groundwater~~~~ground-water~~ flows. The hydrologic connection may be intermittent or seasonal, but must be of sufficient extent and duration to normally reoccur annually. Tributary wetlands do not include constructed or created wetlands.
- (44) "USE ATTAINABILITY ANALYSIS" means an assessment of the factors affecting the attainment of aquatic life uses or other beneficial uses, which may include physical, chemical, biological, and economic factors.
- (45) "USES" see Beneficial Uses.
- (46) "WARM WATER BIOTA" means aquatic life normally found in waters where the summer weekly average temperature frequently exceeds 20 ° C.
- (47) "WATER QUALITY-BASED DESIGNATION" means a designation adopted by the Commission for specific state surface waters pursuant to section 31.8(2), to identify which level of water quality protection such waters will receive under the Antidegradation Rule in section 31.8(1). Such designations are adopted pursuant to the Commission's authority to classify state waters, as set forth in section 25-8-203, C.R.S., and the procedural requirements for classifying state waters shall be applied in adopting such designations.
- (48) "WATER EFFECT RATIO" means a ratio that is computed as a specific pollutant's acute or chronic toxicity value measured in water from the site covered by a standard, divided by the respective acute or chronic toxicity value in laboratory dilution water, as more specifically defined in 40 C.F.R. subsection 131.36(c) (1993).
- (49) "WATER QUALITY STANDARD" see Standard.
- (50) "WEEKLY AVERAGE TEMPERATURE (WAT)" means the average of daily average temperatures over a seven-day consecutive period, with a minimum of three data points spaced equally through each day. For lakes and reservoirs, the WAT is assumed to be equivalent to the average temperature of the mixed layer. The average temperature of the mixed layer is determined from a vertical profile of equally-spaced temperature measurements, separated by not more than one meter.
- (51) "WETLANDS" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

31.11 BASIC STANDARDS APPLICABLE TO SURFACE WATERS OF THE STATE

All surface waters of the state are subject to the following basic standards; however, discharge of substances regulated by permits which are within those permit limitations shall not be a basis for enforcement proceedings under these basic standards:

- (1) Except where authorized by permits, BMPs, 401 certifications, or plans of operation approved by the Division or other applicable agencies, state surface waters shall be free from substances attributable to human-caused point source or nonpoint source discharge in amounts, concentrations or combinations which:
- (a) for all surface waters except wetlands;

- (i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludges, mine slurry or tailings, silt, or mud; or
 - (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or
 - (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or
 - (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or
 - (v) produce a predominance of undesirable aquatic life; or
 - (vi) cause a film on the surface or produce a deposit on shorelines; and
- (b) for surface waters in wetlands;
- (i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or
 - (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.

(2) The radioactive materials in surface waters shall be maintained at the lowest practical level. In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted pursuant to subsection (4) below:

<u>Radionuclide Standards</u>	
<u>Parameter</u>	<u>Picocuries per Liter</u>
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Radionuclide samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values for both plutonium and americium.

(3) The interim organic pollutant standards contained in the following Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for which the corresponding use classifications have been adopted, unless alternative site-specific standards have been adopted pursuant to sub-section (4) below.

Note that all standards in the Basic Standards for Organic Chemicals Table are being adopted as "interim standards." These interim standards will remain in effect until alternative permanent standards are adopted by the Commission in revisions to this regulation or site-specific standards determinations. Although fully effective with respect to current regulatory applications, these

interim standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions.

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Acenaphthene	83-32-9	420	420	--- ¹⁰	1,700	520
Acetochlor	34256-82-1	140	---	---	---	---
Acetone	67-64-1	6300	---	---	---	---
Acrolein	107-02-8	3.5	3.5	9.3	68	21
Acrylamide ^{C, 13}	79-06-1	0.022	---	---	---	---
Acrylonitrile ^C	107-13-1	0.065	0.051	0.25	7,500	2,600
Alachlor	15972-60-8	2 ^M	2	140	---	---
Aldicarb	116-06-3	7 ^M	---	---	---	---
Aldicarb Sulfone	1646-88-4	7 ^M	---	---	---	---
Aldicarb Sulfoxide	1646-87-3	7 ^M	---	---	---	---
Aldrin ^C	309-00-2	0.0021	4.9X10 ⁻⁵	5.0X10 ⁻⁵	1.5	---
Aniline ^C	62-53-3	6.1	---	---	---	---
Anthracene (PAH)	120-12-7	2,100	2,100	40,000	---	---
Aramite ^C	140-57-8	1.4	---	---	---	---
Atrazine	1912-24-9	3 ^M	---	---	---	---
Azobenzene ^C	103-33-3	0.32	---	---	---	---
Benzene ^{C, 12}	71-43-2	2.3 to 5 ^M	2.2	51	5,300	---
Benzidine ^C	92-87-5	0.00015	8.6X10 ⁻⁵	0.00020	2,500	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Benzo(a)anthracene (PAH) ^{C, 13}	56-55-3	0.0048 <u>0.16</u>	0.00380 <u>0.0051</u>	0.0180 <u>0.0053</u>	---	---
Benzo(a)pyrene (PAH) ^{C, 12, 13}	50-32-8	0.0048 to 0.2^M <u>0.016</u>	0.00380 <u>0.00051</u>	0.000530 <u>0.018</u>	---	---
Benzo(b)fluoranthene (PAH) ^{C, 13}	205-99-2	0.0048 <u>0.16</u>	0.00510 <u>0.0038</u>	0.00530 <u>0.018</u>	---	---
Benzo(k)fluoranthene (PAH) ^{C, 13}	207-08-9	0.0048 <u>1.6</u>	0.0510 <u>0.0038</u>	0.0530 <u>0.018</u>	---	---
Benzo(g,h,i)perylene (PAH)	191-24-2	---	0.0038	0.018	---	---
Benzotrichloride ^C	98-07-7	0.0027	---	---	---	---
Benzyl chloride ^C	100-44-7	0.21	---	---	---	---
Biphenyl ^C	92-52-4	4.4	---	---	---	---
Bis(chloromethyl)ether (BCME) ^C	542-88-1	0.00016	0.0001	0.0003	---	---
Bromate ^C	15541-45-4	0.050	---	---	---	---
Bromobenzene	108-86-1	56	---	---	---	---
Bromodichloromethane (HM) ^C	75-27-4	---	0.55	17	11,000	---
Bromoform (HM) ^C	75-25-2	---	4.3	140	---	---
Butyl benzyl phthalate	85-68-7	1,400	1,400	1,900	---	---
Carbofuran ^{C, 12}	1563-66-2	35 to 40 ^M	---	---	---	---
Carbon tetrachloride ^{C, 12}	56-23-5	0.5 to 5 ^M	0.43	3.0	35,200	---
Chlordane ^{C, 12}	57-74-9	0.10 to 2 ^M	0.00080	0.00081	1.2	0.0043
Chlordecone ^C	143-50-0	0.0035	---	---	---	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Chlorethyl ether (BIS-2) ^C	111-44-4	0.032	0.030	0.53	---	---
Chlorobenzene ¹¹	108-90-7	100 ^M	100	1,600	---	---
Chlorodibromomethane (dibromochloromethane) (HM) ¹¹	124-48-1	---	54.0	1,700	---	---
Chloroform (HM) ^C	67-66-3	---	3.4	110	28,900	1,240
Chloroisopropyl ether(BIS-2)	108-60-1	280	280	65,000	---	---
4-Chloro-3-methylphenol	59-50-7	210	---	---	30	---
Chloronaphthalene	91-58-7	560	560	--- ¹⁰	2,300	620
Chlorophenol,2-	95-57-8	35	35	150	4,380	2,000
Chlorpyrifos Chlorphrifos	2921-88-2	21	---	---	0.083	0.041
Chrysene (PAH) ^{C,13}	218-01-9	0.004816	0.00380.51	0.0180.53	---	---
Dalapon	75-99-0	200^M	---	---	---	---
DDD ^C	72-54-8	0.15	0.00031	0.00031	0.6	---
DDE ^C	72-55-9	0.1	0.00022	0.00022	1,050	---
DDT ^C	50-29-3	0.1	0.00022	0.00022	0.55	0.001
Dalapon	75-99-0	200^M	---	---	---	---
Demeton	8065-48-3	---	---	---	---	0.1
Di(2-ethylhexyl)adipate	103-23-1	400^M	---	---	---	---
Diazinon	333-41-5	---	---	---	0.17	0.17

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Dibenzo(a,h)anthracene (PAH) ^{C,13}	53-70-3	0.00480.016	0.00380.00051	0.0180.00053	---	---
1,2 Dibromo-3-Chloropropane (DBCP) ^C	96-12-8	0.2 ^M	---	---	---	---
Dibromoethane 1,2 ^C	106-93-4	0.018	---	---	---	---
Dicamba	1918-00-9	210	170	860	---	---
Dichloroacetic acid ^C	79-43-6	0.7	---	---	---	---
Dichlorobenzene 1,2 ¹¹	95-50-1	600 ^M	420	1,300	---	---
Dichlorobenzene 1,3	541-73-1	94	94	960	---	---
Dichlorobenzene 1,4 ¹¹	106-46-7	75 ^M	63	190	---	---
Dichlorobenzidine ^C	91-94-1	0.078	0.021	0.028	---	---
Dichloroethane 1,2 ^{C, 12}	107-06-2	0.38 to 5 ^M	0.38	37	118,000	20,000
Dichloroethylene 1,1	75-35-4	7 ^M	7	3,600	---	---
Dichloroethylene 1,2-cis ¹²	156-59-2	14 to 70 ^M	---	---	---	---
Dichloroethylene 1,2-trans ¹¹	156-60-5	100 ^M	100	10,000	---	---
Dichloromethane (methylene chloride) ^{C, 13,12}	75-09-2	5 ^M	4.6	590	---	---
Dichlorophenol 2,4	120-83-2	21	21	290	2,020	365
Dichlorophenoxyacetic acid (2,4-D)	94-75-7	70 ^M	---	---	---	---
Dichloropropane 1,2 ^{C, 12}	78-87-5	0.52 to 5 ^M	0.50	14	23,000	5,700
Dichloropropylene 1,3 ^C	542-75-6	0.35	0.34	21	6,060	244

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Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Dichlorvos ^C	62-73-7	0.12	---	---	---	---
Dieldrin ^C	60-57-1	0.002	5.2X10 ⁻⁵	5.4X10 ⁻⁵	0.24	0.056
Diethyl phthalate	84-66-2	5,600	5,600	44,000	---	---
Diisopropylmethylphosphonate (DIMP)	1445-75-6	8	---	---	---	---
Dimethylphenol 2,4	105-67-9	140	140	850	2,120	---
Dimethyl phthalate	131-11-3	70,000	70,000	1,100,000	---	---
Di-n-butyl phthalate	84-74-2	700	700	4,500	---	---
<u>Dinitro-o-cresol 4,6</u>	<u>534-52-1</u>	<u>0.27</u>	<u>1.3</u>	<u>28</u>	<u>---</u>	<u>---</u>
Dinitrophenol 2,4	51-28-5	14	14	5,300	---	---
Dinitro-o-cresol 4,6	534-52-1	0.27	1.3	28	---	---
Dinitrotoluene 2,4 ^C	121-14-2	0.11	0.11	3.4	---	---
Dinitrotoluene 2,6 ^C	606-20-2	---	---	---	330	230
Dinoseb	88-85-7	7 ^M	---	---	---	---
Dioxane 1,4- ^C	123-91-1	0.35	---	---	---	---
Dioxin (2,3,7,8 TCDD) ^{C, 12}	1746-01-6	2.2x10 ⁻⁷ to 3.0x10 ^{-5, M}	5.0X10 ⁻⁹	5.1X10 ⁻⁹	0.01	0.00001
Diphenylhydrazine 1,2 ^C	122-66-7	0.044	0.036	0.20	270	---
Di(2-ethylhexyl)adipate	103-23-1	400^M	---	---	---	---
Diquat ¹²	85-00-7	15 to 20 ^M	---	---	---	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Endosulfan	115-29-7	42	--- ¹⁰	---	0.11	0.056
Endosulfan, alpha	959-98-8	42	--- ¹⁰	---	0.11	0.056
Endosulfan, beta	33213-65-9	42	--- ¹⁰	---	0.11	0.056
Endosulfan sulfate	1031-07-8	42	--- ¹⁰	---	0.11	0.056
Endothall	145-73-3	100 ^M	---	---	---	---
Endrin	72-20-8	2 ^M	---- ¹⁰	---	0.086	0.036
Endrin aldehyde	7421-93-4	2.1	0.29	0.30	---	---
Epichlorohydrin ^C	106-89-8	3.5	---	---	---	---
Ethylbenzene ¹¹	100-41-4	700 ^M	530	2,100	32,000	---
Ethylene dibromide ^{C, 12} (1,2 – dibromoethane)	106-93-4	0.02 to 0.05 ^M	---	---	---	---
Ethylene glycol monobutyl ether (EGBE) (2-Butoxyethanol)	111-76-2	700	---	---	---	---
Ethylhexyl phthalate (BIS-2) ^{C, 12} (DEHP)	117-81-7	2.5 to 6 ^M	1.2	2.2	---	---
Fluoranthene (PAH)	206-44-0	280	130	140	3,980	---
Fluorene (PAH)	86-73-7	280	280	5,300	---	---
Folpet ^C	133-07-3	10	---	---	---	---
Furmecyclo ^C	60568-05-0	1.2	---	---	---	---
Glyphosate	1071-83-6	700 ^M	---	---	---	---
Guthion	86-50-0	---	---	---	---	0.01

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Heptachlor ^{C, 12}	76-44-8	0.008 to 0.4 ^M	7.8X10 ⁻⁵	7.9X10 ⁻⁵	0.52	0.0038
Heptachlor epoxide ^{C, 12}	1024-57-3	0.004 to 0.2 ^M	3.9X10 ⁻⁵	3.9X10 ⁻⁵	0.52	0.0038
Hexachlorobenzene ^{C, 12}	118-74-1	0.022 to 1.0 ^M	0.00028	0.00029	---	---
Hexachlorobutadiene	87-68-3	0.45	0.44	--- ¹⁰	90	9.3
Hexachlorocyclohexane, Alpha ^C	319-84-6	0.0056	0.0026	0.0049	---	---
Hexachlorocyclohexane, Beta	319-85-7	0.019	0.0091	0.017	---	---
Hexachlorocyclohexane, Gamma (Lindane)	58-89-9	0.2 ^M	0.2	--- ¹⁰	0.95	0.08
Hexachlorocyclohexane, Technical ^C	608-73-1	---	0.012	0.041	100	---
Hexachlorocyclopentadiene ^{11, 12} (HCCPD)	77-47-4	42 to 50 ^M	40	--- ¹⁰	7	5
Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-hcdd) ^C	19408-74-3	5.60E-06	---	---	---	---
Hexachloroethane ^C	67-72-1	0.88	0.5	1.2	980	540
<u>Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)</u>	<u>121-82-4</u>	<u>0.42</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
Hexanone 2-	591-78-6	35	---	---	---	---
Hydrazine/Hydrazine sulfate ^C	302-01-2	0.012	---	---	---	---
Indeno(1,2,3-cd)pyrene (PAH) ^{C, 13}	193-39-5	<u>0.00480.16</u>	<u>0.00380.0051</u>	<u>0.0180.0053</u>	---	---
Isophorone ¹¹	78-59-1	140	130	3,600	---	---
Malathion	121-75-5	140	---	---	---	0.1

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Methanol	67-56-1	14,000	---	---	---	---
Methoxychlor ¹²	72-43-5	35 to 40 ^M	--- ¹⁰	---	---	0.03
Methyl bromide (HM)	74-83-9	---	9.8	1,500	---	---
Methyl chloride (HM) ^C	74-87-3	---	5.6	180	---	---
4,4 -Methylene bis-(N,N'-dimethyl)aniline 4,4 ^C	101-61-1	0.76	---	---	---	---
Metribuzin	21087-64-9	180	160	1,700	---	---
Mirex	2385-85-5	1.4	---	---	---	0.001
Naphthalene (PAH)	91-20-3	140	140	--- ¹⁰	2,300	620
Nitrobenzene	98-95-3	14	14	2,800	27,000	---
Nitrophenol 4	100-02-7	56	56	9,700	---	---
Nitrosodibutylamine N ^C	924-16-3	0.0065	0.0043	0.012	---	---
Nitrosodiethylamine N ^C	55-18-5	0.00023	0.00023	0.0083	---	---
Nitrosodimethylamine N ^C (NDMA)	62-75-9	0.00069	0.00069	3.0	---	---
N-Nitrosodiethanolamine ^C	1116-54-7	0.013	---	---	---	---
Nitrosodiphenylamine N ^C	86-30-6	7.1	3.3	6.0	---	---
N-Nitroso-N-methylethylamine ^C	10595-95-6	0.0016	---	---	---	---
<u>N-Nitrosodi-n-propylamine^C</u>	<u>621-64-7</u>	<u>0.005</u>	<u>0.005</u>	<u>0.50</u>	<u>---</u>	<u>---</u>
Nitrosopyrrolidine N ^C	930-55-2	0.017	0.016	36	---	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
N-Nitrosodi-n-propylamine ^C	621-64-7	0.005	0.005	0.50	---	---
Nonylphenol	84852-15-3 and 25154-52-3	---	---	---	28 (effective 1/1/2011)	6.6 (effective 1/1/2011)
Oxamyl (vydate) ¹²	23135-22-0	175 to 200 ^M	---	---	---	---
PCBs ^{C, 9, 12}	1336-36-3	0.0175 to 0.5 ^M	6.4X10 ⁻⁵	6.4X10 ⁻⁵	2.0	0.014
Parathion	56-38-2	---	---	---	0.065	0.013
Pentachlorobenzene	608-93-5	5.6	1.4	1.5	---	---
Pentachlorophenol ^{C, 12}	87-86-5	0.088 to 1.0 ^M	0.080	0.91	19 ⁶	15 ⁶
Perchlorate	7790-98-9	4.9	---	---	---	---
Phenol	108-95-2	2,100	2,100	--- ¹⁰	10,200	2,560
Picloram	1918-02-1	490	---	---	---	---
Prometon	1610-18-0	100	---	---	---	---
Propylene oxide ^C	75-56-9	0.15	---	---	---	---
Pyrene (PAH)	129-00-0	210	210	4,000	---	---
Quinoline ^C	91-22-5	0.012	---	---	---	---
Simazine	122-34-9	4 ^M	---	---	---	---
Styrene	100-42-5	100 ^M	---	---	---	---
Tetrachlorobenzene 1,2,4,5-	95-94-3	2.1	0.97	1.07	---	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Tetrachloroethane 1,1,2,2 ^C	79-34-5	0.18	0.17	4	---	2,400
Tetrachloroethylene (PCE) ^C	127-18-4	5 ^M	5	62	5,280	840
Tetrahydrofuran	109-99-9	6,300	---	---	---	---
Toluene ^{11, 12}	108-88-3	560 to 1,000 ^M	510	5,900	17,500	---
Toxaphene ^{C, 12}	8001-35-2	0.032 to 3 ^M	0.00028	--- ¹⁰	0.73	0.0002
Tributyltin (TBT)	56573-85-4	---	---	---	0.46	0.072
Trichloroacetic, Trichloroacetic acid	76-03-9	0.52	---	---	---	---
Trichlorobenzene 1,2,4- ¹¹	120-82-1	70 ^M	35	--- ¹⁰	250	50
Trichloroethane 1,1,1 (1,1,1-TCA)	71-55-6	200 ^M	---	---	---	---
Trichloroethane 1,1,2 (1,1,2-TCA) ^{11, 12}	79-00-5	2.8 to 5 ^M	2.7	71	9,400	---
Trichloroethylene (TCE) ^C	79-01-6	5 ^M	2.5	30	45,000	21,900
Trichloropropane 1,2,3- ^{C, 13}	96-18-4	3.7E-4	---	---	---	---
Trichlorophenol 2,4,5	95-95-4	700	700	3,600	---	---
Trichlorophenol 2,4,6 ^C	88-06-2	3.2	1.4	2.4	---	970
Trichlorophenoxypropionic acid (2,4,5-tp) (Silvex)	93-72-1	50 ^M	---	---	---	---
<u>Total Trihalomethanes (HMs)</u>	(total) ⁷	80	80	---	---	---
<u>Trimethylbenzene 1,2,3</u>	<u>526-73-8</u>	<u>67</u>	---	---	---	---

BASIC STANDARDS FOR ORGANIC CHEMICALS
(in micrograms per liter)

Parameter	CAS No.	Human Health Based ¹			Aquatic Life Based ⁴	
		Water Supply ²	Water+Fish ³	Fish Ingestion ⁸	Acute	Chronic
Trimethylbenzene 1,2,4	95-63-6	67	---	---	---	---
Trimethylbenzene 1,3,5	108-67-8	67	---	---	---	---
Vinyl Chloride ^{C, 12}	75-01-4	0.023 to 2 ^M	0.023	2.3	---	---
Xylenes (total) ¹²	1330-20-7	1,400 to 10,000 ^M	---	---	---	---

1 All standards are chronic or 30-day standards. They are based on information contained in EPA's Integrated Risk Information System (IRIS) and/or EPA lifetime health advisories for drinking water using a 10⁻⁶ incremental risk factor unless otherwise noted.

2 Only applicable to segments classified for water supply.

3 Applicable to all Class 1 aquatic life segments which also have a water supply classification or Class 2 aquatic life segments which also have a water supply classification designated by the Commission after rulemaking hearing. These class 2 segments will generally be those where fish of a catchable size and which are normally consumed are present, and where there is evidence that fishing takes place on a recurring basis. The Commission may also consider additional evidence that may be relevant to a determination whether the conditions applicable to a particular segment are similar enough to the assumptions underlying the water plus fish ingestion criteria to warrant the adoption of water plus fish ingestion standards for the segment in question.

4 Applicable to all aquatic life segments.

5 Deleted.

6 Standards are pH dependent. Those listed are calculated for pH = 7.8.

$$\text{Acute} = e^{[1.005(\text{pH})-4.869]}; \text{Chronic} = e^{[1.005(\text{pH})-5.134]}$$

7 Total trihalomethanes are considered the sum of the concentrations of bromodichloromethane (CAS No. 75-27-4), dibromochloromethane (Chlorodibromomethane(HM), CAS No. 124-48-1), tribromomethane (bromoform, CAS No. 75-25-2) and trichloromethane (chloroform, CAS No. 67-66-3).

8 Applicable to the following segments which do not have a water supply classification: all Class 1 aquatic life segments or Class 2 aquatic life segments designated by the Commission after rulemaking hearing. These class 2 segments will generally be those where fish of a catchable size and which are normally consumed are present, and where there is evidence that fishing takes place on a recurring basis. The Commission may also consider additional evidence that may be relevant to a determination whether the conditions applicable to a particular segment are similar enough to the assumptions underlying the fish ingestion criteria to warrant the adoption of fish ingestion standards for the segment in question.

9 PCBs are a class of chemicals which include aroclors, 1242, 1254, 1221, 1232, 1248, 1260 and 1016, CAS numbers 53469-21-9, 11097-69-1, 11104-28-2, 11141-16-5, 12672-29-6, 11096-82-5, and 12674-11-2 respectively. The aquatic life criteria apply to this set of PCBs. The human health criteria apply to total PCBs, i.e. the sum of all congener or all isomer analyses.

10 The chronic aquatic life standard is more stringent than the associated Water+Fish or Fish Ingestion standard, and therefore no Water+Fish or Fish Ingestion standard has been adopted.

11 The Water+Fish and Fish Ingestions standards for these compounds have been calculated using a relative source contribution (RSC).

12 Whenever a range of standards is listed and referenced to this footnote, the first number in the range is a strictly health-based value, based on the Commission's established methodology for human health-based standards. The second number in the range is a maximum contaminant level, established under the federal Safe Drinking Water Act that has been determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. Control requirements, such as discharge permit effluent limitations, shall be established using the first number in the range as the ambient water quality target, provided that no effluent limitation shall require an "end-of-pipe" discharge level more restrictive than the second number in the range. Water bodies will be considered in attainment of this standard, and not included on the Section 303(d) List, so long as the existing ambient quality does not exceed the second number in the range.

13 Mutagenic compound, age dependent factors were used in calculating standard.

C Carcinogens classified by the EPA as A, B1, or B2.

M Drinking water MCL.

CAS No. - Chemical Abstracts Service Registry Number.

(HM) – Halomethanes

(PAH) - Polynuclear Aromatic Hydrocarbons.

(4) Site-Specific Radioactive Materials and Organic Pollutants Standards.

- (a) In determining whether to adopt site-specific standards to apply in lieu of the statewide standards established in sections (2) and (3) above, the Commission shall first determine the appropriate use classifications, in accordance with section 31.13. If such a determination would result in removing an existing classification, the downgrading factors in section 31.6 (2)(B) shall apply.

- (b) The Commission shall then determine whether numerical standards other than some or all of the statewide standards established in sections (2) and (3) above would be more appropriate for protection of the classified uses, taking into account the factors prescribed in section 25-8-204(4), C.R.S. and in section 31.7. The downgrading factors described in section 31.6(2)(B) shall not apply to the establishment of site-specific standards under this section.
 - (c) Site-specific standards to apply in lieu of statewide standards may be based upon consideration of the appropriateness of the assumptions used in the risk assessment based potency factors and reference dose values, including, but not limited to, consideration of the uncertainty factor, exposure assessment, bioaccumulation factor, exposed population factor, assumed consumption factor, risk comparisons, uncertainty analysis, and the availability of the toxics in the water column, considering persistence, hardness, pH, temperature or valence form in the water column.
- (5) Nothing in this regulation shall be interpreted to preclude:
- (a) An agency responsible for implementation of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. 9601 et seq., as amended, from selecting a remedial action that is more or less stringent than would be achieved by compliance with the statewide numerical standards established in this section, or alternative site-specific standards adopted by the commission, where a determination is made that such a variation is authorized pursuant to the applicable provisions of CERCLA.
- (6) Except where the Commission adopts or has adopted a different standard on a site-specific basis, the less restrictive of the following two options shall apply as numerical standards for all surface waters with a “water supply” classification, if water supply is an actual use of the waters in question or of hydrologically connected ~~groundwater~~ground water:
- i. existing quality as of January 1, 2000; or
 - ii. the following table value criteria set forth in Tables II and III:
- | | |
|-----------|----------------------|
| Iron | 300 ug/l (dissolved) |
| Manganese | 50 ug/l (dissolved) |
| Sulfate | 250 mg/l |

Provided, that if the existing quality of these constituents in such surface waters as of January 1, 2000, is affected by an unauthorized discharge with respect to which the Division has undertaken an enforcement action, the numerical standards shall be the ambient conditions existing prior to the unauthorized discharge or the above table value criteria, whichever is less restrictive.

Data generated subsequent to January 1, 2000 shall be presumed to be representative of existing quality as of January 1, 2000, if the available information indicates that there have been no new or increased sources of these pollutants impacting the segment(s) in question subsequent to that date.

For all surface waters with a “water supply” classification that are not in actual use as a water supply, the water supply table value criteria for sulfate, iron and manganese set forth in Tables II and III may be applied as numerical standards only if the Commission determines as the result of a site-specific rulemaking hearing that such standards are necessary and appropriate in accordance with section 31.7.

- (7) Methylmercury Fish Tissue: Fish tissue concentrations shall not exceed 0.3 milligrams methylmercury per kilogram (0.3 mg/kg) of wet-weight fish tissue. Attainment of the standard will be assessed by comparing the average fish tissue methylmercury concentration for each species and size class to the 0.3 mg/kg standard.

31.13 STATE USE CLASSIFICATIONS

Waters are classified according to the uses for which they are presently suitable or intended to become suitable. In addition to the classifications, one or more of the qualifying designations described in section 31.13(2), may be appended. Classifications may be established for any state surface waters, except that water in ditches and other manmade conveyance structures shall not be classified.

(1) Classifications

(a) Recreation

(i) Class E Existing Primary Contact Use

These surface waters are used for primary contact recreation or have been used for such activities since November 28, 1975.

(ii) Class P - Potential Primary Contact Use

These surface waters have the potential to be used for primary contact recreation. This classification shall be assigned to water segments for which no use attainability analysis has been performed demonstrating that a recreation class N classification is appropriate, if a reasonable level of inquiry has failed to identify any existing primary contact uses of the water segment, or where the conclusion of a UAA is that primary contact uses may potentially occur in the segment, but there are no existing primary contact uses.

(iii) Class N - Not Primary Contact Use

These surface waters are not suitable or intended to become suitable for primary contact recreation uses. This classification shall be applied only where a use attainability analysis demonstrates that there is not a reasonable likelihood that primary contact uses will occur in the water segment(s) in question within the next 20-year period.

(v) Class U - Undetermined Use

These are surface waters whose quality is to be protected at the same level as existing primary contact use waters, but for which there has not been a reasonable level of inquiry about existing recreational uses and no recreation use attainability analysis has been completed. This shall be the default classification until inquiry or analysis demonstrates that another classification is appropriate.

(b) Agriculture

These surface waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock.

(c) Aquatic Life

These surface waters presently support aquatic life uses as described below, or such uses may reasonably be expected in the future due to the suitability of present conditions, or the waters are intended to become suitable for such uses as a goal:

(i) Class I - Cold Water Aquatic Life

These are waters that (1) currently are capable of sustaining a wide variety of cold water biota, including sensitive species, or (2) could sustain such biota but for correctable water quality conditions. Waters shall be considered capable of sustaining such biota where physical habitat, water flows or levels, and water quality conditions result in no substantial impairment of the abundance and diversity of species.

(ii) Class 1 - Warm Water Aquatic Life

These are waters that (1) currently are capable of sustaining a wide variety of warm water biota, including sensitive species, or (2) could sustain such biota but for correctable water quality conditions. Waters shall be considered capable of sustaining such biota where physical habitat, water flows or levels, and water quality conditions result in no substantial impairment of the abundance and diversity of species.

(iii) Class 2- Cold and Warm Water Aquatic Life

These are waters that are not capable of sustaining a wide variety of cold or warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

(d) Domestic Water Supply

These surface waters are suitable or intended to become suitable for potable water supplies. After receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent) these waters will meet Colorado drinking water regulations and any revisions, amendments, or supplements thereto.

(i) Direct Use Water Supply Lakes and Reservoirs Sub-classification

(A) For the purpose of this section, "plant intake" means the works or structures at the head of a conduit through which surface water is diverted from a source (e.g., lake) into the treatment plant.

(B) Direct Use Water Supply Lakes and Reservoirs (DUWS) are those water supply lakes and reservoirs where:

(I) There is a plant intake located in the lake or reservoir or a man-made conveyance from the lake or reservoir that is used regularly to provide raw water directly to a water treatment plant that treats and disinfects raw water, or

(II) The Commission, based on evidence in the record, determines that the reservoir will meet the criteria in 31.13(1)(d)(i)(B)(I) in the future.

(e) Wetlands

(i) The provisions of this section do not apply to constructed wetlands.

- (ii) Compensatory wetlands shall have, as a minimum, the classifications of the segment in which they are located.
- (iii) Created wetlands shall be considered to be initially unclassified, and shall be subject only to the narrative standards set forth in section 31.11, unless and until the Commission adopts the “wetlands” classification described below and appropriate numeric standards for such wetlands.
- (iv) Tributary wetlands shall be considered tributaries of the surface water segment to which they are most directly connected and shall be subject to interim classifications as follows: such wetlands shall be considered to have the same classifications, except for drinking water supply classifications, as the segment of which they are a part, unless the “wetlands” classification and appropriate site-specific standards have been adopted to protect the water quality dependent functions of the wetlands. Interim numeric standards for these wetlands are described in section 31.7(1)(b)(iv).
- (v) The Commission may adopt a “wetlands” classification based on the functions of the wetlands in question. Wetland functions that may warrant site-specific protection include ~~groundwater~~ground water recharge or discharge, flood flow alteration, sediment stabilization, sediment or other pollutant retention, nutrient removal or transformation, biological diversity or uniqueness, wildlife diversity or abundance, aquatic life diversity or abundance, and recreation. Because some wetland functions may be mutually exclusive (e.g., wildlife abundance, recreation), the functions to be protected or restored will be determined on a wetland-by-wetland basis, considering natural wetland characteristics and overall benefits to the watershed. The initial adoption of a site-specific wetlands classification and related standards to replace the interim classifications and standards described above shall not be considered a downgrading.

(2) Qualifiers

The following qualifiers may be appended to any classification to indicate special considerations. Where a qualifier applies, it will be appended to the use classification; for example, “Class 1, Warm Water Aquatic Life (Goal)”.

(a) Goal

A qualifier which indicates that the waters are presently not fully suitable but are intended to become fully suitable for the classified use. “Goal” will be used to indicate that a temporary modification for one or more of the underlying numeric standards has been granted.

(b) Seasonal

A qualifier which indicates that the water may only be suitable for a classified use during certain periods of the year. During those periods when water is in the stream, the standards as defined in sections 31.7(1)(b) and 31.9(1) shall apply.

(c) Interrupted Flow

A qualifier which indicates that due to natural or human induced conditions the continuity of flow is broken not necessarily according to a seasonal schedule. This qualifier appended to a classification indicates that the flow conditions still permit the classified use during period of flow. The presence of water diversions in a stream does not change the classifications and standards and the standards do not require that flow be maintained in the stream.

(3) Areas Requiring Special Protection

In special cases where protection of beneficial uses requires standards not provided by the classification above, special standards may be assigned after full public notice and hearings. Cases where special protection may be needed include but are not limited to wildlife preserves and waterbodies endangered by eutrophication. In addition, the Commission may adopt site-specific criteria-based standards based on site-specific analyses to protect agriculture, water supply or recreational uses.

31.16 TABLES

(1) INTRODUCTION

The numeric levels for parameters listed in Tables I, II, III shall be considered and applied as appropriate by the Commission in establishing site-specific numeric standards, in accordance with section 31.7.

For the purposes of integrating these parameters into NPDES discharge permits, the duration of the averaging period for the numeric level is designated in the tables. Chronic levels and 30-day levels are to be averaged as defined in section 31.5(7). Acute levels and 1-day levels are to be averaged as defined in section 31.5(2).

Certain toxic metals for Aquatic Life have different numeric levels for different levels of water hardness. Water hardness is being used here as an indication of differences in the complexing capacity of natural waters and the corresponding variation of metal toxicity. Other factors such as organic and inorganic ligands, pH, and other factors affecting the complexing capacity of the waters may be considered in setting site-specific numeric standards in accordance with section 31.7. Metals listed in Table III for aquatic life uses are stated in the dissolved form unless otherwise indicated.

(2) TESTING PROCEDURES

Various testing procedures to determine that numeric values for water quality parameters may be appropriate to present to the Water Quality Control Commission at stream classification hearings. (See section 31.6(3)). These include:

- (a) Standard Test Procedures
 - (i) Code of Federal Regulations, Title 40, Part 136;
 - (ii) The latest approved EPA Methods for Chemical Analysis of Water and Wastes;
 - (iii) Standard Methods for the Examination of Water and Wastewater (current edition), American Public Health Association;
 - (iv) ASTM Standards, Part 31, Water;
 - (v) EPA Biological Field and Laboratory Methods.
- (b) Toxicity testing and Criteria Development Procedures:
 - (i) The latest EPA Methods for Chemical Analysis of Water and Wastewater; ASTM, Standard Methods for Examination of Water, Wastewater;
 - (ii) Interim Guidance on Determination and Use of Water-Effect Ratio for Metals, EPA-823-B-94-001, U.S. Environmental Protection Agency, February, 1994.
 - (iii) Other approved EPA methods.

(c) Other Procedures:

Other procedures may be deemed appropriate by either the Water Quality Control Commission and/or the Water Quality Control Division.

(3) REFERENCES

Capital letters following levels in the tables indicate the sources of the level; they are referenced below. In some cases, the source is described in a footnote.

- (A) EPA Quality Criteria for Water, July 1976, U.S. Environmental Protection Agency, U.S. Government Printing Office: 1977 0-222-904, Washington, D.C. 256 p.
- (B) EPA - Water Quality Criteria 1972, Ecological Research Series, National Academy of Sciences, National Academy of Engineering, EPA-R3-73-033, March 1973, Washington, D.C. 594 p.
- (C) Davies, P.H. and Goettl, J.P., Jr., July 1976, Aquatic Life - Water Quality Recommendations for Heavy Metal and Other Inorganics.
- (D) Parametrix Inc., Attachment II, Parametrix Reports - Toxicology Assessments of As, Cu, Fe, Mn, Se, and Zn, May 1976, Bellevue, Washington, 98005. submitted to Water Quality Control Commission by Gulf Oil Corp., Inc., 161 p.
- (E) EPA National Interim Primary Drinking Water Regulations, 40 Code of Federal Regulations, Part 141.
- (F) EPA, March 1977, Proposed National Secondary Drinking Water Regulation, Federal Register, Vol. 42 No. 62, pp 17143-17147.
- (G) Recommendations based on review of all available information by the Committee on Water Quality Standards and Stream Classification.
- (H) American Fishery Society, June 1978, A Review of the EPA Red Book Quality Criteria for Water, (Preliminary Edition).
- (I) Section 307 of the Clean Water Act, regulations promulgated pursuant to Section 307.
- (J) Final Report of the Water Quality Standards and Methodologies Committee to the Colorado Water Quality Control Commission, June 1986.
- (K) Proposed Nitrogenous Water Quality Standards for the State of Colorado, by the Nitrogen Cycle Committee of the Basic Standards Review Task Force, March 12, 1986 (Final Draft).
- (L) Quality Criteria for Water, 1986, and Updates Through 1989, U.S. Environmental Protection Agency, U.S. Government Printing Office, EPA 440/5-86-001, Washington, D.C. 20460.
- (M) m superscript: level modified by Commission
- (N) 1999 Update of Ambient Water Quality Criteria for Ammonia (1999 Ammonia Update), U.S. Environmental Protection Agency, Office of Water, EPA-823-F-99-024, Washington, D.C. 20460.
- (O) Raisbeck, M.F., S. L. Riker, C. M. Tate, R. Jackson, M. A. Smith, K. J. Reddy and J. R. Zygmunt. 2008. Water quality for Wyoming livestock and wildlife. University of Wyoming AES Bulletin B-1183.

TABLE I - PHYSICAL AND BIOLOGICAL PARAMETERS

TABLE I PHYSICAL AND BIOLOGICAL PARAMETERS								
Parameter	Recreational			Aquatic Life			Agriculture	Domestic Water Supply
	CLASS E (Existing Primary Contact) and CLASS U (Undetermined Use)	CLASS P (Potential Primary Contact Use)	CLASS N (Not Primary Contact Use)	CLASS 1 COLD WATER BIOTA	CLASS 1 WARM WATER BIOTA	CLASS 2		
PHYSICAL								
D.O. (mg/l) ⁽¹⁾⁽⁹⁾	3.0(A)	3.0(A)	3.0(A)	6.0 ⁽²⁾ (G) 7.0(spawning)	5.0 ⁽²⁾ (G)	5.0(A)	3.0(A)	3.0(A)
pH (Std. Units) ⁽³⁾	6.5–9.0 (Bm)	6.5–9.0 (Bm)	6.5–9.0 (Bm)	6.5–9.0(A)	6.5–9.0(A)	6.5–9.0(A)		5.0–9.0(A)
Suspended Solids ⁽⁴⁾								
Temperature (°C) ⁽⁵⁾				Rivers & Streams: Tier I^{a,g}: June-Sept = 17.0 (ch), 21.7 (ac) Oct–May = 9.0 (ch), 13.0 (ac) Tier II^{b,g}: Apr-Oct = 18.3 (ch), 24.3 (ac) Nov-Mar = 9.0 (ch), 13.0 (ac) Lakes & Res^h: Apr-Dec = 17.0 (ch), 21.2 (ac) Jan-Mar = 9.0 (ch), 13.0 (ac) Large Lakes & Res^{c,h}: Apr-Dec = 18.3 (ch), 24.2 (ac) Jan-Mar = 9.0 (ch), 13.0 (ac)	Rivers & Streams: Tier I^d: Mar-Nov = 24.2 (ch), 29.0 (ac) Dec-Feb = 12.1 (ch), 24.6 (ac) Tier II^e: Mar-Nov = 27.5 (ch), 28.6 (ac) Dec-Feb = 13.8 (ch), 25.2 (ac) Tier III^f: Mar-Nov = 28.7 (ch), 31.8 (ac) Dec-Feb = 14.3 (ch), 24.9 (ac) Lakes & Res: Apr-Dec = 26.2 (ch), 29.3 (ac) Jan-Mar = 13.1 (ch), 24.1 (ac)	Same as Class 1		
BIOLOGICAL:								
<i>E. coli</i> per 100 ml	126 ⁽⁷⁾	205 ⁽⁷⁾	630 ⁽⁷⁾					630
Note: Capital letters in parentheses refer to references listed in section 31.16(3); Numbers in parentheses refer to Table 1 footnotes.								
Temperature Definitions ^a Cold Stream Tier I temperature criteria apply where cutthroat trout and brook trout are expected to occur. ^b Cold Stream Tier II temperature criteria apply where cold-water aquatic species, excluding cutthroat trout or brook trout, are expected to occur. ^c Large Cold Lakes temperature criteria apply to lakes and reservoirs with a surface area equal to or greater than 100 acres surface area. ^d Warm Stream Tier I temperature criteria apply where common shiner, johnny darter, or orangethroat darter, or stonecat are expected to occur. ^e Warm Stream Tier II temperature criteria apply where brook stickleback, central stoneroller, creek chub, finescale dace, longnose dace, mountain sucker, northern redbelly dace, razorback sucker, or white sucker are expected occur, and none of the more thermally sensitive species in Tier I are expected to occur. ^f Warm Stream Tier III temperature criteria apply where warm-water aquatic species are expected to occur, and none of the more thermally sensitive species in Tiers I and II are expected to occur. ^g Mountain whitefish-based summer temperature criteria [16.9 (ch), 21.2 (ac)] apply when and where spawning and sensitive early life stages of this species are known to occur. ^h Lake trout-based summer temperature criteria [16.6 (ch), 22.4 (ac)] apply where appropriate and necessary to protect lake trout from thermal impacts.								

Table I – Footnotes

- (1) Standards for dissolved oxygen are minima, unless specified otherwise. For the purposes of permitting, dissolved oxygen may be modeled for average conditions of temperature and flow for the worst case time period. Where dissolved oxygen levels less than these levels occur naturally, a discharge shall not cause a further reduction in dissolved oxygen in receiving water. (For lakes, also see footnote 9.)
- (2) A 7.0 mg/liter standard (minimum), during periods of spawning of cold water fish, shall be set on a case by case basis as defined in the NPDES or CDPS permit for those dischargers whose effluent would affect fish spawning.
- (3) The pH standards of 6.5 (or 5.0) and 9.0 are an instantaneous minimum and maximum, respectively to be applied as effluent limits. In determining instream attainment of water quality standards for pH, appropriate averaging periods may be applied, provided that beneficial uses will be fully protected.
- (4) Suspended solid levels will be controlled by Effluent Limitation Regulations, Basic Standards, and Best Management Practices (BMPs).
- (5) Temperature shall maintain a normal pattern of diel and seasonal fluctuations and spatial diversity with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deleterious to the resident aquatic life. These criteria shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.
 - a. The MWAT of a waterbody shall not exceed the chronic temperature criterion more frequently than one event in three years on average.
 - b. The DM of a waterbody shall not exceed the acute temperature criterion more frequently than one event in three years on average.
 - c. The following shall not be considered an exceedance of the criteria:
 - i. Air temperature excursion: ambient water temperature may exceed the criteria in Table 1 or the applicable site-specific standard when the daily maximum air temperature exceeds the 90th percentile value of the monthly maximum air temperatures calculated using at least 10 years of air temperature data.
 - ii. Low-flow excursion: ambient water temperature may exceed the criteria in Table 1 or the applicable site-specific standard when the daily stream flow falls below the acute critical low flow or monthly average stream flow falls below the chronic critical low flow, calculated pursuant to Regulation 31.9(1)
 - iii. Winter shoulder-season excursion: For the purposes of assessment, ambient water temperatures in cold streams may exceed the winter criteria in Table 1 or applicable site-specific winter standard for 30-days before the winter/summer transition, and 30-days after the summer/winter transition, provided that the natural seasonal progression of temperature is maintained and that temperature exceedances during these periods are not the result of anthropogenic activities in the watershed.
- (6) Deleted

- (7) *E.coli* criteria and resulting standards for individual water segments, are established as indicators of the potential presence of pathogenic organisms. Standards for *E. coli* are expressed as a two-month geometric mean. Site-specific or seasonal standards are also two-month geometric means unless otherwise specified.
- (8) Deleted
- (9) The dissolved oxygen standard applies to lakes and reservoirs as follows.
- a. Recreation: In the upper portion of a lake or reservoir, dissolved oxygen shall not be less than the criteria in Table 1 or the applicable site-specific standard. In the lower portion of a lake or reservoir, dissolved oxygen may be less than the applicable standard except where a site-specific standard has been adopted. A site-specific dissolved oxygen standard will be established for the lower portion of a lake or reservoir where there is evidence that primary contact occurs within the lower portion.
 - b. Agriculture: In the upper portion of a lake or reservoir, dissolved oxygen shall not be less than the criteria in Table 1 or the applicable site-specific standard. In the lower portion of a lake or reservoir, dissolved oxygen may be less than the applicable standard except where a site-specific standard has been adopted. A site-specific dissolved oxygen standard will be established for the lower portion of a lake or reservoir where there is evidence that livestock watering or irrigation water is pumped from the lower portion.
 - c. Aquatic Life: In the upper portion of a lake or reservoir, dissolved oxygen shall not be less than the criteria in Table I or the applicable site-specific standard. In the lower portion of a lake or reservoir, dissolved oxygen may be less than the applicable standard as long as there is adequate refuge. Adequate refuge means that there is concurrent attainment of the applicable Table I temperature and dissolved oxygen criteria. A site-specific dissolved oxygen standard will be established for the lower portion of a lake or reservoir where the expected aquatic community has habitat requirements within the lower portion.
 - i. Fall turnover exclusion: Dissolved oxygen may drop 1 mg/l below the criteria in Table 1 in the upper portion of a lake or reservoir for up to seven consecutive days during fall turnover provided that profile measurements are taken at a consistent location within the lake or reservoir 7-days before, and 7-days after the profile with low dissolved oxygen. The profile measurements taken before and after the profile with low dissolved oxygen must attain the criteria in Table 1 in the upper portion of the lake or reservoir. The fall turnover exclusion does not apply to lakes or reservoirs with fish species that spawn in the fall unless there are data to show that adequate dissolved oxygen is maintained in all spawning areas, for the entire duration of fall turnover.
 - d. Water Supply: The dissolved oxygen criteria is intended to apply to the epilimnion and metalimnion strata of lakes and reservoirs. Dissolved oxygen in the hypolimnion may, due to the natural conditions, be less than the table criteria. No reductions in dissolved oxygen levels due to controllable sources is allowed.

TABLE II - INORGANIC PARAMETERS

TABLE II INORGANIC PARAMETERS							
PARAMETER	AQUATIC LIFE				AGRICULTURE	DOMESTIC WATER SUPPLY	
	CLASS 1 Cold Water Biota		CLASS 1 Warm Water Biota		CLASS 2		
INORGANICS:							
Ammonia (mg/l as N) Total	chronic = elsp or elsa ⁽¹⁾ acute = sp ⁽¹⁾ (N)		chronic = Apr 1-Aug 31=elsp ⁽¹⁾ Sept 1-Mar 29=elsa ⁽¹⁾ acute = sa ⁽¹⁾ (N)		Class 2 Cold/Warm have the same standards as Class 1 Cold/Warm (N)		
Total residual Chlorine (mg/l)	0.019 (L) (1-day)	0.011 (L) (30-day)	0.019 (L) (1-day)	0.011 (L) (30-day)	0.019 (L) (1-day)	0.011 (L) (30-day)	
Cyanide - Free (mg/l)	0.005(H) (1-day)		0.005(H) (1-day)		0.005(H) (1-day)		0.2(G) (1-day)
Fluoride (mg/l)							2.0 ⁽³⁾ (E) (1-day)
Nitrate (mg/l as N)					100 ⁽²⁾ (B)		10 ⁽⁴⁾ (K) (1-day)
Nitrite (mg/l as N)	TO BE ESTABLISHED ON A CASE BY CASE BASIS ⁽³⁾				A CASE BY CASE BASIS ⁽³⁾		10 ⁽²⁾ (B) (1-day)
Sulfide as H ₂ S (mg/l)	0.002 undissociated(A) (30-day)		0.002 undissociated(A) (30-day)		0.002 undissociated(A) (30-day)		0.05(F) (30-day)
Boron (mg/l)							0.75(A,B) (30-day)
Chloride (mg/l)							250(F) (30-day)
Sulfate (mg/l)							250(F) (30-day)
Asbestos							7,000,000 fibers/L ⁽⁵⁾
NOTE: Capital letters in parentheses refer to references listed 31.16(3); numbers in parentheses refer to table II footnotes.							

Table II – Footnotes

(1)

Chronic:

For Fish Early Life Stage Present (elsp):

$$chronic\ elsp = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * MIN \left(2.85, 1.45 * 10^{0.028(25 - T)} \right)$$

For Fish Early Life Stage Absent (elsa):

$$chronic\ elsa = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * 1.45 * 10^{0.028 * (25 - MAX(T, 7))}$$

Acute:

For salmonids present (sp):

$$acute\ sp = \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

For salmonids absent (sa):

$$acute\ sa = \frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH - 7.204}}$$

(2) In order to provide a reasonable margin of safety to allow for unusual situations such as extremely high water ingestion or nitrite formation in slurries, the NO₃-N plus NO₂-N content in drinking waters for livestock and poultry should be limited to 100ppm or less, and the NO₂-N content alone be limited to 10ppm or less.

(3) Salmonids and other sensitive fish species present:

$$Acute = 0.10 (0.59 * [Cl^-] + 3.90) \text{ mg/l NO}_2\text{-N}$$

$$Chronic = 0.10 (0.29 * [Cl^-] + 0.53) \text{ mg/l NO}_2\text{-N}$$

(upper limit for Cl⁻ = 40 mg/l)

Salmonids and other sensitive fish species absent:

$$Acute = 0.20 (2.00 * [Cl^-] + 0.73) \text{ mg/l NO}_2\text{-N}$$

$$Chronic = 0.10 (2.00 * [Cl^-] + 0.73) \text{ mg/l NO}_2\text{-N}$$

[Cl⁻] = Chloride ion concentration

(upper limit for Cl⁻ = 22 mg/l)

- (4) The nitrate limit shall be calculated to meet the relevant standard in accordance with the provisions of Section 31.10 of this regulation, unless (this subsection 4 is repealed effective 12/31/2022):
- a. The permittee provides documentation that a reasonable level of inquiry demonstrates that there is no actual domestic water supply use of the waters in question or of hydrologically connected ~~groundwater~~ground-water, or
 - b. The combined total of nitrate plus nitrite at the point of intake to the domestic water supply will not exceed 10 mg/l as demonstrated through modeling or other scientifically supportable analysis
- (5) Asbestos standard applies to fibers 10 micrometers or longer.

31.57 STATEMENT OF BASIS SPECIFIC STATUTORY AUTHORITY AND PURPOSE; APRIL 13, 2020 RULEMAKING; FINAL ACTION MAY 11, 2020; EFFECTIVE DATE JUNE 30, 2020

The provisions of C.R.S. 25-8-202(1)(a), (b) and (2); 25-8-203; 25-8-204; and 25-8-402; provide the specific statutory authority for adoption of these regulatory amendments. The commission also adopted, in compliance with 24-4-103(4) C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

In this rulemaking the commission considered revisions to criteria and revisions to division point of compliance provisions. The commission adopted changes as detailed below.

I. Statewide Standards - Interim Organic Pollutant Standards

The commission adopted revised and new organic chemical standards in section 31.11. In an effort to keep surface water and groundwater organic chemical standards consistent, the changes to section 31.11 were also adopted for the statewide groundwater organic chemical standards in Regulation No. 41 (41.5(C)(3)).

In adopting these new and revised organic chemical standards, the commission continued to rely on its past policy decisions and precedence documented in Commission Policy 96-2, along with best science practices set forth in the CWA § 304(a) criteria development method. As per Departmental policy, the commission has relied on the United States Environmental Protection Agency's (EPA) Integrated Risk Information System (IRIS) as its first tier source of toxicological data. Review of the IRIS data that had been updated since the last revisions to 31.11 indicated adoption of standards for four new chemicals (hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), CAS 121-82-4; 1,2,3-trimethylbenzene, CAS 526-73-8; 1,2,4-trimethylbenzene, CAS 95-63-6; and 1,3,5-trimethylbenzene, CAS 108-67-8) were necessary. Additionally, the water quality standards for benzo(a)pyrene (BaP), CAS 50-32-8 and related chemicals [benzo(a)anthracene, CAS 56-55-3; benzo(b)fluoranthene, CAS 205-99-2; benzo(k)fluoranthene, CAS 207-08-9; chrysene, CAS 218-01-9; dibenzo(a,h)anthracene, CAS 53-70-3; and indeno(1,2,3-cd)pyrene, CAS 193-39-5], needed to be revised. Water quality standards for RDX and the three trimethylbenzenes use the updated exposure factors of a mean adult (21 years and older) body weight of 80 kilograms and a drinking water ingestion rate of 2.4 liters per day. Use of these updated exposure factors relies on more recent exposure data than those used to derive the exposure factors in the commission Policy 96-2. Policy 96-2 is a retrospective policy and will be updated accordingly to reflect the updated exposure factors at the time of the next review. Though, this will create misalignment with the exposure factors used previously to derive existing organic chemical standards in Regulation No. 31, the division will work towards bringing previous standards up-to-date as well, as resources to do so become available. Additional details regarding aspects of these standards revisions are provided below.

A. Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), CAS 121-82-4

RDX is characterized in IRIS with the cancer descriptor “Suggestive evidence of carcinogenic potential” per EPA 2005 guidelines. This designation is comparable to the cancer group designation of “C – Possible human carcinogen” from the 1986 EPA guidelines. Per Policy 96-2: “for Group C compounds that have both carcinogenic (cancer slope) and toxic (reference dose) data the Commission decided, in accordance with their past practice, to base the standards for these compounds on the reference dose approach, but to adjust the resulting standard with an uncertainty factor of 10 to account for any unknown carcinogenic effects.” However, this approach is not aligned with best science practices set forth in the CWA § 304(a) criteria development method for these types of chemicals, under which both cancer-based and non-cancer-based water quality standards would be calculated and the lower of the two standards selected for use protection. Therefore, the commission adopted the proposed calculation of the RDX Water Supply standard, which uses the lower, cancer-based water quality standard of 0.42 µg/L, based on the IRIS cancer slope factor of 0.008 per mg/kg-day. This approach follows the more protective, 304(a)-compliant approach of selecting the lower of the two calculated standards (cancer-based or non-cancer-based). Derivation of previous standards for “Group C carcinogens” has not been consistent; therefore, the division will, ongoing, follow the practices set forth in the CWA § 304(a) criteria development method for these types of chemicals. The division will also work towards bringing previous standards up-to-date, as resources to do so become available.

The Water Supply standard uses most of the default exposure assumptions from Policy 96-2, along with updated exposure factors of a mean adult (21 years and older) body weight of 80 kilograms and a drinking water ingestion rate of 2.4 liters per day, as discussed above. There are no EPA human health ambient water quality criteria (HHAWQC) available for RDX, which would help inform development of Water +Fish and Fish Ingestion standards for RDX. Furthermore, based on available physical and chemical data available for RDX, this chemical is not likely to bioaccumulate. Therefore, the commission did not adopt Water+Fish or Fish Ingestion standards for RDX at this time.

B. Trimethylbenzenes

The commission adopted new Water Supply standards for 1,2,3-trimethylbenzene, CAS 526-73-8; 1,2,4-trimethylbenzene, CAS 95-63-6; and 1,3,5-trimethylbenzene, CAS 108-67-8, calculated using the non-cancer equations and most of the default exposure assumptions from Policy 96-2 in combination with the RfD of 0.01 mg/kg-day from IRIS. The Water Supply standards use updated exposure factors of a mean adult (21 years and older) body weight of 80 kilograms and a drinking water ingestion rate of 2.4 liters per day, as discussed above. The calculations resulted in Water Supply standards of 67 µg/L. The commission did not adopt Water+Fish or Fish Ingestion standards for these trimethylbenzenes because there are no EPA HHAWQC available for these chemicals. Furthermore, as documented in the 2016 IRIS assessment for these chemicals, the estimated bioconcentration factors (133–439) and high volatility of trimethylbenzenes suggest that bioaccumulation of these chemicals will not be significant.

C. Benzo(a)pyrene (BaP), CAS 50-32-8 and related chemicals

The commission adopted revised Water Supply, Water + Fish, and Fish Ingestion standards for BaP based on updates to the EPA IRIS assessment. In addition to providing an updated cancer slope factor, the IRIS assessment identified BaP as a mutagen. Therefore, the standards adopted by the commission were calculated using age dependent factors, following EPA 2005 guidance on risk assessment for mutagenic compounds and Minnesota’s Human Health-based Water Quality Standards Technical Support Document, in combination with the default Incremental Lifetime Cancer Risk of 1E-06 from Policy 96-2, the oral cancer slope factor of 1 per mg/kg-day from IRIS, and a bioaccumulation factor of 3900 L/kg from EPA’s human health ambient water quality criteria. Age-bracketed upper 90th percentile, per capita, combined direct and indirect,

water ingestion rates for community water sources from Table 3-13 of the 2019 revision to the Exposure Factors Handbook were used to derive the Water Supply and Water + Fish standards. Age-bracketed upper 90th percentiles for consumption of finfish and shellfish, fresh and estuarine (but not marine species), raw weight, and only the edible portion from Tables 9a (adults) and 20a (youth) of the EPA's "Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010) were used to derive the Water + Fish and Fish Ingestion standards. The mutagenicity calculations required for the PAH water quality standards require fish consumption rates to be expressed on a body weight basis. Therefore, the age-bracketed body weights from Table 8-1 of the 2011 EPA Exposure Factors Handbook were used in combination with the fish consumption rate data.

Previously, water quality standards of several related polycyclic aromatic hydrocarbons (PAHs) [benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene] were set equal to those for BaP; therefore, the Water Supply, Water + Fish, and Fish Ingestion standards for these PAHs were also revised. Table 1 summarizes the revised standards for BaP and the other, related PAHs adopted by the commission. The commission adopted revised standards for these PAHs calculated by applying the estimated order of potential potency (EOPP) factor, for each chemical relative to BaP, presented in EPA's 1993 Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. In this approach, the potencies of other PAHs relative to benzo(a)pyrene are determined. These EOPP factors were applied using the revised cancer slope factor for BaP from IRIS and using age dependent factors appropriate for use with mutagenic chemicals. Treatment of the related PAHs as mutagens, based on that determination for BaP, is consistent with the approach described in EPA's 1993 guidance. Footnote 13 was added to indicate that BaP and related PAH standards were calculated as mutagens. In 2010 EPA provided a draft of updated guidance, which applied new relative potency factors (RPFs). However, since the guidance was never finalized, the new RPFs are widely not used throughout EPA risk assessment framework, and are thus not used for the derivation of the revised water quality standards.

Parameter	CAS no.	Water Supply Standard (µg/L)	Water +Fish Standard (µg/L)	Fish Ingestion Standard (µg/L)
benzo(a)anthracene	56-55-3	0.16	0.0051	0.0053
benzo(a)pyrene	50-32-8	0.016	0.00051	0.00053
benzo(b)fluoranthene	205-99-2	0.16	0.0051	0.0053
benzo(k)fluoranthene	207-08-9	1.6	0.051	0.053
chrysene	218-01-9	16	0.51	0.53
dibenzo(a,h)anthracene	53-70-3	0.016	0.00051	0.00053
indeno(1,2,3-cd)pyrene	193-39-5	0.16	0.0051	0.0053

Previous to revision, the Water Supply standard for BaP adopted by the commission was a hybrid standard that ranged from the concentration protective of human-health to the drinking water maximum contaminant level (MCL). The hybrid standard approach was adopted in the 2004 rulemaking in response to ongoing debate dating back to 1989 about whether standards for parameters with MCLs should be based on the MCLs or purely health-based numbers. The arguments for MCLs focused on whether it is reasonable to require surface water remediation to a level below that required for drinking water. The arguments for health-based standards focused on maximizing human-health protection, putting the clean-up burden on pollution sources, and protection of surface water as a resource. In response, the commission adopted a hybrid standard approach that provided much of the benefits advocated for each of the above options. This hybrid approach had the intention to allow for existing contamination to be addressed at

levels that are deemed acceptable according to the Safe Drinking Water Act, but allowed for the protection of surface water as a resource by implementing a more protective human-health health based standard for future contamination.

There are more appropriate alternative regulatory pathways, such as variances, through which dischargers can seek regulatory relief. Furthermore, recent litigation in Idaho has resulted from attempts to adopt water quality standards that are not fully protective of the beneficial uses. In May 2016, EPA entered into a consent decree with Northwest Environmental Advocates to reconsider EPA's 2010 approval of Idaho's human health criteria for arsenic, which were based on the MCL in drinking water. In September 2016, EPA disapproved Idaho's MCL-based criteria, citing that the criteria "are not protective of Idaho's designated uses, including primary and secondary contact recreation and domestic water supply". EPA also noted that there are significant differences between the allowable factors for developing MCLs and water quality criteria to protect designated uses under CWA section 303(c). EPA points out that MCLs are in some cases based on feasibility considerations, including the availability of technology to achieve the regulatory level and the cost of such treatment. In other cases, MCLs are based on concentrations that can be measured reliably rather than concentrations expected to be protective of human health. In contrast, water quality standards must be based on a sound scientific rationale and protect the designated use, rather than being based on available treatment technology, costs, or other feasibility considerations. In addition, water quality standards regulations at 40 CFR 131.11 (a)(1) are explicit that states must adopt water quality criteria that protect designated uses.

For BaP, the Colorado Hazardous Materials and Waste Management Division (at the time of rulemaking) uses the risk-based water quality standard to derive the groundwater protection level for BaP. Furthermore, the MCL for BaP is 0.2 µg/L; the incremental lifetime cancer risk factor resulting from this concentration would be 1.21×10^{-5} , which is more than an order of magnitude greater than the risk factor that has been considered to be the appropriate level risk by the commission in past determinations (1×10^{-6}). Therefore, the commission adopted a risk-based Water Supply standard for BaP of 0.016 µg/L that is protective of human-health.

II. Change of Ground Water to Groundwater

The commission adopted a change from "ground water" to "groundwater" throughout the regulation. This change is consistent with common technical usage and usage in the Water Quality Control Act. This change is part of a broad initiative to change the spelling program-wide, and to increase consistency.

III. House Keeping

The commission added clarification to a number of items and corrected minor typographical errors:

- Alignment of footnote assignments for the following organic chemical standards between Regulation Nos. 31 and 41: biphenyl; carbofuran; 1,2 dibromo-3-chloropropane (DBCP); dibromoethane 1,2; dichloromethane (methylene chloride); dioxane 1,4; hexachloroethane; tetrachloroethane 1,1,2,2; tetrachloroethylene (PCE); and trihalomethanes.
- Corrected the spelling of chlorpyrifos
- Corrected the spelling of trichloroacetic acid
- Corrected the spelling of chloronaphthalene
- Changed the order of appearance for a number of organic chemicals in the organic table, to better align with Regulation 41 and display the correct alphabetical order: dalapon; di(2-ethylhexyl)adipate; dinitro-o-cresol 4,6; and N-Nitrosodi-n-propylamine
- Added a synonym reference for chlorodibromomethane and dibromochloromethane to better align in Regulations 31 and 41.