Fact Sheet

The U.S. Environmental Protection Agency (EPA)

Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

United States Department of the Navy

Naval Base Kitsap Bangor

Public Comment Start Date: February 14, 2023

Public Comment Expiration Date: March 16, 2023

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EPA Proposes to Reissue the NPDES Permit

EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant 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.

This Fact Sheet (FS) includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

CWA § 401 Certification

EPA is requesting that the Washington State Department of Ecology provide a CWA Certification of the permit for this facility under CWA § 401. Comments regarding Ecology's intent to certify the permit should be directed to Angela Zeigenfuse at azei461@ECY.WA.GOV.

CWA § 401(a)(2) Review

Section 401(a)(2) of the CWA requires that, upon receipt of an application and state certification pursuant to Section 401(a)(1), EPA as the permitting authority, shall notify a neighboring State or Tribe with Treatment as a State (TAS) when EPA determines that the discharge may affect the quality of the neighboring State/tribe's waters (33 U.S.C. 1341(a)(2)).

Once EPA obtains the final certification from Ecology, EPA will determine whether the discharge may affect a neighboring jurisdiction's waters. 33 U.S.C. § 1341(a)(2).

PUBLIC COMMENT

We request that all comments on EPA's draft permits or requests for a public hearing be submitted via email to Brian Nickel (Nickel.Brian@epa.gov). If you are unable to submit comments via email, please call (206) 553-6251.

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

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Water Division will make a final decision regarding permit issuance. 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 substantive comments are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

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 at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at:

https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program

US EPA Region 10
1200 Sixth Avenue, Suite 155
Mail Code: 19-C04
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The draft Administrative Record for this action contains any documents listed in the References section. The Administrative Record or documents from it are available electronically upon request by contacting Brian Nickel.

For technical questions regarding the Fact Sheet, contact Brian Nickel at (206) 553-6251 or Nickel.Brian@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at (206) 553-0523.

The fact sheet and draft permits are also available at:

Kitsap Regional Library, Silverdale
3650 NW Anderson Hill Rd
Silverdale, WA 98383
(360) 447-5470

Kitsap Regional Library, Poulsbo
700 NE Lincoln Rd
Poulsbo, WA 98370
(360) 447-5450

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Acronyms

AML	Average Monthly Limit
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BMP	Best Management Practices
BPT	Best Practicable
°C	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
ECHO	Enforcement and Compliance History Online
EFH	Essential Fish Habitat
EIM	Environmental Information Management
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
gpd	Gallons per day
mg/L	Milligrams per liter
mL	Milliliters
ML	Minimum Level
µg/L	Micrograms per liter
MDL	Maximum Daily Limit or Method Detection Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
SPCC	Spill Prevention and Control and Countermeasure
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey

WD	Water Division
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards

I. Background Information

A. GENERAL INFORMATION

This fact sheet provides information on the draft NPDES permit for the following entity:

Table 1: General Facility Information

NPDES Permit #:	WA0025577
Applicant:	United States Department of the Navy Naval Base Kitsap Bangor
Type of Ownership	Federal
Physical Address:	7001 Finback Circle Silverdale, WA 98315
Mailing Address:	7001 Finback Circle, Room E300 Silverdale, WA 98315
Facility Contact:	Carol MacKenzie
Facility Location:	47.722104°N 122.736846°W
Receiving Water	Hood Canal
Outfall 001	47.743333°N 122.730833°W
Outfall 002	47.743333°N 122.730833°W

B. PERMIT HISTORY

The most recent NPDES permit for Naval Base Kitsap Bangor (NBK Bangor) was issued on July 22, 2010, became effective on September 1, 2010, and expired on August 31, 2015. An NPDES application for permit issuance was submitted by the permittee on March 2, 2015. EPA determined that the application was timely and complete. Therefore, pursuant to Title 40 Code of Federal Regulations (CFR) 122.6, the permit has been administratively continued and remains fully effective and enforceable.

C. TRIBAL CONSULTATION

EPA is offering government-to-government consultation with the Jamestown S'Klallam, Port Gamble S'Klallam, and Skokomish Tribes. EPA has also shared preliminary drafts of the permit and fact sheet with these tribes for their review and comment on July 12, 2022 and again on December 19, 2022. EPA held a staff-level meeting with the Jamestown S'Klallam and Port Gamble S'Klallam tribes on September 20, 2022. EPA has considered the tribes' feedback in developing the draft permit.

II. Facility Information

A. GENERAL FACILITY INFORMATION

The United States Department of the Navy (Navy) owns and operates NBK Bangor located in Silverdale, WA. The draft permit proposes to authorize the discharge of pollutants from the Intermediate Maintenance Facility at NBK Bangor. NBK Bangor is located on the western side of the Kitsap Peninsula, on Hood Canal, north of Silverdale, WA (west of Seattle). This facility's mission is to support the TRIDENT missile system. As part of this support, the facility performs repairs and renovations on Navy submarines. These operations are the subject of this NPDES permit. The focus of the permit is on the drydock (or graving dock) area and wastewater generated during such operations.

The drydock, properly known as a graving dock, is a narrow concrete basin, closed by gates or by a caisson, into which a vessel may be floated and the water pumped out, leaving the vessel supported on blocks. The keel blocks as well as the bilge block are placed on the floor of the dock in accordance with the "docking plan" of the ship. Vessels are in drydock at Bangor for approximately one month at a time and there are typically only a few days between taking a vessel out of drydock and putting another one in drydock. The drydock is 90 feet wide x 690 feet long x 63 feet deep and is situated 43 feet below MLLW (Mean Lower Low Water). Repairs in the graving dock take place below the surface level of Hood Canal. Submarines are floated into the dock, then the tide gates are shut and the water is pumped out to create a dry work environment.

When maintenance of a submarine is complete, and Hood Canal water is allowed to enter the drydock to float the vessel, the water which flows over the vessel and drydock surfaces is referred to as drydock floodwater. The discharge of drydock floodwater via the caisson opening (Outfall 002) is specifically authorized and regulated by the proposed NPDES permit.

Non-contact cooling water is discharged through outfall 001 and dry dock flood water is discharged through the caisson opening, which is outfall 002. Nuclear reactor coolant is not discharged to surface water; it is treated and reused on ships or evaporated (Navy, 2022). A schematic of the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A. This is an NPDES minor facility.

1. Discharges Not Covered by this Permit

   a. Upland Stormwater

   Coverage under the NPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP), WAR05F004, authorizes discharges of industrial stormwater from upland areas.

   b. Caisson Ballast Water and Drydock Dewatering Water

   The caisson is a rectangular shaped structure used as a gate to prevent Hood Canal water from entering the drydock. Starting with an empty drydock, Hood Canal water is allowed to enter in a controlled manner. When the water level in the drydock is equivalent to that in Hood Canal, and a vessel is in place in the drydock, the caisson is closed to block Hood Canal water from entering and large dewatering pumps remove the water and discharge it back to Hood Canal. Discharges of ballast water from the caisson and drydock dewatering water are returning ambient water uncontaminated back to Hood Canal. These discharges do not need to be covered under a NPDES permit because they do not add pollutants to waters of the U.S. If the Navy were to change their operations such that pollutants are added to this discharge, then NPDES permit coverage might be required.

c. Saltwater Separation Discharge

Once the drydock caisson is seated and the drydock is dewatered, some Hood Canal water may leak at the interface between the caisson and drydock. There is a curb on the drydock floor near the caisson that keeps the leakage separate from other waters in the drydock. The leakage is pumped back into Hood Canal and does not come into contact with any of the industrial activity of ship repair. Since there is not an addition of pollutants from this discharge, coverage under a NPDES permit is not required. If the Navy were to change operations such that pollutants are added to the discharge, then the Navy should reassess whether the discharge requires an NPDES permit.

d. Hydrostatic Relief (Groundwater)

By design, the drydock incorporates a system to lower the groundwater table adjacent to the drydock. This reduces hydrostatic pressure on the floors and walls to maintain structural integrity. The groundwater is uncontaminated and authorization to discharge is not required. If the Navy were to change operations such that pollutants are added to the discharge, then the Navy should reassess whether the discharge requires an NPDES permit.

e. Vessel Discharges during Dewatering

When a vessel is brought into drydock it may discharge ballast or sonar dome water. The permit prohibits the discharge of ballast water from contacting the drydock floor where it is possible to pick up debris from ship repair.

f. Drydock Operations Water

Ship repair services include electrical and machine work, carpentry, steel fabrication, pipe-fitting, painting, sand blasting, and pressure washing. During normal drydock operation, all water from the drydock floor is directed to the Industrial Wastewater Pretreatment Facility (Building 7030). After treatment, the water is discharged into the sanitary sewer which discharges to the Central Kitsap Wastewater Treatment Plant per State Waste Discharge Permit ST-7363. Drydock floor drainage may consist of stormwater, pressure washer wastewater, hydroblast wastewater, potable water, rinse water, and steam condensate. Since this discharge is sent to the Central Kitsap Wastewater Treatment Plant and is not discharged directly to waters of the U.S., it is not covered under this permit.

B. OUTFALL DESCRIPTION

Outfall 001 is an 8-inch diameter single-port discharge, located 18.5 feet above the mudline at a depth of 30 feet below mean lower low water. See Figure 2 and Figure 3.

Dry dock floodwater is discharged through the caisson (Outfall 002), which is a steel structure situated at the north end of the drydock in an East/West orientation. It is approximately 109 feet long and 65 feet deep, with a sill at approximately 43 MLLW.

C. EFFLUENT CHARACTERIZATION

To characterize the effluent, EPA evaluated the facility's application form, discharge monitoring report (DMR) data, and additional data provided by Naval Base Kitsap Bangor. The effluent quality for outfall 001 is summarized in Table 2. In addition to the parameters listed in Table 2, the permittee was required to perform visual monitoring for oil and grease; no visible oil and grease was observed. Data are provided in Appendix B.

Outfall 002 only had a visual monitoring requirement in the prior permit, and there are no data in the Integrated Compliance Information System (ICIS) database for outfall 002.

Table 2: Effluent Characterization for Outfall 001

Parameter	Units	Minimum	Average	Maximum	Standard Deviation	Count
Ammonia	µg/L	150	150	150	N/A	1
Copper	µg/L	0.697	4.387	19.1	3.982	33
Flow (daily average)	gpd	174,096	1,214,079	1,838,799	287,849	124
Flow (daily maximum)	gpd	206,784	1,480,291	2,614,120	307,716	124
Oil and Grease	mg/L	<5	<5	<5	N/A	1
pH	s.u.	6.86	7.30	7.74	0.62	2
Temperature, monthly 7-DADMax, January	°C	10.2	13.0	14.2	1.13	11
Temperature, monthly 7-DADMax, February	°C	11.6	12.7	13.7	0.62	10
Temperature, monthly 7-DADMax, March	°C	11.2	13.5	14.6	0.97	10
Temperature, monthly 7-DADMax, April	°C	13.1	15.4	19.2	1.77	10
Temperature, monthly 7-DADMax, May	°C	15.7	17.3	19.6	1.28	10
Temperature, monthly 7-DADMax, June	°C	17.2	18.7	21.2	1.17	10
Temperature, monthly 7-DADMax, July	°C	17.2	19.7	21.2	1.15	10
Temperature, monthly 7-DADMax, August	°C	18.3	19.9	21.4	0.94	10
Temperature, monthly 7-DADMax, September	°C	16.5	18.4	20.5	1.22	11
Temperature, monthly 7-DADMax, October	°C	15.5	16.7	19.0	1.08	11
Temperature, monthly 7-DADMax, November	°C	11.5	14.8	17.1	1.51	10

Parameter	Units	Minimum	Average	Maximum	Standard Deviation	Count
Ammonia	µg/L	150	150	150	N/A	1
Temperature, monthly 7-DADMax, December	°C	12.9	14.1	15.3	0.81	11
Total organic carbon (TOC)	mg/L	3.88	3.88	3.88	N/A	1
Sources: DMRs, application form.						

D. COMPLIANCE HISTORY

The facility violated the 7-day average of the daily maximum (7-DADMax) temperature limits 27 times between September 2010 and September 2021.

Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=WA0025577&sys=ICP

III. RECEIVING WATER

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided in the Water Quality-Based Effluent Limits (WQBEL) section below. This section summarizes characteristics of the receiving water that impact that analysis.

This facility discharges to Hood Canal near Bangor, WA.

A. WATER QUALITY STANDARDS (WQS)

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet WQS. 40 CFR 122.4(d) requires that the conditions in NPDES permits ensure compliance with the WQS of all affected States. A State's WQS are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

1. Designated Beneficial Uses

This facility discharges to Hood Canal. The State of Washington has designated the following uses for Hood Canal (WAC 173-201A-612):

- Extraordinary quality aquatic life use
- Primary contact recreation
- All harvest uses

B. RECEIVING WATER QUALITY

The water quality for the receiving water is summarized in Table 3. Data for pH, salinity, and temperature (except for the facility intake temperatures) are from

Ecology's long-term marine water column monitoring station ID number HCB006. Data for ammonia were obtained from the Water Quality Portal and are from stations in Hood Canal, specifically monitoring location identifiers EMAP_CS_WQX-WA00-0024 and EMAP_CS_WQX-WA04-0045, and were collected in 2000 and 2004. Data for copper were provided by the Navy with the application and are from the influent to the cooling water system, which is also called "auxiliary salt water" by the Navy.

Table 3: Receiving Water Quality Data

Parameter	Units	Minimum	Average	Maximum	Standard Deviation	Count
Ammonia	mg/L	0.00028	0.02447	0.0518	0.01796	6
Copper (dissolved)	µg/L	0.243	0.431	0.722	0.158	6
pH (profile maximum)	s.u.	7.89012	8.20479	8.55974	0.17568	12
pH (profile median)	s.u.	7.63506	7.84193	8.16407	0.14058	12
pH (profile minimum)	s.u.	7.58600	7.77370	8.14862	0.16354	12
Salinity (profile maximum)	PSU	29.4179	30.2174	30.9208	0.4412	42
Salinity (profile median)	PSU	28.7266	30.0390	30.7585	0.4831	41
Salinity (profile minimum)	PSU	22.9541	28.3600	30.2273	1.7957	42
Temperature (profile maximum)	°C	8.0171	11.6395	16.3092	2.4064	42
Temperature (profile median)	°C	7.9281	9.9102	11.7939	1.1931	41
Temperature (profile minimum)	°C	7.3908	9.6431	11.7753	1.2436	42
Temperature, facility intake, May - September, 7-DADMax	°C	11.54	15.55	19.57	1.53	1110
Temperature, facility intake, October - April, 7-DADMax	°C	8.80	11.14	14.50	1.32	1339

1. Water Quality Limited Waters

The State of Washington's 2012 Integrated Report lists the beneficial uses of Hood Canal as impaired and needing a total maximum daily load (TMDL) (i.e., in "Category 5" or on the "303(d) list") due the constituents listed in Table 4, observed in water and animal tissue.

In addition to the listings in Table 4, there are listings for 15 parameters in sediment in Hood Canal, including copper, which is a pollutant of concern for this discharge. However, all of the sediment category 5 listings in Hood Canal are from grid cells adjacent to the former Pope and Talbot, Inc. sawmill near Port Gamble. Sediment quality at that location would not be affected by the discharges authorized in this permit.

There are a total of 38 category 4B listings for 24 parameters in sediment in Hood Canal. Waters in category 4B have one or more impaired or threatened beneficial uses, but a TMDL is not required because other pollution control requirements are expected to address the water quality impairments (USEPA, 2003b).

There are no TMDLs that address impairments in Hood Canal.

Table 4: Category 5 Listings in Hood Canal

Parameter	Number of Listings
Tissue	**6**

Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	1
Chrysene	1
Indeno(1,2,3-c,d)pyrene	1
Water	**27**
Bacteria	1
Dissolved Oxygen	26

Bacteria is not a pollutant of concern for this discharge. Dissolved oxygen impairments in Puget Sound are caused primarily by nitrogen discharged by municipal wastewater treatment plants. There are no known sources of nitrogen in the discharge, and the only form of nitrogen for which effluent data are available for this facility is ammonia. As shown in Table 2, the effluent concentration of ammonia is low. There are no effluent data for biochemical oxygen demand (BOD), however, BOD is related to total organic carbon (TOC), and the effluent TOC is low (Table 2). Thus, there is no reason to expect that nitrogen or oxygen demand in the discharges authorized by this permit will cause or contribute to violations of dissolved oxygen criteria. The draft permit, however, proposes continuous monitoring of influent and effluent dissolved oxygen to determine if near-field DO concentrations are affected by discharges of relatively warm water.

None of the constituents causing impairments in animal tissue are pollutants of concern for this discharge.

IV. Effluent Limitations and Monitoring

Table 5 and Table 6, below, present the existing effluent limits and monitoring requirements in the current Permit. Table 7 and Table 8, below, present the effluent limits and monitoring requirements proposed in the draft permit.

Table 5: Existing Permit - Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Units	Effluent Limits		Monitoring Requirements	
		Average Monthly	Maximum Daily	Sample Type	Sample Frequency
Flow	gpd	Report	Report	Meter	Continuous
Temperature	°C	19 (7-DADMax)		Continuous	Continuous
Copper, total recoverable	µg/L	—	Report	Grab	Once every 2 months

Table 6: Existing Permit - Effluent Limits and Monitoring Requirements for Outfall 002

Parameter	Effluent Limitation	Sample Type	Sample Frequency
Visible sheen	No visible sheen	Visual	Each Docking/Undocking Evolution

The following effluent limitations are proposed in the draft permit:

Table 7: Draft Permit - Effluent Limits and Monitoring Requirements for Outfall 001

Parameter	Units	Effluent Limits		Monitoring Requirements		
		Average Monthly	Maximum Daily	Sample Location	Sample Type	Sample Frequency
Flow	gpd	Report	Report	Effluent	Meter	Continuous
Temperature, effluent gross, winter (October - April)	°C	19 (7-DADMax)		Intake and effluent	Continuous	Continuous
Temperature, effluent net, summer (May - September)	°C	5.9 (7-DADMax)		Intake and effluent	Continuous	Continuous
Ammonia, total as N	mg/L	—	Report	Effluent	Grab	1/quarter
Copper, total recoverable	µg/L	—	Report	Effluent	Grab	1/quarter
pH	s.u.	Report minimum and maximum		Effluent	Grab	1/quarter
Dissolved oxygen	mg/L	Report average and minimum		Intake and effluent	Continuous	Continuous

Table 8: Draft Permit - Effluent Limits and Monitoring Requirements for Outfall 002

Parameter	Effluent Limitation	Sample Type	Sample Frequency
Visible sheen	No visible sheen	Visual	Each Docking/Undocking Evolution

A. BASIS FOR EFFLUENT LIMITS

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQSs applicable to a waterbody are being met and may be more stringent than TBELs.

1. Pollutants of Concern

Pollutants of concern are those that either have TBELs or may need WQBELs. EPA identifies pollutants of concern for the discharge based on those which:

- Have a TBEL
- Have an assigned wasteload allocation (WLA) from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

Based on this analysis, pollutants of concern are as follows:

- Ammonia
- Copper
- pH
- Temperature
- Visible sheen

2. Technology-Based Effluent Limits (TBELs)

Technology-based limitations are established by EPA for many industries and are based on available pollution control technology.

a. General

In 1979, EPA published the Draft Development Document for Proposed Effluent Limitations Guidelines and Standards for the Shipbuilding and Repair Point Source Category (USEPA, 1979). In the draft development document, EPA determined that it was impracticable to impose national numerical limitations and standards for the shipbuilding and repair industry, in part because the nature of the discharges from dry docks are not conducive to numeric monitoring and limits. Since establishing limits is impracticable, the draft development document identified best management practices (BMPs) for the industry.

Because the Intermediate Maintenance Facility does not fit into an industrial category for which EPA has developed technology-based requirements, EPA may use best professional judgment (BPJ) to establish technology-based permit requirements, pursuant to authority established by CWA §402 (a)(1)(B), and in accordance with requirements established at 40 CFR 125.3. Consistent with the draft development document, the permit requires development and implementation of a BMP Plan to control the discharge of pollutants, including heat, to Hood Canal. The BMP Plan is the method of technology-based control of discharges from outfall 002.

b. Temperature (Outfall 001)

As explained on Page 12 of the fact sheet for the revised draft permit, dated October 23, 2009, "AKART and Best Available Technology economically achievable (BAT) is minimizing the thermal load to Hood Canal at the existing performance…." Therefore, in the prior permit, EPA established a performance-based effluent limit of 19 °C. The limit is expressed as a 7-DADMax.

As stated in Compliance History, above, the facility has not consistently complied with the 19 °C 7-DADMax temperature limit. In its application for reissuance of this permit, the Navy requested an increased temperature limit of 25 °C.

EPA believes the primary reason the technology-based temperature limit that was established in the prior permit was not achievable was that it was based on year-round data. The temperature of a cooling water discharge is influenced by the temperature of the intake water, which will be warmer in the summer. As shown in Table 2, violations of the 19 °C 7-DADMax temperature limit in the prior permit have only occurred between April and September (inclusive). Only one such violation has occurred in April.

EPA recalculated the technology-based effluent limits on a monthly basis, using the same 7-DADMax statistic as the prior permit and determined that the 19°C temperature limit is achievable (with no more than a 1% exceedance probability) from October - April.

EPA has chosen to recalculate the May - September temperature effluent limit as a net effluent limit, i.e., difference between the intake and effluent temperature, as opposed to a gross effluent temperature limit. Similar to the limit in the prior permit, the revised May – September temperature limit is a technology-based limit that is based on observed performance. The difference is that the temperature performance is now quantified as the temperature difference between the intake and effluent water, as opposed to the effluent temperature. This will ensure that the Navy will be able to comply with the limits even if ambient temperatures in Hood Canal increase due to climate change or other nonpoint heat sources, while still ensuring that the temperature increase at the edge of the mixing zone is de minimis. Based on the May - September maximum 7-DADMax intake temperature in Table 3, the proposed net effluent limit of 5.9 °C would allow 7-DADMax effluent temperatures between 17.44 and 25.47 °C. Details of the calculation of the May - September effluent net temperature limit and its impact upon water quality are provided in Appendix F.

3. Water Quality-Based Effluent Limits (WQBELs)

a. Statutory and Regulatory Basis

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet WQSs. Discharges to State or Tribal waters must also comply with conditions imposed by the State or Tribe as part of its certification of NPDES permits under CWA § 401. 40 CFR 122.44(d)(1) implementing CWA § 301(b)(1)(C) 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 or Tribal WQSs, including narrative criteria for water quality.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQSs are met and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. If there are no approved TMDLs that specify wasteload allocations for this discharge; all of the WQBELs are calculated directly from the applicable WQSs.

b. *Reasonable Potential Analysis and Need for WQBELs*

EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (*TSD*) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (USEPA, 2014). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such that the waterbody as a whole will not be impaired, all designated uses are maintained, and acutely toxic conditions are prevented.

The Washington Water Quality Standards at WAC-173-201A-400 provide Washington's mixing zone policy for point source discharges. EPA has discussed mixing zones with Ecology and EPA anticipates that Ecology will authorize mixing zones as summarized in Table 9 in its final CWA §401 certification. If Ecology does not provide mixing zones or provides different mixing zones, then EPA will determine whether the effluent limits will change and whether an additional public notice period is required.

Table 9: Mixing Zones

Criteria Type	Dilution Factors
	Outfall 001
Acute Aquatic Life	45.17
Chronic Aquatic Life	284.5
Human Health Noncarcinogen	284.5
Human Health Carcinogen	284.5

The equations used to conduct the reasonable potential analysis and calculate the WQBELs are provided in Appendix D.

c. *Reasonable Potential and WQBELs*

The reasonable potential and WQBEL for specific parameters are summarized below. The calculations are provided in Appendix D.

Ammonia

Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria for total ammonia become more stringent as pH and temperature increase. The table below details the equations used to determine water quality criteria for ammonia.

Table 10: Ammonia Criteria

Marine Un-ionized Ammonia Criteria Calculation

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	15.2
2. Receiving Water pH, (90th percentile):	8.4
3. Receiving Water Salinity, g/kg (10th percentile):	26.8
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.549
2. pKa8 at 25 deg C (Whitfield model "B"):	9.309
3. Percent of Total Ammonia Present as Unionized:	5.3%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	4.36
Chronic:	0.65
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**3.58**
Chronic:	**0.54**

A reasonable potential calculation showed that the NBK Bangor discharge does not have the reasonable potential to cause or contribute to a violation of the water quality criteria for ammonia. Therefore, no effluent limits are proposed for ammonia. See Appendix D for reasonable potential calculations for ammonia.

Copper

A reasonable potential calculation showed that the NBK Bangor discharge does not have the reasonable potential to cause or contribute to a violation of the water quality criteria for copper. Therefore, no effluent limits are proposed for copper. See Appendix D for reasonable potential calculations for copper.

pH

Only two effluent measurements are available for pH (Table 2). The lower of the two effluent pH values is below the lower bound of Washington's water quality criteria for pH, which is 7.0 to 8.5 s.u. WAC 173-201A-210(1)(e). However, a discharge at the minimum observed effluent pH will not cause or contribute to excursions below the water quality criteria for pH at the edge of the mixing zone, so no effluent limits are proposed for pH. The draft permit proposes effluent monitoring for pH so that a reasonable potential analysis for pH may be performed in the next permit cycle.

Temperature

As explained under Technology-Based Effluent Limits (TBELs), above, and in Appendix F, the proposed temperature limits are TBELs. These limits ensure that water quality criteria for temperature are met from October - April and that the temperature increase at the edge of the mixing zone is de minimis year-round. Thus, the TBELs are adequate to protect water quality and more stringent WQBELs are not necessary for temperature.

Visible Sheen

The draft permit carries forward the prior permit's prohibition on floating solids or oily wastes that produce a visible sheen on the surface of the receiving water. This provision implements the narrative criterion stating that "aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste" (WAC 173-201A-260(2)(b). Outfall 002 has the reasonable potential to cause or contribute to violations of this narrative criterion because a failure to properly implement BMPs in the dry dock could result in discharges of solids or oil. This is the only water quality-based effluent limit applicable to outfall 002. Compliance with this provision is verified using visual monitoring.

d. Antibacksliding

CWA § 402(o) and 40 CFR §122.44(l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding* (USEPA, 2010).

An anti-backsliding analysis was done for temperature. The temperature limits in the prior permit were not based on a state standard. Therefore, EPA has applied the anti-backsliding regulatory provisions at 40 CFR 122.44(l). See EPA NPDES Permit Writers' Manual at Exhibit 7-2. 40

CFR 122.44(l)(1) states that "effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under § 122.62.)"

The applicable cause for allowing for a less stringent limit than the previous permit for the summer temperature limits in this permit is that EPA has received new information (CWA §402(o)(2)(B)(i); see also 40 CFR 122.62(a)(2)). The technology-based temperature limit in the prior permit was based on only 134 temperature results; see the fact sheet dated October 23, 2009 at Page 27. In recalculating the temperature effluent limits, EPA has used 1,032 7-DADMax differences between the intake and effluent temperature, which were calculated from 325,015 individual intake and effluent temperature measurements taken between May 2013 and September 2021. EPA considers this much more robust data set to be new information that was not available at the time the prior permit was issued.

Because the circumstances on which the previous permit was based have materially and substantially changed since the time the previous permit was issued and would constitute cause for permit modification under 40 CFR 122.62, EPA may revise the temperature limits to be less stringent than the previous permit.

4. Cooling Water Intake Structure

40 CFR Part 125 Subpart J establishes requirements for cooling water intake structures for existing facilities, and implements Section 316(b) of the Clean Water Act. These regulations were promulgated on August 14, 2014 and became effective on October 14, 2014, after the prior permit was issued (79 FR 48299).

40 CFR Part 125 Subpart J regulations are applicable to NBK Bangor, because it is an existing point source which uses a cooling water intake structure with a design intake flow greater than 2 million gallons per day (see Table 2) and 25% or more of the water the facility withdraws is used exclusively for cooling purposes. The permit application and supplemental information report do not specify any uses for the auxiliary salt water withdrawn from Hood Canal other than cooling. See 40 CFR 125.91 and 125.92(g) and (k).

Requirements for the cooling water intake structure appear in Part II.C of the draft permit.

B. MONITORING REQUIREMENTS

CWA § 308 and 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to EPA.

1. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Monitoring Changes from the Previous Permit

The draft permit proposes effluent monitoring requirements for pH at outfall 001, since the pH data reported on the application indicated that the effluent pH does not consistently meet water quality criteria for pH.

The draft permit proposes to reduce the effluent monitoring frequency for total recoverable copper from once every 2 months to once per quarter. Effluent monitoring for copper is necessary so that a reasonable potential analysis may be performed when the permit is reissued. However, since monitoring to date shows that the discharge does not have reasonable potential, the draft permit proposes a reduction in monitoring frequency to reduce the burden on the permittee.

Although the single ammonia result reported on the application did not show that there is a reasonable potential to cause or contribute to excursions above water quality standards for ammonia, the effluent ammonia concentration (Table 2) is higher than the ambient ammonia concentration (Table 3). Thus, the draft permit proposes quarterly effluent monitoring of ammonia.

Because beneficial uses of Hood Canal are impaired by low dissolved oxygen (Table 4), and because water has less capacity for dissolved oxygen at the higher temperatures expected in the cooling water discharge, the draft permit proposes continuous monitoring of the intake and effluent dissolved oxygen, beginning one year after the effective date of the final permit.

Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.epa.gov. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

2. Immediate Noncompliance Reporting

Ecology has requested that EPA include requirements for immediate reporting of certain instances of noncompliance to Ecology, the Central Kitsap Wastewater Treatment Plant, the Washington State Department of Health Shellfish Program, and the Kitsap Public Health District. These requirements appear in Part II.D of the draft permit. EPA expects that Ecology will stipulate this as part of their CWA § 401 certification conditions.

3. Sediment Monitoring

The State of Washington has sediment management standards, which are EPA-approved water quality standards. The draft permit proposes sediment monitoring because there are category 4B sediment listings for mercury and polychlorinated biphenyls (PCBs) adjacent to the facility, but there are no recent sediment data near the facility. The purpose of this monitoring is to characterize sediment (the nature and extent of chemical contamination, biological toxicity, or both) quality in the vicinity of the Permittee's discharge locations.

Specifically, the draft permit requires the permittee to develop and submit to EPA and Ecology a sediment sampling and analysis plan based on Appendix A to Ecology's *Sediment Cleanup User's Manual*. Following Ecology's approval of the plan, the permittee must collect sediment data in accordance with the sampling plan, prepare a data report and submit it to EPA and Ecology. The permittee is also required to upload the sediment data to Ecology's Environmental Information Management (EIM) database. Ecology has indicated that they will stipulate sediment monitoring requirements in their CWA § 401 certification of this permit.

V. OTHER PERMIT CONDITIONS

A. QUALITY ASSURANCE PLAN

The United States Department of the Navy is required to update the Quality Assurance Plan (QAP) within 90 days of the effective date of the permit. The QAP must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and made available to EPA upon request.

B. BEST MANAGEMENT PRACTICES

40 CFR 122.44(k) requires development of a Best Management Practices (BMP) Plan to control or abate the discharge of pollutants to achieve effluent limitations and standards or to carry out the purposes and intent of the Clean Water Act. The draft permit requires the permittee to develop and implement a BMP plan within 90 days of the effective date of the final permit, and it describes certain BMP conditions which must be included in the BMP Plan. The Plan must be kept on site and made available to EPA upon request. The BMP Plan is the method of technology-based control of discharges from outfall 002.

In general, the BMP Plan requirements are the same as those in the prior permit. However, in the draft permit, the requirements for cleaning the dry dock have been made more specific, the draft permit includes requirements to minimize caisson leakage, and the permit specifies that spill cleanups must use dry methods.

Additional BMPs addressing chemical storage and mixing of paints and solvents have been added at Ecology's request.

C. ENVIRONMENTAL JUSTICE

As part of the permit development process, EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. EPA used a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

NBK Bangor is located within or near a Census block group that is potentially overburdened because of National Priorities List site proximity. In order to ensure that individuals near the facility are able to participate meaningfully in the permit process, EPA has made copies of the draft permit and fact sheet available at nearby public libraries in Silverdale and Poulsbo.

Regardless of whether a facility is located near a potentially overburdened community, EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/d/2013-10945). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

For more information, please visit https://www.epa.gov/environmentaljustice and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

D. STANDARD PERMIT PROVISIONS

Permit Parts III, IV, and V. contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VI. OTHER LEGAL REQUIREMENTS

A. ENDANGERED SPECIES ACT

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species.

An official species list from USFWS identified the threatened bull trout, marbled murrelet and streaked horned lark as being present near the facility. The facility is not located within critical habitat for any USFWS species.

Threatened and endangered species under NOAA's jurisdiction which are present near the facility are Puget Sound Chinook salmon, Hood Canal chum salmon, Puget Sound steelhead, southern resident killer whales, bocaccio rockfish and yelloweye rockfish.

As discussed under Pollutants of Concern, above, there are only four pollutants of concern identified for this permit. Technology-based effluent limits have been established for temperature, which will ensure that the temperature increase at the edge of the mixing zone is de minimis. As shown in Table 2, observed end-of-pipe effluent temperatures are lower than those that cause thermal shock or lethality to fish. The discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for ammonia, copper or pH. As shown in Table 9, the discharge from outfall 001 will dilute rapidly in the receiving water.

BMPs and visual monitoring requirements will ensure that dry dock floodwater discharges from outfall 002 are free of pollutants.

Due to the benign nature of the authorized discharges and the rapid dilution at outfall 001, the issuance of this permit will have no effect on threatened or endangered species or their critical habitat.

B. ESSENTIAL FISH HABITAT

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). The receiving water is EFH for finfish, krill, coastal pelagic species, and groundfish.

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 prepared an EFH assessment which appears in Appendix F.

EPA concludes that authorization to discharge from NBK Bangor in accordance with the terms and conditions of the proposed permit will have no effect on EFH in the vicinity of the discharges for the same reasons stated above for the no effect determination for listed species. EPA will provide NOAA Fisheries and the U.S. Fish and Wildlife Service with copies of the draft permit and fact sheet during the public notice period. Any recommendations received from NOAA Fisheries regarding EFH will be considered prior to issuance of this permit.

C. CWA § 401 CERTIFICATION

CWA § 401 requires EPA to seek certification before issuing a final permit. As a result of the certification, the Department of Ecology may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with WQSs, or treatment standards established pursuant to any State law or regulation.

EPA had preliminary discussions with the Department of Ecology regarding the CWA § 401 Certification during development of the draft permit and requested a pre-filing meeting on May 9, 2022. EPA is sending a request for CWA § 401 Certification to the Department of Ecology.

D. ANTIDEGRADATION

EPA is required under Section 301(b)(1)(C) of the CWA and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure protection of state water quality standards, including antidegradation requirements. EPA has prepared an antidegradation analysis consistent with Ecology's antidegradation implementation procedures. EPA referred to Washington's antidegradation policy (WAC 173-201A-300) and Ecology's Water Quality Program Guidance Manual: Supplemental Guidance on Implementing Tier II Antidegradation ("Washington Tier II Guidance") (Ecology, 2011).

There are three tiers of antidegradation protection, as described below:

- Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollution.
- Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.
- Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

<u>Tier I</u>

The receiving water is Hood Canal; thus, the anti-degradation analysis was completed for this receiving water body. Accordingly, EPA will use the designated criteria for this water body in the draft permit. The discharges authorized by this draft permit will not cause a loss of beneficial uses.

The effluent limits in the draft permit ensure compliance with applicable numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and, in compliance with WAC 173-201A-310 and 40 CFR 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected.

If EPA receives information during the public comment period demonstrating that there are existing uses for which Hood Canal is not designated, EPA will consider this information before issuing a final permit and will establish additional or more stringent permit conditions if necessary to ensure protection of existing uses.

<u>Tier II</u>

Tier II antidegradation applies to expanded actions. The Washington Tier II Guidance defines an "expanded action" as:

- A physical expansion of the facility (production or wastewater system expansions with a potential to allow an increase the volume of wastewater or the amount of pollution) or activity.
- An increase (either monthly average or annual average) to an existing permitted concentration or permitted effluent mass limit (loading) to a water body greater than 10%.
- The act of re-rating the capacity of an existing plant greater than 10%.

Although EPA proposes a temperature effluent limit for May - September which is less stringent than the corresponding limit in the prior permit, this does not constitute an "expanded action" because the temperature limit is a 7-day average of the daily maximum temperatures and not a monthly average or annual average.

Washington's antidegradation policy states that, whenever a water quality constituent is of a higher quality than a criterion designated for that water under this chapter, new or expanded actions that are expected to cause a measurable change in the quality of the water may not be allowed unless the Department of Ecology determines that the lowering of water quality is necessary and in the overriding public interest (WAC 173-201A-320(1)). The policy further states that a measurable change includes a temperature increase of 0.3 °C (WAC-201A-320(3)(a)).

The temperature change at the edge of the chronic mixing zone resulting from the proposed increased temperature limit is 0.02 °C, which is not a measurable change in water quality as defined in WAC-201A-320(3)(a). Thus, even if the increased temperature limit is an "expanded action," the increased temperature limit nonetheless complies with Washington's antidegradation policy because the resulting change in water quality is not measurable.

E. PERMIT EXPIRATION

The permit will expire five years from the effective date.

VII. REFERENCES

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Appendix A. **Facility Maps**

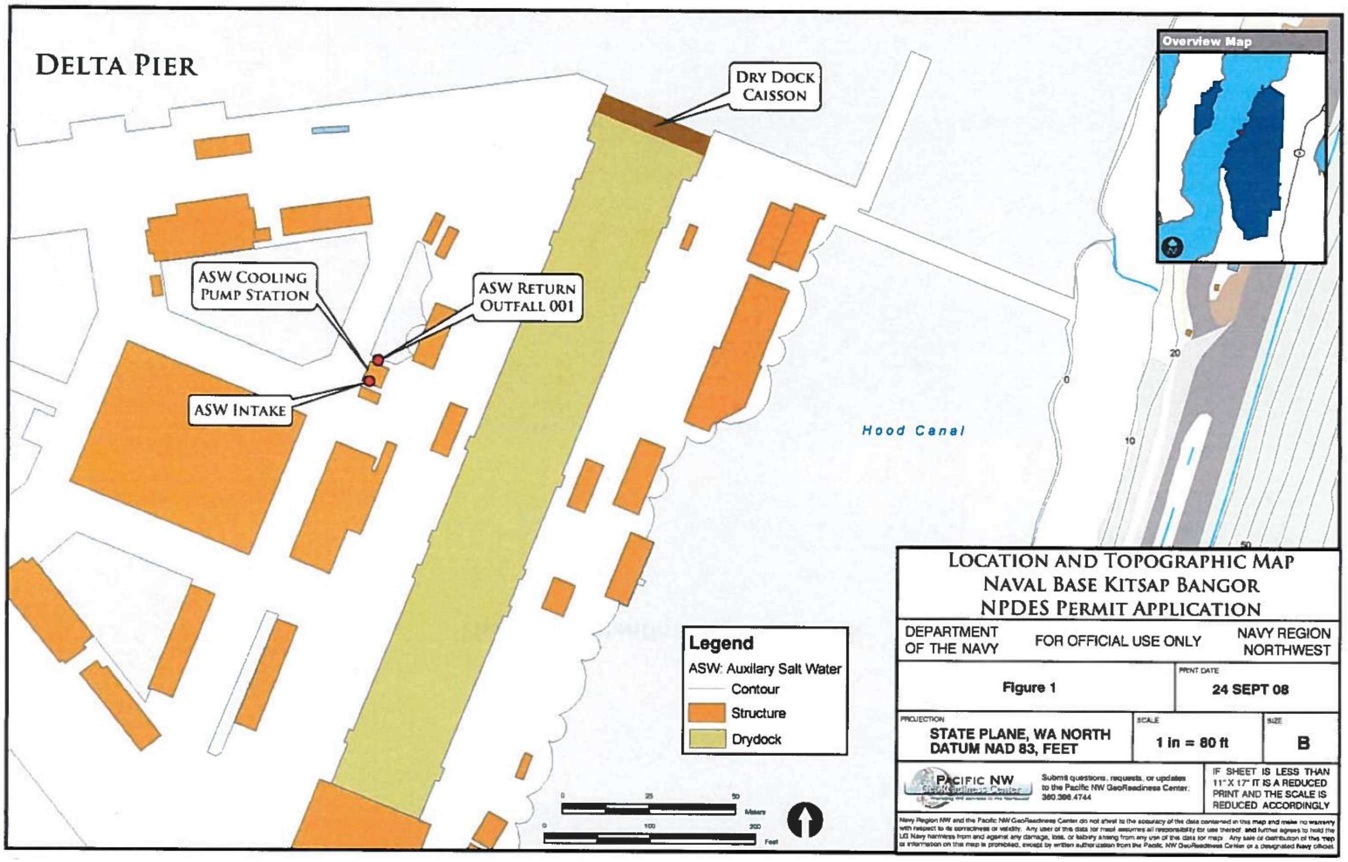

Figure 1: Delta Pier Map

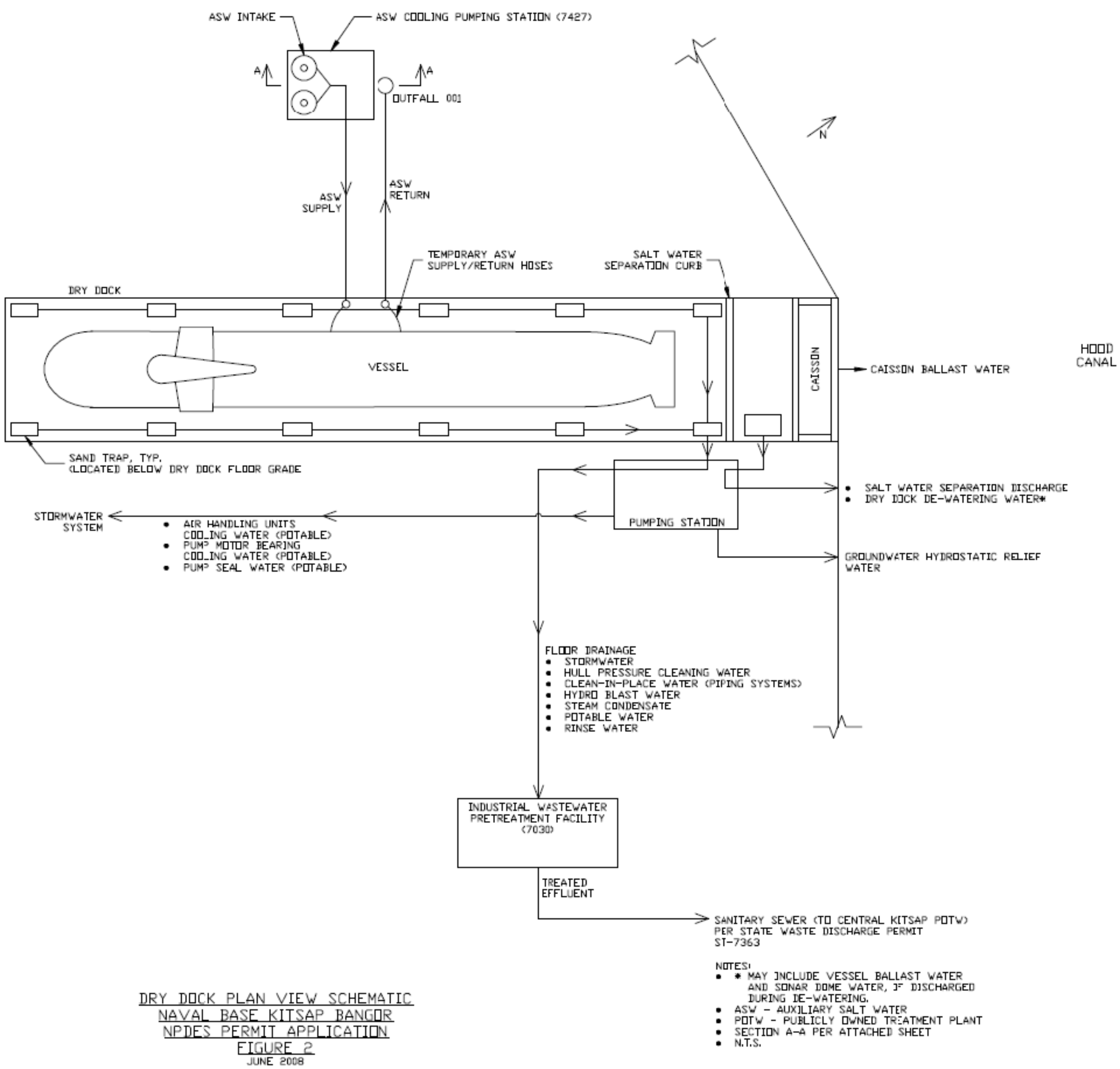

Figure 2: Dry Dock Plan View Schematic

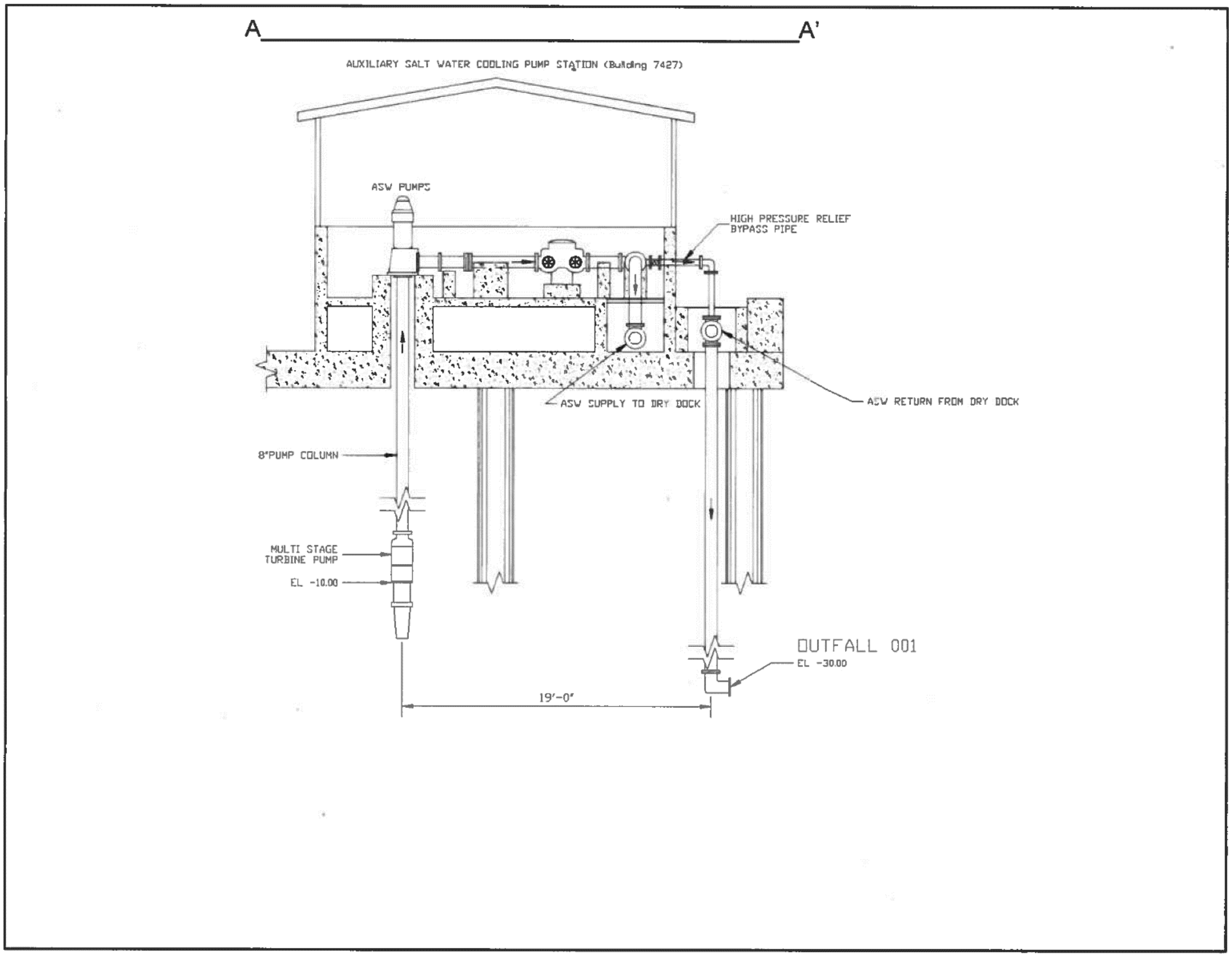

Figure 3: Section A-A' from dry dock plan view schematic

Appendix B. **Water Quality Data**

Treatment Plant Effluent Data

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
10/31/2010	Copper, total recoverable	1.76	Micrograms per Liter	Single Reading
12/31/2010	Copper, total recoverable	3.39	Micrograms per Liter	Single Reading
02/28/2011	Copper, total recoverable	3.03	Micrograms per Liter	Single Reading
04/30/2011	Copper, total recoverable	3.43	Micrograms per Liter	Single Reading
06/30/2011	Copper, total recoverable	1.2	Micrograms per Liter	Single Reading
08/31/2011	Copper, total recoverable	1.55	Micrograms per Liter	Single Reading
10/31/2011	Copper, total recoverable	2.56	Micrograms per Liter	Single Reading
12/31/2011	Copper, total recoverable	5.2	Micrograms per Liter	Single Reading
02/29/2012	Copper, total recoverable	6.64	Micrograms per Liter	Single Reading
04/30/2012	Copper, total recoverable	3.28	Micrograms per Liter	Single Reading
06/30/2012	Copper, total recoverable	.697	Micrograms per Liter	Single Reading
08/31/2012	Copper, total recoverable	2.24	Micrograms per Liter	Single Reading
10/31/2012	Copper, total recoverable	2.33	Micrograms per Liter	Single Reading
12/31/2012	Copper, total recoverable	2.53	Micrograms per Liter	Single Reading
02/28/2013	Copper, total recoverable	1.65	Micrograms per Liter	Single Reading
04/30/2013	Copper, total recoverable	3.65	Micrograms per Liter	Single Reading
06/30/2013	Copper, total recoverable	2.14	Micrograms per Liter	Single Reading
08/31/2013	Copper, total recoverable	5.33	Micrograms per Liter	Single Reading
10/31/2013	Copper, total recoverable	4.87	Micrograms per Liter	Single Reading
12/31/2013	Copper, total recoverable	12.	Micrograms per Liter	Single Reading
02/28/2014	Copper, total recoverable	5.35	Micrograms per Liter	Single Reading
04/30/2014	Copper, total recoverable	2.39	Micrograms per Liter	Single Reading
06/30/2014	Copper, total recoverable	3.33	Micrograms per Liter	Single Reading
08/31/2014	Copper, total recoverable	1.91	Micrograms per Liter	Single Reading
10/31/2014	Copper, total recoverable	19.1	Micrograms per Liter	Single Reading
12/31/2014	Copper, total recoverable	7.05	Micrograms per Liter	Single Reading
02/28/2015	Copper, total recoverable	1.63	Micrograms per Liter	Single Reading
04/30/2015	Copper, total recoverable	1.33	Micrograms per Liter	Single Reading
06/30/2015	Copper, total recoverable	1.28	Micrograms per Liter	Single Reading
08/31/2015	Copper, total recoverable	7.26	Micrograms per Liter	Single Reading
09/30/2015	Copper, total recoverable	5.09	Micrograms per Liter	Single Reading
11/30/2015	Copper, total recoverable	14.3	Micrograms per Liter	Single Reading
01/31/2016	Copper, total recoverable	5.29	Micrograms per Liter	Single Reading

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
09/30/2010	Temperature, water deg. centigrade	17.1	Degrees Centigrade	7 Day Maximum
10/31/2010	Temperature, water deg. centigrade	18.96	Degrees Centigrade	7 Day Maximum
11/30/2010	Temperature, water deg. centigrade	14.76	Degrees Centigrade	7 Day Maximum
12/31/2010	Temperature, water deg. centigrade	12.94	Degrees Centigrade	7 Day Maximum
01/31/2011	Temperature, water deg. centigrade	12.48	Degrees Centigrade	7 Day Maximum
02/28/2011	Temperature, water deg. centigrade	12.38	Degrees Centigrade	7 Day Maximum
03/31/2011	Temperature, water deg. centigrade	11.19	Degrees Centigrade	7 Day Maximum
04/30/2011	Temperature, water deg. centigrade	13.46	Degrees Centigrade	7 Day Maximum
05/31/2011	Temperature, water deg. centigrade	15.7	Degrees Centigrade	7 Day Maximum
06/30/2011	Temperature, water deg. centigrade	18.7	Degrees Centigrade	7 Day Maximum
07/31/2011	Temperature, water deg. centigrade	17.2	Degrees Centigrade	7 Day Maximum
08/31/2011	Temperature, water deg. centigrade	18.28	Degrees Centigrade	7 Day Maximum
09/30/2011	Temperature, water deg. centigrade	18.61	Degrees Centigrade	7 Day Maximum
10/31/2011	Temperature, water deg. centigrade	15.54	Degrees Centigrade	7 Day Maximum
11/30/2011	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
12/31/2011	Temperature, water deg. centigrade	14.02	Degrees Centigrade	7 Day Maximum

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
01/31/2012	Temperature, water deg. centigrade	13.19	Degrees Centigrade	7 Day Maximum
02/29/2012	Temperature, water deg. centigrade	12.89	Degrees Centigrade	7 Day Maximum
03/31/2012	Temperature, water deg. centigrade	13.94	Degrees Centigrade	7 Day Maximum
04/30/2012	Temperature, water deg. centigrade	19.24	Degrees Centigrade	7 Day Maximum
05/31/2012	Temperature, water deg. centigrade	19.58	Degrees Centigrade	7 Day Maximum
06/30/2012	Temperature, water deg. centigrade	17.51	Degrees Centigrade	7 Day Maximum
07/31/2012	Temperature, water deg. centigrade	20.87	Degrees Centigrade	7 Day Maximum
08/31/2012	Temperature, water deg. centigrade	19.19	Degrees Centigrade	7 Day Maximum
09/30/2012	Temperature, water deg. centigrade	17.99	Degrees Centigrade	7 Day Maximum
10/31/2012	Temperature, water deg. centigrade	16.92	Degrees Centigrade	7 Day Maximum
11/30/2012	Temperature, water deg. centigrade	15.07	Degrees Centigrade	7 Day Maximum
12/31/2012	Temperature, water deg. centigrade	13.83	Degrees Centigrade	7 Day Maximum
01/31/2013	Temperature, water deg. centigrade	12.7	Degrees Centigrade	7 Day Maximum
02/28/2013	Temperature, water deg. centigrade	12.12	Degrees Centigrade	7 Day Maximum
03/31/2013	Temperature, water deg. centigrade	13.06	Degrees Centigrade	7 Day Maximum
04/30/2013	Temperature, water deg. centigrade	14.53	Degrees Centigrade	7 Day Maximum
05/31/2013	Temperature, water deg. centigrade	16.22	Degrees Centigrade	7 Day Maximum
06/30/2013	Temperature, water deg. centigrade	17.16	Degrees Centigrade	7 Day Maximum
07/31/2013	Temperature, water deg. centigrade	19.27	Degrees Centigrade	7 Day Maximum
08/31/2013	Temperature, water deg. centigrade	21.04	Degrees Centigrade	7 Day Maximum
09/30/2013	Temperature, water deg. centigrade	18.71	Degrees Centigrade	7 Day Maximum
10/31/2013	Temperature, water deg. centigrade	16.09	Degrees Centigrade	7 Day Maximum
11/30/2013	Temperature, water deg. centigrade	15.33	Degrees Centigrade	7 Day Maximum
12/31/2013	Temperature, water deg. centigrade	15.3	Degrees Centigrade	7 Day Maximum
01/31/2014	Temperature, water deg. centigrade	13.21	Degrees Centigrade	7 Day Maximum
02/28/2014	Temperature, water deg. centigrade	11.6	Degrees Centigrade	7 Day Maximum
03/31/2014	Temperature, water deg. centigrade	14.07	Degrees Centigrade	7 Day Maximum
04/30/2014	Temperature, water deg. centigrade	15.37	Degrees Centigrade	7 Day Maximum
05/31/2014	Temperature, water deg. centigrade	16.92	Degrees Centigrade	7 Day Maximum
06/30/2014	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
07/31/2014	Temperature, water deg. centigrade	18.86	Degrees Centigrade	7 Day Maximum
08/31/2014	Temperature, water deg. centigrade	21.41	Degrees Centigrade	7 Day Maximum
09/30/2014	Temperature, water deg. centigrade	19.3	Degrees Centigrade	7 Day Maximum
10/31/2014	Temperature, water deg. centigrade	16.6	Degrees Centigrade	7 Day Maximum
11/30/2014	Temperature, water deg. centigrade	15.9	Degrees Centigrade	7 Day Maximum
12/31/2014	Temperature, water deg. centigrade	13.5	Degrees Centigrade	7 Day Maximum
01/31/2015	Temperature, water deg. centigrade	13.96	Degrees Centigrade	7 Day Maximum
02/28/2015	Temperature, water deg. centigrade	13.55	Degrees Centigrade	7 Day Maximum
03/31/2015	Temperature, water deg. centigrade	13.14	Degrees Centigrade	7 Day Maximum
04/30/2015	Temperature, water deg. centigrade	14.97	Degrees Centigrade	7 Day Maximum
05/31/2015	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
06/30/2015	Temperature, water deg. centigrade	19.84	Degrees Centigrade	7 Day Maximum
07/31/2015	Temperature, water deg. centigrade	20.4	Degrees Centigrade	7 Day Maximum
08/31/2015	Temperature, water deg. centigrade	19.73	Degrees Centigrade	7 Day Maximum
09/30/2015	Temperature, water deg. centigrade	18.47	Degrees Centigrade	7 Day Maximum
10/31/2015	Temperature, water deg. centigrade	17.75	Degrees Centigrade	7 Day Maximum
11/30/2015	Temperature, water deg. centigrade	17.07	Degrees Centigrade	7 Day Maximum
12/31/2015	Temperature, water deg. centigrade	15.23	Degrees Centigrade	7 Day Maximum
01/31/2016	Temperature, water deg. centigrade	14.23	Degrees Centigrade	7 Day Maximum
02/29/2016	Temperature, water deg. centigrade	12.57	Degrees Centigrade	7 Day Maximum
03/31/2016	Temperature, water deg. centigrade	14.16	Degrees Centigrade	7 Day Maximum
04/30/2016	Temperature, water deg. centigrade	17.06	Degrees Centigrade	7 Day Maximum
05/31/2016	Temperature, water deg. centigrade	17.8	Degrees Centigrade	7 Day Maximum
06/30/2016	Temperature, water deg. centigrade	19.06	Degrees Centigrade	7 Day Maximum
07/31/2016	Temperature, water deg. centigrade	20.13	Degrees Centigrade	7 Day Maximum
08/31/2016	Temperature, water deg. centigrade	19.9	Degrees Centigrade	7 Day Maximum
09/30/2016	Temperature, water deg. centigrade	17.66	Degrees Centigrade	7 Day Maximum
10/31/2016	Temperature, water deg. centigrade	16.48	Degrees Centigrade	7 Day Maximum

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
11/30/2016	Temperature, water deg. centigrade	14.74	Degrees Centigrade	7 Day Maximum
12/31/2016	Temperature, water deg. centigrade	13.9	Degrees Centigrade	7 Day Maximum
01/31/2017	Temperature, water deg. centigrade	12.28	Degrees Centigrade	7 Day Maximum
02/28/2017	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
03/31/2017	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
04/30/2017	Temperature, water deg. centigrade	13.06	Degrees Centigrade	7 Day Maximum
05/31/2017	Temperature, water deg. centigrade	17.24	Degrees Centigrade	7 Day Maximum
06/30/2017	Temperature, water deg. centigrade	18.17	Degrees Centigrade	7 Day Maximum
07/31/2017	Temperature, water deg. centigrade	19.48	Degrees Centigrade	7 Day Maximum
08/31/2017	Temperature, water deg. centigrade	20.	Degrees Centigrade	7 Day Maximum
09/30/2017	Temperature, water deg. centigrade	20.14	Degrees Centigrade	7 Day Maximum
10/31/2017	Temperature, water deg. centigrade	16.32	Degrees Centigrade	7 Day Maximum
11/30/2017	Temperature, water deg. centigrade	15.7	Degrees Centigrade	7 Day Maximum
12/31/2017	Temperature, water deg. centigrade	13.8	Degrees Centigrade	7 Day Maximum
01/31/2018	Temperature, water deg. centigrade	13.2	Degrees Centigrade	7 Day Maximum
02/28/2018	Temperature, water deg. centigrade	13.7	Degrees Centigrade	7 Day Maximum
03/31/2018	Temperature, water deg. centigrade	14.21	Degrees Centigrade	7 Day Maximum
04/30/2018	Temperature, water deg. centigrade	15.8	Degrees Centigrade	7 Day Maximum
05/31/2018	Temperature, water deg. centigrade	19.1	Degrees Centigrade	7 Day Maximum
06/30/2018	Temperature, water deg. centigrade	19.	Degrees Centigrade	7 Day Maximum
07/31/2018	Temperature, water deg. centigrade	21.2	Degrees Centigrade	7 Day Maximum
08/31/2018	Temperature, water deg. centigrade	20.6	Degrees Centigrade	7 Day Maximum
09/30/2018	Temperature, water deg. centigrade	16.5	Degrees Centigrade	7 Day Maximum
10/31/2018	Temperature, water deg. centigrade	15.53	Degrees Centigrade	7 Day Maximum
11/30/2018	Temperature, water deg. centigrade	14.16	Degrees Centigrade	7 Day Maximum
12/31/2018	Temperature, water deg. centigrade	14.7	Degrees Centigrade	7 Day Maximum
01/31/2019	Temperature, water deg. centigrade	14.09	Degrees Centigrade	7 Day Maximum
02/28/2019	Temperature, water deg. centigrade	12.95	Degrees Centigrade	7 Day Maximum
03/31/2019	Temperature, water deg. centigrade	14.6	Degrees Centigrade	7 Day Maximum
04/30/2019	Temperature, water deg. centigrade	15.8	Degrees Centigrade	7 Day Maximum
05/31/2019	Temperature, water deg. centigrade	17.8	Degrees Centigrade	7 Day Maximum
06/30/2019	Temperature, water deg. centigrade	18.	Degrees Centigrade	7 Day Maximum
07/31/2019	Temperature, water deg. centigrade	20.	Degrees Centigrade	7 Day Maximum
08/31/2019	Temperature, water deg. centigrade	20.	Degrees Centigrade	7 Day Maximum
09/30/2019	Temperature, water deg. centigrade	20.45	Degrees Centigrade	7 Day Maximum
10/31/2019	Temperature, water deg. centigrade	17.53	Degrees Centigrade	7 Day Maximum
11/30/2019	Temperature, water deg. centigrade	11.47	Degrees Centigrade	7 Day Maximum
12/31/2019	Temperature, water deg. centigrade	14.86	Degrees Centigrade	7 Day Maximum
01/31/2020	Temperature, water deg. centigrade	13.38	Degrees Centigrade	7 Day Maximum
02/29/2020	Temperature, water deg. centigrade	12.62	Degrees Centigrade	7 Day Maximum
03/31/2020	Temperature, water deg. centigrade	13.77	Degrees Centigrade	7 Day Maximum
04/30/2020	Temperature, water deg. centigrade		Degrees Centigrade	7 Day Maximum
05/31/2020	Temperature, water deg. centigrade	16.34	Degrees Centigrade	7 Day Maximum
06/30/2020	Temperature, water deg. centigrade	18.58	Degrees Centigrade	7 Day Maximum
07/31/2020	Temperature, water deg. centigrade	19.16	Degrees Centigrade	7 Day Maximum
08/31/2020	Temperature, water deg. centigrade	19.04	Degrees Centigrade	7 Day Maximum
09/30/2020	Temperature, water deg. centigrade	17.55	Degrees Centigrade	7 Day Maximum
10/31/2020	Temperature, water deg. centigrade	15.47	Degrees Centigrade	7 Day Maximum
11/30/2020	Temperature, water deg. centigrade	13.62	Degrees Centigrade	7 Day Maximum
12/31/2020	Temperature, water deg. centigrade	13.13	Degrees Centigrade	7 Day Maximum
01/31/2021	Temperature, water deg. centigrade	10.16	Degrees Centigrade	7 Day Maximum
02/28/2021	Temperature, water deg. centigrade	12.85	Degrees Centigrade	7 Day Maximum
03/31/2021	Temperature, water deg. centigrade	13.32	Degrees Centigrade	7 Day Maximum
04/30/2021	Temperature, water deg. centigrade	14.92	Degrees Centigrade	7 Day Maximum
05/31/2021	Temperature, water deg. centigrade	16.29	Degrees Centigrade	7 Day Maximum
06/30/2021	Temperature, water deg. centigrade	21.2	Degrees Centigrade	7 Day Maximum

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
9/30/2010	Flow, in conduit or thru treatment plant	1256544	Gallons per Day	Daily Average
10/31/2010	Flow, in conduit or thru treatment plant	1062878	Gallons per Day	Daily Average
11/30/2010	Flow, in conduit or thru treatment plant	1296230	Gallons per Day	Daily Average
12/31/2010	Flow, in conduit or thru treatment plant	1099094	Gallons per Day	Daily Average
1/31/2011	Flow, in conduit or thru treatment plant	1228723	Gallons per Day	Daily Average
2/28/2011	Flow, in conduit or thru treatment plant	1228838	Gallons per Day	Daily Average
3/31/2011	Flow, in conduit or thru treatment plant	1233035	Gallons per Day	Daily Average
4/30/2011	Flow, in conduit or thru treatment plant	1280923	Gallons per Day	Daily Average
5/31/2011	Flow, in conduit or thru treatment plant	1168834	Gallons per Day	Daily Average
6/30/2011	Flow, in conduit or thru treatment plant	580743	Gallons per Day	Daily Average
7/31/2011	Flow, in conduit or thru treatment plant	431136	Gallons per Day	Daily Average
8/31/2011	Flow, in conduit or thru treatment plant	718128	Gallons per Day	Daily Average
9/30/2011	Flow, in conduit or thru treatment plant	1242518	Gallons per Day	Daily Average
10/31/2011	Flow, in conduit or thru treatment plant	1172405	Gallons per Day	Daily Average
11/30/2011	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average
12/31/2011	Flow, in conduit or thru treatment plant	742120	Gallons per Day	Daily Average
1/31/2012	Flow, in conduit or thru treatment plant	701280	Gallons per Day	Daily Average
2/29/2012	Flow, in conduit or thru treatment plant	918778	Gallons per Day	Daily Average
3/31/2012	Flow, in conduit or thru treatment plant	753789	Gallons per Day	Daily Average
4/30/2012	Flow, in conduit or thru treatment plant	580320	Gallons per Day	Daily Average
5/31/2012	Flow, in conduit or thru treatment plant	1035332	Gallons per Day	Daily Average
6/30/2012	Flow, in conduit or thru treatment plant	318336	Gallons per Day	Daily Average
7/31/2012	Flow, in conduit or thru treatment plant	1296528	Gallons per Day	Daily Average
8/31/2012	Flow, in conduit or thru treatment plant	371829	Gallons per Day	Daily Average
9/30/2012	Flow, in conduit or thru treatment plant	852117	Gallons per Day	Daily Average
10/31/2012	Flow, in conduit or thru treatment plant	826594	Gallons per Day	Daily Average
11/30/2012	Flow, in conduit or thru treatment plant	886165	Gallons per Day	Daily Average
12/31/2012	Flow, in conduit or thru treatment plant	1062970	Gallons per Day	Daily Average
1/31/2013	Flow, in conduit or thru treatment plant	862245	Gallons per Day	Daily Average
2/28/2013	Flow, in conduit or thru treatment plant	1264356	Gallons per Day	Daily Average
3/31/2013	Flow, in conduit or thru treatment plant	834066	Gallons per Day	Daily Average
4/30/2013	Flow, in conduit or thru treatment plant	827197	Gallons per Day	Daily Average
5/31/2013	Flow, in conduit or thru treatment plant	924417	Gallons per Day	Daily Average
6/30/2013	Flow, in conduit or thru treatment plant	1838799	Gallons per Day	Daily Average
7/31/2013	Flow, in conduit or thru treatment plant	1609479	Gallons per Day	Daily Average
8/31/2013	Flow, in conduit or thru treatment plant	1063015	Gallons per Day	Daily Average
9/30/2013	Flow, in conduit or thru treatment plant	1205612	Gallons per Day	Daily Average
10/31/2013	Flow, in conduit or thru treatment plant	877962	Gallons per Day	Daily Average
11/30/2013	Flow, in conduit or thru treatment plant	934804	Gallons per Day	Daily Average
12/31/2013	Flow, in conduit or thru treatment plant	1216097	Gallons per Day	Daily Average
1/31/2014	Flow, in conduit or thru treatment plant	1191470	Gallons per Day	Daily Average
2/28/2014	Flow, in conduit or thru treatment plant	1352304	Gallons per Day	Daily Average
3/31/2014	Flow, in conduit or thru treatment plant	1183824	Gallons per Day	Daily Average
4/30/2014	Flow, in conduit or thru treatment plant	1201421	Gallons per Day	Daily Average
5/31/2014	Flow, in conduit or thru treatment plant	1234080	Gallons per Day	Daily Average
6/30/2014	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average
7/31/2014	Flow, in conduit or thru treatment plant	174096	Gallons per Day	Daily Average
8/31/2014	Flow, in conduit or thru treatment plant	1420474	Gallons per Day	Daily Average
9/30/2014	Flow, in conduit or thru treatment plant	1158502	Gallons per Day	Daily Average
10/31/2014	Flow, in conduit or thru treatment plant	1390651	Gallons per Day	Daily Average
11/30/2014	Flow, in conduit or thru treatment plant	1219075	Gallons per Day	Daily Average
12/31/2014	Flow, in conduit or thru treatment plant	1183522	Gallons per Day	Daily Average
1/31/2015	Flow, in conduit or thru treatment plant	1468800	Gallons per Day	Daily Average
2/28/2015	Flow, in conduit or thru treatment plant	1634083	Gallons per Day	Daily Average
3/31/2015	Flow, in conduit or thru treatment plant	1689120	Gallons per Day	Daily Average
4/30/2015	Flow, in conduit or thru treatment plant	1584000	Gallons per Day	Daily Average
5/31/2015	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average
6/30/2015	Flow, in conduit or thru treatment plant	1712160	Gallons per Day	Daily Average

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
7/31/2015	Flow, in conduit or thru treatment plant	1539360	Gallons per Day	Daily Average
8/31/2015	Flow, in conduit or thru treatment plant	1436787	Gallons per Day	Daily Average
9/30/2015	Flow, in conduit or thru treatment plant	1468719	Gallons per Day	Daily Average
10/31/2015	Flow, in conduit or thru treatment plant	1266951	Gallons per Day	Daily Average
11/30/2015	Flow, in conduit or thru treatment plant	1260420	Gallons per Day	Daily Average
12/31/2015	Flow, in conduit or thru treatment plant	1298008	Gallons per Day	Daily Average
1/31/2016	Flow, in conduit or thru treatment plant	1272286	Gallons per Day	Daily Average
2/29/2016	Flow, in conduit or thru treatment plant	1413259	Gallons per Day	Daily Average
3/31/2016	Flow, in conduit or thru treatment plant	1481097	Gallons per Day	Daily Average
4/30/2016	Flow, in conduit or thru treatment plant	1489120	Gallons per Day	Daily Average
5/31/2016	Flow, in conduit or thru treatment plant	1466440	Gallons per Day	Daily Average
6/30/2016	Flow, in conduit or thru treatment plant	1498861	Gallons per Day	Daily Average
7/31/2016	Flow, in conduit or thru treatment plant	1578950	Gallons per Day	Daily Average
8/31/2016	Flow, in conduit or thru treatment plant	1541748	Gallons per Day	Daily Average
9/30/2016	Flow, in conduit or thru treatment plant	1515890	Gallons per Day	Daily Average
10/31/2016	Flow, in conduit or thru treatment plant	1631335	Gallons per Day	Daily Average
11/30/2016	Flow, in conduit or thru treatment plant	1532828	Gallons per Day	Daily Average
12/31/2016	Flow, in conduit or thru treatment plant	1429441	Gallons per Day	Daily Average
1/31/2017	Flow, in conduit or thru treatment plant	1300962	Gallons per Day	Daily Average
2/28/2017	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average
3/31/2017	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average
4/30/2017	Flow, in conduit or thru treatment plant	1616424	Gallons per Day	Daily Average
5/31/2017	Flow, in conduit or thru treatment plant	1548784	Gallons per Day	Daily Average
6/30/2017	Flow, in conduit or thru treatment plant	1564193	Gallons per Day	Daily Average
7/31/2017	Flow, in conduit or thru treatment plant	1468918	Gallons per Day	Daily Average
8/31/2017	Flow, in conduit or thru treatment plant	1419679	Gallons per Day	Daily Average
9/30/2017	Flow, in conduit or thru treatment plant	1409403	Gallons per Day	Daily Average
10/31/2017	Flow, in conduit or thru treatment plant	1207352	Gallons per Day	Daily Average
11/30/2017	Flow, in conduit or thru treatment plant	1207726	Gallons per Day	Daily Average
12/31/2017	Flow, in conduit or thru treatment plant	1125882	Gallons per Day	Daily Average
1/31/2018	Flow, in conduit or thru treatment plant	1124486	Gallons per Day	Daily Average
2/28/2018	Flow, in conduit or thru treatment plant	1187184	Gallons per Day	Daily Average
3/31/2018	Flow, in conduit or thru treatment plant	1171967	Gallons per Day	Daily Average
4/30/2018	Flow, in conduit or thru treatment plant	1142865	Gallons per Day	Daily Average
5/31/2018	Flow, in conduit or thru treatment plant	1129005	Gallons per Day	Daily Average
6/30/2018	Flow, in conduit or thru treatment plant	1244448	Gallons per Day	Daily Average
7/31/2018	Flow, in conduit or thru treatment plant	1196143	Gallons per Day	Daily Average
8/31/2018	Flow, in conduit or thru treatment plant	1139190	Gallons per Day	Daily Average
9/30/2018	Flow, in conduit or thru treatment plant	1329425	Gallons per Day	Daily Average
10/31/2018	Flow, in conduit or thru treatment plant	1476151	Gallons per Day	Daily Average
11/30/2018	Flow, in conduit or thru treatment plant	1581936	Gallons per Day	Daily Average
12/31/2018	Flow, in conduit or thru treatment plant	1348877	Gallons per Day	Daily Average
1/31/2019	Flow, in conduit or thru treatment plant	1212907	Gallons per Day	Daily Average
2/28/2019	Flow, in conduit or thru treatment plant	1158965	Gallons per Day	Daily Average
3/31/2019	Flow, in conduit or thru treatment plant	1088250	Gallons per Day	Daily Average
4/30/2019	Flow, in conduit or thru treatment plant	1261934	Gallons per Day	Daily Average
5/31/2019	Flow, in conduit or thru treatment plant	1254773	Gallons per Day	Daily Average
6/30/2019	Flow, in conduit or thru treatment plant	1343421	Gallons per Day	Daily Average
7/31/2019	Flow, in conduit or thru treatment plant	1266089	Gallons per Day	Daily Average
8/31/2019	Flow, in conduit or thru treatment plant	1135811	Gallons per Day	Daily Average
9/30/2019	Flow, in conduit or thru treatment plant	997463	Gallons per Day	Daily Average
10/31/2019	Flow, in conduit or thru treatment plant	954982.1	Gallons per Day	Daily Average
11/30/2019	Flow, in conduit or thru treatment plant	1299541	Gallons per Day	Daily Average
12/31/2019	Flow, in conduit or thru treatment plant	1466895	Gallons per Day	Daily Average
1/31/2020	Flow, in conduit or thru treatment plant	1295098	Gallons per Day	Daily Average
2/29/2020	Flow, in conduit or thru treatment plant	1256956.5	Gallons per Day	Daily Average
3/31/2020	Flow, in conduit or thru treatment plant	1316502.8	Gallons per Day	Daily Average
4/30/2020	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Average

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
5/31/2020	Flow, in conduit or thru treatment plant	1431200	Gallons per Day	Daily Average
6/30/2020	Flow, in conduit or thru treatment plant	1294914	Gallons per Day	Daily Average
7/31/2020	Flow, in conduit or thru treatment plant	1366504	Gallons per Day	Daily Average
8/31/2020	Flow, in conduit or thru treatment plant	1118105.2	Gallons per Day	Daily Average
9/30/2020	Flow, in conduit or thru treatment plant	1185467	Gallons per Day	Daily Average
10/31/2020	Flow, in conduit or thru treatment plant	1254382	Gallons per Day	Daily Average
11/30/2020	Flow, in conduit or thru treatment plant	1247446	Gallons per Day	Daily Average
12/31/2020	Flow, in conduit or thru treatment plant	1267722.6	Gallons per Day	Daily Average
1/31/2021	Flow, in conduit or thru treatment plant	1149723.3	Gallons per Day	Daily Average
2/28/2021	Flow, in conduit or thru treatment plant	1227547	Gallons per Day	Daily Average
3/31/2021	Flow, in conduit or thru treatment plant	1207443.2	Gallons per Day	Daily Average
4/30/2021	Flow, in conduit or thru treatment plant	1386079	Gallons per Day	Daily Average
5/31/2021	Flow, in conduit or thru treatment plant	1285113	Gallons per Day	Daily Average
6/30/2021	Flow, in conduit or thru treatment plant	1150277.9	Gallons per Day	Daily Average

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
9/30/2010	Flow, in conduit or thru treatment plant	1683360	Gallons per Day	Daily Maximum
10/31/2010	Flow, in conduit or thru treatment plant	1335067	Gallons per Day	Daily Maximum
11/30/2010	Flow, in conduit or thru treatment plant	1627027	Gallons per Day	Daily Maximum
12/31/2010	Flow, in conduit or thru treatment plant	1251907	Gallons per Day	Daily Maximum
1/31/2011	Flow, in conduit or thru treatment plant	1293120	Gallons per Day	Daily Maximum
2/28/2011	Flow, in conduit or thru treatment plant	1320840	Gallons per Day	Daily Maximum
3/31/2011	Flow, in conduit or thru treatment plant	1323259	Gallons per Day	Daily Maximum
4/30/2011	Flow, in conduit or thru treatment plant	1858550	Gallons per Day	Daily Maximum
5/31/2011	Flow, in conduit or thru treatment plant	1277208	Gallons per Day	Daily Maximum
6/30/2011	Flow, in conduit or thru treatment plant	796550	Gallons per Day	Daily Maximum
7/31/2011	Flow, in conduit or thru treatment plant	766498	Gallons per Day	Daily Maximum
8/31/2011	Flow, in conduit or thru treatment plant	1153382	Gallons per Day	Daily Maximum
9/30/2011	Flow, in conduit or thru treatment plant	1312661	Gallons per Day	Daily Maximum
10/31/2011	Flow, in conduit or thru treatment plant	1281384	Gallons per Day	Daily Maximum
11/30/2011	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
12/31/2011	Flow, in conduit or thru treatment plant	953980	Gallons per Day	Daily Maximum
1/31/2012	Flow, in conduit or thru treatment plant	927360	Gallons per Day	Daily Maximum
2/29/2012	Flow, in conduit or thru treatment plant	1136333	Gallons per Day	Daily Maximum
3/31/2012	Flow, in conduit or thru treatment plant	1000285	Gallons per Day	Daily Maximum
4/30/2012	Flow, in conduit or thru treatment plant	663840	Gallons per Day	Daily Maximum
5/31/2012	Flow, in conduit or thru treatment plant	1266235	Gallons per Day	Daily Maximum
6/30/2012	Flow, in conduit or thru treatment plant	1449970	Gallons per Day	Daily Maximum
7/31/2012	Flow, in conduit or thru treatment plant	1449970	Gallons per Day	Daily Maximum
8/31/2012	Flow, in conduit or thru treatment plant	1429000	Gallons per Day	Daily Maximum
9/30/2012	Flow, in conduit or thru treatment plant	1337365	Gallons per Day	Daily Maximum
10/31/2012	Flow, in conduit or thru treatment plant	1387570	Gallons per Day	Daily Maximum
11/30/2012	Flow, in conduit or thru treatment plant	1285595	Gallons per Day	Daily Maximum
12/31/2012	Flow, in conduit or thru treatment plant	1315945	Gallons per Day	Daily Maximum
1/31/2013	Flow, in conduit or thru treatment plant	1042560	Gallons per Day	Daily Maximum
2/28/2013	Flow, in conduit or thru treatment plant	2068094	Gallons per Day	Daily Maximum
3/31/2013	Flow, in conduit or thru treatment plant	1426040	Gallons per Day	Daily Maximum
4/30/2013	Flow, in conduit or thru treatment plant	1454180	Gallons per Day	Daily Maximum
5/31/2013	Flow, in conduit or thru treatment plant	1946890	Gallons per Day	Daily Maximum
6/30/2013	Flow, in conduit or thru treatment plant	2614120	Gallons per Day	Daily Maximum
7/31/2013	Flow, in conduit or thru treatment plant	2027055	Gallons per Day	Daily Maximum
8/31/2013	Flow, in conduit or thru treatment plant	1451460	Gallons per Day	Daily Maximum
9/30/2013	Flow, in conduit or thru treatment plant	1626070	Gallons per Day	Daily Maximum
10/31/2013	Flow, in conduit or thru treatment plant	1256265	Gallons per Day	Daily Maximum
11/30/2013	Flow, in conduit or thru treatment plant	1342425	Gallons per Day	Daily Maximum

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
12/31/2013	Flow, in conduit or thru treatment plant	1284720	Gallons per Day	Daily Maximum
1/31/2014	Flow, in conduit or thru treatment plant	1271146	Gallons per Day	Daily Maximum
2/28/2014	Flow, in conduit or thru treatment plant	1487362	Gallons per Day	Daily Maximum
3/31/2014	Flow, in conduit or thru treatment plant	1481875	Gallons per Day	Daily Maximum
4/30/2014	Flow, in conduit or thru treatment plant	1312171	Gallons per Day	Daily Maximum
5/31/2014	Flow, in conduit or thru treatment plant	1815840	Gallons per Day	Daily Maximum
6/30/2014	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
7/31/2014	Flow, in conduit or thru treatment plant	206784	Gallons per Day	Daily Maximum
8/31/2014	Flow, in conduit or thru treatment plant	1948896	Gallons per Day	Daily Maximum
9/30/2014	Flow, in conduit or thru treatment plant	1518260	Gallons per Day	Daily Maximum
10/31/2014	Flow, in conduit or thru treatment plant	1550837	Gallons per Day	Daily Maximum
11/30/2014	Flow, in conduit or thru treatment plant	1419293	Gallons per Day	Daily Maximum
12/31/2014	Flow, in conduit or thru treatment plant	1394856	Gallons per Day	Daily Maximum
1/31/2015	Flow, in conduit or thru treatment plant	1660320	Gallons per Day	Daily Maximum
2/28/2015	Flow, in conduit or thru treatment plant	1765094	Gallons per Day	Daily Maximum
3/31/2015	Flow, in conduit or thru treatment plant	1774080	Gallons per Day	Daily Maximum
4/30/2015	Flow, in conduit or thru treatment plant	1856160	Gallons per Day	Daily Maximum
5/31/2015	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
6/30/2015	Flow, in conduit or thru treatment plant	1782101	Gallons per Day	Daily Maximum
7/31/2015	Flow, in conduit or thru treatment plant	1630080	Gallons per Day	Daily Maximum
8/31/2015	Flow, in conduit or thru treatment plant	1605600	Gallons per Day	Daily Maximum
9/30/2015	Flow, in conduit or thru treatment plant	1529611	Gallons per Day	Daily Maximum
10/31/2015	Flow, in conduit or thru treatment plant	1339560	Gallons per Day	Daily Maximum
11/30/2015	Flow, in conduit or thru treatment plant	1464720	Gallons per Day	Daily Maximum
12/31/2015	Flow, in conduit or thru treatment plant	1320360	Gallons per Day	Daily Maximum
1/31/2016	Flow, in conduit or thru treatment plant	1314055	Gallons per Day	Daily Maximum
2/29/2016	Flow, in conduit or thru treatment plant	1655038	Gallons per Day	Daily Maximum
3/31/2016	Flow, in conduit or thru treatment plant	1612955	Gallons per Day	Daily Maximum
4/30/2016	Flow, in conduit or thru treatment plant	1630470	Gallons per Day	Daily Maximum
5/31/2016	Flow, in conduit or thru treatment plant	1607175	Gallons per Day	Daily Maximum
6/30/2016	Flow, in conduit or thru treatment plant	1748065	Gallons per Day	Daily Maximum
7/31/2016	Flow, in conduit or thru treatment plant	1690485	Gallons per Day	Daily Maximum
8/31/2016	Flow, in conduit or thru treatment plant	1872571	Gallons per Day	Daily Maximum
9/30/2016	Flow, in conduit or thru treatment plant	1687850	Gallons per Day	Daily Maximum
10/31/2016	Flow, in conduit or thru treatment plant	1762410	Gallons per Day	Daily Maximum
11/30/2016	Flow, in conduit or thru treatment plant	1702980	Gallons per Day	Daily Maximum
12/31/2016	Flow, in conduit or thru treatment plant	1527715	Gallons per Day	Daily Maximum
1/31/2017	Flow, in conduit or thru treatment plant	1422990	Gallons per Day	Daily Maximum
2/28/2017	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
3/31/2017	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
4/30/2017	Flow, in conduit or thru treatment plant	1739120	Gallons per Day	Daily Maximum
5/31/2017	Flow, in conduit or thru treatment plant	1778985	Gallons per Day	Daily Maximum
6/30/2017	Flow, in conduit or thru treatment plant	2459000	Gallons per Day	Daily Maximum
7/31/2017	Flow, in conduit or thru treatment plant	1576440	Gallons per Day	Daily Maximum
8/31/2017	Flow, in conduit or thru treatment plant	1530595	Gallons per Day	Daily Maximum
9/30/2017	Flow, in conduit or thru treatment plant	1616165	Gallons per Day	Daily Maximum
10/31/2017	Flow, in conduit or thru treatment plant	1613705	Gallons per Day	Daily Maximum
11/30/2017	Flow, in conduit or thru treatment plant	1488295	Gallons per Day	Daily Maximum
12/31/2017	Flow, in conduit or thru treatment plant	1321240	Gallons per Day	Daily Maximum
1/31/2018	Flow, in conduit or thru treatment plant	1337445	Gallons per Day	Daily Maximum
2/28/2018	Flow, in conduit or thru treatment plant	1371710	Gallons per Day	Daily Maximum
3/31/2018	Flow, in conduit or thru treatment plant	1371805	Gallons per Day	Daily Maximum
4/30/2018	Flow, in conduit or thru treatment plant	1322080	Gallons per Day	Daily Maximum
5/31/2018	Flow, in conduit or thru treatment plant	1504290	Gallons per Day	Daily Maximum
6/30/2018	Flow, in conduit or thru treatment plant	1411730	Gallons per Day	Daily Maximum
7/31/2018	Flow, in conduit or thru treatment plant	1394720	Gallons per Day	Daily Maximum
8/31/2018	Flow, in conduit or thru treatment plant	1454425	Gallons per Day	Daily Maximum
9/30/2018	Flow, in conduit or thru treatment plant	1453790	Gallons per Day	Daily Maximum

Monitoring Period End Date	Parameter Desc	DMR Value	Limit Unit Desc	Statistical Base Long Desc
10/31/2018	Flow, in conduit or thru treatment plant	1687970	Gallons per Day	Daily Maximum
11/30/2018	Flow, in conduit or thru treatment plant	1815950	Gallons per Day	Daily Maximum
12/31/2018	Flow, in conduit or thru treatment plant	1615260	Gallons per Day	Daily Maximum
1/31/2019	Flow, in conduit or thru treatment plant	1359800	Gallons per Day	Daily Maximum
2/28/2019	Flow, in conduit or thru treatment plant	1340850	Gallons per Day	Daily Maximum
3/31/2019	Flow, in conduit or thru treatment plant	1355450	Gallons per Day	Daily Maximum
4/30/2019	Flow, in conduit or thru treatment plant	1422445	Gallons per Day	Daily Maximum
5/31/2019	Flow, in conduit or thru treatment plant	1649300	Gallons per Day	Daily Maximum
6/30/2019	Flow, in conduit or thru treatment plant	1553760	Gallons per Day	Daily Maximum
7/31/2019	Flow, in conduit or thru treatment plant	1515375	Gallons per Day	Daily Maximum
8/31/2019	Flow, in conduit or thru treatment plant	1393575	Gallons per Day	Daily Maximum
9/30/2019	Flow, in conduit or thru treatment plant	1200465	Gallons per Day	Daily Maximum
10/31/2019	Flow, in conduit or thru treatment plant	1298795	Gallons per Day	Daily Maximum
11/30/2019	Flow, in conduit or thru treatment plant	1655215	Gallons per Day	Daily Maximum
12/31/2019	Flow, in conduit or thru treatment plant	1068936	Gallons per Day	Daily Maximum
1/31/2020	Flow, in conduit or thru treatment plant	1511035	Gallons per Day	Daily Maximum
2/29/2020	Flow, in conduit or thru treatment plant	1652365	Gallons per Day	Daily Maximum
3/31/2020	Flow, in conduit or thru treatment plant	1652060	Gallons per Day	Daily Maximum
4/30/2020	Flow, in conduit or thru treatment plant		Gallons per Day	Daily Maximum
5/31/2020	Flow, in conduit or thru treatment plant	1563535	Gallons per Day	Daily Maximum
6/30/2020	Flow, in conduit or thru treatment plant	1513660	Gallons per Day	Daily Maximum
7/31/2020	Flow, in conduit or thru treatment plant	1547240	Gallons per Day	Daily Maximum
8/31/2020	Flow, in conduit or thru treatment plant	1405505	Gallons per Day	Daily Maximum
9/30/2020	Flow, in conduit or thru treatment plant	1254335	Gallons per Day	Daily Maximum
10/31/2020	Flow, in conduit or thru treatment plant	1437650	Gallons per Day	Daily Maximum
11/30/2020	Flow, in conduit or thru treatment plant	1437650	Gallons per Day	Daily Maximum
12/31/2020	Flow, in conduit or thru treatment plant	1461360	Gallons per Day	Daily Maximum
1/31/2021	Flow, in conduit or thru treatment plant	1300200	Gallons per Day	Daily Maximum
2/28/2021	Flow, in conduit or thru treatment plant	1387320	Gallons per Day	Daily Maximum
3/31/2021	Flow, in conduit or thru treatment plant	1411080	Gallons per Day	Daily Maximum
4/30/2021	Flow, in conduit or thru treatment plant	2077185	Gallons per Day	Daily Maximum
5/31/2021	Flow, in conduit or thru treatment plant	2077845	Gallons per Day	Daily Maximum
6/30/2021	Flow, in conduit or thru treatment plant	1393445	Gallons per Day	Daily Maximum

Receiving Water Data

Activity Start Date	Monitoring Location Identifier	Characteristic Name	Result Sample Fraction Text	Result Measure Value	Measure Unit Code
6/3/2004	EMAP_CS_WQX-WA04-0045	Ammonia-nitrogen	Dissolved	0.02247	mg/l
6/3/2004	EMAP_CS_WQX-WA04-0045	Ammonia-nitrogen	Dissolved	0.0106	mg/l
6/3/2004	EMAP_CS_WQX-WA04-0045	Ammonia-nitrogen	Dissolved	0.0518	mg/l
8/21/2000	EMAP_CS_WQX-WA00-0024	Ammonia-nitrogen	Dissolved	0.02956	mg/l
8/21/2000	EMAP_CS_WQX-WA00-0024	Ammonia-nitrogen	Dissolved	0.03208	mg/l
8/21/2000	EMAP_CS_WQX-WA00-0024	Ammonia-nitrogen	Dissolved	0.00028	mg/l

Parameter	Location	Date	Result (µg/L)	Duplicate Result (µg/L)	Average Result (µg/L)	Comment
Copper, Total Dissolved	Influent	10/18/2011	0.713	0.731	0.722	
Copper, Total Recoverable	Influent	12/20/2011	0.46	0.352	0.406	Values are for total recoverable Cu because reported influent dissolved Cu was higher than total Cu.
Copper, Total Dissolved	Influent	5/7/2012	0.44	0.441	0.4405	
Copper, Total Dissolved	Influent	7/11/2012	0.056	0.43	0.243	

Parameter	Location	Date	Result (µg/L)	Duplicate Result (µg/L)	Average Result (µg/L)	Comment
Copper, Total Dissolved	Influent	9/19/2012	0.41	0.4	0.405	
Copper, Total Dissolved	Influent	3/5/2013	0.38	0.36	0.37	

Appendix C. **Reasonable Potential and WQBEL Formulae**

A. Reasonable Potential Analysis

EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

1. Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \textit{Equation 1}$$

where,

C_d	=	Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e	=	Maximum projected effluent concentration
C_u	=	95th percentile measured receiving water upstream concentration
Q_d	=	Receiving water flow rate downstream of the effluent discharge = Q_e+Q_u
Q_e	=	Effluent flow rate
Q_u	=	Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \textit{Equation 2}$$

The above form of the equation assumes that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \textit{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \textit{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e} \qquad \textit{Equation 5}$$

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \textit{Equation 6}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u \qquad \textit{Equation 7}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for C_d are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

2. Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \textit{Equation 8}$$

where,

p_n = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}} \qquad \textit{Equation 9}$$

Where,

σ^2	=	$\ln(CV^2 + 1)$
Z_{99}	=	2.326 (z-score for the 99th percentile)
Z_{Pn}	=	z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)
CV	=	coefficient of variation (standard deviation ÷ mean)

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

$$C_e = (RPM)(MRC) \qquad \textit{Equation 10}$$

where MRC = Maximum Reported Concentration

3. Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

4. Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

B. WQBEL Calculations

1. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis. To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$\mathrm{C_e = WLA = D \times (C_d - C_u) + C_u} \qquad \textit{Equation 11}$$

Washington’s water quality criteria for some metals are expressed as the dissolved fraction, but the Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, EPA must calculate a wasteload allocation in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation 12. As discussed in Appendix D the criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

$$C_e = WLA = \frac{D \times (C_d - C_u) + C_u}{CT}$$ *Equation 12*

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\sigma)}$$ *Equation 13*

$$LTA_c = WLA_c \times e^{(0.5\sigma_4^2 - z\sigma_4)}$$ *Equation 14*

where,

σ^2	=	ln(CV^2 +1)
Z_{99}	=	2.326 (z-score for the 99th percentile probability basis)
CV	=	coefficient of variation (standard deviation ÷ mean)
σ_4^2	=	ln(CV^2/4 + 1)

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c = WLA_c \times e^{(0.5\sigma_{30}^2 - z\sigma_{30})}$$ *Equation 15*

where,

σ_{30}^2	=	ln(CV^2/30 + 1)

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

2. Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)}$$ *Equation 16*

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2)}$$ *Equation 17*

where σ, and σ² are defined as they are for the LTA equations above, and,

σ_n^2	=	ln(CV^2/n + 1
z_a	=	1.645 (z-score for the 95th percentile probability basis)
z_m	=	2.326 (z-score for the 99th percentile probability basis)
n	=	number of sampling events required per month. With the exception of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of "n" should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the LTA_c, i.e.,

$LTA_{minimum} = LTA_c$), the value of ‘‘n’’ should is set at a minimum of 30.

Appendix D. **Reasonable Potential and WQBEL Calculations**

Reasonable Potential Calculation

Facility	NBK Bangor Cooling Water
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	45.2	284.5
Human Health Carcinogenic		284.5
Human Health Non-Carcinogenic		284.5

Pollutant, CAS No. & NPDES Application Ref. No.			**AMMONIA, Criteria as Total NH3**	**COPPER - 744058 6M Hardness dependent**									
Effluent Data	# of Samples (n)		1	33									
	Coeff of Variation (Cv)		0.6	0.908	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		150	19.1									
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		52	0.752									
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,585	4.8									
		Chronic	538	3.1									
	WQ Criteria for Protection of Human Health, ug/L		-	-									
	Metal Criteria Translator, decimal	Acute	-	0.83									
		Chronic	-	0.83									
	Carcinogen?		N	N									

Aquatic Life Reasonable Potential

Effluent percentile value			0.990	0.990
s	$s^2=\ln(CV^2+1)$		0.555	0.775
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.010	0.870
Multiplier			13.20	2.54
Max concentration (ug/L) at edge of...		Acute	94	1.626
		Chronic	59	0.891
Reasonable Potential? Limit Required?			**NO**	**NO**

Appendix E. **Effluent Limit Calculations for pH**

Calculation of pH of a Mixture in Marine Water

Based on the CO2SYS program (Lewis and Wallace, 1998),
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	284.5
Depth at plume trapping level (m)	26.330
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	15.21
pH:	7.59
Salinity (psu):	26.79
Total alkalinity (meq/L)	208.00
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	21.41
pH:	6.86
Salinity (psu)	26.79
Total alkalinity (meq/L):	208.00
4. CLICK THE 'Calculate" BUTTON TO UPDATE OUTPUT RESULTS -->	Calculate

OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	15.23
Salinity (psu)	26.79
Density (kg/m^3)	1020
Alkalinity (mmol/kg-SW):	203.98
Total Inorganic Carbon (mmol/kg-SW):	204
pH at Mixing Zone Boundary:	**7.59**

Appendix F. **Technology-based Effluent Limit for Temperature**

Overview

As explained on Page 12 of the fact sheet dated October 23, 2009, "AKART and Best Available Technology economically achievable (BAT) is minimizing the thermal load to Hood Canal at the existing performance…." Therefore, in the prior permit, EPA established a performance-based effluent limit of 19 °C. The limit was expressed as a 7-DADMax.

Minimizing the thermal load to Hood Canal at the existing performance continues to be AKART and BAT for this facility. From October - April, the facility has generally been able to comply with the 19 °C 7-DADMax temperature limit in the prior permit, thus it has been retained.

However, for the season of May - September, the facility has not been able to consistently comply with the 19 °C limit in the prior permit. For May - September, EPA has updated the calculation of the performance-based temperature limit based on recent effluent data and has changed the limit from an effluent gross temperature limit to an effluent net temperature limit (i.e., the maximum allowable difference between the temperatures of the intake and effluent water).

Revised Summer Limit

The Navy provided EPA with temperature data for the intake and effluent, taken at 5-minute intervals. Data were provided only for those times when a vessel was in the dry dock and the cooling water system was in use. This results in 288 temperature measurements for a 24-hour day in which the cooling water system is in continuous use.

For the purposes of calculating the 7-DADMax effluent net temperatures, EPA first used pivot tables in Microsoft Excel to find the maximum intake and effluent temperatures for each day, then EPA calculated the differences between these daily maximum intake and effluent temperatures, and finally, whenever maximum temperature differences were available for 7 consecutive days, EPA calculated the 7-day rolling averages of these differences. Although the maximum intake and effluent temperatures for a given day may not have occurred simultaneously, EPA considers this a reasonable way to characterize the temperature differences. The permit requires the calculation for compliance purposes to be performed the same way, except that the permit states that the 7-DADMax temperature for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date, which is consistent with the definition of 7-DADMax in the Washington water quality standards (WAC 173-201A-020) as well as the prior permit.

For May - September, from 2013-2021, this resulted in a total of 1,032 7-DADMax differences, with summary statistics shown in Table 11.

Table 11: Summary Statistics for 7-DADMax Temperature Differences

Minimum	0.889
Average	2.534
Maximum	7.373
Standard Deviation	1.091
Average of Natural Logarithms	0.8489
Variance of Natural Logarithms	0.1584

The May - September 7-DADMax temperature differences calculated as described above approximately fit a lognormal distribution, with a correlation coefficient of 0.992.

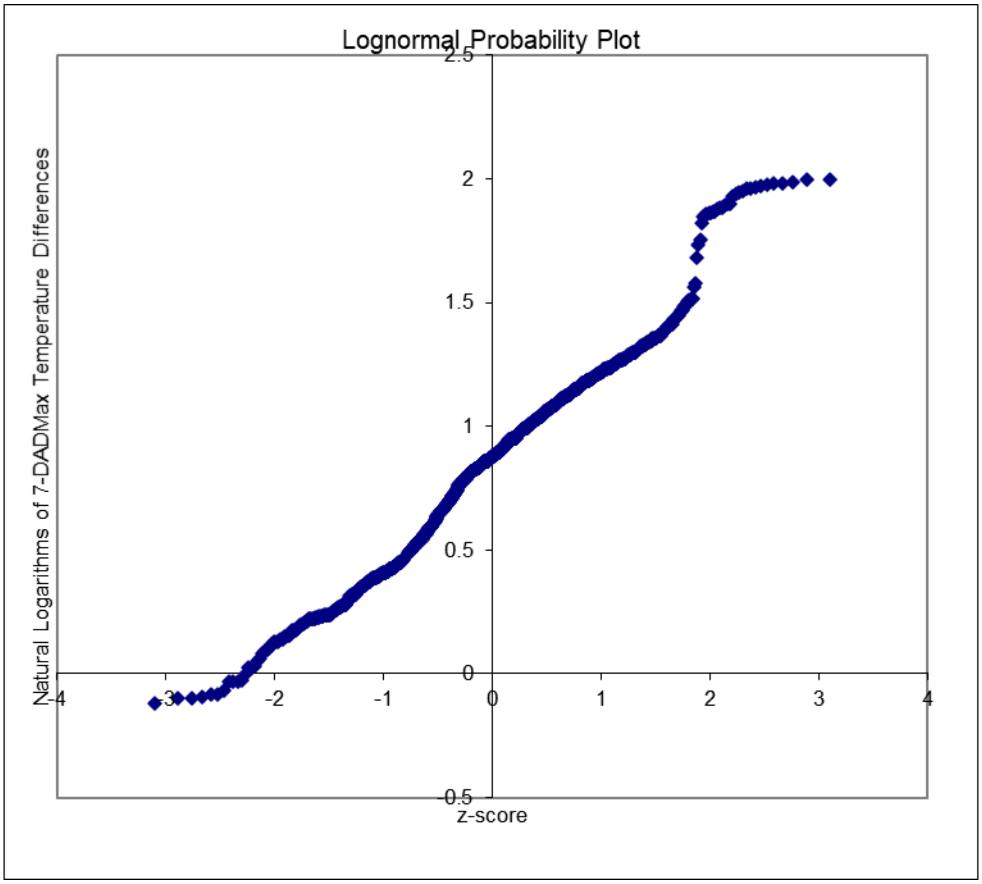

Figure 4: Lognormal Probability Plot for 7-DADMax temperature differences for May - September

Thus, to calculate a performance-based 7-DADMax temperature difference limit, EPA used the "Perform. Limit" sheet in the PermitCalc Excel workbook developed by the Washington Department of Ecology. This resulted in a performance-based 7-DADMax temperature difference limit of 5.9 °C, as shown in Table 12.

Table 12: Performance-based 7-DADMax Difference Limit

Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	0.8489
LogNormal Transformed Variance:	0.1584
OUTPUT	
E(X) =	2.5296
V(X) =	1.099
VARn	0.1584
MEANn=	0.8489
VAR(Xn)=	1.099
RESULTS	
7-DADMax Effluent Net Limit	**5.9**

WATER QUALITY EVALUATION

As shown in Table 13, from October - April, the 19 °C effluent gross 7-DADMax limit will ensure compliance with water quality criteria for temperature at the edge of the mixing zone.

From May - September, EPA evaluated the facility's impact on receiving water temperature and found the temperature increase to be 0.021 °C above the numeric criteria. See Table 13. EPA's Region 10 Temperature Guidance For Pacific Northwest State and Tribal Temperature Water Quality Standards (USEPA, 2003a) states that "an increase on the order of 0.25°C for all sources cumulatively (at the point of maximum impact) above fully protective numeric criteria or natural background temperatures would not impair the designated uses, and therefore might be regarded as de minimis." Because the temperature increase resulting from the summer effluent net temperature limit of 5.9 °C is less than one tenth of the cumulative temperature increase that may be regarded as de minimis, EPA considers the water quality impact of the proposed summer temperature TBEL to be de minimis. Therefore water quality-based effluent limits are not required.

Table 13: Temperature Reasonable Potential Analysis

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

INPUT	May - Sep	Oct-April
1. Chronic Dilution Factor at Mixing Zone Boundary	284.5	284.5
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	13.0 °C	10.9 °C
3. 1DADMax Effluent Temperature (95th percentile)	18.9 °C	19.0 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	13.021 °C	10.93 °C
6. Incremental Temperature Increase or decrease:	0.021 °C	0.028 °C
7. Incremental Temperature Increase 12/(T-2) if T≤ crit:	---	1.348 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	13.25 °C	12.25 °C