



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10

1200 Sixth Avenue  
Seattle, Washington 98101

APR 07 1997

REPLY TO  
ATTN OF:

OW-134

Michele Brown, Commissioner  
Alaska Department of Environmental Conservation  
410 Willoughby Ave., Suite 105  
Juneau, AK 99801-1795

Dear Ms. Brown:

The Environmental Protection Agency (EPA) has completed its review of the Alaska Water Quality Standards (WQS) adopted December 4, 1994, and submitted to EPA for approval on January 26, 1995, and WQS adopted February 14, 1996, which were subsequently submitted to EPA for approval on September 26, 1996. In response to a petition filed in the State, by the Sierra Club Legal Defense Fund (SCLDF petition), on January 12, 1995, Alaska solicited comments on five portions of the newly adopted December 1994 WQS. At the same time, Alaska conducted a public review of proposed revisions to the antidegradation policy in the WQS regulations. As a result of the public review of the five petition issues and the antidegradation policy, several changes were made to these earlier December 1994 WQS and are reflected in the WQS adopted in February 1996. We have conducted our review of both WQS packages together, using the most recent adopted version where it replaces an earlier provision.

EPA approval of Alaska WQS is considered a Federal action and EPA must comply with the Section 7 consultation requirements of the Endangered Species Act (ESA). Section 7 states that "all federal agencies shall utilize their authorities on furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species" and "each federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species." EPA has initiated discussions with the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) about the need for informal or formal consultation on EPA's approval action. Our efforts will include identification of any potential effects to endangered or threatened species from the new and revised WQS regulations. Completion of the consultation process is a high priority for EPA Region 10.

EPA has reviewed the new and revised elements of the December 1994 WQS regulations, as amended by the February 1996 WQS regulations pursuant to Section 303(c) of the Clean Water Act and the implementing regulations at 40 CFR Part 131. This letter constitutes our formal notification of the results of this review.

EPA approves all of the new and revised elements in Alaska's 1994 WQS as amended in 1996, subject to successful conclusion of ESA consultation, with the exception of the 3Q2 design flow for conventional and nontoxic substances. EPA disapproves Alaska's 3Q2 design flow mixing zones for conventional and non-toxic substances. A more detailed discussion of the basis for our approval and disapproval is enclosed.

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EPA's regulations require States and Tribes to adopt criteria based on EPA's criteria, EPA's criteria modified to reflect local conditions, or criteria established using scientifically defensible methods. Design flows for ambient water quality criteria (AWQC) are an integral component of criteria. Criteria are deemed to be protective based on certain duration and frequency assumptions. EPA's criteria rely on a 1B3 or 1Q10 for protection of aquatic life from acute effects and a 4B3 or 7Q10 for protection of aquatic life from chronic effects. Because a 3Q2 appears to be less protective than EPA's criteria, Alaska is required to submit an analysis demonstrating that a 3Q2 is sufficient to protect aquatic life in Alaska. EPA cannot approve a 3Q2 for conventional and non-toxic substances without a scientifically defensible analysis.

Alaska has 90 days to correct this deficiency to avoid a federal promulgation as required by section 303(c) of the Clean Water Act. One way Alaska could correct the deficiency is to provide EPA with a scientifically defensible analysis demonstrating that a 3Q2 is sufficient to protect aquatic life in Alaska. Suggestions for an approach are included in the enclosure. Alternatively, Alaska could modify the mixing zone regulations in Chapter 70 which specify design flows to be consistent with EPA's criteria.

One further point, as part of a triennial review package States are supposed to re-examine any water body that does not include the uses specified in section 101(a)(2) of the Clean Water Act (CWA) (40 CFR 131.6). This section establishes an interim water quality goal which provides for the protection and propagation of fish, shellfish and wildlife, and for recreation in and on the water (fishable/swimmable uses). The Alaska WQS regulations at 18 AAC 70.050(b) contain a number of waterbodies that do not have fishable/swimmable designated uses. Alaska initially performed use attainability analyses, consistent with 40 CFR 131.10(j), to determine appropriate designated uses for these waterbodies. 40 CFR § 131.20 indicates that any waterbody segment that does not include fishable/swimmable uses should be re-examined every three years to determine if new information is available indicating that fishable/swimmable uses are now attainable. This is a reminder that Alaska needs to confirm whether any new information exists that would necessitate a reexamination of the less than fishable/swimmable uses found in 18 AAC 70.050(b). This confirmation is needed, because without it Region 10 may consider a recommendation to the EPA Administrator to propose fishable/swimmable uses.

The review and revision of WQS is an iterative process depending on the foundation that has been laid during the previous triennial reviews. Based on our review of the 1994 and 1996 WQS regulations, EPA has identified a number of areas to be addressed during the next triennial review cycle. These areas for future refinement are discussed in more detail in the attached comments. The following paragraphs summarize the subject areas that EPA believes are important for Alaska to consider during the next triennial review cycle.

Alaska needs to identify implementation procedures for its antidegradation and mixing zone policies. This is particularly important for State issued permits and NPDES permits issued by EPA. In order for EPA to successfully implement the intent of Alaska's WQS, and to avoid confusion during the § 401 certification process, EPA needs additional clarification as to how Alaska intends to implement these State policies. Implementation procedures do not have to be adopted in regulation, they can be adequately addressed in State policy or guidance.

Alaska has added new narrative criteria for toxic substances to the 1994 and 1996 WQS regulations. Alaska needs to adopt or identify procedures for implementing the new and previously

adopted narrative criteria. The WQS Handbook contains general guidance for narrative criteria implementation procedures.

EPA applauds Alaska for addressing the potentially unique needs of threatened and endangered species in the State's mixing zone policy. However, EPA strongly encourages Alaska to adopt similar considerations for threatened and endangered species in the State's antidegradation policy. In particular, the presence of threatened and endangered species should be considered when determining whether or not to lower water quality.

EPA is initiating a national program to protect public health at our nation's beaches. EPA recently sent a letter to Alaska expressing concern with public health risks posed by contaminated bathing beaches. EPA strongly encourages Alaska to move to adopt EPA's 1986 updated bacteriological ambient water quality criteria during the next triennial review period.

Alaska should also consider more refined, biologically-based, aquatic life uses in future revisions. More precisely defined uses allow WQS to be implemented more effectively on a watershed basis, and provide a stronger scientific basis on which to select the most appropriate criteria.

A detailed summary of the rationale for our approval and disapproval is enclosed. If you have any questions concerning this letter and enclosure please contact me at (206) 553-0422 or have your staff contact Sally Brough, Water Quality Standards Coordinator, at (206) 553-1295.

Sincerely,



Philip G. Millam  
Director  
Office of Water

Enclosures

cc: Mike Conway, ADEC  
Susan Braley, ADEC  
Teresa Woods, FWS  
Brad Smith, NMFS

## DETAILED DISCUSSION OF APPROVAL & DISAPPROVAL ISSUES

### 18 AAC 70.010 - General

EPA approves the wording changes found in the February 1996 version of 18 AAC 70.010(b) and (f). Section (b) has added references to the revised antidegradation policy and the new whole effluent toxicity limit provision. The changes in this section clarify how these provisions will be applied. The basis for our approval of these new and/or revised provisions are found in the following pages.

18 AAC 70.010(f) contains an exemption from WQS for treatment works and a definition for treatment works has been added at 18 AAC 70.990(55). The February 1996 WQS repealed major portions of the December 1994 WQS treatment works exemption. As a result, the exemption now applies only within the boundaries of treatment works authorized by the Department. Such treatment works, defined at 18 AAC 70.990(55), are excluded from the definition of waters of the United States at 40 CFR 122.2. EPA approves the treatment works provision found at 18 AAC 70.010(f) and the treatment works definition found at 18 AAC 70.990(55) in the February 1996 WQS.

### 18 AAC 70.011 - Antidegradation Policy

EPA's regulations require states to adopt an antidegradation policy consistent with 40 CFR § 131.12. The December 1994 WQS regulations did not contain a provision for Tier 1 waters [40 CFR 131.12(a)(1)] or Tier 3 - outstanding national resource waters [40 CFR 131.12(a)(3)]. The 1994 WQS regulations did contain a process for lowering water quality for high quality, tier 2, waterbodies but it was inconsistent with 40 CFR 131.12(a)(2). The 1996 WQS regulations have added Tier 1, Tier 3, additional provisions for lowering the water quality in tier 2 waters, and definitions for existing use and highest statutory and regulatory treatment requirements. EPA approves all new and revised regulatory language found in the February 1996 version of 18 AAC 70.011(a)(1), (a)(2), (a)(3), and (a)(4); 18 AAC 70.011(b) and (c); 18 AAC 70.015(a); and 18 AAC 70.990(20) and (25). Definition 18 AAC 70.990(20) has been adopted from 40 CFR 131.3 and definition 18 AAC 70.990(25) complies with the EPA interpretation of this phrase. With these revisions, the policy complies with the requirements of 40 CFR 131.12.

With the revisions EPA is approving, Alaska's antidegradation policy now meets the requirements of 40 CFR 131.12(a). Section 131.12(a) also requires States to identify implementation methods for their antidegradation policies. The reason for this is two-fold. First, such implementation methods encourage consistent application of the antidegradation policy and provide guidance to EPA where, as in Alaska, EPA issues NPDES permits. Second, by requiring States to identify implementation methods, section 131.12(a) deters States from adopting implementation methods which undercut or reinterpret the State's antidegradation policy so as to render it, in practice, inconsistent with the requirements of section 131.12(a). Were a State to do so, EPA has the authority to promulgate a federal antidegradation policy for waters in the State with sufficient detail to supersede the State's policy as implemented by the State.

Alaska has not yet adopted implementation methods for its revised antidegradation policy. EPA expects Alaska to do so during the next triennial review. In the meanwhile, EPA will, as needed, follow the antidegradation guidance in its 1993 WQS Handbook (Second Edition, 1993) in interpreting Alaska's antidegradation policy, and recommends that Alaska do the same.

As Alaska begins to work on antidegradation implementation methods we would like to reiterate EPA's position on existing use protection requirements. In EPA guidance, Questions and Answers on Antidegradation, August, 1985 (50 FR 34546) question 7 asks about the proper interpretation of the term "an existing use". The answer to question 7 states:

An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur (unless there are physical problems which prevent the use regardless of water quality). An example of the latter is an area where shellfish are propagating and surviving in a biologically suitable habitat and are available and suitable for harvesting. Such facts clearly establish that shellfish harvesting is an "existing" use, not one dependent on improvements in water quality.

In other words, establishing an existing use (past or present) is not dependent solely upon a demonstration that the use is being satisfied in a functional sense. As illustrated in this example, the existing use question should address both the functional use and the water quality. The intent of the regulation is to ensure the existing use and water quality necessary to support that use are maintained and protected.

#### 18 AAC 70.020 - Protected Water Use Classes; Water Quality Criteria; and Water Quality Standards Table

At 18 AAC 70.020(b), minor wording changes have been incorporated to reflect the ability of the State to develop site-specific criteria. Revised 18 AAC 70.020(b) clarifies that water quality criteria apply except "as modified" under the site-specific criteria provision and the thermal discharge provision. Throughout 18 AAC 70.020(b)(1) and (2) WQS Table, the wording has been changed from "shall not" to "may not" to reflect the ability of the State to approve site-specific criteria (18 AAC 70.025 and 18 AAC 70.034). EPA approves these clarifications. EPA previously approved 18 AAC 70.025 and 18 AAC 70.034; 18 AAC 70.025 has been revised and the basis for our approval of the revision is found below.

#### Fecal Coliform Bacteria

Alaska revised its freshwater and marine contact recreation fecal coliform criteria from a 20 FC/100 ml (in the 1989 WQS) to 100 FC/100 ml in the 1994 and 1996 WQS. While less stringent than the 1989 WQS, the 100 FC/100 ml criterion is still more stringent than the fecal coliform criteria recommendation of 200 FC/100 ml recommended by EPA in its section 304(a)(1) bacteriological criteria documents prior to 1986.

Historically, fecal coliform bacteria were used as an indicator species for bacteria likely to cause gastroenteritis in humans. In 1986, EPA issued a revised bacteriological criteria document which recommended use of Escherichia coli and enterococci as indicator species for swimming uses, because statistics showed they better correlated with gastroenteritis rates from contact recreation (51 FR 8012 March 7, 1986). EPA's 1986 recommendation provided the same level of protection for contact recreation as intended by the previous fecal coliform criteria. EPA's Federal Register (FR) notice announcing the availability of the new bacteriological criteria document stated that, "EPA expects a gradual transition from the fecal coliform criteria to the new indicator bacteria by the States." (51 FR 8013)

Alaska's response to public comments, submitted to EPA as part of the review package for the Dec. 1994 WQS, states that it "will consider such criteria in the next Triennial Review." Given the stringency of the revised fecal coliform criteria and EPA's expectation that there could be a gradual transition, balanced against the length of time that has elapsed since issuance of the revised 304(a) criteria document, EPA approves Alaska's revised criteria, with the EPA recommendation that Alaska should adopt the more precise E. coli/enterococci indicators during its next triennial review.

EPA recently sent a letter to Alaska expressing agency concern with public health risks posed by contaminated bathing beaches (see enclosed letter from Robert Perciasepe to Michele Brown). EPA is initiating a national program to protect public health at our nation's beaches and a cornerstone of that effort is State adoption of EPA's 1986 updated bacteriological ambient water quality criteria.

#### Settleable Solids/Sediment

Alaska WQS have previously established "sediment" as a pollution category. The 1996 WQS revisions to this category deal with settleable solids, a component of sediment. The corresponding EPA guidance for sediment and settleable solids is found under the heading Solids (Suspended, Settleable) and Turbidity. EPA addresses the issue by defining several fractions. Alaska's revisions to this pollutant category only address one of the fractions but the Alaska regulations in total are equally protective as Federal criteria.

EPA criteria for Solids (Suspended, Settleable) and Turbidity do not specify a single analytical methodology for measuring the inorganic and organic particulate matter found and transported in the aquatic environment. The EPA criterion for this pollutant category references several definitions and methods; total suspended matter (suspended solids), settleable matter (settleable solids), fixed suspended matter (fixed suspended solids), and volatile suspended matter (volatile solids) found in the 1971 *Standard Methods for the Examination of Water and Wastewater*. The Federal criterion for "solids (suspended, settleable) and turbidity" states that for the protection of freshwater fish and other aquatic life "settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

#### Freshwater Uses

The 1989 Alaska WQS for this pollutant category for freshwater (FW) uses (water supply, (i) drinking culinary and food processing, and contact recreation) stated "no increase in concentration of sediment, including settleable solids, above natural conditions. (See Note 15)" Note 15 described, in detail, the volumetric Imhoff cone method for measuring settleable solids. Now the Alaska standard for these two FW use categories states, "no measurable increase in concentration of settleable solids above natural condition as measured by the volumetric Imhoff cone method (see note 15)." In the 1996 WQS the word "measurable" has been added before increase, sediment has been dropped, the reference to the Imhoff cone method has been added to the narrative statement, Note 15 remains the same, and a definition for settleable solids has been added to the definition section. The definition specifies that "solid material of organic or mineral origin that is transported or deposited from water" should be measured by the Imhoff cone method, method 2540(B) in *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992). The sediment standard for the FW uses described above has always specified the volumetric Imhoff cone method which measures settleable solids. Although the term "sediment" has been removed in the 1996 WQS, it makes no substantive difference because the method to measure settleable solids was previously specified for these use

categories. Therefore, the only change to the FW uses in this pollutant category is the new definition which now specifies the laboratory method.

#### Marine Uses

The 1989 Alaska WQS for this pollutant category for marine uses (contact recreation and growth and propagation of fish) stated "no measurable increase in concentration above natural conditions". Unlike the FW sediment standard, the marine narrative criterion did not reference Note 15 and Note 15 did not specify to which use categories the Imhoff cone method should apply. In other words, the 1989 Alaska WQS marine standard for sediment did not specify settleable solids or the Imhoff cone method.

In the 1996 WQS, Alaska has changed the marine criteria for sediment by adding two phrases ("of settleable solids" and "as measured by the Imhoff cone method") and adding a new definition for settleable solids that specifies the method to be used to measure settleable solids. These revisions apply to the following marine use categories: contact recreation - 18 AAC 70.020(b)(2)(B)(i) and growth and propagation of fish, shellfish, other aquatic life, and wildlife - 18 AAC 70.020(b)(2)(C). The sediment criteria for the other freshwater and marine use categories have been previously approved.

The State's new definition of settleable solids now includes only settleable solids and excludes suspended sediment or nonsettleable solids. However, there are a number of other provisions within the Alaska WQS regulations and National Pollutant Discharge Elimination System (NPDES) permitting requirements that deal with suspended sediment. These revisions in combination with the following provisions found elsewhere in the Alaska 1996 WQS provide adequate protection of all uses with regard to sediment. Guidance in the WQS Handbook acknowledges that a combination of independent approaches may be required to support designated uses (p. 3-24). For the following reasons, we find the Alaska revisions to this pollution category to be equally stringent to the Federal criteria.

The volumetric Imhoff cone method is an EPA approved method for the analysis of "settleable residue" (EPA-600/4-79-020, 160.5-1).

Settleable solids will be limited by the new definition for natural condition which prohibits any increases in settleable solids loading from human sources or causes.

Alaska has separate marine turbidity criteria that measure suspended sediment that are as stringent as Federal criteria. EPA has previously approved the turbidity criteria and determined that they are protective of designated uses. For the marine growth and propagation use category, Alaska has adopted the Federal criterion for solids (suspended, settleable) and turbidity (described above).

All waters are designated for all uses and the most stringent water quality criteria for all the included use classes will apply [18 AAC 70.030(1)]. For example, the marine turbidity criterion for water supply-aquaculture states that turbidity "may not exceed 25 nephelometric turbidity units (NTU)". The marine turbidity criterion for growth and propagation may not reduce the depth of the photosynthetic compensation point by 10 percent. On a site-specific basis, the most stringent of the two, would apply in marine waters.

EPA and Alaska, if it assumes primacy of the NPDES program, have an independent regulatory responsibility to include Total Suspended Solids (TSS) in NPDES permits for those industrial categories where TSS is an effluent guideline/limit. TSS measures all solids that do not pass through a 0.0015 mm standard glass fiber filter. The pore size in this filter would remove a major proportion of the suspended solids as well as settleable solids:

EPA approves the revisions found in the marine use categories 18 AAC 70.020(b)(2)(B)(i) and 18 AAC 70.020(b)(2)(C) for this pollutant category. EPA approves the definition at 18 AAC 70.990(45) for this pollutant category. It includes a narrative description and the EPA approved laboratory method to be used to measure this parameter (EPA-600/4-79-020, 160.5-1). These revisions comply with the requirements of 40 CFR § 131.11.

#### Toxics and Other Deleterious Organic and Inorganic Substances

Under the "Toxics and Other Deleterious Organic and Inorganic Substances" pollutant category, the 1994 and 1996 WQS contain four changes. One revision applies to the freshwater (FW) water supply (i) drinking, culinary, and food processing use category [18 AAC 70.020 (b)(1)(A)(i)]. The other three revisions apply to the FW aquaculture [18 AAC 70.020 (b)(1)(A)(iii)], FW growth and propagation [18 AAC 70.020 (b)(1)(C)], marine aquaculture [18 AAC 70.020 (b)(2)(A)], marine growth and propagation [18 AAC 70.020 (b)(2)(C)], and marine harvesting and consumption [18 AAC 70.020 (b)(2)(D)] uses..

#### FW - water supply; drinking, culinary, and food processing [18 AAC 70.020 (b)(1)(A)(i)] use

Alaska revised this use category to clarify those instances when criteria based on standards from the Safe Drinking Water Act [drinking water standards (DWS)] should be used as the applicable criteria rather than the criteria included in EPA *Quality Criteria for Water* (water quality criteria) to protect this use category. The 1989 Alaska WQS applied both water quality criteria and DWS to this use category. The revised 1996 WQS clarify that when both a DWS and water quality criteria exist for a particular toxic substance, DWS should be used as the applicable criteria for this use category. This revision complies with EPA guidance found at 45 FR 79356 that indicates that DWS are appropriate for protection of human health from exposure to toxic substances from ingestion of contaminated drinking water. DWS are derived to protect human health from consumption of toxicants found in finished (at-the-tap) drinking water. Alaska has adopted EPA DWS and applies them to ambient surface water. The use of DWS instead of water quality criteria, also complies with guidance found in the WQS Handbook that indicates that States have the option of applying DWS, human health water quality criteria, modified human health criteria, or controls more stringent than these three to protect against the effects of ingesting contaminated drinking water (p.3-12).

When no DWS exist, Alaska has chosen to apply EPA water quality criteria. Water quality criteria include acute and chronic aquatic life criteria as well as human health criteria. The human health criteria provide pollutant concentrations protective of human health and include fish bioaccumulation and consumption factors in addition to direct human drinking water intake (WQS Handbook p.3-12). Alaska has previously adopted EPA water quality criteria, by reference, and EPA has promulgated, for Alaska, water quality criteria for priority pollutants where gaps existed in Alaska's coverage for toxic substances [40 CFR 131.36(d)(12)]. Using water quality criteria where there are no DWS complies with guidance found in the WQS Handbook on page 3-12 discussed above. EPA approves the revisions to this use category. These revision comply with 40 CFR 131.11(a)(1).



FW aquaculture [18 AAC 70.020 (b)(1)(A)(iii)], FW growth and propagation [18 AAC 70.020 (b)(1)(C)], marine aquaculture [18 AAC 70.020 (b)(2)(A)], marine growth and propagation [18 AAC 70.020 (b)(2)(C)], and marine harvesting and consumption [18 AAC 70.020 (b)(2)(D)] uses

The first revision to these use categories clarifies when to use drinking water standards (DWS) as criteria and when to use EPA *Quality Criteria for Water* (water quality criteria). In the 1989 Alaska WQS, water quality criteria and DWS were applied on the basis of "whichever is less" (more stringent). In the 1994 and 1996 WQS, the revision establishes that when both a DWS and water quality criteria exist for a particular toxic substance, the EPA CWA water quality criteria will be used, instead of the DWS, in these use categories.

Both aquatic life and human health criteria are relevant to these uses. The following paragraphs lay out the basis for our approval of this first revision for each criteria type.

Alaska has previously adopted EPA aquatic life criteria, by reference, and EPA has promulgated, for Alaska, water quality criteria for priority pollutants where gaps existed in Alaska's coverage for toxic substances 40 CFR 131.36(d)(12). The WQS Handbook clearly states that section 304(a)(1) criteria for aquatic life should be used to support these designated uses (p.3-11). This revision complies with 40 CFR 131.11(b)(1)(i).

The human health criteria are protective of human health because they incorporate fish bioaccumulation, fish consumption factors, and direct intake of drinking water into the calculations to derive these criteria (WQS Handbook p.3-12). Human health water quality criteria would apply to the freshwater and marine aquaculture uses and the marine harvesting for consumption of raw mollusks or other raw aquatic life use since these uses involve human consumption of aquatic life. However, EPA's policy is to apply human health criteria to all waters designated for aquatic life (57 FR 60860), therefore, human health criteria would also apply to the FW and marine growth and propagation of fish, shellfish, other aquatic life, and wildlife uses. Alaska has previously adopted EPA water quality criteria, by reference, and EPA has promulgated, for Alaska, water quality criteria for priority pollutants where gaps existed in Alaska's coverage for toxic substances. EPA aquatic life and human health criteria will protect these uses. This revision is consistent with 40 CFR 131.11(b)(1)(i).

Finally, when no water quality criteria exist the State has chosen to apply DWS as criteria. This will protect those who drink the water and it complies with the flexibility given to States to apply DWS or human health water quality criteria to protect against the effects of contaminants by ingestion from drinking water (WQS Handbook p.3-12).

EPA approves the first revision to these use categories. This revision complies with 40 CFR 131.11(a)(1) and 40 CFR 131.11(b)(1)(i). EPA is approving this revision because, as discussed above, the particular water quality criteria in effect in Alaska are scientifically based and protective of the use whether or not they are more stringent than DWS.

The second revision applicable to these use categories is a new provision that allows Alaska to develop acute and chronic aquatic life criteria, in regulation, for sensitive resident Alaskan species. This revision provides the State a mechanism to revise toxics criteria based on the sensitivity of resident Alaskan species. This revision is in accordance with 40 CFR 131.11(b)(iii). Any new Alaska specific toxic criteria must be submitted to EPA for review and approval or disapproval in accordance with 40 CFR 131.20 and 131.21.

The third revision applicable to these use categories involves new wording for a narrative criterion for toxic substances. Such narrative criteria are statements that describe the desired water quality goal. As stated in the WQS Handbook (p. 3-24), narrative criteria can supplement numeric criteria for toxicants or they can be the basis for establishing controls when the State has not adopted chemical-specific numeric criteria. EPA considers narrative criteria for toxic substances to apply to all designated uses at all flows and are necessary to meet the statutory requirements of section 303(c)(2)(A) of the CWA.

Specifically, the narrative criterion language in the 1989 Alaska WQS regulations focused on undesirable odor or taste to fish. The 1996 Alaska WQS now include the phrase "no concentration of toxic substances in water or in shoreline or bottom sediments, that, singly or in combination, cause or reasonably can be expected to cause toxic effects on aquatic life, except as authorized in this chapter". This new narrative criterion addresses: the water column, sediment, and the shoreline; cumulative effects of more than one toxic substance; and potential toxic effects, not just demonstrated toxic effects. Compared to the 1989 narrative criterion, this revision provides a clear goal statement and provides additional protection to aquatic resources from exposure to toxic substances. This revision complies with section 303(c)(2)(A) of the CWA, the guidance in the WQS Handbook, and the requirement at 40 CFR 131.11(a)(2), and 40 CFR 131.11(b)(2). EPA approves this third revision applicable to these use categories.

### Color

Alaska has adopted new numeric color criteria for the following freshwater use categories: FW drinking water - 18 AAC 70.020(b)(1)(A)(i), FW aquaculture - 18 AAC 70.020(b)(1)(A)(iii), FW growth and propagation - 18 AAC 70.020(b)(1)(C), marine aquaculture - 18 AAC 70.020(b)(2)(A)(i), marine seafood processing - 18 AAC 70.020(b)(2)(A)(ii) and marine growth and propagation - 18 AAC 70.020(b)(2)(C). The 1996 WQS for color are a combination of numeric and narrative criteria. The numeric revisions to the color criteria for these uses are no less stringent than Federal criteria.

The narrative revisions to the color criterion for the use categories identified above adds the phrase "or the natural condition whichever is greater". This phrase could result in an adjustment to the numeric criterion (15 color units) based on the natural condition. While natural conditions may not automatically be protective of the uses in question, such protection can be assured by using the site-specific criteria provisions of 18 AAC 70.025(b) before substituting natural conditions for the numeric criterion. Read together, these provisions meet the requirements of 40 CFR 131.11(a)(1) and 131.11(b)(2).

These revised criteria meet the requirements of section 40 CFR 131.11(a)(1) and 131.11(b)(2) and are approved.

### Petroleum Hydrocarbons, Oil and Grease

#### Applicable Federal Criteria

Oil and grease is a measure of biodegradable animal greases and vegetable oils, along with the relative non-biodegradable mineral oils. Petroleum hydrocarbons is the measure of only the mineral oils. They are a subset of oil and grease and represent a large family of compounds that include straight and branched-chain hydrocarbons, monoaromatic hydrocarbons (single carbon-ring molecules), and polynuclear aromatic hydrocarbons (PAH) (multiple carbon-ring molecules).

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EPA has narrative criteria for oil and grease for domestic water supply and aquatic life. For protection of aquatic life, EPA has a narrative criterion for each of the following; the water column, sediments, and surface waters. The narrative water column criterion is based on a bioassay procedure. The sediment narrative criterion states that levels of oils or petrochemicals in the sediment which cause deleterious effects should not be allowed. Surface waters should be virtually free from floating nonpetroleum oils as well as petroleum derived oils.

EPA has not developed aquatic life or human health criteria for petroleum hydrocarbons as a class. EPA's regulations at 40 CFR 131.11(b) require States to adopt criteria based on: EPA's § 304(a) criteria, § 304(a) criteria modified to reflect site-specific conditions, or other scientifically defensible methods. For petroleum hydrocarbons, Alaska's revised standards are scientifically defensible in accordance with [40 CFR 131.11(b)(1)(iii)] as detailed below.

EPA included 20 individual aromatic hydrocarbon compounds (3 monoaromatic compounds and 17 PAHs) in the 1992 National Toxics Rule (NTR). EPA promulgated human health criteria for 14 of the 20 individual aromatic hydrocarbon compounds. Eight of the individual aromatic hydrocarbons compounds are carcinogenic and EPA promulgated human health criteria for Alaska for these eight carcinogens (57 FR 60922). EPA's policy is to apply human health criteria to all waters designated for aquatic life (57 FR 60860). Therefore, the human health criteria for aromatic hydrocarbons apply to freshwater and marine growth and propagation of fish, shellfish, other aquatic life, and wildlife uses in order to protect humans who might consume aquatic life. In general, for organic compounds, human health criteria tend to be more stringent than the corresponding aquatic life criteria and they would therefore be protective of Alaska's freshwater and marine uses.

#### 1989 Alaska WQS for Petroleum Hydrocarbons

To protect the water column, Alaska's 1989 WQS contained numeric criteria for total hydrocarbons (TH) and total aromatic hydrocarbons (TAH) plus a procedural mechanism (bioassay procedure) to establish numeric criteria for aquatic life based on the sensitivity of resident Alaskan species. The 1989 WQS contained narrative criteria for the protection of aquatic life exposed to oil and grease and petroleum hydrocarbons in sediment and surface waters. These narrative criteria comply with the Federal criteria for this pollution category. The numeric and narrative criteria applied to the freshwater and marine growth and propagation of aquatic life use categories. Notes 8, 9, and 10 provided clarification about bioassay procedures. Definitions for TAH and TH were included. The TH definition specified the laboratory method to be used for measurement of TH and the sampling procedure for gathering a sample.

#### 1996 Alaska WQS for Petroleum Hydrocarbons

Several provisions in the 1989 petroleum hydrocarbon standard have not changed in the 1994 and 1996 WQS. The unchanged portions include the numeric criteria, the fact that the numeric criteria apply to the water column, the narrative criteria for sediment and the surface of waterbodies, and the sampling procedure (sample must be taken below any observable sheen).

Alaska's Public Review Packet for the SCLDF petition indicates that Alaska has done studies to determine which fractions of petroleum hydrocarbons are the most toxic. Alaska also compared different methods of measurement to determine which analytical methods are best for quantifying the most toxic fractions of petroleum hydrocarbons and which methods are most sensitive for detecting petroleum hydrocarbons. The 1996 WQS regulate and measure the collective toxicity of several

individual hydrocarbon fractions found in the water column. (State of Alaska Public Review Packet, Proposed Revisions to the Antidegradation Policy in the WQS Regulations 18 AAC 70 and Request for Public Comment on the Petition by the Sierra Club Legal Defense Fund to Repeal Certain Sections of the Current WQS Regulations, February 1995)

As a result of these studies, the 1994 and 1996 Alaska WQS include several revisions to this pollutant category. The revisions include; 1) elimination of the bioassay procedure to establish numeric criteria for aquatic life based on the sensitivity of resident Alaskan species, 2) revisions to Note 8 that change the analytical methods to be used to test for petroleum hydrocarbons, 3) a new definition for TAH, 4) elimination of the TH standard, 5) adoption of the total aqueous hydrocarbon (TAQH) standard, and 6) application of the growth and propagation standard to additional use categories.

The first revision in 1994 and 1996 WQS eliminates the option to use the bioassay procedure (0.01 of the 96-hour  $LC_{50}$ ) to establish numeric criteria for sensitive or biologically important species. (Old Notes 8, 9, and 10 have also been repealed as unnecessary since they provided additional information about the bioassay procedure that has been eliminated.) Because of the difficulty of implementing the bioassay procedure, EPA commented in Nov. 1992 on proposed changes to the Alaska WQS, and supported this action, indicating that it would be appropriate for the State to move away from the bioassay procedure to the no observable effects concentration (NOEC) in order to limit whole effluent toxicity. The NOEC approach is included in the newly adopted WET provision at 18 AAC 70.023. Elimination of the 1989 WQS bioassay procedure from this pollutant category is approvable because the "Toxics" narrative criterion at 18 AAC 70.020 and the WET provision at 18 AAC 70.023 can be used to provide the same protection. (See the discussions of these provisions.)

The second revision is a new Note 8 which specifies new analytical methods for measuring TAH and TAQH. The only method that was specified in the 1989 WQS was method 503(B) for TH which is an infra-red (IR) method that had a detection limit higher than the numeric criteria (EPA-600/4-79-020, p. 413.2-1). It is being replaced by EPA-approved methods 602 and 610 which use gas chromatography (GC). GC is a more sensitive detection method than IR and methods 602 and 610 can measure aromatic hydrocarbon concentrations lower than the numeric criteria of 10 ug/l for TAH and 15 ug/l for TAQH (40 CFR Part 136, App. A Method 602 Table 1 and Method 610 Table 1). A method detection limit that is lower than the numeric criteria is important for compliance monitoring and the assessment of ambient water quality. Unlike method 503(B), methods 602 and 610 also identify target compounds to be measured (40 CFR Part 136, App. A Method 602 1.1 and Method 610 1.1). Note 8 indicates that alternative methods can be used with Department approval. EPA endorses the concept of modifications to methods as long as the results obtained are no less precise and accurate than the results obtained using the unmodified method (EPA 821-B-93-001, p.10). We strongly encourage Alaska to use its own guidelines for preparing quality assurance project plans for sampling and testing for petroleum hydrocarbons. Adoption of these methods and summing the results are approvable.

The third revision is a new definition for TAH. The 10 ug/l criterion for TAH has not changed. The new 1996 definition limits TAH to "the sum of: benzene, ethylbenzene, toluene, and the xylene isomers (BETX)". Note 8 specifies that BETX or TAH is measured by EPA-approved method 602. BETX are among the most water soluble of the aromatic hydrocarbons and therefore, the most likely to be present in the water column. The definition for TAH at 18 AAC 70.990(52) is a narrative description of the aromatic hydrocarbons that are measured by method 602 (Note 8). Since the numeric criterion applies to the water column, the new definition [18 AAC 70.990(52)] and the

use of method 602 are approvable. Additionally, EPA acknowledged, by promulgating human health criteria in the NTR, that benzene, ethylbenzene, and toluene are aromatic hydrocarbons of concern [40 CFR 131.36(b)(19), (33) and (39)].

The fourth revision to the 1996 WQS is the elimination of the TH definition. TH was defined as those compounds measured, using method 503(B). Analytical method 503(B) (which is equivalent to EPA method 413.2) uses a chlorofluorocarbon (CFC) solvent for the extraction process. EPA has two methods for measuring total recoverable oil and grease (methods 413.1 and 413.2) and one method (418.1) for measuring total recoverable petroleum hydrocarbons. All three use the same CFC solvent and they will not be available or acceptable by the end of 1997 due to the international ban on CFCs (61 FR 1737 and 60 FR 24970). Method 503(B) had a detection level of 200 ug/l (EPA-600/4-79-020) which is higher than the 15 ug/l criterion. No alternative method is currently available as a direct replacement of method 503(B) (61 FR 1730). Elimination of the definition for TH is approvable for the reasons described above.

The fifth revision is the adoption of the TAqH standard. The TH numeric criterion (15 ug/l) applies to TAqH. Note 8 specifies that the TAqH criterion of 15 ug/l is the sum of monoaromatic hydrocarbons measured by Method 602 (BETX) plus PAHs measured by method 610. Method 610 is EPA-approved and it measures the concentration of each of 16 individual PAH compounds (40 CFR Part 136, App. A Method 610 1.1). The detection limits of method 610 are adequate to detect each of the individual 16 PAHs at concentrations that are equal to their solubilities in water (40 CFR Part 136, App. Method 610 Table 1). The definition for TAqH at 18 AAC 70.990(51) is a narrative description of the aromatic hydrocarbons that are measured by methods 602 and 610 (Note 8). Since the numeric criterion (15 ug/l) applies to the water column and TAqH represents the sum of relatively water soluble aromatic hydrocarbons, the new definition [18 AAC 70.990(51)] and the sum of methods 610 and 602 are approvable. The 16 PAHs that are measured by method 610 are among the 20 aromatic hydrocarbons that EPA included in the 1992 NTR.

The sixth revision, in the 1996 WQS, extends the combination of numeric and narrative criteria found in the growth and propagation use category to the freshwater and marine aquaculture uses. The previous standard for these aquaculture uses was based on continuous flow or static flow bioassay procedures. Application of the revised growth and propagation standard is appropriate for the cultivation of aquatic species for human consumption [18 AAC 70.990(4)] because it adds additional protection to aquatic life exposed to petroleum hydrocarbons in the sediment and surface waters not just the water column. Additionally, the revised standard now measures the concentrations of 19 (16 PAHs plus benzene, ethylbenzene, and toluene) out of 20 aromatic hydrocarbons that EPA included in the 1992 NTR. EPA has established human health criteria for the majority of these aromatic hydrocarbons and these criteria protect human health because they incorporate fish bioaccumulation, fish consumption factors, and the direct intake of drinking water into the calculations for each criterion. This revision is in accordance with 40 CFR 131.11(a)(1) which directs States to adopt criteria to protect designated uses.

Methods 602 and 610 measure specific "relatively water soluble" aromatic hydrocarbons. These methods do not measure other aromatic hydrocarbons; the straight chain and branched chain (aliphatic) petroleum hydrocarbons; or the "nonaqueous" petroleum hydrocarbons. Nonaqueous petroleum hydrocarbons include heavier (longer chains, more carbon rings) hydrocarbons that are less water soluble and are more likely to attach to particulates and settle out in the sediment or get caught in the thin layer (microlayer) at the surface. Several narrative criteria can be used to regulate the "nonaqueous" petroleum hydrocarbons. Several narrative criteria and the newly adopted whole