Fact Sheet

NPDES Permit Number:	ID-002129-6
Public Notice Start Date:	August 28, 2002
Public Hearing Date:	October 1, 2002
Public Notice Expiration Date:	October 15, 2002
Technical Contact:	Kelly Huynh 206-553-8414 or 1-800-424-4372 (within Region 10) huynh.kelly@epa.gov

The U.S. Environmental Protection Agency (EPA) Proposes to Reissue a Wastewater Discharge Permit to:

South Fork Coeur d'Alene River Sewer District
Mullan Wastewater Treatment Plant
1020 Polaris Ave.
PO Box 783
Osburn, Idaho 83849

and

the State of Idaho proposes to Certify the Permit

EPA Proposes NPDES Permit Reissuance

The EPA proposes to reissue a *National Pollutant Discharge Elimination System* (NPDES) permit to the South Fork Coeur d'Alene River Sewer District. The draft permit sets conditions on the discharge of pollutants from the Mullan wastewater treatment plant to the South Fork Coeur d'Alene 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. A variance from the water quality standards for cadmium, lead, and zinc is also being proposed by EPA as a separate action from the NPDES permit. Please contact Lisa Macchio at 206-553-1834 or macchio.lisa@epa.gov for a copy of the draft variance and Public Information Document.

This fact sheet includes:

- information on public comment, a public hearing, and appeal procedures
- a description of the current and proposed discharge
- a listing of past and proposed effluent limitations and other conditions
- a map and description of the discharge location and schematic of the contributing entities
- detailed background information supporting the conditions in the draft permit

Idaho State Certification

The Idaho Department of Environmental Quality (IDEQ) proposes to certify the NPDES permit to the South Fork Coeur d'Alene River Sewer District for the Mullan wastewater treatment plant, under section 401 of the Clean Water Act.

Public Comment on the Draft Permit

Persons wishing to comment on the draft permit may do so in writing by the expiration date of the public notice. All comments must be in writing and include the commenter's name, address, and telephone number and either be addressed to the Office of Water Director at U.S. EPA, Region 10, 1200 6th Avenue, OW-130, Seattle, WA 98101; submitted by facsimile to (206) 553-0165; or submitted via e-mail to huynh.kelly@epa.gov. In addition, EPA has scheduled a public hearing on October 1 2002, beginning at 6:00 p.m. and ending when all persons have been heard, at Silver Hills Middle School Gymnasium at East Mullan Avenue in Osburn, Idaho. A sign-in process will be used for persons wishing to make a statement or submit written comments at the hearing. Although the draft permit and metals variance for are being proposed as separate actions, the public hearing will include both actions. Comments on the proposed variances should be submitted to Office of Water Director at U.S. EPA, Region 10, 1200 - 6th Avenue, OW-131, Seattle, WA 98101; submitted by facsimile to (206) 553-0165; or submitted via e-mail to macchio.lisa@epa.gov.

After the comment period closes, and all significant comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit reissuance. If no comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon reissuance. If comments are received, EPA will address the significant comments and reissue the permit. The permit will become effective 35 days after the issuance date, unless an appeal is filed with the Environmental Appeals Board within 30 days of the issuance date.

Public Comment on the State Preliminary 401 Certification

The IDEQ provides the public with the opportunity to review and comment on preliminary 401 certification decisions. Any person may request in writing, that IDEQ provide that person notice of IDEQ's preliminary 401 certification decision, including, where appropriate, the draft certification. Persons wishing to comment on the preliminary 401 certification should submit written comments by the public notice expiration date to the Idaho Department of Environmental Quality, Coeur d'Alene Regional Office, c/o David Stasney at 2110 Ironwood Parkway, Coeur d'Alene, Idaho 83814 or fax number 208-769-1404 or dstasney@deq.state.id.us.

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). .

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
206-553-0523 or
1-800-424-4372 (within Alaska, Idaho, Oregon, and Washington)

The fact sheet and draft permit are also available at:

EPA Coeur d'Alene Field Office
1910 NW Boulevard
Coeur d'Alene, Idaho 83814
208-664-4588

Idaho Department of Environmental Quality
Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene, Idaho 83814
208-769-1422

Wallace Public Library
415 River Street
Wallace, Idaho
208-752-4571

The draft permit and fact sheet can also be found by visiting the Region 10 website at www.epa.gov/r10earth/water.htm.

For technical questions regarding the permit or fact sheet, contact Kelly Huynh at the phone numbers or email address at the top of this fact sheet. Additional services can be made available to person with disabilities by contacting Kelly Huynh.

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LIST OF ACRONYMS

AML	Average Monthly Limit
AWL	Average Weekly Limit
BMP	Best Management Practices
BOD_5	five day Biochemical Oxygen Demand
BPT	Best Practicable control Technology currently available
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CWA	Clean Water Act
CV	Coefficient of Variation
DMR	Discharge Monitoring Report
ESA	Endangered Species Act
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
IDEQ	Idaho Department of Environmental Quality
I/I	Inflow and Infiltration
MDL	Maximum Daily Limit or Method Detection Limit
µg/L	Micrograms per liter
mgd	Million gallons per day
mg/L	Milligrams per liter
ML	Minimum Level
%MZ	Percent Mixing Zone
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
QAP	Quality Assurance Plan
SSO	Sanitary Sewer Overflow
SFCDA	South Fork Coeur d'Alene
s.u.	Standard units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA 1991)
TSS	Total Suspended Solids
TU_c	Chronic Toxicity Units
URSG	URS Geiner Corporation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UAA	Use and Attainability Analysis
WLA	Wasteload Allocation
WWTP	Wastewater treatment plant

BACKGROUND INFORMATION

I. APPLICANT

South Fork Coeur d'Alene River Sewer District
NPDES Permit No.: ID-002129-6

Mailing address:	Physical location:
1020 Polaris Ave.	191 Mill Road
PO Box 783	Mullan, Idaho
Osburn, Idaho 83849	

Facility contact: Ross Stout, District Manager

II. FACILITY ACTIVITY

A. Facility Activity Description

The South Fork Coeur d'Alene River Sewer District (the "District") owns, operates, and maintains the Mullan wastewater treatment plant (WWTP) located in Mullan, Idaho, Shoshone County. The secondary treatment facility has been active since 1975. The Mullan WWTP treats domestic sewage from the City of Mullan. There are no industrial discharges to the system. The influent to the WWTP sewage is pumped from a wet well to the comminutor basin where solids are shredded to small pieces. Bacteria and air is then added to basins 1 and 2 before secondary (biological) treatment is achieved in the clarifier. The clarifier settles out the sludge before the effluent is disinfected, by chlorine, before discharge to the South Fork Coeur d'Alene River.

See Appendix A for a map of the location of the treatment plant and discharge. Details about the wastewater treatment processes and waste streams are included in Appendix B.

B. Background Information

The first NPDES permit for the Mullan WWTP became effective on October 21, 1974 and expired May 31, 1979. The current NPDES permit was reissued on September 10, 1985 and became effective October 10, 1985. An application for renewal was received by EPA February 20, 1990 (prior to the permit expiration date of October 9, 1990) therefore, EPA administratively extended the permit pursuant to federal regulation 40 Code of Federal Regulation (CFR) 122.6. The conditions of the 1985 permit are in effect until the permit is reissued or revoked. The District's latest application was submitted to EPA on April 8, 1999.

A review of the facility's monthly discharge monitoring reports[1] (DMRs) since December of 1994 shows that the facility's monthly average flow is approximately 0.276 mgd. The average design flow for the WWTP is 0.55 mgd. Review of the last five years of DMRs also reveals past violations of biochemical oxygen demand (4 violations), total suspended solids (11 violations), fecal coliform (3 violations), and chlorine (4 violations) limits. In addition, peak flows to the treatment plant exceeding its design capacity and power shortages have resulted in sanitary sewer overflows (SSOs) to the South Fork Coeur d'Alene (SFCDA) River. In response to a compliance order issued to the Page WWTP, the District submitted an engineering report in April 2000 that identified the causes of peak flows to the Mullan WWTP.

III. RECEIVING WATER

A. Outfall Location/ Receiving Water

The District discharges treated effluent directly to the SFCDA River via outfall 001 at approximately latitude 47° 27' 55" and longitude:115° 48' 38". The outfall is located approximately 21 miles upstream of the Page WWTP (25 miles upstream from the confluence with the main branch of the Coeur d'Alene River).

Usually low receiving water flows are calculated using a minimum of twenty years of flow data. However, the closest upstream United States Geological Survey (USGS) station (#12413040, South Fork Coeur d'Alene River above Deadman Gulch near Mullan) only has one and one half years of flow data. Therefore a critical low flow of 9.2 cfs has been estimated using the lowest available daily flow from October 1998 through April 2000 consistent with EPA Region 10's policy of using the lowest available flow with less than 20 years of data. Critical low flows are used when calculating effluent limits where a zone of dilution (i.e., mixing zone) is available and provided by the state.

B. Water Quality Standards

Idaho's *Water Quality Standards and Wastewater Treatment Requirements* are composed of use classifications, numeric and narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (i.e., cold water aquatic life communities, contact recreation, etc.) that each water body is supporting or expected to support. 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

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[1] DMRs are forms that the facility uses to report the results of monitoring the facility has done in compliance with their NPDES permit.

represents a three tiered approach to maintain and protect various levels of water quality and uses.

The SFCDA River is protected, under IDAPA 58.01.02.109.09 (P-1), IDAPA 58.01.02.100.03.c, IDAPA 58.01.02.100.04, and IDAPA 58.01.02.100.05, for secondary contact recreation, cold water biota, agricultural water supply, industrial water supply, wildlife habitats, and aesthetics. On July 31, 1997 (62 Federal Register 41162) EPA promulgated a cold water biota use designation for the South Fork (below Daisy Gulch), Canyon Creek, and Shields Creek. This promulgation was challenged in federal court and EPA's action regarding the SFCDA River was upheld on March 15, 2000. Since this time, the State has promulgated and submitted to EPA for approval, the cold water biota use designation for these areas.

The SFCDA River (Big Creek to Pine Creek) has also been listed under Section 303(d) of the Clean Water Act as not attaining or not expected to meet the state water quality standards for sediment and heavy metals (specifically, cadmium, lead, and zinc). Where the receiving water quality does not meet water quality standards after the imposition of technology-based effluent limitations, Section 303(d) of the Clean Water Act requires the development of a Total Maximum Daily Load (TMDL) plan to ensure that these waters will come into compliance. A TMDL is a determination of the amount of a pollutant, or property of a pollutant, from point, nonpoint, 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 water quality criterion for that pollutant.

A cadmium, lead and zinc TMDL for the Coeur d'Alene River basin, which includes the SFCDA River, was issued by the state and EPA (for tribal waters) on August 18, 2000. This TMDL was declared null and void by 1st District Judge John Luster in Idaho on September 6, 2001. The state has appealed the decision to the state supreme court and therefore the status of the TMDL is uncertain. A Suspended Solids TMDL has been developed by the state for the South Fork Coeur d'Alene River and several tributaries and will be submitted to EPA for federal approval. The wasteload allocations for total suspended solids (TSS) have been included in the proposed permit. These limits will be included in the reissued permit if EPA approves the TMDL prior to reissuance.

The criteria that the State of Idaho has deemed necessary to protect the beneficial uses for the SFCDA River and the State's anti-degradation policy are summarized in Appendix C. Appendix C contains the site specific criteria (SSC) for cadmium, lead, and zinc as well as the new criteria for ammonia that have been adopted by the state and are currently under review by EPA.

IV. PROPOSED EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

EPA followed the Clean Water Act (CWA or the Act), State and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control (TSD)* to develop the draft effluent limits. In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either the technology-based or water quality-based limits.

Technology-based limits are set according to the level of treatment that is achievable using available technology. Technology-based limits have been included in the draft permit for the Mullan WWTP for five day Biochemical Oxygen Demand (BOD_5), total suspended solids (TSS, concentration limits only), the upper pH range and fecal coliform. Appendix D provides the basis for the development of technology-based limits.

The EPA evaluates the technology-based limits to determine whether they are adequate to ensure that water quality standards are met in the receiving water. If the limits are not adequate, EPA must develop additional water quality-based limits. These limits are designed to prevent exceedences of the Idaho water quality standards in the SFCDA River. The draft permit includes water quality-based limits for total residual chlorine, E. coli, the lower pH range, total suspended solids, total ammonia, cadmium, lead, and zinc.

Two alternate sets of water quality-based total ammonia limits are being proposed at this time. The first set of limits is based on the current federally approved state criteria and the second on new state adopted new criteria. Until the new criteria is approved by EPA, the current criteria is in effect for purposes of NPDES permit limits. If the new state criteria is approved by EPA prior to reissuance of the permit, then the limits corresponding to the new criteria will be the only ones included in the final permit. If the new state criteria is not approved by EPA prior to reissuance of the permit, then the limits corresponding to the current federally approved criteria will be the only ones included in the final permit.

Two alternate sets of water quality-based effluent limits are also proposed for cadmium, lead and zinc. The first set of effluent limits are based on the federally approved Idaho water quality criteria (which are equal to the NTR "Gold Book" criteria). The second set of limits are based on Idaho's proposed SSC. If the SSC are approved by EPA prior to reissuance of the permit, the limits based on the SSC will be retained. Otherwise the limits based on the applicable water standards for CWA purposes (i.e., Gold Book criteria) will be retained in the final permit. Regardless of which alternate limits are in the final permit, five year variances from

the state's water quality standards, or criteria, are also being proposed for cadmium, lead and zinc. While the variance is in effect, alternate variance limits for cadmium, lead and zinc are based on the existing effluent water quality which should prevent any worsening of current effluent quality. After the five year variance expires, the non-varied set of limits will be either the limits based on the Gold Book criteria or the SSC depending upon which criteria are in effect under the CWA at the time of permit reissuance.

Appendix D provides details on how the effluent limits were developed while Appendix E contains example permit limit calculations for total ammonia.

B. Current Effluent Limitations

Table IV-1 contains the effluent limits found in the current 1985 NPDES permit.

Table IV-1: Current Effluent Limitations for Outfall 001

Parameter	**Units**	**Average Monthly**	**Average Weekly**	**Daily Maximum**
BOD_5	mg/L	30	45	---
	lbs/day	75	113	---
TSS	mg/L	30	45	---
	lbs/day	75	113	---
Fecal Coliform	colonies/100 ml	100	200	---
Total Residual Chlorine	mg/L	0.5	---	2.0
pH	s.u.	within the range of 6 - 9		

C. Proposed Effluent Limitations

Section 1 (including Table IV-2) below contains proposed effluent limits for outfall 001 (excluding the non-varied limits for cadmium, lead, and zinc). A metals variance from cadmium, lead, and zinc water quality standards is being proposed. While the variance is in effect, the alternate metals limits in Table IV-2 apply. The water quality-based metals effluent limits that apply after the variance expires will be either based on IDEQ's federally approved water quality standards or site specific criterion (SSC). The non-varied metals limits that apply to each of these scenarios are included in Sections 2 and 3 below. Only one set of non-varied metals limits will be included in the final permit determined by the criteria that are

in effect at the time of permit reissuance.

1. The following list and Table IV-2 include proposed effluent limits for outfall 001.

    a. The effluent pH range must be between 6.5 and 9.0 standard units (s.u.).

    b. For BOD_5 and TSS, the monthly average effluent concentration must not exceed 15 percent (%) of the monthly average influent concentration.

    c. Surface waters shall be free of floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

    d. Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.

Table IV-2: Draft Effluent Limitations for Outfall 001						
Parameter	**Draft Effluent Limitations**					
	Average Monthly		**Average Weekly**		**Maximum Daily**	
BOD_5	30 mg/L	75 lbs/day	45 mg/L	113 lbs/day	---	---
TSS	30 mg/L	75 lbs/day[1] 67.4 lbs/day[2]	45 mg/L	113 lbs/day[1] 176 lbs/day[2]	---	---
E. coli	126/100 ml	---	---	---	576/100 ml[3]	---
Total Ammonia as N	7.1 mg/L[5]	33 lbs/day[5]	---	---	15 mg/L[4,5]	70 lbs/day[5]
	20.2 mg/L[6]	93 lbs/day[6]	---	---	8.95 mg/L[4,6]	41 lbs/day[6]
Total Residual Chlorine	33 µg/L[7]	0.15 lbs/day	---	---	55 µg/L[4,7]	0.25 lbs/day
Cadmium, total recoverable	5.5 µg/L	0.025 lbs/day	---	---	11 µg/L[4]	0.05 lbs/day
Lead, total recoverable	11 µg/L	0.052 lbs/day	---	---	15 µg/L[4]	0.07 lbs/day
Zinc, total recoverable	1832 µg/L	8.4 lbs/day	---	---	3682 µg/L[4]	17 lbs/day

Footnotes:

1 The mass-based effluent limit for TSS will be in the final permit if the Suspended Solids TMDL for Coeur d'Alene is not received and approved by EPA prior to reissuance.

2 The mass-based effluent limit for TSS will be in the final permit if the Suspended Solids TMDL for Coeur d'Alene is received and approved by EPA prior to permit reissuance.

3 The effluent limit is an instantaneous maximum limit (not maximum daily limit).

4 The permittee is required to report noncompliance within 24 hours if the maximum daily limit or instantaneous maximum limit is violated.

5 The effluent limit will be in the final permit if the new ammonia criteria is not approved by EPA prior to issuance.

6 The effluent limit will be in the final permit if the new ammonia criteria is approved by EPA prior to permit issuance.

7 The effluent limit for total residual chlorine is not quantifiable using EPA approved test methods. Therefore, the EPA will use the minimum level (ML) of 100 µg/L as the compliance evaluation level. If the test method indicates a value less than the ML, then the compliance evaluation level for the average monthly and maximum daily limits are 0.46 lbs/day.

2. Non-varied Cadmium, Lead, and Zinc Limitations Based on Gold Book Criteria

Table IV-3 summarizes the draft effluent limits for outfall 001 based on IDEQ's federally approved Gold Book water quality standards. These

limits will be included in the final permit if the site-specific-criteria, for cadmium, lead, and zinc, have not been approved by EPA upon permit reissuance. These limits will apply when the variance expires.

Table IV-3: Draft Effluent Limitations for Outfall 001 Based on Gold Book Criteria

Parameter	Draft Effluent Limitations[1]			
	Average Monthly		Maximum Daily[2]	
Cadmium, total recoverable	0.928 µg/L	0.00426 lbs/day	1.35 µg/L	0.0062 lbs/day
Lead, total recoverable	1.73 µg/L	0.0079 lbs/day	2.53 µg/L	0.116 lbs/day
Zinc, total recoverable	51.9 µg/L	0.238 lbs/day	82.9 µg/L	0.380 lbs/day

Footnote:
1 If the variance is issued, the effluent limits will apply one day before the expiration date of the permit.
2 The permittee is required to report noncompliance within 24 hours if the maximum daily limit is violated.

3. Non-varied Cadmium and Zinc Limitations Based on Site Specific Criteria

IDEQ has adopted SSC for cadmium, lead, and zinc in the SFCDA River and these criteria have been submitted to EPA for approval. If the SSC are approved by EPA prior to reissuance of the permit then the cadmium and zinc limits in Table IV-4 will be included in the final permit. Non-varied lead limitations are not needed because the discharge does not have the reasonable potential to violate the proposed lead SSC.

Table IV-4: Draft Effluent Limitations for Outfall 001 Based on Site-Specific-Criteria

Parameter	Draft Effluent Limitations[1]			
	Average Monthly		Maximum Daily[2]	
Cadmium, total recoverable	0.936 µg/L	0.0043 lbs/day	1.37 µg/L	0.0063 lbs/day
Zinc, total recoverable	95.9 µg/L	0.44 lbs/day	153 µg/L	0.70 lbs/day

Footnotes:
1 If the variance is issued, the effluent limits will apply one day before the expiration date of the permit.
2 The permittee is required to report noncompliance within 24 hours if the maximum daily limit is violated.

V. MUNICIPAL SEWAGE SLUDGE/BIOSOLIDS MANAGEMENT

The EPA Region 10 has recently decided to separate the permitting of wastewater discharges and the disposal of biosolids. Under the CWA, the EPA has the authority to issue separate "sludge only" NPDES permits for the purposes of regulating biosolids. The EPA has historically implemented the biosolids standards by inclusion of the requirements in facility's NPDES wastewater permit, the other option authorized by the CWA.

The permittee has submitted a biosolids permit application (Form 2S) for the Mullan WWTP. The EPA will likely issue a sludge-only permit to this facility at a later date. This may be in the form of a general permit through which EPA can cover multiple facilities.

Meanwhile, the environment will be protected since 1) the permittee's sludge activities will continue to be subject to the national sewage sludge standards at 40 CFR 503 and 2) IDEQ conducts a program to review and approve biosolids activities. Part 503 of the Code of Federal Regulations (CFR) contains provisions relating to pollutants in sewage sludge, the reduction of pathogens in sewage sludge, the reduction of the characteristics in sewage sludge that attract vectors, the quality of the exit gas from a sewage sludge incinerator stack, the quality of sewage sludge that is placed in a municipal solid waste landfill unit, the sites where sewage sludge is either land applied or placed for final disposal, and sewage sludge incinerators. The CWA prohibits any use or disposal of biosolids not in compliance with these standards. The EPA has the authority under the CWA to enforce these standards directly, including in the absence of a permit. The CWA does not require the facility to have a permit prior to the use or disposal of its biosolids.

The biosolids resulting from the Mullan WWTP are transferred to the Page wastewater treatment plant. This practice is expected for the life of the permit.

VI. PROPOSED MONITORING REQUIREMENTS

A. Basis for Effluent and Receiving Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) requires that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on DMRs to the EPA.

B. Proposed and Current 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.

Table VI-1 presents the draft and current monitoring requirements for outfall 001. The sampling location shall be after the last treatment unit and prior to discharge to the SFCDA River.

TABLE VI-1: Effluent Monitoring Requirements for Outfall 001

Parameter[1]	Draft Sample Type	Draft Location	Draft Sample Frequency	Current Sample Frequency
Flow, mgd	Recorder	Influent or Effluent	Continuous	Continuous
BOD_5, mg/L[2]	24-hour composite	Influent and Effluent	1/week	1/week[3]
TSS, mg/L[2]	24-hour composite	Influent and Effluent	1/week	1/week[3]
pH, standard units[4]	Grab	Effluent	5/week	5/week
E. coli, colonies/100 ml	Grab	Effluent	5/month[5]	---
Total Ammonia as N, mg/L	24-hour composite	Effluent	1/week	---
Total Residual Chlorine, µg/L	Grab	Effluent	5/week	5/week
Temperature, °C	Grab	Effluent	2/month	---
Total Phosphorus, mg/L	Grab	Effluent	1/month	---
Nitrate-nitrite as N, mg/L	Grab	Effluent	1/month	---
Total Kjeldahl Nitrogen, mg/L	Grab	Effluent	1/month	---
Cadmium, µg/L[6]	24-hour composite	Effluent	1/month	---
Lead, µg/L[6]	24-hour composite	Effluent	1/month	---
Zinc, µg/L[6]	24-hour composite	Effluent	1/month	---

Parameter[1]	Draft Sample Type	Draft Location	Draft Sample Frequency	Current Sample Frequency

Footnotes:

1 If the discharge concentration falls below the method detection limit (MDL), the permittee shall report the effluent concentration as "less than {numerical MDL}" on the discharge monitoring report. Actual analytical results shall be reported on the discharge monitoring report when the results are greater than the MDL. For averaging, samples below the MDL shall be assumed equal to zero. See Section VI.C for the MDLs. The permittee shall report the number of non-detects for the month in the "Comments Section" of the DMR.

2 Influent and effluent monitoring is required. The percent BOD_5 and TSS removal will be reported on each monthly discharge monitoring report.

3 The current permit required 8-hour composite samples.

4 The permittee shall report the number of pH excursions during the month with the discharge monitoring report.

5 The state's water quality standard for E. coli is based on a geometric mean and a minimum of five samples taken every three (3) to five (5) days. If a sample is taken that is less than the MDL the MDL shall be used for purposes of calculating the geometric mean.

6 The permittee shall conduct analysis for total recoverable metals.

C. Method Detection Limits and Minimum Levels

The aquatic life criteria for total residual chlorine is very low. In order to determine if the effluent discharged from the facility has the potential to cause or contribute to an exceedence of state water quality criteria (including those parameters without effluent limits) the permittee must use analytical test methods with a method detection limit (MDL) or minimum level (ML) below the aquatic life criteria or as sensitive as possible (EPA 1996a). The draft permit requires the permittee to use EPA approved test methods that achieve the following MDLs or MLs in Table VI-2.

Table VI-2: Analytical Testing Requirements

Parameter	Unit	Method Detection Limit	Minimum Level
Cadmium, total recoverable	µg/L	0.1	---
Chlorine, total residual	µg/L	---	100
Lead, total recoverable	µg/L	0.7	---
Nitrate-Nitrite as N	mg/L	---	0.1
Phosphorus, total	mg/L	0.06	---
Total Kjedjal Nitrogen	mg/L	---	0.05

Table VI-2: Analytical Testing Requirements			
Parameter	**Unit**	**Method Detection Limit**	**Minimum Level**
Zinc, total recoverable	µg/L	20	---

D. Proposed Receiving Water Monitoring

Receiving water monitoring is needed to evaluate if the effluent is causing or contributing to an instream excursion of the water quality criteria. The permittee must use test methods that achieve the MDLs and MLs for total residual chlorine and phosphorus in Table VI-2. To the extent practicable, surface water sample collection must occur on the same day as effluent sample collection. The proposed receiving water monitoring requirements are provided in Table VI-3 (the current permit does not contain receiving water monitoring). Receiving water monitoring must begin on or before **four months from the issuance date of the permit**.

Table VI-3: Receiving Water Monitoring Requirements in the South Fork Coeur d'Alene River			
Parameter	**Location**	**Sample Frequency**	**Sample Type**
pH, s.u.	downstream of outfall 001	1/month[1]	Grab
Temperature, °C	downstream of outfall 001	1/month[1]	Grab
Total Ammonia as N, mg/L	upstream of outfall 001	1/month[1]	Grab
Total Residual Chlorine, µg/L	upstream of outfall 001	1/month[1]	Grab
Total Phosphorus, mg/L	upstream of outfall 001	1/month[1]	Grab

Footnote:
1 Ambient monitoring shall be conducted for two years beginning four months from the effective date of the permit from June through November. If ambient sampling in June poses hazardous conditions, two samples may be taken in July. The hazardous conditions shall be noted on the June DMR and two results shall be provided on the DMR in July in this case.

E. Representative Sampling

The draft permit has expanded the requirement in the federal regulations regarding

monitoring (40 CFR 122.41[j]). This provision now specifically requires representative sampling whenever a bypass, spill, sanitary sewer overflow or non-routine discharge of pollutants occurs, if the discharge may reasonably be expected to cause or contribute to a violation of an effluent limit under the permit. This provision is included in the draft permit because routine monitoring could easily miss permit violations and/or water quality standards exceedences that could result from bypasses, spills, sanitary sewer overflows or non-routine discharges. This requirement directs the permittee to conduct additional, targeted monitoring to quantify the effects of these occurrences on the final effluent discharge.

VII. OTHER PERMIT CONDITIONS

A. Additional Requirements Associated with the Variance

A variance from the water quality standards for cadmium, lead and zinc has been requested by the District and is being proposed separate from the draft permit. If granted by EPA, this variance would delay the requirement to meet water quality-based effluent limits for cadmium, lead (unless the SSC are adopted) and zinc until five years from the effective date of the variance or the day before the permit expires, whichever comes first. The variance analysis (found in a separate document titled "public information document") demonstrates that the controls necessary to meet water quality-based limitations would result in "substantial and widespread economic and social impact" (See Appendix D Part B Section 4 of this fact sheet for more details).

Some additional requirements have been included in the draft permit as conditions of granting the variance. In general, the District must 1) not backslide from its current discharge of metals based on existing effluent quality, 2) identify what metals treatment alternatives are available, and 3) identify and correct the sources of inflow and infiltration (I/I)[2] to the collection system. Table IV-2 contains effluent limits for cadmium, lead and zinc based on the Mullan's current performance. Infiltration and inflow identification and correction is important because the Mullan WWTP does not accept industrial process waste containing metals and domestic sewage contains negligible amounts of metals. Therefore, the source of cadmium, lead and zinc in the effluent must be from ground and storm water through I/I.

The District has made some progress towards identification of their I/I.. The District's I/I Evaluation and Wastewater Treatment Facility Plan (J-U-B April

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[2] The infiltration of groundwater is generally through breaks, cracks, disconnections, and collapses in collection pipes. The inflow of stormwater is generally from roadway runoff entering man holes, roof drain connections, and basement drain connections.

2000) identified I/I as a major component of peak flows in the system. The determination considered frequent maintenance locations, old sewer mains, areas of poor soil conditions, and wet/dry weather monitoring.

Specifically, the draft permit requires annual reports (due January 10th) that demonstrate progress or compliance with the following action items:

a. Complete a study of alternatives and costs for treatment system modification to improve metals removal. The study must include a literature search, investigation of other facilities, and estimates of effectiveness. The alternatives shall be provided to EPA and IDEQ within **three years of the issuance date of the permit**. The ranked alternatives, based on a cost effectiveness ratio, shall be provided to EPA and IDEQ within **four years of the issuance date of the permit**.

b. Identify the major sources of I/I to the extent it has not been completed by **two years from the issuance date of the permit**

c. Correct deficiencies in the collection systems by **five years from the issuance date of the permit** to significantly eliminate I/I and eliminate SSOs. Corrections might be by 1) sealing or installing inserts in all manholes that allow significant amounts of inflow 2) replacing crushed sewer mains and/or 3) in-situ lining of cracked collection pipes.

d. Lift stations must be monitored during off hours (i.e., around 1:00-5:00 am) to determine if their use is excessive within **one year of the issuance date of the permit**. If the lift stations operate excessively during off hours, any mechanical problems (i.e., worn pump impellers, blocked suction lines, malfunctioning check valves and gate valves etc) shall be identified and corrected within **three years of the issuance date of the permit**.

B. Quality Assurance Plan

Federal regulation 40 CFR 122.41(e) requires the permittee to develop a Quality Assurance Plan (QAP) to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to complete and implement a QAP within **four months of the issuance date of the permit**. The QAP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

C. Operation & Maintenance Plan

Section 402 of the CWA and federal regulations 40 CFR 122.44(k)(2) and (3) authorize EPA to require best management practices (BMPs) in NPDES permits. Best Management Practices 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 (O&M) plan. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the District to incorporate appropriate BMPs into their O&M plan within **six months of the issuance date of the permit**. Specifically, the permittee must consider spill prevention and control, optimization of chlorine and other chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system, and water conservation.. To the extent that any of these issues have already been addressed, the permittee need only reference the appropriate document in its O&M plan. The O&M plan must be revised as new practices are developed.

As part of proper O&M, the draft permit requires the District to develop a facility plan when the annual average flow exceeds 85 percent of the design flow of the plant and design influent load of BOD and TSS exceeds 85 percent of the design capacity of the plant. The design flow of the plant is 0.55 mgd and design influent load of BOD and TSS is 75 lbs/day. The facility plan includes a strategy for remaining in compliance with effluent limits in the permit.

VIII. OTHER LEGAL REQUIREMENTS

A. State Certification Requirements

Section 401 of the CWA requires EPA to seek certification from the state that the permit is adequate to meet State water quality standards before issuing the final permit. The regulations allow for the State to stipulate more stringent conditions in the permit, if the certification cites the CWA or State law upon which that condition is based. In addition, the regulations require a certification to include statements of the extent to which each condition of the permit can be made less stringent without violating the requirements of State law.

Part of the State's certification is authorization of a mixing zone. The draft permit was developed using the assumption that 25 percent of the low flow would be authorized as a mixing zone for chlorine and total ammonia. If the State authorizes a different mixing zone in its final certification, EPA will recalculate the effluent limitations based on the dilution available in the final mixing zone. If the state does not certify a mixing zone, EPA will recalculate the permit limitations

based on meeting water quality standards at the point of discharge.

B. Standard Permit Provisions

In addition to facility-specific requirements, most of sections III, IV, and V of the draft permit contain "boilerplate" requirements. Boilerplate is standard regulatory language that applies to all permittees and must be included in NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The boilerplate covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and general requirements.

C. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA requested lists of threatened and endangered species from the NMFS and USFWS in letters dated May 22, 2000. In a letter dated June 28, 2000, the USFWS identified the Gray wolf (*Canis lupus*) as endangered and the Bull trout (*Salvelinus confluentus*), Bald eagle (*Haliaeetus leucocephalus*), and Ute ladies'-tresses (*Spiranthes diluvialis*) as threatened while there are no proposed or candidate species. The NMFS indicated that there are no threatened, endangered, proposed or candidate species under their jurisdiction listed for the SFCDA River.

The USFWS considers the gray wolf experimental and non-essential within the central Idaho area south of Interstate Highway 90 and west of Interstate Highway 15. Critical habitat has not and cannot be designated under the nonessential experimental classification, 16 U.S.C. 1539(j)(2)(C)(ii). The main management goals for the wolves are to protect them from disturbance during vulnerable periods, minimize illegal take, and remove individuals from the wild population that deprecate livestock or otherwise cause significant problems. Hunting and habitat destruction are the primary causes of the gray wolf's decline. Issuance of the NPDES permit is not expected to result in habitat destruction, nor will it result in changes in the wolves food population (they consume prey that are primarily vegetarian).

The USFWS has indicated in the June 2000 letter that the bull trout are not available in the vicinity of the discharges. They generally reside near the mouth of the Coeur d'Alene River, approximately 25 miles from the discharge.

The primary reasons for decline of the bald eagle are destruction of their habitat and food sources and widespread historic application of DDT. This draft permit

will have no impact on any of these issues. The USFWS has indicated in the June 2000 letter that the bald eagle are not found in the area of the discharges.

The Ute ladies' tresses is a terrestrial orchid species that is only periodically exposed to surface waters. This species generally inhabits riverbanks where inundation occurs infrequently. The Ute ladies'-tresses can be adversely affected by modifications of its habitat associated with livestock grazing, vegetation removal, excavation, construction, stream channelization, and other actions that alter hydrology. The permit is for discharges from preexisting facilities and is not expected to result in any excavation or vegetation removal. Although the Ute ladies' tresses have not been sighted near the discharges, there would be minimal exposure to any contaminants in aquatic systems.

The EPA has tentatively determined that issuance of the NPDES permit will have **no effect** on the gray wolf, bald eagle, bull trout, or ute ladies'-tresses. The EPA has provided copies of the draft permit and fact sheet to the USFWS and NMFS. Any reasonable and prudent measures or alternatives that require more stringent permit conditions received from these agencies will be considered prior to reissuance of this permit.

D. Essential Fish Habitat

Section 305(b) of the Magnuson-Stevens Act (16 USC 1855(b)) requires federal agencies to consult with the NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have an adverse effect on designated Essential Fish Habitat (EFH) as defined by the Act. The EFH regulations define an *adverse effect* as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

To date, federal management plans have been approved by the Secretary of Commerce for groundfish and coastal pelagics. None of the 83 West Coast groundfish surveyed for the federal management plan included habitat near the SFCDA River. Similarly, the coastal pelagic species are not effected by the permitted discharges. Appendix A of Amendment 14 to the Pacific Coast Salmon Plan includes a geographic range freshwater EFH for coho, chinook, and pink salmon (Figure A-1) that does not include the SFCDA River. Because the permit does not include discharges to waters protected for EFH, EPA has made a finding of "no potential for adverse effect." The EPA has provided NMFS with a copy of the draft permit and fact sheet during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to

reissuance of this permit.

E. Permit Expiration

This permit will expire **five years from the issuance date of the permit**.

REFERENCES

EPA 1986. Quality Criteria for Water 1986. Office of Water Regulations and Standards. Washington D.C., May 1987. EPA 440/5-86-001.

EPA 1991. Technical Support Document for Water Quality-based Toxics Control. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, D.C., March 1991. EPA/505/2-90-001.

EPA, 1996a. EPA Region 10 Guidance For WQBELs Below Analytical Detection/Quantification Level. NPDES Permits Unit, EPA Region 10, Seattle, WA, March, 1996.

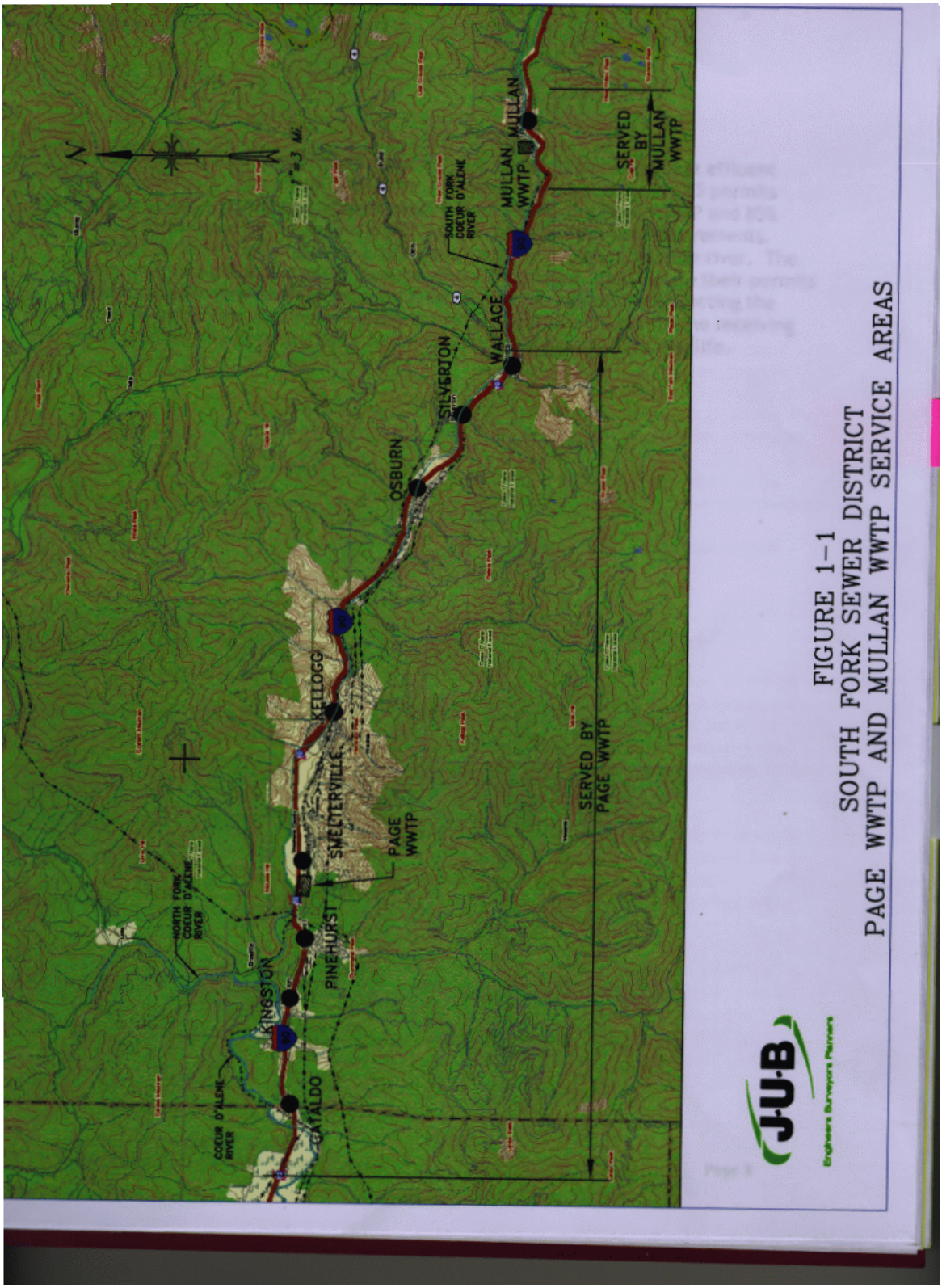
Coeur d'Alene Lake Management Plan, Executive Summary. Coeur d'Alene Tribe, Clean Lakes Coordinating Council and Idaho Division of Environmental Quality. March 19, 1996.

USGS 1997. Trace-Element Concentrations and Transport in the Coeur d'Alene River, Idaho, Water Years 1993-1994. U.S. Geological Survey Boise, Idaho, by Michael A. Beckwith, Paul F. Woods, and Charles Berenbrock.

J-U-B Engineers, Inc. 2000. Environmental Report for South Fork of the Coeur d'Alene River Sewer District.
April 2000.

USGS Paper 2485. Nutrient and Trace-Element Enrichment of Coeur d'Alene Lake, Idaho. By Paul Woods and Michael Beckwith.

APPENDIX A - MULLAN WASTEWATER TREATMENT PLANT MAP



APPENDIX B - MULLAN WASTEWATER TREATMENT PLANT DESCRIPTION AND PROCESS DIAGRAM

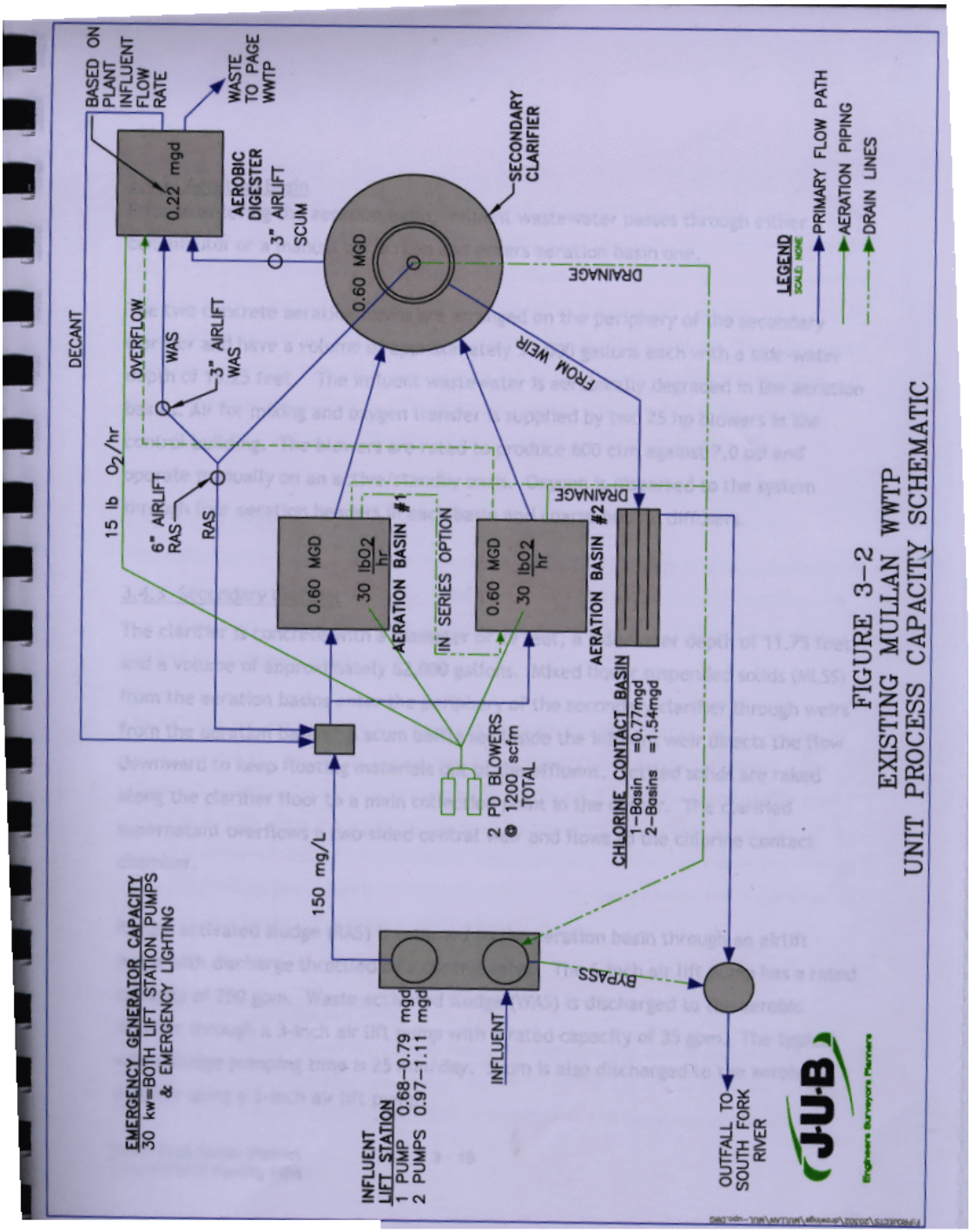
Flow measurement and recording:
- The sewage is pumped from the wet well to the comminutor basin where it is shredded to small pieces.
- Bacteria is then added

Primary treatment:
- Air is then supplied from the bottom of basin 1 and 2

Secondary treatment:
- The bacteria and sewage then flow to the clarifier to allow settling

Discharge:
- The treated effluent flows over top of the weir and
- Disinfection is achieved by chlorine in the chlorine contact chamber.
- Discharge is to the South Fork Coeur d'Alene River through Outfall 001
- Effluent discharge rate is an average of 0.276 mgd (based on monitoring from December 1994 through March 2000) and a maximum of 0.654 mgd

Biosolids (sludge) handling:
- Much of the bacteria that settles to the bottom of the clarifier to recycled back to the comminutor basin.
- The excess bacteria is pumped to the digester, where it becomes sludge and is transferred to the Page plant



Mullan Process Diagram

APPENDIX C - WATER QUALITY STANDARDS

A. Federally Approved Water Quality Criteria

For Mullan's discharge, the following water quality criteria were considered for the protection of the beneficial uses of the SFCDA River:

1. IDAPA 58.01.02.200.02 - Surface waters of the State shall be free from toxic substances in concentrations that impair designated beneficial uses. Furthermore, IDAPA 58.01.02.210.01 incorporates the National Toxics Rule by reference as found in 40 CFR 131.36(b)(1) that includes numeric criteria for toxic substances.

2. IDAPA 58.01.02.200.05 - Surface waters of the State shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

3. IDAPA 58.01.02.200.06 - Surface waters of the State shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses.

4. IDAPA 58.01.02.250.01.a. - Hydrogen ion concentration (pH) values within the range of 6.5 to 9.5 standard units.

5. IDAPA 58.01.02.250.01.c.i. - The one-hour average concentration of total residual chlorine shall not exceed 19 µg/L.

   IDAPA 58.01.02.250.01.c.ii. - The four-day average concentration of total residual chlorine shall not exceed 11 µg/L.

6. The one hour average concentration of un-ionized ammonia (as N) is not to exceed (0.43/A/B/2) mg/L, where:

   A = 1 if the water temperature (T) is $ 20°C, or
   $A = 10^{(0.03(20-T))}$ if T < 20°C, and

   B = 1 if the pH is $ 8.0, or
   $B = (1+ 10^{(7.4-pH)}) \div 1.25$ if pH is < 8.0

   (Formerly numbered IDAPA 58.01.02.250.02.c.i)

7. The four day average concentration of un-ionized ammonia (as N) is not to exceed (0.66/A/B/C) mg/L, where:

$A = 1.4$ if T is $ 15°C, or
$A = 10^{(0.03(20-T))}$ if $T < 15°C$, and

$B = 1$ if the pH is $ 8.0, or
$B = (1+ 10^{(7.4-pH)}) \div 1.25$ if pH is < 8.0

$C = 13.5$ if pH is $ 7.7, or
$C = 20(10^{(7.7-pH)}) \div (1+ 10^{(7.4-pH)})$ if the pH is < 7.7

(Formerly numbered IDAPA 58.01.02.250.02.c.ii)

8. IDAPA 58.01.02.250.02.e - Waters designated for salmonid spawning are to exhibit the following characteristics during the spawning period and incubation for the particular species inhabiting those waters:
   - IDAPA 58.01.02.250.02.e.i.1 - Intergravel dissolved oxygen shall have a one day minimum of not less than 5.0 mg/L and a seven day average mean of not less than 6.0 mg/L.
   - IDAPA 58.01.02.250.02.e.i.2 - Water column dissolved oxygen shall have a one day minimum of not less than 6.0 mg/L or 90% saturation, whichever is greater.
   - IDAPA 58.01.02.250.02.e.ii - Water temperatures shall not exceed 13 degrees C with a maximum daily average no greater than 9 degrees C.

9. IDAPA 58.01.02.251.02 Waters designated for secondary contact recreation are not to contain E. coli bacteria significant to the public health in concentrations exceeding:
   - a single sample of 576/100 mL,
   - a geometric mean of 126/100 mL based on a minimum of five (5) samples taken every three (3) to five (5) days over a thirty day period.

B. <u>Recently Proposed Water Quality Criteria</u>

1. IDAPA 58.01.02.284 - South Fork Coeur d'Alene Subbasin, Subsection 110.09, HUC 17010302, Aquatic Life Criteria for Cadmium, Lead, and Zinc. The following criteria are to be met dependant upon the hardness, expressed as mg/L of calcium carbonate, of the water. CMC and, one hour average concentrations, and CCC, four day average concentration, of the dissolved metals (in µg/L) are not to exceed, more than once every three years, the values calculated using the following equations:

   Cadmium

   $CMC = 0.973 \times e^{[(1.0166 \times \ln H - 3.924]}$

   $CCC = [\ 1.101672 - (\ln H \times 0.041838] \times e^{[(0.7852 \times \ln H - 3.490]}$

Lead

$CMC = e^{[(0.9402 \times \ln H + 1.1834]}$

$CCC = d^{[(0.9402 \times \ln H - 0.9875]}$

Zinc

$CMC = e^{[(0.6624 \times \ln H + 2.2235]}$

$CCC = e^{[(0.6624 \times \ln H + 2.2235}$

The maximum hardness allowed for use in the equations shall not be greater than 400 mg/L even if the actual ambient hardness is greater than 400 mg/L.

2. IDAPA 58.01.02.250.02.c.i - Acute Criterion (criterion maximum concentration (CMC)). The one hour average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equation:

$$CMC = \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

3. IDAPA 58.01.02.250.02.c.ii - Chronic Criterion (criterion continuous concentration (CMC)). The thirty (30) day average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equations:

When fish early life stages are likely present:

$$CCC = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) \times MIN\ (2.85, 1.45 \times 10^{0.028(25 - T)})$$

C. <u>Anti-Degradation Policy</u>

The State of Idaho has adopted an anti-degradation policy as part of their water quality standards. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses. The three tiers of protection are as follows:

Tier 1 – Maintenance of Existing Uses for all Waters - The existing in stream uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

Tier 2 – High Quality Water – Where the quality of the water exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water,

that quality shall be maintained and protected unless the Department finds, after full satisfaction on the intergovernmental coordination and public participation provisions of the Department's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the Department shall assure water quality adequate to protect existing uses fully.

Tier 3 - Outstanding Resource Waters – Where high quality waters constitute an outstanding natural resource, such as waters of national and state parks and wildlife refuges, and waters of exceptional recreational or ecological significance, that water shall be maintained and protected from the impacts of point and nonpoint source activities.

The SFCDA River is a Tier 1 waterbody, therefore the existing stream uses must be protected. An NPDES permit cannot be issued that would result in the water quality criteria being violated. The draft permit contains effluent limits which ensure that the existing beneficial uses will be maintained. Because the effluent limits in the draft permit are more stringent than those in the current permit the conditions in the permit comply with the State's antidegradation requirements.

APPENDIX D - BASIS FOR EFFLUENT LIMITATIONS

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

In general, the EPA first determines which performance-based requirement (i.e., technology-based limits) must be incorporated into the permit. EPA then evaluates the effluent quality expected to result from these controls, to see if it could result in any exceedences of the water quality standards in the receiving water. If exceedences could occur, EPA usually includes the more stringent water quality-based limits in the permit. The draft permit limits reflect whichever requirements (technology-based or water quality-based) are more stringent. The following explains in more detail the derivation of technology-based effluent limits and water quality-based effluent limits.

A. Technology-Based Effluent Limitations

The 1972 CWA required Publically Owned Treatment Works (POTWs) to meet performance-based requirements determined by 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.

More specifically, Section 301(b)(1)(B) of the CWA requires that EPA develop secondary treatment standards for POTWs as defined in Section 304(d)(1) of the CWA. Based on this statutory requirement, EPA developed secondary treatment regulations, found in 40 CFR Part 133.102. These technology-based regulations 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. These requirements have been included in Table D-1.

Table D-1: Secondary Treatment Requirements for POTWs

Parameter	Average Weekly Limit	Average Monthly Limit	Percent Removal
BOD_5	45 mg/L	30 mg/L	85%
SS	45 mg/L	30 mg/L	85%
pH	between 6.0 and 9.0 standard units		

A technology-based chlorine effluent limitation of 0.5 mg/L was derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment

plant 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, NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) as well as average monthly limits (AMLs) unless impracticable. The AWL is expressed as 1.5 times the AML, or in this case 0.75 mg/L. Finally, federal regulations require limitations to be expressed as mass-based limits using the design flow of the facility.

Idaho's water quality standards found at IDAPA 58.01.02.420.05 include the technology-based limit that fecal coliform concentrations in secondary treated effluent not exceed a geometric mean of two hundred per one hundred ml based on no more than one week's data and a minimum of five samples.

B. Water Quality-Based Effluent Limitations

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. Determination of Need for Water Quality-Based Limits

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 ambient water and, if appropriate, the dilution available from the

ambient 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 the "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 an area of ambient water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loading of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate ambient flow and the background ambient water is below the criteria necessary to protect designated uses.

Table D-2 contains the information used to determine whether there is the reasonable potential for the discharge form the Mullan WWTP to violate state water quality standards in the SFCDA River. Reasonable potential was determined following procedures in EPA's TSD. Appendix E demonstrates how reasonable potential determinations are made using ammonia as an example.

TABLE D-2: Reasonable Potential Determination

Parameter	Effluent Data[1]				Receiving Water Upstream Conc[5]	Maximum projected receiving water concentration	Federally approved Water Quality Criteria	Proposed Criteria	Reasonable Potential
	Maximum Effluent Concentration	Coefficient of Variation[2]	# of Samples	Reasonable Potential Multiplier[3]					
Total Ammonia	10.6 mg/L	0.46	30	1.3	N/A	3.63 mg/L (acute and chronic)	14.8 mg/L (acute) 2.7 mg/L (chronic)	9.32 mg/L (acute) 3.5 mg/L (chronic)	YES
Total Residual Chlorine	2.8 mg/L	0.29	62	1.1	N/A	0.811 mg/L (acute and chronic)	0.019 mg/L (acute) 0.011 mg/L (chronic)	N/A	YES
Total Recoverable Cadmium	3.6 µg/L	0.6	10	3.0	1973 µg/L	10.4 µg/L (acute) 10 µg/L (chronic)	1.9 µg/L (acute) 0.76 µg/L (chronic)	1.38 µg/L (acute) 0.77 µg/L (chronic)	YES[5]
Total Recoverable Lead	5 µg/L	0.6	10	3.0	20 µg/L	12.8 µg/L (acute and chronic)	33 µg/L (acute) 1.3 µg/L (chronic)	169 µg/L (acute) 19.3 µg/L (chronic)	YES[5]
Total Recoverable Zinc	898 µg/L	0.78	10	4.1	55 µg/L	3600 µg/L (acute) 3630 µg/L (chronic)	81 µg/L (acute) 74 µg/L (chronic)	150 µg/L (acute and chronic)	YES[5]

Footnotes:

1 The effluent data is based on sampling conducted by the District from March 1992 through February 2000.

2 The CV is calculated as the standard deviation of the data divided by the mean. A CV of 0.6 was used for cadmium and lead because a majority of the samples are nondetect.

3 The RPM is based on the CV and the number of data points (i.e., number of samples collected). See Table 3.1 of the TSD.

4 The receiving water concentrations are based on the 95th percentile of samples collected in the SFCDA River above Deadmans Gulch near Mullan (USGS #12413040) upstream of Outfall 001. Upstream concentrations for cadmium, lead and zinc were not used since a mixing zone is not available.

5 A reasonable potential analysis is unnecessary because the SFCDA River is impaired for these metals. Therefore effluent limits will apply if a variance is not issued to the Mullan WWTP.

3. Procedure for Deriving Water Quality-Based Limits

The first step in developing a water quality based permit limit is to develop a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that the Permittee may discharge without causing or contributing to an exceedence of water quality standards in the receiving water. Wasteload allocations are determined the following ways:

a. TMDL-Based WLA

When the quality of the receiving water quality does not meet water quality standards it is "303(d) listed", and a TMDL is generally developed by the state that includes WLAs. 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 (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 (WLAs), natural background loadings, and a margin of safety to account for any uncertainties. Permit limits are developed for point sources that are consistent with the WLA for that point source.

As discussed in Section III.B, the status of the TMDL for the Coeur d'Alene River basin is unknown and therefore the WLAs from the Coeur d'Alene TMDL were not used during the development of the non-varied permit limitations. The suspended solids TMDL has not been federally approved yet. Therefore, the WLAs for total suspended solids have been included in the proposed permit and will be retained if the TMDL is approved prior to permit reissuance. See Section C of Appendix D for further information.

b. Mixing Zone-Based WLA

When the State authorizes a mixing zone for the discharge, the WLA is calculated using a mass balance equation. The equation takes into account the available dilution provided within the mixing zone, and the background concentrations of the pollutant. A 25% mixing zone was used for total ammonia and total residual chlorine based on previous mixing zones provided by the State for municipal permits. The mixing zone may change depending on the state's final 401 certification (See section VIII.A).

c. Criterion as the WLA

In some cases a mixing zone cannot be authorized, either because the receiving water already exceeds the criteria, the receiving water flow is too low to provide dilution, or the state doesn't authorize a mixing zone. In such cases, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the Permittee will not contribute to an exceedence of the criteria. A mixing zone was not provided for cadmium, lead, and zinc because the background concentration was greater than the water quality standard (see Table D-2).

Once WLAs have been developed, the EPA applies the statistical permit limit derivation approach 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. Appendix E demonstrates how water quality-based effluent limits are developed using ammonia as an example.

4. Variances from Water Quality-based Requirements

a. Basis for Variances

Variances to water quality-based permit requirements are allowed under 301(g) of the CWA and 40 CFR 122.21(n) if they are based on one or more of the following factors:

i. <u>Site-specific water quality criteria</u>. The variance must demonstrate that either the background parameters differ significantly from what the laboratory used to develop the CWA criteria or the types of local aquatic organisms differ significantly from those actually tested in develop the CWA criteria. Site specific criteria changes

the water quality criteria for the waterbody in the state's water quality standards.

ii. Designated use reclassification, The variance must perform a use attainability analysis (UAA) to permanently reclassify the water body.

iii. Water quality standard variance. This type of variance is time-limited and appropriate when the standard can be ultimately attained. In accordance with 40 CFR 131.33(d)(3), the applicant must demonstrate that attaining the water quality standard is not feasible because of one or more of the following six criteria:

- Naturally occurring pollutant concentrations prevent the attainment of the standard;
- Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
- Dams, diversions or other types of hydrologic modification preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use;
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like unrelated to water quality, preclude attainment of aquatic life protection uses; or
- Controls more stringent than 301(b) and 306 of the Clean Water Act would result in "substantial and widespread economic and social impact."

b. Basis for Cadmium, Lead and Zinc Variance to the South Fork Coeur d'Alene River

The District has requested, and EPA is proposing, to issue a water quality standard variance from the state's water quality criteria for cadmium, lead, and zinc. This variance is either from end-of-pipe (i.e., no mixing zone) limits based on federally approved state criteria (i.e. Gold Book) or end-of-

pipe limits based on site-specific-criteria that hasn't yet been approved EPA.

The variance is being proposed separate from the draft permit (since it is a water quality standards action) but is being public noticed concurrent with the permit for the public's convience. The water quality variance is based on "substantial and widespread economic and social impact." The variance addresses the socioeconomic impacts on the served communities by complying with Idaho's water quality standards for metals.

The variance study suggests that the Mullan WWTP would need to install lime or sulfide precipitation and microfiltration in order to meet water quality standards for metals. Sulfide precipitation and microfiltration in addition to current treatment would equate to an annual cost per residential user of 2.8% of the median household income for Shoshone County. This is considered a "large financial impact" according to EPA's "Economic Guidance Workbook."

As a condition of granting the variance, the permittee must sustain its current level of metals removal, identify possible treatment of metals, and identify and eliminate significant amounts of I/I. See also Section VII.A of the Fact Sheet. If the variance is not issued, one of the following sets of limits apply 1) end-of-pipe limits based on the state's federally approved water quality standards (Table IV-3) or 2) end-of-pipe limits using SSC (Table IV-4).

The proposed variance will be issued or not issued by EPA. The variance approval is a federal action because the cold water beneficial use for the River (which is the basis for the water quality standards for cadmium, lead, and zinc) was designated by federal rule on July 31, 1997 (See Section III.B). This federal rule included a federal variance procedure to obtain relief from the use designation.

If issued, the variance will remain in effect five years from the issuance date of the variance or the day before the expiration date of the reissued NPDES permit (whichever is sooner).

C. Basis for Effluent Limits and Monitoring Requirements

The following parameters have been evaluated for compliance with technology and water quality-based criteria. The more stringent criteria has been included in the draft permit when applicable. Monitoring has been included for nutrients.

1. Biochemical Oxygen Demand

Water quality-based criteria are not available for BOD_5, therefore the technology-based criteria for secondary treatment apply. These include a weekly average limit of 45 mg/L and an monthly average limit of 30 mg/L (See Table D-1). The secondary technology-based limits also require 85% removal of BOD. The removal requirements are determined using the 30-day average values of the raw wastewater influent concentrations and the 30-day average values of the effluent concentrations.

EPA methodology and Federal regulations at (40 CFR §122.45 (b) and 122.45 (f)) require BOD_5 limitations to be expressed as mass-based limits using the design flow (0.55 mgd) of the facility. The loading limits were taken from the previous permit to avoid backsliding.

Discharges from the Mullan WWTP are not expected to have an appreciable effect on the dissolved oxygen concentration in the SFCDA River because BOD_5 limitations are expected to control the discharge of oxygen demanding constituents into the SFCDA River. Although the proposed loading limits are greater than the previous loading limits, they do not result in a violation of applicable effluent limitation guidelines and therefore the anti-backsliding provisions have been met.

2. Total Suspended Solids

Technology-based criteria for secondary treatment include a weekly average limit of 45 mg/L and an monthly average limit of 30 mg/L (See Table D-1). The equivalent to secondary technology-based limits also require 65% removal of TSS. The removal requirements are determined using the 30-day average values of the raw wastewater influent concentrations and the 30-day average values of the effluent concentrations.

In addition to the technology-based limits, water quality-based WLAs are included in the proposed permit. The WLAs are taken from the State's South Fork Coeur d'Alene Suspended Solids TMDL. The TMDL has not been federally approved yet and therefore the limits will be included in the reissued permit if EPA approves the TMDL prior to reissueance. The WLA (12.3 tons/year for Mullan) represents 90% of the previous permited average monthly limit (30 mg/L) converted to tons per year by using Page's average discharge flow from 1999 to 2001 (0.28 mgd). The EPA converted the WLA (in tons/year) to pounds per day and applied it as an average monthly limit.

Average monthly limit = 12.3 tons/year × (1 year /365 days) × (2000 lbs/1 ton)
67.4 lbs/day

The average weekly limit was determined using Table 5.3 of EPA's TSD. This table considers the frequency of sampling (4 samples/month) as well as the variability of the previous monitoring data (1.1).

Average weekly limit = average monthly limit × value from table 5.3
Average weekly limit = 67.4 lbs/day × 2.62 = **176 lbs/day**

3. pH

In addition to the technology-based limits on BOD_5 and TSS, 40 CFR 133.102 requires that effluent pH be within the range of 6.0 to 9.0 s.u. for POTWs (See Table D-1). However, the State water quality standards for the protection of aquatic life (IDAPA 58.01.02250.01) requires that ambient pH be in the range of 6.5 to 9.5 s.u. Therefore, the minimum range in the draft permit is water quality-based (6.5 s.u.) while the maximum range is technology-based (9.0 s.u.).

4. Bacteria - E. coli

Idaho does not have federally approved technology-based limits for E. coli. Therefore, since the SFCDA River is protected for secondary contact recreation (i.e. boating, fishing etc), the water quality-based effluent limits at IDAPA 58.01.02.251.02 apply. This standard specifies a maximum daily effluent limit of 576 E. coli organisms per 100 ml and a monthly average limit of 126 organisms per 100 ml. A monitoring frequency of five samples per month has also been included in the draft permit based on the requirements found in this same water quality standard.

5. Total Residual Chlorine

Chlorine disinfection is utilized at the Mullan treatment plant. The draft permit includes water quality-based limits consistent with Idaho's water quality standards found at IDAPA 58.01.02.250.01.c.i. and IDAPA 58.01.02.250.01.c.ii because there was the reasonable potential to violate these water quality standards. The standards require that a one-hour average concentration of total residual chlorine not exceed 19 µg/L and that a four-day average concentration of total residual chlorine not exceed 11 µg/L (See Appendix C). Based on these standards and a 25% mixing zone, an average monthly limit of 33 µg/L and a maximum daily limit of 55 µg/L have been calculated using the TSD and included in the draft permit. These limits are more stringent than the 0.5 mg/L technology-based limits. Mass-based limits for chlorine were calculated using the same formula as discussed previously for BOD and TSS.

6. Total Ammonia

Low concentrations of ammonia can be toxic to freshwater fish, particularly salmonids. Un-ionized ammonia (NH_3) is the principal toxic form of ammonia. The ammonium ion (NH_4^+) is much less toxic. The relative percentages of these two forms of ammonia in the water vary as the temperature and pH vary. As the pH and temperature decrease, the percentage of ammonia that is in the un-ionized form increases, causing increased toxicity.

As effluent mixes with receiving water, the temperature and pH change, making it difficult to predict how much of the total ammonia in the discharge will convert to the un-ionized form. Therefore, the limits in the draft permit are expressed as total ammonia, not un-ionized ammonia. These limits are protective of Idaho's water quality criteria for cold water biota and salmonids found at IDAPA 58.01.02.250.02.c.

Because the toxicity of ammonia is dependent upon pH and temperature, the criteria are also pH and temperature dependent. EPA calculated the total ammonia criteria using 95th percentile ambient pH and temperature values assuming a 25% mixing zone was available (See Step 1 of Appendix E).

Using the statistical permit derivation method in the TSD, EPA calculated water quality-based daily maximum and monthly average limits (See Appendix E for the calculations). Mass-based limits for ammonia were calculated using the same formula as discussed previously for BOD and TSS. In addition to the effluent limits, the draft permit includes requirements for ambient monitoring for temperature, pH, and ammonia in the SFCDA River.

7. Narrative Criteria

Idaho's 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 or that may impair designated beneficial uses. In addition, the water quality standards require that surface waters be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses (See Appendix C). The draft permit has incorporated these water quality-based criteria.

8. Cadmium, Lead and Zinc

A variance from the state's water quality standards for cadmium, lead, and zinc is being proposed as a separate action from the draft NPDES permit. If the variance is issued, those water quality-based effluent limitations that assure protection of cold water biota are deferred until five years from the issuance date of the permit or the

day before the expiration of the NPDES permit (whichever is sooner). Upon expiration of the variance, one of the following sets of effluent limits apply: 1) end-of-pipe limits based on the state's federally approved water quality standards or 2) end-of-pipe limits based on SSC.

While the variance is in effect maximum daily alternate limits have been included in the permit that assure the permittee discharges at or below its current concentrations for cadmium, lead and zinc (See Table IV-2). The development of the alternate limits were provided in the proposed variance document and public information document. Average monthly alternate limits were developed using Table 5-3 of EPA's TSD. This table considers the sampling frequency of the metals and the variability (i.e., coefficient of variation) of the previous monitoring samples.

9. Nutrients

Total phosphorus, nitrate-nitrite, and total Kjeldahl nitrogren monitoring have been included in the draft permit in response to concerns in the 1996 Coeur d'Alene Lake Management Plan Executive Summary. A USGS Water-Supply Paper (#2485) titled *Trace-Element Concentrations and Transport in the Coeur d'Alene River, Idaho,Water Years 1993-1994* modeled increases in nutrient loads to Coeur d'Alene Lake and determined that an anoxic (no oxygen) hypolimnion (the region of the lake from below where the water stratifies due to temperature changes to the bottom of the lake) is unlikely with increased nutient loads because the Lake has a large assimilative capacity (USGS Paper 2485). Therefore limited monitoring has been included in the draft permit. This monitoring information will be useful if eutrophication in Coeur d'Alene Lake occurs and will help determine what form the nutients exist in (elemental or organic). It is expected that I/I controls will decrease the phosphorus discharged from the treatment plant since it is a natural component of sediment and a ban on phosphorus in detergent is already in effect.

APPENDIX E - EXAMPLE EFFLUENT LIMIT CALCULATIONS FOR TOTAL AMMONIA

This appendix describes how the water quality-based effluent limits were calculated for total ammonia. The calculations were performed according to procedures outlined in Chapters 3 and 5 of the TSD. Effluent limits for chlorine were developed in a similar manner, although the specific calculations are not included herein.

In calculating water quality-based limits, EPA used the following assumptions:

1Q10/7Q10 = 9.2 cfs (based on USGS station 12413040, South Fork Coeur d'Alene River above Deadman Gulch near Mullan from October 1998 through April 2000)

Mixing zone = 25% of the South Fork Coeur d'Alene River (based on state water quality standards)

Step 1 - Determine the appropriate water quality criteria

The water quality criteria is determined based on the use of the receiving water. The SFCDA River is protected, under IDAPA 58.01.02.109.09 (P-11), for secondary contact recreation, cold water biota (by federal rule), and agricultural water supply. Idaho's water quality standards (IDAPA 58.01.02250.02.c) require that ammonia be protective of cold water aquatic life. These criteria are based on pH and temperature.

Federally approved acute criteria

$$[0.275/(1 + 10^{7.204 - pH})] + [39/(1 + 10^{pH - 7.204})]$$

Federally approved chronic criteria

$$\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}} \times \text{minimum of } 2.85 \text{ or } 1.45*10^{0.028(25-T)}$$

Proposed acute criteria

$$\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

Proposed chronic criteria when fish early life stages are likely present

$$CCC = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) \times MIN\ (2.85,\ 1.45 \times 10^{0.028(25 - T)})$$

EPA used 95th percentile ambient pH (7.72 su) and temperature (10.9 BC) data from October 1998 through August 1999 to calculate the following total ammonia as N criteria:

Federally approved acute criteria: 14.75 mg/L

Federally approved chronic criteria: 2.7 mg/L.

Proposed acute criteria: 9.32 mg/L
Proposed chronic criteria: 3.5 mg/L

Step 2 - Determine whether there is "reasonable potential" to exceed the criteria

There is the reasonable potential (RP) to exceed water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated using the following mass-based equation:

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

where,

C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration (13.4 mg/L)
= maximum reported effluent concentration (10.6 mg/L) X reasonable potential multiplier (1.3)

In calculating the reasonable potential multiplier, EPA assumed a sampling frequency of 20 per month, and used a coefficient of variation of 0.5 based on monitoring between March 1992 through July 1999.

C_u = 95th percentile upstream concentration (data not available, therefore 0 was used)
Q_e = maximum effluent flow (0.853 cfs, design flow)
Q_u = upstream flow (1Q10 for acute and 7Q10 for chronic = 9.2 cfs)
$Q_d = Q_e + (Q_u \text{ X } \%MZ)$, receiving water flow downstream of the effluent discharge

$C_{d\text{-Acute}}$ = 3.63 mg/L < acute criteria of 14.75 mg/L and 9.32 mg/L
$C_{d\text{-Chronic}}$ = 3.63 mg/L > chronic criteria of 2.7 µg/L and 3.5 mg/L

Because the chronic downstream concentration is greater than both the federally approved and proposed criteria, total ammonia limits must be included in the permit.

Step 3 - Calculate Wasteload Allocations

Acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the criterion and C_e is replaced by the WLA_{acute} or $WLA_{chronic}$. The WLAs define the appropriate concentration of pollutant allowed in the effluent.

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

Federally approved criteria:
WLA_{acute} = 54.6 mg/L
$WLA_{chronic}$ = 10.0 mg/L

Proposed criteria:
WLA_{acute} = 34.4 mg/L
$WLA_{chronic}$ = 12.9 mg/L

Step 4 - Develop Permit Limits

a) Convert the WLAs to Long Term Averages (LTAs)

The acute and chronic WLAs are converted to acute and chronic LTA concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations from Section 5.4 of EPA's TSD:

$LTA_{acute} = WLA_{acute} \times e^{[0.5F^2 - zF]}$ where,

CV = coefficient of variation of the effluent concentration, standard deviation/mean = 0.5
F^2 = $\ln(CV^2 + 1) = 0.223$
z = 2.326 for 99th percentile probability basis, per the TSD

Federally approved criteria:
LTA_{acute} = 21.7 mg/L

Proposed criteria:
LTA_{acute} = 12.8 mg/L

$LTA_{chronic} = WLA_{chronic} \times e^{[0.5F^2 - zF]}$ where,

CV = coefficient of variation of the effluent concentration = 0.5
F^2 = $\ln(CV^2/4 + 1) = 0.06$
z = 2.326 for 99th percentile probability basis, per the TSD

Federally approved criteria:
$LTA_{chronic}$ = 6.05 mg/L

Proposed criteria:
$LTA_{chronic}$ = 7.52 mg/L

b) Calculate Average Monthly and Maximum Daily Permit 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. The TSD

recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

To derive the MDL and the AML for ammonia the calculations would be as follows:

$MDL = LTA_{chronic} \times e^{(zF - 0.5F^2)}$ where,

CV = coefficient of variation = 0.5

$F^2 = \ln(CV^2 + 1) = 0.223$

z = 2.326 for 99th percentile probability basis, per the TSD

MDL (federally approved criteria) = 15.2 mg/L

MDL (proposed criteria) = 20.2 mg/L

$AML = LTA_{chronic} \times e^{(zF - 0.5F^2)}$ where,

CV = coefficient of variation = 0.5

$F^2 = \ln(CV^2/n + 1) = 0.012$

z = 1.645 for 95th percentile probability basis, per the TSD

n = number of sampling events required per month = 20

AML (federally approved criteria) = 7.12 mg/L

AML (proposed criteria) = 8.95 mg/L

Mass based concentration limits were calculated by multiplying the concentration limit by the design flow (0.55 mgd) and the 8.34 conversion factor.

MDL (federally approved criteria) = (0.55 mgd) X (8.34) X (15.2 mg/L) = **70 lbs/day**

MDL (proposed criteria) = (0.55 mgd) X (8.34) X (20.2 mg/L) = **93 lbs/day**

AML (federally approved criteria) = (0.55 mgd) X (8.34) X (7.12 mg/L) = **33 lbs/day**

AML (proposed criteria) = (0.55 mgd) X (8.34) X (8.95 mg/L) = **41 lbs/day**