ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – DRAFT

Permit Number: AK0021431

City of Valdez Wastewater Treatment Plant

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Wastewater Discharge Authorization Program

555 Cordova Street

Anchorage, AK 99501

Public Comment Period Start Date: April 8, 2015
Public Comment Period Expiration Date: May 8, 2015
Alaska Online Public Notice System

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Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to

CITY OF VALDEZ

For wastewater discharges from

Valdez Wastewater Treatment Facility
800 So. Sawmill Rd
Valdez, AK, 99686

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to reissue an APDES individual permit (permit) to City of Valdez. The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. 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 from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from Valdez Wastewater Treatment Facility and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions in the permit
- proposed monitoring requirements in the permit

Public Comment

Persons wishing to comment on, or request a public hearing for the draft permit for this facility, may do so in writing by the expiration date of the public comment period.

Commenters are requested to submit a concise statement on the permit condition(s) and the relevant facts upon which the comments are based. Commenters are encouraged to cite specific permit requirements or conditions in their submittals.

A request for a public hearing must state the nature of the issues to be raised, as well as the requester's name, address, and telephone number. The Department will hold a public hearing whenever the Department finds, on the basis of requests, a significant degree of public interest in a draft permit. The Department may also hold a public hearing if a hearing might clarify one or more issues involved in a permit decision or for other good reason, in the Department's discretion. A public hearing will be held at the closest practicable location to the site of the operation. If the Department holds a public hearing, the Director will appoint a designee to preside at the hearing. The public may also submit written testimony in lieu of or in addition to providing oral testimony at the hearing. A hearing will be tape recorded. If there is sufficient public interest in a hearing, the comment period will be extended to allow time to public notice the hearing. Details about the time and location of the hearing will be provided in a separate notice.

All comments and requests for public hearings must be in writing and should be submitted to the Department at the technical contact address, fax, or email identified above (see also the public comments section of the attached public notice). Mailed comments and requests must be postmarked on or before the expiration date of the public comment period.

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a Response to Comments document that will be made available to the public. If no substantive comments are received, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may waive this review period. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 Alaska Administrative Code (AAC) 15.185.

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://www.dec.state.ak.us/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation at
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800.

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://www.dec.state.ak.us/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: http://www.dec.state.ak.us/water/wwdp/index.htm .

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 410 Willoughby Avenue, Suite 310 Juneau, AK 99801 (907) 465-5180

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1.0 APPLICANT

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Name of facility:	City of Valdez Wastewater Treatment Facility
APDES Permit Number:	AK0021431
Facility Location:	800 South Sawmill Road, Valdez, AK 99686
Mailing Address:	P.O. Box 307, Valdez, AK 99686
Facility Contact:	Mr. Rob Comstock, (907) 835-4888

The map in Appendix A to the Fact Sheet shows the location of the treatment facility and the discharge location.

2.0 FACILITY INFORMATION

The Valdez Wastewater Treatment Facility (WWTF or facility) is a waste stabilization pond that provides aerobic treatment and is owned and operated by the City of Valdez (City or permittee). The facility serves a population of approximately 3,976 (2010 Census). The City's population is assumed to be larger during the summer tourist season. The collection system is 100 percent separated from the storm sewer system. The WWTF treats residential and commercial wastewater with no significant industrial dischargers to the facility. The WWTF has a design capacity of 1.5 million gallons per day (mgd). The average daily flow (2014) was 1.09 mgd. The facility provides secondary treatment and disinfection through chlorination. The WWTF was designed and constructed as a zero-discharge facility in 1978 and included two aerated lagoons and one percolation pond. Because of the high groundwater table in the area, the facility never functioned as a zero-discharge facility and the percolation pond now serves as the chlorine contact/settling pond. In 1990, two 3,000 gallon aeration tanks were installed to increase effluent dissolved oxygen. Baffles were installed in the chlorine contact pond in 1997 to increase detention time and prevent short circuiting. In 2000, bar screens were replaced with comminutors[1]. There are no on-site headworks. The comminutors are located in the main pump station upstream of the WWTF. Following the comminutors, the flow enters a five mile force main to the facility. The treatment process includes: two aerated lagoons, a baffle chlorine contact/settling pond, aeration, and gas chlorination disinfection. Details about the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in APPENDIX A.

The previous permit, issued by the Environmental Protection Agency (EPA) in 2002, included provisions for the City to construct a marine outfall directly to the Port Valdez (previously named Outfall 002). A compliance schedule was established in the permit that allowed 36 months to construct and make the marine outfall 002 operational. The City obtained funding to construct the marine outfall, however, that funding was withdrawn based on the assumption that the 2006 Water Quality Standards (WQS) would allow a mixing zone to be established in the current salmon spawning freshwater receiving stream. However, the stream appears to have supported some type of salmon spawning, which would preclude the establishment of a mixing zone even if the 2006 WQS become approved. The facility has since constructed an outfall to the marine waters of the Port of Valdez. Marine outfall 002, fitted with a diffuser, discharges into the Port of Valdez, located at: N 61° 6' 58.91" by W 146° 16' 50.66".

[1] Comminutors are mechanical devices used to break up or grind solids.

2.1 Background

Date	Action
August 15, 1975	Temporary National Pollutant Discharge Elimination System (NPDES) Permit authorized discharge of untreated effluent while a zero-discharge treatment facility was designed and constructed. Expiration Date: December 31, 1976.
December 1, 1978	Initial NPDES permit issued. It contained secondary treatment requirements. Expiration date: December 1, 1983.
January 31, 1983	The City applied for a waiver from secondary treatment under Section 301(h) of the Clean Water Act (CWA). The incentive for the waiver application was the City's concern that the WWTF would be unable to meet percent removal requirements for 5-day biochemical oxygen demand (BOD_5) due to projected increases in plant flow as the result of population growth and increased Inflow/Infiltration (I/I) in the collection system.
March 26, 1985	The City withdrew its 301(h) application.
March 26, 1985	Short-form application received by EPA to reissue NPDES permit.
September 4, 1985	NPDES Permit reissued, expiration date: October 3, 1990.
April 3, 1990	Standard Form 2A application received to reissue NPDES permit. Under the conditions of code of federal regulations (CFR) 40 CFR § 122.6, the City was authorized to continue discharging under the terms of the 1985 permit until a new permit was reissued.
March 5, 2001	Standard Form 2A application received to reissue NPDES permit.
June 1, 2002	NPDES Permit reissued with revised percent removal requirements, revised dissolved oxygen (DO) requirements, revised pH requirements, an increase in flow, and increased BOD_5 and total suspended solids (TSS) loading. The expiration date was: April 17, 2007.
April 26, 2004	DEC issued a Draft Certificate of Reasonable Assurance for a Proposed Modification of NPDES Permit No. AK0021431 that included provisions for constructing an outfall to the Port of Valdez with an accompanying 100 meter radius circular mixing zone for fecal coliform bacteria, total chlorine, nutrients, metals, pH, DO, and whole effluent toxicity.
November 27, 2006	Standard Form 2A application received by EPA and determined to be timely and complete
February 8, 2007	Administrative permit extension letter issued by EPA.
October 2008	In October 2008, the Department became the permitting authority for CWA Section 402 permits.
March 30, 2012	Revised Alaska Pollutant Discharge Elimination System (APDES) Form 2A application submitted. (Determined to be technically complete when final round of effluent sampling submitted on December 17, 2013.)

3.0 COMPLIANCE HISTORY

Discharge Monitoring Reports (DMRs) from November 30, 2008 to November 30, 2014 were reviewed to determine the facility's compliance with effluent limits. There were three monthly average and two daily maximum flow violations during this time period. The facility was most recently inspected on May

15, 2014 by DEC's Compliance and Enforcement Program. The WWTF was found to be in compliance with all terms and conditions that were evaluated under the APDES individual permit.

4.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

4.1 Basis for Permit Effluent Limits

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBEL) or water quality-based effluent limits (WQBEL). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the Water Quality Standards (WQS) of a water body are met. WQBELs may be more stringent than TBELs. The basis for the proposed effluent limits, including less stringent percent removal requirements, can be found in APPENDIX B.

4.2 Basis for Effluent and Receiving Water Monitoring

In accordance with Alaska Statute (AS) 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and receiving water data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving water body quality.

The permit also requires the permittee to perform effluent monitoring required by the APDES Form 2A application, so that this data will be available when the permittee applies to reissue its APDES permit. 18 AAC 83.330(f)(1 - 3) requires that the applicant provide "sampling and analysis for the pollutants listed in Appendix J, Table 1A, Table 1, and Table 2 to 40 CFR Part 122, adopted by reference in 18 AAC 83.010." The permittee should review Form 2A, which can be found online here: http://dec.alaska.gov/water/wwdp/online_permitting/pdfs/Form%202A%20POTWsReader.pdf or by contacting the Department, to ensure all permit application requirements are understood. The permittee is responsible to conduct the monitoring and report results on DMRs or on the application for reissuance, as appropriate, to the Department.

4.3 Effluent Limits and Monitoring Requirements

Both TBELs (CFR 40 CFR 133 adopted by reference in 18 AAC 83.010) and WQBELs are included in the permit. The following summarizes the proposed effluent limits (see Appendices B through D for more details).

All effluent limits and monitoring requirements from the previous permit for marine outfall 002 have been retained. There are three new monitoring requirements for this permit issuance. Monitoring for total recoverable copper and enterococci bacteria has been added to make future permit decisions. DEC is revising the seasonal TSS requirement for TSS percent removal to match the secondary treatment minimum percent removal of 85 percent for TSS year round based on facility performance (See APPENDIX B). Furthermore, chronic whole effluent toxicity (WET) monitoring has been included using marine organisms for the final year of the permit (See Fact Sheet Section 4.5 for a discussion on WET monitoring).

Enterococci bacteria monitoring is included in the permit due to EPA promulgation of enterococci bacteria marine waters standards for the protection of primary contact recreation. On

October 10, 2000, the Beaches Environmental Assessment and Coastal Health (BEACH) Act was signed into law amending the CWA. The BEACH Act addresses pathogens and pathogen indicators in coastal recreation waters and establishes water quality criteria for enterococci for States that "do not have water quality standards for bacteria that comply with the requirements of section 303(i)(1)(A) of the" CWA (USEPA 2004). Due to EPA's establishing water quality criteria for enterococci in marine waters, the Department is requiring the WWTF to monitor their effluent for enterococci bacteria to make reasonable potential analysis and effluent limit determinations in future permit decisions. The Department is not establishing an effluent limit at this time for enterococci bacteria until actual effluent data has been collected and evaluated during permit reissuance.

Table 1: Marine Outfall 002 - Effluent Limits and Monitoring Requirements

	Effluent Limits					Monitoring Requirements		
Parameter	**Daily Minimum**	**Monthly Average**	**Weekly Average**	**Daily Maximum**	**Units**	**Sample Location**	**Sample Frequency**	**Sample Type**
Total Discharge Flow [a]	N/A	1.5	N/A	2.5	MGD	Effluent	Continuous	Recorded
BOD_5	N/A	30	45	60	mg/L [b]	Influent and Effluent [d]	1/Week	24-hour Composite [e]
	N/A	375	563	751	lb/day [c]			
BOD_5 Percent Removal (June 1 – September 30)	N/A	85 [f]	N/A	N/A	% [g]	Influent and Effluent [d]	1/Month	Calculated
BOD_5 Percent Removal (October 1 – May 31)	N/A	80 [f]	N/A	N/A	%	Influent and Effluent [d]	1/Month	Calculated
TSS	N/A	30	45	60	mg/L	Influent and Effluent [d]	1/Week	24-hour Composite [e]
	N/A	375	563	751	lb/day			
TSS Percent Removal	N/A	85 [f]	N/A	N/A	%	Influent and Effluent [d]	1/Month	Calculated
Fecal Coliform (FC) Bacteria	N/A	200 [h]	400 [h]	800	FC/100 mL [i]	Effluent	2/Week	Grab
Enterococci Bacteria	N/A	N/A	N/A	Report	#/100 mL [j]	Effluent	2/Year	Grab
pH	6.5	N/A	N/A	8.5	SU [k]	Effluent	2/Week	Grab
Dissolved Oxygen	2.0	N/A	N/A	17	mg/L	Effluent	2/Week	Grab
Total Chlorine Residual [l]	N/A	0.03	N/A	0.07	mg/L	Effluent	2/Week	Grab
	N/A	0.4	N/A	0.9	lb/day			
Total Ammonia, as N	N/A	N/A	N/A	Report	mg/L	Effluent	1/Month	24-hour Composite [b]
Total Recoverable Copper	N/A	N/A	N/A	Report	mg/L	Effluent	Quarterly	24-hour Composite [b]
Temperature	N/A	N/A	N/A	Report	° C [m]	Effluent	1/Month	Grab
Chronic WET	N/A	N/A	N/A	Report	TUc [n]	Effluent	Quarterly [o]	24-hour Composite [b]

Notes:

a. The wastewater discharge volume shall not exceed the maximum hydraulic design flow rate approved in the Final Approval to Operate issued by the Department. Final Approval to Operate means that the Department has reviewed and approved the wastewater treatment works engineered plans submitted to the Department in accordance with
18 AAC 72.210 through 18 AAC 72.285 or as amended.

b. Milligrams per liter.

c. Pounds per day.

d. Limits apply to effluent. Report average monthly influent concentration

e. Composite samples must consist of at least eight discrete sample aliquots of at least 100 milliliters, collected over periodic intervals from the same location, during the operating hours of a facility over a 24 hour period. The composite must be flow proportional.

f. Minimum percent removal = [(average monthly influent concentration in mg/L – average monthly effluent concentration in mg/L) / (average monthly influent concentration in mg/L)] x 100. Calculation required monthly.

g. Percent.

h. All fecal coliform bacteria average results must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the quantities. For example, the geometric mean of 100, 200, and 300 is $(100 \times 200 \times 300)^{1/3} = 181.7$.

i. Fecal coliforms per 100 milliliters.

j. Number per 100 milliliters.

k. Standard units.

l. Effluent limits for total residual chlorine are not quantifiable using EPA-approved analytical methods. DEC will use the minimum detection limit of 0.1 mg/L as the compliance limit for this parameter.

m. Celsius.

n. Chronic toxic units.

o. Sampling required during the fourth year of the effective date of the permit.

4.4 Influent and Effluent Monitoring

The permit requires monitoring of the effluent for total discharge flow, BOD_5, TSS, fecal coliform bacteria, pH, dissolved oxygen, and total residual chlorine to determine compliance with the effluent limitations. The permit also requires monitoring of the influent for BOD_5 and TSS to calculate monthly percent removal rates for these parameters. In addition, the permit includes requirements to monitor identified additional pollutants of concern in the effluent for total ammonia as N, enterococci bacteria, temperature, WET, and total recoverable copper in order to conduct a future reasonable potential analysis to determine if the discharge has the potential to cause an exceedance of the WQS in the receiving water body for the subject parameters.

Monitoring frequencies are based on the nature and effect of the pollutant, monitoring frequencies specified in the previous permit, and a determination of the minimum sampling necessary to adequately monitor the facility's performance. The permittee has the option of taking more frequent samples than required under the permit. These additional samples must be used for averaging if they are conducted using the Department – approved test methods (generally found in 18 AAC 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]), and if the Method Detection Limits (MDLs) are less than the effluent limits.

Table 3 presents the influent and effluent monitoring requirements.

The permittee shall perform the additional effluent testing in the APDES application Form 2A for publicly owned treatment works (POTWs). The permittee shall submit the results of this additional testing with their application for renewal of this APDES permit. The permittee shall consult and review Form 2A upon permit issuance to ensure that the required monitoring in the application will be completed prior to submitting a request for permit renewal. A copy of Form 2A can be found at: http://dec.alaska.gov/water/wwdp/index.htm.

4.5 Whole Effluent Toxicity Monitoring

18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS. Tests are for monitoring purposes only and may not be included in the next permit reissuance. Test results will be analyzed to make permitting decisions during the next permit issuance.

WET tests are laboratory tests that measure total toxic effect of an effluent on living organisms. Whole effluent toxicity tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. The two different durations of toxicity tests are: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

WET monitoring requirements are included for marine Outfall 002; however, 18 AAC 83.435 (f) states: "Limits on whole effluent toxicity are not required if the department demonstrates in the fact sheet of the APDES permit, using the procedures in [18 AAC 83.435] (c) of this section, that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative state water quality standards." The Department has determined that existing controls, chemical-specific limits for the effluent, and dilution of the effluent are sufficient to attain and maintain applicable WQS outside the boundary of the mixing zone. Therefore, the permit does not establish limits for WET.

WET monitoring was included as a quarterly requirement during the final year of the previous permit for the discharge to freshwater Unnamed Stream No. 221-60-11390 using freshwater organisms. These results indicate that there was no toxicity present at 100% effluent. However, the facility has since constructed a new outfall to the marine waters of the Port of Valdez and has discontinued using the freshwater outfall. Therefore, monitoring for chronic WET is required to evaluate potential toxicity using marine organisms and to establish a basis for possible future permit actions. Toxicity tests shall be conducted as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*, Third Edition, EPA-821-R-02-014, October 2002. The dilution series (based on the chronic mixing zone dilution factor of 21.2) shall consist of effluent concentrations of 19%, 9.4%, 4.7%, 2.6%, 1.2%, and a control. Likewise, a WET permit trigger of 21.2 TUc is included in the permit. If WET results exceed this trigger, accelerated testing requirements of section 1.4.3 of the permit become effective. If WET tests continue to exceed the 21.2 TUc trigger during accelerated testing, the permittee must initiate a Toxicity Reduction Evaluation in accordance with section 1.4.4 of the permit.

5.0 RECEIVING WATER BODY

5.1 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the Alaska WQS. The state's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the beneficial use classification of each water body. The antidegradation policy ensures that the beneficial uses and existing water quality are maintained.

Water bodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some water bodies in Alaska can also have site–specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

5.2 Water Quality Status of Receiving Water

Any part of a water body for which the water quality does not or is not expected to meet applicable WQS is defined as a "water quality limited segment" and placed on the state's impaired water body list. The Port of Valdez is not included on the *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report,* July 15, 2010 (2010 Integrated Report) as an impaired water body. The 2010 Integrated Report lists the Port of Valdez as a Category 3 water body. Category 3 water bodies are defined as: "Waters for which there is insufficient or no data and information to determine whether any designated use is attained" (DEC 2010).

5.3 Mixing Zone Analysis

In accordance with state regulations at 18 AAC 70.240, as amended through June 26, 2003, the Department has authority to authorize a mixing zone in a permit. The City of Valdez submitted a

Form 2M mixing zone application in November 2011. A revised CORMIX model was submitted in April 2014. Based on this revised mixing zone checklist, mixing zones for ammonia, dissolved oxygen, fecal coliform bacteria, WET, and total residual chlorine, are authorized for the discharge to the Port of Valdez. The applicant modeled and requested a circular 100 foot radius mixing zone. However, upon review of the submitted Form 2M (mixing zone application), DEC has revised the size of the applicant proposed mixing zone to comply with 18 AAC 70.240(a)(2), which requires the authorized mixing zone "be as small as practicable." The CORMIX model indicates that the water quality criteria would be met relatively rapidly, downstream of and perpendicular to the direction of the ambient current (in both flooding and ebbing tidal directions). The mixing zone is sized such that the water quality criteria found in 18 AAC 70 is met at the boundary of the mixing zone to ensure the mixing zone is as small as practicable and complies with the applicable mixing zone regulations. A chronic mixing zone size as a rectangle with a width of 66 feet (perpendicular to the diffuser) and a length of 44 feet (parallel to the diffuser) centered on the diffuser, from the seafloor to the surface is authorized for: ammonia, fecal coliform bacteria, WET, and total residual chlorine. The mixing zone size was driven by the dilution required for ammonia. The dilution factor for the chronic mixing zone is 21.2. Furthermore, an acute mixing zone size as a width of 62 feet and a length of 8 feet centered on the diffuser, from the seafloor to the surface, is established per 18 AAC 70.255 for ammonia and total residual chlorine. The dilution factor for the acute mixing zone is 4.2

Appendix E, Mixing Zone Analysis Checklist, outlines criteria that must be considered when the Department analyzes a permittee's request for a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the water body, human consumption, spawning areas, human health, aquatic life, and endangered species. All criteria must be met in order to authorize a mixing zone. The following summarizes this analysis:

5.3.1 Size: In accordance with 18 AAC 70.255, the Department determined that the size of the mixing zone is appropriate and as small as practicable. The CORMIX modeling discussed in the preceding paragraphs was used to determine the mixing zone size for this permit issuance. Mixing zone sizes were calculated using an ambient current of 0.1 m/s. This current velocity was estimated from a hydrographic survey that was conducted in 2011 (Wescott Bott, personal communication, 2014). The CORMIX simulations calculated a chronic mixing zone size as a rectangle with a width of 66 feet and a length of 44 feet centered on the diffuser for this permit issuance, which is smaller than the previously authorized mixing zone. The dilution factor for the chronic mixing zone is 21.2. Furthermore, an acute mixing zone size as a rectangle with a width of 62 feet and a length of 8 feet centered on the diffuser is established per 18 AAC 70.255. The dilution factor for the acute mixing zone is 4.2. As previously mentioned, all other pollutants authorized—at their respective maximum expected effluent concentrations—to exceed WQS within the authorized mixing zone have been modeled to verify achievement of WQS prior to reaching the boundaries of the chronic and acute mixing zones.

5.3.2 Technology: In accordance with 18 AAC 70.240(a)(3), the most effective technological and economical methods were used to disperse, treat, remove, and reduce pollutants. Wastewater operations at the WWTF generally exceed minimum treatment standards for wastewater stabilization lagoons found at 40 CFR § 133.105 as adopted by reference in 18 AAC 83.010 (e). The facility provides secondary treatment and disinfection through chlorination. The facility had two flow violations in the past five years. The complete treatment process is described in Fact Sheet Section 2.0. The Department has determined that the effluent will be treated to remove pollutants using methods to be the most effective and technologically and economically feasible, consistent with the highest statutory and regulatory requirements required in 18 AAC 70.240(a)(3).

5.3.3 Existing Use: In accordance with 18 AAC 70.245, the mixing zone has been appropriately sized to fully protect the existing uses of the Port of Valdez. Effluent monitoring results indicate that the discharge neither partially nor completely eliminates an existing use of the water body outside of the mixing zone. The residence time of any floating organism traveling through the chronic mixing zone is expected to be relatively short, with a potential exposure to diluted effluent for up to 19 seconds based on the current velocity. Exposure to acute concentrations of pollutants from the effluent in the mixing zone would be three seconds. Mixing zone modeling indicates that the flushing is adequate to ensure full protection of uses of the water body outside of the mixing zone. Results of recent WET testing indicate that toxicity does not exist at levels that might result in biological impairment or cause an effect or damage to the ecosystem that the Department considers so adverse that a mixing zone is not appropriate. DEC has determined that the existing uses and biological integrity of the water body will be maintained and fully protected under the terms of the permit as required at 18 AAC 70.245(a)(1-2), 18 AAC 70.250(a)(3), and 18 AAC 70.250(a)(4).

5.3.4 Human Consumption: Under the conditions of the permit, and in accordance with 18 AAC 70.250(b)(2) and (b)(3), the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption; nor can the discharge preclude or limit established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting. The CORMIX modeling suggests that the maximum expected effluent concentrations of pollutants will be diluted relatively rapidly within a small distance from the diffuser. DEC has determined that effluent monitoring results, application data, and available mixing zone modeling suggests that pollutants discharged will neither produce objectionable color, taste, or odor in harvested aquatic resources for human consumption nor preclude or limit fish and shellfish harvesting per 18 AAC 70.250(b)(2-3).

5.3.5 Spawning Areas: In accordance with 18 AAC 70.255(h), the mixing zones are not authorized in a spawning area for anadromous fish or resident fish spawning redds for chinook, coho, pink, chum and sockeye salmon. The Alaska Department of Fish and Game (ADF&G) anadromous waters interactive catalog[2] indicates that the outfall to the Port of Valdez is located in an area where fish are not known to spawn in the vicinity of the discharge location.

5.3.6 Human Health: The WWTF effluent contains small amounts of copper which is identified as bioaccumulative by EPA (USEPA 2000). However, there are not enough copper samples (three within the past five years and only two that were detectable by applicable laboratory methods) to determine whether the discharge exhibits reasonable potential to cause or contribute to an in-stream excursion above the numeric water quality criterion. Furthermore, the effluent is diluted relatively rapidly (Fact Sheet Section 5.3.1) and the copper samples that were detected were discharged at low concentrations. Therefore, DEC is requiring that the permittee monitor copper to make future determinations about reasonable potential, the need for WQBELs, and/or the need for a specific mixing zone authorization for copper. Sampling information submitted with the Form 2A application (and previous monitoring required by the permit) do not indicate that the discharge contains any other pollutants known to bioaccumulate, bioconcentrate, or persist above background levels. Similarly, these data suggest that the pollutants that could be expected to cause carcinogenic, mutagenic, or teratogenic effects, or otherwise present a risk to, human health are not present in the discharge. DEC has determined that the permit satisfies 18 AAC 70.250(a)(1)(A-C), 18 AAC 70.255(b-c), and 18 AAC 70.255(e)(3)(B) and that the level of treatment at the WWTF is protective of human health.

[2]"ADFG Fish Resource Monitor, Anadromous Waters Interactive Catalog," <http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.interactive>, accessed on September 4, 2014.

5.3.7 Aquatic Life and Wildlife: There are no known spawning areas for chum, coho, chinook, and pink salmon in the Port of Valdez. However, freshwater spawning locations have been documented in the Valdez area indicating that salmon pass through the discharge area on their way upstream to spawn. Reasonable potential analysis results suggest that pollutants will not be discharged at very high levels (Fact Sheet Section B.2.2), will require relatively small dilution factors, and will have a relatively short residence time in the mixing zones (Section 5.3.1). Furthermore, recent WET testing results do not exhibit toxicity even at 100% effluent concentrations (Fact Sheet Section 4.5). Due to these items and the long operational history of the WWTF, the Department determined that the mixing zones will not create a significant adverse effect to fish spawning or rearing, form a barrier to migratory species, fail to provide a zone of passage, result in undesirable or nuisance aquatic life, result in permanent or irreparable displacement of indigenous organisms, or result in reduction in fish population levels and that 18 AAC 70.250(a)(2)(A-C), 18 AAC 70.250(b)(1) and 18 AAC 70.255(g)(1-2) are met.

5.3.8 Acute Mixing Zone: An acute mixing zone is sized to prevent lethality to passing organisms, while a chronic mixing zone is sized to protect the ecology of the water body as a whole (18 AAC 70). According to EPA (USEPA 1991), lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one hour time period (18 AAC 70.255(d) – Alternative 4 in Section 5.1.2 of the EPA's Water Quality Standards Handbook, Second Edition, August 1994). Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one hour exposure is not to exceed the acute criterion (EPA 1991). Acute mixing zone sizes were calculated using CORMIX. The acute mixing zone modeling resulted in an acute mixing zone size of eight feet long by 62 feet wide. Mixing zone CORMIX modeling indicates that a drifting organism passing through the WWTF acute mixing zone will be exposed to acute concentrations for no longer than three seconds. Furthermore the mixing zone is not expected to cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zones. The Department determined that 18 AAC 70.255(b)(1-2) and 18 AAC 70.255 (d) to be met.

5.3.9 Endangered Species In accordance with 18 AAC 70.250(a)(2)(D), the authorized mixing zones will not cause an adverse effect on threatened or endangered species. The National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) indicated that no threatened or endangered species occur in the area, nor is the subject discharge and associated mixing zones in a proposed or designated critical habitat area. (See 9.1 of the Fact Sheet for additional details.)

6.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit."
18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued."
The effluent limitations in this permit reissuance are consistent with
18 AAC 83.430. The permit effluent limitations, standards, and conditions are as stringent as in the

previous permit. Furthermore, new monitoring requirements for total recoverable copper, enterococci bacteria, and WET have been included in this permit issuance.

7.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBEL may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the WQS (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation Policy.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these procedures and policy, the Department determines whether a water body, or portion of a water body, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska. The Port of Valdez is not listed as impaired on DEC's most recent *Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report*; therefore, a Tier 1 designation is not warranted. In addition, little other baseline receiving water data exists. Accordingly, this antidegradation analysis conservatively assumes that the discharge is to a Tier 2 water body.

The State's Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, (i.e. Tier 2 waters), that quality must be maintained and protected unless the Department, after receiving from the applicant all information reasonably necessary to make a decision, allows the reduction of water quality for a zone of deposit under 18 AAC 70.210 (September 2009), a mixing zone under 18 AAC 70.240 (July 2003), or another purpose as authorized in a Department permit, certification, or other approval. The Department may authorize a reduction of water quality only after the applicant submits information in support of the application, and the Department must make five findings. The five findings and the Department's determination are as follows:

1. **18 AAC 70.015 (a)(2)(A).** Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.

   The WWTF collects and treats wastewater from the City of Valdez. Wastewater is conveyed to the facility for treatment and disposal via 22 miles of separate sanitary sewer thereby reducing the risk to public health. Its continued operation is important to the public health and regional economy.

   As previously mentioned, the community of Valdez has been operating under the NPDES Program since 1975. The community's entire sewer infrastructure has been constructed and expanded over the years to drain to the community's treatment plant. Accordingly, any change in this configuration would come at a large cost to local taxpayers. Further, as previously mentioned, the Department has found that the facility routinely produces effluent quality that is better than required by the effluent limits of the previously issued NPDES permit. Based on the above, the Department finds that the lowering of water quality is necessary.

The Department concludes that the operation of the WWTF and the authorization of the discharge is necessary to accommodate the important economic and social development of the City of Valdez and that the finding is met.

2. **18 AAC 70.015 (a)(2)(B).** Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

   The permit reissuance application does not propose any changes that would likely result in wastewater of lower quality to be discharged than has been discharged under the previously issued NPDES permits for the WWTF. The WQS upon which the permit effluent limits are based, serve the specific purposes of protecting the existing and designated uses. The permit limits will ensure that water quality criteria will not be exceeded at or beyond the boundary of the chronic and acute mixing zones (See Section 5.3.1). A new acute mixing zone has been authorized, consistent with 18 AAC 70.255(b), to ensure no lethality to passing organisms occurs. Furthermore, the size of the chronic mixing zone is reduced from the proposed mixing zone in the 2004 proposed permit modifications. The acute and chronic mixing zones are specifically authorized in accordance with 18 AAC 70.240 – 18 AAC 70.270 and have been sized to ensure that all applicable water quality criteria are met at the boundary the mixing zones. Site-specific criteria as allowed by 18 AAC 70.235 have not been established for the Port of Valdez and are therefore not applicable. WET monitoring does not indicate that the discharge is toxic to freshwater organisms, however, WET monitoring is required using marine organisms during this permit issuance. As such, reducing water quality is not expected to violate the WET requirements in 18 AAC 70.030. Ongoing chronic toxicity monitoring is required during this permit cycle to validate this expectation.

   The Department concludes that the operation of the WWTF and the authorization of the discharge will not violate 18 AAC 70.020, 18 AAC 70.235, or 18 AAC 70.030 and that these findings are met.

3. **18 AAC 70.015(a)(2)(C).** The resulting water quality will be adequate to fully protect existing uses of the water.

   Fact Sheet Section 5.1 lists the use protections for the Port of Valdez. The water quality criteria, upon which the permit effluent limits are based, serve the specific purposes of protecting the existing and designated uses. Accordingly, the permit effluent limits restricting the discharge will ensure that water quality criteria will not be exceeded at the boundary of the mixing zones (See Fact Sheet Section 5.3.3).

   The Department finds that water quality will be adequate to fully protect the existing uses of the water and that this requirement has been met.

4. **18 AAC 70.015(a)(2)(D).** The methods of pollution prevention, control, and treatment found by the department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

   The methods of prevention, control, and treatment the Department finds to be most effective and reasonable are currently in use at the facility and include meeting secondary treatment (even with small revisions to the percent removal requirements for BOD_5 and TSS see Fact Sheet Section 4.2) and requirements for disinfecting the wastewater prior to discharge. The City has both a Quality Assurance Project Plan (QAPP) and Operations and Maintenance (O & M) Plan to

ensure protocol for discharging adequately treated wastewater is followed to the extent feasible. In addition, the permittee has installed chlorine disinfection at the end of the treatment process to reduce fecal coliform bacteria effluent concentrations.

The Department concludes that the most effective and reasonable methods of pollution prevention, control, and treatment will be applied and that the finding is met.

5. **18 AAC 70.015(a)(2)(E).** All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

   The applicable "highest salutatory and regulatory treatment requirements" are defined in 18 AAC 70.990(30) (as amended June 26, 2003) and in the Interim Antidegradation Implementation Methods. Accordingly, there are three parts to the definition, which are:

   - (A) any federal technology-based effluent limitation guidelines (ELG) identified in 40 CFR § 125.3 and 40 CFR § 122.29, as amended through August 15, 1997, adopted by reference at 18 AAC 83.010(c)(9).
   - (B) minimum treatment standards in 18 AAC 72.040; and
   - (C) any treatment requirement imposed under another state law that is more stringent than a requirement of this chapter.

   The first part of the definition includes all federal technology-based ELGs including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e), which are incorporated in this permit. (See Fact Sheet Section 4.2 for a discussion on the treatment requirements for the City of Valdez.)

   The second part of the definition 18 AAC 70.990(30)(B) (2003) appears to be in error, as 18 AAC 72.040 describes discharges to sewers and not minimum treatment. The correct reference appears to be the minimum treatment standards found at 18 AAC 72.050, which refers to domestic wastewater discharges only. The permit includes stipulations that meet the intent of 18 AAC 70.990.

   The third part of the definition includes any more stringent treatment required by state law, including 18 AAC 70 and 18 AAC 72. The Department concludes that all wastes and other substances discharged from the facility will be treated and controlled to achieve the highest statutory and regulatory requirements and finds that this requirement is met.

   After review of the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge from the existing point source meets the highest applicable statutory and regulatory requirements and that this finding is met.

8.0 OTHER PERMIT CONDITIONS

8.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update the Quality Assurance Project Plan (QAPP) within 180 days of the effective date of the final permit. Additionally, the permittee must submit written notification to the Department within 180 days of the effective date of the permit stating that the plan has been implemented within the required time frame. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; and data reporting. The plan shall be retained on site and made available to the Department upon request.

8.2 Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop or update and implement an operation and maintenance plan for its facility within 180 days of the effective date of the final permit. The permittee is required to provide written notification to DEC that the operation and maintenance plan has been updated and implemented within 180 days of the effective date of the final permit. The plan shall be retained on site and made available to the Department upon request.

8.3 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

8.4 Facility Plan

The permittee is required to develop a Facility Plan evaluating the WWTF's existing condition and identifying near-and long-term needs and potential improvements if the WWTF's average annual value exceeds 85% of 1.5 mgd average flow rate. The Facility Plan must include the permittee's strategy for continuing to maintain compliance with effluent limits. The Facility Plan must be made available to the Department upon request.

9.0 OTHER LEGAL REQUIREMENTS

9.1 Ocean Discharge Criteria

Section 403(a) of the CWA, Ocean Discharge Criteria, prohibits the issuance of a permit under Section 402 of the CWA for a discharge into the territorial sea, the water of the contiguous zone, or the oceans except in compliance with Section 403. Permits for discharges seaward of the baseline of the territorial seas must comply with the requirements of Section 403, which include complying with Ocean Discharge Criteria Evaluation (ODCE) regulations.

An interactive map depicting Alaska's baseline plus additional boundary lines is available at http://www.charts.noaa.gov/OnLineViewer/AlaskaViewerTable.shtml. The map is provided for informational purposes only. The U.S. Baseline committee makes the official determinations on baseline.

A review of the baseline line maps revealed that the Valdez WWTP outfall terminus is positioned landward of the baseline of the territorial sea; therefore, Section 403 of the CWA does not apply to the permit, and further review of ODCE requirements is not warranted for this permit reissuance.

9.2 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with NMFS and USFWS if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions; however, DEC voluntarily contacted the agencies to notify them of this permit issuance and to obtain listing of threatened and endangered species near the proposed discharge.

On February 13, 2014, DEC attempted to contact USFWS and NOAA via email regarding the information previously sent regarding Threatened and Endangered Species under the ESA and the revised location of the facility's outfall. USFWS replied with a link to the USFWS Information, Planning, and Conservation System. Details about the Valdez WWTP were entered (including discharge volume and discharge location) and a report was generated that indicates that no threatened or endangered species are listed nor are there any critical habitats within the area (USFWS 2014).

9.3 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH.

The Department accessed EFH information via use of NOAA's Habitat Conservation Interactive EFH Mapper located at: http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html. The Data Query Tool was used for the Port of Valdez, near the Valdez WWTP outfall location. This tool indicated that no Habitat Areas of Particular Concern nor EFH areas protected from fishing were identified at the location.

9.4 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

9.4.1 State Requirements

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's Solid Waste Program web page for more information and who to contact.

9.4.2 Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [see also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:

> U.S. Environmental Protection Agency, Region 10, NPDES Permits Unit OWW-130, Attention: Biosolids Contact, 1200 Sixth Avenue, Suite 900, Seattle, WA 98101-3140. The EPA Region 10 telephone number is 1-800-424-4372.

Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

9.5 Permit Expiration

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

10.0 References

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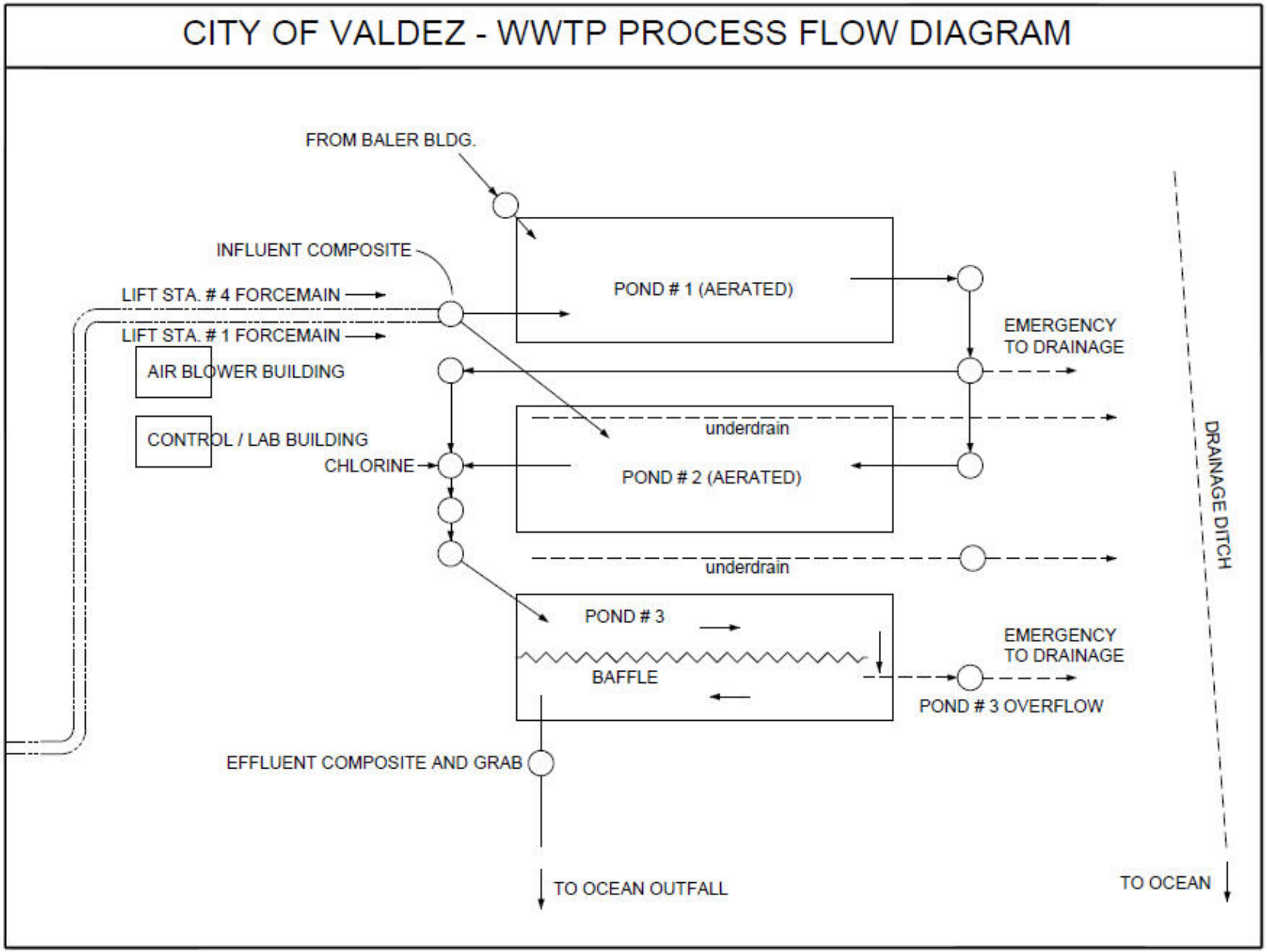
USFWS, 2014. "List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project." Consultation Tracking Number: 07CAAN00-2014-SLI-0133. September 04, 2014.

Water Pollution Control Federation. 1976. Chlorination of Wastewater, Manual of Practice No. 4. Moore & Moore, Washington D.C.

APPENDIX A. FACILITY INFORMATION

Figure 1: Valdez WWTP Map

Figure 2: Valdez WWTP Process Flow Diagram



APPENDIX B. BASIS FOR EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limits. The Alaska Department of Environment Conservation (DEC or the Department) may find, by analyzing the effect of an effluent discharge on the receiving water body, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards (WQS). In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBEL), which are designed to ensure that the WQS of the receiving water body are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Limits have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW (e.g., industrial facilities, as well as residential areas discharge into the POTW). When technology-based effluent limits (TBEL) do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a WQS for the water body. If a pollutant causes or contributes to an exceedance of a WQS, a WQBEL for the pollutant must be established in the permit.

B.1 Secondary Treatment Effluent Limitations

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The Department has adopted the "secondary treatment" effluent limits, which are found in 40 CFR §133.102. The TBEL apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133, the State of Alaska requires maximum daily limits of 60 mg/L for BOD_5 and TSS in its own secondary treatment regulations (18 AAC 72.990). The secondary treatment effluent limits are listed in Table B-1.

The previous NPDES permit for the City of Valdez—issued by the Environmental Protection Agency (EPA)—applied less stringent percent removal requirements for BOD_5 and TSS during the months of October through May due to the treatment works receiving less concentrated wastes from the separate sewer system in accordance with 40 CFR § 133.103(d). The percent removal requirements for BOD_5 during these months was revised to 80 percent removal. Similarly, the percent removal requirements for TSS for these months were revised to 75 percent removal. The EPA's rationale for revising the percent removal requirements during these months was as follows:

> "Historical data for the treatment plant indicate that during periods of low influent BOD concentrations, the facility has difficulty achieving BOD removal requirements in spite of consistently achieving BOD effluent concentration limits. The City has attributed the low influent BOD concentrations to customer freeze protection and Inflow and Infiltration (I/I). Customers run their water continuously during cold winter months to prevent freezing of pipes.
>
> In accordance with 40 CFR § 133.103 (d), treatment works that receive less concentrated wastes from separate sewer systems can qualify to have their percent removal limit reduced provided that all of the following are met: 1) the facility can

consistently meet its permit effluent concentration limits but cannot meet its percent removal limits because of less concentrated effluent water 2) the facility would have been required to meet significantly more stringent limitation than would otherwise be required by the concentration-based standards and 3) the less concentrated effluent is not the result of excessive inflow/infiltration (I/I).

40 CFR § 133.103 (e) and 40 CFR § 35.2005 (b)(16) (28) and (29) provide definitions and criteria of excessive I/I. Excessive I/I is the I/I which can be economically eliminated from a sewer system as determined in a cost-effectiveness analysis that compares the costs for correcting the I/I conditions to the total costs for transportation and treatment of the I/I. Inflow is not excessive if the total flow to the POTW during a storm event does not exceed 275 gallons per capita per day.

The permittee has not met the criterion that the total flow to the POTW be less than 275 gallons per capita per day during a storm event. Based on a service area population of 4,000, this criterion would require a flow of less than 1.1 (million gallons per day) mgd during storm events. Both the maximum daily flow and the average monthly flow have exceeded 1.1 mgd, indicating that the system may have excessive I/I. However, the City has provided documentation of their efforts to reduce I/I in their system. In 1981, the City began investigating and repairing/rehabilitating sources of I/I. The City has an annual budget for its I/I reduction program. The EPA considers this work sufficient evidence that the City has eliminated the I/I that could be economically eliminated from the system. Therefore, the BOD percent removal requirement has been reduced to 80% during periods of low influent BOD concentrations (October 1 through May 31). The City should continue its efforts to reduce I/I."

DEC has reviewed monitoring results from November 2008 until November 2013 for BOD_5 and TSS from the City of Valdez. Monitoring results reported on the discharge monitoring reports indicate that the Valdez Wastewater Treatment Facility (WWTF) is consistently meeting effluent concentration limits for these parameters. Furthermore, there was only one month in the previous five years where the secondary standard 85 percent removal requirement for TSS was not met. All other months achieved greater than 85 percent removal of TSS; therefore, DEC is revising the seasonal TSS requirement for TSS percent removal to match the secondary treatment minimum percent removal of 85 percent for TSS year round. The WWTF does not consistently meet the minimum 85 percent removal requirement for BOD_5 during the months from October to May despite meeting the effluent concentration requirements. Low influent BOD_5 can still be attributed to customer freeze protection when customers run their water during these months to avoid freezing pipes.

The City continues to implement an I/I reduction program which includes an annual budget to reduce I/I. DEC has maintained the 80% removal rate for BOD_5 during periods of low influent BOD_5 concentrations (October 1 through May 31) from the previous permit. The City has an active plan to continue to reduce I/I.

Table B- 1: Effluent Limits

Parameter	Monthly Average	Weekly Average	Daily Maximum	Range
BOD_5	30 mg/L [a]	45 mg/L	60 mg/L	---
TSS	30 mg/L	45 mg/L	60 mg/L	---
Removal Rates for BOD_5 and TSS (June 1 – September 30)	85% (minimum)	---	---	---
Removal Rates for BOD_5 (October1 – May 31)	80% (minimum)			
pH	---	---	---	6.0 – 9.0 SU [b]

a. Milligrams per liter
b. Standard units

B.1.1 pH

40 CFR §133.102 as adopted by reference at 18 AAC 83.010(e) requires POTWs to meet an effluent range for pH of 6.0 – 9.0.

B.1.2 Mass-Based Limitations

The regulation at 18 AAC 83.540 requires that effluent limits be expressed in terms of mass, if possible. The regulation at 18 AAC 83.520 requires that effluent limits for a POTW be calculated based on the design flow of the facility. For this facility, the average monthly design flow is 1.5 mgd. The mass based limits are expressed in pounds per day (lbs/day) and are calculated as follows:

$$\text{Mass based limit}\left(\frac{\text{lb}}{\text{day}}\right) = \text{ concentration limit}\left(\frac{\text{mg}}{\text{L}}\right) \times 1.5\ (\text{mgd}) \times 8.341^{3}$$

[3] 8.341 is a conversion factor with units: $\frac{(lb \times L)}{(mg \times gallon \times 10^6)}$

Table B- 2: Mass-Based Effluent Limits

Parameter	Monthly Average	Weekly Average	Daily Maximum
BOD_5 (lb/day)	375	563	751
TSS (lb/day)	375	563	751
Total Residual Chlorine (lb/day)	0.4	N/A	0.9

B.2 Water Quality – Based Effluent Limitations

B.2.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS.
18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements. The regulations require the permitting authority to make this evaluation using procedures that 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 body. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

B.2.2 Reasonable Potential Analysis

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving water body concentration for each pollutant of concern down current of where the effluent enters the receiving water body. The chemical-specific concentration of the effluent and receiving water body and, if appropriate, the dilution available from the receiving water body, are factors used to project the receiving water body concentration. If the projected concentration of the receiving water body exceeds the numeric criterion for a limited parameter, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a WQBEL must be developed.

According to 18 AAC 70.990(38), a mixing zone is an area in a water body surrounding, or downstream of, a discharge where the effluent plume is diluted by the receiving water within which specified water quality criteria may be exceeded. Water quality criteria and limits may be exceeded within a mixing zone. A mixing zone can be authorized only when adequate receiving water body flow exists, and the concentration of the pollutant of concern in the receiving water body is below the numeric criterion necessary to protect the designated uses of the water body.

The Department evaluated ammonia and total residual chlorine for reasonable potential using the APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide (APDES, RPA Guide, DEC 2014). Copper was detected twice out of three sample results, however more information is required to make a permit effluent limit decision regarding copper, therefore the Department (in accordance with Section 2.4.1 of the APDES RPA Guide) is requiring the permittee to sample copper on a quarterly basis to establish a baseline data set. The reasonable potential analysis did not indicate that ammonia or total residual chlorine would cause or

contribute to an exceedance above a numeric criterion at or beyond the boundary of the authorized mixing zones.

B.2.3 Specific Water Quality-Based Effluent Limits

B.2.3.1 Toxic Substances

The WQS for toxic and other deleterious organic and inorganic substances for marine water uses are codified in 18 AAC 70.020(b)(23). Individual criteria are summarized in the Department's, *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008 (Toxics Manual).

As discussed in Section B.2.2 of the fact sheet, the Department evaluated ammonia and total residual chlorine to determine if there was reasonable potential for to exceed water quality criteria in the receiving water body. Table B-3 presents the water quality criteria for ammonia and total residual chlorine.

The reasonable potential analyses did not show a reasonable potential to exceed WQS at or beyond the boundary of the mixing zones. A summary of the reasonable potential analysis is provided in Appendix C.

Table B- 3: Water Quality Criteria

Parameter		Criterion (µg/L)
Ammonia	Acute	5,780
	Chronic	3,730
Total Residual Chlorine	Acute	13
	Chronic	7.5

B.2.3.2 Dissolved Oxygen

The criteria for agricultural water supply are the most stringent standards for dissolved oxygen (DO). The standards at 18 AAC 70.020(b)(15)(A)(i) require that "DO may not be reduced below 4 mg/L at any point beneath the surface. DO concentrations in estuaries and tidal tributaries may not be less than 5.0 mg/L except where natural conditions cause this value to be depressed. In no case may DO levels exceed 17 mg/L. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection." The Department reviewed 521 DO effluent results for the WWTF. The DO concentration ranged between 5.08 mg/L and 16.89 mg/L and averaged 9.06 mg/L. The previous permit contained DO effluent limits of 2.0 mg/L to 17.0 mg/L therefore the Department has retained those limits and included DO in the mixing zone authorization.

B.2.3.3 Fecal Coliform Bacteria

The criteria at 18 AAC 70.020(b)(14) for waters designated for use as harvesting for consumption of raw mollusks or other raw aquatic life purposes are the most stringent criteria for fecal coliform bacteria. The criteria require that the fecal coliform median most probable number may not exceed 14 fecal coliform units/100 mL, and not more than 10% of the total samples may exceed 43 fecal coliform units/100 mL. This permit has retained the average monthly limit of 200 FC/100 mL, the average weekly limit of 400 FC/100 mL,

and the maximum daily limit of 800 FC/100 mL from the previous permit. Furthermore, the definition of disinfection at 18 AAC 72.990(21)(A-B) defines disinfection as a treatment "designed to eliminate pathogenic organisms…producing…an arithmetic mean for…samples collected in 30 consecutive days that does not exceed 200 (FC/100 mL) and an arithmetic mean…for effluent samples collected in seven consecutive days that does not exceed 400 (FC/100 mL)."

B.2.3.4 Total Residual Chlorine

The most stringent state water quality criteria for total residual chlorine to protect designated uses requires that concentrations may not exceed 13 µg/L for acute aquatic life and 7.5 µg/L for chronic aquatic life [Toxics Manual]. The Department has authorized an acute mixing zone with a dilution factor of 4.2 for meeting acute chlorine criteria. Similarly, the Department has authorized a chronic mixing zone with a dilution factor of 18.5 for meeting chronic chlorine criteria. The reasonable potential analysis in Appendix C, takes into account these dilution factors. Based on the water quality criteria of 13 µg/L for protection from acute effects on aquatic life and 7.5 µg/L for protection from chronic effects on aquatic life and on a maximum projected effluent concentration of 50 µg/L, the reasonable potential analysis indicates that total residual chlorine does not have reasonable potential to violate WQS at the boundary of the authorized mixing zones.

The WWTF, as well as many municipal wastewater plants, use chlorine to disinfect wastewater prior to discharge. A 0.5 mg/L average monthly limitation for chlorine is 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 (TRC) is maintained after 15 minutes of contact time. Therefore, a wastewater treatment plant that provides adequate chlorine contact time can meet a 0.5 mg/L total residual chlorine limitation on a monthly average basis.

B.2.3.5 *pH*

The criteria for water supply, aquaculture, and growth and propagation of fish, shellfish, other aquatic life, and wildlife are the most stringent standards for pH. These standards at 18 AAC 70.020(b)(18) state that marine waters, "May not be less than 6.5 or greater than 8.5 SU."

B.2.3.6 Floating, Suspended, or Submerged Matter, including Oil and Grease

The water quality criteria for floating, suspended or submerged matter, including oil and grease, are narrative. The most stringent standard, found at 18 AAC 70.020(b)(8)(A)(i), require that fresh waters, "may not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the receiving of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the receiving of the water, within the water column, on the bottom, or upon adjoining shorelines."

B.2.3.7 Ammonia

Ammonia criteria were determined using the *Reasonable Potential Analysis and Water Quality-Based Effluent Limits Calculation Tool* for marine waters at 20 g/kg salinity, temperature of 10° C, and a pH of 8.0 SU.

B.2.4 Selection of Most Stringent Limitations

B.2.4.1 BOD_5 and Total Suspended Solids

The permit proposes technology-based effluent limitations for BOD_5 and TSS.

B.2.4.2 TRC

The previous permit included a more stringent monthly average concentration limit for TRC 0.03 mg/L and maximum daily limit of 0.07 mg/L, therefore DEC is retaining the previous effluent limits for TRC. Furthermore, the previous permit included mass-based limits for TRC. The monthly average of 0.4 lbs/day and maximum daily limit of 0.9 lbs/day are included in this permit issuance.

B.2.4.3 pH

The current pH limit between 6.5 SU and 8.5 SU are identical to the more stringent WQBELs and shall apply at the end-of-pipe.

Table B- 4: Selection of pH Permit Limits

	Minimum Daily (SU)	Maximum Daily (SU)
Technology Based Limits	6.0	9.0
Water Quality-Based Limits	6.5	8.5
Selected Limits	6.5	8.5

APPENDIX C. REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (DEC or the Department) used to determine if the discharge authorized in the permit has the reasonable potential to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (EPA, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System (APDES) Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 2014) to determine the reasonable potential for any pollutant to exceed a water quality criterion.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria (WQC) for a given pollutant, the Department compares the maximum projected receiving water body concentration to the criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving water body concentration exceeds the criteria, and a water quality-based effluent limit must be included in the permit (18 AAC 83.435). This section discusses how the maximum projected receiving water body concentration is determined.

C.1 Mass Balance

The maximum projected receiving water body concentration is determined using the following mass balance equation:

$$C_d = \frac{C_e - C_u}{D_{a,c}} + C_u \qquad \text{(Equation C-1)}$$

where,

C_d = Receiving water body concentration down current of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = 85th percentile measured receiving water body ambient concentration (or if that information is not available, 15% of the most stringent WQC).

$D_{a,c}$ = Acute and/or chronic dilution factor (e.g. for this discharge, the acute dilution factor is 4.2 and the chronic dilution factor is 21.2)

C.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in Section 3.3 of the TSD, "Determining the Need for Permit Limits with Effluent Monitoring Data." In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving water body concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum reported effluent concentration by a "reasonable potential multiplier" (RPM). The RPM is the ratio of the 99th percentile concentration to the maximum reported effluent concentration and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD recommends making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability.

Using the equations in Section 3.3.2 of the TSD, the RPM for ammonia is calculated as follows.

The percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - confidence\ level)^{1/n} \qquad \text{(Equation C-2)}$$

Where,

p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 95% = 0.95

The data set contains 82 ammonia effluent samples, therefore:

$$p_{82} = (1 - 0.95)^{1/82}$$

$$p_{82} = 0.9641$$

This means that we can say, with 95% confidence that the maximum reported effluent ammonia concentration is greater than the 94th percentile.

The RPM is the ratio of the 99th percentile concentration (at the 95% confidence level) to the maximum reported effluent concentration. This is calculated as follows:

$$RPM = \frac{C_{99}}{C_{p_n}} = \frac{e^{(z_{99}\hat{\sigma}_y - 0.5\hat{\sigma}_y^2)}}{e^{(z_{p_n}\hat{\sigma}_y - 0.5\hat{\sigma}_y^2)}} \qquad \text{(Equation C-3)}$$

Where,

z_{99} = the inverse of the normal cumulative distribution function at the 99th percentile = 2.326

z_{pn} = the z-statistic at the 95 percent confidence level = $(1 - 0.95)^{(1/n)}$

$\hat{\sigma}_y$ = the lognormal standard deviation

$\hat{\sigma}_y^2$ = the lognormal variance (square of the lognormal standard deviation)

In the case of ammonia:

$\hat{\sigma}_y = 0.394$

$\hat{\sigma}_y^2 = 0.155$

$z_{99} = 2.326$ for the 99th percentile

$z_{96.41} = 1.800$ for the 96.41 percentile (from z-table)

$C_{99} = \exp(2.326 \times 0.394 - 0.5 \times 0.155) = 2.3138$

$C_{96.41} = \exp(1.800 \times 0.394 - 0.5 \times 0.155) = 1.8808$

$RPM = C_{99}/C_{96.41} = 2.3138/1.8808$

RPM = 1.2302

The maximum projected effluent concentration is determined by multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM) \times (MRC) \quad \text{(Equation C-4)}$$

Where,

MRC = Maximum Reported Concentration

In the case of ammonia,

C_e = (1.2302)(25 mg/L) = 30.75 mg/L (maximum projected effluent concentration)

Receiving water concentration,

$$C_d = \frac{C_e - C_u}{D_{a,c}} + C_u$$

C_e = 30.75 mg/L

C_u = 0.255 (in this case ambient data for ammonia are not available so Cu becomes 15% of the most stringent WQC: chronic = 1.7 mg/L. 15% of 1.7 = 0.255)

D_a = 4.2

D_c = 21.2

Acute C_d = ((30.75 – 0.255)/4.2) + 0.255 = 7.5157

Chronic C_d = ((30.75 – 0.255)/21.2) + 0.255 = 1.6934

Comparison with ambient criteria for ammonia

In order to determine if reasonable potential exists for this discharge to violate the ambient criteria, the highest projected concentrations at the boundary of the mixing zone are compared with the ambient criteria.

Acute	7.5157 mg/L < 11.5 mg/L (acute criteria)	**NO**, there is not a reasonable potential to violate
Chronic:	1.6934 mg/L < 1.70 mg/L (chronic criteria)	**NO**, there is not a reasonable potential to violate

Since there is no reasonable potential for the effluent to cause an exceedance of chronic WQC for protection of aquatic life, a water quality-based effluent limit for ammonia is not required.

C.3 Upstream (Ambient) Concentration of Pollutant

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration outside the influence of the facility's discharge. For criteria that are expressed as maxima (such as ammonia and chlorine), the 95th percentile of the ambient data is generally used as an estimate of the worst-case. No ammonia or chlorine concentrations were available from the ambient receiving water monitoring conducted by the facility, or from any USGS gages. Thus, it was assumed that ambient concentrations of ammonia and chlorine were 15% of the most stringent water quality criteria. These values were used in the reasonable potential analyses.

Table C-1 summarizes the data, multipliers, and criteria used to determine reasonable potential to exceed criteria. Table C-2 shows the comparison of the maximum projected effluent concentrations for the acute and chronic mixing zones to their respective criteria. The most stringent criterion is the lower of the acute and the chronic criteria.

Table C- 1: Reasonable Potential Calculations

Parameter (µg/L)	Max. Reported Effluent Conc.	Number of Samples	CV	RPM	Max Projected Effluent Conc. (C_e)	Ambient Conc. (C_u)	Projected Down Current Conc. [a] (C_d)
Total Residual Chlorine	50	521	0.45	1	50	1.125	3.43
Total Ammonia as Nitrogen	25,000	82	0.41	1.23	30,750	255	1,690

Note:

a. Projected down current concentrations were calculated using the chronic mixing zone dilution factor of 21.2.

Table C- 2: Reasonable Potential Determination

Parameter (µg/L)	Max Projected Effluent Conc. (C_e), µg/L	Effluent Flow (Q_e), mgd	Ambient Conc. (C_u), µg/L	Dilution Ratio (D)	Maximum Conc. at Boundary of Mixing Zone (C_d)	Criterion (µg/L) (Aquatic Life Marine Water total recoverable)	Does C_d exceed criteria?
Total Residual Chlorine (chronic)	50	1.5	1.125	21.2	3.43	7.5	No
Total Residual Chlorine (acute)	50	1.5	1.125	4.2	12.76	13	No
Total Ammonia as N (chronic)	30,750	1.5	255	21.2	1,693	1,700	No
Total Ammonia as N, (acute)	30,750	1.5	255	4.2	7,516	11,500	No

APPENDIX D. MIXING ZONE ANALYSIS CHECKLIST

Mixing Zone Authorization Checklist

based on Alaska Water Quality Standards (2003)

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 through 18 AAC 70.270 are satisfied, as well as provide justification to authorize a mixing zone in an APDES permit. In order to authorize a mixing zone, all criteria must be met. The permit writer must document all conclusions in the permit Fact Sheet; however, if the permit writer determines that one criterion cannot be met, then a mixing zone is prohibited, and the permit writer need not include in the Fact Sheet the conclusions for when other criteria were met.

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Size	Is the mixing zone as small as practicable? - Applicant collects and submits water quality ambient data for the discharge and receiving water body (e.g. flow and flushing rates) - Permit writer performs modeling exercise and documents analysis in Fact Sheet at: ►APPENDIX C **Error! Reference source not found.** ►Section 5.3 Mixing Zone Analysis - describe what was done to reduce size.	•Technical Support Document for Water Quality Based Toxics Control •Fact Sheet, Appendix C •Fact Sheet, Appendix D • DEC's RPA Guidance • EPA Permit Writers' Manual Fact Sheet, Section 5.3.1	18 AAC 70.240 (a)(2) 18 AAC 70.245 (b)(1) - (b)(7) 18 AAC 70.255(e) (3) 18 AAC 70.255 (d)	Y
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **If yes**, describe methods used in Fact Sheet at Section 5.3 Mixing Zone Analysis. Attach additional documents if necessary.	Fact Sheet, Section 5.3.2	18 AAC 70.240 (a)(3)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
Low Flow Design	**For river, streams, and other flowing fresh waters.**	N/A	18 AAC 70.255(f)	N/A
Existing use	Does the mixing zone…			
	(1) partially or completely eliminate an existing use of the water body outside the mixing zone? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.3	18 AAC 70.245(a)(1)	Y
	(2) impair overall biological integrity of the water body? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.3	18 AAC 70.245(a)(2)	Y
	(3) provide for adequate flushing of the water body to ensure full protection of uses of the water body outside the proposed mixing zone? **If no, then mixing zone prohibited.**	YES, Fact Sheet Section 5.3.3	18 AAC 70.250(a)(3)	Y
	(4) cause an environmental effect or damage to the ecosystem that the department considers to be so adverse that a mixing zone is not appropriate? **If yes, then mixing zone prohibited.**	NO, Fact Sheet Section 5.3.3	18 AAC 70.250(a)(4)	Y
Human consumption	Does the mixing zone…			
	(1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption?	NO, Fact Sheet Section 5.3.4	18 AAC 70.250(b)(2)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	If yes, mixing zone may be reduced in size or prohibited.			
	(2) preclude or limit established processing activities of commercial, sport, personal use, or subsistence shellfish harvesting? **If yes, mixing zone may be reduced in size or prohibited.**	NO, Fact Sheet Section 5.3.4	18 AAC 70.250(b)(3)	Y
Spawning Areas	Does the mixing zone…			
	(1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye salmon? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.5	18 AAC 70.255 (h)	Y
Human Health	Does the mixing zone…			
	(1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.6	18 AAC 70.250 (a)(1)	Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(2) contain chemicals expected to cause carcinogenic, mutagenic, tetragenic, or otherwise harmful effects to human health? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.6		Y
	(3) Create a public health hazard through encroachment on water supply or through contact recreation? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.6	18 AAC 70.250(a)(1)(C)	Y
	(4) meet human health and aquatic life quality criteria at the boundary of the mixing zone? **If no, mixing zone prohibited.**	YES, Fact Sheet Section 5.3.6	18 AAC 70.255 (b),(c)	Y
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.6	18 AAC 70.255(e)(3)(B)	Y
Aquatic Life	Does the mixing zone…			
	(1) create a significant adverse effect to anadromous, resident, or shellfish spawning or rearing? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7	18 AAC 70.250(a)(2)(A-C)	Y
	(2) form a barrier to migratory species? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7		Y
	(3) fail to provide a zone of passage? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7		Y

Criteria	Description	Resources	Regulation	MZ Approved Y/N
	(4) result in undesirable or nuisance aquatic life? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7	18 AAC 70.250(b)(1)	Y
	(5) result in permanent or irreparable displacement of indigenous organisms? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7	18 AAC 70.255(g)(1)	Y
	(6) result in a reduction in fish or shellfish population levels? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.7	18 AAC 70.255(g)(2)	Y
	(7) prevent lethality to passing organisms by reducing the size of the acute zone? **If no, mixing zone prohibited.**	YES, Fact Sheet Section 5.3.8	18 AAC 70.255(b)(1)	Y
	(8) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **If yes, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.8	18 AAC 70.255(b)(2)	Y
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone?If yes, are there likely to be adverse effects to T/E spp based on comments received from USFWS or NOAA. If yes, will conservation measures be included in the permit to avoid adverse effects? **If yes, explain conservation measures in Fact Sheet. If no, mixing zone prohibited.**	NO, Fact Sheet Section 5.3.9	Program Description, 6.4.1 #5 18 AAC 70.250(a)(2)(D)	Y