

FACT SHEET

The United States Environmental Protection Agency (EPA) proposes to reissue a National Pollutant Discharge Elimination System (NPDES) permit to:

**The Meadows L.L.C.
#24 Peregrine Drive
Ketchum, Idaho 83340**

NPDES Permit Number: ID-002442-2

Date:

Public Notice Expiration Date:

and requests the state of Idaho to certify this NPDES permit pursuant to 40 CFR 124.53.

NPDES Permit Reissuance.

EPA proposes to reissue an NPDES permit to the Meadows Mobile Home Park (hereafter referred to as The Meadows) in Ketchum, Idaho. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant effluent to the Big Wood River and the transfer of sewage sludge (biosolids) to the Ohio Gulch Transfer Station in Blaine County, Idaho pursuant to the provisions of the Clean Water Act.

This Fact Sheet includes:

- ♦ information on public comment, public hearing, and appeal procedures;
- ♦ a description of the current discharge and biosolids practices;
- ♦ a listing of past and proposed effluent limitations and requirements;
- ♦ a listing of past and proposed influent, effluent and ambient monitoring requirements;
- ♦ a map and description of the wastewater discharge and surface disposal locations; and
- ♦ detailed technical material supporting the conditions in the permit.

State of Idaho Certification.

EPA requests that the Idaho Division of Environmental Quality (IDEQ) conduct an antidegradation analysis in accordance with the state antidegradation policy (IDAPA 16.01.02.051) (see Section III.E.) and certify the NPDES permit for The Meadows, under section 401 of the Clean Water Act. Prior to the Public Notice period, the state provided preliminary comments relating to the nutrient loadings and waste load allocations specified in the 1980 State evaluation of the existing discharges to the Big Wood River above the Magic Reservoir (IDEQ, 1980). These preliminary comments have been incorporated or addressed in the fact sheet and draft permit.

Public Comment.

Persons wishing to comment on or request a Public Hearing for the draft permit may do so in

writing by the expiration date of the Public Notice. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for a Public Hearing must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless a request for an evidentiary hearing is submitted within 30 days.

Availability of Documents for Review.

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below). Draft permits, Fact Sheets, and other information can also be found by visiting the EPA Region 10 website at www.epa.gov/r10earth/offices/water/npdes.htm.

United States Environmental Protection Agency
Region 10
Park Place Building, 13th Floor
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-1214 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

United States Environmental Protection Agency (EPA)
Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

City Clerk's Office
City Hall
P.O. Box 2315
Ketchum, Idaho 83340
(208) 726-3841

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I. BACKGROUND

A. Applicant

The Meadows L.L.C.
NPDES Permit No.: ID-002442-2
Contact Person: Robert Kantor

Facility Mailing Address:
#24 Peregrine Drive
Ketchum, Idaho 83340

B. Activity

The Meadows is located in Blaine County in south central Idaho along the west bank of the Big Wood River. The Meadows owns, operates, and has maintenance responsibility for a facility that treats domestic wastewater from approximately 250 local residents. The facility receives no commercial or industrial wastes. The Meadows completed an upgrade of its facility in 1982. The permit application (dated March 29, 1999) indicates the design flow of the upgraded facility to be 100,000 gallons per day or 0.10 million gallons per day (mgd). Actual flow at the plant over the past four years has averaged approximately 0.02 mgd. The treatment system consists of a dry well, bar screen, communitor, clarifier with scum trough, ultraviolet light disinfection and sludge holding tank. Details about the treatment process are discussed in Appendix A and a map showing the locations of the Meadows wastewater treatment facility and Ohio Gulch Transfer Station are included in Appendix B.

C. Permit History

The NPDES permit for the wastewater treatment plant expired on August 31, 1980. Under the federal Administrative Procedures Act, a federally issued NPDES permit is administratively extended (i.e. continues in force and effect) provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. Since the Meadows did submit a timely application for a new permit, the most recent permit was administratively extended.

D. Plant Performance History

A review of the facility's Discharge Monitoring Reports for the past four years (1995-1998) indicates that the facility has generally been in compliance with its permit effluent limitations.

II. RECEIVING WATER

A. Outfall Location

Treated effluent from the Meadows wastewater treatment facility is discharged from outfall 001, located at latitude: 43° 37' 58.639"; longitude: 114° 20' 59.321" to the Big Wood River at river kilometer 148 (river mile 92.5).

B. Water Quality Standards

A State's water quality standards consist of use classifications and numeric and/or narrative water quality criteria. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary, by the State, to protect the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The state of Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 16.01.02.150.01) (1996) designate the Big Wood River beginning at the source to the Magic Reservoir for the following beneficial uses: domestic water supply, agricultural water supply, cold water biota, salmon spawning, primary contact recreation, secondary contact recreation and special resource water.

C. Water Quality Limited Segment

A water quality limited segment is any waterbody, or definable portion of a water body, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. In 1994, the state of Idaho listed the segment of the Big Wood River at Ketchum, ID (i.e. headwaters to the Glendale Diversion) as "water quality limited" for flow alteration. The next impaired water segment of the Big Wood River extends from the Richfield Diversion to Highway 75 and is listed as water quality limited for nutrients, sediment and flow alteration.

III. EFFLUENT LIMITATIONS

Sections 101, 301(b), 304, 308, 401, 402 and 405 of the Clean Water Act provide the basis for the effluent limitations and other conditions in the draft permit. EPA evaluates discharges with respect to these sections of the Clean Water Act and the relevant NPDES regulations in determining which conditions to include in the permit.

In general, EPA first determines which technology-based limits are required to be incorporated into the permit [40 CFR §122.44(a)] as well as best management practices and

other applicable requirements. The Meadows is a non-municipal discharger referred to as a Treatment Works Treating Domestic Sewage (TWTDS). Technology-based effluent limitations for non-municipal discharges are based on two general approaches: (1) using national effluent limitations guidelines (ELGs) or (2) using Best Professional Judgement (BPJ) on a case-by-case basis in the absence of ELGs. National ELGs have not been promulgated for TWTDS and, as such, BPJ-based limits have been incorporated into the draft permit based on the secondary treatment standards for municipal wastewater treatment plants (40 CFR §133.102). The authority for BPJ is contained in Section 402(a)(1) of the Clean Water Act and NPDES regulations 40 CFR §125.3 define what factors must be considered when establishing BPJ-based conditions in a permit.

In addition to the technology-based limits, Section 301(b) of the Clean Water Act requires that NPDES permits include limits for all pollutants or parameters 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, including state narrative criteria for water quality.” The limits must be stringent enough to ensure that water quality standards are met (see section II.B. above), and must be consistent with any available wasteload allocation (WLA). Therefore, the effluent limitations specified in an NPDES permit are developed from both technology available to treat the pollutants (“technology-based limits”) and limits that are protective of the designated uses of the receiving water (“water quality-based limits”). For a pollutant for which both technology-based and water quality-based limits exist, the more stringent limits will be included into the permit.

In determining whether water quality-based limits are needed and developing those limits when necessary, EPA uses the approach outlined below:

1. Determine the appropriate water quality criteria
2. Determine whether there is “reasonable potential” to exceed the criteria
3. If there is “reasonable potential”, then develop a WLA
4. Develop effluent limitations based on WLAs
5. Compare to technology based limits and apply the more stringent limits

A. Summary of Effluent Limitations in Draft NPDES Permit

The following tables summarize the current effluent limitations that were included in the 1975 permit and the proposed effluent limitations included in the draft permit:

Table 1. CURRENT EFFLUENT LIMITATIONS (1975 PERMIT)					
Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily	Minimum Daily
Flow	mgd	0.035	---	---	---
Biochemical Oxygen Demand (BOD ₅)	mg/L	20	30	---	---
	lbs/day	7	11	---	---
Total Suspended Solids (TSS)	mg/L	20	30	---	---
	lbs/day	7	11	---	---
Fecal Coliform Bacteria	colonies/100 mL	200	400	---	---
pH	s.u.	---	---	9.0	6.0

Table 2. PROPOSED EFFLUENT LIMITATIONS (1999 PERMIT)					
Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily	Minimum Daily
Biochemical Oxygen Demand (BOD ₅) ¹	mg/L	30	45	---	---
	lbs/day	25	38	---	---
Total Suspended Solids (TSS) ¹	mg/L	30	45	---	---
	lbs/day	25	38	---	---
Fecal Coliform Bacteria (May 1- September 30)	colonies/100 mL	50 ²	200 ³	500 ⁴	---
Fecal Coliform Bacteria (October 1 - April 30)	colonies/100 mL	200 ²	200 ³	800 ⁴	---
pH	s.u.	---	---	9.0	6.5
Total Nitrogen as N	mg/L	10.79	---	21.65 ⁴	---
	lbs/day	9.00	---	18.05 ⁴	---
Total Phosphorus as P	mg/L	3.36	---	5.61 ⁴	---
	lbs/day	2.80	---	4.68 ⁴	---
<p>1 The average monthly percent removal must be $\geq 85\%$ and will be the arithmetic mean of the percent removals calculated from each weekly influent and corresponding effluent concentration value within that month. Average monthly percent removal must be reported on the following monthly Discharge Monitoring Report (DMRs).</p> <p>2 Based on a geometric mean of all samples taken in that month.</p> <p>3 Based on a geometric mean of all samples taken in that week.</p> <p>4 Reporting is required within 24-hours if the maximum daily limit is violated.</p>					

In addition to the requirements listed above, the following limitations shall also apply:

1. The permit does not authorize the discharge of any waste streams, including spills and

other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application, or any pollutants that are not ordinarily present in such waste streams. The facility may discharge waste streams and pollutants associated with operations which would not require notification under Part **IV.A. Notice of New Introduction of Pollutants** of the draft permit.

2. The discharge of chemicals in toxic amounts is prohibited pursuant to Section 101(a)(3) of the Clean Water Act and Idaho water quality standards (IDAPA 16.01.02.200.02), which prohibits the discharge of toxic pollutants in toxic amounts.
3. There shall be no discharge of deleterious materials in concentrations that impair beneficial uses of the receiving water.
4. There shall be no discharge of floating solids, visible foam, or oily wastes which produce a sheen on the surface of the receiving water.

B. Evaluation of Effluent Limitations

1. Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS)

The Meadows is subject to the federal technology-based requirements for BOD₅ and TSS (40 CFR §133.102) based upon Best Professional Judgement and the state standards for point sources discharging sewage wastewater (IDAPA 16.01.02.420.01). Both federal and state requirements specify weekly and monthly average concentration based limits for BOD₅ and TSS. In addition, federal regulations 40 CFR §122.45(f) require that NPDES permits must also express the effluent limits in terms of mass-based limits. Based on the current design flow of 0.10 million gallons per day, these mass-based limits were higher than the current (1975) permit limits. Federal regulations 40 CFR §122.44(l) specify that when a permit is renewed or reissued, the effluent limitations must be at least as stringent as the effluent limitations in the previous permit. In addition, the receiving water has been designated as a special resource water and any increase in effluent limitations must be consistent with the state of Idaho's antidegradation policy (see Section III.E.). Therefore, the more stringent effluent limits in the 1975 permit were initially considered for the draft permit. Federal regulations 40 CFR §122.44(l)(2)(i)(A) specify exceptions with respect to less stringent effluent limitations in reissued permits provided that substantial alterations or additions to the permitted facility occurred after the permit was issued. In this case, the Meadows treatment facility was updated in 1982, seven years after the NPDES permit was issued. Also, after further consultation with IDEQ, the waste load allocations for BOD₅ and TSS specified in the 1980 State evaluation of the existing discharges to the Big Wood River above the Magic Reservoir (IDEQ, 1980) were incorporated into the draft permit. These waste load allocations included concentration-based effluent limitations of 30 mg/L monthly average and 45 mg/L

weekly average for BOD₅ and TSS with a design flow of 0.10 million gallons per day. In accordance with 40 CFR §122.45(f), the draft permit includes mass-loading limits based on the plant design capacity of 0.10 million gallons per day (40 CFR §122.45(b)). See Appendix C for calculations.

The following table summarizes the effluent limits for BOD₅ and TSS expressed in both effluent concentration limits and percent removal based on influent loading:

Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average
Biochemical Oxygen Demand (BOD ₅) ¹	mg/L	30	45
	lbs/day	25	38
Total Suspended Solids (TSS) ¹	mg/L	30	45
	lbs/day	25	38
¹ Removal efficiency ≥ 85%.			

2. Fecal Coliform Bacteria

Fecal coliform bacteria are a non-pathogenic indicator species whose presence suggest the likelihood that pathogenic bacteria such as E. coli are present. Idaho water quality standards for primary contact recreation (IDAPA 16.01.02.250.01.a.) require that between May 1 - September 30, fecal coliform bacteria in the effluent shall not exceed 500 colonies/100 mL at any time, 200 colonies/100 mL in more than ten percent of the total samples taken over a thirty day period and a geometric mean of 50 colonies/100 mL based on a minimum of five samples taken over a thirty day period. Idaho water quality standards for secondary contact recreation (IDAPA 16.01.02.250.01.b.) require that fecal coliform bacteria in the effluent shall not exceed 800 colonies/100 mL at any time, 400 colonies/100 mL in more than ten percent of the total samples taken over a thirty day period and a geometric mean of 200 colonies/100 mL based on a minimum of five samples taken over a thirty day period. In addition, the disinfection requirements for sewage wastewater treatment plant effluent (IDAPA 16.01.02.420.05) specify that fecal coliform bacteria concentrations in secondary treated effluent (as determined by multiple-tube fermentation or membrane filter procedures) must not exceed a geometric mean of 200 colonies/100 mL based on no more than one week's data and a minimum of five samples.

The following summarizes the effluent limits for fecal coliform bacteria:

Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily
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Fecal Coliform Bacteria (May 1 - September 30)	colonies/100 mL	50 ¹	200 ²	500
Fecal Coliform Bacteria (October 1 - April 30)	colonies/100 mL	200 ¹	200 ²	800
1 Based on a geometric mean of all samples taken in that month.				
2 Based on a geometric mean of all samples taken in that week..				

3. Hydrogen ion concentration (pH)

The federal technology-based requirements for pH (40 CFR §133.102) specify pH limits of 6.0 to 9.0 standard units. The Idaho water quality standards for aquatic life specify pH limits of 6.5 to 9.5 standard units (IDAPA 16.01.02.250.02.a.i). The more stringent pH range applies, therefore the draft permit proposes a pH limit of 6.5 to 9.0.

4. Nutrients

Nutrients typically found in sewage wastewater consist of phosphorus, nitrogen and carbon compounds. Idaho water quality standards (IDAPA 16.01.02.200.06) specify narrative criteria which requires that surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. Furthermore, numeric criteria are specified in Idaho water quality standards for ammonia (IDAPA 16.01.02.250.02.c.iii and 16.01.02.250.02.d.iii) and for nitrate and nitrite (IDAPA 16.01.02.250.03.b).

- a. Total Ammonia (NH₃ as N). Using the 95th percentile temperature (14.5°C) and pH (8.47 s.u.) from monitoring data obtained at the U.S. Geological Survey (USGS) station at Hailey, Idaho, the acute criterion was calculated to be to 2.08 mg/L and the chronic criterion was 0.48 mg/L. The more conservative criterion of 0.48 mg/L was compared to the 95th percentile ambient ammonia concentration of 0.29 mg/L at the U.S. Geological Station. Because the ambient ammonia concentration did not exceed the state water quality standard, a mixing zone was incorporated into the reasonable potential analysis. If the state of Idaho does not certify a mixing zone (IDAPA 16.01.02.060) in the 401 certification, then in accordance with 40 CFR § 122.44(d)(1), the effluent limitations including the reasonable potential analysis will be recalculated without a mixing zone. See Appendix C for calculations.

The draft permit does not propose any effluent limitations for ammonia because EPA determined that there was no reasonable potential for the water quality standards to be exceeded.

- b. Total Nitrogen (N). A mass-based average monthly limit (AML) of 9.0 lb/day was specified in the 1980 State evaluation of the existing discharges to the Big Wood

River above the Magic Reservoir (IDEQ, 1980). A corresponding concentration-based AML of 10.79 mg/L was developed from the mass-based AML. In addition, the 9.00 lb/day AML was used to back-calculate a long term average (LTA) which was then used to develop maximum daily limits (MDLs) in both concentration and mass-based loading units (see Appendix C for calculations).

Currently, there is no EPA-approved method for total nitrogen analysis. Therefore, the Meadows will be required to monitor for total organic and inorganic nitrogen and combine these results to determine total nitrogen in the effluent. Total organic nitrogen will be determined by using an EPA-approved method to measure total Kjeldahl nitrogen and total inorganic nitrogen will be determined by using EPA-approved methods to measure total ammonia, nitrate and nitrite.

The draft permit proposes the following effluent limitations for total nitrogen:

Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily	Minimum Daily
Total Nitrogen ¹	mg/L	10.79	---	21.65	---
	lb/day	9.00	---	18.05	---

¹ Effluent limits based on design flow of 0.10 million gallons per day.

- c. Nitrate-Nitrite as N. In addition to total nitrogen effluent limitations, Idaho water quality standards (IDAPA 16.01.02.250.03.b) specify the use of “Water Quality Criteria 1972 (Blue Book), Section V, Agricultural Uses of Water” when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 100 µg/L nitrate-nitrite as N is listed for agricultural water supplies intended as drinking water for livestock.

The draft permit does not propose any effluent limitations for nitrate-nitrite due to the lack of historical effluent data which is necessary to determine if there is a reasonable potential for applicable water quality criteria to be exceeded. The draft permit does propose monitoring requirements for nitrate to assist in the evaluation of future effluent limitations (see also Sections IV.A. and IV.B.).

- d. Nitrite as N. In addition to total nitrogen effluent limitations, Idaho water quality standards (IDAPA 16.01.02.250.03.b) specify the use of “Water Quality Criteria 1972 (Blue Book), Section V, Agricultural Uses of Water” when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 10 µg/L nitrite as N is listed for agricultural water supplies intended as drinking water for livestock.

The draft permit does not propose any effluent limitations for nitrite due to the lack of historical effluent data which is necessary to determine if there is a reasonable potential for applicable water quality criteria to be exceeded. The draft permit does propose monitoring requirements for nitrite to assist in the evaluation of future effluent limitations (see Sections IV.A. and IV.B.).

- e. Total Phosphorus (P). A mass-based average monthly limit (AML) of 2.80 lb/day was specified in the 1980 State evaluation of the existing discharges to the Big Wood River above the Magic Reservoir (IDEQ, 1980). A corresponding concentration-based AML of 3.36 mg/L was developed from the mass-based AML. In addition, the 2.80 lb/day AML was used to back-calculate a long term average (LTA) which was then used to develop maximum daily limits (MDLs) in both concentration and mass-based loading units (see Appendix C for calculations).

Based upon analytical results of the Meadows discharge submitted to EPA (dated March 30, 1999), the facility will not meet this requirement approximately 25% of the time (predominantly during the months of June, July and August). State water quality standards (IDAPA 16.01.02.400.03) indicate that discharge permits for point sources may incorporate schedules of compliance which allow a discharger to phase in, over time, compliance with water quality-based effluent limitations when new limitations are in the permit for the first time. The Meadows may request a compliance schedule from IDEQ which will be included in the state 401 certification of this permit. Federal requirements for schedules of compliance are specified under 40 CFR §122.47 and include submittal of annual progress reports to EPA.

The draft permit proposes the following effluent limitations for total phosphorus:

Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily	Minimum Daily
Total Phosphorus (P) ¹	mg/L	3.36	---	4.70	---
	lb/day	2.80	---	3.92	---
¹ Effluent limits based on design flow of 0.10 million gallons per day.					

5. Toxic Substances

The Idaho water quality standards (IDAPA 16.01.02.200.02) and Section 101(a)(3) of the Clean Water Act require surface waters of the state to be free from toxic substances in concentrations that impair designated beneficial uses. EPA has evaluated the Meadow's discharge in accordance with the Agency's policy for controlling the discharge of toxic substances. Because the Meadows facility treats only domestic

sewage with no commercial or industrial wastewater contributors, the proposed permit does not include numeric effluent limitations to assess potential effluent toxicity.

6. Deleterious Materials

In accordance with Idaho water quality standards (IDAPA 16.01.02.200.03), the receiving waters of the state shall be free from deleterious materials in concentrations that impair beneficial uses.

The draft permit proposes that the facility meet a narrative standard for deleterious materials.

7. Floating, Suspended or Submerged Matter

In accordance with Idaho water quality standards (IDAPA 16.01.02.200.05), the receiving waters of the state shall be free from floating, suspended or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that impair designated beneficial uses.

The draft permit proposes that the facility meet a narrative standard for floating, suspended and submerged matter.

8. Turbidity

The Idaho water quality standards for cold water biota require that turbidity shall not exceed background turbidity by more than fifty Nephelometric Turbidity Units (NTU) instantaneously or more than twenty-five NTU for more than ten consecutive days. Water quality standards for point sources that discharge wastewater (IDAPA 16.01.02.401.03) require that the wastewater must not increase the turbidity of the receiving water outside the mixing zone by:

- i. more than five (5) NTU over background turbidity, when background turbidity is fifty (50) NTU or less; or
- ii. more than ten percent (10%) increase in turbidity when background turbidity is more than fifty (50) NTU, not to exceed a maximum increase of twenty-five (25) NTU.

Since turbidity is directly related to total suspended solids (TSS), monitoring and limiting TSS should prove protective of this requirement.

No monitoring requirements for turbidity are proposed in the draft permit.

9. Temperature

Idaho water quality standards specify numeric temperature criteria for waters designated for cold water biota (IDAPA 16.01.02.250.02.c.ii) and salmonid spawning (IDAPA 16.01.02.250.02.d.ii). Waters designated for cold water biota must exhibit temperatures of 22°C or less with a maximum daily average of no greater than 19°C. Waters designated for salmonid spawning must exhibit temperatures of 13°C or less with a maximum daily average no greater than 9°C.

The draft permit does not propose any effluent limitations for temperature due to the lack of historical effluent data which is necessary to determine if there is a reasonable potential for applicable water quality criteria to be exceeded. The draft permit does propose monitoring requirements for temperature to assist in the evaluation of future effluent limitations (see Sections IV.A. and IV.B.).

10. Dissolved Oxygen

The Idaho water quality standards for waters designated for cold water biota (IDAPA 16.01.02.250.02.c.i) require that dissolved oxygen concentrations must exceed 6.0 mg/L at all times. Water quality standards for waters designated as salmonid spawning (IDAPA 16.01.02.250.02.d.i) require a one day minimum of not less than 6.0 mg/L or 90% of saturation, whichever is greater.

The 1980 State report (IDEQ, 1980) summarizes dissolved oxygen concentrations upstream from the Meadows with the lowest concentration of 8.50 mg/L. Modeling results (see Appendix C) indicate a maximum decrease in dissolved oxygen concentration of 0.08 mg/L which is below the sensitivity of the analytical method. Changes in dissolved oxygen concentrations less than 2 mg/L cannot be reliably measured (IDEQ, 1980).

Based on the results of the dissolved oxygen modeling, the draft permit does not propose any effluent limitations for dissolved oxygen.

11. Total Residual Chlorine (TRC)

The Idaho water quality standards (IDAPA 16.01.02.250.02.a.iii) specify numeric criteria for total residual chlorine concentration. In 1982, the Meadows upgraded the wastewater treatment facility which included ultraviolet light disinfection. Therefore, the numeric criteria for total residual chlorine concentration does not apply.

C. Antidegradation

The state of Idaho has adopted an anti-degradation policy (IDAPA 16.01.02.051) as part

of their water quality standards. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses. The Big Wood River from its source to the Magic Reservoir has been designated as a special resource water (IDAPA 16.01.02.150.01). EPA considers waters designated as special resource waters as Tier 2 waters for purposes of Idaho’s antidegradation policy. Tier 2 waters have higher water quality than is necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. Before water quality of Tier 2 waters can be lowered, there must be an anti-degradation review consisting of: (1) a finding that it is necessary to accommodate important economical or social development in the area where the waters are located; (2) full satisfaction of all intergovernmental coordination and public participation provisions; and (3) assurance that the highest statutory and regulatory requirements for point sources and best management practices for nonpoint sources are achieved. Furthermore, water quality may not be lowered to less than the level necessary to fully protect the “fishable/swimmable” uses and other existing uses.

EPA is requesting that the state of Idaho conduct an antidegradation analysis and certify that the limits proposed in the draft permit are consistent with the State’s water quality standards. If the state of Idaho does not certify the proposed effluent limits in the 401 certification, then EPA will recalculate the effluent limitations based on the limits specified in the 1975 NPDES permit.

IV. MONITORING REQUIREMENTS

Section 308 of the Clean Water Act and federal regulation 40 CFR §122.44(i) requires that monitoring be included in permits to determine compliance with effluent limitations. Additionally, monitoring may be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility’s performance. The permittee is responsible for conducting the monitoring and for reporting results with Discharge Monitoring Reports (DMRs) to EPA.

A. Summary of Influent and Effluent Monitoring Requirements in Draft NPDES Permit

Table 3 summarizes the effluent monitoring requirements proposed in the draft permit. For comparison purposes, Table 3 also includes the monitoring requirements of the current permit. Any change in monitoring frequency is discussed below.

Table 3. INFLUENT AND EFFLUENT MONITORING REQUIREMENTS		
Parameter	Current Permit (1975)	Draft Permit (1999)

Flow	Weekly	5/week
Biochemical Oxygen Demand (BOD ₅) ¹	1/month	1/week
Total Suspended Solids (TSS) ¹	1/month	1/week
Fecal Coliform Bacteria	1/month	5/week
E. Coli Bacteria	----	5/week
pH	3/week	5/week
Total Ammonia as N	----	1/month
Total Kjeldahl Nitrogen	----	1/month
Nitrate as N	----	1/month
Nitrite as N	----	1/month
Total Phosphorus as P	----	1/month
Temperature	----	5/week
Total Residual Chlorine (TRC)	3/week	----
¹ Monitoring requirements for both influent and effluent.		

1. Flow

The proposed monitoring frequency has been changed to five times per week in order to determine compliance with the mass-based effluent limitations (ie. lb/day) proposed in the draft permit.

2. Biochemical Oxygen Demand (BOD₅)

The proposed monitoring frequency has been changed to once per week in order to determine compliance with federal regulations 40 CFR §133.102.

3. Total Suspended Solids (TSS)

The proposed monitoring frequency has been changed to once per week in order to determine compliance with federal regulations 40 CFR §133.102.

4. Fecal Coliform Bacteria

The proposed monitoring frequency has been changed to five times per week in order to determine compliance with state water quality standards IDAPA 16.01.02.250.01.a and b and 16.01.02.420.05.

5. E. Coli Bacteria

EPA anticipates that the State of Idaho may change the water quality standards for primary and secondary contact recreational uses from fecal coliform bacteria to E. coli bacteria in the near future (i.e. during the effective period of the permit). Therefore, effluent monitoring requirements for E. coli bacteria are proposed in the draft permit.

6. Hydrogen ion concentration (pH)

The proposed monitoring frequency has been changed to five times per week in order to determine compliance with federal regulations 40 CFR §133.102 and state water quality standards IDAPA 16.01.02.250.02.a.i.

7. Total Ammonia (NH₃ as N)

The proposed monitoring frequency has been changed to once per month in order to determine compliance with state water quality standards IDAPA 16.01.02.200.06 and the proposed effluent limitations based on the nutrient loadings specified in the 1980 State report (IDEQ, 1980).

8. Total Kjeldahl Nitrogen

The proposed monitoring frequency has been changed to once per month in order to determine compliance with state water quality standards IDAPA 16.01.02.200.06 and the proposed effluent limitations based on the nutrient loadings specified in the 1980 State report (IDEQ, 1980).

9. Nitrate-Nitrite as N

The proposed monitoring frequency has been changed to once per month in order to determine compliance with state water quality standards IDAPA 16.01.02.200.06 and the proposed effluent limitations based on the nutrient loadings specified in the 1980 State report (IDEQ, 1980).

10. Total Phosphorus as P

The proposed monitoring frequency has been changed to once per month in order to determine compliance with state water quality standards IDAPA 16.01.02.200.06 and the proposed effluent limitations based on the nutrient loadings specified in the 1980 State report (IDEQ, 1980).

11. Temperature

The proposed monitoring frequency has been changed to five times per week in order to assist in the evaluation of future effluent limitations.

12. Total Residual Chlorine (TRC)

The water quality standards are no longer applicable because the facility currently uses ultraviolet light disinfection.

B. Summary of Ambient Monitoring Requirements in Draft NPDES Permit

The purpose of ambient monitoring is to determine water quality conditions as part of the effort to reissue the permit and evaluate the reasonable potential for the discharge to cause the receiving water to not meet state water quality criteria. Table 4 summarizes the ambient monitoring requirements proposed in the draft permit:

Table 4. AMBIENT MONITORING REQUIREMENTS^{1, 2}				
Parameter	Units	Sample Location	Sample Frequency	Sample Type
E. Coli Bacteria	#/100 mL	Upstream & Downstream	1/month	grab
pH	s.u.	Upstream & Downstream	1/month	grab
Temperature	°C	Upstream & Downstream	1/month	grab
Total Phosphorus as P	mg/L	Upstream & Downstream	1/month	grab
Total Kjeldahl Nitrogen	mg/L	Upstream & Downstream	1/month	grab
Total Ammonia as N	mg/L	Upstream & Downstream	1/month	grab
Nitrate as N	mg/L	Upstream & Downstream	1/month	grab
Nitrite as N	mg/L	Upstream & Downstream	1/month	grab
¹ For each parameter monitored in both effluent and receiving water, ambient sampling shall be conducted on the same day as effluent sampling. ² Monitoring for these parameters must start within 90 days after the effective date of the permit and must continue for a period of two years.				

1. E. Coli Bacteria

EPA anticipates that the state of Idaho may change the water quality standards for

primary and secondary contact recreational uses from fecal coliform bacteria to E. coli bacteria in the near future (i.e. during the effective period of the permit). Therefore, ambient monitoring requirements for E. coli bacteria are proposed in the draft permit to assist in the development of these new water quality standards.

2. Hydrogen ion concentration (pH)

The draft permit proposes ambient monitoring requirements for pH to assist in future efforts to evaluate the reasonable potential for the discharge to cause the receiving water to not meet state water quality criteria for ammonia.

3. Temperature

Idaho water quality standards specify numeric temperature criteria for waters designated for cold water biota (IDAPA 16.01.02.250.02.c.ii) and salmonid spawning (IDAPA 16.01.02.250.02.d.ii). Waters designated for cold water biota must exhibit temperatures of 22°C or less with a maximum daily average of no greater than 19°C. Waters designated for salmonid spawning must exhibit temperatures of 13°C or less with a maximum daily average no greater than 9°C.

The draft permit proposes ambient monitoring requirements for temperature to assist in future efforts to evaluate the reasonable potential for the discharge to cause the receiving water to not meet state water quality criteria.

4. Nutrients

Idaho water quality standards (IDAPA 16.01.02.250.03.b) specify the use of “Water Quality Criteria 1972 (Blue Book), Section V, Agricultural Uses of Water” when developing specific criteria to protect waters designated as agricultural water supplies. The numeric criteria of 10 µg/L nitrite as N and 100 µg/L nitrate-nitrite as N, respectively, are recommended for waters designated for agricultural water supply and intended as drinking water for livestock.

In addition, EPA anticipates that a Total Maximum Daily Load (TMDL) management plan for pollutants including nutrients will be developed for the Big Wood River in the near future (i.e. during the effective period of the permit). Section 303(d) of the CWA requires States to develop a TMDL management plan for water bodies determined to be water quality limited. A TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state’s water quality standards and allocates that load capacity to known point sources and nonpoint sources.

The draft permit proposes ambient monitoring requirements for total Kjeldahl nitrogen, total ammonia, nitrate, nitrite and total phosphorus to assist in future efforts to evaluate the reasonable potential for the discharge to cause the receiving water to

not meet state water quality criteria. Also, the proposed monitoring requirements will assist in evaluating current (IDEQ, 1980) and future waste load allocations for point sources discharging to the Big Wood River.

V. SLUDGE REQUIREMENTS

Since the issuance of the current permit, the sludge management regulations (40 CFR Part 503) have been promulgated. These regulations were designed so that the standards are directly enforceable against most users or disposers of sewage sludge, whether or not they obtain a permit. Therefore, the publication of Part 503 in the *Federal Register* on February 19, 1993, served as notice to the regulated community of its duty to comply with the requirements of the rule, except those requirements that indicate that the permitting authority shall specify what has to be done.

Even though Part 503 is largely self-implementing, Section 405(f) of the CWA requires the inclusion of sewage sludge use or disposal requirements in any NPDES permit issued to a Treatment Works Treating Domestic Sewage (TWTDS). In addition, the sludge permitting regulations in 40 CFR Parts 122 and 124 have been revised to expand its authority to issue NPDES permits with these requirements. This includes all sewage sludge generators, sewage sludge treaters and blenders, surface disposal sites and sewage sludge incinerators. Therefore, the requirements of 40 CFR Part 503 have to be met when sewage sludge is applied to the land, placed on a surface disposal site, placed on a municipal solid waste landfill (MSWLF) unit, or fired in a sewage sludge incinerator.

Requirements are included in Part 503 for pollutants in sewage sludge, the reduction of pathogens in sewage sludge, the reduction of the characteristics in sewage sludge that attract vectors, the quality of the exit gas from a sewage sludge incinerator stack, the quality of sewage sludge that is placed in a MSWLF unit, the sites where sewage sludge is either land applied or placed for final disposal, and for a sewage sludge incinerator. The sections of Part 503 applicable to this facility's proposed practices are Section A (General Provisions, 503.1-9) and Section B (Land Application, 503.10-18).

A. Activity

The Meadow's sludge is strictly domestic in nature. The sludge is wasted from the clarifier and pumped into the sludge holding tank. When close to capacity, the sludge is transferred to the Ohio Gulch Transfer Station via a tanker truck where it is then placed in sludge drying basins, along with sludge from the cities of Ketchum and Hailey, ID wastewater treatment plants. After allowing the sludge to dry for several months, it is removed from the basins and used for either landfill cover, soil reclamation or disposed in a surface disposal site.

The sewage sludge practices at the Ohio Gulch Transfer Station are regulated under federal standards, therefore the facility is submitting a separate NPDES permit application.

A map showing the locations of the Meadows and the Ohio Gulch Transfer Station is located in Appendix B.

B. Sludge Management Requirements

To ensure compliance with the Clean Water Act and the federal standards for the use or disposal of biosolids (40 CFR Part 503), the draft permit contains the requirements of this section.

1. **Health & Environment.** Section 405(d)(4) of the Clean Water Act requires that the environment and public health be protected from toxic effects of any pollutants in sludge using a combination of the national standards for some pollutants, and permits for the use of others. Therefore, the draft permit requires the permittee to handle and use or dispose of sludge in such a way as to protect human health and the environment. The permittee is also responsible for determining the pollutants allowed to accumulate in the sewage sludge and for preventing harm to human health and the environment from those pollutants.
2. **State Laws and Future Federal Standards.** The federal regulations (40 CFR Part 122.41[a]) require the permittee to comply with the standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement. Therefore, a condition has been incorporated into the draft permit that requires the permittee to comply with all existing federal and state laws, and all regulations applying to sewage sludge use and disposal.
3. **Protection of Surface Waters from Biosolids Pollutants:** Section 405(a) of the Clean Water Act prohibits any practice where biosolids pollutants removed in a treatment works at one location would ultimately enter surface waters at another location. The draft permit implements this prohibition by requiring the permittee to ensure that pollutants from biosolids do not reach surface waters.
4. **Pathogen and Vector Attraction Reduction.** Since the sewage sludge is transferred to the Southern Idaho Regional Solid Waste District after treatment in the drying basins at the Ohio Gulch Transfer Station, the Meadows is not required to meet the Class A or Class B pathogen reduction alternatives in Part 503.32 or the vector attraction reduction methods listed in Part 503.33.

C. Monitoring

1. **Pollutant limits.** Federal regulations 40 CFR §503.13 specifies maximum and monthly average concentrations of pollutants in bulk sewage sludge which is applied to the

land. The concentration of pollutant cannot exceed the maximum limits listed in Table 1 of 40 CFR §503.13 and the monthly average limits listed in Table 3 of 40 CFR §503.13. The draft permit proposes that the permittee perform annual monitoring for pollutants in the sewer sludge depending upon the method of final disposal (see Table 5) to ensure that pollutant limits specified in 40 CFR §503.13 and 23 are not exceeded prior to transferring the sludge to the Southern Idaho Regional Solid Waste District unless the District establishes alternative limits. In addition, the percent solids of sewage sludge must be monitored to report pollutant concentrations on a dry weight basis.

Table 5. SLUDGE MONITORING REQUIREMENTS			
	Final Disposal Method		
Pollutant	Land Application	Surface Disposal	Co-Disposal
Arsenic	X	X	
Cadmium	X		
Chromium		X	
Copper	X		
Lead	X		
Mercury	X		
Molybdenum	X		
Nickel	X	X	
Selenium	X		
Zinc	X		

VI. OTHER PERMIT CONDITIONS

A. Quality Assurance Project Plan (QAPP)

The federal regulation at 40 CFR §122.41(e) requires the permittee to ensure adequate laboratory controls and appropriate quality assurance procedures in order to properly operate and maintain all facilities which it uses. Therefore, the draft permit requires the permittee to develop a QAPP that will 1) assist in planning for the collection and analysis of samples in support of the permit, 2) ensure that the monitoring data submitted is accurate and 3) explain data anomalies if they occur. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The permittee is required to

submit the QAPP within 60 days of the effective date of the draft permit.

EPA recommends the following references when developing an adequate QAPP:

- ♦ Requirements for Quality Assurance Project Plans, EPA QA/R-5.
- ♦ Guidance for Preparation of Quality Assurance Project Plans, EPA, Region 10, Quality and Data Management Program, QA/G-5
- ♦ You and Quality Assurance in Region 10, EPA, Region 10, Quality and Data Management Program, March 1988.
- ♦ The Volunteer Monitors Guide to Quality Assurance Project Plans, EPA 841-B-96-003, September 1996.
- ♦ Internet site: <http://www.epa.gov/r10earth/offices/oea/qaindex.htm>.

B. Best Management Practices (BMPs)

Section 402 of the Clean Water Act and federal regulation 40 CFR Part 122.44(k) authorize EPA to require best management practices (BMPs) in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For facilities treating domestic sewage, these measures are typically included in the facility Operation & Maintenance (O&M) plans. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires that the permittee develop a plan and implement BMPs within 60 days of the effective date of the draft permit. EPA has a guidance manual (EPA, 1993) that may provide some assistance in the development of BMPs. Specifically, the permittee must consider spill prevention and control, optimization of chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system and water conservation. Furthermore, it is considered a good management practice to maintain a log of daily plant operations and observations. To the extent that any of these issues have already been addressed, the permittee need only reference the appropriate document/section in its O&M plan. Additionally, the BMP operating plan must be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for an increased discharge of pollutants.

VII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding potential effects an action may have on listed endangered species. In a letter dated June 8, 1999, EPA requested a listing of threatened and endangered species in the vicinity of the The Meadows facility from NMFS and USFWS.

In a letter dated July 2, 1999, the U.S. Fish and Wildlife Service identified the Gray wolf (*Canis Lupus*) as being a federally-listed endangered species that may occur in the area of the discharge. There are no proposed or candidate species in the area of the discharge. In a letter dated June 29, 1999, the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) stated that there are no listed, proposed or candidate anadromous fish species known to occur in the Big Wood River basin. In addition, the letter indicates that the location of the discharge is not within designated or proposed critical habitat for any species under NMFS' jurisdiction.

EPA has determined that the requirements contained in the draft permit should not have an impact on the Gray wolf. Hunting and habitat destruction are the primary causes of the Gray wolf's decline. Issuance of an NPDES permit for the Meadows facility should not result in habitat destruction, nor should it result in changes in population that could lead to increased habitat destruction. Furthermore, issuance of the NPDES permit should not impact the food sources of the Gray wolf.

EPA will provide USFWS and NMFS with copies of the draft permit and fact sheet during the public notice period. Any comments received from these agencies regarding this determination will be considered prior to reissuance of this permit.

B. State Certification

Section 401 of the Clean Water Act requires EPA to seek state certification before issuing a final permit. This certification by the state of Idaho ensures that federally issued permits are in compliance with the laws of the state. As a result of the certification, the state may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards. EPA is requesting the State of Idaho to review and provide appropriate certification to this NPDES permit pursuant to 40 CFR §124.53. Additionally, in accordance with 40 CFR §124.10(c)(1), public notice of the draft permit has been provided to the State of Idaho agencies having jurisdiction over fish, shellfish and wildlife.

C. Permit Expiration

This permit will expire five years from the effective date of the permit.

D. Facility Changes or Alterations

In accordance with 40 CFR §122.41(l) and IDAPA 16.01.02.401.01, the facility is required to notify EPA and the Idaho Division of Environmental Quality (IDEQ) of any planned physical alteration or operational changes to the facility. This requirement has been incorporated into the proposed permit to ensure that EPA and IDEQ are notified of any potential increases or changes in the amount of pollutants being discharged and evaluate the impact of the pollutant loading on the receiving water.

VIII. REFERENCES

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

EPA. 1993. *Guidance Manual for Developing Best Management Practices (BMP)*. U.S. Environmental Protection Agency, Office of Water, EPA/833/B-93-004.

EPA. 1996. *U.S. EPA NPDES Permit Writer's Manual*. U.S. Environmental Protection Agency, Office of Water, EPA/833/B-96-003.

IDAPA. 1996. *Water Quality Standards and Wastewater Treatment Requirements*. Idaho Department of Health and Welfare Rules, Title 01, Chapter 02.

IDEQ. 1980. *Staff Evaluation on a Waste Load Allocation for Existing Discharges to the Big Wood River Above Magic Reservoir*. July 23.

IX. ACRONYMS

BMPs	Best management practices
BOD	Biochemical oxygen demand
BOD ₅	Biochemical oxygen demand, five-day
°C	Degrees Celsius
CFR	Code of Federal Regulations
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDAPA	Idaho Administrative Procedures Act

IDEQ	Idaho Division of Environmental Quality
lb	pounds
mg/L	milligrams per liter
µg/L	micrograms per liter
mL	milliliter
MSWLF	Municipal solid waste landfill
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OW	Office of Water
P	Phosphorus
POTW	Publicly owned treatment works
QAPP	Quality assurance project plan
s.u.	Standard units
sp.	Species
TMDL	Total Maximum Daily Load
TRC	Total residual chlorine
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
TWTDS	Treatment works treating domestic sewage
USFWS	U.S. Fish and Wildlife Service
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

APPENDIX A
PROCESS DESCRIPTION

PROCESS DESCRIPTION

PRELIMINARY TREATMENT

- Dry Well
- Overflow Tank

PRIMARY TREATMENT

- Bar screen
- Communitor

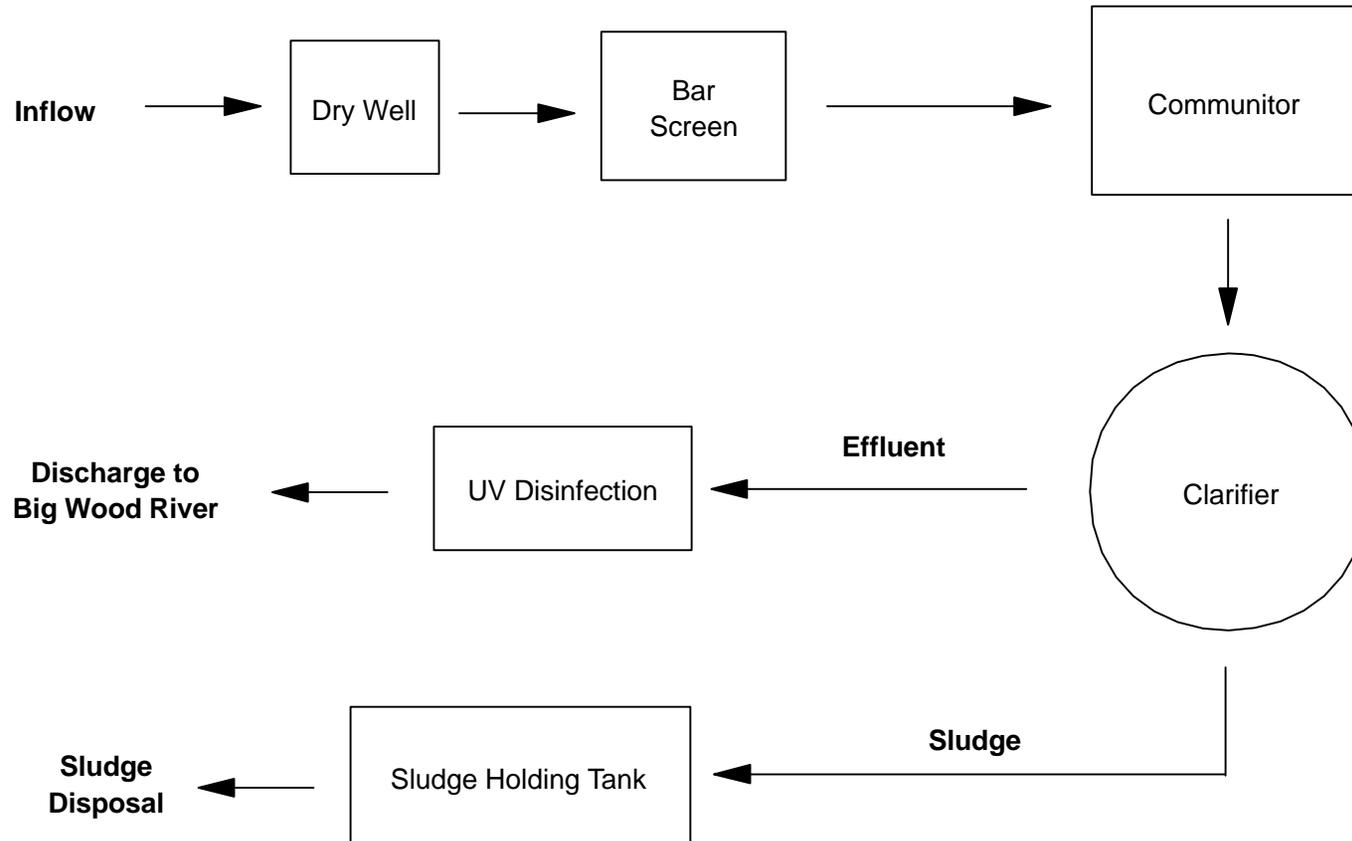
SECONDARY TREATMENT

- Clarifier
- Ultraviolet light (UV) disinfection
- Flow measurement

BIOSOLIDS HANDLING

- Sludge Holding Tank

Schematic of the Meadows Wastewater Treatment Plant



APPENDIX B
MAP

APPENDIX C
CALCULATIONS

I. Technology-Based Limits

The draft permit establishes loading limits based on the plant design capacity of 0.10 million gallons per day (mgd). The limits are calculated by multiplying the concentration limits by the design flow and a conversion factor of 8.34 pounds-liters / milligrams-million gallons as shown below:

A. Biological Oxygen Demand (BOD₅)

Monthly Average Loading = (0.10 mgd)(30 mg/L)(8.34) = 25 lbs/day

Weekly Average Loading = (0.10 mgd)(45 mg/L)(8.34) = 38 lbs/day

B. Total Suspended Solids (TSS)

Monthly Average Loading = (0.10 mgd)(30 mg/L)(8.34) = 25 lbs/day

Weekly Average Loading = (0.10 mgd)(45 mg/L)(8.34) = 38 lbs/day

II. Water Quality-based Evaluation

This section describes the process of how EPA determined reasonable potential for ammonia and how the effluent limits were calculated. The calculations were performed according to procedures outlined in Chapter 5 of the *Technical Support Document for Water Quality-based Toxics Control* (TSD) (EPA, 1991).

EPA used the following assumptions:

1. 1Q10 or 1-day low flow that has a 10 percent chance of occurring in any given year = 48.5 mgd (based on USGS data from 1975 to 1996).
2. 7Q10 or 7-day average low flow that has a 10 percent chance of occurring in any given year = 56.9 mgd (based on USGS data from 1975 to 1996).
3. Mixing zone = 25% of Big Wood River [if State does not authorize use of mixing zone in its 401 Certification, the limit will be recalculated based on meeting water quality criteria at the point of discharge (“end-of-pipe”).]

A. Ammonia

1. Reasonable Potential Determination
 - a. Determine the appropriate water quality criteria

Water quality criteria for waters designated for cold water biota and salmonid

spawning require numeric criteria for ammonia. Using the 95th percentile temperature (14.5°C) and pH (8.47 s.u.) from monitoring data obtained at the U.S. Geological Survey (USGS) Station at Hailey, Idaho, the one-hour (acute) average criterion is calculated to be 2.08 mg/L and the four-day chronic criterion is 0.48 mg/L.

- b. Determine whether there is “reasonable potential” to exceed the criteria

There is reasonable potential to exceed water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation:

$$C_r = \frac{(C_d \times Q_d) + (C_s \times (Q_s \times \%MZ))}{Q_d + (Q_s \times \%MZ)}$$

where,

C_r = receiving water concentration at the edge of the mixing zone

C_d = maximum projected effluent concentration (4.91 mg/l)

= maximum reported effluent concentration (1.91 mg/l) × reasonable potential multiplier (2.57)

Q_d = maximum effluent flow (0.10 mgd)

C_s = upstream concentration of pollutant (0.29 mg/l)

Q_s = upstream flow

♦ 1Q10 for acute = 48.5 mgd

♦ 7Q10 for chronic = 56.9 mgd

%MZ = mixing zone to include not more than 25% of volume of stream

$$C_{r-Acute} = 0.328 \text{ mg/L}$$

$$C_{r-Chronic} = 0.322 \text{ mg/L}$$

The projected acute and chronic ammonia concentrations at the edge of the mixing zone in the receiving water (i.e. Big Wood River) are less than their respective criterion. Therefore, there is no reasonable potential for the discharge from the Meadows wastewater treatment plant to cause an exceedance of the numeric criteria for ammonia.

B. Total Nitrogen

1. Water Quality-based Effluent Limit Calculation

- (a) Average Monthly Limit (AML)

Mass-based limit = 9.00 lb/day (specified in 1980 State Report)

Concentration-based limit = (9.00 lb/day) / [(0.10 mgd)(8.34)] = 10.79 mg/L

(b) Convert AML to Long Term Average (LTA)

$$\text{AML} = \text{LTA} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,}$$

$$\text{CV} = \text{coefficient of variation} = 0.6 \text{ (default value)}$$

$$\sigma^2 = \ln(\text{CV}^2/n + 1) = 0.086$$

$$z = 1.645 \text{ for } 95^{\text{th}} \text{ percentile probability basis}$$

$$n = \text{number of sampling events required per month} = 4 \text{ (default value)}$$

$$\text{LTA} = \text{AML} / e^{(z\sigma - 0.5\sigma^2)} = 6.95$$

(c) Calculate Maximum Daily Limit (MDL)

$$\text{MDL} = \text{LTA} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,}$$

$$\text{CV} = \text{coefficient of variation} = 0.6 \text{ (default value)}$$

$$\sigma^2 = \ln(\text{CV}^2 + 1) = 0.307$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

$$\text{MDL} = 21.65 \text{ mg/L}$$

$$\text{Concentration-based limit} = 21.65 \text{ mg/L}$$

$$\text{Mass-based limit} = (21.65 \text{ mg/L})(0.10 \text{ mgd})(8.34) = 18.05 \text{ lb/day}$$

C. Total Phosphorus

1. Water Quality-based Effluent Limit Calculation

(a) Average Monthly Limit (AML)

$$\text{Mass-based limit} = 2.80 \text{ lb/day (specified in 1980 State Report)}$$

$$\text{Concentration-based limit} = (2.80 \text{ lb/day}) / [(0.10 \text{ mgd})(8.34)] = 3.36 \text{ mg/L}$$

(b) Convert AML to Long Term Average (LTA)

$$\text{AML} = \text{LTA} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,}$$

$$\text{CV} = \text{coefficient of variation} = 0.24$$

$$\sigma^2 = \ln(\text{CV}^2/n + 1) = 0.014$$

$$z = 1.645 \text{ for } 95^{\text{th}} \text{ percentile probability basis}$$

$$n = \text{number of sampling events required per month} = 4 \text{ (default value)}$$

$$\text{LTA} = \text{AML} / e^{(z\sigma - 0.5\sigma^2)} = 2.79$$

(c) Calculate Maximum Daily Limit (MDL)

$$\text{MDL} = \text{LTA} \times e^{(z\sigma - 0.5\sigma^2)} \text{ where,}$$

$$\text{CV} = \text{coefficient of variation} = 0.24$$

$$\sigma^2 = \ln(\text{CV}^2 + 1) = 0.056$$

$$z = 2.326 \text{ for } 99^{\text{th}} \text{ percentile probability basis}$$

$$\text{MDL} = 4.70 \text{ mg/L}$$

$$\text{Concentration-based limit} = 4.70 \text{ mg/L}$$

$$\text{Mass-based limit} = (4.70 \text{ mg/L})(0.10 \text{ mgd})(8.34) = 3.92 \text{ lb/day}$$

D. Oxygen-Sag Model

This model analyzes the dissolved oxygen sag in Big Wood River, based on the Streeter-Phelps equation :

$$D=K_1 * L / (K_2 - K_1) * (e^{(-K_1 * t)} - e^{(-K_2 * t)}) + D_o * e^{(-K_2 * t)} + (S + R - P) (1 - e^{(-K_2 * t)}) / K_2$$

where:

D = dissolved oxygen deficit at point x

K_1 = first order reaction rate constant

L = ultimate BOD at point x

K_2 = reaeration constant

$K_2 = 21.6 * (U^{0.67} / H^{1.85})$, where U is stream velocity (ft/sec) and H is stream depth (ft)

e = natural logarithm, base e

t = time when the effluent reaches point x

D_o = initial oxygen deficit at x=0

S = sediment oxygen demand

P = reaeration due to photosynthesis

R = oxygen demand due to algal respiration

L can be calculated from the 5-day BOD as:

$$L = y_5 / (1 - e^{(-5 * K_1)})$$

where y_5 = 5-day BOD

Insert the following information

Facility Name: Meadows

NPDES No: ID-002442-2

K_1 = 0.99

K_2 = 39.30

Effluent BOD5 (mg/l) = 45.00 "Proposed weekly average effluent limit"

Rcv Wtr BOD5 (mg/l) = 3.86 "95th percentile of data in Table 1 (IDEQ, 1980)"

Effluent Temp (C) = 20.00

Rcv Wtr Temp (C) = 14.53 "95th percentile of data from USGS station at Hailey, ID"

Rcv Wtr V (ft/sec) = 2.08

Effluent Flow (cfs) = 0.15 "Based on 0.10 million gallons per day (mgd)"

Rcv Wtr Flow (cfs) = 66.00 "5th percentile of data in Table 1 (IDEQ, 1980)"

Effluent DO (mg/l) = 0.00

Rcv Wtr DO (mg/l) = 8.50 "5th percentile of data in Table 1 (IDEQ, 1980)"

S = 0.00

R = 0.00

P = 0.00

$$\text{Effluent } L = 45.33$$

Calculate the temperature, dissolved oxygen, BOD, and L of the mix

$$T = 14.54$$

$$\text{DO} = 8.48$$

$$\text{BOD} = 3.95$$

$$L = 3.98$$

Input the saturation dissolved oxygen concentration (DO_s) at T mix

$$\text{DO}_s = 14.65 - 0.41022T + 0.00791T^2 - 0.00007774T^3 \text{ (assume salinity is negligible)}$$

where T is the temperature of the mix in Celcius

$$\text{DO}_s \text{ at 5600 feet elevation} = \text{DO}_s * (1 - 0.027 * E / 760)$$

where E is the elevation in feet

$$\text{DO}_s \text{ at 5,600 ft} = 8.11$$

Calculate D_o

$$D_o = -0.37$$

Correct K_1 , K_2 to the temperature of the mix

$$K_1 = 0.77$$

$$K_2 = 34.53$$

TC = time to reach minimum DO, in days, calculated by:

$$TC = \frac{\ln\left(\frac{K_2}{K_1} * \left(1 - \frac{D_o * (K_2 - K_1)}{K_1 * L}\right)\right)}{K_2 - K_1}$$

$$TC = 0.16 \text{ days}$$

DC = maximum DO sag, in mg/l, calculated by:

$$DC = \left(\frac{K_1}{K_2}\right) * L * e^{(-K_1 * TC)}$$

$$DC = 0.08 \text{ mg/l}$$

XC = location of maximum DO sag, in mi, calculated by:

$$XC = TC * V * 16.36$$

Where 16.36 is the conversion from ft/sec and days to mi

$$XC = 5.49 \text{ miles}$$

Source: Table 1 (IDEQ, 1980)

Month	7 day in 10 year low flow (CFS)	width of river (ft)	depth of river (ft)	upstream DO (mg/L)	upstream BOD (mg/L)
October	66.00	36.00	0.88	13.00	0.70
November	66.00	36.00	0.88	10.20	3.00
December	66.00	36.00	0.88	10.80	1.60
January	66.00	36.00	0.88	11.00	0.80
February	66.00	36.00	0.88	10.10	2.50
March	66.00	36.00	0.88	12.00	1.00
April	80.00	40.00	0.95	12.60	1.60
May	138.00	54.00	1.15	9.50	1.20
June	395.00	86.00	1.75	9.20	1.00
July	171.00	60.00	1.25	8.50	1.10
August	78.00	40.00	0.95	9.80	1.10
September	66.00	36.00	0.88	8.50	4.90
5th Percentile	66.00	36.00	0.88	8.50	----
95th Percentile					3.86