Fact Sheet

NPDES Permit Number: AK-002003-6
Date: xxxx
Public Notice Expiration Date: xxx

The U.S. Environmental Protection Agency (EPA) Plans To Reissue A Wastewater Discharge Permit To:

City of Soldotna Wastewater Treatment Facility
177 N. Birch St.
Soldotna, AK 99669

and
The State of Alaska Proposes to Certify the Permit and Issue a Consistency Determination

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue a *National Pollutant Discharge Elimination System* (NPDES) Permit to the City of Soldotna. The draft permit sets conditions on the discharge--or release--of pollutants from the Soldotna wastewater treatment facility to the Kenai River.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of past and proposed effluent limitations and other conditions
- a map and description of the discharge location and the sewage disposal or use locations
- detailed technical material supporting the conditions in the permit

The State of Alaska Proposes Certification and Consistency Determination.

The Alaska Department of Environmental Conservation (ADEC) proposes to certify the NPDES permit for the City of Soldotna, under section 401 of the Clean Water Act. The state provided preliminary comments prior to the public notice which are incorporated.

Public Comment.

EPA will consider all substantive comments before issuing the final permit. Those wishing to comment on the draft permit may do so in writing by the expiration date of the Public Notice. A request for public hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. 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.

Persons wishing to comment on State Certification should submit written comments by the Public Notice expiration date to ADEC, Air and Water Quality Division, 610 University Avenue, Fairbanks, Alaska 99709.

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

If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance.

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) 553-1774 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

EPA Alaska Operations Office, Room 537
Federal Building
222 West 7th Avenue
Anchorage, Alaska 99513-7588.

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I. APPLICANT

Soldotna Wastewater Treatment Facility NPDES Permit No. AK-002137-7

Facility Location:
215 South Kobuk
Soldotna, Alaska 99669

Mailing Address:
177 North Birch
Soldotna, Alaska 99669

Facility contact: Stephen L. Bonebrake, Public Works Director

II. FACILITY ACTIVITY

The City of Soldotna owns, operates, and maintains a complete mix modification of activated sludge secondary treatment facility. The facility discharges treated municipal wastewater to the Kenai River and sludge to the Soldotna landfill. The facility receives no significant industrial discharge, and the system has no combined sewers. The facility serves a resident population of under 4,000. As the City of Soldotna is a tourist area, though, actual population is higher during summer months. Details about the wastewater treatment process are included in Appendix A. The map in Appendix B shows the location of the treatment facility and discharge.

III. RECEIVING WATER

The applicable water quality standards are those adopted by the State of Alaska Department of Environmental Conservation (ADEC) at 18 AAC 70. State water quality standards protect the Kenai River for the freshwater use classifications of water supply, contact recreation, and the propagation of fish, shellfish, other aquatic life and wildlife (18 AAC 70.050).

The amount of dilution available from the Kenai River is dictated by requirements in the Alaska State Water Quality Standards. These standards stipulate that any mixing zone shall be as small as practicable (18 AAC 70.032). For the Soldotna discharge, the Alaska Department of Environmental Conservation (ADEC) has determined that one fourth of the 7Q10 low flow (or 909 cfs) will constitute the allowable mixing zone. This translates to a dilution ratio of 30 to 1. The 7Q10 low flow value was estimated using information from USGS station number 15266300.

IV. FACILITY BACKGROUND

The current Soldotna permit expired on March 20, 1996. The EPA received an updated permit application from the City of Soldotna dated November 30, 1995. Design flow for the facility is 1.02 mgd. The City is currently considering expansion of capacity to 1.08 MGD and installation of ultraviolet disinfection.

A review of the facility's discharge monitoring reports for the last three years shows that the facility's average flow is about 0.54 mgd. Review of the discharge monitoring reports also reveal that the facility has generally reported compliance with its 1991 permit effluent limits. Discharge monitoring reports are forms the facility uses to report results of self-monitoring, including effluent testing results.

V. EFFLUENT LIMITATIONS

EPA followed the Clean Water Act, state and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control (TSD)* to determine the need for and to develop the proposed effluent limits. Appendix C provides the basis for the development of effluent limits.

In general, the Clean Water Act 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 based on the level of treatment that is achievable using available technology. Water quality-based limits are required for pollutants that are discharged at levels that could cause or contribute to an exceedance above the state water quality standards in the Kenai River. Water quality-based effluent limits are only required if the pollutants are discharged at levels which cause or have the reasonable potential to cause or contribute to exceedances of the Alaska Water Quality Standards. The determination of the need for water quality-based limits is presented in Appendix D.

In addition to water quality-based limitations for pollutants that could cause or contribute to exceedances of standards, EPA must consider the state's antidegradation policy (18 AAC 70.010). This policy is designed to protect existing water quality when the existing quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard. The draft permit will result in no increases in the authorized pollutant loadings to the Kenai River. Therefore, the draft permit is consistent with Alaska's antidegradation policy.

The draft permit includes both technology-based and water quality-based limits (See Appendices E and F). For wastewater treatment plants, technology-based limits cover three parameters: five day Biochemical Oxygen Demand (BOD_5), total suspended solids (TSS), and pH. In addition, this permit includes water quality-based limits for fecal coliform and total residual chlorine. Table V-1 presents the effluent limits for the draft

permit. For comparison purposes, the table also shows the effluent limitations in the 1991 permit.

Table V-1: Soldotna Effluent Limitations

Parameter	Monthly Average Limit		Average Weekly Limit		Daily Maximum Limit	
	Draft	1991	Draft	1991	Draft	1991
BOD_5[1]	30 mg/L 255.2 lbs/day	30 mg/L 200 lbs/day	45 mg/L 382.8 lbs/day	45 mg/L 300 lbs/day	60 mg/L 510.4 lbs/day	60 mg/L 400 lbs/day
TSS[1]	30 mg/L 255.2 lbs/day	30 mg/L 200 lbs/day	45 mg/L 382.8 lbs/day	45 mg/L 300 lbs/day	60 mg/L 510.4 lbs/day	60 mg/L 400 lbs/day
pH, standard units	---	---	---	---	6.5 - 8.5	6.0 - 9.0
Fecal Coliform, # FC/100 mL	100	20	--	20	200	400
Total Residual Chlorine	---	---	---	[2]	0.002 mg/L 0.017 lbs/day	---

1 The average monthly percent removal shall be greater than 85%.
2 Based upon amperiometric or DPD methods, the chlorine residual shall be below the detectable level.

The draft permit requires that discharges be free from floating, suspended, or submerged matter in concentrations that cause/may cause a nuisance. It also prohibits discharges of waste streams that are not part of the normal operation of the facility, as reported in the permit application.

Fecal coliform limits were based on the more stringent of the water quality-based or ADEC technology-based limitations from 18 AAC 72.

When the facility design capacity of the Soldotna WWTF increases to 1.08 MGD, upon notification of EPA and ADEC, the effluent limits for BOD_5 and TSS will be as follows.

Effluent Characteristic	Unit of Measure	Average Monthly Limits[1]	Average Weekly Limits[1]	Maximum Daily Limits[1]
Biochemical Oxygen Demand 5-day (BOD_5)	mg/L 1b/day	30 270.2	45 405.3	60 540.4

Effluent Characteristic	Unit of Measure	Average Monthly Limits[1]	Average Weekly Limits[1]	Maximum Daily Limits[1]
Total Suspended Solids (TSS)	mg/L 1b/day	30 270.2	45 405.3	60 540.4

1 If an analytical value is less than the method detection limit (MDL), the permittee shall report "< [numerical method detection limit]" on the DMR. For example, if the laboratory reports "not detected" for a sample, and states that the MDL is "5 µg/L" then the permittee shall report "< 5 µg/L" on the DMR. All other values shall be reported and used in calculating averages. For minimum levels and interim minimum levels, see section I.A.5. of the permit. For the purposes of calculating averages, any value below the MDL may be set equal to zero.

VI. MONITORING REQUIREMENTS

A. Effluent Monitoring.

Section 308 of the Clean Water Act and federal regulation 40 CFR § 122.44(i) requires that monitoring be included in permits to determine compliance with effluent limitations. 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 Discharge Monitoring Reports (DMRs) to EPA. Table VI-1 presents the proposed monitoring requirements based on the minimum sampling necessary to adequately monitor the facility's performance. For comparison purposes, the table also shows the monitoring requirements in the 1991 permit.

TABLE VI-1. Monitoring Requirements for Outfall 001

Parameter	1991 Sample Frequency	Proposed Sample Frequency
Flow, mgd	continuous	continuous
BOD_5, mg/L[1]	1/week	1 day/week
TSS, mg/L[1]	1/week	1 day/week
pH, standard units[2]	daily	5 days/week
Fecal Coliform Bacteria, colonies/100 mL	1/week	1 day/week
Total Residual Chlorine, mg/L	daily	5 days/week, to be discontinued upon implementation of UV disinfection
Temperature[3], EC	N/A	1/month

Parameter	1991 Sample Frequency	Proposed Sample Frequency
Copper, Fg/L	N/A	1/quarter until 12 samples obtained
Zinc, Fg/L	N/A	1/quarter until 12 samples obtained
Hardness as $CaCO_3$, mg/L	N/A	Whenever metals are sampled
Alkalinity as $CaCO_3$, mg/L	N/A	Whenever metals are sampled
Total Ammonia, mg/L N	N/A	1/month for 1 year, until 12 samples obtained
Whole Effluent Toxicity	Once during second year and once during fourth year	3 annual tests

1 Percent Removal Monitoring: The percent BOD_5 and TSS removal will be reported on each monthly DMR form.
2 The Permittee shall report the number and duration of pH excursions during the month with the DMR for that month.
3 Monitoring for this shall continue for 12 months after the effective date of the permit.

B. Representative Sampling.

The requirement in the federal regulations regarding representative sampling (40 CFR § 122.41[j]) has been expanded and specifically requires sampling whenever a bypass, spill, 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 exceedances that could result from bypasses, spills, 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.

C. Ambient Monitoring.

The draft permit requires the Permittee to conduct quarterly ambient (in-stream) monitoring upstream of outfall 001. Table VI-2 presents the draft monitoring requirements that will be used to verify the assumptions made in permit limit development regarding receiving water conditions. Based on the results of this study, EPA will determine whether to revise these permit limits when the permit is renewed. The Permittee must report the results of the sampling with the DMR for the months in which the samples are taken. The permittee must also establish

monitoring stations upstream and downstream for fecal coliform, and upstream only for all other parameters.

TABLE VI-2. Ambient Monitoring Requirements for Outfall 001

Parameter	Draft Sample Frequency
Total Ammonia[1], mg/L N	1/month (May -October) and twice in October- April, until 12 samples obtained
pH[1], standard units	1/month (May -October) and twice in October- April, until 12 samples obtained
Temperature[1], EC	1/month (May -October) and twice in October- April, until 12 samples obtained
Copper[2], Fg/L	1/month (May -October) and twice in October- April, until 12 samples obtained
Zinc[2], Fg/L	1/month (May -October) and twice in October- April, until 12 samples obtained
Hardness as $CaCO_3$, mg/L	Whenever metals are sampled
Alkalinity as $CaCO_3$, mg/L	Whenever metals are sampled
Fecal Coliform Bacteria, FC/100 mL	1/month in May, June, July, August, September, October, and twice in October - April

1 If weather conditions during the scheduled month prevent collecting samples, then that sample shall be collected at the next earliest opportunity.
2 These parameters shall be analyzed as total recoverable.

The ambient monitoring for pH, total ammonia, temperature, copper, zinc, hardness and alkalinity are needed to assess compliance with the Alaska criteria for ammonia, copper, and zinc. The ammonia and metals sampling is only required for a total of 12 samples. Because of safety concerns, in the event weather conditions prevent sampling during a quarter, the permittee is required to sample as soon as possible during the next quarter. In addition, fecal coliform monitoring shall be conducted twice during the winter. The permittee is also required to sample fecal coliform both at the edge of the mixing zone.

D. Minimum Detection Levels

Water quality-based effluent limits (WQBELs) have been incorporated into the permit to protect State water quality standards. The WQBEL for total residual chlorine falls below the capability of current analytical technology to detect

and/or quantify the parameter. In order to determine compliance with the limit for total residual chlorine, EPA is establishing the minimum level (ML) as the quantification level for use in laboratory analysis.

EPA believes that the use of the ML as an analytical chemistry performance standard provides an unambiguous and rational means to demonstrate that the best chemistry available at the time of permit issuance is being used.

The ML is defined as the lowest concentration that gives recognizable signals and an acceptable calibration point. It is the equivalent concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes and processing steps have been followed. MLs are analyte- and method-specific and are established during the development and validation of the method. The ML for total residual chlorine is 0.100 mg/L. While the permittee must report all values between the method detection limit[1] and the ML, the permittee will be judged in compliance with the limit specified in the permit if the values reported are less than the ML.

E. Whole Effluent Toxicity.

Whole effluent toxicity tests are laboratory tests that use small vertebrate and invertebrate species, or plants, to measure the toxicity of an effluent. The effluent concentration that results in the death of 50% of test organisms during a 96-hour exposure determines the short-term (acute) toxicity. The highest effluent concentration that causes reduced growth or reduced reproduction of test organisms or plants during a 1-week (or other specified period of) exposure determines the long-term (chronic) toxicity.

Federal regulations at 40 CFR § 122.44(d)(1) requires that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard. Alaska water quality standards at 18 AAC 70.023 state that effluents discharged to a water may not impart chronic toxicity to organic organisms, expressed as 1.0 chronic toxic unit (TUc), at the point of discharge, or if ADEC authorizes a mixing zone in a certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. Based on the minimum dilution of 30, the discharged WET should be less than or equal to 30 TUc. The available data, consisting of three WET tests, indicate no toxicity. This data set is too

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[1] Method detection limit is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero as determined by a specific laboratory method (40 CFR Part 136).

limited to determine reasonable potential, so the facility will be required to conduct three more suites of tests using the *Ceriodaphnia dubia* (water flea) and the *Pimephales promelas* (fathead minnow). This is essentially the same frequency as in the current permit, since major[2] municipalities are required to submit the results from a WET test upon application for reissuance of their permits. More frequent monitoring for WET is not needed since there are no industrial users discharging to the Soldotna WWTF. In addition, the permit includes requirements to monitor for ammonia, copper, and zinc, which would be the most likely causes of toxicity at this facility.

VII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan.

Federal regulation 40 CFR § 122.41(e) requires the Permittee to develop and keep onsite 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 develop a Quality Assurance Plan within 60 days of the effective date of the permit. The Quality Assurance Plan shall consist of standard operating procedures the Permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Operation & Maintenance Plan.

Section 402 of the Clean Water Act and federal regulations 40 CFR § 122.44(k)(2) and (3) authorize EPA to require *best management practices*, or 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 Operation & Maintenance (O&M) plans. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the Soldotna WWTF to incorporate appropriate BMPs into its O&M plan within 180 days of permit issuance. 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

[2] "Major municpalities" is defined as those WWTF with design flows of 1.0 MGD or more.

reference the appropriate document in its O&M plan. The O&M plan shall be revised as new practices are developed.

C. Municipal Sewage Sludge (Biosolids) Management.

The City of Soldotna Wastewater Treatment Facility's biosolids are primarily domestic. The biosolids are disposed of in the Soldotna Landfill. The sludge management regulations of 40 CFR Part 503 were designed so that the standards are directly enforceable against most users or disposers of sewage sludge, whether or not they obtain a permit. Therefore, the publication of Part 503 in the *Federal Register* on February 19, 1993 served as notice to the regulated community of its duty to comply with the requirements of the rule, except those requirements that indicate that the permitting authority shall specify what has to be done. Even though Part 503 is largely self-implementing, section 405(f) of the CWA requires the inclusion of sewage sludge use or disposal requirements in any NPDES permit issued to a Treatment Works Treating Domestic Sewage. In addition, the sludge permitting regulations in 40 CFR §§ 122 and 124 have been revised to expand its authority to issue NPDES permits with these requirements. This includes all sewage sludge generators, sewage sludge treaters and blenders, surface disposal sites and sewage sludge incinerators. Therefore, the requirements of 40 CFR Part 503 have to be met when sewage sludge is applied to the land, placed on a surface disposal site, placed on a municipal solid waste landfill (MSWLF) unit, or fired in a sewage sludge incinerator.

The proposed NPDES wastewater permit no longer contains any requirements related to sewage sludge. EPA Region 10 has recently decided to change the regional approach to permitting disposal of biosolids and to separate wastewater and sludge permitting. As a result, the sludge language in the proposed NPDES permit has been removed so it can be placed in a separate "sludge only" permit to be issued at a later date. Under the CWA, EPA has the authority to issue separate "sludge only" NPDES permits for the purposes of regulating biosolids. EPA Region 10 has historically implemented the biosolids standards by inclusion of the biosolid requirements in the facility's NPDES wastewater permit, the other option authorized by the Act.

EPA will issue a sludge-only permit to this facility at a later date. This will likely be in the form of a general permit through which EPA can cover and better serve multiple facilities.

Meanwhile, the environment will be protected since the permittees sludge activities will continue to be subject to the national sewage sludge standards at 40 CFR Part 503. The CWA prohibits any use or disposal of biosolids not in

compliance with these standards. 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 use or disposal of biosolids. Also, the State of Alaska Department of Environmental Conservation conducts a program to review and approve biosolids activities.

D. Additional Permit Provisions.

1. Boilerplate. Sections II, III, and IV 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.

2. Requirements added by ADEC pre-certification. In its pre-certification of this permit, dated , ADEC added a requirement for the permittee to place sign(s) near the mixing zone and outfall lines. The sign(s) should contain information about the mixing zone, notification that treated wastewater is being discharged, as well as a number to contact for further information. ADEC also requested to be notified of violations, bypasses, facility changes as well as permit modifications. ADEC pre-certified a mixing zone with a minimum dilution of 30:1 for the Soldotna discharge and ambient monitoring requirements for fecal coliform. The permit requires that ADEC be notified whenever there is an increase of more than 10 percent of flow based on the previous 12 months of data.

3. The permit also requires that the permittee compute an annual average value for flow, and BOD_5 and TSS loading entering the facility based on the previous 12 months of data or all data available. When the average annual values exceed the 85 percent of the design criteria for the WWTF three months in a row, the permittee is required to develop a facility plan and schedule within 18 months from the date of the exceedance. This plan or strategy is required to ensure that the permittee will continue to comply with permit limits if capacity is being exceeded.

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 beneficially or adversely affect any threatened or endangered species. EPA has determined that issuance of this permit will not affect any of the threatened or endangered species in the vicinity of the discharge. See Appendix I for further details.

B. Essential Fish Habitat.

The Magnuson-Stevens Act requires federal agencies to consult with 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.

EPA has determined that issuance of this permit will not likely have an adverse effect on EFH in the vicinity of the discharge. Effluent limitations have been incorporated into the draft permit based on secondary treatment standards and are considered to be protective of overall water quality in the Kenai River based on criteria contained in the Alaska Water Quality Standards. EPA will provide NMFS with copies of the draft permit and fact sheet during the public notice period. Any comments received from NMFS regarding EFH will be considered prior to reissuance of this permit.

C. State Certification.

Section 401 of the Clean Water Act requires EPA to seek *state certification* before issuing a final permit. The state certification process began consistent with the public notice process. As a result of the certification, the state may require more stringent permit conditions to ensure that the permit complies with water quality standards. The state also may or may not authorize the *mixing zone* used to calculate the effluent limitations in the draft permit. The reasonable potential and effluent limit calculations for fecal coliform, total residual chlorine, and metals are based on a dilution of 30:1, the state's proposed mixing zone for the Soldotna wastewater treatment facility discharge.

The water quality-based limits in the draft permit are based on the dilution available in that mixing zone for fecal coliform and total residual chlorine. The draft permit has been sent to the state to begin the final certification process. If

the state authorizes a different mixing zone in its final certification, the effluent limitations in the final permit will be recalculated based on the dilution available in the final mixing zone. If the state does not certify the mixing zone, EPA will recalculate the permit limitations based on meeting water quality standards at the point of discharge.

D. Permit Expiration.

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

REFERENCES

EPA 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Memo from Martha Prothro to Water Management Division Directors. October 1, 1993.

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/Quantitation Level. NPDES Permits Unit, EPA Region 10, Seattle, WA, March, 1996.

LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
AML	Average Monthly Limit
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BMP	Best Management Practices
BPJ	Best Professional Judgement
BOD	Biochemical Oxygen Demand
BPT	Best Practicable control Technology currently available
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CWA	Clean Water Act
DMR	Discharge Monitoring Report
CV	Coefficient of Variation
EPA	Environmental Protection Agency
LA	Load Allocation
MDL	Maximum Daily Limit
mgd	Million gallons per day
mg/L	Milligrams per liter
ML	Minimum level
MSWLF	Municipal Solid Waste Landfill
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
RP	Reasonable Potential
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA 1991)
TSS	Total Suspended Solids
ug/L	Micrograms per liter
USFWS	United State Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload Allocation
WQBEL	Water quality-based effluent limitation
WWTF	Wastewater treatment facility

APPENDIX A - SOLDOTNA WASTEWATER TREATMENT FACILITY DESCRIPTION

Preliminary treatment

- Flow measurement and recording
- Solids removal (bar screen)
- Dewatering and landfilling removed solids

Primary treatment

- Grit removal (grit chamber)
- Biological treatment (aeration basins)

Secondary treatment

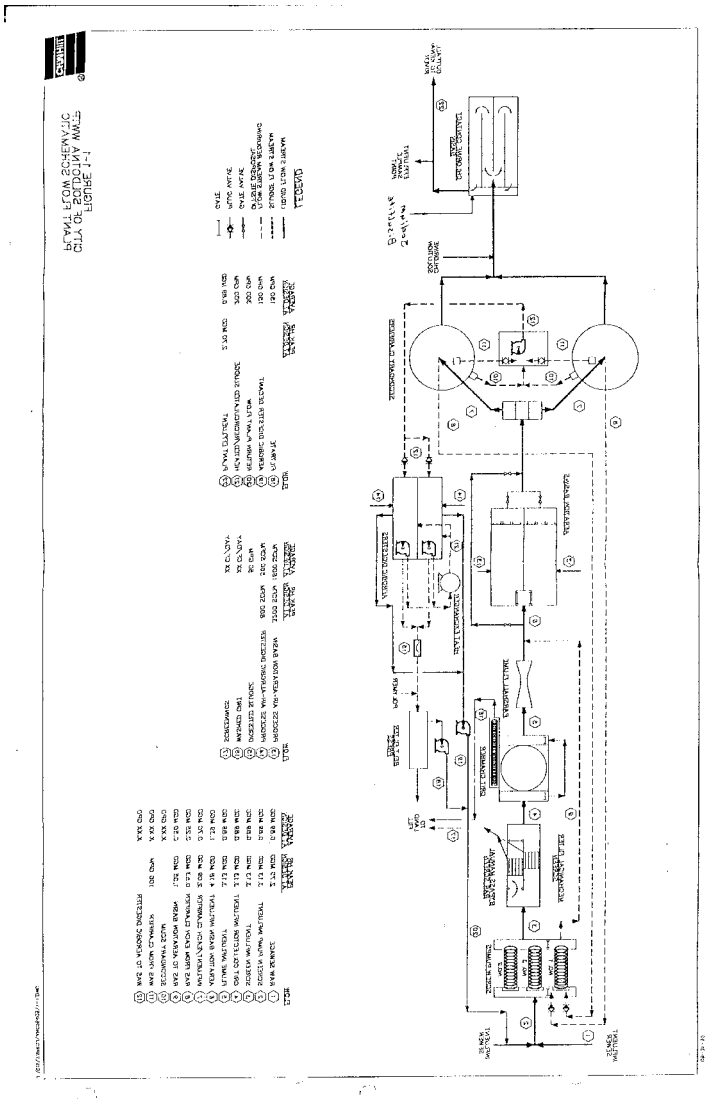
- Secondary clarification
- Chlorination
- Flow measurement
-Dechlorination with sodium bisulfite

Discharge

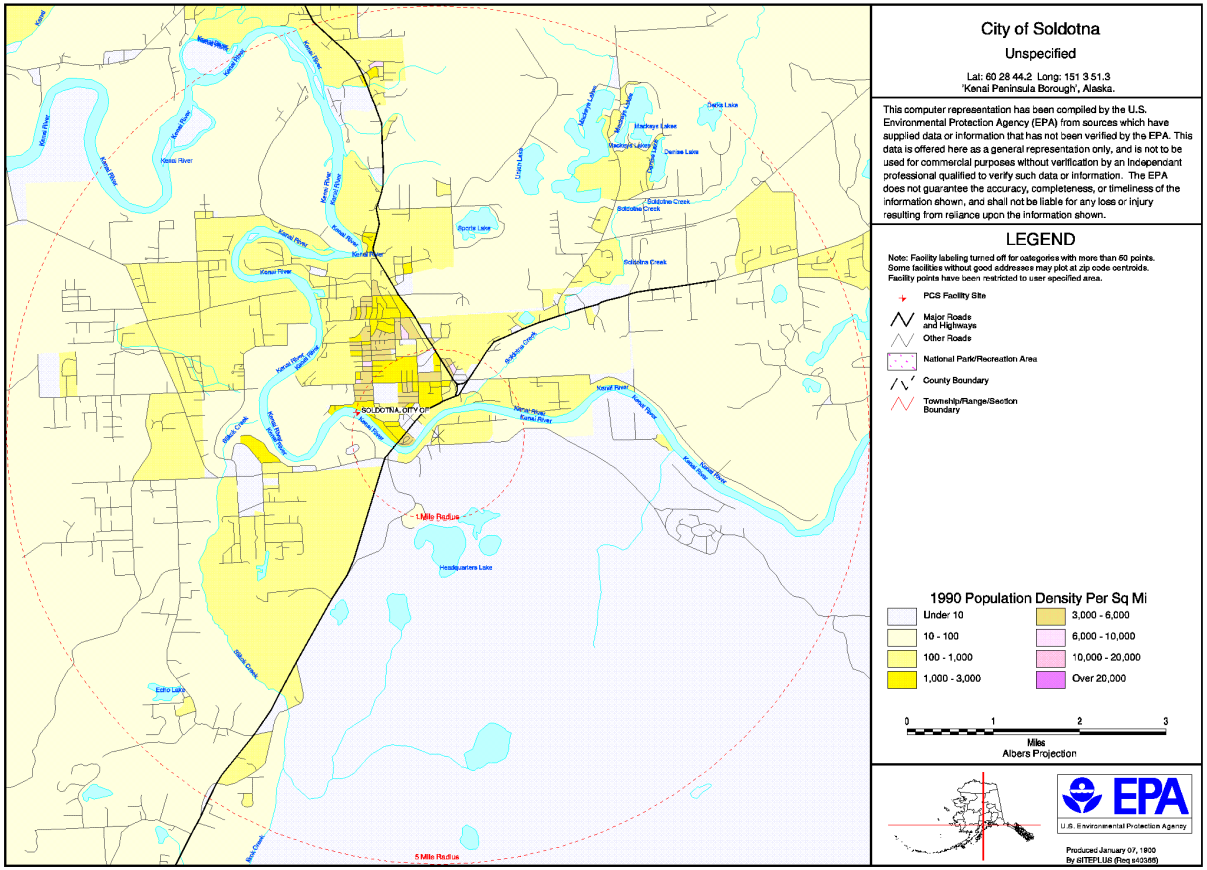
- Effluent discharge rate is an average of 0.540 mgd (based on monitoring from 1996-1999) and a maximum of 1.02 mgd

Biosolids handling

- Polymer addition
- Dewatering (gravity table/belt filter)
-Co-mixed with garbage and then buried in Soldotna landfill



APPENDIX B - MAP OF SOLDOTNA WASTEWATER TREATMENT FACILITY



APPENDIX C - BASIS FOR EFFLUENT LIMITATIONS

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (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 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 exceedances of the water quality standards in the receiving water. If exceedances could occur, EPA must include water quality-based limits in the permit. The draft permit limits will reflect whichever requirements (technology-based or water quality-based) are more stringent. The limits which EPA is proposing in the draft permit are found in Section V.A. of this Fact Sheet.

I. Technology-based Evaluation.

Section 301(b)(1)(B) of the CWA requires that discharges from publicly owned treatment works (POTWs) meet technology-based requirements defined as “secondary treatment” by July 1, 1977. The CWA initially focused on the control of “traditional” pollutants (conventional pollutants and some metals) through the use of “best practicable control technology currently available” (BPT). Section 301(b)(1)(3) of the CWA allowed a deadline for achieving BPT of March 31, 1989, under certain circumstances, but that deadline has also passed. Thus, permits issued after March 31, 1989, must include any conditions necessary to ensure that BPT is achieved.

Section 301(b)(2) of the CWA requires further technology-based controls on effluents. This section of the CWA requires that all permits contain effluent limitations which: (1) control toxic pollutants and nonconventional pollutants through the use of “best available technology economically achievable” (BAT), and (2) represent “best conventional pollutant control technology” (BCT) for conventional pollutants by March 31, 1989. In no case may BCT or BAT be less stringent than BPT.

In many cases, BPT, BCT, and BAT limitations are based on effluent guidelines developed by EPA for specific industries. Where EPA has not yet developed guidelines for a particular industry or a particular pollutant, permit conditions must be established using best professional judgement (BPJ) procedures (40 CFR §§ 122.43, 122.44, and 125.3). Secondary treatment requirements exist for BOD, TSS and pH, as discussed in Section C below.

II. Water Quality-based Evaluation.

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with section 301(b)(1)(C) of the CWA. This section requires the establishment 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 at 40 CFR § 122.44(d)(1) 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 limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

EPA uses the approach outlined below when determining whether water quality-based limits are needed and when developing those limits.

** Determine the appropriate state-adopted criteria.
*** Determine whether there is "reasonable potential" to exceed the criteria.
**** If there is reasonable potential to exceed the criteria, then develop a WLA.
***** Develop effluent limitations, based on WLAs.

The following sections below provide a detailed discussion of these steps.

A. Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in Section III of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

Table C-1 lists the most stringent criteria applicable to the discharge. These criteria are contained in Alaska's water quality standards (18 AAC 70) and the National Toxics Rule (40 CFR 131.36).

TABLE C-1 Applicable Water Quality Criteria		
Parameter	**Aquatic Acute**	**Aquatic Chronic**
Total Residual Chlorine, mg/L	---	.002 for salmonid fish; 0.010 for other organisms
Total Ammonia (mg/L)	8.05	1.83
Copper[1] (Fg/L)	5.2	3.86
Zinc[1] (Fg/L)	38.6	47
1 Criteria are based on mixed hardness at 30:1 dilution		

B. Reasonable Potential Evaluation

To determine if there is "reasonable potential" to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares applicable water quality criteria to the maximum expected receiving water concentrations (i.e., the concentration at the edge of the mixing zone) for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is "reasonable potential" and a water quality-based effluent limit must be included in the permit.

EPA has used the recommendations in Chapter 3 of the *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991) to conduct this "reasonable potential" analysis for the Soldotna wastewater treatment facility (WWTF). Reasonable potential (RP) calculations have been made for those pollutants with monitoring data and state criteria.

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

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

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

Q_u = upstream flow

1. **Mixing zone/flow conditions**

The dilution used to evaluate compliance with the copper and zinc criteria are based on a mixing zone application submitted by the City of Soldotna and tentatively approved by the Alaska Department of Conservation (ADEC). In accordance with state water quality standards, only ADEC may authorize mixing zones. 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.

2. **Step 1 - Maximum projected effluent concentration**

The maximum projected effluent concentration (C_e) is calculated based on the maximum reported effluent concentration and a multiplier (called a reasonable potential multiplier, RP) to account for uncertainty.

a. **Determine the maximum effluent concentrations.** The maximum effluent concentration was determined for copper and zinc.

b. **Determine the RP multiplier.** The RP multiplier depends upon the number and variability of the effluent data points. The standard deviation (or scatter of the observation around the mean) of the data is expressed as a percentage of the mean or coefficient of variation (CV). The CV is a measurement of variability of the data. When there are not enough data (i.e., less than 10 data points) to reliably determine a CV, the TSD recommends using 0.6 as a default value.

The RP multiplier is calculated, assuming 99% confidence level and 99% probability basis (using equations from Section 3.3.2 of the TSD):

RP multiplier = C_{99}/C_x where,

$F^2 = \ln(CV^2 + 1)$
$C_{99} = \exp(2.326\ F - 0.5\ F^2)$
C_x = percentile represented by highest concentration in the data base

c. **Calculate the maximum projected effluent concentration (C_e).**

(1) C_e = (maximum effluent concentration from (1)) x (RP multiplier from (2)).

Table C-2 summarizes the CV's, reasonable potential multipliers, maximum effluent concentration and maximum projected concentration (C_e) for each parameter.

Table C-2: Maximum Projected Effluent Concentrations

Parameter	Coefficient of Variation[1]	Reasonable Potential Multiplier	Maximum reported effluent concentration, Fg/L	Maximum Projected Effluent Concentration[2] (C_e), Fg/L
Copper	0.6	13.2	18.0	237.6
Zinc	0.6	13.2	68.0	897.6

1 Because less than 10 data points were available, a default CV of 0.6 was used.
2 Reasonable Potential Multiplier X Maximum reported concentration.

3. **Step 2 - Determine reasonable potential**

EPA assumed a background concentration of zero for each of the parameters evaluated based on data available for Kenai River. The maximum effluent flow is 1.02 mgd.

The following Table compares the maximum projected receiving water concentration (C_e) with the most stringent water quality criteria (C_{dd}). Water quality-based effluent limits were developed for those parameters that exhibit a reasonable potential to exceed the water quality criteria (that is, where C_e is greater than C_{dd}). The development of water quality-based effluent limits is described in Section C.

Table C-3 Reasonable Potential Determination						
Parameter	**C_e (Fg/L)**	**C_u (Fg/L)**	**Dilution**	**C_d (Fg/L)**	**Most stringent water quality criteria (C_{dd} Fg/L)**	**Reasonable potential**
Copper	237.6	0	145	1.58	4.8	No
Zinc	897.6	0	145	7.15	47	No

Using the allowable dilution of 30:1 and one sample each of copper and zinc, the discharge would have reasonable potential to cause or contribute to an exceedance of the water quality criteria for copper and zinc, based on using default statistical multipliers. However, permit limits will not be developed at this time and the permittee will be allowed the permit term to collect more data.

C. Wasteload allocation development

Once it has been determined that a water quality-based limit is required for a pollutant, the first step in developing a permit limit is development of a 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 exceedance of water quality standards in the receiving water. EPA used a mixing zone-based WLA for chlorine, since the requirement for chlorine limits have been retained from the 1991 permit.

Where the state authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutant(s), and the water quality criteria. Because the different criteria (acute aquatic life, chronic aquatic life, human health apply over different time frames and may have different mixing zones, it is not possible to compare them directly to determine which criterion results in the most stringent limits. For example, the acute criteria are applied as a one-hour average and may have a smaller mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone. The human health criteria are generally based on a 70-year exposure period. To allow for comparison, each criterion is statistically converted to a long-term average effluent concentration. The criterion that results in the most stringent long-term average concentration is the WLA that is used to calculate the permit limits.

D. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability, sampling frequency, water quality standards, and the difference in time frames between the monthly average and daily maximum limits.

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there is not enough data to calculate a CV (i.e., less than 10 samples), EPA assumes a CV of 0.6 for both monthly average and daily maximum calculations.

III. Effluent Limitations and Monitoring Requirements.

This discussion outlines the basis for each of the effluent limitations in Soldotna's proposed NPDES permit. The limitations proposed are either technology-based, water quality-based, or a combination of technology and water quality-based information.

A. Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS)

The Soldotna wastewater treatment facility (WWTF) is a secondary treatment facility that employs biological treatment. As such, the facility is subject to the technology-based requirements for five-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) of 40 CFR § 133.102, as outlined in Table C-4.

Table C-4: Secondary Treatment Requirements

Parameter	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (%)
BOD_5	30	45	85
TSS	30	45	85

In addition to the concentration limits, 40 CFR § 122.45(f) requires that NPDES permits contain mass-based limits for such pollutants as BOD_5 and TSS. The draft permit establishes loading limits based on Soldotna's current design capacity of 1.02 mgd (40 CFR § 122.45(b)). The limits are calculated by multiplying the concentration limits by the design flow and a conversion factor of 8.34 pound•liter/milligram•million gallons, as shown below.

Monthly Average Load: = (1.02 mgd)(30 mg/L)(8.34)
= **255.2 lbs/day**
Weekly Average Load: = (1.02 mgd)(45 mg/L)(8.34)
= **382.8 lbs/day**
Daily Maximum Load: = (1.02 mgd)(60 mg/L)(8.34)
= **510.4 lbs/day**

After the capacity upgrade to 1.08 MGD is complete, upon notification of EPA and ADEC, the limits will be as shown below.

Monthly Average Load: = (1.08 mgd)(30 mg/L)(8.34)
= **270.2 lbs/day**
Weekly Average Load: = (1.08 mgd)(45 mg/L)(8.34)
= **405.3 lbs/day**

Daily Maximum Load: = (1.08 mgd)(60 mg/L)(8.34)
= **382.8 lbs/day**

The daily maximum limits for BOD_5 and TSS are retained from the current permit, and the loading limits are increased based on increased design capacity.

B. pH

In addition to limits on BOD_5 and TSS, 40 CFR § 133.102 specifies a pH range from 6.0 to 9.0 standard units for POTWs. The State water quality standards for protection of aquatic life (18 AAC 70.020) require that ambient pH be in the range of 6.5 - 8.5 standard units. The draft permit incorporates the water quality-based limits of 6.5 - 8.5 standard units.

C. Fecal Coliform Bacteria

In establishing fecal coliform limits for Soldotna's draft permit, EPA considered five different requirements: a) Alaska's water quality standard for primary recreation; b) Alaska's water quality standard for secondary recreation; c) the limits in the 1991 permit, d) Alaska's water quality standard for water supply, drinking, culinary, and food processing and e) Alaska's wastewater treatment regulations at 18 AAC 72 that define disinfection for secondary facilities.

1. The State water quality standards contain criteria for fecal coliform bacteria for waters protected for contact recreation (18 AAC 70.020 (b)(1)(B)(i)).

Monthly geometric mean: 100/100 mL (based on a minimum of 5 monthly samples).

Not more than 1 sample or no more than 10 percent if more than 10 samples are collected may exceed 200/100 mL.

2. The State standards for secondary contact recreation (18 AAC 70.020(b)(1)(B)(ii)):

   monthly geometric mean of 200/100 mL (based on a minimum of 5 monthly samples) and

   no more than 10 percent may exceed 400/100 mL.

3. The State standards for water supply, drinking, culinary, and food processing (18 AAC 70.020(b)(1)(A)(i):

   mean MPN may not exceed 20 FC/100 mL and

   not more than 10 percent of the samples may exceed a fecal coliform mean MPN of 40 FC/100 mL.

   In order to assure a mixing zone as small as practicable as required at AAC 18 70.245, ADEC has indicated that the following values will be certified for the Soldotna discharge:

   mean MPN may not exceed 100 FC/100 mL and

   not more than 10 percent of the samples may exceed a fecal coliform mean MPN of 200 FC/100 mL.

4. The 1991 permit contained a monthly average limit of 20/100ml, a weekly average limit of 20 FC/100 mL, and a daily maximum limit of 40 FC/100.

5. Alaska wastewater disposal regulations at 18 AAC 72 define “disinfect” as a means to treat by means of a chemical, physical, or other process, such as chlorination and produces an effluent with the following characteristics:

   a. an arithmetic mean of the values for a minimum of five effluent samples collected in 30 consecutive days that does not exceed 200 FC/100 mL; and

b. an arithmetic mean of the values for a minimum of five effluent samples collected in 7 consecutive days that does not exceed 400 FC/100 mL.

The draft permit incorporates the most stringent of the fecal coliform limits for the monitoring period. Table C-5 presents the draft permit limits for fecal coliform. Table C-5a presents the draft limits if the WWTF converts to ultraviolet disinfection instead of chlorination.

Table C-5: Fecal Coliform Limits

Time Period	Monthly Average	Weekly Average	Daily Maximum
Fecal Coliform Bacteria	100	---	200

D. Total Residual Chlorine

The State water quality standard for total residual chlorine for protection of aquatic life (18 AAC 70.020(b)(1)(A)(iii)) is 2.0 µg/L measured for salmonid fish, or 10.0 µg/L for other organisms. The current permit specified that total residual chlorine (TRC) must be below detectable amounts using amperiometric or DPD analytical methods. The facility currently dechlorinates the effluent. To ensure that the facility continues dechlorinating, the draft permit proposes a numeric limit based on the Alaska water quality standards. Because those values (2 ug/L daily maximum) are below current capability to detect and/or quantify the parameter, EPA is establishing the minimum level (ML) as the quantification level for use in laboratory analysis. For chlorine, the ML is 0.100 mg/L.

E. Temperature

The State of Alaska water quality criteria for temperature for Kenai River states that the discharge may not cause the weekly average temperature to increase more than 1 EC. EPA does not have sufficient information to apply temperature limits to the Soldotna WWTF effluent. Therefore, monitoring is required in the draft permit.

F. Total Ammonia (as N)

Low concentrations of ammonia can be toxic to freshwater fish, particularly salmonids. Un-ionized ammonia (NH_3) is the principal toxic form of ammonia.

EPA does not have enough information apply ammonia limits to the Soldotna effluent. The draft permit requires monitoring instead.

G. Floating, Suspended or Submerged Matter

The state water quality standard (18 AAC 70.020) requires 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. This condition will be retained in the draft permit.

APPENDIX D - ENDANGERED SPECIES ACT

In a letter dated November 16, 1999, the US Fish and Wildlife Service (USFWS) state that no federally-listed species or critical habitat are found within the project area.

In a letter dated November 17, 1999, the National Marine Fisheries Service (NMFS) stated that the waters of Kenai River in the immediate area support Steller (Northern) Sea Lions (*Eumetopias jubatus*) which are listed as endangered. However, there are no documented Sea Lion rookeries or haulout sites near the Soldotna WWTF discharge. The beluga whale (*Delphinapterus leucas*) is commonly found in the area. The Cook Inlet population of beluga whales is currently listed as a candidate species under the ESA.

Steller Sea Lions

Steller sea lions are polygamous and use traditional territorial sites for breeding and resting. Breeding sites, also known as rookeries, occur on both sides of the North Pacific, but the Gulf of Alaska and Aleutian Islands contain most of the large rookeries. Adults congregate for purposes other than breeding in areas known as haulouts (NMFS 1996d). In 1997, NMFS classified Steller sea lions into two distinct population segments divided by the 144EW. The eastern population segment occupies habitat including southeastern Alaska and Admiralty Island. Currently, NMFS has classified the western population segment as endangered, while classifying the eastern population segment as threatened (62FR24345). Although the Steller sea lion population has declined steadily for the last 30 years, scientists have yet to identify the cause of the decline (NMFS 1992).

Steller sea lions spend most of their time at rookeries or haulouts; this is also where most scientific observations are made. Habitat types that typically serve as rookeries or haulouts include rock shelves, ledges and slopes and boulder, cobble, gravel and sand beaches. When foraging in marine habitats, Steller sea lions typically occupy surface and midwater ranges in coastal regions (Hoover 1988). Some animals may also follow prey into river and inlet systems (T. Loughlin, NMFS, personal communication, 29 July 1998).

Pollock and mackerel comprise most of the diet of Steller sea lions. They also frequently consume other small schooling fish such as salmon, herring, and capelin (NMFS 1992; Merrick et al. 1997). The sea lions generally leave haulouts and rookeries to feed for periods of time varying from hours to months. However, they often return to the same haulout or rookery even after lengthy absences (NMFS 1992).

Threats to Steller sea lions include environmental changes, incidental take, commercial harvest of prey species, and disturbances associated with tourism and industry. Environmental changes may

affect food supply, thus affecting survival and productivity. Incidental take has not generally affected the species since the mid-1980's. Commercial harvest of prey species, such as pollock, may affect the survival and health of the species, but limitations of data and models make it difficult to determine the effects of this practice. Tourism and industry bring with them a host of activities that may affect the sea lions through vessel traffic and the potential for chemical spills. Studies have not determined the potential effects of pollutants, but evidence does not indicate an immediate threat from toxic pollutants under current conditions (NMFS 1996d).

Beluga Whales

Beluga whales inhabit arctic and subarctic waters, usually staying close to the pack ice edge. One small population occurs in the Gulf of St. Lawrence in eastern Canada. The Alaskan population comprises a large portion of the total world population, an estimated 25,000-30,000 of a total 49,000-69,000 animals. In summer months, belugas follow the pack ice into shallow coastal waters and estuaries, only to travel off-shore in the winter. Because of their habit to follow the edge of the pack ice, belugas are one of the few toothed whales to undertake a rigid, annual migration. Belugas mate in late winter or spring, and calve in shallow coastal waters, estuaries or rivers in spring or summer. While essentially marine, these whales can also withstand prolonged periods in fresh or brackish waters (Martin, 1990).

The beluga whale's unique white coloration does not appear in newborn animals, but later develops during the juvenile years with all animals becoming white by 12 years of age, but some by as early as 5 years old. This stocky species has no dorsal fin and is characterized by a small, rounded head with a bulbous melon that becomes more obvious with age (Martin, 1990). Belugas have unusual control of their facial features with the ability to alter the shape of the melon (possibly to aid in echolocation) and their lips (this may allow the use of suction to forage by drawing invertebrates into the mouth; Martin, 1990; Haley, 1986). These whales feed opportunistically on many different types of bottom dwelling animals. They eat various species of cephalopods, crustaceans, molluscs and fish (Perez, 1990; Haley, 1986). Using their flexible neck, belugas forage at or near the bottom in shallow waters where they can produce suction and strong jets of water with their mouths to dislodge prey from the bottom. This species may also hunt in groups for schooling fishes, herding fish into shallow water before attacking (MacDonald, 1993). Extremely vocal animals, the beluga's frequency and large repertoire of vocalizations has earned them the nickname, "sea canaries (Haley, 1986)."

Commercial and subsistence hunting of belugas occur although at a much reduced level (Dold, 1993) than the commercial hunt that occurred in the 18th and 19th centuries which brought high mortalities that the population could not sustain (Martin, 1990). Other disturbances such as shipping, chemical pollution and oil exploration may also cause problems for this species. In Alaska, oil exploration in coastal waters and hydroelectric plants on rivers have become a concern for calving success (Martin, 1990). Belugas are also known to be susceptible to toxicity of chemical pollution such as PCBs, DDT and heavy metals.

EPA has determined that the draft permit will not impact the beluga whales or Steller sea lions. Principle threats to beluga whales and Steller sea lions are chemical pollution such as heavy metals. This draft permit will have no impact on any of these issues. Therefore, EPA has determined that the Soldotna WWTF discharge will not impact the beluga whales or Steller sea lions.