Response to Comments on the Draft NPDES Permit for the City and Borough of Juneau Mendenhall WWTF

EPA Region 10
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NPDES Permit #AK-002295-1

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Background

On October 21, 2005, EPA issued a public notice of the availability of a draft NPDES permit for the City and Borough of Juneau's Mendenhall Wastewater Treatment Facility (WWTF). This is an existing publicly owned treatment works (POTW) discharging to the Mendenhall River in Juneau, Alaska. The proposed permitting action was a revocation and reissuance of the facility's current permit. The permittee had requested EPA to modify the permit and later agreed that a revocation and reissuance was preferable to a modification, in this case.

Response to Public Comments on the Draft NPDES Permit

EPA received comments on the draft NPDES Permit from the City and Borough of Juneau (CBJ).

Comment #1

CBJ has stated that a mixed steady-state/continuous simulation analysis for metals demonstrates that there is no reasonable potential to exceed water quality standards for metals and there is no need for metals effluent limits. The analysis also shows what the wasteload allocations (WLAs) should be if EPA insists that limits for some metals and for some seasons are still necessary.

CBJ argues that the approach EPA used to determine reasonable potential to exceed water quality criteria and calculate effluent limits for metals is overly conservative. CBJ has submitted an alternative analysis which, according to CBJ's comments, shows that effluent limits are not necessary for metals. CBJ's mixed steady-state/continuous analysis held the following parameters constant:

- Effluent hardness (the 5^{th} percentile was used).
- Effluent flow (the design flow of 4.9 mgd was used).
- Ambient dissolved metals (the 95^{th} percentile for each season was used).
- The maximum expected total recoverable effluent metals concentrations were used.

CBJ combined the above steady-state elements with the following dynamic elements:

- River flow
- Dilution (which varies proportionate to the river flow)

- Ambient hardness
    - Hardness varies inversely to the river flow according to the following relationship:
      Hardness = 12237 × (river flow)$^{-0.7806}$

CBJ then calculated the following for river flows ranging from 25 CFS to 3,500 CFS:

- The hardness of the mixture of the effluent and the river.
- Dissolved metal concentration of the mixture of the effluent and the river.
- Dissolved metals criteria (based on the hardness of the mixture of the effluent and river)

CBJ compared the dissolved metals concentrations to the criteria for each river flow simulated, however, when the river flow is less than the 1Q10, the dissolved metals concentration was compared only to the acute criterion. CBJ also calculated a wasteload allocation for every river flow simulated.

CBJ stated in its comments that the calculations show that the discharge has no reasonable potential to cause or contribute to water quality standards violations for copper, lead, silver, or zinc, under any conditions. CBJ stated in its comments that, if any limits for copper, lead, silver, or zinc are included in the final permit, they should be based on the wasteload allocations (WLAs) in Table C-1.1, below.

Table C-1.1: CBJ's Suggested Metals Wasteload Allocations

metal	Nov-May	June	Jul-Sep	Oct
Copper	152	396	181	449
Lead	56	187	189	172
Silver	145	123	90	142
Zinc	3126	6781	5082	6907

Response #1

EPA has agreed to re-evaluate the metals reasonable potential and effluent limits calculations in order to respond to CBJ's comments, however, EPA disagrees with the particulars of CBJ's analysis. EPA's re-evaluation resulted in changes to the metals effluent limits that were proposed in the draft permit, including the elimination of effluent limits for lead, as requested by CBJ. The final permit retains effluent limits for copper, but copper limits are different, and at times less stringent, than those proposed in the draft permit.

The fundamental flaw in CBJ's analysis of metals is that it considers EPA's correlation of the hardness and flow data to be a rigid "formula." The correlation is not a formula; it is the result of a least-squares analysis which seeks the best "fit" to the data. EPA has compared the ratio of the actual river hardness to the predicted hardness (using the correlation from the fact sheet and used by CBJ in its own analysis submitted as part of its comments) for each data point. The actual hardness was between 39% and 280% of that predicted by the correlation for a given flow rate. It is not appropriate to use the correlation without accounting for this uncertainty when determining whether the discharge has the reasonable potential to cause or contribute to water quality standards violations and to calculate water quality-based effluent limits. By assuming that the river hardness will always be that predicted by the correlation, CBJ has failed to take into account the uncertainty surrounding the river hardness and its relationship to the river flow.

When preparing the draft permit, EPA's method of accounting for this uncertainty when determining reasonable potential to cause or contribute to water quality standards violations and calculating water quality-based effluent limits was to assume that, when the river flow was equal to a 1Q10 or 7Q10 flow for a given season, the river hardness could be as low as that predicted by the correlation for an average flow rate during that season. It appears that this was an overly conservative assumption for the low-flow season of November through May and the June "shoulder" season, as shown in table R-1.1, below.

Table R-1.1 shows the hardness values predicted by the correlation for the 1Q10, 7Q10 and average flow rates for the four seasons under consideration. Note that the ratios of the hardness predicted for the average flow to that predicted for the 7Q10 flow during November through May and the month of June are lower than the range of ratios actually observed (the range was 39% to 280%, as stated above). While observations show that the river hardness may be less than that predicted by the correlation, it is unlikely that the difference will be as large as EPA assumed when determining reasonable potential and calculating effluent limits for the draft permit. For November through June, EPA concurs with CBJ that its approach was overly stringent.

Table R-1.1 Hardness Values for the Mendenhall River Used in Preparation of the Draft Permit

Season	Hardness Predicted by Correlation at Various Flows			Ratio of Predicted Hardnesses (Average Flow : 7Q10 Flow)
	1Q10	7Q10	**Average**	
Nov-May	839	799	**140**	**17.5%**
June	189	165	**32**	**19.3%**
Jul-Sep	68	48	**22**	**45.3%**
Oct	126	84	**41**	**48.5%**

EPA has therefore re-evaluated the reasonable potential to exceed water quality criteria for metals and re-calculated the water quality-based metals effluent limits where reasonable potential existed. In its re-evaluation, EPA multiplied the hardness predicted by the correlation for the 1Q10 and 7Q10 flows for each season by the 5th percentile ratio of the actual hardness to the predicted hardness. This results in reasonable worst-case hardness values for the 1Q10 and 7Q10 flow rates for each season. EPA used these hardness values to calculate water quality criteria for metals, determine reasonable potential for the discharge to cause or contribute to violations of these criteria, and, where reasonable potential existed, calculate effluent limits.

Table R-1.2: Revised Hardness and Metals Criteria Values for the Mendenhall River					
Seasonal Hardness Predicted by Correlation at Critical Flows			**5th Percentile Hardness Ratio (Actual : Predicted)**	**Worst-Case Hardness**	
Season	1Q10	7Q10		**Acute**	**Chronic**
Nov-May	839	799	**42.4%**	**356**	**339**
June	189	165		**80.2**	**70.0**
Jul-Sep	68	48		**28.7**	**20.3**
Oct	126	84		**53.4**	**35.5**

This change resulted in the following changes to the numeric criteria for metals:

Table R-1.3 Water Quality Criteria for Metals Using Old and New Hardness Values														
All Concentrations Have Units of µg/L														
Season	**Using Old Hardness Values**							**Using New Hardness Values**						
	Copper		Lead		Silver	Zinc		Copper		Lead		Silver	Zinc	
	A	C	A	C	Acute	A	C	A	C	A	C	Acute	A	C
Nov. – May	16.2	10.6	80.1	3.12	4.85	139	140	37.3	21.9	205	7.69	22.2	293	287
June	4.63	3.41	18.5	0.72	0.493	44.9	45.3	10.8	6.55	50.0	1.68	2.30	96.1	86.6
Jul. – Sep.	3.21	2.44	11.9	0.47	0.252	32.3	32.6	4.17	2.31	16.3	0.43	0.41	40.9	30.8
Oct.	5.76	4.15	24.0	0.93	0.735	54.7	55.2	7.43	3.71	32.3	0.81	1.17	68.7	49.4

Using this method, EPA found that the discharge does not have reasonable potential to cause or contribute to water quality standards violations for lead at any time. This is the same conclusion CBJ drew from its own analysis. EPA found that the discharge has the reasonable potential to cause or contribute to water quality standards violations for copper from November through May and July through September (there is no reasonable potential in June or October). The resulting copper effluent limits are less stringent from November though May, but slightly more stringent from July through September, compared to those proposed in the draft permit. However, the effluent limits for copper are considerably less stringent than the year-round effluent limits of 8.36 µg/L average monthly and 20.1 µg/L maximum daily in the current permit. See Table R-1.4 for a comparison of metals effluent limits in the draft and final permits.

In order to better determine compliance with the July-September copper effluent limits, EPA has required more frequent effluent monitoring for copper than proposed in the draft permit. In order to better assess the discharge's effect on water quality, the permit also requires downstream receiving water monitoring for copper. Future permits may include more stringent effluent limits for copper if receiving water monitoring shows that the discharge has the reasonable potential to cause or contribute to water quality standards violations.

Table R-1.4 Metals Effluent Limit Comparison								
Season	Units	Draft Permit				Final Permit		
		Copper		Lead		Copper		Lead
		Average Monthly Limit	Maximum Daily Limit	Average Monthly Limit	Maximum Daily Limit	Average Monthly Limit	Maximum Daily Limit	
Nov. – May	µg/L	34.8	74.9	11.4	29.9	86.7	187	No Limits
	lb/day	1.42	3.06	0.46	1.22	3.54	7.63	
June	µg/L	37.4	80.5	No Limits		No Limits		
	lb/day	1.53	3.29					
July – Sep.	µg/L	62.0	133			44.5	95.8	
	lb/day	2.53	5.45			1.82	3.92	
October	No Limits	No Limits				No Limits		

Revisions to the Permit:

Effluent limits for lead have been deleted, and the monitoring frequency for lead has been reduced from once per month to once per quarter. Effluent limits for copper have been deleted for the month of June and revised for the seasons of November through May and July through September. Effluent monitoring frequency for copper has been increased to twice per month during July through September. The permit now requires downstream water quality monitoring for copper.

Comment #2

CBJ has stated that the State's new ammonia standard calls for a more complex evaluation than provided in the fact sheet. CBJ has submitted an analysis following implementation considerations in EPA's Ammonia Criteria document which, according to CBJ's comments, shows that ammonia limits are not needed.

Specifically, CBJ's objections to EPA's approach in determining reasonable potential to exceed water quality standards and calculate effluent limits are as follows:

- CBJ states in its comments that, because the ammonia criteria vary with pH and temperature, use of real-time mixing is more appropriate than the steady-state approach used by EPA in determining reasonable potential to exceed water quality standards and to calculate effluent limits. CBJ's comments quote the following paragraph from EPA's ammonia criteria document to support this assertion:

> Because the ammonia criterion is a function of pH and temperature, calculation of the appropriate weighted average temperature or pH is complicated. For some purposes, calculation of an average pH and temperature can be avoided. For example, if samples are obtained from a receiving water over a period of time during which pH and/or temperature is not constant, the pH, temperature, and the concentration of total ammonia in each sample should be determined. For each sample, the criterion should be determined at the pH and temperature of the sample and then the concentration of total ammonia nitrogen in the sample should be divided by the criterion to determine a quotient. The criterion is attained if the mean of the quotients is less than 1 over the duration of the averaging period.

- CBJ questioned EPA's assumption that early life stages of fish are present in the receiving waters year-round.
- CBJ stated that EPA's use of a 30B3 critical flow (a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate) is counter to EPA's ammonia criteria guidance guidance that treats the criteria as a running 30-day average not to be exceeded. CBJ notes that individual values can exceed the calculated chronic criterion as long as the 30-day average ammonia concentration did not exceed the criterion. In general, CBJ believes that EPA failed to evaluate the need for an ammonia limit in the context of the 30-day average chronic criterion and the fact that the highest 4-day average concentration cannot be more than 2.5 times the chronic criterion.

CBJ's calculations utilize river flow and effluent data from September 2002 through October 2005. The analysis considers both the 30-day average chronic criterion and the 4-day average "criterion" (i.e. the requirement that the 4-day average ammonia concentration not be greater than 2.5 times the chronic criterion).

When considering the 30-day average criterion, the inputs to the analysis include:

- Average monthly river temperature.
- Average monthly river pH.
- Average monthly river ammonia concentration.
- Average monthly effluent temperature.
- Average monthly effluent pH.
- Average monthly effluent ammonia concentration.
- Average monthly river flow.
- The treatment plant's design flow.
- The monthly average dilution factor (calculated from the monthly average river flow and the plant design flow)
- The monthly average temperature of the mixture of the river and the effluent.

When considering the 4-day average criterion, the inputs to the analysis include:

- Maximum monthly river temperature.
- Maximum monthly river pH.
- Maximum monthly river ammonia concentration.
- Maximum monthly effluent temperature.
- Maximum monthly effluent pH.
- Maximum monthly effluent ammonia concentration.
- Minimum monthly river flow.
- The treatment plant's design flow.
- The monthly minimum dilution factor (calculated from the monthly minimum river flow and the plant design flow)
- The monthly maximum temperature of the mixture of the river and the effluent.

Response #2

EPA does not agree with CBJ that the analysis submitted with its comments shows that the discharge does not have the reasonable potential to cause or contribute to water quality standards

violations for ammonia. EPA's regulations (40 CFR 122.44(d)(1)(i)) require that water quality-based limits be imposed for all pollutants which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard. When determining whether a discharge has this reasonable potential, the regulations also require (in 40 CFR 122.44(d)(1)(ii)) that the permitting authority use procedures which account for existing controls on point and non-point sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, and, where appropriate, the dilution of the effluent in the receiving water. In this case, because the State of Alaska has granted the permittee a mixing zone for ammonia, EPA has considered the dilution of the effluent in the receiving water when performing the reasonable potential analysis.

EPA's procedures for performing reasonable potential analyses are described in the fact sheet and in the *Technical Support Document for Water Quality-based Toxics Control*, hereafter referred to as the TSD (EPA/505/2-90-001). These procedures use the upper 99th percentile of the effluent data as the maximum projected effluent concentration, in order to account for the variability of the pollutant in the effluent, as required by the regulations. When performing reasonable potential analyses for ammonia, EPA uses critical values for receiving water pH, temperature, and ambient ammonia in order to account for existing controls on point and non-point sources of pollution, as required by the regulations.

The analysis presented by EPA in the fact sheet shows that the discharge has the reasonable potential to cause or contribute to water quality standards violations for ammonia from November through May, and EPA has therefore established effluent limits for that season. EPA recognizes that the approach used to determine if a discharge has the reasonable potential to cause or contribute to water quality standards violations is a critical-conditions analysis, and that the critical conditions of high effluent flow, low receiving water flow, high receiving water pH, and high effluent and ambient ammonia concentrations are unlikely to occur simultaneously. However, they do have the reasonable potential to occur simultaneously. The fact that the discharge would cause water quality standards violations for ammonia under these critical conditions necessitates effluent limits for ammonia.

EPA has made the conservative assumption that early life stages of fish could be present in the Mendenhall River at any time of the year. EPA had no information demonstrating that early life stages are not present at certain times of the year and when those times might be when drafting the permit, and CBJ has submitted no such information along with its comments.

The analysis submitted with CBJ's comments shows that the discharge did not cause water quality standards violations for ammonia during the time period under consideration. It did not, however, show that the discharge does not have the reasonable potential to cause or contribute to such violations. By using the actual pH, temperature, river flow, and ammonia values for given months (with the sole conservative assumption of setting the effluent flow equal to the plant's design flow) and determining if the discharge could have caused a water quality standards violation for ammonia under those specific conditions, CBJ failed to account for the variability of the pollutant in the effluent and the existing controls on point and non-point sources of pollution, as required by the regulations. Also, because there is seldom more than one ambient pH measurement and one effluent ammonia measurement per month, it is unlikely that the true monthly average pH and ammonia values are equal to the single measured values.

The analysis also erroneously assumed that the pH of a mixture of the effluent and receiving water is equal to a flow-weighted average of the pH of the effluent and the receiving water. Proper calculation of the pH of a mixture of two flows requires a more complex calculation which accounts for the differing alkalinities (or "buffering capacities") and temperatures of the two flows. Such a calculation was performed in order to establish water quality-based effluent limits for pH, as discussed in Appendix E of the fact sheet. CBJ's assumption would be correct only if the alkalinities and temperatures of the two flows were equal.

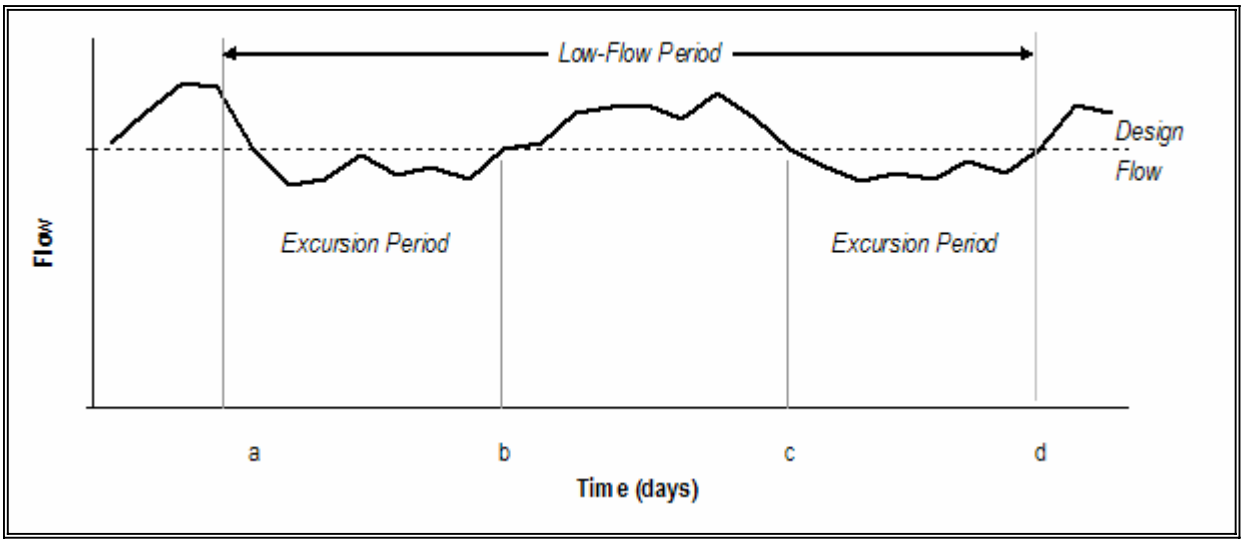
The discussion in the ammonia criteria document that CBJ quoted in its comments is not specific to reasonable potential analyses. EPA believes that the discussion is best suited for determining whether the chronic ammonia criterion is met in the receiving water (e.g. for mixing zone confirmation monitoring or assessing the attainment of beneficial uses in a water body).

CBJ also questioned the use of the 30B3 flow rate. CBJ is correct that the chronic ammonia criterion is expressed as a 30-day average not to be exceeded more than once every three years, but CBJ is incorrect that the use of the 30B3 design flow is oriented towards a single data point exceeding the criterion.

As stated by in the fact sheet and by CBJ in its comments, the 30B3 is a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate. Contrary to CBJ's assertion that the 30B3 is oriented towards a single data point exceeding the criterion, daily flow rates are, by definition, less than the 30B3 at times. This means that a discharge in compliance with the ammonia effluent limits (which are calculated based on the dilution expected in the receiving water at the 30B3 flow rate) could cause exceedances of the chronic ammonia criterion concentration, although not for more than 30 days every three years, as required by the criterion.

Biologically-based design flows are calculated empirically so that the specified averaging period (30 days in this case) and excursion frequency (3 years in this case) are met. The *Technical Guidance Manual for Performing Wasteload Allocations: Book VI - Design Conditions: Chapter 1 - Stream Design Flow for Steady-State Modeling* (EPA, 1986) notes that "the biologically-based calculation method is flexible enough to make full use of special averaging periods and frequencies that might be selected for specific pollutants (e.g. ammonia)." The use of the biologically-based method recognizes that "criteria concentrations should not be interpreted as values that are never to be exceeded 'at any time or place' in the receiving waters." See Figure 1, below, for a general graphical representation of a biologically-based design flow (this figure appears as Figure 3-1 in the *Technical Guidance Manual*). When interpreting the figure, note that intervals a-b and c-d are excursion periods and each day in these intervals is part of an average flow that is below the design flow. Also note that, in this case, the term "design flow" refers to the design flow for the receiving stream, not for the effluent discharge. The number of excursions in an excursion period is calculated as the number of days in the excursion period divided by the duration (in days) of the averaging period (e.g., 1 day for a typical acute criterion, 4 days for a typical chronic criterion, and 30 days for the chronic ammonia criterion). A low-flow period is defined as one or more excursion periods occurring within a 120-day interval.

Figure R-2.1: Illustration of biologically-based design flow



The DFLOW 3 computer program that EPA used to calculate the critical flows for the Mendenhall River uses the 30B3 as the default design flow for use with the chronic ammonia criterion. The averaging period (30 days) and the excursion frequency (3 years) are consistent with the chronic ammonia criterion. Therefore, by using the 30B3 flow rate in the receiving water to determine reasonable potential to exceed water quality standards and calculate effluent limits for ammonia, EPA is recognizing that the chronic ammonia criterion is not a value never to be exceeded at any time, rather, it is a value not to be exceeded, as a 30-day average, more than once every three years.

The following table provides a site-specific excursion analysis for the 30B3 flow rate from November through April in the Mendenhall River for the period of record (1966 through 2004). The analysis shows that river flow was less than the 30B3 at times during 1969, 1974, 1975, 1978, 1979, 1989, and 1999. The total number of excursions is 12.67. This is an average of one 30-day excursion every three years over the 38-year period of record, consistent with the requirements of the chronic ammonia criterion.

Table R-2.1: Excursion Analysis for the 30B3 flow rate in the Mendenhall River

Cluster Start	Excursions[1]	Period Start	Duration (days)	Avg Excursion
24-Jan-69	2.83	24-Jan-69	85	23.70%
23-Feb-74	2.3	23-Feb-74	69	22.60%
12-Mar-75	1.6	12-Mar-75	48	5.90%
9-Jan-78	1.27	9-Jan-78	38	4.30%
5-Feb-79	1.8	5-Feb-79	54	13.60%
17-Mar-89	1.2	17-Mar-89	36	0.60%
2-Mar-99	1.67	2-Mar-99	50	8.50%
Total	12.67			

Table R-2.1 Notes:
1. The number of excursions is equal to the number of days in the excursion period divided by the duration (in days) of the averaging period (i.e. 30 days for the 30B3 design flow).

Revisions to the Permit:

None.

Comment #3

CBJ has requested that EPA make a number of changes to the fact sheet. Some of these changes were requested in order to correct certain spelling, grammar, and typographical errors in the fact sheet. Other changes were requested in order to make the fact sheet consistent with the final permit. In requesting the changes, it appears that CBJ has assumed that that the final permit would be modified to reflect all of the changes requested in its comments on the draft permit.

Response #3

The fact sheet is a final document, the sole purpose of which is to explain the basis for the conditions proposed in the draft permit. Therefore, the fact sheet will not be modified. Any changes made to the draft permit prior to issuance in response to public comments are explained in this response to comments document. EPA will address comments on the fact sheet in this response to comments, to the extent that EPA's response to those comments could result in changes to the permit. EPA regrets any errors made in the fact sheet and any confusion that may have resulted from such errors.

Revisions to the Permit:

None.

Comment #4

CBJ commented on the discussion of receiving water low-flow conditions in the fact sheet.

The discussion describes use of 30B3 for evaluating ammonia. The approach might not be needed in view of the above comments concerning ammonia.

The discussion includes computations of 1Q10 flows for each season, to be used when evaluating acute criteria. The 1Q10 flow should only be pertinent for the low flow season and should define the threshold at and below which only the acute criteria applies.

The effect of the seasonal low flow computations is to describe conservative seasonal worst case dilutions used in deriving seasonal limits. CBJ notes here that for some parameters that co-vary with other parameters, the low flow computations might be less relevant to the evaluations and derivations of limits.

Response #4

EPA has calculated 1Q10, 7Q10 and 30B3 flow rates for each season, in an effort to recognize that there are significant variations in the flow rate of the Mendenhall River throughout the year. EPA believes this is appropriate, because, for example, it is unlikely that a river flow less than or equal to the "year-round" 1Q10, 7Q10, or 30B3 will occur during the high flow season of July

through September, and that it is therefore inappropriate to establish water quality-based effluent limits based on those flow rates during that season.

EPA does not agree that the 1Q10 flow rate should be pertinent only to the low-flow season. The TSD recommends the use of the 1Q10 flow rate when evaluating a discharge's potential to cause acute toxicity to aquatic life and to calculate wasteload allocations and effluent limits based on acute aquatic life criteria. Acute toxicity must be prevented at all times, not just during the low-flow season (although, in general, the low-flow season is when the discharge will have its greatest impact on the receiving water).

EPA assumes that CBJ's reference to "parameters that co-vary with other parameters" is a reference to certain metals (for which the criteria are functions of hardness) and ammonia (for which the criteria are functions of pH and temperature). The fact that the criteria for these pollutants are functions of pH, temperature, and/or hardness is irrelevant to the question of which critical flow rates should be used to determine reasonable potential to exceed water quality standards and to calculate wasteload allocations and water quality-based effluent limits.

Revisions to the Permit:

None.

Comment #5

Limits for copper in November-May, June and July-September, and limits for lead in November-May are not needed and should be deleted. See the analysis of metals described earlier in these comments. Should EPA still require limits for any metals or seasons, they should be based on the lowest WLAs from the continuous simulations presented in Appendix A.

Response #5

EPA agrees with CBJ that effluent limits are not necessary for lead. However, EPA does not agree with CBJ that effluent limits are not necessary for copper (except during the months of October and June), and EPA has calculated effluent limits for copper which are in effect from November through May and from July through September. A detailed response to the issues surrounding the metals effluent limits in the draft permit appears in the response to Comment #1.

Revisions to the Permit:

See Comment and Response #1.

Comment #6

The limits for total ammonia are lower than in the existing permit. The need for the limits was not based on an appropriate evaluation given the varying aspect of the ammonia criteria and the implementation guidance in the EPA's ammonia criteria document. CBJ notes that the ammonia analysis described earlier showed that no excursions of the ammonia criteria were evident from the ambient and effluent data over the last three years. CBJ asks that the ammonia limits be deleted. CBJ does not believe ammonia limits are necessary, but if EPA insists on limits, then the unique features of the chronic ammonia standard would result in an average monthly limit of 33.8 and a maximum daily limit of 57.0 mg/L for November through May. This is because the chronic ammonia criterion is based both on a 30-day running average, and a 4-day running average that may be 2.5 times higher. In deriving the limits based on the 30-day running average

chronic standard, the WLA should be used directly as the chronic Long Term Average (LTA), as that would represent the 30-day aspect of the chronic ammonia standard. If the limits are to be evaluated based on the 4-day running average chronic standard, then the limiting LTA would be the acute LTA, which by coincidence, yields exactly the same limits (AML of 33.8 and MDL of 57) for November through May.

Response #6

As discussed in the response to Comment #2, EPA does not agree with CBJ that effluent limits are not necessary for ammonia. In this comment, CBJ has questioned the accuracy of the effluent limit calculations for ammonia, which is a separate issue from that of determining whether ammonia effluent limits are necessary.

As stated on Page 97 of the TSD, water quality-based effluent limits "must 'force' treatment plant performance, which, after considering acceptable effluent variability, will only have a low statistical probability of exceeding the wasteload allocation (WLA)." This is achieved by calculating the long-term average (LTA) concentrations which a facility must achieve in order to consistently meet WLAs (and therefore ensure compliance with water quality standards in the receiving water).

CBJ asserted that the chronic ammonia LTA should be set equal to the chronic WLA, because the chronic ammonia criterion is expressed as a 30-day average concentration. EPA disagrees with this; however, EPA acknowledges an error in the calculation of the chronic LTA for ammonia. When calculating the chronic LTA for ammonia, EPA had calculated the LTA as if the chronic ammonia criterion were expressed as a 4-day average concentration, not a 30-day average concentration. When EPA corrected this error in its effluent limit calculations, the chronic ammonia LTA for November through May increased from 15.8 mg/L to 20.9 mg/L. The new chronic LTA is closer to the chronic wasteload allocation, which is intuitive, because the 30-day average concentration of a pollutant will tend to be closer to the long-term average concentration than the 4-day average concentration would be. The chronic LTA is still the limiting LTA (as it was in the calculations presented in the fact sheet). Use of the revised chronic LTA results in ammonia effluent limits as shown in Table R-6.1. These effluent limits are less stringent than those in the current permit. This "backsliding" is justified under Section 402(o)(2)(B)(i) of the Clean Water Act and 40 CFR 122.62(a)(2), because it results from new information regarding river flows and ambient conditions for pH, temperature and ammonia.

Table R-6.1: Effluent Limits for Ammonia

Units	**Current Permit[1]**		**Draft Permit[2]**		**Final Permit[2]**	
	Average Monthly Limit	Maximum Daily Limit	Average Monthly Limit	Maximum Daily Limit	**Average Monthly Limit**	**Maximum Daily Limit**
mg/L	26.4	39.7	21.6	36.4	**28.5**	**48.0**
lb/day	1079	1622	882	1487	**1164**	**1963**

Notes:
1. The ammonia effluent limits in the current permit are in effect year-round.
2. The ammonia effluent limits in the draft and final permits are effective only from November 1 – May 31.

Revisions to the Permit:

Effluent limits for ammonia have changed, as shown in Table R-6.1.

Comment #7

CBJ believes that the use of the 30B3 flow in Table D-1 does not adequately address the 30-day averaging issue of the chronic ammonia criterion. CBJ prefers that evaluations be made based on real dilution, for its effect on pH, temperature and ammonia, as described by EPA's own ammonia criteria document. The chronic dilution factor, based on the 7Q10 can be used to compare to the 4-day average chronic ammonia criterion, which is 2.5 times the 30-day value derived from the criterion's formula.

Response #7

EPA has responded to most of CBJ's concerns about the use of the 30B3 flow rate in the responses to comments 2, 4, and 6. In this particular comment, CBJ suggests (correctly) that the chronic dilution factor (based on the 7Q10 receiving water flow rate) could be used to evaluate the discharge with respect to the 4-day average chronic ammonia "criterion" which is 2.5 times the 30-day average value derived from the criterion formula.

EPA did not perform this step in the development of the draft permit because, for every season under consideration, the chronic ammonia dilution factor (based on the 30B3 flow rate and designed for a 30-day average criterion not to be exceeded more than once every three years) was less than 2.5 times the chronic dilution factor (based on the 7Q10 flow rate and designed for a 4-day average criterion not to be exceeded more than once every three years). See Table R-7.1 for a comparison of the 7Q10 and 30B3 dilution factors. Therefore, other factors being equal, the 4-day average ammonia concentration will never be more than 2.5 times the 30-day average concentration in the receiving water. Therefore, EPA concluded that the 30-day average chronic ammonia criterion, when paired with the dilution resulting from the 30B3 flow rate, was more limiting than the requirement that the 4-day average ammonia concentration not be more than 2.5 times the chronic ammonia criterion and EPA performed no further evaluations regarding the 4-day average ammonia "criterion."

Table R-7.1: Dilution Factor Comparison

Season	Chronic (7Q10) Dilution Factor	30B3 Dilution Factor	Ratio (30B3:chronic)
Nov. - May	5.35	6.54	1.22
June	33.8	73.4	2.17
July - Sept.	161.0	268	1.66
Oct.	79.2	151	1.91

EPA has responded to the issues of whether the discharge has the reasonable potential to cause or contribute to water quality standards violations for ammonia, and whether the alternative analysis presented by CBJ in its comments is valid in the responses to comment numbers 2, 4, and 6 of this response to comments.

Revisions to the Permit:

None.

Comment #8

The mass balance equation (Equation D-1 of the fact sheet) shows that the 95th percentile measured receiving water upstream concentration is used. For ambient metals, did EPA use only dissolved metals data collected and analyzed with clean metals techniques?

The maximum projected receiving water metal concentrations incorporate the minimum dilutions for the seasons, and are then compared to single value acute or chronic calculated criteria based on average hardness values, resulting in a mismatch between hardness dependent criteria and the hardness of the river at low dilutions. The table presents lots of calculations, showing needs for limits for some parameters and some seasons, yet a less conservative and defensible analysis provided by CBJ in Appendices A and B to these comments supports that no limits are needed, and if limits were imposed, those limits could be higher than what EPA has imposed. The analyses for metals and ammonia in Table D-2 should be deleted and the fact sheet should instead describe the analyses that CBJ has prepared.

Response #8

CBJ is correct that the 95^{th} percentile upstream concentration was used. For ambient metals, EPA used ambient dissolved metals data submitted by the permittee. The data set consisted of 22 samples collected between February 2003 and April 2005. These data were not accompanied by any information on the sampling or analytical methods used to collect them.

A detailed response to the hardness and dilution factor issues surrounding the metals effluent limits in the draft permit appears in the response to Comment #1.

Revisions to the Permit:

None.

Comment #9

CBJ commented that EPA should make sure the frequency of effluent hardness measurements is the same as the frequency of metals measurements. If EPA chooses to retain higher frequency than 1/quarter for any metal, then the hardness monitoring frequency should equal the frequency for the most monitored metal. Since metals standards are hardness dependent formulas, any metal measurements should have the associated hardness measurements in order to relate the observation to the standards.

Response #9

EPA agrees and has made the requested change.

Comment #10

CBJ made comments on Page 11, Section I.D, Surface Water Monitoring, of the draft permit.

In item 5, which discusses monitoring of metals in the receiving water, CBJ requested that EPA add a sentence that says, “Use of clean metals sampling and analytic methods is recommended.”

In Table 3, CBJ requested that EPA change sample frequency for Copper and Lead to 2/year, the same as for Silver and Zinc.

In Table 3, CBJ requested that EPA include the downstream sample location for temperature and total ammonia.

Response #10

It is not appropriate to make "recommendations" in an NPDES permit. The permit should contain only conditions with which the permittee must comply, not recommendations or suggestions. However, EPA concurs with the permittee that clean metals sampling and analytical methods are appropriate for the surface water monitoring required by this NPDES permit.

In the draft permit, EPA had required receiving water monitoring for all metals subject to effluent limitations four times per year and for all other metals twice per year. EPA has re-evaluated reasonable potential for metals and concluded that the discharge does not have the reasonable potential to cause or contribute to water quality standards violations for lead. Therefore, EPA agrees with CBJ's comment with respect to lead and reduced the surface water monitoring frequency for lead to twice per year. EPA has shown that the discharge has the reasonable potential to cause or contribute to water quality standards violations for copper, therefore EPA has not reduced the sample frequency to twice per year for copper.

EPA agrees with CBJ that downstream sampling for ammonia and temperature is appropriate and has made the requested change.

Revisions to the Permit:

The final permit requires downstream sampling for ammonia and temperature, and the required surface water monitoring frequency for lead has been reduced to twice per year.

Comment #11

CBJ requests that part II.C.4 of the draft permit (calculating an annual average flow rate for use with design criteria requirements) be deleted. The other requirements are sufficient to assure timely planning for new capacity.

Response #11

EPA disagrees with this comment. A maximum daily flow limit of 4.9 mgd has been included in the permit, pursuant to the State of Alaska's Clean Water Act Section 401 certification. EPA believes it is appropriate for CBJ to use the annual average flow rate and annual average influent BOD and TSS loadings for facility planning purposes, as opposed to the maximum daily flow rate and maximum daily influent BOD and TSS loadings. Because the design criteria requirements are in terms of annual averages, CBJ should calculate an appropriate annual average flow rate for use with the design criteria requirements.

Revisions to the Permit:

None.

Comment #12

CBJ requested that, on page 17, Part III.F. Retention of Records, EPA should change the first sentence to also include circular chart recordings and electronic data recordings.

Response #12

This section of the permit contains standard regulatory language from 40 CFR 122.41(j). The conditions in 40 CFR 122.41 are applicable to all NPDES permits. EPA has not made the

requested change to the regulatory language. However, Part III.F. of the draft permit and 40 CFR 122.41(j) require the permittee to retain "records of all monitoring information," and EPA agrees with CBJ that this includes circular chart recordings and electronic data recordings, among other records.

Revisions to the Permit:

None.

Comment #13

CBJ stated in it comments that Part II.D. of the draft permit, (Pretreatment Requirements) functionally requires CBJ to develop and implement a pretreatment program contrary to the EPA's determination on page 19 of the fact sheet that such a program is not needed. CBJ has only one significant industrial user and keeps close track of them. CBJ stated in its comments that the program described in the permit is excessive.

Response #13

EPA disagrees, in part, with this comment. CBJ is not required to implement a formal pretreatment program as set forth in 40 CFR 403.8. Therefore, any of the pretreatment requirements in the draft permit based on 40 CFR 403.8 have been deleted.

However, CBJ is still subject to the general pretreatment regulations in other subparts of 40 CFR Part 403. The general pretreatment regulations set forth in 40 CFR Part 403 are applicable to POTWs which receive wastewater from sources subject to National Pretreatment Standards. The Mendenhall WWTF receives wastewater from a significant industrial user as well as other industrial users who are subject to National Pretreatment Standards. Thus, the general pretreatment regulations are applicable to the Mendenhall WWTP (see 40 CFR 403.1 "Purpose and Applicability.")

Revisions to the Permit:

Requirements based on 40 CFR 403.8 have been deleted. These were Parts II.D.3, 5, and 9. The prohibited discharges listed in 40 CFR 403.5, which were included in the draft permit by reference, have been included explicitly in the final permit for clarity; these prohibitions appear in Part II.D.1. of the final permit. These prohibitions are applicable to all industrial users and POTWs. There have been minor changes to other requirements for clarity (e.g. adding regulatory citations). The numbering of the pretreatment requirements has changed.

Comment #14

CBJ made several minor editorial comments on the draft permit.

> ***Comment***
>
> Expanded Effluent Testing: Change the reference from "I.B.9" to "I.B.12."
>
> ***Response***
>
> EPA agrees and has made the requested change.

Comment

Pages 9-10, Part C. Whole Effluent Toxicity….: Paragraph #1 at the bottom of the page requires analysis for the chemical and physical parameters "required in Part 1.B. above…". We suggest that it be changed to read "required in Table 1 above….". Elsewhere in paragraph 1, where it refers to "Part I.B" it should instead refer to "Table 1".

Response

EPA agrees and has made the requested changes.

Comment

Page 12, Section II.A.1: The first sentence refers to Section III.E. It should refer to Section IV.E.

Response

EPA agrees and has made the requested change.

Comment

Page 26, Part V.I., Transfer. The section refers to part III.I.3 and should refer instead to "III.I.4."

Response

EPA agrees and has made the requested change. The same error appeared in Part IV.I., Planned Changes, and was corrected there as well.

Comment

Page 26, Part VI. Definitions: The definition of BMPs refers to pollution of "wasters" and should say "waters" instead.

Response

EPA agrees and has made the requested change.

Comment

Page 27, Part VI. Definitions: definition for "24-hour composite": The last sentence needs to delete the repetition of "…in accordance…."

Response

EPA agrees and has made the requested change.

Revisions to Permit Pursuant to Alaska's Final Clean Water Act Section 401 Certification

Technology-based Maximum Daily Limit for Total Residual Chlorine

The final Clean Water Act Section 401 certification for this permit includes a maximum daily limit of 1 mg/L total residual chlorine when there is enough dilution available to allow a discharge at this concentration without causing or contributing to a violation of water quality

criteria for chlorine. EPA has included this effluent limit in the final permit from July through September. For the balance of the year, EPA has determined that this technology-based effluent limit is not stringent enough to prevent water quality standards violations for chlorine, therefore, more stringent water quality-based effluent limits apply.

Using the technology-based maximum daily limit of 1 mg/L instead of the technology-based average weekly limit of 750 µg/L as the maximum projected effluent concentration in the reasonable potential analysis results in the discharge having reasonable potential to cause or contribute to water quality standards violations for chlorine in the month of October. Therefore, the final permit includes water quality-based effluent limits for total residual chlorine during the month of October, rather than the technology-based limits for chlorine that were in the draft permit for the month of October.

Reporting Requirements for Fecal Coliform Criteria Violations at the Edge of the Mixing Zone

The final Clean Water Act Section 401 certification for this permit requires the permittee to report to ADEC any violations of Alaska's water quality criteria for fecal coliform, as measured at the edge of the authorized mixing zone. The final permit includes this condition, which appears as Part I.D.11. of the final permit. For consistency with this requirement, the final permit also requires 24-hour reporting to EPA and ADEC of any violation of a maximum daily limit of the fecal coliform effluent limits.

Other Revisions to the Draft Permit

November-May Fecal Coliform Limits

EPA has determined that the "trigger" dilution ratios used to determine which of the tiered effluent limits for fecal coliform are applicable should be expressed as monthly average dilution ratios. Consistent with a 1994 letter from EPA's NPDES compliance unit to the Mendenhall WWTP, EPA acknowledges that the monthly reporting period may not end on the last day of a calendar month (to allow reporting for full weeks for compliance with average weekly limits). Therefore, the dilution ratios are to be reported as the minimum and average for the monthly reporting period.

For clarity, EPA changed the column headings in Table 2 to reflect the fact that the "average monthly" and "average weekly" limits are based on the geometric mean fecal coliform concentrations. In the draft permit, this was stated in a footnote to Table 2, which has been retained because it explains that values less than one (1) must be rounded up to 1 for the purposes of calculating the geometric mean. A definition of "geometric mean" was added to the "definitions" section of the permit.

Also, EPA made an error when calculating the monthly geometric mean fecal coliform limit for the lowest dilution tier. The monthly geometric mean fecal coliform limit for the lowest dilution tier should have been 161 organisms/100 ml instead of 170 organisms/100 ml. The revised Table 2 is reproduced on the following page.

Table 2: Effluent Limits and Monitoring Requirements for Fecal Coliform					
Conditions	**Units**	**Effluent limits**			**Monitoring Requirements**
		Monthly Geometric Mean Limit	**Weekly Geometric Mean Limit**	**Maximum Daily Limit[5]**	**Monitoring Frequency and Sample Type**
November 1 – May 31					
Average effluent dilution ratio for the monthly reporting period[4] < 15:1, regardless of method of disinfection.	#/100ml	161[3]	---	See Note 2	2 grab samples per week
Average effluent dilution ratio for the monthly reporting period[4] ≥ 15:1 and < 30:1, regardless of the method of disinfection.	#/100ml	200[3]	400[3]	800	2 grab samples per week
Average effluent dilution ratio for the monthly reporting period[4] ≥ 30:1 **and chlorine is used** for total or partial disinfection during the monthly reporting period.[1]	#/100ml	200[3]	400[3]	800	2 grab samples per week
Average effluent dilution ratio for the monthly reporting period[4] ≥ 30:1 **and chlorine is not used** for total or partial disinfection during the monthly reporting period.	#/100ml	400[3]	800[3]	1200	2 grab samples per week
June 1 – October 31					
Chlorine is used for total or partial disinfection during the monthly reporting period.[1]	#/100ml	200[3]	400[3]	800	1 grab sample per week
Chlorine is not used for total or partial disinfection during the monthly reporting period.	#/100ml	400[3]	800[3]	1200	1 grab sample per week

1. See I.B.7.
2. No more than 10% of the samples collected during a monthly reporting period when the average effluent dilution ratio is < 15:1 may exceed 314 organisms/100 ml.
3. The permittee must report the geometric mean fecal coliform concentration. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean.
4. Any tiered effluent limitations that are contingent upon the effluent dilution ratio are determined by the average effluent dilution ratio for a given monthly reporting period. Only one effluent limit tier can be effective during a given monthly reporting period.
5. 24-hour reporting is required in case of a maximum daily limit violation for fecal coliform (see Part III.G. of this permit).

Changes to Dates

EPA has replaced compliance dates formerly expressed as intervals after the effective date of the permit with dates certain, now that the effective date of the final permit is known.

References

EPA. Letter to from Florence K. Carroll, Compliance Officer, to David Frickey, Supervisor, Mendenhall Wastewater treatment facility. October 12, 1994.

EPA. 1986. *Technical Guidance Manual for Performing Wasteload Allocations: Book VI - Design Conditions: Chapter 1 - Stream Design Flow for Steady-State Modeling.* US Environmental Protection Agency, Office of Water, PB92-231778.

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.