FACT SHEET

The United States Environmental Protection Agency (EPA)
Plans To Reissue A
National Pollutant Discharge Elimination System (NPDES) Permit To:

City of Burley Wastewater Treatment Plant
340 Highland Avenue
Burley, Idaho 83318

Permit Number: ID-002009-5
Public Notice start date: September 7, 2001
Public Notice expiration date: October 9, 2001

EPA Proposes NPDES Permit Reissuance.
EPA proposes to reissue an NPDES permit to the City of Burley. The draft permit places conditions on the discharge of pollutants from the City of Burley's wastewater treatment plant to the Snake River. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a description of the current discharge and current sewage sludge (biosolids) practices
- a listing of proposed effluent limitations, schedules of compliance, and other conditions
- a map and description of the discharge location
- technical material supporting the conditions in the permit

The State of Idaho Proposes Certification.
EPA is requesting that the Idaho Department of Environmental Quality certify the NPDES permit for the City of Burley, under section 401 of the Clean Water Act.

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 Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

Persons wishing to comment on State Certification should submit written comments by the Public Notice expiration date to the Idaho Department of Environmental Quality (IDEQ) at 601 Pole Line Road, Suite 2, Twin Falls, Idaho 83301. A copy of the comments should also be submitted to EPA.

After the Public Notice expires, and all comments have been considered, EPA's regional

Director for the Office of Water, will make a final decision regarding permit reissuance. 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 an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available 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 Region 10 website at "www.epa.gov/r10earth/water.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-2108 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

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I. APPLICANT

City of Burley Wastewater Treatment Facility
NPDES Permit No.: ID-002009-5

Facility Mailing Address:
P.O. Box 1090
Burley, Idaho 83318

Facility Address:
340 Highland Avenue
Burley, Idaho 83318

II. FACILITY INFORMATION

A. Treatment Plant Description

1. Existing Facility: The City of Burley owns, operates, and has maintenance responsibility for a facility that treats wastewater from domestic, commercial, and industrial sources. Currently, the only significant industrial source is Boise Cascade Corrugated Boxes.

   The treatment plant provides equivalent to secondary treatment using aeration pond followed by primary and secondary stabilization ponds, followed by pH adjustment pond, and micro-screening, if necessary, and finally chlorination and dechlorination. The facility serves a population of 9,578 and currently has an annual average flow rate of approximately 1.3 million gallons per day (mgd). Boise Cascade Corrugated Boxes discharges approximately 0.012 mgd into the City's facility.

   The design characteristics of this facility are as follows:

Daily Average Design Flow:	2.25 mgd
Design Biochemical Oxygen Demand ($BOD_{5)}$ Removal	65%
Design Total Suspended Solids (TSS) Removal	65%

2. New/Modified Facility: The City of Burley has recently completed a feasibility study for its wastewater treatment facility. The city has not yet decided if it will build a new facility or modify its existing lagoons. The city has decided to increase the design flow to 5.0 mgd which can be increased to 7.3 mgd if necessary. The new/modified facility will be able to meet the secondary treatment limits for 5-day biochemical oxygen demand and total suspended solids. It will also be designed to meet water quality based effluent limits for chlorine, ammonia, and phosphorus. It is anticipated that the facility will be operational within the next three to four years, therefore, the proposed permit contains limits that will apply to the new/modified facility once it is operational.

B. Background Information

1. Administratively Extended Permit: The NPDES permit for the wastewater treatment plant expired on July 3, 1997. Under federal law, specifically, the Administrative Procedures Act (APA), a federally issued NPDES permit is administratively extended (i.e., continues in force and effect) provided the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. Since the City did submit a timely application for a new permit, the current permit was administratively extended.

2. Compliance Review: A review of the facility's Discharge Monitoring Reports[1] for the past five years indicates that the facility has been having trouble meeting the effluent limits for TSS, pH, and ammonia. Since 1999 the effluent from the facility has frequently violated the ammonia limitation in the NPDES permit.

3. Map: A map has been included in Appendix A which shows the location of the treatment plant and the discharge location.

III. RECEIVING WATER

A. Outfall Location/ Receiving Water

The treated effluent from the City's facility is discharged from outfall 001 to Milner Pool at approximately river mile (RM) 652.8 on the Snake River. The outfall extends approximately 550 feet into the river channel.

Milner pool, is a slow moving section of the Snake River that extends from approximately RM 640 to 675. Physical and chemical water quality characteristics are influenced by water releases from Minidoka Dam and American Falls Reservoir, municipal and industrial point source discharges, irrigation return flows, and nonpoint source agricultural runoff. Critical low flow conditions can result during fall and winter, the non-irrigation season, as water releases are curtailed at upstream dams to store water for irrigation purposes. Such curtailment takes place when carryover storage is small and precipitation and/or snow pack are below normal. Because of this, low flows (1Q10, 7Q10) were calculated for the irrigation season and for the non irrigation season.

The following low flow values were calculated from data from 1948 through 1990 from USGS gaging station 13081500 (the USGS station is downstream from Minidoka dam):

[1]Discharge monitoring reports are forms used by the permittee to report the results of monitoring that is conducted to verify that they are adhering to the effluent limitations and conditions in their NPDES permit.

	1Q10	7Q10
June-September:	2412 cfs (1559 mgd)	3311cfs (2140 mgd)
October-May	145 cfs (93.7 mgd)	330 cfs (213.3 mgd)

The 1Q10 flow is the one day low flow with a return period of 10 years, and the 7Q10 is the seven day average low flow with a return period of 10 years.

B. Water Quality Standards

A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (i.e, 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 support 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.

Idaho Water Quality Standards: The Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02.140.19.SW-4) protects this segment of the Snake River for the following beneficial uses: warm water biota, primary contact recreation, and agricultural water.

The Snake River is a tier 1 waterbody, therefore, water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. The draft permit contains effluent limits which ensure that the existing beneficial uses for the Snake River will be maintained.

C. Water Quality Limited Segment

A water quality limited segment is any waterbody, or definable portion of 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. The Snake River has been listed as a water quality limited segment. This section of the river has been listed as water quality limited for sediment, nutrients, oil and grease, and dissolved oxygen.

Section 303(d) of the Clean Water Act (CWA) requires States to develop a plan, known as a Total Maximum Daily Load (TMDL) management plan, for water bodies determined to be water quality limited. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards and allocates that load to known point sources and nonpoint sources. The Idaho Department of Environmental Quality (IDEQ) completed the *Lake Walcott Subbasin Assessment and Total Maximum Daily Load* (hereafter referred to as the TMDL) and submitted it to EPA on December 20, 1999. EPA approved the TMDL on June 28, 2000. The TMDL assessment found that this portion of

the river was impaired for nutrients and, therefore, the TMDL provided phosphorus allocations for point sources and non-point sources. Additionally, the TMDL analysis found that the river was not impaired for dissolved oxygen or sediment. However, there was no data available to determine if the river was, in fact, impaired for oil and grease. The state is in the process of collecting data to evaluate the levels of oil and grease in the river.

IV. EFFLUENT LIMITATIONS

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based effluent limits. A technology based effluent limit requires a minimum level of treatment for municipal point sources based on currently available treatment technologies. A water quality based effluent limit is designed to ensure that the water quality standards of a waterbody are being met and they may be more stringent than technology-based effluent limits. For more information on deriving technology-based effluent limits and water quality-based effluent limits see Appendices B and C.

A. Proposed Effluent Limits for the Existing Wastewater Treatment Facility

The following summarizes the proposed effluent limitations that are in the draft permit for the existing facility.

1. The pH range must be between 6.5 - 9.0 standard units.

2. For any month, the monthly average effluent concentration for BOD_5 and TSS must not exceed 15 percent of the monthly average influent concentration for BOD_5 and TSS.

   From February through May, when the facility is using its microscreens, the monthly average effluent concentration for TSS must not exceed 35 percent of the monthly average influent concentration for TSS.

3. There must be no discharge of floating solids or visible foam, or oil and grease in other than trace amounts.

4. Table 1, below, presents the proposed effluent limits for BOD_5, TSS, E. coli bacteria, total residual chlorine, total ammonia, and phosphorus.

TABLE 1: Effluent Limitations for the Existing Facility				
Parameters	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Instantaneous Maximum Limit
BOD_5	30 mg/L (563 lbs/day)	45 mg/L (845 lbs/day)	---	---
TSS	30 mg/L (563 lbs/day)	45 mg/L (845 lbs/day)	---	---
TSS[1] **February 1- May 31**	70 mg/L (1314 lbs/day)	105 mg/L (1971 lbs/day)		
E. coli Bacteria	126 /100 ml	---	---	406 /100 ml
Total Residual Chlorine **June 1- September 30**	0.5 mg/L (9.4 lbs/day)	0.75 (14.1 lbs/day)	---	---
Total Residual Chlorine[2] **October 1 - May 31**	0.05 mg/L (0.9 lbs/day)	---	0.22 mg/L (4.1 lbs/day)	---
Total Ammonia, as N **June 1 - September 30**	43.1 mg/L (808.6 lbs/day)	---	65 mg/L (1219.3 lbs/day)	---
Total Ammonia, as N **October 1 - May 31**	4.3 mg/L (80.4 lbs/day)	---	6.5 mg/L (121.2 lbs/day)	---
Total Phosphorus	39 lbs/day	78.4 lbs/day	---	---

1. This TSS limit will apply only from February 1 through May 31if the facility diverts the effluent through the micro-screens.
2. The October 1 through May 31 average monthly effluent limit for chlorine is not quantifiable using EPA test methods. EPA will use the minimum level of 0.1 mg/L as the compliance evaluation level for this limit.

B. Proposed Effluent Limitations for the New/Modified Wastewater Treatment Facility

The following summarizes the proposed effluent limitations that are in the draft permit for the new/modified facility the City is proposing to build. Since the new/modified facility should be operational by December 31, 2004, the draft permit requires the facility to meet the effluent limits by that date.

1. The pH range must be between 6.5 - 9.0 standard units.

2. For any month, the monthly average effluent concentration for BOD_5 and TSS shall not exceed 15 percent of the monthly average influent concentration for BOD_5 and TSS.

3. There must be no discharge of floating solids or visible foam, or oil and grease in other than trace amounts.

4. Table 2, below, presents the proposed effluent limits for BOD_5, TSS,

E. coli bacteria, total residual chlorine, total ammonia, and total phosphorus.

TABLE 2: Effluent Limitations for New/Modified Facility

Parameters	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Instantaneous Maximum Limit
BOD_5	30 mg/L (1251 lbs/day)	45 mg/L (1876.5 lbs/day)	---	---
TSS	30 mg/L (1251 lbs/day)	45 mg/L (1876.5 lbs/day)	---	---
E. coli Bacteria	126 /100 ml	---	---	406 /100 ml
Total Residual Chlorine **June 1- September 30**	0.5 mg/L (20.8 #/day)	0.75 mg/L (31.3 #/day)	---	---
Total Residual Chlorine[1] **October 1 - May 31**	0.04 mg/L (1.7 #/day)	---	0.11 mg/L (4.5 #/day)	---
Total Ammonia, as N **June 1- September 30**	17.8 mg/L (738.1 lbs/day)	---	35.6 mg/L (1484.9 lbs/day)	---
Total Ammonia, as N **October 1 - May 31**	1.9 mg/L (79.2 lbs/day)	---	3.8 mg/L (158.5 lbs/day)	---
Total Phosphorus, as P	39 lbs/day	78.4 lbs/day	---	---

1. The October 1 through May 31 average monthly effluent limit for chlorine is not quantifiable using EPA test methods. EPA will use the minimum level of 0.1 mg/L as the compliance evaluation level for this limit.

C. Compliance Evaluation Levels

During the months from October through May, the proposed average monthly water quality based effluent limit for total residual chlorine falls below the level at which it can be accurately quantified using EPA analytical methods. In such cases, it is difficult to determine compliance with the effluent limits. The inability to measure to the necessary level of detection is addressed by establishing the minimum level (ML) as the compliance evaluation level for use in reporting data to EPA. Effluent values at or below the ML would be considered in compliance with the water quality based effluent limit. The ML for total residual chlorine is 0.1 mg/L.

V. COMPLIANCE SCHEDULE FOR TOTAL PHOSPHORUS

Section 58.01.02.400.03 of the *Idaho Water Quality Standards and Treatment Requirements* allow discharge permits to incorporate compliance schedules which allow a discharger to phase in compliance with water quality-based effluent limits when new limits are in the permit for the first time. This permit is incorporating water quality-based effluent limits for total phosphorus for the first time. The permit requires compliance with the effluent limitations for total phosphorus by December 31, 2004. The permittee will be

required to submit annual reports which document progress towards meeting the final effluent limit (40 CFR 122.47).

VI. MONITORING REQUIREMENTS

A. Basis for Effluent and Receiving Water Monitoring

Section 308 of the Clean Water Act and federal regulation 40 CFR 122.44(i) require effluent monitoring in NPDES permits to determine compliance with effluent limitations. Section 308 also allows additional effluent and receiving water monitoring to gather data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports to EPA.

B. Proposed Effluent Monitoring

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.

In 1996, EPA developed interim guidance to help determine if the frequency of effluent monitoring may be reduced from the requirements in the permittee's existing permit. The guidance document allows EPA to use a statistical analysis of the permittee's historical effluent data to reduce unnecessary monitoring while at the same time maintaining a high level of environmental protection. Based on this guidance, and the compliance history of the facility for the last five years, it was found that monitoring for TSS for the existing facility could be reduced from 1/day to 3/week, and monitoring for chlorine could be reduced from 2/day to 1/day. This reduced monitoring frequency is proposed in the draft permit.

Table 3 presents the proposed effluent monitoring requirements for the existing facility, table 4 presents the proposed effluent monitoring requirements for the new/modified facility, and table 5 presents the proposed receiving water monitoring requirements required during the life of the permit.

TABLE 3: Effluent Monitoring Requirements for the Existing Facility

Parameter	Sample Location	Sample Frequency	Sample Type
Flow, mgd	Effluent	Continuous	—
BOD_5, mg/L	Influent and effluent	1/week	24-hour composite
TSS, mg/L	Influent and effluent	3/week	24-hour composite

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TABLE 3: Effluent Monitoring Requirements for the Existing Facility

Parameter	Sample Location	Sample Frequency	Sample Type

pH, standard units	Effluent	2/day	grab
E. Coli Bacteria, colonies/100 ml	Effluent	5/month	grab
Total Residual Chlorine, mg/L	Effluent	1/day	grab
Total Ammonia as N, mg/L	Effluent	1/week	24-hour composite
Total Phosphorus as P, mg/L	Effluent	1/week	24-hour composite

TABLE 4: Effluent Monitoring Requirements for the New/Modified Facility

Parameter	Sample Location	Sample Frequency	Sample Type
Flow, mgd	Effluent	Continuous	—
$BOD_{5,}$ mg/L	Influent and effluent	1/week	24-hour composite
TSS, mg/L	Influent and effluent	3/week	24-hour composite
pH, standard units	Effluent	5/week	grab
E. Coli Bacteria, colonies/100 ml	Effluent	5/month	grab
Total Residual Chlorine, mg/L	Effluent	1/day	grab
Total Ammonia as N, mg/L	Effluent	1/week	24-hour composite
Temperature, °C	Effluent	1/week	grab
Total Phosphorus as P, mg/L	Effluent	1/week	24-hour composite
Oil and Grease, mg/L	Effluent	1/month	grab
Dissolved Oxygen, mg/L	Effluent	1/month	24-hour composite
Whole Effluent Toxicity	Effluent	once	24-hour composite
Cadmium, µg/L, total recoverable	Effluent	1/month	24-hour composite
Lead, µg/L, total recoverable	Effluent	1/month	24-hour composite
Mercury, µg/L, total	Effluent	1/month	24-hour composite
Cyanide, µg/L, WAD	Effluent	1/month	grab

TABLE 5: Receiving Water Monitoring Requirements			
Parameter	Sample Location	Sample Frequency	Sample Type
Temperature, °C	upstream of outfall	1/month	grab
pH, standard units	upstream of outfall	1/month	grab
Total Ammonia, mg/L	upstream of outfall	1/month	grab
Hardness as $CaCO_3$	upstream of outfall	1/quarter	grab
Oil and Grease	upstream of outfall	1/quarter	grab
Cadmium, dissolved	upstream of outfall	1/quarter	grab
Copper, dissolved	upstream of outfall	1/quarter	grab
Lead, dissolved	upstream of outfall	1/quarter	grab
Mercury, total	upstream of outfall	1/quarter	grab
Silver, dissolved	upstream of outfall	1/quarter	grab
Cyanide, WAD	upstream of outfall	1/quarter	grab
Note: Receiving water monitoring must start 1 year after the effective date of the permit and continue for 3 years.			

VII. OTHER PERMIT CONDITIONS

A. Biosolids (Sludge)

Section 405 of the CWA requires NPDES permits to include sewage sludge use and disposal standards unless these requirements are included in another permit. However, the sewage sludge standards at 40 CFR Part 503 are self-implementing which means the permittee is required to comply with the them whether or not they have an NPDES permit that includes sewage sludge requirements. Since EPA Region 10 has recently decided to separate waste water and sewage sludge permitting, sewage sludge requirements are not included in this draft permit. EPA will issue a sludge only permit to this facility at a later date, if necessary.

B. Pretreatment Requirements

The city has an EPA approved pretreatment program. Section 301(b) of the CWA requires that industrial users who discharge to publicly owned treatment works comply with pretreatment requirements established under section 307 of the Act. The objectives of the pretreatment program are: 1) to prevent the introduction of pollutants into the POTW that will interfere with the operation of the POTW, 2) to prevent the introduction of pollutants into the POTW which will pass through the POTW, inadequately treated, into receiving waters or otherwise be incompatible with the POTW, 3) to ensure that the quality of the POTW sludge is maintained at a level which allows its use and disposal in compliance with applicable statutes and regulations, 4) to protect POTW personnel who may be affected by wastewater and

sludge in the course of their employment and to protect the general public, and 5) to improve the opportunity to recycle and reclaim wastewater and sludge from the POTW.

The draft permit contains pretreatment requirements that are essentially the same as those in the current permit. The draft permit requires the city to implement the EPA-approved pretreatment program in accordance with its most recent Industrial Pretreatment Program. The pretreatment program includes requirements to enforce pretreatment standards promulgated under section 307 of the Act, to issue permits to significant industrial users that contain limits and other conditions, to maintain records, to carry out inspections, and to obtain remedies for non-compliance by industrial users. The draft permit also requires monitoring of influent, and effluent, for metals and cyanide. Finally, the draft permit requires the city to submit an annual report summarizing pretreatment program activities.

C. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop and submit a Quality Assurance Plan to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to complete a Quality Assurance Plan within 60 days of the effective date of the final permit. The Quality Assurance Plan must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

D. Operation and Maintenance (O&M) Plan

Section 402 of the Act and federal regulations 40 CFR 122.44(k)(2) and (3) 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 municipal facilities, these measures are typically included in the facility's Operation & Maintenance plan. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the City to incorporate appropriate BMPs into their O&M plan within 180 days of the effective date of the permit. Specifically, the permittee must consider spill prevention and control and optimization of chemical use, preventative maintenance, public education, conservation of water. The plan must be revised as new practices are developed.

E. Additional Permit Provisions

Sections III through V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

VIII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service if their actions could adversely affect any threatened or endangered species. The endangered species that may be located within the vicinity of the discharge include the grey wolf (experimental), bald eagle, Utah Valvata Snail, and the Snake River Physa. The EPA has determined that issuance of this permit will not affect the grey wolf or the bald eagle and is not likely to adversely affect the listed snail species. For more information see Appendix F.

B. State Certification

Section 401 of the CWA requires EPA to seek state certification before issuing a final permit. 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.

C. Permit Expiration

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

APPENDIX A
Wastewater Treatment Plant Location

APPENDIX B

Basis for Effluent Limitations
for the Existing Facility

The CWA requires Publicly Owned Treatment Works (POTW) to meet certain effluent limits based on available wastewater treatment technology. These types of effluent limits are called technology based effluent limits. EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that technology based effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent water quality-based effluent limits which are designed to ensure that the water quality standards of the receiving water are met.

Technology based effluent limits may not limit every parameter that is in an effluent. For example, technology based effluent limits for POTWs have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH, yet effluent from a POTW may contain other pollutants such as bacteria, chlorine, ammonia, or metals depending on the type of treatment system used and the service area of the POTW (i.e., industrial facilities as well as residential areas discharge into the POTW). When technology based effluent limits do not exist for a particular pollutant, EPA must still determine if the pollutants expected to be in the effluent will cause or contribute to a violation of the water quality standards for the water body. If they do, EPA must develop water quality-based effluent limits. The effluent limits in the draft permit reflect whichever limits (technology-based or water quality-based) are more stringent.

The following discussion explains in more detail the derivation of technology based effluent limits, and water quality based effluent limits. Part A discusses technology based effluent limits for the existing facility, Part B discusses water quality based effluent limits for the existing facility, and Part C compares the technology based and water quality based effluent limits and shows which limit is in the draft permit.

A. Technology Based Effluent Limits

The CWA requires Publicly Owned Treatment Works to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. EPA developed "secondary treatment" regulations which are specified in the 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5, TSS, and pH.

The definition of "secondary treatment" includes special considerations for lagoons. The regulations allow less stringent limits for facilities using lagoons. These alternative limits are called "treatment equivalent to secondary treatment" (40 CFR 133.101(g), and 40 CFR 133.105(d)).

The draft permit retains the concentration based limits from the previous permit, and incorporates percent removal requirement for TSS. The limits in the draft permit are:

1. **BOD_5 and TSS, concentration based limits**:

Average Monthly Limit =	30 mg/L
Average Weekly Limit =	45 mg/L
Percent Removal Requirements =	85 %

During the period from February 1 through May 31 the following TSS limitations will apply if the facility has diverted the effluent through the micro-screens.

Average Monthly Limit =	70 mg/L
Average Weekly Limit =	105 mg/L
Percent Removal Requirements =	65 %

2. **BOD_5 and TSS, mass based limits**: The federal regulation at 40 CFR § 122.45 (f) require BOD_5 and TSS limitations to be expressed as mass based limits using the design flow of the facility. In the existing permit the mass loading limits were derived based on the facility influent design load, and a removal efficiency of 85%. Since federal regulations require limits to be derived using the design flow of the facility, the limits have been recalculated as follows: concentration X design flow X 8.34.

BOD_5 and TSS loading, average monthly = 30 mg/L X 2.25 mgd X 8.34 = 563 lbs/day
BOD_5 and TSS loading, average weekly = 45 mg/L X 2.25 mgd X 8.34 = 845 lbs/day

During the period from February 1 through May 31 the following TSS limitations will apply if the facility has diverted the effluent through the micro-screens.

TSS loading, average monthly Limit = 70 mg/L X 2.25 mgd X 8.34 = 1313.6 lbs/day
TSS loading, average weekly Limit = 105 mg/L X 2.25 mgd X 8.34 = 1971 lbs/day

3. **pH**: The pH range must be between 6.0 - 9.0 standard units.

4. **Fecal Coliform Bacteria**: The Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02.420.02.b) require disinfection of sewage wastewater treatment plant effluent when the effluent is discharged to (1) waterbodies or tributaries of waterbodies that flow through populated areas, (2) waterbodies that are designated for primary contact recreation, or (3) site specific conditions warrant disinfection for the protection of public health. The regulations also state that the need for disinfection for treatment systems consisting of lagoons with a retention time of 30 days should be evaluated on a case by case basis. The disinfection requirements limit fecal coliform bacteria.

Fecal coliform limits are not incorporated into the draft permit for the following reasons:

- The intent of the disinfection requirements outlined in this section of the Idaho water quality standards is for the protection of human health. The draft permit already contains effluent limits based on the state's

bacteriological water quality criteria for protecting human health. This criteria uses E.coli as the indicator organism to determine adverse health effects. E.coli bacteria is superior to fecal coliform bacteria as an indicator organism (*Ambient Water Quality Criteria for Bacteria - 1986*, EPA 440/5-84-002, January 1986).

- The City uses a lagoon system that has greater than 30 day retention time, and the fecal coliform count has varied from non-detect to 9 colonies per 100 ml over the last five years.
- The state is currently in the process of revising their water quality standards. As part of the revision, the state is changing the indicator organism, in this section of their standards, from fecal coliform bacteria to E.coli bacteria.

5. **Total Residual Chlorine**: The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment facility can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis.

   Additionally, the NPDES regulation at 40 CFR 122.45(d) requires permit limits for publicly owned treatment works be expressed as average monthly limits (AMLs) and average weekly limits (AWLs) unless impracticable. In this case, the AWL is expressed as 1.5 X AML, or 0.75 mg/L.

   Finally, since the federal regulation at 40 CFR § 122.45 (f) requires limitations to be expressed as mass based limits using the design flow of the facility, mass based limits have been added to the draft permit. The mass based limit is calculated as follows: concentration X design flow X 8.34.

   Average monthly loading limit = 0.5 mg/L X 2.25 mgd X 8.34 = 9.4 lbs/day
   Average weekly loading limit = 0.75 mg/L X 2.25 mgd X 8.34 = 14.1 lbs/day

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality based effluent limits in NPDES permits, section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, section 3 discusses the procedures used to develop water quality based effluent limits, and section 4 discusses the water quality based limits specific to this permit.

1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state waters must also comply with limitations imposed by the state as part of its certification of NPDES permits under section 401 of the CWA.

The NPDES regulation (40 CFR 122.44(d)(1)) implementing section 301 (b)(1)(C) of the CWA requires that 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 regulations require that this evaluation be made using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of receiving water to provide dilution of the effluent, these areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Idaho Department of Environmental Quality.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit limit is to develop a wasteload allocation for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. Wasteload allocations for this permit have been determined in one of the following ways:

(a) <u>TMDL Based WLA</u>
Where the receiving water quality does not meet water quality standards, the wasteload allocation (WLA) is generally based on a TMDL developed by

the State. A TMDL is a determination of the amount of a pollutant from point, non-point, and natural background sources, including a margin of safety, that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity risks violating water quality standards.

Section 303(d) of the CWA requires states to develop TMDLs for water bodies that will not meet water quality standards after the imposition of technology-based effluent limitations to ensure that these waters will come into compliance with water quality standards. The first step in establishing a TMDL is to determine the assimilative capacity of the waterbody (the loading of pollutant that a water body can assimilate without exceeding water quality standards). The next step is to divide the assimilative capacity into allocations for non-point sources (load allocations), point sources (wasteload allocations), natural background loadings, and a margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the wasteload allocation for the point source.

The State has completed a TMDL for the Snake River which provides the City of Burley with a WLA for phosphorus.

(b) Mixing zone based WLA

When the State authorizes a mixing zone for the discharge, the WLA is generally calculated by using a simple mass balancing equation. The equation takes into account the available dilution provided by the mixing zone, and the background concentrations of the pollutant.

The WLA for ammonia and chlorine are based on a 25% mixing zone.

(c) Criterion as the WLA

In some cases a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the state does not authorize one. In such cases, the criterion becomes the wasteload allocation. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion. The wasteload allocations have been determined for pH and E. coli bacteria without using a mixing zone, because the state does not generally authorize mixing zones for these pollutants. For these particular parameters, the wasteload allocation translates directly into the effluent limit without any statistical conversion.

Once the wasteload allocation has been developed, the EPA applies the statistical permit limit derivation approach, if appropriate, described in Chapter 5 of the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-

90-001, March 1991, hereafter referred to as the TSD) to obtain monthly average, and weekly average or daily maximum permit limits. This approach takes into account effluent variability, sampling frequency, and water quality standards.

4. Specific Water Quality-Based Effluent Limits

(a) **Toxic Substances**

The Idaho state water quality standards requires surface waters of the state to be free from toxic substances in concentration that impair designated uses. The facility's existing permit required the permittee to conduct whole effluent toxicity tests on the effluent. The results of these tests indicate that whole effluent toxicity is not a concern and therefore, the annual toxicity testing requirements is not retained in the draft permit.

The NPDES regulations do require the facility to include a toxicity test with their next permit application, therefore, the draft permit requires the permittee to conduct one toxicity test, using the effluent from the new/modified facility that the city is planning to build.

(b) **Floating, Suspended or Submerged Matter/Oil and Grease**

The Idaho state water quality standards require surface waters of the state to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions that may impair designated beneficial uses. Therefore, a narrative condition is proposed for the draft permit that states there must be no discharge of floating solids or visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

Additionally, the segment of the Snake River that the City of Burley discharges to has oil and grease listed as a pollutant of concern. According to the Lake Walcott TMDL, information was not available to determine if oil and grease was, in fact, affecting the beneficial uses in this segment of the river, therefore, IDEQ will assess oil and grease impacts on the river over the next five years to better quantify the loads in this segment of the river. To support IDEQ's effort the draft permit proposes that the facility monitor the receiving water and its effluent for oil and grease. However, since the city is building a new facility or modifying its existing facility the monitoring will be deferred until the new/modified facility is built.

(c) **Excess Nutrients**

The Idaho state water quality standards require surface waters of the state be free from excess nutrients that can cause visible slime growths or other

nuisance aquatic growths impairing designated beneficial uses.

The Snake River has been listed as water quality limited for nutrients. The TMDL determined that total phosphorus was the main problem, and as a result allocated various phosphorus loads to point and non-point sources. Federal regulations at 40 CFR 122.44(d)(vii)(B) require EPA to incorporate effluent limits based on allocations from the State's TMDL into NPDES permits.

The following water quality based effluent limits have been proposed, based on the TMDL: an average monthly limit of 39 lbs/day, and an average weekly limit of 78.4 lbs/day for phosphorus. For details on deriving the effluent limits see pages E-12.

(d) **Sediment**

The Idaho state water quality standards state that sediment shall not exceed quantities which impair designated beneficial uses. The state of Idaho has listed the Snake River as water quality limited for sediment.

The analysis completed for the TMDL maintains that the river is meeting the water quality standards for sediment. Therefore, requirements more stringent than technology based requirements are not necessary.

(e) **pH**

The Idaho state water quality standards require surface waters of the state to have a pH value within the range of 6.5 - 9.5 standard units.

It is anticipated that a mixing zone will not be authorized for pH, therefore, this criterion must be met before the effluent is discharged to the receiving water. The technology based effluent limit for pH is 6.0 - 9.0 standard units, and also must be met before the effluent is discharged to the receiving water.

To ensure that both water quality based requirements and technology based requirements are met the draft permit incorporates the lower range of the water quality standards (6.5 standard units) and the upper range of the technology based limits (9.0 standard units).

(f) **Metals**

The Idaho water quality standards have developed criteria for metals that are protective of aquatic life and human health. The criteria are numeric values that represent contaminant concentrations that are not to be exceeded in the receiving water. These criteria are applicable to the Snake River.

The draft permit requires the permittee to sample for metals in the effluent and the receiving water. These data will be used to determine if the effluent discharged by the facility has the reasonable potential to cause or contribute to a water quality standards violation.

Since some metals criteria are dependent on the hardness of the receiving water, the draft permit also proposes monitoring for hardness in the receiving water.

(g) **Total Residual Chlorine**

The Idaho state water quality standards established an acute criterion of 19 µg/L, and a chronic criterion of 11 µg/L for the protection of aquatic life.

The existing permit has an average monthly limit of 0.5 mg/L, which is based on the technology standard. A reasonable potential analysis was done to ensure that the technology based effluent limit would not cause or contribute to a water quality standard violation (see Appendix D for the reasonable potential analysis). The result of the analysis indicated that from June through September the technology based effluent is protective of water quality, however, from October through May the technology based effluent limits may cause or contribute to a water quality standard violation. Therefore, water quality based limits have been incorporated into the draft permit for these months. The average monthly limit is 0.05 mg/L and the maximum daily limit is 0.22 mg/L (for more information on deriving the effluent limits see pages E-1 through E-3).

(h) **Dissolved Oxygen (D.O.)**

The state water quality standards require the level of D.O. in a receiving water to exceed 5 mg/L at all times when the water body is protected for aquatic life use.

The state of Idaho has listed the Snake River as water quality limited for dissolved oxygen. The TMDL assessment found that low D.O. was not a problem in this segment of the Snake River, therefore, only effluent monitoring has been proposed for this parameter. Effluent monitoring will be required when the new or modified facility is built.

(i) **Temperature**

The state water quality standards require ambient water temperatures of thirty three degrees C or less with a maximum daily average of no greater than twenty nine degrees C. Currently, this segment of the Snake River is meeting the standard. However, IDEQ is in the process of re-evaluating its temperature standards, therefore, effluent monitoring is appropriate. Since the city is planning to either build a new facility or modify its existing

facility, the temperature monitoring will be deferred until the new/modified facility is built.

(j) **Total Ammonia**

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from ammonia.

The existing permit contains ammonia limitations. These limitations were re-evaluated based on low flows expected to occur during the irrigation and non-irrigation seasons. A reasonable potential analysis was performed to determine if the existing limits were adequate to protect water quality standards. The analysis indicated that water quality based effluent limits were necessary (see page D-9).

The following limits were derived for the facility (for more information on deriving the effluent limits see pages E-4 through E-7):

	Average Monthly Limit	Maximum Daily Limit
June-September	43.1 mg/L (808.6 lbs/day)	65 mg/L (1219.3 lbs./day)
October-may	4.3 mg/L (80.4 lbs/day)	6.5 mg/L (121.2 lbs/day)

(k) **Escherichia Coli (E. coli) Bacteria**

According to the Idaho Water Quality Standards, waters designated for primary contact recreation, such as the Snake River, are not to contain E. coli bacteria significant to the public health in concentrations exceeding:

a. A single sample of four hundred and six E. coli organisms per one hundred ml; or
b. A geometric mean of one hundred and twenty six E. coli organisms per one hundred ml based on a minimum of five samples taken, every three to five days, over a thirty day period.

It is anticipated that a mixing zone will not be authorized for bacteria, therefore, the criteria must be met before the effluent is discharged to the receiving water. The proposed water quality based effluent limits in the permit include an instantaneous maximum limit of 406 organisms/100 ml, and an average monthly limit of 126 organisms/100 ml.

C. Comparison of technology based effluent limits and water quality based effluent limits

The following table compares the technology based effluent limits with the water quality based effluent limits. The proposed effluent limits in the draft permit are the more stringent of the two types of limits.

Parameter	Technology Based Effluent Limits				Water Quality Based Effluent Limits				Proposed Effluent Limits in Draft Permit			
	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range
BOD_5	30 mg/L 563 lbs/day	45 mg/L 845 lbs/day	---	---	---	---	---	---	30 mg/L 563 lbs/day	45 mg/L 845 lbs/day	---	---
BOD_5, Percent Removal	85%	—	—	—	—	—	—	—	85%	—	—	—
TSS	30 mg/L 563 lbs/day	45 mg/L 845 lbs/day	---	---	---	---	---	---	30 mg/L 563 lbs/day	45 mg/L 845 lbs/day	---	---
TSS, Percent Removal	85%	—	—	—	—	—	—	—	85%	—	—	—
TSS **Feb 1- May 31**	70 mg/L 1314 lbs/day	105 mg/L 1971 lbs/day	---	---	---	---	---	---	70 mg/L 1314 lbs/day	105 mg/L 1971 lbs/day	---	---
TSS, Percent Removal **Feb 1- May 31**	65%	—	—	—	—	—	—	—	65%	—	—	—
E.Coli Bacteria, #/100 ml	---	---	---	---	126/100 ml	---	406/100 ml	---	126/100 ml	---	406/100 ml	---
Total Residual Chlorine **June 1-Sept 30**	0.5 mg/L 9.4 lb/day	0.75 mg/L 14.1 lbs/day	---	---	---	---	---	---	0.5 mg/L 9.4 lb/day	0.75 mg/L 14.1 lbs/day	---	---
Total Residual Chlorine **Oct 1-May 31**	0.5 mg/L 9.4 lb/day	0.75 mg/L 14.1 lbs/day	---	---	0.05 mg/L 0.9 lbs/day	---	0.22 mg/L 4.1 lbs/day	---	0.05 mg/L 0.9 lbs/day	---	0.22 mg/L 4.1 lbs/day	---

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Parameter	Technology Based Effluent Limits				Water Quality Based Effluent Limits				Proposed Effluent Limits in Draft Permit			
	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range
Total Ammonia as N **June 1- Sept 30**	---	---	---	---	43.1 mg/L 808.6 lbs/day	---	65 mg/L 1219.3 lbs/day	---	43.1 mg/L 808.6 lbs/day	---	65 mg/L 1219.3 lbs/day	---
Total Ammonia as N **Oct 1 - May 31**	---	---	---	---	4.3 mg/L 80.4 lbs/day	---	6.5 mg/L 121.2 lbs/day	---	4.3 mg/L 80.4 lbs/day	---	6.5 mg/L 121.2 lbs/day	---
Total Phosphorus as P	---	---	---	---	39 lbs/day	78.4 lbs/day	---	---	39 lbs/day	78.4 lbs/day	---	---
pH	---	---	---	6.0-9.0 s.u.	---	---	---	6.5-9.5 s.u.	---	---	---	6.5-9.0 s.u.

AML means Average Monthly Limit
AWL means Average Weekly Limit
IML means Instantaneous Maximum Limit, MDL means maximum daily limit. E. Coli bacteria is an instantaneous maximum limit, all other values are maximum daily limits.
--- means no limit

APPENDIX C
Basis for Effluent Limitations
for the New/Modified Facility

As discussed in Appendix B, the CWA requires the effluent limits for a particular pollutant to be the more stringent of either technology-based effluent limits or water quality based effluent limits. Appendix B also discusses the basis for deriving technology and water quality based effluent limits, therefore, that discussion will not be repeated here.

Part A of this appendix discusses technology based effluent limits for the new/modified facility, Part B discusses water quality based effluent limits for the existing facility, and Part C compares the technology based and water quality based effluent limits and shows which limit is in the draft permit.

A. Technology-based Effluent Limits

As discussed in Appendix B, POTWs must, at a minimum, meet technology limits based on EPA's "secondary treatment" regulations which are specified in 40 CFR 133.102, the technology based effluent limits applicable to the City's new/modified facility are:

(1) **BOD_5 and TSS, concentration based limits**:

Average Monthly Limit =	30 mg/L
Average Weekly Limit =	45 mg/L
Percent Removal Requirements =	85 %

(2) **BOD_5 and TSS, mass based limits**: The federal regulation at 40 CFR § 122.45 (f) require BOD_5 and TSS limitations to be expressed as mass based limits using the design flow of the facility. Based on a design flow of 5.0 mgd, the limits are:

BOD_5 and TSS loading, monthly average = 30 mg/L X 5 mgd X 8.34 = 1251 lbs/day
BOD_5 and TSS loading, weekly average = 45 mg/L X 5 mgd X 8.34 = 1876.5 lbs/day

(3) **pH**: The pH range must be between 6.0 - 9.0 standard units.

(4) **Fecal Coliform Bacteria**: The Idaho *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02.420.02.b) require disinfection of sewage wastewater treatment plant effluent when the effluent is discharged to (1) waterbodies or tributaries of waterbodies that flow through populated areas, (2) waterbodies that are designated for primary contact recreation, (3) or site specific conditions warrant disinfection for the protection of public health. The regulations also state that the need for disinfection for treatment systems consisting of lagoons with a retention time of 30 days should be evaluated on a case by case basis. The disinfection requirements limit fecal coliform bacteria.

Fecal coliform limits are not incorporated into the draft permit for the following reasons:

- The intent of the disinfection requirements outlined in this section of the

Idaho water quality standards is for the protection of human health. The draft permit already contains effluent limits based on the state's bacteriological water quality criteria for protecting human health. This criteria uses E.coli as the indicator organism to determine adverse health effects. E.coli bacteria is superior to fecal coliform bacteria as an indicator organism (*Ambient Water Quality Criteria for Bacteria - 1986*, EPA 440/5-84-002, January 1986).

- The state is currently in the process of revising their water quality standards. As part of the revision, the state is changing the indicator organism, in this section of their standards, from fecal coliform bacteria to E.coli bacteria.

(5) **Total Residual Chlorine**: The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment facility can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis.

Additionally, the NPDES regulation at 40 CFR 122.45(d) requires permit limits for publicly owned treatment works be expressed as average monthly limits (AMLs) and average weekly limits (AWLs) unless impracticable. The AWL is expressed as 1.5 X AML, or, in this case, 0.75 mg/L.

Finally, since the federal regulation at 40 CFR § 122.45 (f) requires limitations to be expressed as mass based limits using the design flow of the facility, mass based limits have been added to the draft permit. The mass based limit is calculated as follows: concentration X design flow X 8.34.

Average monthly loading limit = 0.5 mg/L X 5 mgd X 8.34 = 20.9 lbs/day
Average weekly loading limit = 0.75 mg/L X 5 mgd X 8.34 = 62.5 lbs/day

B. Water Quality-Based Effluent Limits

The discussion for deriving water quality based effluent limits can be found in Appendix B and will not be repeated here. The only water quality based effluent limits and/or requirements that differ from those required for the existing facility are for total residual chlorine and total ammonia. Additionally, monitoring will be required for whole effluent toxicity (see page B-6 for explanation), metals and hardness (see Page B-7 for explanation), dissolved oxygen, and temperature (see page B-8 for explanation).

(1) Total Residual Chlorine

The Idaho state water quality standards established an acute criterion of 19 µg/L, and a chronic criterion of 11 µg/L for the protection of aquatic life.

The water quality based effluent limits for chlorine were based on the new design

flow of 5 mgd. The water quality based effluent limits are (see pages E1-E-3 for further information):

	Average Monthly Limit	Maximum Daily Limit
June-September	0.57 mg/L(23.9 lbs/day)	1.5 mg/L (62.5 lbs/day)
October-May	0.04 mg/L (1.7 lbs/day)	0.11 mg/L (4.5 lbs/day)

(2) **Total Ammonia**

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from ammonia.

The water quality based effluent limits for total ammonia were based on the new design flow of 5 mgd. Based on this design flow the water quality based effluent limits are (see pages E-8 - E-11 for further information):

	Average Monthly Limit	Maximum Daily Limit
June-September	17.7 mg/L (738.1 lbs/day)	35.6 mg/L (1484.5 lbs/day)
October-May	1.9 mg/L (79.2 lbs/day)	3.8 mg/L (158.5 lbs/day)

C. Comparison of technology based effluent limits and water quality based effluent limits

The following table compares the technology based effluent limits with the water quality based effluent limits. The proposed effluent limits in the draft permit are the more stringent of the two types of limits.

Parameter	Technology Based Effluent Limits				Water Quality Based Effluent Limits				Proposed Effluent Limits in Draft Permit			
	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range
BOD_5	30 mg/L 1251 lbs/day	45 mg/L 1876.5 lbs/day	---	---	---	---	---	---	30 mg/L 1251 lbs/day	45 mg/L 1876.5 lbs/day	---	---
BOD_5, Percent Removal	85%	—	—	—	—	—	—	—	85%	—	—	—
TSS	30 mg/L 1251 lbs/day	45 mg/L 1876.5 lbs/day	---	---	---	---	---	---	30 mg/L 1251 lbs/day	45 mg/L 1876.5 lbs/day	---	---
TSS, Percent Removal	85%	—	—	—	—	—	—	—	85%	—	—	—
E.Coli Bacteria, #/100 ml	---	---	---	---	126/100 ml	---	406/100 ml	---	126/100 ml	---	406/100 ml	---
Total Residual Chlorine June1-Sept 30	0.5 mg/L 20.8 lb/day	0.75 mg/L 31.3 lbs/day	---	---	0.57 mg/L (23.9 lbs/day)	---	1.5 mg/L (62.5 lbs/day)	—	0.5 mg/L 20.8 lb/day	0.75 mg/L 31.3 lbs/day	---	---
Total Residual Chlorine Oct 1-May 31	0.5 mg/L 20.8 lb/day	0.75 mg/L 31.3 lbs/day	---	---	0.04 mg/L 1.7 lbs/day	---	0.11 mg/L 4.5 lbs/day	---	0.04 mg/L 1.7 lbs/day	---	0.11 mg/L 4.5 lbs/day	---

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Parameter	Technology Based Effluent Limits				Water Quality Based Effluent Limits				Proposed Effluent Limits in Draft Permit			
	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range	AML	AWL	IML or MDL	Range
Total Ammonia as N June 1- Sept 30	---	---	---	---	17.8 mg/L 738.1lbs/day	—	35.6 mg/L 1484.9 lbs/day	---	17.8 mg/L 738.1 lbs/day	---	35.6 mg/L 1484.9 lbs/day	---
Total Ammonia as N Oct 1 - May 31	---	---	---	---	1.9 mg/L 79.2 lbs/day	---	3.8 mg/L 158.5 lbs/day	---	1.9 mg/L 79.2 lbs/day	---	3.8 mg/L 158.5 lbs/day	---
Total Phosphorus as P	---	---	---	---	39 lbs/day	78.4 lbs/day	---	---	39 lbs/day	78.4 lbs/day	---	---
pH	---	---	---	6.0-9.0 s.u.	---	---	---	6.5-9.5 s.u.	---	---	---	6.5-9.0 s.u.

AML means Average Monthly Limit
AWL means Average Weekly Limit
IML means Instantaneous Maximum Limit, MDL means maximum daily limit. E. Coli bacteria is an instantaneous maximum limit, all other values are maximum daily limits.
--- means no limit

APPENDIX D

Reasonable Potential Calculations

To determine if a water quality based effluent limitation is required, the receiving water concentration of a pollutant 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.

$$C_d \text{ X } (Q_e + Q_u = (C_e \text{ X } Q_e) + (C_u \text{ X } Q_u)$$

$$C_d = \frac{(C_e \text{ X } Q_e) + (C_u \text{ X } Q_u)}{Q_e + Q_u}$$

where,
C_d = receiving water concentration 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 low flow (1Q10, 7Q10)

Reasonable Potential Calculation for Total Residual Chlorine

I. Mixing Zone/Low Flow Conditions/Effluent Flow

A. Mixing Zones

The Idaho *Water Quality Standards and Wastewater Treatment Requirements* at IDAPA 16.01.02.060 allow the Idaho Department of Environmental Quality to authorize mixing zones. In this case, a mixing zone of twenty-five percent (25%) of the low flow receiving water is assumed. If the State does not authorize a mixing zone in its 401 certification, the permit limits will be re-calculated to ensure compliance with the standards at the point of discharge.

If a mixing zone (%MZ) is allowed, the mass balance equation, above, becomes

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

B. Low Flow Conditions

The following low flow values were calculated from data from 1948 through 1990 from USGS gaging station 13081500 (the USGS station is downstream from Minidoka dam):

	1Q10	7Q10
June-September:	2412 cfs (1559 mgd)	3311cfs (2140 mgd)
October-May	145 cfs (93.7 mgd)	330 cfs (213.3 mgd)

The 1Q10 flow is used in determining protection of aquatic life from acute effects of pollutants. It represents the lowest daily flow that is expected to occur once in 10 years. The 7Q10 flow is used in determining protection of aquatic life from chronic effects of pollutants. It represents the lowest 7-day average flow expected to occur in 10 years.

C. Effluent flow

The current effluent design flow from the facility is 2.25 mgd.
The effluent design flow of the new/modified facility is 5.0 mgd.

II. Data Set for Total Residual Chlorine

The effluent data collected from January 1996 through April 2001 was used to determine the coefficient of variation (CV) of the data for the current facility. The CV is 1.2.

There is no ambient data for chlorine, therefore it will be assumed that the background concentration is zero.

III. Numeric Criteria for Total Residual Chlorine

The Idaho water quality standards have total residual chlorine criteria. The criteria are :
acute criterion: 19 µg/L
chronic criterion: 11 µg/L

IV. Maximum Projected Effluent Concentration for Total Residual Chlorine for the Existing Facility

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 has been calculated, the reasonable potential multiplier used to derive the maximum projected effluent concentration (C_e) can be found using the equation in chapter 3.3.2. of EPA's TSD.

The purpose of this analysis is to determine if the technology based limit of 0.5 mg/L, which is in the current permit, is sufficiently stringent to protect water quality standards. Therefore, the maximum projected concentration (C_e) for the effluent is equal to the allowable concentration value multiplied by the reasonable potential multiplier, or 0.5 mg/L X 2.2 = 1.1 mg/L (This value will also be used for the new/modified facility).

V. Reasonable Potential Calculation for Total Residual Chlorine for the Existing Facility

(a) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated:

The upstream flow (Q_u) used to make the determination is the 1Q10 flow. Assume the State will allow a 25% mixing zone (%MZ). The upstream concentration of total residual chlorine (C_u) is assumed to be 0 μg/L, and the effluent concentration (C_e) is 1.1 mg/L (1100 μg/L).

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

June-September

$$C_d = \frac{(1100 \text{ X } 2.25) + 0.0\text{X } (1559 \text{ X } .25)}{2.25 + (1559 \text{ X } .25)} = 6.3 \text{ μg/L}$$

October -May

$$C_d = \frac{(1100 \text{ X } 2.25) + 0.0\text{X } (93.7 \text{ X } .25)}{2.25 + (93.7 \text{ X } .25)} = 96.4 \text{ μg/L}$$

Since 6.3 μg/L is less than the acute aquatic life criterion (19 μg/L), there is no reasonable potential for the effluent to cause an exceedance of the water quality standard in June through September. However, from October through May the water quality criterion is exceeded and a water quality based effluent limit is required.

(b) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated:

The upstream flow used to make the determination is the 7Q10 flow. Assume the State will allow a 25% mixing zone. The upstream concentration of total residual chlorine is assumed to be 0 μg/L, and the effluent concentration (C_e) is 1.1 mg/L (1100 μg/L).

June-September

$$C_d = \frac{(1100 \text{ X } 2.25) + (0.0 \text{ X } (2140 \text{ X } .25)}{2.25 + (2140 \text{ X } .25)} = 4.6 \text{ μg/L}$$

October-May

$$C_d = \frac{(1100 \text{ X } 2.25) + (0.0 \text{ X } (213.3 \text{ X } .25)}{2.25 + (213.3 \text{ X } .25)} = 44.5 \text{ µg/L}$$

Since 4.6 µg/L is less than the chronic aquatic life criterion (11 µg/L), there is no reasonable potential for the effluent to cause an exceedance of the water quality standard from June through September, however, there is reasonable potential to violate the water quality standards from October through May, so water quality based effluent limits are required during this time period.

VI. Reasonable Potential Calculation for Total Residual Chlorine for the New/Modified Facility

(a) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated:

The upstream flow (Q_u) used to make the determination is the 1Q10 flow. Assume the State will allow a 25% mixing zone (%MZ). The upstream concentration of total residual chlorine (C_u) is assumed to be 0 µg/L, and the effluent concentration (C_e) is 1.1 mg/L (1100 µg/L).

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

June-September

$$C_d = \frac{(1100 \text{ X } 5) + 0.0\text{X } (1559 \text{ X } .25)}{5 + (1559 \text{ X } .25)} = 13.9 \text{ µg/L}$$

October -May

$$C_d = \frac{(1100 \text{ X } 5) + 0.0\text{X } (93.7 \text{ X } .25)}{5 + (93.7 \text{ X } .25)} = 193.5 \text{ µg/L}$$

Since 13.9 µg/L is less than the acute aquatic life criterion (19 µg/L), there is no reasonable potential for the effluent to cause an exceedance of the water quality standard in June through September. However, from October through May the water quality criterion is exceeded and a water quality based effluent limit is required.

(b) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated:

The upstream flow used to make the determination is the 7Q10 flow. Assume the State will allow a 25% mixing zone. The upstream concentration of total residual chlorine is assumed to be 0 µg/L, and the effluent concentration (C_e) is 1.1 mg/L (1100 µg/L).

June-September

$$C_d = \frac{(1100 \times 5) + (0.0 \times (2140 \times .25)}{5 + (2140 \times .25)} = 10.2\ \mu g/L$$

October-May

$$C_d = \frac{(1100 \times 5) + (0.0 \times (213.3 \times .25)}{5 + (213.3 \times .25)} = 94.3\ \mu g/L$$

Since 10.2 µg/L is less than the chronic aquatic life criterion (11 µg/L), there is no reasonable potential for the effluent to cause an exceedance of the water quality standard from June through September, however, there is reasonable potential to violate the water quality standards from October through May, so water quality based effluent limits are required during this time period.

Reasonable Potential Calculation for Total Ammonia

I. Data Set for Total Ammonia

The effluent data collected from January 1996 through April 2001 was used to determine the coefficient of variation (CV) of the data and the highest observed effluent value. The CV is 0.3, and the maximum observed value is 20.1 mg/L.

The surface water data was collected by IDEQ above Burley at the power line from March 1997 - June 1999, and by Ore-Ida Foods at river mile 653.8 from November 1994 - November 1998. Based on this data set the 95th percentile background concentrations were:

June - September	October -May
T = 22.1 C	T = 13.9 C
pH = 8.6	pH = 8.7
C_u = 0.12 mg/L	C_u = 0.11 mg/L

II. Numeric Criteria for Total Ammonia

The Idaho water quality standards have total ammonia criteria. The criteria are based on the 95th percentile pH and temperature, upstream of the facility:

	acute criterion	chronic criterion
June - September	1.59 mg/L	0.32 mg//L
October - May	1.29 mg/L	0.30 mg/L

III. Maximum Projected Effluent Concentration for Total Ammonia

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 has been calculated, the reasonable potential multiplier used to derive the maximum projected effluent concentration (C_e) can be found using the equation in chapter 3.3.2. of EPA's TSD.

The maximum projected concentration (C_e) for the effluent is equal to the highest observed concentration value of the data set multiplied by the reasonable potential multiplier, or 20.1 mg/L X 1.27 = 25.5 mg/L

IV. Reasonable Potential Calculation for Total Ammonia

(a) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated:

The upstream flow (Q_u) used to make the determination is the 1Q10 (mgd). Assume the State will allow a 25% mixing zone (%MZ).

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

June-September

During the last permitting cycle it was found that the facility effluent had reasonable potential to violate WQS based on the 1Q10 and & 7Q10 that occurs from June through September, therefore, the calculation will not be repeated. A reasonable potential calculation was not previously done for the non-irrigation season (October - May) when flows are lower than the June - September flows therefore, a reasonable potential calc will be done for this time period.

October -May

$$C_d = \frac{(25.5 \text{ X } 2.25) + 0.11 \text{ X } (93.7 \text{ X } .25)}{2.25 + (93.7 \text{ X } .25)} = 2.33 \text{ mg/L}$$

Since 2.33 mg/L is greater than the acute aquatic life criterion (1.59 mg/L), there is reasonable potential for the effluent to cause an exceedance of the water quality standard and a water quality based effluent limit is required.

(b) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated:

The upstream flow used to make the determination is the 7Q10 flow. Assume the State will allow a 25% mixing zone.

October-May

$$C_d = \frac{(25.5 \text{ X } 2.25) + (0.11 \text{ X } (213.3 \text{ X } .25)}{2.25 + (213.3 \text{ X } .25)} = 1.13 \text{ mg/L}$$

Since 1.13 mg/L is greater than the chronic aquatic life criterion (0.32 mg/L), there is reasonable potential for the effluent to cause an exceedance of the water quality standard and a water quality based effluent is needed.

APPENDIX E
Calculations for Water Quality Based Effluent Limits
for Chlorine, Ammonia, and Phosphorus

I. Total Residual Chlorine

Based on the results of the reasonable potential calculations completed in Appendix D, water quality based effluent limits are only needed from October through May. From June through September technology based limits will apply to the effluent.

The Idaho state water quality standards established an acute criterion of 19 µg/L, and a chronic criterion of 11 µg/L for the protection of aquatic life. Based on these criteria, the effluent limits for October through May were determined as follows :

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_dC_d = Q_eC_e + Q_uC_u$$

where, Q_d = downstream flow = $Q_u + Q_e$
C_d = aquatic life criteria that cannot be exceeded downstream
($C_{d(acute)}$ = 19 µg/L, $C_{d(chronic)}$ = 11 µg/L)
Q_e = effluent flow
(current facility flow is 2.25 mgd, the new/modified facility flow is 5.0 mgd)
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow (1Q10 or 7 Q10)
(The 1Q10 flow is 93.7 mgd, and the 7Q10 flow is 213 mgd)
C_u = upstream background concentration of pollutant (0 µg/L)

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{Q_dC_d - Q_uC_u}{Q_e}$$

when a mixing zone is allowed, this equation becomes:

$$C_e = WLA = \frac{C_d(Q_u \times \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e}$$

where, %MZ is the mixing zone allowable by the state standards. The Idaho water quality standards at IDAPA 16.01.02060 allow twenty-five percent (25%) of the receiving water to be

used for dilution for aquatic life criteria. The effluent limits have been derived using Idaho's guidelines for mixing zone. However, establishing a mixing zone is a State discretionary function, if the State does not certify a mixing zone in the 401 certification process the effluent limits will be recalculated without a mixing zone.

(a) Existing Facility:

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} = \frac{19\ (93.7 \text{ X } .25) + 19 \text{ X } 2.25}{2.25} = 216.8$$

$$WLA_{chronic} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} = \frac{11(213 \text{ X } .25) + 11 \text{ X } 2.25}{2.25} = 271.3$$

(b) New/Modified Facility:

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} = \frac{19\ (93.7 \text{ X } .25) + 19 \text{ X } 5}{5} = 108.02$$

$$WLA_{chronic} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} = \frac{11(213 \text{ X } .25) + 11 \text{ X } 5}{5} = 128.15$$

Step 2 - Determine the Long Term Average

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_a and LTA_c) using the following equations:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
$z = 2.326$ for 99^{th} percentile probability basis
CV = coefficient of variation = standard deviation ÷ mean (if information is not available EPA recommends using .6 for the CV. The existing facility has a CV of 1.2. There is no data to determine the CV of the new/modified facility, in such cases EPA's Technical Support Document for Water Quality Based Toxics Control recommends using a CV of 0.6).

$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$

where,
$\sigma^2 = \ln(CV^2/4 + 1)$
$z = 2.326$ for 99^{th} percentile probability basis
CV = coefficient of variation = standard deviation/mean

(a) Existing Facility:
LTA_{acute} = 37.72
$LTA_{chronic}$ = 87.08

(b) New/Modified Facility:
LTA_{acute} = 34.67

$LTA_{chronic}$ = 67.53

Step 3 - Determine the effluent limits

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. In this case, from June through September the most limiting LTA is 402.2. From October through May the most limiting LTA is 29.9.

The TSD recommends using the 95th percentile for the average monthly limit, and the 99th percentile for the maximum daily limit.

To derive the maximum daily limit and the average monthly limit for chlorine the calculations are as follows:

(a) Existing Facility:
Maximum Daily Limit = $LTA_{chronic}$ X $e^{[z\sigma-0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis

maximum daily limit = 37.7 X 5.76 = 217.2 µg/L
maximum daily load = (0.22 mg/L) X (2.25 mgd) X (8.34) = 4.1 lbs/day

Average Monthly Limit = $LTA_{chronic}$ X $e^{[z\sigma- 0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis

n = number of sampling events required per month = 30
average monthly limit = 37.6 X 1.39 = 52.4 µg/L
average monthly load = (0.05 mg/L) X (2.25 mgd) X (8.34) = 0.9 lbs/day

(b) New/Modified Facility:
maximum daily limit = 34.6 X 3.11 = 107.8 µg/L
maximum daily load = (0.108 mg/L) X (5 mgd) X (8.34) = 4.5 lbs/day

average monthly limit = 34.6 X 1.19 = 41.2 µg/L
average monthly load = (0.041 mg/L) X (5 mgd) X (8.34) = 1.7 lbs/day

SUMMARY: The following limits are applicable for the months from October through May

	Average Monthly Limit	Maximum Daily Limit
Existing Facility:	0.05 mg/L (0.9 lbs/day)	0.22 mg/L (4.1 lbs/day)
New/Modified Facility:	0.04 mg/L (1.7 lbs/day)	0.11 mg/L (4.5 lbs/day)

II. Total Ammonia Calculations for the Existing Facility

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from ammonia.

Step 1- Determine the WLA

The acute and chronic criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_dC_d = Q_eC_e + Q_uC_u$$

where, Q_d = downstream flow = $Q_u + Q_e$
C_d = aquatic life criteria that cannot be exceeded downstream
Q_e = effluent flow (2.25 mgd)
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow
C_u = upstream background concentration of pollutant

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation results in the following:

$$C_e = WLA = \frac{Q_dC_d - Q_uC_u}{Q_e}$$

when a mixing zone is allowed, this equation becomes:

$$= \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e}$$

where, %MZ is the mixing zone[2] allowable by the state standards. Establishing a mixing zone is a State discretionary function. Twenty five percent for the stream flow was used for a mixing zone.

June-September: 1Q10 = 1559 mgd 7Q10 = 2140 mgd
$C_{d(acute)}$ = 1.59 mg/L
$C_{d(chronic)}$ = 0.32 mg/L
C_u = 0.12 mg/L
Q_e = 2.25 mgd
%MZ = 0.25

[2] Mixing zone - is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. Only the State of Idaho has the regulatory authority to grant a mixing zone.

October-May: 1Q10 = 93.7 mgd 7Q10 = 213 mgd
$C_{d(acute)}$ = 1.29 mg/L
$C_{d(chronic)}$ = 0.30 mg/L
C_u = 0.11 mg/L
Q_e = 2.25 mgd
%MZ = 0.25

(**a) <u>June - September</u>:**

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e} =$$

$$\frac{1.59\ (1559 \text{ X } .25) + 1.59 \text{ X } 2.25}{2.25} - \frac{(1559\text{X}0.12\text{X}.25)}{2.25} = 256.2$$

$$WLA_{chronic} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e} =$$

$$\frac{0.32\ (2140 \text{ X } .25) + 0.32 \text{ X } 2.25}{2.25} - \frac{(2140\text{X}0.12\text{X}.25)}{2.25} = 47.9$$

(b) <u>October - May</u>:

$$WLA_{acute} = \frac{1.29\ (93.7 \text{ X } .25) + 1.29 \text{ X } 2.25}{2.25} - \frac{(93.7\text{ X}0.11\text{X}.25)}{2.25} = 13.6$$

$$WLA_{chronic} = \frac{0.3\ (213 \text{ X } .25) + 0.3 \text{ X } 2.25}{2.25} - \frac{(213\text{ X}0.11\text{X}.25)}{2.25} = 4.8$$

<u>Step 2 - Determine the Long Term Average</u>

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_a and LTA_c) using the following equations:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.3 (based on data from January 1996 through April 2001)

$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$

where,
$\sigma^2 = \ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation ÷ mean = 0.3

Using the equations above the LTA_{acute} and the $LTA_{chronic}$ are as follows:

(a) <u>June-September</u>:

LTA_{acute} = 135 mg/L
$LTA_{chronic}$ = 34.2 mg/L

(b) <u>October-May</u>:

LTA_{acute} = 7.16 mg/L
$LTA_{chronic}$ = 3.4 mg/L

<u>Step 3 - Determine the effluent limits</u>

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. In this case, from June through September the most limiting LTA is 34.2, and from October through May the most limiting LTA is 3.4.

When developing limits the TSD recommends using the 95th percentile for the average monthly limit, and the 99th percentile for the maximum daily limit.

To derive the maximum daily limit and the average monthly limits the calculations are as follows:

maximum daily limit = $LTA_{chronic}$ X $e^{[z\sigma-0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.3

average monthly limit = $LTA_{chronic}$ X $e^{[z\sigma- 0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation = 0 .3
n = number of sampling events required per month = 4

(a) The effluent limits from June through September are:

maximum daily limit = 65 mg/L
maximum daily load = (65 mg/L) X (2.25 mgd) X (8.34) = 1219.3 lbs/day

average monthly limit = 43.1 mg/L
average monthly load = (43.1 mg/L) X (2.25 mgd) X (8.34) = 808.6 lbs/day

(b) The effluent limits from October through May are:

maximum daily limit = 6.5 mg/L
maximum daily load = (6.5 mg/L) X (2.25 mgd) X (8.34) = 121.2 lbs/day

average monthly limit = 4.3 mg/L
average monthly load = (4.3 mg/L) X (2.25 mgd) X (8.34) = 80.4 lbs/day

III. Total Ammonia Calculations for the New/Modified Facility

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from ammonia.

Step 1- Determine the WLA

The acute and chronic criteria are converted to acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_dC_d = Q_eC_e + Q_uC_u$$

where, Q_d = downstream flow = $Q_u + Q_e$
C_d = aquatic life criteria that cannot be exceeded downstream
Q_e = effluent flow
C_e = concentration of pollutant in effluent = WLA_{acute} or $WLA_{chronic}$
Q_u = upstream flow
C_u = upstream background concentration of pollutant

Rearranging the above equation to determine the effluent concentration (C_e) or the wasteload allocation results in the following:

$$C_e = WLA = \frac{Q_dC_d - Q_uC_u}{Q_e}$$

when a mixing zone is allowed, this equation becomes:

$$= \frac{C_d(Q_u \times \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e}$$

where, %MZ is the mixing zone[3] allowable by the state standards. Establishing a mixing zone is a State discretionary function. In this case, twenty five percent of the stream flow was used for a mixing zone.

June-September: 1Q10 = 1559 mgd 7Q10 = 2140 mgd
$C_{d(acute)}$ =1.59 mg/L
$C_{d(chronic)}$ = 0.32 mg/L
C_u = 0.12 mg/L
Q_e = 5.0 mgd
%MZ = 0.25

October-May: 1Q10 = 93.7 mgd 7Q10 = 213 mgd

[3] Mixing zone - is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. Only the State of Idaho has the regulatory authority to grant a mixing zone.

$C_{d(acute)}$ = 1.29 mg/L
$C_{d(chronic)}$ = 0.30 mg/L
C_u = 0.11 mg/L
Q_e = 2.25 mgd
%MZ = 0.25

(a) <u>June - September</u>:

$$WLA_{acute} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e} = \frac{1.59\ (1559 \text{ X } .25) + 1.59 \text{ X } 5}{5} - \frac{(1559\text{X}0.12\text{X}.25)}{5} = 116.18$$

$$WLA_{chronic} = \frac{C_d(Q_u \text{ X } \%MZ) + C_dQ_e}{Q_e} - \frac{Q_uC_u(\%MZ)}{Q_e} = \frac{0.32\ (2140 \text{ X } .25) + 0.32 \text{ X } 5}{5} - \frac{(2140\text{X}0.12\text{X}.25)}{5} = 21.72$$

(b) <u>October - May</u>:

$$WLA_{acute} = \frac{1.29\ (93.7 \text{ X } .25) + 1.29 \text{ X } 5}{5} - \frac{(93.7\text{ X}0.11\text{X}.25)}{5} = 6.82$$

$$WLA_{chronic} = \frac{0.3\ (213 \text{ X } .25) + 0.3 \text{ X } 5}{5} - \frac{(213\text{ X}0.11\text{X}.25)}{5} = 2.32$$

<u>Step 2 - Determine the Long Term Average</u>

The acute and chronic WLAs are then converted to Long Term Average concentrations (LTA_a and LTA_c) using the following equations:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation/mean (if information is not available EPA recommends using .6 for the CV. Since the City will be updating their plant in the future 0.6 will be used as the CV.)

$LTA_{chronic} = WLA_{chronic} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$
where,
$\sigma^2 = \ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis
CV = 0.6

Using the equations above the LTA_{acute} and the $LTA_{chronic}$ are as follows:

(a) **<u>June-September</u>**:

LTA_{acute} = 37.29 mg/L
$LTA_{chronic}$ = 11.45 mg/L

(b) **<u>October-May</u>**:

LTA_{acute} = 2.19 mg/L
$LTA_{chronic}$ = 1.22 mg/L

<u>Step 3 - Determine the effluent limits</u>

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. In this case, from June through September the most limiting LTA is 11.4, and from October through May the most limiting LTA is 1.4.

When developing limits the TSD recommends using the $95^{\underline{th}}$ percentile for the average monthly limit, and the $99^{\underline{th}}$ percentile for the maximum daily limit.

To derive the maximum daily limit and the average monthly limits the calculations are as follows:

maximum daily limit = $LTA_{chronic}$ X $e^{[z\sigma-0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99^{th} percentile probability basis
CV = coefficient of variation = 0.6

average monthly limit = $LTA_{chronic}$ X $e^{[z\sigma- 0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95^{th} percentile probability basis
CV = coefficient of variation = 0 .6
n = number of sampling events required per month = 4

(a) **The effluent limits from June through September are**:

maximum daily limit = 35.6 mg/L
maximum daily load = (35.6 mg/L) X (5 mgd) X (8.34) = 1484.5 lbs/day

average monthly limit = 17.7 mg/L
average monthly load = (17.7 mg/L) X (5 mgd) X (8.34) = 738.1 lbs/day

(b) **The effluent limits from October through May are**:

maximum daily limit = 3.8 mg/L
maximum daily load = (3.8 mg/L) X (5 mgd) X (8.34) = 158.5 lbs/day

average monthly limit = 1.9 mg/L
average monthly load = (1.9 mg/L) X (5 mgd) X (8.34) = 79.2 lbs/day

IV. Total Phosphorus Calculations for the Existing Facility and the New/Modified Facility

The Idaho state water quality standards require surface waters of the state be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses. The Snake River is listed as water quality impaired for nutrients, and as a result of this listing IDEQ developed a TMDL. The TMDL allocated the City of Burly a WLA of 39 lbs/day. As stated previously, federal regulations at 40 CFR 122.44(d)(vii)(B) require EPA to incorporate effluent limits based on WLAs from the State's TMDL into NPDES permits.

In translating the wasteload allocation (WLA) into permit limits, EPA followed the procedures in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991, TSD). The first step in developing limits is to determine the time frame over which the WLAs apply. In general, the period over which a criterion applies is based on the length of time the target organism can be exposed to the pollutant without adverse effect. For example, aquatic life criteria generally apply as one-hour averages (acute criteria) or four-day averages (chronic criteria). In the case of total phosphorus, the target organisms are aquatic vegetation which respond to high phosphorus concentrations with excess growth, resulting in eutrophication. The TMDL indicates the target is a yearly average of 0.080 mg/L with a maximum of 0.128 mg/L to allow for natural variability. The TMDL provided a WLA of 39 lbs/day to the City of Burley wastewater treatment plant.

Because compliance with permit limits is determined on a weekly, and monthly basis (40 CFR 122.45(d)(2)) it is necessary to set permit limits that meet a given WLA for every month. If the statistical procedures normally used for calculating aquatic life protection were used for developing permit limits the weekly and monthly limits would exceed the WLA necessary to meet criteria concentrations. Thus, even if a facility was discharging in compliance with permit limits calculated using these procedures, it would be possible to constantly exceed the WLA. This approach is not acceptable. In addition, the statistical derivation procedure is not applicable to exposure periods more than 30 days. Therefore, the recommended approach for setting water quality based effluent limits is as follows:

- set the average monthly limit equal to the WLA of 39 lbs/day
- calculate the average weekly limit using the following relationship:

$$\frac{\text{Average Weekly Limit}}{\text{Average Monthly Limit}} = \frac{\exp[Z_m \sigma - .5\sigma^2]}{\exp[Z_a \sigma_n - .5\sigma_n^2]}$$

where:

Z_m = percentile exceedance probability for AWL (99%) = 2.326
Z_a = percentile exceedance probability for AML (95%) = 1.645
σ_n^2 = $\ln(CV^2/n + 1) = \ln(.6^2/4 + 1) = .08618$
σ^2 = $\ln(CV^2 + 1) = \ln(.6^2 + 1) = .307$
CV = 0.6
n = 4 (number of sampling events per month)

$$\frac{\text{Average Weekly Limit}}{\text{Average Monthly Limit}} = \frac{3.11}{1.55} = 2.01$$

Average Weekly Limit = 2.01 X 39 lbs/day = 78.4 lbs/day

APPENDIX F

Endangered Species Act

The endangered species that may be in the vicinity of the City of Burley outfall include the Grey wolf, Bald eagle, Utah Valvata Snail, and Snake River Physa. EPA has made a preliminary determination that the re-issued permit will have no affect on the Grey wolf or the Bald eagle, and is not likely to adversely affect the snail species.

EPA has made this determination for the following reasons:

- EPA has prepared a biological assessment (BA) to identify the potential impacts to federally listed endangered or threatened species that could result from the reissuance of the permits for the Lake Walcott Subbasin. These permits include the City of Burley, the City of Heyburn, the City of American Falls, and Minidoka Power Plant.

- The results of this assessment concluded that the reissuance of all of permits would not affect the Grey wolf or the Bald eagle, the reissuance of the Minidoka Power Plant would not affect the Utah Valvata Snail or the Snake River Physa, and the reissuance of the City of Burley, City of Heyburn, and City of American Falls were not likely to adversely affect the Utah Valvata Snail or the Snake River Physa.

- The assessment done for the Lake Walcott Subbasin is similar in scope and content to the *Biological Assessment for Reissuance of NPDES Permits for Middle Snake River and Billingsley Creek, Idaho Facilities and a General Permit for the State of Idaho for Aquaculture Facilities* (EPA, January 22, 1999). The U.S. Fish and Wildlife Service concurred with the findings for the Middle Snake BA on July 28, 1999.

EPA has initiated informal consultation with U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. If the consultation results in reasonable and prudent measures that require more stringent permit conditions, EPA will incorporate those conditions into the final permit.