Response to Comments
Draft NPDES Permit No. ID-002019-2
City of Meridian, Idaho

Background: On June 11, 1999, EPA issued a notice of proposed reissuance of a National Pollutant Discharge Elimination System (NPDES) permit for the City of Meridian, Idaho. The facility is an activated sludge wastewater treatment plant. The wastewater from the facility is discharged to Five Mile Creek and/or the Boise River. The public review and comment period expired on, July 12, 1999.

Written comments regarding the proposed permit for the Meridian facility were received from the permittee, through a letter from John Shawcroft, the Public Works Superintendent. The following summarizes and responds to each significant comment raised.

1. Comment: The total suspended solids (TSS) mass effluent limits in the draft permit were included based on the Lower Boise TMDL. The fact sheet indicated that these limits would be removed from the final permit if EPA did not approve the Lower Boise TMDL prior to final issuance of the permit.

   If the TSS mass effluent limits are included in the final permit, the City requested that the limit be based on an effluent flow of 7 million gallons per day (mgd). The TMDL states that "each facility may use its allocated reserve as needed by requesting the incorporation of some portion of its reserve when its permit is re-issued by EPA.

   Response: As of the issuance date of this permit, the Lower Boise TMDL has not been approved by EPA, therefore the TSS mass effluent limits have been removed from the final permit.

2. Comment: The draft permit imposed new or more restrictive dissolved oxygen (DO) and pH limitations than the existing permit. These limits are equal to the ambient water quality criteria, and do not account for mixing in the receiving water. In addition, EPA does not appear to have conducted the requisite "reasonable potential calculation" for water quality based effluent limits for these parameters. This analysis would consider ambient and effluent water quality as well as mixing.

   Response: EPA conducted a reasonable potential calculation for these parameters. The result of the analysis indicates that water quality based effluent limits are required. The reasonable potential analysis for dissolved oxygen and pH can be found in Appendix A of this document.

3. Comment: The City stated that the draft permit does not specify the time frame for determining compliance with the DO and pH limits. The permit needs to

define the applicable averaging period, and the fact sheet should provide the justification for the averaging period. The Idaho water quality standards do not provide an applicable averaging period for pH.

Although the DO standard could be interpreted as an instantaneous standard, EPA has the opportunity to implement such standards using different averaging periods. An example is that application of acute and chronic aquatic life criteria (one-hour average and 4 day durations in the standard) are implemented by EPA in permits as daily and monthly limits.

Response: The Idaho water quality standards do not express an averaging period for DO or Ph, therefore the limit must be an instantaneous limit. EPA has confirmed this with the State of Idaho water quality standards coordinator. The final permit has been revised to clarify that the limits are instantaneous limits.

4. Comment: The City stated that there is no justification for the increase in frequency for WET tests from annual to semi-annual. The City believes that the higher level of treatment recently implemented at the plant, specifically nitrification, will make it even less likely that WET limits will be needed. Additionally, the data that does exist does not support development of a WET limit or increased frequency of WET tests.

The City recommends either dropping WET testing requirements based on the last five months of operation (extremely low ammonia) or using two years of semi-annual WET testing to determine if there is a reasonable potential to exceed water quality standards. If the data demonstrates no reasonable potential to exceed water quality standards, the permit should reduce WET monitoring to once per year, or once every two years.

Response: The increased frequency of the WET tests is being required to obtain sufficient data to determine if a WET limit is needed to protect aquatic life in Five Mile Creek and the Boise River.

The current WET data only looked at effluent dilutions between 0% and 44%. The data does not show that the effluent does not have toxicity, rather it only indicates that toxic effects are not seen when the dilution is between 0% and 44%. It is unknown if toxic effects occur above 44%. Additional sampling will provide information on toxic effects at dilutions greater than 44%.

EPA has reconsidered the monitoring frequency and agrees that sufficient data will be collected if the facility monitors twice per year for the first two years and annually thereafter. The final permit has been modified to reflect this change.

4. Comment: The City also requested that the IC_{25} be used when reporting WET results.

   Response: The final permit has been revised to allow WET results to be reported as the IC_{25}.

5. Comment: The City requested to know the basis for having whole effluent toxicity tests (WET) conducted at dilutions of 44% effluent, and two concentrations above and two concentrations below that level.

   Response: In the past, WET testing conducted on the effluent from the facility looked at effluent dilutions from 0% to 44% only. Based on these tests it is not possible to determine if toxic effects may be occurring at effluent dilutions greater than 44%. The intent of having two dilutions above 44% was to determine if toxicity might be occurring at higher dilution ratio's. The final permit has been revised to require a dilution series of 100%, 75%, 44%, 11% and 6%.

6. Comment: The draft permit required the City to submit a Quality Assurance Plan (QAP) to EPA within 60 days of the effective date of the permit, and to implement the QAP within 120 days of the effective date of the permit. The City stated that they do not have the in-house expertise to develop a plan and therefore, would have to hire contractors. The City requested that the final permit be changed to allow the City 120 days from the effective date of the permit to submit the QAP, with implementation another 60 days thereafter.

   Response: The final permit has been revised to require the City to submit the plan to EPA by the 120th day of the effective date of the permit and to implement the plan 150 days after the effective date of the permit.

7. Comment: The City clarified that only the appropriate and applicable portions of the QAP guidance documents listed in the draft permit should be incorporated into the City's QAP.

   Response: The City is correct.

8. Comment: The permit required the City to use a qualified biologist to conduct an endangered species analysis for each new site used for land application of biosolids. The City requested that the permit be revised to allow the City to consult with state and federal agencies to determine if threatened or endangered species are present at a proposed new land application site. If information suggests that threatened or endangered species do exist at a proposed land application site, then the City should conduct a special evaluation using a qualified biologist.

Response: The final permit has been revised to allow the City to contact the appropriate agencies to determine if endangered species are present in the area. If endangered species are present, the City must conduct an evaluation of the area using a qualified biologist.

9. Comment: When the City proposes using a new site for the land application of biosolids, the draft permit requires the City to notify, at a minimum, adjacent land owners, the local Natural Resource Conservation Service, State Agriculture Extension Service, and the local Soil Conservation District. The City states that EPA has provided no basis for this requirement, and the City does not believe it necessary to require notification of anyone except adjacent landowners.

Response: 40 CFR 503.5 allows the permitting authority to impose more stringent requirements for the disposal of sludge. EPA typically consults with the above agencies on sludge issues and believes it is important that these agencies be notified whenever a new land application site is chosen.

10. Comment: The draft permit required the City to monitor cadmium, chromiumVI copper, lead, mercury and silver. The fact sheet provided no basis for the monitoring except that the metals may be of concern.

The City stated that they did conduct clean sampling at very low detection levels. Since the monitoring requirement is costly, the City requests the basis for the monitoring requirements.

Response: The City of Meridian collected metals data from July 23, 1996 through July 16, 1998. A review of the data collected indicated metals concentrations for mercury, silver, copper and cyanide occasionally exceeded Idaho's water quality criteria. It was not clear if cadmium, chromium, and lead also exceeded the criteria because the analytical method detection levels for these parameters exceeded the water quality criteria.

In the City's October 1996 permit application, the City submitted clean metal data obtained on August 15, 1995 and November 11, 1995. The data show fairly low concentrations of chromium, and cadmium, and fairly high lead concentrations. Relying on these data would result in a determination that the effluent had a reasonable potential to cause or contribute to an exceedance of the water quality standards, and water quality based effluent limits would be required. two data points are not sufficient to characterize the City's effluent.

Rather than incorporate metals limits into the permit at this time, EPA is requiring the facility to collect quality data that will accurately reflect the

metals concentrations that are in the effluent and ambient water. Additionally, since the data indicates the cyanide concentrations exceeded the water quality standards, EPA is requiring the facility to monitor this parameter in the effluent and the receiving water.

EPA realizes that monitoring is costly to the facility. However, it is important to note that the more effluent data that is available the greater the certainty there is in characterizing the maximum projected effluent concentration. This is important because the maximum projected effluent concentration, after consideration of dilution, is compared to the water quality criterion to determine the potential for exceeding that criterion. If the criterion is exceeded then a water quality based effluent limit must be incorporated into the permit. The more accurately the maximum projected effluent concentration can be defined the more accurate a determination can be made as to whether or not a water quality based effluent limit is required for the effluent discharge.

11. Comment: The City stated that there are interference problems when monitoring for Chromium VI that often lead to chromium VI results that substantially exceed total chromium values.

Response: The final permit has been revised to require the facility to monitor total chromium rather than Chromium VI. Additionally, a footnote has been added to the permit which recommends that the permittee consider monitoring for chromium VI if the concentration of total chromium exceed 11 µg/L.

12. Comment: The City stated that there is little discussion about how the ammonia limits were developed. Additionally, the City indicated that the treatment facility had been recently upgraded and that the ammonia concentrations in the effluent are substantially less than historic concentrations. A reasonable potential calculation should be done using the ammonia data obtained after the facility upgrade.

Response: The City submitted ammonia data that is representative of the effluent after the facility upgrade. Based on this data the facility does not have the reasonable potential to cause or contribute to a water quality standards violation therefore the ammonia limits have been removed from the final permit (see appendix A for the reasonable potential determination). The final permit still retains ammonia monitoring. This data will be used during the next reissuance of the permit to determine if ammonia limits may be needed at that time.

13. Comment: The City requested clarification on the reporting requirements for Section I.A.2.d. of the draft permit.

Response: Section I.A.2.d. outlined the reporting requirements for ammonia. Since the ammonia limits have been removed from the final permit, these requirements are no longer needed and have been removed from the permit.

14. Comment: The City requested clarification on temperature monitoring requirements. The City was unclear if EPA's intent was for the City to monitor both the Boise River and Five Mile Creek on a monthly basis. The City recommended that temperature monitoring only be conducted in the receiving water in which the discharge is occurring at the time of monitoring.

If EPA requires that both receiving waters be sampled on a monthly basis, regardless of the discharge location at the time of discharge, then the City recommends that the receiving water to which the discharge is not occurring be sampled on the day following the day of concurrent effluent sampling.

Response: The intent of the temperature monitoring requirements was to have the city monitor both the Boise River and Five Mile Creek on a monthly basis. However, the final permit has been revised to allow the receiving water that is not being discharged to be sampled on the day following the concurrent effluent sampling. In addition, the reporting requirements for temperature monitoring have been clarified.

15. Comment: The City requested clarification on the monitoring frequency for metals. The draft permit identifies the sampling frequency for metals as once per month, however, the fact sheet identifies the sampling frequency as weekly.

Response: The monitoring frequency for metals is once per month.

16. Comment: The permit requires 24 hour composite sampling for metals. The City is concerned that the sampling cannot be accomplished in a clean environment without substantial investment in new and relatively unproven auto-sampling technology. The City requested that the permit allow them to collect manual samples over 2 shifts, and have these samples composited.

Response: The final permit has been revised to allow the facility to collect grab composites, consisting of 6 grab samples over an 18 hour period.

17. Comment: The draft permit allows the monitoring frequency to be reduced based on a statistical analysis using a Students t-test. The permit should not stipulate a specific statistical method that may not be appropriate. The City

requested the permit allow for technically defensible statistical tests appropriate to the distribution and nature of the data to be analyzed.

Response: The statistical analysis used to determine if reduced the monitoring is appropriate was developed by the Idaho Division of Environmental Quality (IDEQ). These same requirements have been incorporated into permits for other municipal wastewater treatment plants in the lower Boise watershed. The final permit has not been revised.

18. Comment: The draft permit requires metals (except mercury) to be analyzed only for the total recoverable form. Idaho aquatic life criteria are expressed as dissolved form of the metal. The City questions how EPA will be able to conduct defensible reasonable potential determinations using only total recoverable data.

The City recommends that EPA and IDEQ develop a programmatic approach, on a watershed basis, to metals monitoring and regulation that recognizes the recent science and national policy focus on dissolved metals.

Response: The draft permit required ambient and effluent metals monitoring to determine if, in the future, metals concentrations in the effluent would need to be regulated in order to protect aquatic life. For the protection of aquatic life the instream criterion for most metals is expressed as the dissolved form of the metal. In the draft permit EPA required metals to be measured as dissolved in the upstream receiving water, and as total recoverable in the effluent. EPA is requiring the effluent to be measured as total recoverable because the chemical conditions in ambient waters frequently differ substantially from those in the effluent, and there is no assurance that effluent particulate metal would not dissolve after discharge into the receiving water. This is important because by measuring only dissolved metals in the effluent you may be greatly underestimating the amount of dissolved metal actually being contributed to the creek by the effluent.

A metal specific “translator” can be used to account for the amount of particulate metal in the effluent that may dissolve after mixing with the ambient water. The translator would be multiplied by the total recoverable metal concentration in the effluent to determine the total amount of dissolved metal that will be contributed to the receiving water by the effluent. In future reasonable potential calculations EPA can use a translator <u>if</u> one is provided by the IDEQ. In the absence of a metal specific translator EPA will use a default translator of 1÷(conversion factor used for converting total recoverable criteria to dissolved criteria).

19. Comment: The draft permit requires the City to collect water temperature samples "at the hottest time of the day". The City states that this is not practical because (1) there is no way of knowing when the hottest time of the day is, (2) it is not clear if the hottest time pertains to air or water temperatures, and (3) it is not uncommon for very hot temperatures to persist in Meridian well after the end of the normal work day.

The City recommends that the permit only require that sampling occur in the afternoon or late evening. This will provide a reasonable estimate of the highest water temperatures, without subjecting the City to unreasonable compliance, staffing and scheduling constraints.

Response: The final permit has been revised to require the facility to monitor between the hours of 4 PM and 6 PM.

20. Comment: Item I.C.5., and I.D.5 state that the monitoring results should be submitted to EPA no later than June 1, 2002. This date presumes a permit issuance or effective date. The City recommends that this section stipulate a time duration subsequent to the effective date of the permit (i.e. 36 months), thus relieving the City of the burden of any potential delays in permit issuance.

Response: The final permit has been revised to clarify the reporting requirements.

21. Comment: Table 5, footnote 2 of the draft permit states that sampling for parameters in Table 5 denoted with a "2" may be decreased provided the requirements in section I.A.6. are met. Section I.A.6. should be Section I.C.2.

Response: The final permit has been corrected.

22. Comment: Section I.D.7 of the draft permit should include the statement that the monitoring will be required for two years (as in section I.A.8).

Response: The statement is at the beginning of section I.D.

23. Comment: Section I.E.3.a and I.E.3.b are redundant.

Response: The final permit has been revised to combine the two requirements.

24. Comment: Table 6, in Section I.G.5. of the permit requires the permittee to notify EPA, but does not specify a name or address.

Response: The final permit has been revised to include an address.

25. Comment: Section II.H states that reports for noncompliance items not required to be

reported within 24 hours shall contain the information listed in section II.H.4. There is no II.H. 4 in the permit.

Response: The correct citation is II.G.3., the final permit has been corrected.

State Certification Requirements

Pursuant to Section 401 of the Clean Water Act, the State of Idaho provided certification that the requirements set forth in the NPDES comply with the Idaho water quality standards. As part of the certification, the State required that monitoring for E. Coli bacteria be incorporated into the permit during the fourth year of the permit. This condition has been incorporated into the final permit.

APPENDIX A

1. Reasonable Potential Determination for Dissolved Oxygen (DO)

The State of Idaho has listed Five Mile Creek as water quality limited for DO. A water quality limited water is defined as "any segment where it is known that water quality does not meet applicable water quality standards".

Since the creek already exceeds the water quality standards for DO it is not possible to consider a mixing zone. Therefore an effluent discharge that has DO concentrations of less than 6.0 mg/L would cause or contribute to a violation of the water quality standard.

EPA has developed a statistical approach to characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation with the uncertainty due to a limited number of data points to project an estimate of the worst case concentration for the effluent. For DO, the estimated concentration for the effluent is equal to the lowest observed toxicity value of the data set divided by the reasonable potential factor (see Technical Support Document for Water Quality Based Toxics Control (March 1991) .

In this case, it is not necessary to determine the reasonable potential multiplier because in August, September, and October of 1998, the facility reported average monthly DO concentrations of 5.3 mg/L, 5.8 mg/L and 5.7 mg/L. Since these values are less than the DO criterion, an effluent limit is required.

3. Reasonable Potential Determination for pH

Mixing zones are authorized at the discretion of IDEQ. Additionally, since there is no alkalinity data available to indicate that the receiving water has sufficient capacity to buffer the effluent discharge a mixing zone is not appropriate. Since IDEQ has not authorized a mixing zone for pH the reasonable potential determination will be conducted based on no mixing zone. In this case, the minimum projected effluent concentration must not be less than 6.5 standard units.

The minimum projected effluent pH concentration was calculated using the procedures outlined in chapter 3 of the Technical Support Document for Water Quality Based Toxics Control (March 1991). Data from January 1995 through December 1998 indicates that the coefficient of variation is 0.029, based on this information the reasonable potential factor is 1.03. The minimum observed effluent concentration is 6.62 standard units. The minimum projected effluent concentration is $6.62 \div 1.03 = 6.4$ standard units. Since this value is less than the criterion of 6.5 standard units, a limit is needed.

4. Reasonable Potential Analysis for Ammonia

As a first step a reasonable potential calculation will be done assuming worst case conditions, such as no mixing zone. If this calculation shows that a water quality based effluent limit is required, the calculation will be refined using a 25% mixing zone.

To determine if a water quality based effluent limitation is required, the receiving water concentration of pollutants is determined downstream of where the effluent enters the receiving water. If the projected receiving water concentration is greater than the applicable numeric criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard and an effluent limit must be incorporated into the NPDES permit.

The receiving water concentration is determined using the following mass balance equation.

$$C_d \times Q_d = (C_e \times Q_e) + (C_u \times Q_u)$$

$$C_d = \frac{(C_e \times Q_e) + (C_u \times Q_u)}{Q_d}$$

where,
C_d = receiving water concentration downstream of the effluent discharge
Q_d = receiving water flow downstream of the effluent discharge
C_e = maximum projected effluent concentration
Q_e = maximum effluent flow
C_u = upstream concentration of pollutant
Q_u = upstream flow

If a mixing zone (%MZ) is authorized by IDEQ, the mass balance equation becomes

$$C_d = \frac{(C_e \times Q_e) + (C_u \times (Q_u \times \%MZ))}{Q_e + (Q_u \times \%MZ)}$$

NOTE: $Q_d = Q_e + (Q_u \times \%MZ)$

When a mixing zone is not authorized by IDEQ, the mass balance equation becomes

$$C_d = C_e$$

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration, EPA's *Technical Support Document for Water Quality-based Toxics Controls* (TSD, 1991) recommends using the maximum projected effluent concentration. To determine the maximum projected effluent

concentration (C_e) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV's for each parameter have been calculated, the reasonable potential multiplier used to derive the maximum projected effluent concentration (C_e) can be found in Table 3-1 of EPA's TSD.

The maximum projected concentration (C_e) for the effluent is equal to the maximum observed concentration value of the data set multiplied by the reasonable potential multiplier.

The following table summarizes the data used to calculate the CV

Date	Plant Effluent Data	Date	Plant Effluent Data
3/3/99	0.15	5/5/99	0.10
3/5/99	0.18	5/7/99	0.12
3/10/99	0.18	5/12/99	0.16
3/12/99	0.15	5/14/99	0.14
3/17/99	0.18	5/19/99	0.15
3/19/99	0.12	5/21/99	0.14
3/24/99	0.16	5/26/99	0.15
3/26/99	0.14	5/28/99	0.15
4/2/99	0.16	6/2/99	0.20
4/7/99	0.18	6/4/99	0.13
4/9/99	0.16	6/9/99	0.09
4/14/99	0.12	6/11/99	0.10
4/16/99	0.18	6/18/99	0.15
4/21/99	0.08	6/23/99	0.15
4/23/99	0.07	6/25/99	0.15
4/28/99	0.16	6/30/99	0.16
4/30/99	0.12		

Using the above data the CV (standard deviation ÷ mean) is 0.21; the number of samples is 32; and the maximum observed effluent data is 0.20 mg/L.

The reasonable potential multiplier is calculated as follows (see chapter 3 of the TSD for additional information).

The following relationship characterizes the highest measured effluent concentration based on the desired confidence level. (p_n is the percentile represented by the highest concentration in the data and n is the number of samples).

p_n = (1 - confidence level)$^{1/n}$

= (1-.99)$^{1/32}$ = 87%

The second part of the statistical approach is a relationship between the percentile described above and the selected upper bound of the lognormal effluent distribution.

$\underline{C_{99}} = \underline{e(2.36 \text{ sigma} - 0.5 \text{ sigma}^2)}$
$C_{87} = e(1.13 \text{ sigma} - 0.5 \text{ sigma}^2)$

2.36 and 1.13 represent the normal distribution values for the 99th and 87th percentiles, respectively;
$\text{sigma}^2 = \ln(CV^2 + 1) = \ln(.21^2 + 1) = 0.043$
sigma = 0.21

$\underline{C_{99}} = \underline{e(2.36 \text{ sigma} - 0.5 \text{ sigma}^2)} = \underline{1.61} = 1.3$
$C_{87} = e(1.13 \text{ sigma} - 0.5 \text{ sigma}^2)$ 1.24

The maximum projected effluent concentration is 0.20 mg/L X 1.3 = 0.26 mg/L.

<u>Numeric Criteria for Ammonia</u>

The numeric criterion for ammonia is related to ambient temperature and pH. In this case, the 95th percentile of downstream ambient data from January 1995 - December 1998 was used. For Five Mile Creek the temperature is 19.05EC, and pH 8.36; for the Boise River the temperature is 16.8EC and the pH is 8.46. Using these values the criteria for the streams are"

Five Mile Creek: Acute = 2.6 mg/L, and Chronic = 0.37 mg/L
Boise River = 2.1 mg/L, and Chronic = 0.35 mg/L

As stated previously, if the projected receiving water concentration is greater than the applicable numeric criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard and an effluent limit must be incorporated into the NPDES permit.

In this case, the maximum projected receiving water concentration is equal to the maximum projected effluent concentration. The maximum effluent concentration is 0.26 mg/L. This concentration is lower than the criteria for the Boise River and Five Mile Creek, therefore a limit is not needed.